Delft University of Technology

The Oil is Dying? Long Live its "Heritage"!
The Refining of Legal Systems and Port-Cities' Planning

Hauser, S.J.

DOI
10.7480/abe.2022.02

Publication date
2022

Document Version
Final published version

Citation (APA)
Hauser, S. J. (2022). *The Oil is Dying? Long Live its "Heritage"! The Refining of Legal Systems and Port-Cities' Planning*. [Dissertation (TU Delft), Delft University of Technology]. A+BE | Architecture and the Built Environment. https://doi.org/10.7480/abe.2022.02

Important note
To cite this publication, please use the final published version (if applicable).
Please check the document version above.

Copyright
Other than for strictly personal use, it is not permitted to download, forward or distribute the text or part of it, without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license such as Creative Commons.

Takedown policy
Please contact us and provide details if you believe this document breaches copyrights.
We will remove access to the work immediately and investigate your claim.

This work is downloaded from Delft University of Technology.
For technical reasons the number of authors shown on this cover page is limited to a maximum of 10.

The Oil is Dying? Long Live its "Heritage"!

The Refining of Legal Systems and Port-Cities' Planning

Stephan Hauser

The Oil is Dying? Long Live its "Heritage"!

The Refining of Legal Systems and Port-Cities' Planning

Stephan Hauser

A+BE | Architecture and the Built Environment | TU Delft BK

22#02

Design | Sirene Ontwerpers, Véro Crickx

Cover image | Beautiful cover art which captures the evolution that this research illustrates, and inspired by Gül Aktürk.

Keywords | Environment, History, Law, Lobbying, Oil, Port Cities, Urban Planning

ISBN 978-94-6366-500-1
ISSN 2212-3202

© 2022 Stephan Hauser

This dissertation is open access at https://doi.org/10.7480/abe.2022.02

Attribution 4.0 International (CC BY 4.0)

This is a human-readable summary of (and not a substitute for) the license that you'll find at:
https://creativecommons.org/licenses/by/4.0/

You are free to:
Share — copy and redistribute the material in any medium or format
Adapt — remix, transform, and build upon the material
for any purpose, even commercially.
This license is acceptable for Free Cultural Works.
The licensor cannot revoke these freedoms as long as you follow the license terms.

Under the following terms:
Attribution — You must give appropriate credit, provide a link to the license, and indicate if changes were made. You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use.

Unless otherwise specified, all the photographs in this thesis were taken by the author. For the use of illustrations effort has been made to ask permission for the legal owners as far as possible. We apologize for those cases in which we did not succeed. These legal owners are kindly requested to contact the author.

THE OIL IS DYING? LONG LIVE ITS "HERITAGE"!

THE REFINING OF LEGAL SYSTEMS AND PORT-CITIES' PLANNING

Proefschrift

ter verkrijging van de graad van doctor
aan de Technische Universiteit Delft,
op gezag van de Rector Magnificus prof.dr.ir. T.H.J.J van der Hagen,
voorzitter van het College voor Promoties,
in het openbaar te verdedigen op
Maandag 24 Januari 2022 om 17:30 uur

door

Stephan Jacques HAUSER

Master Droit, Economie, Gestion,
Université Lille 2, Lille, France,
born in Lesquin, France.

Dit proefschrift is goedgekeurd door de promotoren

Samenstelling promotiecommissie bestaat uit:

Rector Magnificus,	voorzitter
Prof. dr. ir. T.H.J.J van der Hagen,	Technische Universiteit Delft
Prof. dr. ing. C. Hein	Technische Universiteit Delft, promotor
Prof. dr. C. Roche	Université du Littoral Côte d'Opale, promotor
Dr. A. Thomas	Technische Universiteit Delft, copromotor

Onafhankelijke leden:

Prof. dr. W.A.M Zonneveld	Technische Universiteit Delft
Prof. B. Touchelay	Université de Lille
Dr. S. Ramos	University of Georgia
Prof. dr. P.T. van de Laar	Erasmus University of Rotterdam
Prof. dr. P.W Chan	Technische Universiteit Delft, reservelid

Quoiqu'il arrive tu restes toi, et c'est une réussite.

For the person who was my best confident, supportive and late mother,
Catherine Hauser

Contents

Acknowledgements xi

Summary xv

Samenvatting xix

Preface xxiii

1 Introduction 1
- 1.1 From Local Oil Companies in the 1860s to Global Corporations 2
- 1.2 Problem Statement: The End of Oil and the Lack of Anticipation 7
- 1.3 Questions, Scope, Terms and Method 9
  - 1.3.1 How Have Oil Companies Influenced Spaces and Regulations Since the 1860s? 9
  - 1.3.2 The Importance of Port Cities, History, and Regulations 11
  - 1.3.3 Regulations and the Need for Clarity in a World of Words 14
  - 1.3.4 A Mixed Methodology: History, Laws, Space, and the Literature 18
- 1.4 Chapter Summaries 22

2 The Literature and Theoretical Framework 27
- 2.1 An Analysis Starting Before the Beginning of the Oil Industry 28
- 2.2 Sea Port Cities: Hubs and Oil Places Facing Numerous Challenges 29
- 2.3 From Abundant to Peaking and Polluting Oil 31
- 2.4 The Blocking and Enabling Complexity of Regulations 33
- 2.5 The Extensive Landscape of Oil Influences 37

3 First Disasters and a Story of Power: From 1654 until the 1930s 41
- 3.1 Industrial Accidents and Frames Predate Petroleum 43
  - 3.1.1 Memorable Disasters for New Planning Practices 44
  - 3.1.2 Regular Repetitions of Incidents 49
- 3.2 Local to National and International Actors 51
  - 3.2.1 The End of the 19th Century and the Oil Development 52
  - 3.2.2 Embracing Old Practices: From Chemical to Oil Influence 54
- 3.3 The Root of Oil Majors' Practices in the 1870s 59
  - 3.3.1 A Shift in Scale Between 1870 and 1911: Rockefeller's Rise 59
- 3.4 The Beginning of the 20th Century and the Global Petroleumscape 64
  - 3.4.1 The Urban Layer Serving the Petroleumscape 64
  - 3.4.2 Public Credit and Control through Philanthropy 66
  - 3.4.3 Ignorance of the Past in Dunkirk: The "Cité des Ingénieurs" of 1932 . 67

3.5 Visible Hazards and Unclear Legal Interventions 70
3.5.1 From Local to International Pollution Issues in 1930 70
3.5.2 Legal Acknowledgment of Petroleum and Pollution's Importance . . . 71
3.6 Conclusion 73

4 The Rise of Oil Companies and a Monopoly of Knowledge (1945-1980s) 77
4.1 The Post-War Economic Growth and the New Planning Strategies 79
4.2 Maritime Waters as a Trigger for Reaction 83
4.2.1 Greater Industrial Scale for Greater Pollution 83
4.2.2 The Reactivity of Rules and Cooperation 85
4.3 The Search and Use of Knowledge by Petroleum Companies 88
4.3.1 Early Greenwashing Practices 88
4.3.2 Self and Secret Environmental Awareness 91
4.4 The New Environmental Concern and Legal Acknowledgments 94
4.5 New Modern Environmental Rule: The French Shoreline Act of 1986 97
4.6 Conclusion 102

5 The Constant Up-scaling of Disasters Since the 1990s 105
5.1 The Chain of Reactivity: Greater Incidents for Greater Rules? 107
5.1.1 Maritime Regulations Exemplifying a Lack of Anticipation 108
5.1.2 Industrial Protection and the Cycle of Disasters 111
5.2 The Empowerment and Rise of New Actors 114
5.2.1 The European Guardian 115
5.2.2 Local Inclusion in the Decision-Making 118
5.2.3 From Secondary to Ubiquity: The Climate 120
5.3 The Lack of Anticipation in Policies: The Hand of Oil? 123
5.3.1 A New Trend of Relocation 124
5.3.2 A Ubiquitous Industry 126
5.3.3 Double-Game of Oil Majors: Pledges and Lobbying 129
5.4 New Petroleum is still Old Petroleum 135
5.5 Conclusion 139

6 Past, Present, Futures: From Heydays to Complex Legacy 143
6.1 Knowing the Past to Plan the Future 144
6.1.1 The Forgotten Heritage 145
6.1.2 Past Sensitivity or Path Dependence: How the Past can Block Futures 147
6.2 New Horizon and European Pledges 151
6.2.1 Transformation of Abandoned Sites: The Importance of Anticipation 151
6.2.2 The European Neutrality Objective 155
6.3 Port City Futures 159
6.3.1 Towards Multi/Inter/Trans-disciplinary Solutions 161
6.3.2 Networks and Exchanges 162
6.4 Conclusion 163

7 Epilogue 167

Bibliography **177**
7.1 Articles, Books, Conference Proceedings, Report and Thesis 177
7.2 Main Regulations and Databases 198
7.3 Newspapers and Magazines 201
7.4 Movies and Documentary 203
7.5 Web-pages, Blogs and Websites 204

Writings **207**
.1 Peer-Reviewed Publications 207
.2 Non-peer-reviewed 207

Acknowledgements

Often the acknowledgment thank people that intervened during the project to support or encourage the PhD candidate. In my case I would like to start before the beginning and follow a chronology that I have been trained to respect during my PhD. Most of the people that I will mention here believed in my research topic, in me, even before the official starting date of this project, and continued to do so throughout the almost four years of my research. I would love to demonstrate how much I value the help of all the people I have met during my PhD, but there were so many wonderful persons that the size of another dissertation would be needed. Whether or not I mention you, trust me, I know I owe you much more than what I could write here.

For different personal reasons, the year and a half preceding the beginning of my PhD was chaotic, as well as physically and psychologically challenging. When I considered the PhD path as one of my options, I immediately asked the opinion of the person who believed in me at the end of my master and introduced me to the European Council of Town Planners (ECTP). Working for Antea Group, Dominique Lancrenon was immediately appealed by my idea and provided all the supports I needed to reach my goal. She did not stop at the professional level only, and I will never forget her invitation to Ljubljana for the meeting of the ECTP. It was an awful period of my life; she knew it, and offered a helping hand. Even if the relation with the company was not continued later on, Dominique convinced Antea Group of the relevance of my research and helped me find the best place and person to work with on my subject. I am convinced that without the support of such an amazing person, I would not have had such a confidence and spirit at the beginning of my PhD. If I can thank Antea Group for its support during the first year of my research, it is one of Dominique's achievements. I owe her more than thanks.

Another accomplishment of Dominique was to put me in touch with the perfect person for the subject I was considering. Not only because if you come to consider port cities in combination with the oil industry and spatial issues, the name of Prof. Carola Hein must come to your mind, but also because she is one of the few to believe in the importance of interdisciplinary perspectives. When she heard about me, an environmental and town planning jurist interested in the relations between the oil industry, port cities, history, laws, and spatial planning, she did not think twice. I searched for more than a year for a professor that would support me. Less than three months after getting in touch with Prof. Carola Hein I was enrolled at TU Delft's faculty of architecture as a PhD in her chair, and welcomed beyond everything I could have imagined. She supported me in times of personal and professional struggles; she pushed me to constantly aim higher and better, introduced me to her tremendous network, and I hope I never disappointed

the trust she put in me. I am sure she had a lot of expectations when she accepted me, and I did my best to meet these expectations to thank her for all the time and opportunities she gave me. Again here, thanks cannot be enough.

Through her amazing network, Carola Hein put me in touch with the Learning Center of Dunkirk as another potential funding and research partner. This collaboration was made possible by the intervention of, again, another amazing person, Mr. Marnix Bonnike, who was the director of the Learning Center. His openness, his interest in people, history, and more than anything in Dunkirk convinced me that the path I was taking was the right one. Discussing and working with him is a pleasure, and his passion is contagious. I miss our discussions and debates, and the warm welcome and support of the entire team of the Learning Center. This research would not have been possible without their dedication and work. Thank you all.

There is one last important person I met before the beginning of my PhD who helped me find my way and make my mind. The help and support provided by Prof. Faïz Gallouj was a key element in my enrollment and later success as a PhD. He opened me his house, took the time to explain me the steps, and gave me crucial advice on how to choose and succeed. I take this opportunity to thank him again for his patience and time.

Working with the Learning Center allowed me to connect with the Université du Littoral Côte d'Opale (ULCO) to find in Prof. Catherine Roche the best co-promotor for me. When writing my first article, she carefully advised me on the necessary literature, told me which authors were of particular importance for my subject, and supported me in my endeavor. I discovered her passion, patience, and trust through the article we wrote together in 2020. She dedicated an amazing amount of time to debate on this article and beyond, and I had a great time exchanging with her, though mostly online sadly. Her availability and advice reassured me when I was doubting the quality of my content, and her guidance led me to confidence. I said it multiple times already, but I am very thankful for this dedication.

I would like to also thank the team of the secretary of the Department of Architecture at TU Delft, as well as Amber Leeuwenburgh who is now the Faculty Secretary. My countless questions and doubts were always answered, and always with a smile. Their availability and the warm atmosphere of this office undoubtedly helped me to relax and enjoy fully the years I spent as a PhD in this department. Thank you all for your smiles.

During my PhD, I was lucky enough to be included in a team full of welcoming and supportive people. All my colleagues are amazing individuals, and I miss the long and animated discussions with everyone in the middle of the office, as well as the jokes and the laughs that the pandemic stopped. It feels like home, and I am taking pleasure to go there every day with you all. The list is long, but I want to thank Dr. Herman van Bergeijk, my intimidating first Dutch contact, amazing joker, and wonderful man; Dr. Amy Thomas, my passionate and patient daily-supervisor who gave me precious recommendations and guided me in my new field; Prof. Rachel Lee for her openness and

cheerful spirit; Prof. Han Meyer for his valuable comments on a really short notice; Prof. Izumi Kuroishi, Prof. Akane Mizushima, Dr. Kazumasa Iwamoto, and Ren Xiaogeng, though we only cross for a short amount of time it was a really valuable encounter; drs. Charlotte van Wijk, Dr.mr. Everhard Korthals Altes, Dr. Reinout Rutte, and Dr. Mo Sedighi (an amazing wingman and travel partner!); Phoebus Panigyrakis, Paolo de Martino and Gabriel Schwake, great colleagues now all doctors; Dr. Tino Mager (I miss your jokes!) and Dr. Sandra Fatoric for their expertise and support when I was struggling; and all my fellow PhD colleagues, in my chair and beyond, Elmira Jafari, Penglin Zhu, Maria Novas Ferradas, John Hannah, Li Lu, YingYing Gan, Jungmin Yoon, Fatma Tanis, Kaiyi Zhu, Rose Sarkhosh, Gökçe Önal, Anteneh Tesfaye Tola, Dirim Dinçer, Brook Teklehaimanot, Siton Luo, Óscar Andrade Castro, Federica Marulo, and Wenwen Sun. I want to thank also all the experts and passionate people I regularly discuss with at the research group PortCityFutures, many of which I now consider as friends. Last but not least, I want to thank all the committee members for their comments, availability and interest. I really hope I'm not forgetting anyone, but I know I do, as so many talented people helped me during these few years. Thank you all.

On a personal note, I want, of course, to thank my family. My father Jean-Jacques, my sister Cécile, and my brother Jean-Noël, as well as their families, constantly pushed me at the beginning and seeing them proud gave me more motivation than I could ever need. I know the path was hard and long, the separation deepened by the pandemic, yet their constant questions and obvious interest were rewarding. I take this opportunity to thank this amazing family.

I cannot write these acknowledgments without talking about two other really important persons. First my fiancée, Gül Aktürk. I never thought that this new PhD candidate in my office would be the perfect person for me. She understands me and my struggles better than anyone else, as we are on the same path. I doubt anyone can find a better pillar to rely on than the one I found with her. I owe her my sanity, my happiness, and she knows it. Second and last, but not least, my mother, Catherine Hauser, to whom this entire research is dedicated. I lost my mother before she could see me start this journey, although she was the one to believe in me right from the beginning, when doing a PhD was just a dream. She did not know at the time that TU Delft was in sight, and that I would meet the best group of people she could dream of for her son. That is also why, on her behalf and, undoubtedly, on behalf of my entire family, I thank all the people that intervened and helped me before and during this period. I know she is proud, though I wish I could hear it.

SUMMARY

Oil is a dangerous product. Its transport, storage and refining present numerous environmental, health challenges and local, national, European regulators have taken steps to locate it in space since the beginning of industrial oil drilling in the 1860s. Key leaders of the oil industry in Northwest Europe, and beyond, have also served as policy makers and aimed to keep legal constraints (decrees, laws, taxes) as limited as possible to prevent any harm to the interests of their industry. This process led to a cruel lack of anticipation and foresight in the design of rules. Public authorities established limited frames upon the oil industry and designed rules in general terms to avoid obstacles in the development of this strategic industry. The pollution and the risks they generate restrict opportunities for the future re-use of industrial sites, and there has been little done on the law-making scale to guide the transformation of oil spaces. Using the case of North West European ports that have emerged as oil ports for their respective countries over the last 150 years, with a specific focus on Dunkirk in France, this thesis examines the emergence and application of spatial and environmental regulations along with oil industrial expansion to help the development of anticipatory measures in the transformation of its heritage. The aim is to reveal how:

1. Fires, water pollution and other health threats of the oil industry have led local, national, international and European authorities to create new environmental and spatial regulations in port cities hosting oil facilities.
2. From the 1860s onward, oil industrial actors influenced decision-makers to design regulations and policies that would benefit them in different cities and countries, leading to a diversity of environmental, health, as well as safety rules and practices.
3. Existing legal and institutional frameworks shaped by this industry influence local, national, international and European policy-makers when dealing with the energy transition and the transformation of the oil heritage.

As points of exchange between a hinterland and the rest of the world, port cities play an important role in the oil networks, in terms of transport, transformation and distribution. They are the link between extraction and production sites around the world and the consumers of the hinterland. Building on recent scholarship on oil and its spatial impact[1], this research focuses on three North West European ports – Dunkirk, Antwerp,

[1] C. Hein and M. Sedighi. "Iran's Global Petroleumscape: The Role of Oil in Shaping Khuzestan and Tehran". In: *Architectural Theory Review* 21.3 (Sept. 2016), pp. 349–374; C. Hein. "Oil Spaces: The Global Petroleumscape in the Rotterdam/The Hague Area". In: *Journal of Urban History* (2018); C. Hein. "'Old Refineries Rarely Die': Port City Refineries as Key Nodes in The Global Petroleumscape". In: *Canadian Journal of History* 53.3 (2018), pp. 450–479; S. Yanxun *et al.* "Analysis of the groundwater and soil pollution by oil leakage". In: *Procedia Environmental Sciences* 11 (2011), pp. 939–944. ISSN: 1878-0296; A. Borowik *et al.* "Implications of soil pollution with diesel oil and BP petroleum with ACTIVE Technology for soil health". In: *International*

Rotterdam – that have been extensively shaped by petroleum transport and transformation over the last 150 years, to highlight the influence of the petroleum activity on the development of industrial ports. The shared history, legal backgrounds and influences of the case studies led to different patterns in the settlement of the oil industry. The analysis of comparable legal rules on buildings (safety and environmental constraints on a refinery, petrochemical or a storage site), but different authorities, planning and economic strategies, cultures, and languages in three port cities within the same perimeter of the North Sea, and beyond, will show different impacts, interpretations and results around the oil infrastructure. The description and plans of the first settlements of oil from archival sources will illustrate the evolution of the concern and influence of this industry in the three examples. The comparison of different laws, frameworks and cultures will explain the current situation of each port to highlight the best practices in the three countries. Their common history and, more recently, European regulations do not prevent them from having different and innovative practices. The analysis of these differences will help to provide efficient advice for stakeholders (port authorities, cities, private sector) on the transformation of the oil heritage, answering questions around land uses, pollution, transition and sustainable development.

Authorities of port cities – a complex system of representatives from national, local and industrial actors – are facing the problems of how to redevelop oil sites if and when the activity stops. The closure of refineries like in Dunkirk and the concentration of oil-related sites in clusters like Rotterdam and Antwerp indicate the decreasing interest of the oil industry in European cities due to the overcapacity of the sector on the continent[2]. The complex balance between energy security for Europe, production of oil derivatives, and the energy transition makes the transformation of industrial port areas challenging. Meanwhile, some authorities of port cities such as Rotterdam and Antwerp will, together with oil companies, continue to invest in their oil infrastructure and their "last men standing refineries", while trying to anticipate the end and conversion of oil activities[3]. For these actors this anticipation is key in order to avoid dealing with a great number of facilities being shut down at once and in a short delay. The authorities of cities, ports and oil companies have to anticipate the consequences of the oil industry's end to protect their economy and attractiveness. To achieve the energy transition they have to look, all together and towards the same objective, at the legal system to understand how the lack of definition and clarity hinders the movement and the transformation of the oil heritage.

This historical study of Dunkirk, along with other port cities like Rotterdam and Antwerp, through the themes of health, risks and pollution and their impact on space and regulations can facilitate the consequences of the energy transition process. The differences in

journal of environmental research and public health 16.14 (2019), p. 2474; C. Hein. "Oil and Water: Port city regions as nodes in the global petroleumscape". In: *Sartoniana.* Ed. by R. Rubens and M. van Dyck. 33rd ed. Gent: Ghent University, 2020. Chap. 13, pp. 193–224

[2] British Petroleum. *BP statistical review of world energy.* Dataset. 2017

[3] R. Van den Bergh, M. Nivard, and M. Kreijkes. "Long-Term Prospects for Northwest European Refining. Asymmetric Change: A Looming Government Dilemma?" In: *Den Haag: Clingendael International Energy Programme* (2016)

the legal production and planning practices of different countries from the middle of the 19th century until now also allows a better understanding of the current situation. Then, analyzing the role of the legal context is of prior importance to understand the issues around the planning of oil port cities and the transformation of their petroleum heritage. A clear knowledge and understanding of the legal framework in urban planning, health and environment is also essential to plan these zones according to the future needs of ports and cities. The definitions and applications of legal principles can be a hindrance to the transition process of cities if not completely understood or well interpreted – in a new or innovative way. The transformation of these oil-related spaces both in ports and cities will be a great challenge with potential troubles in term of liability and clean-up for their future use (pollution, regulations, conversion and demolition). The historical study of legal systems' evolution in different countries and their relation to the development of the oil industry will reveal the challenge's complexity of improving regulations and the transformation of polluted sites in port cities.

SAMENVATTING

Olie is een gevaarlijk product. Het transport, de opslag en de raffinage ervan brengen tal van uitdagingen op het gebied van milieu en gezondheid met zich mee en lokale, nationale, Europese regelgevers hebben stappen ondernomen om het in de ruimte te lokaliseren sinds het begin van de industriële olieboringen in de jaren 1860. Belangrijke leiders van de olie-industrie in Noordwest-Europa en daarbuiten hebben ook gediend als beleidsmakers en hebben tot doel de wettelijke beperkingen (decreten, wetten, belastingen) zo beperkt mogelijk te houden om schade aan de belangen van hun sector te voorkomen. Dit proces leidde tot een wreed gebrek aan anticipatie en vooruitziendheid bij het ontwerpen van regels. Regelgeving voor olie beperkt zich tot het selecteren van aspecten om toepassing van bijvoorbeeld voorzorgs- en duurzaamheidsprincipes te voorkomen. De vervuiling en de risico's die ze veroorzaken, beperken de mogelijkheden voor toekomstig hergebruik van de zone, en er is weinig gedaan aan de wetgevende schaal om olieruimten te leiden. Gebruikmakend van het geval van Noordwest-Europese havens die zich de afgelopen 150 jaar hebben ontpopt als oliehavens voor hun respectievelijke landen, met een specifieke focus op Duinkerken in Frankrijk, onderzoekt dit proefschrift de opkomst en toepassing van ruimtelijke en milieuregelgeving die van invloed zijn op oliepraktijken om te helpen de ontwikkeling van anticiperende maatregelen. Het doel is om te onthullen hoe:

1. Branden, watervervuiling en andere gezondheidsbedreigingen van de olie-industrie hebben ertoe geleid dat lokale, nationale, internationale en Europese autoriteiten nieuwe milieu- en ruimtelijke regelgeving hebben opgesteld in de havensteden waar olie-installaties zijn gevestigd.

2. Vanaf de jaren 1860 beïnvloedden olie-industriële actoren besluitvormers om regelgeving en beleid te ontwerpen die hen in verschillende steden en landen ten goede zouden komen, wat leidde tot een diversiteit aan milieu-, gezondheids- en veiligheidsregels.

3. Bestaande juridische en institutionele kaders die door deze industrie zijn gevormd, beïnvloeden lokale, nationale, internationale en Europese beleidsmakers bij het omgaan met de energietransitie en de transformatie van het olie-erfgoed.

Als knooppunten tussen een achterland en de rest van de wereld spelen havensteden een belangrijke rol in de olienetwerken, zowel qua transport, transformatie als distributie. Zij zijn de schakel tussen winnings- en productielocaties over de hele wereld en de consumenten van het achterland. Voortbouwend op recente wetenschap over olie en

zijn ruimtelijke impact[4], richt dit onderzoek zich op drie Noordwest-Europese havens – Duinkerken, Antwerpen, Rotterdam – die de afgelopen 150 jaar op grote schaal zijn gevormd door aardolietransport en -transformatie, om de invloed van de aardolieactiviteit op de ontwikkeling te benadrukken. van industriële havens. De gedeelde geschiedenis, juridische achtergronden en invloeden van de casestudies leidden tot verschillende patronen in de afwikkeling van de olie-industrie. De analyse van vergelijkbare wettelijke regels voor gebouwen (veiligheids- en milieubeperkingen op een raffinaderij, petrochemie of een opslagplaats), maar verschillende autoriteiten, plannings- en economische strategieën, culturen en talen in drie havensteden binnen dezelfde omtrek van de Noordzee zal tonen verschillende effecten, interpretaties en resultaten op de olie-infrastructuur. De beschrijving en plannen van de eerste nederzettingen van olie uit de archieven illustreren de evolutie van de zorg en invloed van deze industrie in de drie voorbeelden. De vergelijking van verschillende wetten, kaders en culturen zal de huidige situatie van elke haven uitleggen om de beste praktijken in de drie landen te benadrukken. Hun gemeenschappelijke geschiedenis en, meer recentelijk, Europese regelgeving weerhoudt hen er niet van om verschillende en innovatieve praktijken te hebben. De analyse van deze verschillen zal helpen om efficiënt advies te geven aan belanghebbenden (havenautoriteiten, steden, particuliere sector) over de transformatie van het olie-erfgoed, waarbij vragen worden beantwoord over landgebruik, vervuiling, transitie en duurzame ontwikkeling.

Autoriteiten van havensteden - een complex systeem van vertegenwoordigers van nationale, lokale en industriële actoren - worden geconfronteerd met de problemen hoe het olie-erfgoed kan worden herontwikkeld als en wanneer de activiteit stopt. De sluiting van raffinaderijen zoals in Duinkerken en de concentratie van oliegerelateerde sites in clusters wijzen op de afnemende interesse van de olie-industrie in Europese steden als gevolg van de overcapaciteit van de sector op het continent. De complexe balans tussen energiezekerheid voor Europa, productie van oliederivaten en de transitie maakt de transformatie van havengebieden uitdagend. Ondertussen zullen sommige autoriteiten van steden zoals Rotterdam en Antwerpen, samen met oliemaatschappijen, blijven investeren in hun olie-infrastructuur en hun "last men standing raffinaderijen", terwijl publieke en private autoriteiten proberen te anticiperen op het einde van de olie-activiteiten Deze anticipatie is essentieel voor deze actoren om te voorkomen dat een groot aantal faciliteiten in één keer en met korte vertraging worden stilgelegd. De autoriteiten van

[4] C. Hein and M. Sedighi. "Iran's Global Petroleumscape: The Role of Oil in Shaping Khuzestan and Tehran". In: *Architectural Theory Review* 21.3 (Sept. 2016), pp. 349–374; C. Hein. "Oil Spaces: The Global Petroleumscape in the Rotterdam/The Hague Area". In: *Journal of Urban History* (2018); C. Hein. "'Old Refineries Rarely Die': Port City Refineries as Key Nodes in The Global Petroleumscape". In: *Canadian Journal of History* 53.3 (2018), pp. 450–479; S. Yanxun *et al.* "Analysis of the groundwater and soil pollution by oil leakage". In: *Procedia Environmental Sciences* 11 (2011), pp. 939–944. ISSN: 1878-0296; A. Borowik *et al.* "Implications of soil pollution with diesel oil and BP petroleum with ACTIVE Technology for soil health". In: *International journal of environmental research and public health* 16.14 (2019), p. 2474; C. Hein. "Oil and Water: Port city regions as nodes in the global petroleumscape". In: *Sartoniana.* Ed. by R. Rubens and M. van Dyck. 33rd ed. Gent: Ghent University, 2020. Chap. 13, pp. 193–224

[5] R. Van den Bergh, M. Nivard, and M. Kreijkes. "Long-Term Prospects for Northwest European Refining. Asymmetric Change: A Looming Government Dilemma?" In: *Den Haag: Clingendael International Energy Programme* (2016)

steden, havens en oliemaatschappijen moeten anticiperen op de gevolgen van het einde van de olie-industrie om hun economie en aantrekkelijkheid te beschermen. Om de energietransitie te bereiken, moeten ze, allemaal samen en naar hetzelfde doel, kijken naar het rechtssysteem om te begrijpen hoe het gebrek aan definitie en duidelijkheid de beweging en de transformatie van het olie-erfgoed belemmert.

Deze vergelijkende en historische studie van Duinkerken met oa Antwerpen en Rotterdam via de thema's gezondheid, risico's en vervuiling en hun impact op regelgeving kan de realisatie van het transitieproces vergemakkelijken. De verschillen in de legale productie- en planningspraktijken van verschillende landen vanaf het midden van de 19e eeuw tot nu maken een beter begrip van de huidige situatie mogelijk. Vervolgens is het analyseren van de rol van de juridische context van prioritair belang om de problemen rond de planning van oliehavensteden en de transformatie van hun petroleumerfgoed te begrijpen. Een duidelijke kennis van het wettelijk kader op het gebied van stedenbouw, gezondheid en milieu is ook essentieel om deze zones te plannen volgens de toekomstige behoeften van havens en steden. De definities en toepassingen van juridische principes kunnen een belemmering vormen voor het transitieproces van steden als ze niet volledig worden begrepen of geïnterpreteerd - op een nieuwe of innovatieve manier. De transformatie van deze oliegerelateerde ruimten, zowel in havens als in steden, zal een grote uitdaging zijn met mogelijke problemen op het gebied van aansprakelijkheid en sanering voor toekomstig gebruik (vervuiling, regelgeving, conversie en sloop). De historische studie van de evolutie van rechtsstelsels in verschillende landen en hun effecten op de olie-industrie zal de complexiteit van de uitdaging van het verbeteren van de regelgeving en de transformatie van vervuilde locaties in havensteden onthullen.

Preface

In 2015, during my last year of legal studies in town planning and environment at the University of Lille, I worked for the European Council of Town Planners. Over the period of 4 months, I discovered the rich diversity of European legal systems in town planning and environment, and the multiple ways in which different European legislation and separate legal fields influence each other. The fascination derived from this research, led me, step by step, to pursue a PhD on the complex relation between oil flows, and the legal framework that emerge in response to and in preparation for oil-related spaces and environments. I argue that a thorough understanding of this intricate relationship is a necessary foundation for meaningful post-oil planning and careful assessment of the issue of future oil heritage sites. The case studies selected for the research – Dunkirk, Antwerp and Rotterdam – exemplify the important role that port cities, as key nodes in the system of oil flows and petroleum refining, have played in both oil-related spatial and legal development.

Thanks to ANTEA Group and the Learning Centre of Dunkirk, I was able to start my research in January 2018. With the support of my promoters and supervisor, Professor Carola Hein, Professor Catherine Roche and Dr. Amy Thomas, I developed the subject, questions and case studies which I present today.

Stephan Hauser
Delft, January 2022

1

Introduction

The Stone Age did not end for lack of stone, and the Oil Age will end long before the world runs out of oil

Sheikh Zaki Yamani,
Saudi Arabian oil minister from 1962 to 1986.

SINCE the 1860s and the beginning of the oil industry, petroleum and its derivatives have extensively shaped our society and the use of urban and rural areas. Extraction, transformation, transportation and retail of oil and its products require large spaces on land and at sea. Sea port cities in Northwest Europe specifically, play an important role in the oil networks and infrastructure; they are the link between extraction and production sites around the world and the European consumers of the hinterland[1]. Based on existing scholarship on oil and its spatial impact[2], this research add a legal perspective on the analysis of North West European port cities, taking Dunkirk, in France, as the main case study. Antwerp, in Belgium, and Rotterdam in the Netherlands, along with other port cities around the world, are supportive examples on a much greater scale of oil practices' transferability. These three port cities are the main focus as they are all within a 300km line of the North Sea coast, and, while competing with each other, have all been extensively shaped by petroleum transport and transformation over the last 150 years (Figure1.1). Thanks to this proximity, the three case studies also share a common historical and legal background linked to, among others, wars and the evolution of the European Union (EU). Yet, their different governing systems, culture and planning and economic strategies or policies led to significant variations in the growth of these port cities. The analysis of Dunkirk's development, in parallel with Rotterdam and Antwerp (and other port cities when needed), highlights the influence of petroleum actors and companies on the creation and application of spatial, environmental and health regulations and their impacts over contemporary challenges.

1.1. FROM LOCAL OIL COMPANIES IN THE 1860S TO GLOBAL CORPORATIONS

PETROLEUM as a resource, has been a significant contributor to the development of many Western countries and European port cities. With the rise of industrial drilling techniques and the constant discoveries of new oil fields since the 1860s, oil companies gradually expanded. From small local activities, such as the one of Trystram in Dunkirk, they became dominant and international entities like the Standard Oil and its contemporary derivatives (ExxonMobil and Chevron among others). The oil drilling technique

[1] V. Roso, J. Woxenius, and K. Lumsden. "The dry port concept: connecting container seaports with the hinterland". In: *Journal of Transport Geography* 17.5 (2009), pp. 338–345. ISSN: 0966-6923; B. Zondag *et al.* "Port competition modeling including maritime, port, and hinterland characteristics". In: *Maritime Policy & Management* 37.3 (2010), pp. 179–194. ISSN: 0308-8839; O. Merk and T. Notteboom. "Port hinterland connectivity". In: (2015)

[2] C. Hein and M. Sedighi. "Iran's Global Petroleumscape: The Role of Oil in Shaping Khuzestan and Tehran". In: *Architectural Theory Review* 21.3 (Sept. 2016), pp. 349–374; C. Hein. "Oil Spaces: The Global Petroleumscape in the Rotterdam/The Hague Area". In: *Journal of Urban History* (2018); C. Hein. "'Old Refineries Rarely Die': Port City Refineries as Key Nodes in The Global Petroleumscape". In: *Canadian Journal of History* 53.3 (2018), pp. 450–479; S. Yanxun *et al.* "Analysis of the groundwater and soil pollution by oil leakage". In: *Procedia Environmental Sciences* 11 (2011), pp. 939–944. ISSN: 1878-0296; A. Borowik *et al.* "Implications of soil pollution with diesel oil and BP petroleum with ACTIVE Technology for soil health". In: *International journal of environmental research and public health* 16.14 (2019), p. 2474; C. Hein. "Oil and Water: Port city regions as nodes in the global petroleumscape". In: *Sartoniana.* Ed. by R. Rubens and M. van Dyck. 33rd ed. Gent: Ghent University, 2020. Chap. 13, pp. 193–224

Figure 1.1: Satellite image of the North Sea coast of France, Belgium and the Netherlands, with, highlighted in red from South West to North East, the ports of Dunkirk, Antwerp, and Rotterdam. Petroleum sites in this area are highlighted thanks to the database provided by Europétrole. Satellite image from Google Earth.

used by Edwin Drake in 1869 in western Pennsylvania, United States (U.S), participated in the expansion of this industry[3]. It was one of the many steps allowing oil companies to free themselves from the local frame they started in.

From the 1860s until the first World War, oil storage or refining facilities appeared and disappeared more regularly than today. The first establishment of oil facilities in western European ports occurred in the middle of the ninetieth century, with local companies importing crude oil from the U.S and Russia. Local business owners invested in oil in their hometown, building sites to welcome and transform this 'new' product and be among the first on the market. In this adventure, national and local authorities saw these new factories as economic opportunities for their development, developing railways or infrastructure to attract them or facilitate their activities[4]. Like they did for the chemical and industrial sectors in the past[5], public authorities provided all the political and regulative support that petroleum business owners needed to settle and grow.

[3] C. Hein. "Refineries (Oil)". In: *The Encyclopedia of Greater Philadelphia* (2016)

[4] The development of the port and network infrastructure of Dunkirk, later explained in Chapter3 to Chapter5, was the result of such national and local political support.

[5] T. Le Roux. "Chemistry and industrial and environmental governance in France, 1770–1830". In: *History of Science* 54.2 (2016), pp. 195–222

With the industrial development of their activity, oil business owners supported by their governments became defenders and influencers for the industry. Building up on their networks and influences as local providers of jobs, petroleum producers sought for more control. Most of the time, like the Rockefeller in the U.S with its company Standard Oil, petroleum developers stayed in business, affecting political decisions through the expansion of their network and facilities[6]. Others, like J-B. Trystram, invested early on in the oil refining business in Dunkirk and gradually pursued political positions, from local until national ones. Trystram became a member of the French parliament and supported fellow petroleum actors in time of struggles[7].

Port cities are strategic places for petroleum companies to settle. The maritime access to sea trade and the rail network linked to these trading hubs are a perfect combination for the early development of a commerce. This research mainly focuses on Dunkirk, in France, though sometimes putting the French port city in the broader context by analyzing other oil port cities like Antwerp in Belgium and Rotterdam in the Netherlands. These three are of particular interest due to their proximity on the North Sea coast. They share many historical similarities with early oil developments, cultural elements of the Flemish and Dutch influences, but also for their focus on the energy sector and their country's membership of the European Union[8]. Public authorities of the three countries developed their ports and improved their trading connections differently; to the outside to import the needed resources from overseas, and to the inside with canals, pipelines and railways in order to export the merchandises to the hinterland. The availability of such an infrastructure, together with efficient political contacts, led to a convenient planning and expansion of port facilities in port cities, which facilitated the growth of local oil companies. The influence of local and national actors from the oil industry also drove specific adaptations and objectives for both oil companies and public authorities.

In the 1910s only a few local oil companies survived. By using oil before the first World War the British Navy changed the importance and scale of the oil industry[9]. The oil resource not only became a common product for the global population but also a strategic good for nations as other military forces followed the British example. This phenomenon radically changed the importance and the role of oil companies. Local oil producers, using their network of influence, slowly became major actors of the industry, absorbing the remaining local companies and building an almost monopoly in their countries (like Standard Oil at the beginning of the 20th century in the U.S). National governments supported this business to secure their access to this strategic resource and support their economies, leading to well-known companies and flagships of countries such as Shell,

[6] The founder of the Rockefeller empire stayed in the oil industry, though later on, members of the family reached important political positions. Nelson Rockefeller, for instance, was, among others, U.S Vice President in the 1970s

[7] In p.43 of J. Denise. *La Belle Époque à Dunkerque.* Vol. 3. 1988, the author highlights the support provided by Trystram to Clère, the owner of a refinery in a small town near Dunkirk (and mayor of this same town), when his refinery exploded in 1891, killing 7. See Chapter3

[8] The combination of these elements does not exclude considerations for other port cities in the European Union and beyond throughout the chapters. It makes, however, an interesting common ground to analyze the influence of local and national factors and actors on the development of port cities.

[9] D. Yergin. *The prize: The epic quest for oil, money & power.* Simon and Schuster, 2011

British Petroleum, ExxonMobil, and Total. This evolution also triggered a new scale of influence for oil actors over national and international decisions.

The national supports that oil companies received led them to progressively assert their dominant positions. This domination is not limited to the oil sector but also to the decision-making process of rules and policies in countries and European or international institutions. Now among the most powerful entities in the world, petroleum companies have tremendous financial and technological means, more than some countries[10]. Economists and medias are now using the notions of 'Supermajors' or 'Big Oil' to refer to their individual and collective economic power[11]. Hence, the influence of such powerful companies on the creation of rules potentially affecting their activities is tremendous. This research shows the consequences of such powers on legal and planning systems over time, their effects on the development of port cities and on the contemporary challenges linked to the energy transition and the environmental protection. This legal perspective is important to highlight, as public authorities and private actors, along with the literature, often ignore or forget the historical and legal aspect of the transition and their blocking or enabling possibilities. Planning history and regulations are defining elements of spatial sciences, as they are hidden designers determining land use patterns and planning policies[12]. Spatial planning, environmental, and health regulations now define land uses as well as what can built and how on a land. Thus, one cannot understand planning documents and the development of cities without considering their legal origin or foundation.

If legal systems in Europe and beyond are already lacking of flexibility, the influence of external factors and actors aggravated this situation. The multiple reports and warnings on environmental damages of human activities from scientists since the 1970s, as well as the discourses on the climate change issue since the 1990s illustrate this blocking aspect of legal systems, as well as the interests at stake when talking about the oil industry. This blocking mechanism led to public authorities' absence of anticipation in regulations when dealing with questions of planning, security, and the environment around industrial sites in port cities. This seems paradoxical when knowing that planning is already, in itself, an anticipatory practice. But spatial and urban planning can encompass and ignore many subjects or uncertainties[13]. The oil crisis of 1973 and 1979 warned European nations and the global economy over the oil dependency through a sharp rise of oil barrel's price produced by the governments of oil producing countries. These crises also put an end to the construction of additional refining facilities in Northwest Europe,

[10] V. Vivoda. "International oil companies, US Government and energy security policy: an interest-based analysis". In: *International Journal of Global Energy Issues* 33.1-2 (2010), pp. 73–88. ISSN: 0954-7118

[11] These two notions do not take into consideration State-owned companies or those member of the Organization of the Petroleum Exporting Countries like Saudi Aramco, Petrochina or Sinopec, but refers to private companies like Royal Dutch Shell or British Petroleum. See also: C. W. Barlow. "Corporate packaging management". In: (1969)

[12] L. A. Momirski, Y. van Mil, and C. Hein. "Straddling the Fence: Land Use Patterns in and around Ports as Hidden Designers". In: *Urban Planning* 6.3 (2021), pp. 136–151. ISSN: 2183-7635

[13] P. H. C. Torres. "Reaction or anticipation? The role of urban and regional planning in adapting to the climate emergency". In: *Regions e-Zine*. 2020

with Total achieving the last refinery ever built in France in 1974, in Dunkirk[14]. Yet, industries, and petroleum industries in particular, with their intense lobbying, constantly prevented the introduction and application of rules potentially harmful for their activities[15]. The rise of environmentalism in the 1990s did not threaten the privileged relation between petroleum companies and decision-makers, as well as the oil influence in legal systems. The political inability to adapt to environmental, health, security or planning needs relates to past treaties, laws and rules enacted under the pressure of industrial lobbyists using the uncertainties of the future. Now unable to free themselves from this limiting frame they created, politicians, when willing to, cannot fully act to tackle the climate and gas emission crisis because of the consequences of past decisions.

Inabilities of public local, national or international authorities to act, or react, against the oil "Establishment" is an illustration of the powerful influence of the system described by Hein, a German expert in history of architecture and urban planning, as the "Global Petroleumscape"[16]. On the one hand, the notion of "Establishment" used here refers to the one coined by Henry Fairlie, a British political and social critic, in 1955 in *The Spectator* and defined by *Oxford Reference* as: "A group in a society exercising power and influence over matters of policy or taste, and seen as resisting change"[17]. On the other hand, the "Global Petroleumscape" defines the visible, subtle and invisible prominence of oil industry over a variety of spatial networks. This combination of terms perfectly illustrates how oil lobbyists secured, through time, the dominant position of the entire sector, through influences and resistance to societal and regulatory changes. To improve the management and flows of their products, petroleum actors acted as a group[18]. Through such alliances they have affected the design of spaces, landscapes, industrial and housing facilities, as well as the design of regulations. The regulatory aspect is here an addition to the concept of the petroleumscape which is essentially focusing on the spatial perspective. Yet, oil companies built part of this oil landscape on their ability to influence the creation of rules and prevent the emergence of (regulatory) obstacles in the development of their activities. This invasive process allowed the constant growth of oil profits, increasing again their influence over spatial and political networks. Oil platforms, refineries, oil storage and tankers are only the visible tip of the oi 'iceberg'. The invisible part, or the web of influences, is tremendous and a support to, and consequence of, the development of the visible infrastructure.

[14] The name of the refinery was "Raffinerie des Flandres", in Mardyck, a city part of Dunkirk's metropolitan area.

[15] S. Laville. *Top oil firms spending millions lobbying to block climate change policies says report*. Mar. 2019. URL: https://www.theguardian.com/business/2019/mar/22/top-oil-firms-spending-millions-lobbying-to-block-climate-change-policies-says-report

[16] C. Hein. "Oil Spaces: The Global Petroleumscape in the Rotterdam/The Hague Area". In: *Journal of Urban History* (2018)

[17] See: Oxford Reference website: https://www.oxfordreference.com/view/10.1093/oi/authority.20111031142001455

[18] In the US for instance, influential groups of oil companies can be, among others, the American Petroleum Institute, or the American Fuel and Petrochemical Manufacturers group. They each defend specific interests, with the latter not openly supporting the Paris Agreement for instance. This stance recently pushed European oil companies such as Shell to leave the group in order to avoid critics. See: I. Kottasová. *Shell quits major US oil lobby over climate change*. Apr. 2019. URL: https://edition.cnn.com/2019/04/02/business/shell-climate-change-afpm/index.html

Oil companies' activities are one of the principal causes of global warming and climate change. Yet, its representatives and lobbyists are the first to prevent the emergence of constraining legal and international commitments to deal with this issue. This "business-as-usual" is threatening local and global efforts to tackle and adapt to the effect of climate change[19]. And if their strategies seem to change towards more sustainability, a financial analysis of their lobbying proves that this has to do with green washing[20]. A growing number of companies, not only related to oil, have plans to act towards more sustainable practices. However, observers and researchers did not identify a global application of strict measures nor any drastic shifts in their strategies to respect such plans.

1.2. PROBLEM STATEMENT: THE END OF OIL AND THE LACK OF ANTICIPATION

THE days of oil activities as people know and experience them in European port cities are counted. With the rise of the environmental movement in the 1970s and the multiple reports constantly pointing the major responsibility of climate change at oil companies, their practices must change. The need for a transition in the global system of energy will affect this industry, as it needs to drastically shift its activities and strategies towards more sustainable actions. The peaking of world oil production is a confirmation of the limit reached between the growth of economies and the capacity of the world to provide the necessary oil supply[21]. Statistical reviews from oil companies like British Petroleum show that, between 2005 and 2015, the production and the consumption of oil, especially in Europe, is stagnating if not regressing[22]. This statistic illustrates a shift in the weight of petroleum products in the European energy sector. This shift will and already have consequences on the viability of oil activities in European port cities hosting the facilities of the oil industry with refining sites closing across the continent[23].

[19] G. Turner. *Is Global Collapse Imminent?* University of Melbourne, Melbourne Sustainable Society Institute, 2014

[20] See Chapter5 and S. Laville. *Top oil firms spending millions lobbying to block climate change policies says report.* Mar. 2019. URL: https://www.theguardian.com/business/2019/mar/22/top-oil-firms-spending-millions-lobbying-to-block-climate-change-policies-says-report

[21] R. L. Hirsch, R. H. Bezdek, and R. M. Wendling. "Peaking oil production: sooner rather than later?" In: *Issues in Science and Technology* 21.3 (2005), pp. 25–30; R. L. Hirsch. "The inevitable peaking of world oil production". In: *Bulletin of the Atlantic Council of the United States* 16.3 (2005), pp. 1–10; A. Nafeez. *A former BP Geologist: Peak Oil is here and it will break economies.* Dec. 2013; J.-M. Bezat and N. Wakim. "Patrick Pouyanné, PDG de Total : « Après 2020, on risque de manquer de pétrole »". In: *Le Monde* (2018); J. Ambrose. *Global oil demand may have passed peak, says BP energy report.* 2020. URL: https://www.theguardian.com/business/2020/sep/14/global-oil-demand-may-have-passed-peak-says-bp-energy-report

[22] British Petroleum. *BP statistical review of world energy.* Dataset. 2017

[23] "FOCUS: European refinery closures continue as foreign competition increases". In: *Oil and Energy Trends* 39.3 (Mar. 2014), pp. 3–6. ISSN: 0950-1045. DOI: https://doi.org/10.1111/oet.12139. URL: https://doi.org/10.1111/oet.12139

Port cities are areas where the massive infrastructure of the oil industry settled and developed. These water-related places are privileged areas for the oil industry, as it relies on water for its processes and the shipment of its products[24]. If an energy transition were to happen, the impact on the activities of port cities and on the planning of their urban areas would be tremendous. This industry consumed a significant amount of spaces in port cities and influenced not only the spatial planning of the port but also the urban shape and evolution of the city. Its influence is gradually disappearing in many places, focusing on last standing port cities where oil companies concentrate their activities. In this respect, Dunkirk, Rotterdam, and Antwerp are excellent illustrations. When one is closing, facing neighbors' competition and the decreasing importance of refineries in Western Europe (Dunkirk), the others are still investing in oil facilities while trying to make it greener (Rotterdam and Antwerp)[25].

This apparent green process hides a greater issue in European legal systems in their ways of dealing with energy-related activities and resources. There is a fundamental lack of anticipation from public authorities in planning, security, sanitary, and environmental regulations. Even though national, European, and international authorities and institutions developed principles that relate to these fields, there is still a cruel lack of adaptability in modern policies to face contemporary needs and challenges while dealing with pollution and influences from the past. Instead of trying to foresee what could happen, many policy-makers keep on having a conservative approach based on reaction. Public and private authorities privilege reaction to incidents and disasters rather than trying to anticipate issues in the content of rules in spite of their potential negative effects on industries. This dissertation contributes to highlight the lack of consideration for legal and historical perspectives in dealing with obstacles in the way of the energy and industrial transition. The objective of this research is to add the legal perspective to the spatial and historical discussions around the planning of port cities and the global petroleumscape.

Anticipating the end of the 'Oil Age' is of primary importance for the society as well as for actors and authorities of port cities. The dependence of both over the resource is dramatic in a period where the question is not anymore "will we have enough oil?" but rather "can we afford to burn the oil we have?"[26]. With port cities, this problematic has more impact considering the amount of spaces dedicated to the oil industry, with all their polluting consequences on public health and the environment. The end of oil activities in ports means not only the disappearance of an economic benefit for port cities authorities but also a tremendous cleaning and transforming challenge. Authorities in Dunkirk are currently trying to get beyond this issue, and the scale is already great. Yet,

[24] C. Hein. "Oil and Water: Port city regions as nodes in the global petroleumscape". In: *Sartoniana*. Ed. by R. Rubens and M. van Dyck. 33rd ed. Gent: Ghent University, 2020. Chap. 13, pp. 193–224

[25] In Rotterdam for instance, the Shell refinery of the port is counting on hydrogen to partly reduce its impacts on gas emissions. See Port of Antwerp. "Port of Antwerp, Europe's leading integrated oil and chemical cluster". In: (2015); Port of Rotterdam. *Research into the use of green hydrogen in refinery process*. 2017. URL: https://www.portofrotterdam.com/en/news-and-press-releases/research-into-the-use-of-green-hydrogen-in-refinery-process

[26] S. Alexander. *The new economics of oil*. Melbourne Sustainable Society Institute, the University of Melbourne, 2014

the territory considered for the transformation process in Dunkirk is small in comparison with port areas in Antwerp and Rotterdam, where oil is the resource around which everything is organized. To enable the transformation of these vast lands, public and private authorities need to consider legal, historical, and planning perspective as well as develop anticipation in their strategies.

The pollution of oil sites and the consequences of the transformation of soon closed industrial sites must become a preoccupation of local public and private actors. Citizens, their environmental organizations, port and city authorities, industrial actors and companies, as well as regional, national, European and international authorities are all affected by this challenge and must acknowledge its risks and extent. Historical choices of previous political leaders, being local, national, European or international, shaped current frames where flexibility for adaptation and anticipation is lacking[27]. This has become an obstacle for the future efficient planning of port cities and for their stakeholders. The analysis of past and present regulations, policies, and declarations, within all different levels, shows that the origin of this process stems from a persistent influence of the oil lobbying. In 2013 Barkan, an American expert on the influence of private actors on public authorities, accurately highlighted the importance to stop thinking companies' influences, or what he describes as "corporate power", and public governance systems, or "political sovereignty", as two distinctive topics[28]. This public-private relationship is not the fact of inefficient regulations but rather their origin. The path leading to the current legal, environmental, and planning blockages transpires through the words used or ignored in rules and policies related to these fields[29], which impact, directly or indirectly, the planning of port cities and the economy of their entire region[30].

1.3. QUESTIONS, SCOPE, TERMS AND METHOD

1.3.1. HOW HAVE OIL COMPANIES INFLUENCED SPACES AND REGULATIONS SINCE THE 1860S?

SUMMING up the struggle that stakeholders have to face now because of 150 years of oil influence and activity is particularly difficult because diverse. Oil activities in port cities have long-term effects on the built and natural environment and on regulations but also reached political declarations, scientific and administrative reports, as well as courts' decisions. Considering the current climate issue, the global warming threat, and the concerns over rising greenhouse gas emissions, the key question of this research is:

[27] A. Moatty and F. Vinet. "Post-disaster recovery: the challenge of anticipation". In: *E3S Web of Conferences*. Vol. 7. EDP Sciences, 2016, p. 17003. ISBN: 2267-1242

[28] J. Barkan. *Corporate sovereignty: Law and government under capitalism*. U of Minnesota Press, 2013. ISBN: 0816686491

[29] S. Hauser. *The European Green Deal: New Opportunities for Port Cities?* 2020. URL: https://www.portcityfutures.nl/news/the-european-green-deal-new-opportunities-for-port-cities

[30] R. den Bergh, M. Nivard, and M. Kreijkes. "Long-term prospects for northwest european refining. Asymmetric change: A looming government dilemma". In: *CIEP Energy Paper by the Clingendael International Energy Programme (CIEP)* (2016)

> How have oil companies, with their network of influences as well as their environmental and health disasters, shaped the spatial organization of port cities, and influenced public policies and regulations?

The aim of this research is to demonstrate the role of regulations in the transformation of oil sites and port cities. The evolution of these rules and their efficiency is, however, also dependent on the influence of oil actors and of (oil) industrial disasters. This influence transpires both in the development of port cities hosting their facilities and on the creation and application of rules. Through this pressure and in combination with their incidents, growth, and expansion, oil companies adapted planning frameworks of nations and planning practices in port cities according to their needs. The objective is to expose the historic role of oil actors in locking the evolution of both port cities and legal systems to protect the development of the oil industry.

Each chapter answers the key question by going chronologically through the expansion of the oil industry and the regulatory framework around it, from global circumstances and events to more local implications. Hence, the general argumentation investigates three sub-themes:

1. The beginning of the oil industry and the growth of its actors' influence on the planning of port cities and the application of regulations in the fields of security, environment, and health.

2. The change of scale of oil-related events and practices after the second World War. This theme discusses the growing size of oil companies' infrastructure, their influence over decision-makers, their knowledge on the consequences of their industry, and their control of the public opinion.

3. The need for regulatory considerations and improvements in the fields of spatial planning, security, and environmental and health protection in reaction to the constant up-scaling of oil industrial disasters.

To answer the research question, the analysis of the sub-themes goes through both inter- and trans-disciplinary perspectives. This way of seeing the issue in a more holistic way, interweaving and blending history, corporate power, urban planning, regulations, and environmental and health protection, relates to the notion of "Wicked Problems". Churchman, an American expert in management science and ethics, used this term in 1967, arguing that tackling one problem at a time and considering it only through the lens of one field would create more issues than what it would solve[31]. As the influence of the oil industry is old and complex, it is not solely limited to the political sphere, but also affects laws, urban planning strategies, the environment, and inhabitants. Blending regulations of different fields with their spatial and historical origins as well as their implications is a way to illustrate a field (law) that stays mainly abstract, invisible, ignored, and difficult to grasp for non-initiated people, although omnipresent. This thesis thus supports visions advocating the blending of disciplines as a way to better understand historical evolution and the current situation. The perspective of Barkan on considering

[31] C. W. Churchman. "Guest editorial: Wicked problems". In: (1967)

private power as a form of political authority is one excellent illustration of the oil industry's influence on public authorities that this research aims to follow[32].

1.3.2. THE IMPORTANCE OF PORT CITIES, HISTORY, AND REGULATIONS

ENVIRONMENTAL regulations have progressively impacted spatial, environmental, and health topics, and now affect many other fields, far beyond the legal perspective from which they originate. "Environmental law covers the conservation of natural and cultural heritage"[33]. National parliaments first sectored the field of environment before giving it its own legitimacy. Now expanding at a tremendous rate, environmental law is standing on its own and influence other sectors such as economy, industry, trade, health, security and urban planning. The topic changed from secondary and almost ignored to one of prior importance and, in appearance, unavoidable.

Port cities are, when considering the environmental subject, important places to focus on. Global trade and industries privilege these areas because of their connections and infrastructure, hence, pollution, health and security issues follow. Rotterdam, Antwerp, and Dunkirk are no exceptions to this process, and rather excellent illustrations of the impact oil companies can have in port cities. On 300 kilometers of coast and land, the three port authorities compete in refining, storage, and distribution of oil as they are trading centers for their respective countries but also for the containers flow. They all complement each other at the same time, especially Rotterdam and Antwerp. These two ports compete in intra-Europe and transatlantic trades and on the chemical field. The size, competitiveness, and networks of the Belgian and Dutch ports put them on another scale compared to Dunkirk. Rotterdam became the oil hub of Northwest Europe, distributing to the hinterland, while Antwerp is a chemical cluster for the oil transformation industry. Their attractiveness and connections allow them to keep their oil facilities active while investing in new projects and extensions to retain their oil-related activities. Refineries in Dunkirk, however, are already closed or closing, and the port city is trying to transform these former oil sites. There lies the relevance of the comparison: ports close to each other, competing in similar fields, sharing analogous legal systems, and facing comparable climate, health, and pollution challenges are answering differently.

European history comprises conflicts, conquests, and influences of, and between, different countries that participated in creating common legal and cultural grounds on the continent. These games of control introduced an early harmonization on the continent. One actor in this process was, for instance, Napoléon Bonaparte, who introduced, through his conquests at the beginning of the 19th century, the Civil Code Napoléon of 1804 in many European countries. Several civil codes in Europe derived from this first code, while other regulations still in place are also coming from this same period[34]. In

[32] J. Barkan. *Corporate sovereignty: Law and government under capitalism.* U of Minnesota Press, 2013. ISBN: 0816686491

[33] Quote made by Ben Boer, in May 2018, during a conference held in Leiden University on heritage destruction, human rights, and international law.

[34] B. Taverne. *Petroleum, Industry, and Governments: An Introduction to Petroleum Regulation, Economics,*

the present topic, one interesting example that can be found in France, Belgium and The Netherlands is the definition of individual liability. The general definitions found in the Belgian civil code on article 1382 and in the French civil code, article 1240, demonstrate this legacy by sharing a similar formulation. Respectively:

> "A person is not only liable for the damage which he caused by its deeds, but also for the damage which he caused by its negligence or imprudence."
>
> "Any act by which a person causes damage to another, obliges the one by whose fault the damage occurred to compensate for this."

The three port cities discussed earlier are all in what is now the European Union. The importance of this supra-national entity is not to be minimized, especially in environmental protection and health. Early on, European institutions and founding treaties aimed at improving the quality of life and citizens' health on the continent. To briefly sum up, after the second World War the cooperation in Europe focused firstly and mainly on economic topics, with the treaty on European Coal and Steel Community as the first draft of a continental cooperation in 1951. It was at first aiming only at controlling these two specific resources. The collaboration between countries then evolved and led later on to the Treaty of Rome in 1957 establishing the European Economic Communities, or EEC, to build common economic policies and harmonize legal systems. Through this treaty, national authorities acknowledged the important role of regulations in the development of the European idea. First programs focusing on environment did not wait for the creation of the "Union", and following the development of environmental awareness in policies in the 1970s, European institutions laid down first environmental objectives in 1973. The Single European Act in 1987 officially included the environmental concern in a founding treaty of the community, with an entire chapter dedicated to it. This process and its following steps created a, in appearance, more equal relationship between environmental and economic interests, with an additional focus on the quality of life for what became, in 1993 with the Maastricht Treaty, European citizens[35].

The European idea and Union continued and furthered the harmonization, continuously including more environmental and health subjects in texts. This process progressively led to the creation, development and/or incorporation of rules and principles to protect the environment and the health of European citizens. Though many fundamental principles are not originating from the EU, some, such as the principle of prevention, or the precautionary and polluter-pays principles, were gradually acknowledged by European governments through their inclusion in national legal systems. The same mechanism of extension applies to environmental and health topics in the European Union,

and Government Policies. Kluwer Law International, 1999; J. Chorus. *Introduction to Dutch law*. Kluwer Law International BV, 2016

[35] The importance of the European Union in the topic is further discussed throughout the entire dissertation, and more specifically in the Chapter5. See also: S. Baziadoly. "Le droit communautaire de l'environnement depuis l'Acte unique européen jusqu'à la Conférence intergouvernementale". PhD thesis. Paris 2, 1993; S. Baziadoly and M. Bettati. *Le Droit communautaire de l'environnement depuis l'Acte unique européen jusqu'à la Conférence intergouvernementale*. French. Bruxelles: Ed. Bruylant, 1996, p. 360. ISBN: 2802707108 9782802707103 2800411465 9782800411460

with no domain being able to avoid their influence. Spatial planning and sanitary policies, for instance, incorporated distances between industrial buildings and houses to protect inhabitants from industrial hazards and pollution. The original founders of the EU probably did not imagine that their economically oriented association would turn into a supra-national body protecting the environment and health of citizens across the continent and beyond[36]. Such a protection also had an indirect consequence as it contributed to the efficiency of the protection: it empowered people and local organizations. By giving them access to environmental information and including them in the decision-making, European institutions, through their regulations, allowed citizens to challenge projects and rules they considered harmful for their health and environment[37]. The rise in the regulatory power of the EU and its enabling process towards citizens and their local organizations drastically increased the number of actors monitoring the enforcement of new protective rules.

There are still obstacles in the way of powerful environmental and health protection, within Europe and beyond. The influence of industries in the definition of legal principles is one of them. Their preemptive lobbying and actions towards potentially harmful rules or activities created deadlocks in the creation and application of rules. Decisions of past public authorities shaped a lack of flexibility for actual needs and policies towards efficient protection[38]. Through more than 150 years of development, the dependence and power that managers of the oil industry created succeeded in progressively preventing laws from having detrimental effects on their activities. On the one hand, the primary role of the oil industry in economies but also in the process of climate change appears paradoxical and eminently dangerous. On the other hand, environmentalism, the development of "Keep it in the ground" movements and the recent drop in oil consumption because of the COVID pandemic are tremendous threats for the oil industry[39]. The conflict between a great political influence to protect a polluting activity and the will of people to defend the quality of their environment cannot be more opposed. They are, however, connected to each other through the intermediary position of decision-makers.

This research not only considers different scales of territories, but also actors and fields. The aim is to explain planning and legal obstacles that public authorities and citizens of port cities have to deal with when considering environmental protection, the energy transition, and the transformation of oil sites. Starting from a grounded perspective using global examples and context to their implications and 'spatialization' on port cities like Dunkirk, the research later dives deeper into the importance of international and European legal systems in affecting the oil industry. The further the research goes

[36] R. Romi. *Droit internation et Européen de l'environnement*. 3rd ed. LGDJ, 2017; C. Roche. *L'essentiel du droit de l'environnement 2020-2021*. 11th ed. GUALINO, 2020

[37] J. Daligaux. "Urbanisation et environnement sur les littoraux : une analyse spatiale". In: *Rives méditerranéennes* 15 (Oct. 2003), pp. 11–20. DOI: 10.4000/rives.12

[38] S. Schunz. "Explaining the evolution of European Union foreign climate policy: A case of bounded adaptiveness". In: *European Integration online Papers* 2012-006 (2012); D. Rosenbloom, J. Meadowcroft, and B. Cashore. "Stability and climate policy? Harnessing insights on path dependence, policy feedback, and transition pathways". In: *Energy Research & Social Science* 50 (2019), pp. 168–178

[39] See the website of Keepitintheground and its long list of support: http://keepitintheground.org/

in time, the greater the scale of influences over port cities and regulations becomes, with the intervention of international actors such as multinational oil companies and supranational organization like the EU. Oil actors adapted their communication strategies and interventions to the evolution of these scales. This chronological approach highlights the importance of past events and interventions on current legal systems. It aims at demonstrating their impact on the spatial planning of port cities. One cannot grasp local current obstacles in the transformation of the oil heritage, the planning of port cities, and the difficulty to achieve the energy transition without understanding their origin, evolution, and the diversity of actors and influences behind such processes. To reach that understanding, stakeholders must not look at spatial and urban planning strategies solely through historical and economic considerations, but also acknowledge the determinant role of regulations in framing these strategies.

1.3.3. Regulations and the Need for Clarity in a World of Words

One main issue attributed to regulations in this piece, being nationals or internationals, relates to the lack of precise definition of terms and objectives. In order to avoid similar obstacles in this dissertation, it seems important to identify the principal words used, the reason behind their presence, and their understanding within the perspective of this research.

One of the major obstacles in the argumentation is the precise use of terms, and in the perspective of this multi-disciplinary research, precision is a challenge. In the complexity of this approach, a paradox appears with the first and main word used: Regulations. Why regulations, rules, and legal systems that refers to a broad understanding of legal texts and institutions, and not laws that are texts enacted by parliaments? This use is for the sole purpose of not being too precise and exclude a range of texts defining terms or precising the application of legal measures. In his dictionary Cornu, a French jurist, gives multiple definitions of the term depending on the context and in opposition to other legal texts. In a general understanding, he defines it as "any legal or extra-legal norm or system of norms", further explaining that it is "the supreme rule in the hierarchy of norms, in this sense the laws are the rules that a political regime makes supreme"[40]. Using this definition, talking only about laws would mean ignoring international treaties or declarations from international bodies such as the United Nations, the European directives, programs and texts, or the planning documents of local authorities. Being very specific in using legal terms also excludes a wide range of sources, such as authorization of local representative of the government, able to illustrate the influence of the oil industry that this research is developing. Thus, instead of using laws, the research refers to legal texts as a system by using "regulations" in a general understanding[41], or "rules",

[40] G. Cornu. *Dictionnaire Juridique*. 8th ed. Paris: Presses Universitaires de France, 2000. ISBN: 2 13 050600 3

[41] The precision "in a general understanding" is necessary to prevent the confusion with the regulation of the European Union, which is a category of texts directly applicable within national legal systems. See: Publications Office of the European Union. *Eur-Lex*. URL: https://eur-lex.europa.eu/

and is more specific when needed in order to analyze particular legal texts.

The notion of "Heritage" also needs to be explained, as it is used in the title for the duality it can represent, and is part of a wordplay. Harvey, an English expert in critical heritage studies, defines the notion of heritage as "the process by which people use the past", it is "interwoven within the power dynamics of any society and intimately bound up with identity construction at both communal and personal levels"[42]. Authors also understood heritage as "virtually anything by which some kind of link, however tenuous or false, may be forged with the past"[43]. According to this understanding, the oil heritage refers to any kind of link between the oil industry and past developments linked to it, tangible or intangible. This title makes this link to history and past events clear with an adaptation of the quote "The King is dead. Long live the King!" used to announce the death of a King and wish a long life to the following one. In this research, the notion of heritage is understood as the legacy of the oil industry influencing contemporary developments. The dying oil industry in this title is a reference to the first king, while its legacy, on legal systems, spatial planning, port cities, and on the environment through its pollution is its surviving part, like the royal position in History. Through this research, the visible infrastructure of oil industry represents the dying King as refineries are "dying" in Northwest European port cities, and now authorities have to deal with their pollution and influence[44]. Thus, "Heritage" is here both the visible and disappearing infrastructure which oil industry developed and its influential legacy on regulations, the environment, and the health of citizens. In a linguistic perspective, the word 'Heritage' encompasses both notions, though in a more architectural perspective it is better understood as a building. The Cambridge dictionary illustrates this duality: "features belonging to the culture of a particular society, such as traditions, languages, or buildings, that were created in the past and still have historical importance"[45]. Therefore, it is, in this discussion, considered both as a cultural or built heritage and similarly a positive or negative, tangible or intangible legacy left by previous generations of oil and political actors.

Port cities are places around which this oil legacy is discussed, as such their frame must also be defined. If ports are interfaces, physical docking and connecting points, they also have linguistic tricks. Still looking at the Cambridge dictionary, a port is "a town by the sea or by a river that has a harbour, or the harbour itself". Following this definition, the notion of port cities itself would be a pleonasm considering that a port can encompass not only the harbor area but also the city. Though ports and cities have been, and still are in many places, two distinct entities, they have been one place, not only in definitions but also spatially before port activities gradually abandoned urban

[42] D. C. Harvey. "The history of heritage". In: *The Ashgate research companion to heritage and identity* (2008), pp. 19–36

[43] P. Johnson and B. Thomas. "Heritage as business". In: *Heritage, tourism and society* (1995), pp. 170–190; D. C. Harvey. "Heritage pasts and heritage presents: Temporality, meaning and the scope of heritage studies". In: *International journal of heritage studies* 7.4 (2001), pp. 319–338. ISSN: 1352-7258

[44] The word dying is here between quotation marks as a reference to the article of Hein suggesting that old refineries rarely die. See: C. Hein. "'Old Refineries Rarely Die': Port City Refineries as Key Nodes in The Global Petroleumscape". In: *Canadian Journal of History* 53.3 (2018), pp. 450–479

[45] See: The Cambridge Dictionary, available online: https://dictionary.cambridge.org/

areas[46]. For efficiency purposes, they are both again discussed as one through inclusive policies, bringing more and more local and urban actors into the port authority, thus into the decision-making of port developments[47]. When talking about "the port of Dunkirk" or "the port of Rotterdam", one can understand that a person is talking of "the port of" a city. In the common knowledge a port does not stand by itself and has developed together with a city, even if its actual territory can be physically independent from the urban area it stemmed from.

> With a few exceptions around the world, cities and their ports are inseparable. The city provides general services while the ports constitute an undeniable economic engine. The city cannot ignore the port and vice versa. [...] This close relationship between the city and the port, however, is subject to limits imposed in particular by competition law and by the incompatibility of the neighborhood of industrial activities in relation to inhabited areas[48].

Port and city's entities influenced and are still influencing each other[49]. However, for many port actors, urban areas can often be an obstacle to the development of industrial and trade activities[50]. As such, both areas can no longer be analyzed independently, especially when talking about their economic and spatial developments, as well as their effects on the citizens living nearby and the surrounding environment. This complex network of influences in port cities requires "a careful understanding of changing terms of port and urban infrastructures and functions"[51], as these terms also diverge depending on the narrative of port cities, the priorities of their authorities, but also on the languages[52].

A confusion around the title "The Oil is Dying" is conceivable, with oil possibly understood by readers as vegetable, animal or petrochemical oil. Of course the research discusses the petrochemical product, and to prevent a boring and constant repetition of only "Oil" or "Petroleum" both terms will be used interchangeably. If oil, understood as crude oil, is the underground and liquid hydrocarbon resource, petroleum alone has a much wider understanding, encompassing both crude oil and the petroleum products processed from the crude oil. This explanation as well as the possibility of using both

[46] B. S. Hoyle. "The port—City interface: Trends, problems and examples". In: *Geoforum* 20.4 (1989), pp. 429–435

[47] S. Hauser. "The Interplay of Economic Development and Environmental Protection: Dunkirk and the Search for Balance". In: *PORTUSplus* 8.0 (2019)

[48] R. Rezenthel. "Ville-Port: un rapprochement progressif". In: *Portus 8* (2004), pp. 18–21

[49] P. V. Hall and W. Jacobs. "Why are maritime ports (still) urban, and why should policy-makers care?" In: *Maritime Policy & Management* 39.2 (2012), pp. 189–206. ISSN: 0308-8839; J. Monios, R. Bergqvist, and J. Woxenius. "Port-centric cities: The role of freight distribution in defining the port-city relationship". In: *Journal of Transport Geography* 66 (2018), pp. 53–64. ISSN: 0966-6923

[50] C. Ducruet. "A metageography of port-city relationships". In: *Ports, Cities, and Global Supply Chains*. Ed. by J. Wang *et al.* Routledge, 2007. Chap. 10, pp. 157–172

[51] B. Moretti. *Port City Discourse: A New Vocabulary for Research and Action*. 2021. URL: https://www.portcityfutures.nl/news/port-city-discourse-a-new-vocabulary-for-research-and-action (visited on 03/31/1989)

[52] D. Tianchen, C. Hein, and D. Baciu. *Understanding how words matter for port heritage: towards a network perspective*. 2021. URL: https://www.portcityfutures.nl/news/understanding-how-words-matter-for-port-heritage-towards-a-network-perspective (visited on 03/31/2021)

terms interchangeably is supported by the definition provided by the U.S Energy Information Administration. It explains that:

> "Crude oil is a mixture of hydrocarbons that exists as a liquid in underground geologic formations and remains a liquid when brought to the surface. Oil companies produce petroleum products from the processing of crude oil and other liquids at petroleum refineries, from the extraction of liquid hydrocarbons at natural gas processing plants, and from the production of finished petroleum products at blending facilities. Petroleum is a broad category that includes both crude oil and petroleum products. The terms oil and petroleum are sometimes used interchangeably"[53].

One last explanation of the terms used in the title is necessary to clarify an ongoing process when talking about the oil industry. There is still no proclamation of oil activities' death, and one can only think that such a statement may never come. Petroleum companies are economically suffering from the consequences of the Coronavirus (or covid) pandemic, which started at the beginning of 2020, and from the shift towards renewable energies. Many of them recently declared bankruptcy, meaning they 'died' or are 'dying'[54]. The 'Supermajors' or 'Big Oil' are the only one sustaining well enough and for which talking about death is way too premature. The war on prices led by Russia and Saudi Arabia combined with the Coronavirus crisis severely affects the petroleum sector, with prices for a barrel of petroleum even temporarily reaching negative values. This situation results from the pandemic which triggered, through lock down measures, a massive drop in global oil demand when production was still high. The American booming in shale oil, that started in 2007, thus abruptly stopped[55]. Many producers, including major companies, had to declare bankruptcy as the price of a barrel was not making their activity profitable anymore[56]. When adding the general trend towards renewable energy production of many countries, especially in Europe, the future of oil activities became suddenly uncertain, if not compromised in the European Union. The oil industry suffered tremendous losses since 2019 but is far from dead, even in Europe, and oil companies are recovering at a fast pace[57]. This context rather enhanced the dominance of powerful companies controlling the entire petroleum chain over smaller producers. The business-as-usual of oil companies and their structure is dying as oil actors are pushed, by shareholders and the public opinion, to change their practices, but the influential positions of these companies on decision-makers protect them from radical shifts.

[53] A page on the website of this administration explains "What is the difference between crude oil, petroleum products, and petroleum?". See the website: https://www.eia.gov/

[54] L. Hampton. *U.S. energy bankruptcy surge continues on credit, oil-price squeeze.* Aug. 2020. URL: https://www.reuters.com/article/us-north-america-oil-idUSKCN25727Wlaw%20firm's%20data%20showed.

[55] L. Maugeri. *The shale oil boom: a US phenomenon.* Harvard Kennedy School, Belfer Center for Science and International Affairs, 2013

[56] N. Albishausen. "The Impact of the COVID-19 Pandemic on the US Shale Industry: An (Expert) Review". In: (2020)

[57] J. Ambrose. *Shell and BP bounce back into profit even as oil's glory days fade.* Apr. 2021. URL: https://www.theguardian.com/business/2021/apr/24/shell-bp-back-into-profit-oils-glory-days-fade

1.3.4. A MIXED METHODOLOGY: HISTORY, LAWS, SPACE, AND THE LITERATURE

IN the literature on port cities the debate around local, regional, national or European scales is clearly unbalanced (Fig1.2). On the one hand there is a clear overweight of national policies' discussions which reflects a strong influence of nationalistic perspectives and concerns over the creation of environmental policies and the management of the energy sector. On the other hand, the literature neglects considerations for local or regional characteristics and decisions of public authorities, as well as the consequences of oil activities on the quality of the environment (soil, water, and air) and on the health of inhabitants. Yet, oil issues, its pollution, transformation, and influence, require to look at this variety of topics. All the scales discussed are where the oil industry and its actors emerged, where the influence of oil companies can intervene to shape rules, and where inhabitants and public authorities will suffer the repercussions of oil pollution.

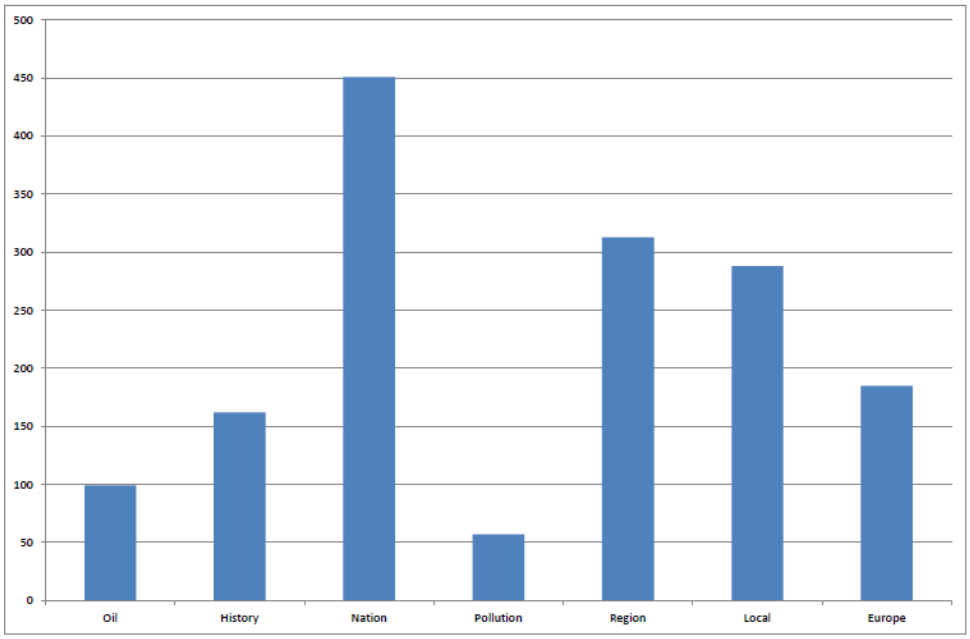


Figure 1.2: Appearance of words in the abstracts of 1380 references taken from Scopus with the research "Port City". From left to right one can read: Oil, History, Nation, Pollution, Region, Local and Europe.

Out of the 1380 references extracted from Scopus and discussing port cities between 1930 and 2019[58], only a few of them are focusing on the question of oil and its pollution. Oil is a topic appearing only 99 times, while merely 57 references are mentioning the pollution issue in port cities. Similarly, there are only 162 texts discussing the history

[58]See: https://www.scopus.com/

of port cities. In the current energy transition conversation, especially in port cities, the question of oil and pollution must take a more prominent place to anticipate the future of oil spaces. Authors focus more on the economic (425 using 'econom' to include all the variants) and development (431 references) aspects of port cities, with an even deeper focus on port (1290) than on the city (916). There is a lack of interest towards oil pollution and transformation issues though the energy transition context will inevitably push them forward in the future (84) and in the agenda of local and European authorities. Considering the climatic and sanitary context, the lack of attention towards problems linked to oil industries and their consequences in port cities indicates the confidence of many authors in the resilience of petroleum activities. This confidence appears through a cruel imbalance between considerations for the future of port cities (84) and questions related to development (431), and the greater focus of authors on questions relating to the port (1290) over the city (916). This brief quantitative analysis illustrates the focus and the gaps in the literature, while demonstrating a clear division between the different interests, rather than the use of a holistic approach when talking about port cities. However, this research does not solely rely on the analysis of the literature, but on a wide understanding of the hermeneutics, with the analysis and interpretation of all the various materials supporting and showing the influence of oil companies over and in legal frameworks and planning practices.

Taking Dunkirk as a main case study area, the visit of the city as well as its port area was unavoidable. This ground analysis was compulsory to better grasp the spatial influence and importance of the oil industry on the port city and confirm the relevance of this case study. The information and materials obtained during these visits are but one of the multiple data used to build this research. The objective of gathering different types of materials through a variety of sources and fields was to create a body of evidence. The analysis of an event or a law through the lenses of theories, history, or spatial developments aims at supporting the explanation of their origin and consequences[59]. This triangulation approach refers to the explanations of the American social scientist Robert K. Yin on how to efficiently conduct a case study answering the questions of "how" and "why"[60]. Investigating the topic through the historical, legal, spatial, and environmental disciplines constitute another part of this body of evidence, not only to face the complexity of the issue but also as part of the fields considered in the interdisciplinary approach of this research.

Visits to the local archives of Lille[61] and Dunkirk provided a few primary materials for this research[62]. Drawings, paintings, letters and authorizations brought new elements and precious illustrations on the influence of oil industries on the development of the port city of Dunkirk. These documents also revealed the evolution of security, health and planning measures related to oil activities. This research uses also online archival

[59] H. Noble and R. Heale. “Triangulation in research, with examples”. In: *Evidence-Based Nursing* 22.3 (2019), pp. 67–68

[60] R. K. Yin. *Case study research: Design and methods*. Vol. 5. sage, 2009. ISBN: 1412960991

[61] Lille is the capital of the region "Hauts-de-France", and the prefecture of the department "Nord", in which Dunkirk is located.

[62] Here namely the "Archives Départementales du Nord" in Lille and the "Archives de Dunkerque - CMUA".

sources such as the aerial pictures of the National Institute of Geographic and forest information, or "IGN"[63], and the detailed listing of industrial sites in France from the website "Géorisques"[64]. Furthermore, the research combines old maps and aerial pictures with current satellites images and geo-referencing software (ArcGIS) to locate former oil sites in Dunkirk. This methodology connecting spatial and historical mapping to understand urban and environmental issues in port cities is an important tool. Mapping allows the identification of planning and health challenges around former industrial areas like in Dunkirk beyond quantitative economic data[65]. The objective is to demonstrate the spatial impact that oil industrial sites can have beyond their administrative borders and lifetime, and potentially on the entire port city region[66]. This spatial analysis together with a study of the literature, planning regulations, land uses, and historical events intend to highlight the origins of current practices as well as the influences behind the evolution of regulations. This method uncovers lost and polluted sites to identify their origin, location, and the remaining invisible influence of petroleum activities (pollution among others) on the port city.

Multiple readings, conferences, and meetings in research groups confirmed that industrial port cities share a common evolution in their development. The growth of the oil industry in port cities like Dunkirk, Antwerp, or Rotterdam followed a pattern sharing similar influences. In the Netherlands, production sites are in Rotterdam where public and private authorities extensively invested in an oil port and infrastructure. But the decision-making process took place in The Hague as the headquarters of oil companies are there, nearby governmental offices and law-makers[67]. This example is transferable to other industrial port cities. Their development and the influences they face are similar from one to another. Production and transformation sites are in well-connected and equipped areas like port cities, whereas headquarters of companies are located nearby national and international political centers. The heritage of oil industry, both visible, with its infrastructure, and invisible, with its pollution and legal and political influence, is a complex burden for local authorities to deal with. Past decisions and plans influenced by economic considerations of oil companies are binding them, creating a relation of economic dependence between local actors and "Big Oil" companies, and incompatibilities between port and city planning strategies.

Analyzing regulations is an important part of the work and unavoidable to meet the challenges around spatial planning complexity and the energy and industrial transition in port cities. The general observation of rules at national (France, Belgium and The

[63] IGN stands for "Institut national de l'information géographique et forestière". It includes historical aerial pictures with "Remonter Le Temps", and actual aerial pictures through the service "Géoportail".

[64] The website "Géorisques" http://www.georisques.gouv.fr/ lists the pollution of industrial sites in France since the end of the 18th century. The category used to identify oil sites was "Petroleum refining, distillation and rectification and / or storage of mineral oils".

[65] C. Hein and Y. Van Mil. "Mapping as Gap-Finder: Geddes, Tyrwhitt, and the Comparative Spatial Analysis of Port City Regions". In: *Urban Planning* 5.2 (2020), pp. 152–166. ISSN: 2183-7635

[66] S. Hauser, P. Zhu, and A. Mehan. "160 Years of Borders Evolution in Dunkirk: Petroleum, Permeability, and Porosity". In: *Urban Planning* 6.3 (2021)

[67] C. Hein. "Oil Spaces: The Global Petroleumscape in the Rotterdam/The Hague Area". In: *Journal of Urban History* (2018)

Netherlands), European and international scales reveals the locks that exist on the path to an efficient transformation of oil industries and to the anticipation of disasters linked to their activity. The comparison and study of different measures in countries or regions can also reveal best and transferable practices in dealing with the transformation of oil sites, their pollution or influence[68]. The production of treaties and rules related to the protection of environment soared since the 1970s with more than 300 outputs, making the international level a pressuring actor in the environmental topic[69]. And the growing concern over climate change and pollution is enhancing this phenomenon. Interpretations of judges, local, national, and European authorities and private actors are valuable sources of inspiration in a field where there are numerous and important gray zones in the application of rules.

Put in parallel with historical events related to the use or transformation of oil, the origin of many regulations can appear. The knowledge of past industrial or chemical incidents reveal the reactive mechanism behind the production of many legal tools. When creating spatial planning, environmental, and health measures, reaction of public authorities often prevailed over the anticipation of potential industrial catastrophes. The link between rules and incidents being sometimes more complex than with some bearing specific names[70]. These same historical events can also give precious information on activities taking place in specific areas of port cities. Their analysis can give insights on how public authorities have ignored the importance of such historical knowledge and how the influence of the oil industry transpired in legal texts. This argument refers back to the notion of the "minimalist" and "maximalist" positions in which public authorities and industrial actors minimize the responsibility of the industry in case of disaster, while inhabitants and unions try to define the responsibility as widely as possible[71]. The success of such observations relies on the gathering of information on oil-related incidents, regulations discussing oil, spatial planning, environment, and health, as well as on archival documents, mapping techniques and past authorizations for industrial sites found in archives.

In order to observe these influences from a more regional perspective and analyze the impact of the oil lobby, the research considered a variety of legal texts from different areas. The analysis focused on French, Flemish (Antwerp is on the Dutch speaking part of Belgium, near the Dutch border), Dutch, European and international regulations. The translation of French, Dutch, and Flemish regulations in English was necessary to standardize the search and use of words. Laws, decrees, and treaties are coming from official records or "journals" of authorities, national and regional, and in some cases from the

[68] The countries are here the three of the case studies. The regions are also important scales and actors as they continuously receive more power from central governments and support from the EU. It is also important to notice that Belgium is a federal state, as such the regional authority is a powerful actor in the decision-making process.

[69] S. Maljean-Dubois and L. Rajamani. *La mise en oeuvre du droit international de l'environnement.* Martinus Nijhoff, 2011

[70] The Erika packages established in the EU system are, for instance, a reference and reaction to the oil spill of the tanker Erika in French Brittany in 1999. The same goes for the Seveso Directive of 1982, which refers to the chemical incident of Seveso in 1976, in Italy.

[71] E. Tucker. *Working disasters: the politics of recognition and response.* Routledge, 2016. ISBN: 1351840541

literature or the jurisprudence[72]. The study used an excel file to reveal the gaps and focus of the legal texts, similarly to the literature analysis previously detailed. The translation was also unavoidable to better grasp the aims and objectives of these texts. Although this translation implied a loss in some meanings and implications typical of legal documents, it was necessary to understand their general content. The table1.1 is summing up the primary materials used in the research.

1.4. CHAPTER SUMMARIES

To answer the issues and research questions mentioned in this introductory chapter, this dissertation develops a plan based on chronology and scales. Each chapter discusses the effects of events, actors, rules and trends on the development of new practices towards or from the oil industry on the planning of port cities and the creation and application of rules. The effects of these developments are articulated around historical events that triggered changes in behaviors and strategies of public and private authorities. Similarly to a form of top-down approach, chapters develop first the global or national context, with examples and illustrations beyond Dunkirk, before coming back to this main case study, when possible, to investigate the consequences on the local scale. In spite of its legal approach, the objective of this dissertation is to highlight the importance of both historical and legal fields in improving the protection of health and the environment, as well as the future planning of port cities; to demonstrate the intervention and influence of oil actors in the creation (or lack of creation) and application of regulations on local, national, European and international scales; and to highlight the evolution of oil actors or companies on the law-making process through time. Such a multidisciplinary approach can reveal the prior importance of regulations in achieving the energy transition and the transformation of oil industry's legacy. The harmonization efforts achieved by European institutions since the 1957 Treaty of Rome make this study even more transferable to other European port cities, supporting the regional approach of this research, beyond the borders of port cities and countries. As public and private actors, along with scientific authors, often underestimate the origin and weight of legal frameworks on the efficiency of planning and environmental policies, this study can also generate new uses and interpretations for them to deal with the heritage of oil activities in port cities. The shape and dedication of zones in cities, as well as their spatial evolution and planning is determined by legal texts that define possibilities and limitations. As explained in Chapter2, the legal field is essential to comprehend the spatial evolution of, in this case, port cities that, like Dunkirk, relied and are still relying on the oil industry.

The first element to highlight in order to grasp the functioning of legal systems in Europe is reaction. Disasters or incidents linked to industrial activities, related to transformation or storage of a product, forced the creation of many rules in the fields analyzed in

[72] In his dictionary, Cornu defines jurisprudence as "a set of court decisions produced during a certain period either in a matter, or in a branch of law, or in the whole of law" or again as a "set of solutions provided by court decisions in the application of law (especially in the interpretation of the law when it is obscure) or even in creating law (when it is necessary to complete the law, replace a rule that lack)". See: G. Cornu. *Dictionnaire Juridique.* 8th ed. Paris: Presses Universitaires de France, 2000. ISBN: 2 13 050600 3

Table 1.1: Summary of basic materials used in the research.

Type	Source(s)	Description
Regulations	From National (French, Dutch and Belgian) and European official journals, websites of conventions and treaties, and the literature.	As many objectives of the regulations as possible on spatial planning, environment and health. From treaties, conventions, declarations, directives and laws.
Literature	From articles and books linked to heritage, law, port cities, energy transition, spatial and urban planning, political science and history.	All pieces related to spatial planning, environment and health, from the 1970s until 2020 provide interesting insights on the development of the oil influence. The interpretation of rules in the legal literature is a valuable perspective.
Illustrations	From archives, newspapers, online databases, museums and the literature.	Many illustrations describe the effects of past petroleum industries on the planning of port cities and on the environment. From maps and paintings, to aerial pictures and archived drawings.
Software	ArcGIS and GIMP.	Both softwares allow to locate old petroleum facilities and highlight the development of urban areas over these former industrial sites.

this research. The implications of these events on health, security, spatial planning and environmental protection triggered public authorities' reaction to take measures in order to prevent the repetition of such catastrophes, or limit their impacts. These historical crisis and their narratives impacted choices and strategies of public and private authorities, and still are[73]. The reaction principle did not, however, start with the beginning of oil activities in the 1860s, as private actors, since the eighteenth century, hampered the efficiency of some innovative regulations. A mechanism that oil actors later incorporated and developed to protect their activities, influence the spatial organization of port cities to their benefit, and ensure the support of the public (Chapter 3).

The reaction mechanism in creating spatial, environmental and health regulations stems from the growing influence of oil actors after 1945. Their early lobbying drastically expanded after the second World War with populations and governments becoming increasingly dependent over cheap petroleum products. The economic weight and financial power of oil companies led them to enjoy a dominant position over national, European, and international decision-makers thanks to low prices (Chapter 4). Despite the rise of the environmentalism movement and two oil crises in the 1970s, oil actors managed to turn political speeches and regulations in their favor, in order to protect their position on the long-term. The visible infrastructure of oil companies expanded in port cities, while they secured a positive image in the mind of populations and a grasp over knowledge and policies.

Some recent actors rose to face the oil industry and its detrimental effects on nature and people. The up-scaling of oil disasters and their greater visibility, combined with the awareness of decision-makers and citizens on climate change and the effects of pollution, triggered new behaviors and practices in the 1980s. The European Union, for instance, filled a gap that many of its Member States let in protecting both the environment and the citizens (Chapter 5). Natural environments ignore borders, as such, the scale on which the EU is acting is one of the most relevant ones to improve the cohesion and effectiveness of planning policies[74]. Improvements of the air and water quality are important successes of European policies and of the legal harmonization of the Union[75]. The EU also empowered local actors such as citizens, associations, and local authorities. The recognition of their knowledge and participation is slowly creating a public lobbying to counter the one from oil industries[76]. This movement incorporated their concerns and needs into political discourses and policies across the continent and overseas. The effects on urban developments or the renewal of industrial port cities become clearer and visible with inclusive initiatives like with the port centers of the AIVP[77], while also

[73] K. Kalmbach, A. Marklund, and A. Åberg. "Crises and technological futures: Experiences, emotion, and action". In: *Technology and culture* 61.1 (2020), pp. 272–281. ISSN: 1097-3729

[74] A. Liberatore. *The integration of sustainable development objectives into EU policy-making*. Routledge: London, 1997; W. Zonneveld. "Expansive spatial planning: the new European transnational spatial visions". In: *European Planning Studies* 13.1 (2005), pp. 137–155. ISSN: 0965-4313

[75] S. Dühr, D. Stead, and W. Zonneveld. "The Europeanization of spatial planning through territorial cooperation". In: *Planning, Practice & Research* 22.3 (2007), pp. 291–307. ISSN: 0269-7459

[76] B. Lits. "Exploring astroturf lobbying in the EU: The case of responsible energy citizen coalition". In: *European Policy Analysis* 7.1 (2021), pp. 226–239. ISSN: 2380-6567

[77] AIVP stands for "Association Internationale Villes et Ports", or International Cities and Ports Association. See

benefiting port authorities. Yet, the influence of disasters and actors from oil companies on policies and political commitments remains today despite their facilities disappearing in Northwest European port cities like Dunkirk. Though European oil companies advertise a greener strategy and more sustainable practices to go carbon neutral, they are still applying double standards with aggressive climate-related lobbying[78].

Port authorities are now discovering the benefits of historical knowledge and public participation[79]. Ports and cities authorities work closer together to meet the need and expectations of each other[80]. Such practices must go together with a better inclusion of anticipation in the closure of oil sites, especially in port cities shaped by it like Antwerp and Rotterdam. This awareness slowly appears in the agenda of private and public actors. When the Dutch and Belgian port authorities are trying to improve the efficiency and extend the life of their oil sites, others like in Dunkirk have to make the transition happen as closures already hit at the beginning of 2000. Recent experiments and innovations, in both cases (the transiting one and the survivalist ones) give insights on the weaknesses of planning and environmental tools supposed to support the energy transition and the citizens. The transformation of the oil heritage, the new pledges from nations, the European Union, in 2019 and 2021, and internationally, in 2015, towards a more sustainable future require from decision-makers to look beyond the technological perspective and to consider inter- or trans-disciplinary solutions (Chapter 6)[81]. Thus, these experiences highlight the necessary changes that must occur in European legal systems and port cities spatial planning to meet the transformation challenge of vast oil industrial and polluted spaces, and achieve the continent's objectives of carbon neutrality[82]. The social justice emphasized by the European Commission in its proposal for a European Green Deal must go along with spatial justice. This objective requires to investigate laws and events that shaped them and the spatial evolution of port cities.

the website of the AIVP explaining the aims and objectives of these centers: https://www.aivp.org/en/acting-sustainably/port-center-by-aivp/

[78] J. Green *et al.* "Transition, hedge, or resist? Understanding political and economic behavior toward decarbonization in the oil and gas industry". In: *Review of International Political Economy* (2021), pp. 1–28. ISSN: 0969-2290

[79] V. P. Mega. "Coastal Cities for and with Local and World Citizens". In: *Conscious Coastal Cities: Sustainability, Blue Green Growth, and The Politics of Imagination*. Cham: Springer International Publishing, 2016, pp. 253–268. ISBN: 978-3-319-20218-1

[80] J. Monios, R. Bergqvist, and J. Woxenius. "Port-centric cities: The role of freight distribution in defining the port-city relationship". In: *Journal of Transport Geography* 66 (2018), pp. 53–64. ISSN: 0966-6923

[81] J. T. Klein. "Prospects for transdisciplinarity". In: *Futures* 36.4 (2004), pp. 515–526. ISSN: 0016-3287

[82] The European Commission. *The European Green Deal, COM/2019/640 final*. Tech. rep. 2019. URL: https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1588580774040%7B%5C&%7Duri=CELEX%7B%5C%%7D3A52019DC0640

2

The Literature and Theoretical Framework

Language is not simply a reporting device for experience but a defining framework for it.

Benjamin Lee Whorf
American linguist and anthropologist at the beginning of the 20th century.

Parts of this chapter have been published in: S. J. Hauser and C. Roche. "Sharing Is Caring, but Is the Shore Cared for? The Sharing Paradox of the French Coast". In: *Urban Science* 4.4 (Nov. 2020), p. 60.

THE research intends to consider the influence of oil industry over regulations and planning systems in a broad sense. Thus, the analysis is not focusing solely on a legal perspective, but also considers disciplines beyond the expertise of the author, such as history, architecture, urban and spatial planning, as well as political science. The objective is to grasp as much as possible the extent of oil companies' influence and impact on planning practices, regulations, people, and cities. This inter- if not trans-disciplinary approach is promoted in the literature to deal with the growing complexity of contemporary issues[1]. Churchman, discussed in the introduction, was already highlighting this complexity in the 1960s with the notion of 'Wicked Problem'. He promoted a holistic approach in dealing with issues rather than treating problems separately, one by one[2]. Rittel and Webber, respectively German and American designers and theorists, linked in 1973 this notion to planning theory to explain the uncertainty and complexity inherent to the spatial planning field[3].

This chapter discusses the theories and the literature upon which this research is built and how they are used or expanded to develop the argument of this dissertation. The aim here is to explain the relevance of the planning and political choices made to investigate oil companies' influence over port cities through the lens of regulations. Thus, this chapter shows, through the existing literature, the relevance of the time period considered and the importance of port cities' planning in relation to the oil industry and its influence. It eventually explains how all these elements connect with each other and affect contemporary challenges linked to the energy transition, the health of inhabitants, and the planning of port cities.

2.1. AN ANALYSIS STARTING BEFORE THE BEGINNING OF THE OIL INDUSTRY

THE research behind this thesis is based on the analysis of historical developments in planning systems and practices, or planning history. There are various actors able to influence planning developments, like citizens through the construction of their houses, public institutions with rules and plans for cities, and industrial owners in the establishment of their facilities. The studies around planning history are, however, lacking of long-run historical studies.

Historians and contemporary studies in social sciences are mainly focusing on particular events and materials, as Sorensen, a Canadian geographer and planner, pointed out[4]. In the chapter of one of his books, he summed up this process by using the no-

[1] G. D. Brewer. "The challenges of interdisciplinarity". In: *Policy sciences* 32.4 (1999), pp. 327–337. ISSN: 0032-2687; L. López. "La importancia de la interdisciplinariedad en la construcción del conocimiento desde la filosofía de la educación/The importance of interdisciplinarity in the construction of knowledge from philosophy of education". In: (2012)

[2] C. W. Churchman. "Guest editorial: Wicked problems". In: (1967)

[3] H. W. Rittel and M. M. Webber. "Dilemmas in a general theory of planning". In: *Policy Sciences* 4.2 (1973). ISSN: 00322687. DOI: 10.1007/BF01405730

[4] A. Sorensen. "Institutions, Comparison, and Temporal Processes". In: *The Routledge Handbook of Planning*

tion of 'micro-history' developed by the British historians Guldi and Armitage to criticize the rise of event-based experts which are missing the big picture[5]. He also refers to the notion of 'snapshots' from the American political scientist Pierson, highlighting the importance of cumulative processes and explaining the lack of consideration for large time frames and the long-term causes of events[6]. Taking these critics into account, this research considers not only the extensive time frame of the oil industry's history, around one hundred and fifty years, but also analyses events and practices taking place beforehand. The aim is to understand the origins of the oil industry's power and its long-term consequences, as suggested by Pierson.

The aim here is to efficiently analyze the processes petroleum companies and actors created and their consequences on regulations and port cities' planning. Thus, the research needs to combine the methods and understanding of a variety of fields to better understand port cities' spatial development, especially around oil industrial sites. To tackle current obstacles, there is a need to solve the lack of long-term perspectives on certain socio-economic and historical studies. Therefore, this research, though focusing on the oil industry, goes beyond the already long history of petroleum activities to identify the origin of industrial influences and their impacts on planning policies and the creation of regulations. Actors of the oil industry were not the first to influence and develop their own interpretations of regulatory frameworks, and followed the path set before by chemical entrepreneurs. To clearly define the objective of the research this chapter develops the theoretical frames and the literature around the key topics considered in the research.

2.2. SEA PORT CITIES: HUBS AND OIL PLACES FACING NUMEROUS CHALLENGES

COASTAL areas suffer tremendous pressures created by the conflicting interests at stake in their territory. Tourism, agriculture, urban expansion, and industrial developments compete on these lands, especially around hubs such as port cities. While local associations and citizens try to protect their environment, the urban and industrial expansion represent economic opportunities in the perspective of both public and private authorities[7]. This conflicting situation is well illustrated in Dunkirk with tourism and urban areas in the East and port activities in the West, with the latter having detrimental effects over the attractiveness and the environment of the East part. The French geographers Dewailly and Barbaza were already, in 1974, illustrating the necessary and difficult compromise to find for public and private authorities of Dunkirk when dealing

History. Routledge, 2017, p. 26

[5] J. Guldi and D. Armitage. *The history manifesto*. Cambridge University Press, 2014. ISBN: 1316165256

[6] P. Pierson. *Politics in Time: History, Institutions, and Social Analysis*. Princeton University Press, 2004. ISBN: 0691117152

[7] J. Daligaux. "La périurbanisation en Provence: visages d'hier et d'aujourd'hui, interrogations pour demain. Le cas du Var et des Bouches-du-Rhône/Periurbanisation in Provence: past and present images and questions for tomorrow. The case of the Var and the Bouches-du-Rh". In: *Géocarrefour* 76.4 (2001), pp. 289–302

with spatial planning[8]. Port authorities are not solely managing their territory anymore but became partners of local spatial and urban planning strategies[9].

In a book published in 2016, Mega, an expert in planning and policy analysis, emphasizes the important role of coastal cities. Their public and private authorities have to face a variety of challenges and risks, while managing the different interests at stake and the link they make between local and global goods and citizens[10]. Taking Hamburg as one example, she shows how the development of a port is beneficial to many actors, not only locally but also on a greater scale. She demonstrates the role of comprehensive and integrated policies to regenerate coastal cities. Climate change, natural hazards, and maritime activities are threats to their sustainable development. To challenge these obstacles, Mega stresses out the need for anticipative and inclusive strategies, with powerful institutions and an efficient enforcement of rules. Similarly to Mega, Fenton, an expert in sustainable governance, highlighted in 2020 the central role of such coastal areas in the sustainable development objectives of nations and in transport systems[11]. Taking Stockholm as an example, he demonstrates the pressures and challenges that port city authorities have to deal with and the transferability of these issues to other places. Among others, he mentions as challenges for the urban redevelopment, the maintenance of port infrastructure, the management of environmental risks, and the aim of becoming fossil-free ports. These authors emphasize the importance of industrial transformation issues in port areas, the anticipation need of authorities, the challenge of protecting the environment, and the necessity to enforce rules.

One of the significant points developed by Fenton is the important influence of petroleum companies on the redevelopment strategies of port cities. Hein emphasized this role of oil companies by highlighting the domination of petroleum industry and its products on the energy landscape and how it shaped the built environment of port cities[12]. Taking Rotterdam as an example, she shows similarities in the challenges that port cities' authorities around the world have to face when dealing with the heritage of petroleum. Oil actors worldwide shaped policies and cities differently according to local or national characteristics, but Hein confirms that "together they function as a global palimpsestic petroleumscape". She defines this notion as the interconnections of physical structures and imaginaries of the petroleum industry and its effects on the built environment of cities. The dominance of this industry over the planning and land allocation in Rotter-

[8] J.-M. Dewailly and Y. Barbaza. "Conflits de fonction dans un secteur à vocation touristique: le littoral entre Dunkerque et la frontière belge". In: *Bulletin de l'Association de géographes français* 51.417 (1974), pp. 203–213

[9] L. Fedi. "La consécration et les défis du port aménageur". In: *Le Droit Maritime Français* (2013)

[10] V. P. Mega. *Conscious Coastal Cities.* Springer International Publishing, 2016

[11] P. Fenton. "Port-City Redevelopment and Sustainable Development". In: *European Port Cities in Transition: Moving Towards More Sustainable Sea Transport Hubs.* Ed. by A. Carpenter and R. Lozano. Cham: Springer International Publishing, 2020, pp. 19–36

[12] C. Hein. "'Old Refineries Rarely Die': Port City Refineries as Key Nodes in The Global Petroleumscape". In: *Canadian Journal of History* 53.3 (2018), pp. 450–479; C. Hein and P. T. van de Laar. "The Separation of Ports from Cities: The Case of Rotterdam". In: *European Port Cities in Transition: Moving Towards More Sustainable Sea Transport Hubs.* Ed. by A. Carpenter and R. Lozano. Cham: Springer International Publishing, 2020, pp. 265–286

dam led to multiple relocations of its infrastructure since the 1860s, even claiming land over the North Sea after the Second World War. The renewal of the city after the war led to a deepening of the functionalist perspective of the port with greater infrastructure incompatible with the urban network[13]. With Rotterdam, the energy transition will be a major challenge for the authorities as its oil history is similar to Dunkirk though on a much greater scale. However, dealing with the current and well-known infrastructure does not mean that lost and past petroleum sites do not pollute the soil and the water anymore, and do not affect citizens. This is one of the reasons behind the choice of Dunkirk as a case study when considering the important number of facilities that oil entrepreneurs built in this port city since the 1860s. Knowing that many of them were ignored in records, thus their sites never cleaned, further increased the relevance of this case study to illustrate the importance to know about past industrial developments.

2.3. FROM ABUNDANT TO PEAKING AND POLLUTING OIL

THE era of easy and cheap petroleum is progressively ending. Now the aim for oil company is to get the most out of the fields they are already exploiting because the location (poles) and depths of the next sources are difficult to access[14]. Such a difficulty supports the notion of 'peaking of oil' developed in the 1950s by the American geologist Hubbert[15] which explains that the production of oil will eventually cease to increase and rather reach a plateau before decreasing[16]. Yet, the issue is not necessarily the impossibility to sustain a continuous growth of oil production but rather the impossibility to contain the growing demand for cheap energy from developing countries and the rest of the world. Though the global peaking of oil happened recently, and was acknowledged even by oil companies[17], the lack of consideration for this notion and for the anticipation of its consequences can have dire effects on a global economy totally dependent on the availability and the prices of oil[18].

The peaking of oil has also consequences on port cities, with local authorities needing solutions to adapt their plans and strategies to a post-oil period[19]. The British environmentalist Hopkins develops a future where the lack of anticipation of public authorities towards this peak will produce an economic crisis, a volatility in energy prices, and

[13] H. Meyer, C. D'Laine, and P. Henk. *City and port: Transformation of Port Cities. London, Barcelona, New York and Rotterdam.* 1999, p. 424

[14] Chevron Corporation. "Deep Seething Sea: Unlocking oil that lies beneath menacing forces of nature". In: *Next** (2008)

[15] J. Jovinelly. *Oil: The Economics of Fuel.* The Rosen Publishing Group, Inc, 2007. ISBN: 1404219153

[16] R. L. Hirsch, R. H. Bezdek, and R. M. Wendling. "Peaking oil production: sooner rather than later?" In: *Issues in Science and Technology* 21.3 (2005), pp. 25–30; R. L. Hirsch. "The inevitable peaking of world oil production". In: *Bulletin of the Atlantic Council of the United States* 16.3 (2005), pp. 1–10

[17] A. Nafeez. *A former BP Geologist: Peak Oil is here and it will break economies.* Dec. 2013; J. Ambrose. *Global oil demand may have passed peak, says BP energy report.* 2020. URL: https://www.theguardian.com/business/2020/sep/14/global-oil-demand-may-have-passed-peak-says-bp-energy-report

[18] S. Alexander. *The new economics of oil.* Melbourne Sustainable Society Institute, the University of Melbourne, 2014

[19] R. Hopkins. "Peak oil and transition towns". In: *Architectural Design* 82.4, Scarcity: Architecture in an Age of Depleting Resources (2012), pp. 72–77. DOI: 10.1002/ad.1432

deepen the climate change issue. These three elements combined with a lack of actions from governments unless economic growth comes back must, according to Hopkins, shift the aim of sustainability towards one of resilience, focusing on local solutions. This approach supports the recent yet growing development of visions and plans in port cities promoting adaptation and putting back nature in their strategies[20]. For Wilkinson, a British specialist in environmental epidemiology, the driving force of the energy transition will not be linked to climate change but rather to a question of costs of the energy, the technology and the balance between the costs of mitigation and those directly caused by climate change[21]. Though focusing on the effects of peak oil on health, Wilkinson makes a point on the importance to achieve the transition to create an economy more resilient to oil shocks. This transition is slowly happening with renewable energies producing more electricity than fossil fuels, but the literature and authorities are forgetting what this transition implies for port cities' planning and futures.

Port cities' authorities will have to transform these dying oil sites in Europe, and not all of them can become touristic spots or part of the heritage[22]. Authors writing on heritage described a variety of perspectives on the re-use or reclamation of post-industrial lands. Kirkwood, an expert in landscape architecture and technology, illustrated in 2003 the challenge of transforming former industrial sites around New York[23]. Using the term "brownfields" to describe these areas, he uses a definition from the U.S Environmental Protection Agency of 1996: "Abandoned or under-used industrial and commercial sites where redevelopment is complicated by real or perceived contamination". In his explanation, developers perceive these lands as an opportunity for potential economic development considering that their location is often in or around urban areas. If Tempel, a German expert in industrial heritage, also reflects on the pollution, transformation, and perception of the industrial heritage, he again discusses mainly the reclamation of the built heritage, the one still visible[24]. For him, the cleaning process often implies a destruction of the industrial history. However, Tempel later highlights the recent yet growing collaboration between companies and nature conservation groups in the remediation of former industrial sites. In his article, he deals however with modern time industries, still visible when the reclamation happens and where authorities are aware of the pollution. Though providing examples for anticipative plans in urban planning, it is the implications of long lasting and well-known industries on the urban tissue that he extensively discusses. Nevertheless, the energy transition and the notion of environmental justice also requires looking at the consequences of ancient and sometimes lost industrial sites on the urban planning of modern cities and the quality of their environment[25]. A topic much less developed in the literature on which this research elaborates

[20] S. Davoudi, J. Crawford, and A. Mehmood. *Planning for climate change: strategies for mitigation and adaptation for spatial planners*. Earthscan, 2009. ISBN: 1849770158

[21] P. Wilkinson. "Peak oil: Threat, opportunity or phantom?" In: *Public Health* 2008 Jul;1 (2008)

[22] C. Hein. "Imagining fossil-free futures over contemporary petroleumscapes". In: *Atlantis* 26.3 (2016), pp. 8–11

[23] N. Kirkwood. "Manufactured sites: integrating technology and design in reclaimed landscapes". In: *Manufactured Sites*. Taylor \& Francis, 2003, pp. 16–24

[24] N. Tempel. "Post-industrial landscapes". In: *Industrial heritage re-tooled: The TICCIH guide to industrial heritage conservation* (2012), pp. 142–148

[25] C. D. Jacobson. "Historical perspectives on pollution in the city". In: *Cities (Guildford)* 18.2 (2001), pp. 127–

to prevent the energy transition debate from being solely on transformation, but also on a form of historical as well as environmental justice.

2.4. THE BLOCKING AND ENABLING COMPLEXITY OF REGULATIONS

THE relations between regulations, the planning of port cities, their history, the environment, and (oil) industrial activities, are often underestimated by decision-makers. When considering these topics, public and private actors dealing with planning strategies, policies, or economic activities treat them individually or in their own perspective, without considerations for the benefits and capabilities of integrated approaches[26]. Though the dominance of established networks of influences is likely to remain, their understanding combined with new practices and better communication can enable finer choices for future strategies in the planning of port cities[27]. Oil actors' intervention within the design and application of regulations is an indirect aspect of the landscape of influences developed by Hein through the notion of global petroleumscape. Rather than an addition to this landscape, it is caused by it, and is the ultimate representation and accomplishment of the oil lobby as it transcribes its influence into the rule of law[28].

The protection of the environment or the environmentalism movement started, internationally, in the 1970s. However, the beginning of environmental considerations, locally and nationally, though predating this movement, was only indirectly linked to the environment. This notion of environment encompasses here both the natural and the built and urban environment of port cities. This comprehension stems from port-related activities affecting both, as well as their development and quality which is, in turn, also impacting inhabitants. Already in the mid-19th century, ideas around public hygiene were already promoting, among others, a logic of environmental quality in cities to tackle sanitary issues and epidemics[29]. The period following the Second World War led, with the renewal of industrial activities, to new pollution issues in industrialized regions of western countries. Environmental impacts of this pollution and the incidents linked to industrial activities pushed public authorities to focus more on the importance of environmental quality. 1972 was the starting point of international awareness and

130; S. Baron, J. Carignan, and A. Ploquin. "Dispersion of heavy metals (metalloids) in soils from 800-year-old pollution (Mont-Lozere, France)". In: *Environmental science & technology* 40.17 (2006), pp. 5319–5326. ISSN: 0013-936X

[26] M. C. S. de Abreu and R. d. J. C. de Andrade. "Dealing with wicked problems in socio-ecological systems affected by industrial disasters: A framework for collaborative and adaptive governance". In: *Science of the Total Environment* 694 (2019). ISSN: 18791026. DOI: 10.1016/j.scitotenv.2019.133700

[27] E. P. Weber and A. M. Khademian. "Wicked problems, knowledge challenges, and collaborative capacity builders in network settings". In: *Public Administration Review* 68.2 (2008). ISSN: 00333352. DOI: 10.1111/j.1540-6210.2007.00866.x

[28] J. Barkan. *Corporate sovereignty: Law and government under capitalism*. U of Minnesota Press, 2013. ISBN: 0816686491

[29] A. E. M. de Hollander and B. A. M. Staatsen. "Health, environment and quality of life: an epidemiological perspective on urban development". In: *Landscape and Urban Planning* 65.1-2 (2003), pp. 53–62. ISSN: 0169-2046

of the environmentalism movement that still occupies contemporary public debates[30]. The concept of sustainability was introduced by Goldsmith in 1972[31], together with the report of the Club of Rome or "limit to growth"[32] and the first Earth Summit of Stockholm. This succession of events, reports, and international summits and conventions affected established legal systems. Since the 1970s, public authorities across the world took part in creating an increasing amount of treaties and conventions related to the environment, its protection or its management[33]. The importance of regulating industrial activities and improving collaboration between countries to achieve environmental objectives was clear from this point onward.

The period of economic renewal following the end of the Second World War went together with a great consumption of natural spaces around coastal areas. In Europe, this redevelopment also triggered the rise of environmental concerns and governmental responses in the 1970s. The French government, for instance, gradually acknowledged this issue and the pressures around port cities, and recognized the importance of coastal environments for the sustainable development of their regions[34]. With the support of the Shoreline Act of 1986, local citizens and associations in French coastal areas tackled the urban expansion, and forced urban planning strategies of coastal and port cities' authorities to switch from a strategy of expansion to one of densification and rationalization of land uses[35]. This legal tool, further developed in Chapter4, was the first constraining rule to protect the environment of the coast, and followed an example set a year before in 1985 protecting the mountain. These two laws alone, still famous and used as references today to protect natural places, exemplified the importance of strict regulations to efficiently tackle processes threatening the environment of port city regions and their inhabitants. They also showed the importance of judges and local actors in ensuring its respect and application against the economic appetite of real estate agents and local authorities[36]. The short coastal line of Belgium illustrates this urban and touristic pressure with the emergence, before the 1970s, of a thin but long strip of urbanized land along the coast, and the development, after the 1970s, of touristic activities consuming natural spaces near the sea[37].

[30] C. Roche. *L'essentiel du droit de l'environnement 2020-2021*. 11th ed. GUALINO, 2020

[31] E. R. D. Goldsmith *et al.* "Blueprint for survival.[Basic thesis that economic and population growth must be halted]". In: *Ecologist;(United Kingdom)* 2.1 (1972)

[32] D. H. Meadows *et al. The limits to growth: a report for the club of rome's project on the predicament of mankind*. New American Library, 1972

[33] S. Maljean-Dubois and L. Rajamani. *La mise en oeuvre du droit international de l'environnement*. Martinus Nijhoff, 2011

[34] S. J. Hauser and C. Roche. "Sharing Is Caring, but Is the Shore Cared for? The Sharing Paradox of the French Coast". In: *Urban Science* 4.4 (Nov. 2020), p. 60

[35] J. Daligaux. "La périurbanisation en Provence: visages d'hier et d'aujourd'hui, interrogations pour demain. Le cas du Var et des Bouches-du-Rhône/Periurbanisation in Provence: past and present images and questions for tomorrow. The case of the Var and the Bouches-du-Rh". In: *Géocarrefour* 76.4 (2001), pp. 289–302

[36] J. Daligaux. "Urbanisation et environnement sur les littoraux : une analyse spatiale". In: *Rives méditerranéennes* 15 (Oct. 2003), pp. 11–20. DOI: 10.4000/rives.12

[37] I. Van den Steen, B. Wayens, and E. Wolff. "Evolution de l'utilisation du sol le long du littoral belge". In: *Belgeo. Revue belge de géographie* 3 (2005), pp. 327–348. ISSN: 2294-9135

In the late 1980s, it became increasingly clearer that cooperation was a necessity. All the actors aware of the environmental issues realized that individual countries, with their scale and the diversity of pressures they face, could not significantly tackle environmental issues without the collaboration of their neighbors[38]. The creation of the EU and its single market relies on regulations and treaties that recognized the importance of collaboration between different governments. Yet, this supra-national institution was not only influenced but also supported by representatives of oil companies in Europe to counterbalance the American system and its lack obstacles between States[39]. They encouraged its creation, demonstrating at the same time their tremendous influence over politicians, with some lobbying groups having privileged access to many senior European leaders[40]. Oil companies later on constantly pushed for more deregulation as it is in their interest to prevent the emergence of stricter environmental rules hindering their activities. However, at the same time, oil companies were supporting a greater harmony between national legal systems in Europe to ease restrictions on their activities, as well as on the imports and exports of petroleum products.

Hence, regulations have an important role in dealing with planning, environmental, and health issues. The complexity of rules is a skillful compromise of law-makers for all parties to find elements supporting their claims, both citizens and private and public authorities. Their hierarchy in legal systems[41] as well as the conflicting interests at stake, between economic and industrial development, and environmental and health protection, often have a detrimental impact on the clarity of rules, their enforcement, and thus, the achievement of objectives in times of environmental emergency. International examples, such as the Kyoto Protocol, demonstrated the potential of such collaborations with its relative success in dealing with harmful emissions, but also its weaknesses with some great emitting countries like the US not participating. The aims at European or national levels are not the same at the international one. However, if the efficiency of the latter level is often negligible because not binding, it can be, like the Kyoto Protocol, a driving force for national governments, which can, eventually, implement more stringent and ambitious objectives[42].

Regulations, understood in a broad sense, are tools to achieve ambitious objectives linked to the energy transition, the improvement of health, or protecting the environ-

[38] R. Fieldson. "Architecture & Environmentalism: Movements & Theory in Practice". In: *Editorial Team* (2004), p. 20

[39] T. Mitchell. *Carbon Democracy*. Verso Books, 2013

[40] Corporate Europe Observatory. *The Corporate Europe Observatory guide to the murky world of EU lobbying*. Report. 2017

[41] The highest level in the French hierarchy of norms is the body of constitutional rules ("bloc constitutionnel"); then come conventions, treaties and European texts, or the conventional body ("bloc conventionnel"); the latter is followed by the legal body with national laws ("bloc législatif"); the before last level includes general principles of the law, that comprise non-written rules that the judge considers binding on the administration and the State ("principes généraux du droit"); and eventually comes the level with decrees, orders, and circulars, called the regulatory framework ("bloc réglementaire"). See the website "Vie Publique" on https://www.vie-publique.fr/infographie/23806-infographie-la-hierarchie-des-normes.

[42] J. Adshead. "The quest for sustainable buildings: Getting it right at the planning stage". In: *Green buildings and the law* (2011), pp. 76–93

ment. Their importance in achieving or blocking policies deserves more attention from decision-makers and academics. In 1997 already, Hutter, a specialist in risk regulations, highlighted the lack of academic scrutiny over the importance of regulations on economic and environmental questions[43], but the subject is increasingly discussed, both in academia and in the relevant institutions[44]. For instance, Ashford and Hall, respectively experts in technology and policy and urban affairs and planning, emphasized in 2011 the crucial importance of legal and political interventions in improving the sustainability of industrial states. They argue that strong national regulations can support innovations in a wide range of fields, and can in turn enhance environmental quality and employment. Their argument is based on the early explanation of the economist Porter in 1991 that constraining environmental rules with logical outcomes are not hindering innovations but rather fostering sustainability by forcing companies to innovate and adapt to new frames[45]. Stricter rules can push companies to shift their strategies towards less polluting and more cost effective practices to prevent the rise of new competitors. As Ashford and Hall explain, not all the companies will meet this challenge, but those rising to it can improve environmental quality and spatial planning efficiency while becoming technological leaders that others can follow.

Regular attempts and experiments at creating new rules and standards demonstrated the positive influence that regulations can have when defining strict frames. Examples such as the MARPOL convention[46] of 1973 discussed in Chapter5 to tackle maritime and air pollution, or the Montreal protocol of 1987 on substances that deplete the ozone layer are successful illustrations[47]. Relevant institutions and governments in Europe recently acknowledged this need for stricter and clearer legal systems. The European Commission in its communication over the 'European Green Deal' in 2019 admitted that issues around the implementation and enforcement of rules and policies in the Union were an obstacle to its environmental objectives[48]. However, and similarly to the challenge of the energy transition, the ambitious aims set by many European governments need a legal transition or a change of perspective from decision-makers when creating regulations. The economists Dechezleprêtre and Sato, argue that the positive effects of environmental regulation developed by Porter did not produce the expected rise of competitiveness in the industrial sector, while recognizing the positive effects on innovations[49]. Such studies, however, assume that the environmental regulations implemented so far were

[43] B. M. Hutter. *Compliance: Regulation and environment.* Oxford University Press, 1997. ISBN: 0198264755

[44] N. A. Ashford and R. P. Hall. "The importance of regulation-induced innovation for sustainable development". In: *Sustainability* 3.1 (2011), pp. 270–292

[45] M. E. Porter. "America's green strategy," Scientific American, April. p. 96". In: (1991)

[46] The International Convention for the Prevention of Pollution from Ships, or MARPOL, was adopted in 1973 at the International Maritime Organization, with many follow up protocols.

[47] The Montreal Protocol is part of the Vienna Convention for the Protection of the Ozone Layer adopted in 1985, and "is to date the only United Nations treaty ever that has been ratified by every country on Earth". See the website of the United Nations Environment Programme: https://www.unep.org/ozonaction/who-we-are/about-montreal-protocol

[48] S. Hauser. *The European Green Deal: New Opportunities for Port Cities?* 2020. URL: https://www.portcityfutures.nl/news/the-european-green-deal-new-opportunities-for-port-cities

[49] A. Dechezleprêtre and M. Sato. "The impacts of environmental regulations on competitiveness". In: *Review of Environmental Economics and Policy* 11.2 (2017), pp. 183–206. ISSN: 1750-6816

as strict and clear as the one envisioned by Porter in its explanation, failing to recognize the absence of these fundamental adjectives when describing contemporary legal systems. Other studies showed the efficiency of rules with a clear, realistic, and strict content on the reduction of polluting emissions[50]. They also demonstrated how companies adapted to them with more circular and sustainable practices, while highlighting the limits of precised objectives when dealing with issues out of their specific range[51]. Recent programs and funding opportunities from the European Commission also aim at tackling societal issues through an inclusive process, like the "Responsible Research & Innovation" program to improve the applicability of scientific outcomes and enable a better access to results[52]. These experiments showed the environmental efficiency and the potential economic benefits of this new legal perspective over industries, while the authors demonstrated the limited adverse effects on the competitiveness of companies[53]. Yet, strict rules remain the exception rather than the norm, precisely because of the existence and power of the global petroleumscape, and the influence of dominant oil companies in such a strategic and powerful sector for economies. However, the literature often ignore the importance of regulatory frameworks. In the analysis of the literature from Scopus explained in the Chapter1, only 38 references touch upon the legal topic out of 1380. The objective of this dissertation is to highlight the important role of regulations when considering other disciplines to understand historical events and the contemporary form of legal systems.

2.5. THE EXTENSIVE LANDSCAPE OF OIL INFLUENCES

THIS research refers to the idea of Petroleumscape developed by Hein, and answers authors' and decision-makers' lack of consideration towards the importance of regulations in spatial analysis. Their power to block or enable solutions to contemporary spatial challenges linked to the energy transition and environmental protection need further investigations. For this purpose, the research combines historical, urban planning, and legal perspectives, to add the influence of oil companies over regulations into this landscape[54]. The idea behind the notion of a palimpsestic petroleumscape relies on the connections between the different spatial representations of oil[55]. But this no-

[50] E. Ben-Hakoun, M. Shechter, and Y. Hayuth. "Economic evaluation of the environmental impact of shipping from the perspective of CO 2 emissions". In: *Journal of Shipping and Trade* 1.1 (2016), pp. 1–36. ISSN: 2364-4575; E. Ben-Hakoun, E. Van De Voorde, and Y. Shiftan. "Marine environmental emission reduction policy in the liner shipping the economic impact from trade lane perspective". In: *Maritime Policy & Management* (2021), pp. 1–29. ISSN: 0308-8839

[51] H. Fan *et al. Going Green in China: Firms' Responses to Stricter Environmental Regulations.* Tech. rep. 2019

[52] See the webpage of the European Commission on "Responsible Research and Innovation": https://ec.europa.eu/programmes/horizon2020/en/h2020-section/responsible-research-innovation

[53] A. B. Jaffe *et al.* "Environmental regulation and the competitiveness of US manufacturing: what does the evidence tell us?" In: *Journal of Economic literature* 33.1 (1995), pp. 132–163. ISSN: 0022-0515

[54] C. Hein. "'Old Refineries Rarely Die': Port City Refineries as Key Nodes in The Global Petroleumscape". In: *Canadian Journal of History* 53.3 (2018), pp. 450–479; C. Hein and P. T. van de Laar. "The Separation of Ports from Cities: The Case of Rotterdam". In: *European Port Cities in Transition: Moving Towards More Sustainable Sea Transport Hubs.* Ed. by A. Carpenter and R. Lozano. Cham: Springer International Publishing, 2020, pp. 265–286

[55] C. Hein. "Analyzing the Palimpsestic Petroleumscape of Rotterdam". In: *Global Urban History* (2016)

tion goes beyond the simple description of the built environment of oil to investigate its impact on flows, culture, designs, and planning and political practices. These interconnections created a loop where oil companies' influence grew together with their power to shape behaviors and secure the continuous growth of their activities[56].

The current climatic and environmental context pushed citizens and a few political actors to support a shift in the decision-making process. The powerful and long-standing influence of lobbies like the one of oil renders an inter-generational justice, understood under the notion of sustainability which seems impossible to reach in the current course of action, almost impossible to achieve. Understanding the context and the influences playing since the beginning of the oil industry must trigger this shift towards actions aiming at a resilience characterized by an evolving and flexible system[57]. The slowness and rigidness of current legal systems developed and shaped by national and industrial interests have become incompatible with the fast changing techniques of the industry and the unprecedented importance of the environmental threat. Authorities of port cities, hubs of this industry, need adaptive and innovative tools in their planning documents and strategies to face the challenges of industrial transformation and climate change. Their territory and populations have an important role to play in tackling these issues, but need the support of researches linking together historical oil practices with planning, environmental, and health considerations. Yet, to achieve this, public and private authorities, as well as local actors, must understand the historic nature of their cities[58], while applying and respecting enacted regulations and objectives.

The consequences of climate change and environmental pollution are pushing all actors in port cities and beyond towards transitions, and the energy transition must not be the only one authorities must aim at. The energy, legal, and urban transition is now forced upon public and private authorities by the threat of global warming and the need to protect the environment. Yet, local public authorities and actors still need a design or frame to follow in order to implement the transitions and efficiently plan for the future[59]. It is not a question of considering the environmental context as an opportunity anymore, but as an emergency. The limitless horizons of growth promised by oil companies[60] produced an imaginary where a world without oil rhymes with a drastic deterioration of living standards. Yet, the end of this oil dream and dependence, along with more efficient planning and environmental policies, could go together with an improvement of health and the quality of life. This change can only be achieved through the identification of gaps in official records and in the literature when discussing historical and lasting influences of oil companies, their heritage on the spatial organization of port cities, on legal systems, and their potential consequences on inhabitants. However, in

[56] C. Hein. "Oil Spaces: The Global Petroleumscape in the Rotterdam/The Hague Area". In: *Journal of Urban History* (2018)

[57] S. Derissen, M. F. Quaas, and S. Baumgärtner. "The relationship between resilience and sustainability of ecological-economic systems". In: *Ecological Economics* 70.6 (2011), pp. 1121–1128. ISSN: 0921-8009

[58] H. Girardet. *Cities, people, planet: urban development and climate change* . NJ: John Wiley, 2013

[59] Petrocultures Research Group. "After Oil: Explorations and Experiments in the Future of Energy". In: *Culture, and Society, Petrocultures Research Group, Edmonton, AB* (2016)

[60] T. Mitchell. *Carbon Democracy.* Verso Books, 2013

the references extracted from Scopus and discussed in the introduction (Figure1.2), the literature on port cities since 1930 until 2019 mainly focuses on the development of port and cities rather than on questions linked to pollution, regulations, and future planning. Yet, all these topics, not only individually, but more importantly together, are of prior importance for the coherent and efficient planning of cities and port cities. This research aims at explaining the current obstacles in the way of the energy transition as well as the importance to consider the issue across a variety of disciplines by going through historical, legal, and spatial perspectives.

3

First Disasters and a Story of Power: From 1654 until the 1930s

A law is valuable, not because it is a law, but because there is right in it.

Henry Ward Beecher
American ecclesiastic and social reformer, in *Life Thoughts*

Those who do not remember the past are condemned to repeat it.

George Santayana,
Spanish-American Philosopher.

Parts of this chapter have been published in S. J. Hauser. "Long Live the Heritage of Petroleum: Discoveries of Former Oil Sites in the Port City of Dunkirk". In: *Urban Science* 4.2 (2020), p. 22.

THIS chapter investigates the beginning of the oil industry and the early influence of its actors in the creation and enforcement of regulations, especially those linked to spatial planning and health. The objective is here to understand how oil actors affected the evolution of legal frames as well as the development of the port cities they settled in before their companies becoming global corporations. The growing number and scale of oil sites at the end of the 19th and beginning of the 20th century went together with numerous industrial disasters that impacted populations and the development of port cities[1]. Public authorities changed regulatory frameworks around industrial sites, oil facilities included, in reaction to the growing risks on nearby inhabitants. Archival sources provided newspapers, images, or administrative documents that, together, portray the damages as well as the behavior of public authorities and industrial actors. To understand legal systems and their development, one must know where this industrial influence on local then national policies and rules stems from. Since the 1860s until the second World War, the oil industry relied on small and local investors seeing a great potential in the resource. The growing use of petroleum products at the end of the 19th century for lighting, drugs, and fuels triggered a wave of new exploration, as well as the construction of refining and storage sites across the world. This phenomenon created an over-production which benefited to some dominant companies and actors that, early on, shaped the future of oil companies and helped improve the financial efficiency of the industry. The power of these petroleum actors went hand in hand with the rise of their activities and networks. However, this influential power of private actors over regulations did not start with oil but with entrepreneurs from the chemical industry. How did industrial actors before the emergence of the oil industry affect port cities and regulations in a way later adopted and improved by oil companies? Explaining the early example set by the chemical sector is important to understand the origins and methods later used by oil actors. The evolution of oil activities and influence from local to international relied on this early example as well as on the work of ambitious oil actors. The analysis of these companies' power and disasters across the world linked to increasing industrial activities reveal similar patterns, influences, and results worldwide, supporting the idea of the global petroleumscape[2]. Oil disasters were a fresh addition to the list of industrial catastrophes, but from the oil industry's tremendous growth and network emerged private actors able to influence decision-makers internationally. These practices linked to the petroleum industry are fascinating as they adapted to economic, political, legal, and social contexts by constantly changing the scale and shape of their influence[3]. This impact of the oil industry was captured by artists in paintings, but also by local actors in maps, plans, letters and reports as well as in regulations since the beginning of the 1860s. Through this diverse sources one can observe the growing influence and importance of oil actors in shaping frames and spaces, and understand how, early on, they protected their activities.

[1] H. Granot. "The dark side of growth and industrial disasters since the Second World War". In: *Disaster Prevention and Management: An International Journal* (1998). ISSN: 0965-3562

[2] C. Hein. "Analyzing the Palimpsestic Petroleumscape of Rotterdam". In: *Global Urban History* (2016); C. Hein. "Oil Spaces: The Global Petroleumscape in the Rotterdam/The Hague Area". In: *Journal of Urban History* (2018)

[3] T. Mitchell. *Carbon Democracy*. Verso Books, 2013

Civilizations around the world used oil, as a resource and in its different forms, for diverse purposes since the antiquity. Greek, Chinese, and Egyptians, among others, used it into construction, warfare, mummification and medicine[4]. The industrial age of oil started much later, at the beginning of the 1860s after Edwin Drake designed a new technique to drill for oil in 1859, in Philadelphia, U.S. Following his innovation, business owners in European port cities like Dunkirk and Rotterdam quickly invested in facilities to develop an industry around the transformation and storage of oil products[5]. Their influence grew from these local places to the province, the country, and quickly ended up having enough power to affect other national governments. The aim was clear and defined beforehand by other industries before it: protect oil activities from rules and policies that could have a negative impact on their development. To achieve such a purpose, some local oil actors used their industrial ventures as a step to reach political positions. Following former examples set by the chemical industry, the oil investors once asking for support from the government slowly became part of the decision-making process to create that support. Early in the development of oil businesses, actors were connected to each other beyond national borders for supply, transportation and exportation. Local or national crude oil reserves, like in France, were not great enough to accommodate the booming demand for petroleum products. This lack of availability throughout Europe before the Second World War pushed oil investors abroad to supply their facilities, already connecting different places, and granting foreign investors with the power to affect the decisions of their national government.

3.1. INDUSTRIAL ACCIDENTS AND FRAMES PREDATE PETROLEUM

OIL actors' impact over the creation and application of regulations did not start with some business owners reaching political positions. Their influence started with their activities, causing a forced evolution. Catastrophes affecting the urban planning and improving the security of port cities did not wait for the development of oil industry. Examples across the world and linked to different disasters showed the transferability of this reactive process. The fire of London in 1666 was an outstanding example of disaster which triggered a reaction in building regulations from public authorities to create a safer London. Other cities in Europe and around the world took the renewal of London and its new planning rules as an example after experiencing similar catastrophes[6]. The same reaction and transferability (or lack of transferability) mechanism went for oil. For instance, the pollution of drinking water supply by oil activities in the port city region of Philadelphia in the 1860s also happened in other places around the world[7]. Such issues

[4] R. J. Forbes. *Bitumen and petroleum in antiquity*. Vol. 1. Brill Archive, 1936

[5] C. Hein. "Refineries (Oil)". In: *The Encyclopedia of Greater Philadelphia* (2016)

[6] Like the planning of Philadelphia, U.S, in 1682, and Lisbon, Portugal, in 1755. See:J. W. Reps. "William penn and the planning of philadelphia". In: *The Town Planning Review* 27.1 (1956), pp. 27–39. ISSN: 0041-0020; and C. Castel-Branco and M. Ishikawa. "Sustainable Post-Disaster Solutions—London 1666, Lisbon 1755 and Japan 2011—Learning from the Past". In: *Journal of Environmental Science and Engineering A* (2016), p. 196

[7] C. Hein. "Refineries (Oil)". In: *The Encyclopedia of Greater Philadelphia* (2016)

linked to security and health affected the management and planning of oil industrial sites in port cities. The multiplication of tragedies linked to these activities in port cities hosting industrial sites also show an absence of monitoring and enforcement of the rules created by public authorities in reaction to these events.

3.1.1. Memorable Disasters for New Planning Practices

The extensive damages following the first major industrial disasters left undeniable traces on the development and spatial organization of cities and port cities, as well as in the memories of their inhabitants. Regular industrial disasters across the globe demonstrated public authorities' lack of considerations for the importance of safe urban planning practices for inhabitants living around industrial facilities. Planning documents and strategies were not preventing inhabitants from building their houses around industrial sites, nor the construction of industrial sites nearby houses. With the development of oil activities, the oil industry became an additional source of hazards, particularly in port cities where water connections facilitated oil flows.

The Chemical Industry and the Discovery of Industrial Threats

Industrial activities and influences predated those developed by the petroleum industry. Influencing the creation and application of rules over industrial activities did not start with actors of the oil industry. The origins of industrial lobbying and their link to citizen's health and spatial planning date back to the pre-oil period. Industrial actors understood early on the importance of intervening in the design of rules, even after disastrous incidents[8].

One early example of the link between spatial planning and industrial activity relates to the production of gunpowder. The nature of such product led to the occurrence of several explosions around the world. These explosions and disasters happening in industrial facilities had dire consequences on cities and the life of their inhabitants. Industrial catastrophes often forced public authorities to create new regulations over urban and spatial planning to improve the security around these dangerous sites. The "Delftse Donderslag" or "Delft Thunderclap" was a demonstration of such industrial hazards. In 1654, a gunpowder magazine in Delft, a few kilometers north of the actual Rotterdam, in the Netherlands, exploded and, together with the fire it provoked, destroyed several parts of the city, killing hundreds (Fig3.1)[9]. This event changed construction practices. When inhabitants rebuilt the city they preferred bricks and stones, moving away from wooden structures to prevent similar destruction from other potential explosions and

[8] T. Le Roux. "Accidents industriels et régulation des risques: l'explosion de la poudrerie de Grenelle en 1794". In: *Revue d'histoire moderne contemporaine* 3 (2011), pp. 34–62. ISSN: 0048-8003

[9] Many different sources mentioned the low number of casualties due to the explosion. Reports explained that most of the population at the time was out of Delft to fairs or markets in the neighboring cities of Den Haag or Schiedam. See: P. Douglas. *The Delft Thunderclap of 1654*. Ed. by New Netherland Institute. URL: https://www.newnetherlandinstitute.org/files/2013/5757/5054/THE%7B%5C_%7DDELFT%7B%5C_%7DTHUNDERCLAP%7B%5C_%7DOF%7B%5C_%7D1654.pdf.

fires[10]. The fear of other disasters changed the building habits within the city. Delft was not the first nor the last to experience such devastation, several similar explosions happened in other cities of The Netherlands and in neighboring countries.

Figure 3.1: A View of Delft after the Explosion of 1654. From the National Gallery, London.

More than a century after Delft, the same event occurred in Paris, in 1794. The explosion of the castle of Grenelle, used as a powder factory, killed thousands and affected the surrounding districts of Paris[11]. It is still considered as one of the worst industrial disasters in French history. The lessons learned from this event led to new practices around the processing of powder in France. Authorities divided production sites, keeping them away from each other and from urban areas, while transforming the production techniques to reduce risks on human lives[12].

[10] See the website "Lens on Leeuwenhoek" and its article on the incident, https://lensonleeuwenhoek.net/.

[11] The Castle was located a few hundred meters south from the actual position of the Eiffel Tower.

[12] M. Chargé de l'environnement. "Explosion de la poudrerie de Grenelle". In: (), p. 14. URL: http://barpipdf.geniecube.info/5692.pdf

Dunkirk's First Oil Facilities and Disasters

The first oil incidents had similar consequences on the improvement of urban planning and security rules. Archives highlighted the existence of a link between fires related to oil and new planning practices aiming at creating a safer environment for citizens. Minutes from Dunkirk's chamber of commerce in 1866 illustrated the concerns of public and private actors around these repetitive episodes. They referred to fires in Jersey and in Antwerp taking place the same year and related to the transport and transshipment of oil[13]. The French central government progressively acknowledged the danger of the resource with an imperial decree in April 18, 1866, regulating "the operation of Depots and Stores for Mineral Oil or other Hydrocarbons". It implemented new conditions for the storage of the resource, explaining how, what quantities and the way to transport it[14]. Actors of the port city (local authorities, citizens and business owners) regularly addressed their concerns over the risks of this resource and its storage to the representatives of the Chamber, pushing for more control over its trade and handling. Among other actions, new dedicated places for petroleum trade appeared in Dunkirk and in other European port cities. The transshipment docks for oil moved outside city centers in France and in neighboring countries, without Dunkirk being necessarily the first[15]. Yet, multiple other oil-related disasters kept on occurring. The port cities of Bordeaux in 1867 and 1869, and Dunkirk in 1868 (Fig3.2) experienced these same transshipment issues[16] with dire and directs consequences on the spatial organization of ports cities, and on the life of citizens.

The fire and explosion of the refinery Clère-Boilet highlighted the tight relationship (social and spatial) between the urban fabric and industrial sites. The refinery was in the city of Coudekerque-Branche, a city part of the metropolitan area of Dunkirk (Figure3.3). In 1891, a terrible explosion followed by a great fire destroyed the refining site, spreading a leak of burning oil on 500 meters, killing 7 persons and destroying many houses located around the facility[17]. Yet, for years, inhabitants of the city alerted local authorities on the danger of this petroleum site after multiple other fires broke out on this same site. The facility was, however, rebuilt at the same place before eventually closing in 1906[18]. Despite this incident, small oil investors settled multiple similar facilities related to oil nearby houses in Dunkirk. Their lifetime was relatively short, producing a fast turnover

[13] These minutes can be found in the archives of the Learning Center of Dunkirk.

[14] See: C. d'Etat. *Décret impérial portant Réglement pour l'exploitation des Dépôts et Magasins d'Huiles minérales ou autres Hydrocarbures*. 1866. URL: https://gallica.bnf.fr/ark:/12148/bpt6k97362516/f620.item. Many other decrees followed in 1872, 1879, and 1911, affecting the conditions of transformation, transportation, and storage. See: C. Sillans. *" Au service du Diable": pour une histoire de la gestion des risques: incendies et organisations de secours: Lyon, 1852-1913*. 2000. URL: http://theses.univ-lyon2.fr/documents/lyon2/2000/sillans%7B%5C_%7Dc%7B%5C#%7Dp=0%7B%5C&%7Da=top

[15] In the case of Rotterdam, the docking area moved from the Boompjeskade, in the city center, to Buizengat on the East to eventually end up in 1865 in Feijenoorde, on the other side of the Maas. A fire in Brooklyn in 1862, again related to oil, influenced these relocations. See: https://www.portofrotterdam.com/en/news-and-press-releases/the-first-barrel-of-oil

[16] Y. Baillot d'Estivaux. "L'incendie du port de Bordeaux en 1869". In: 130 (), p. 26

[17] J. Denise. *La Belle Époque à Dunkerque*. Vol. 3. 1988

[18] C. Hein *et al.* "Dunkerque : De port pétrolier à territoire de transition post-pétrole". In: *La résilience des villes-portuaires européennes. Crises et réinventions (XVIe-XXIe siècle)*. Ed. by C. Borde *et al.* 2020

Figure 3.2: Engraving of the fire of Bordeaux in 1869, from the collections of "Musée d'Aquitaine". The oil on fire spread on the surface of the water, burning several ships around.

with no considerations for the risks that such activities could have on human lives, the environment and the health of citizens. In case of incident, only the greatest investors or those with a strong network, like Mr. Clère, could rebuild and restart their activities. When a site was closing, the urban tissue was eventually taking over the former industrial site[19].

The effects of fires linked to petroleum activities on the spatial planning of the port city of Dunkirk are visible on historic maps. Improvements in the relation between urban areas of the port-cities and industrial sites were often reactions to dreadful events or their repetition. To tackle these issues and improve its efficiency, the port of Dunkirk experienced multiple transformations to become one of the most important port of France. The plan Freycinet, by the name of the public works minister Charles Freycinet, triggered one of these modifications in 1878. The plan upgraded French ports infrastructure, with new railways and canals connections to the hinterland.

Petroleum transshipment, in the new design of the Feycinet plan, moved away from the city and port center to a dedicated basin, the most distant one. Maps and paintings from 1900 in the Port Museum of Dunkirk show a discreet tool added to counter the fire risk: a floating dam (Fig3.4). The northernmost basin was the only one equipped with this device. It confirmed not only its entire dedication to petroleum activities but also a fear of authorities, triggered by former incidents, towards the flammable substance. Implementing the plan was also an opportunity for authorities in Dunkirk to improve the

[19] S. Hauser, P. Zhu, and A. Mehan. "160 Years of Borders Evolution in Dunkirk: Petroleum, Permeability, and Porosity". In: *Urban Planning* 6.3 (2021)

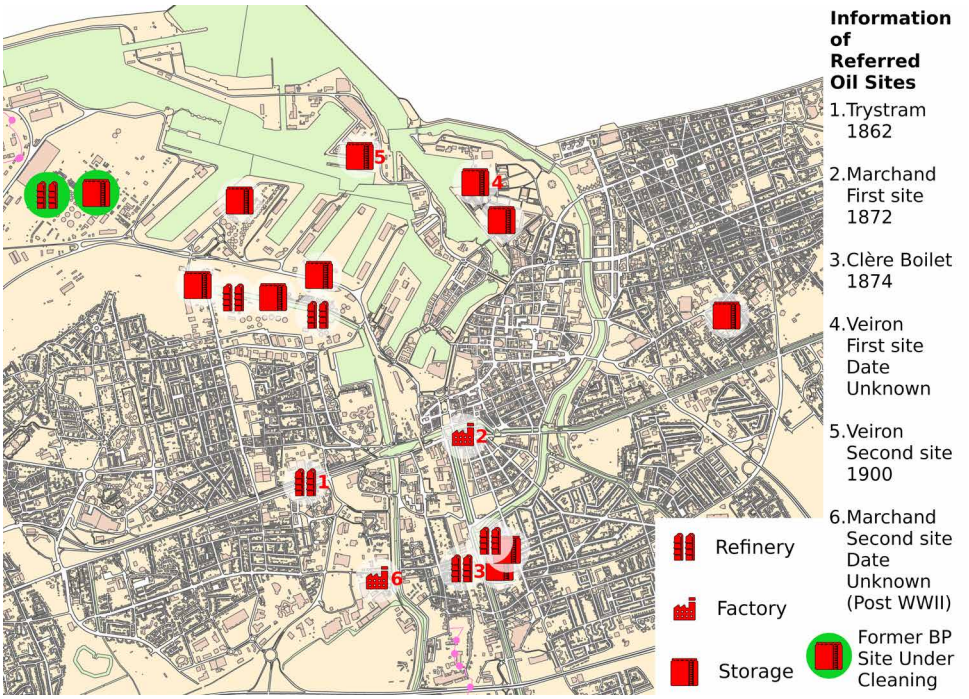


Figure 3.3: Mapping of oil-related sites that settled since 1860 in the port city of Dunkirk. Made by the author based on the actual map of the port city from the Learning Center of Dunkirk. Published in S. J. Hauser. "Long Live the Heritage of Petroleum: Discoveries of Former Oil Sites in the Port City of Dunkirk". In: *Urban Science* 4.2 (2020), p. 22.

connection with existing facilities, as they connected this north part of the port to local refineries with a pipeline[20]. These regular and disastrous events linked to the storage or refining of petroleum led to new practices in spatial planning and security around industrial areas in Dunkirk and beyond. The construction of new basins and docks, and the dedication of available areas for port activities happened over a long period of time. These changes were directly linked to oil disasters and are still visible in contemporary shapes of port cities, despite economic circumstances contributing to the disappearance of the oil infrastructure.

Figure3.5 highlights the evolution of the port city of Dunkirk after the implementation of Freycinet's plan. The shape of the city and particularly of its port drastically changed. The port became strictly organized with rectangular basins more adapted to receive greater ships, as well as with a denser network of railways to serve the efficiency

[20]See: Recueil des procès-verbaux des séances de la Chambre de Commerce, 1909, p.430-431; and C. Hein, C. Stroobandt, and S. Hauser. "Petroleumscape as Heritage Landscape: The Case of the Dunkirk Port City Region". In: *Oil Spaces: Exploring the Global Petroleumscape*. Ed. by C. Hein. Routledge, 2021. Chap. 15

Figure 3.4: Maps of the port city of Dunkirk. On the left Dunkirk in 1875 and on the right in 1910 after the modifications of the plan Freycinet. The red circle highlights the location of the floating dam and the basin dedicated to oil. Images from the archives of the Learning Center of Dunkirk.

of the port. Meanwhile, more industrial sites, like oil storage and refining sites, settled in Dunkirk, and the urban tissue expanded. This process led housing district to catch up with industrial sites, and surround them. While indirectly contributing to improving the security in the port city through the creation of a port area, the plan ignored the urban aspect of the planning and the urban expansion that new activities would cause. Housing districts became denser, yet still close to many dangerous industrial sites. This is especially visible when comparing the maps of Dunkirk in 1879, before the intervention of Freycinet, and with its evolution in 1928.

3.1.2. REGULAR REPETITIONS OF INCIDENTS

WITH the oil industry starting as early as in the 1860s, private actors had the time to establish many petroleum sites in Dunkirk before the first World War[21]. However, the general knowledge around all the incidents and the settlements (dates, location, cleaning) of this period is rather vague. This problem of precise information of

[21] Ministère de la Transition Ecologique et Solidaire. *Géorisques*. URL: http://www.georisques.gouv.fr/; S. J. Hauser. "Long Live the Heritage of Petroleum: Discoveries of Former Oil Sites in the Port City of Dunkirk". In: *Urban Science* 4.2 (2020), p. 22; C. Hein, C. Stroobandt, and S. Hauser. "Petroleumscape as Heritage Landscape: The Case of the Dunkirk Port City Region". In: *Oil Spaces: Exploring the Global Petroleumscape*. Ed. by C. Hein. Routledge, 2021. Chap. 15

Figure 3.5: Pictures of Dunkirk in 1879 on the left and 1928 on the right, with oil infrastructure in red. Picture made by the author from archival maps provided by the Learning Center of Dunkirk.

past industrial settlements goes together with a lack of anticipative measures from past public authorities when dealing with spatial planning rules linked to security and health concerns, or environmental protection. The succession of industrial disasters demonstrates an absence of framework and regulatory intervention around technological risks through history and the influence of private actors on the decision-making process to prevent the creation or application of rules.

Authors in the literature extensively discussed the principle of learning from past urban and environmental experiences[22]. Yet, this is in contradiction with the long list of dreadful and regular industrial incidents worldwide in history. Not only is it a fundamental problem related to the handling and techniques behind the production of potentially dangerous substances, but the issue is also linked to an absence of efficient spatial planning strategies for such important economic activities. The benevolent behavior of public authorities towards the settlement of industrial companies in their territory led to a lack of innovation or evolution towards security, health, and environmental considerations. All the incidents described in this chapter were not necessarily linked to petroleum alone, but reflect the negligence and cooperation of public and private actors in benefiting from unclear restrictions. Public authorities eased the access to land by granting authorizations to industrial owners which were, in turn, bringing wealth and employment to the port city region. Repetitions of industrial disasters were cruel reminders of inefficient reactions of port cities' public authorities around industrial sites.

Most of the incidents mentioned earlier involved the destruction of significant parts of

[22] J. A. Dearing *et al.* "Human–environment interactions: learning from the past". In: *Regional Environmental Change* 6 (2006); C. Di Domenico and M. Di Domenico. "Heritage and urban renewal in Dundee: Learning from the past when planning for the future of a post-industrial city". In: *Journal of Retail & Leisure Property* 6.4 (2007), pp. 327–339. ISSN: 1750-2098; A. Rae. "Learning from the past? A review of approaches to spatial targeting in urban policy". In: *Planning Theory & Practice* 12.3 (2011), pp. 331–348. ISSN: 1464-9357

cities or the relocation of many inhabitants. Such events are extreme illustrations of what can happen with some industrial activities, but the extensive destruction accompanying them also greatly affected populations. Their periodicity is alarming and a proof of the tight link between industrial activities, economic interests and public policies, between private actors and investors and public authorities. These actors were, sometimes, only one person, the one investing, the one building, and the one managing the city, as often industrial entrepreneurs rose to political positions.

The long-standing practice of settling facilities near residential areas or sometimes right next to them represented the ties between public and private actors. Considerations for the security and health of workers and citizens were an obstacle in the way of industrial developments and constraining rules for investors. Citizens also benefited from this practice and took pride in working for the industry[23]. It was convenient both for employees and employers to have this proximity so long as nothing was happening. The case of the refinery Clère-Boilet illustrated this problematic proximity when a deadly incident occurred. With following settlements of similar facilities, the competent administration for the authorization required new equipment and planning rules. They became visible in prefectural documents through the authorizations given to an industry to settle or expand[24]. These documents created new conditions linked to the settlement of industrial facilities with a 2 meters high wall around the facility, and paved basins for storage units (see Figure3.6)[25]. Industrial actors opposed the creation of new rules and refused the application of required modification introduced by public authorities at the end of the 19th century[26], to the detriment of workers and inhabitants[27]. Although clearly minor compared to current standards, owners of industrial sites considered them as obstacles to the development of their activities. This opposition stemmed from a long support and protection of industrial activities by local and national public authorities in France[28], and eventually led new rules to never be enforced and monitored.

3.2. LOCAL TO NATIONAL AND INTERNATIONAL ACTORS

IN the 1860s, when business owners like Rockefeller in the U.S and Trystram in France invested in oil it was on a limited space and scale. The slow, yet constant investment of oil owners in networks and political influence eventually led to a shift in oil business practices. From small and local industries with little power on local and national authorities, oil actors became active players in the planning of cities. With their growing

[23] See p.299 of J. K. Leggett. *The carbon war: global warming and the end of the oil era.* Routledge, 2001. ISBN: 0415931029

[24] The prefect was and still is the representative of the government on the provincial scale and ensures the respect of rules. Many authorizations depend on its approval.

[25] In the case of Dunkirk, some of these documents can be found in the "Archives Départementales du Nord" in Lille, France.

[26] J. Denise. *La Belle Époque à Dunkerque.* Vol. 3. 1988

[27] T. Le Roux. "L'effacement du corps de l'ouvrier. La santé au travail lors de la première industrialisation de Paris (1770-1840)". In: *Le mouvement social* 1 (2011), pp. 103–119

[28] T. Le Roux. "Accidents industriels et régulation des risques: l'explosion de la poudrerie de Grenelle en 1794". In: *Revue d'histoire moderne contemporaine* 3 (2011), pp. 34–62. ISSN: 0048-8003

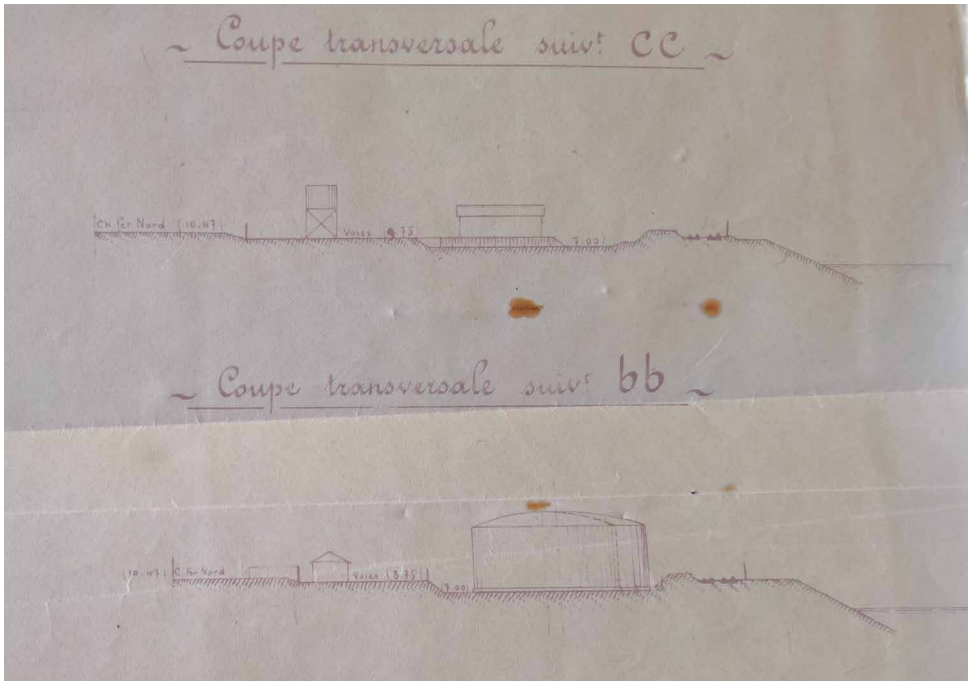


Figure 3.6: Cross section showing the new measures required for the construction of an oil storage site with basins and walls. Diagram accompanying the plans for the construction of the "Compagnie Occidentale des Produits de Pétrole" in Dunkirk (date unknown), and taken from the departmental archives of the North, "Archives Départementale du Nord", in Lille, France.

influence on the economic life of cities and nations, they intervened in the creation and application of rules on the national scale, and in people's perception of the industry. After securing their place and importance locally, oil actors progressively aimed at national institutions and stakeholders. This level was the most relevant to influence for the oil industry as they were the key actors behind the creation of laws and policies that could affect their activities. The development of local and national influences of oil actors, with tangible and intangible interventions interconnected to each other, participate in the idea of the global petroleumscape developed by Hein[29].

3.2.1. THE END OF THE 19TH CENTURY AND THE OIL DEVELOPMENT

WITH the emergence of oil-burning engines in cars and ships, oil companies competing for market shares started to also compete for the best locations in ports. They established long-term land and political relationships in port cities like Dunkirk, as well as in port cities of other countries like Antwerp in Belgium, or Philadelphia in the

[29] C. Hein. "Oil Spaces: The Global Petroleumscape in the Rotterdam/The Hague Area". In: *Journal of Urban History* (2018)

U.S. The latter was one of the first major oil hub, exporting petroleum products to the rest of the world, including to oil business owners in Dunkirk[30]. The latter had one of the oldest operational refinery in the world, refining petroleum (and polluting its soil) since 1866[31]. The city of Philadelphia hosted multiple oil facilities through time and at least eight refineries. This unregulated growth of oil industry around the world illustrated the economic-centered vision of public authorities and private actors, and how the dangers of petroleum, while visible, were mostly ignored by and benefiting to both actors.

The multiplication of fires and other hazards pushed public authorities to move the settlement of oil facilities away from urban areas. In Philadelphia, the growing number of oil storage sites and refineries went together with more incidents and concerns around the supply of drinking water[32]. As these facilities were usually located nearby rivers for their process and the transportation of products, it also affected cities' water quality when located upstream. Health and security considerations slowly triggered planning restrictions and strategies in oil port cities. Philadelphia, Rotterdam, and Antwerp public authorities forced petroleum infrastructure to settle further downstream to protect drinking water and prevent damages to urban areas in case of disaster[33]. Authorities of Dunkirk followed the same process, taking advantage of a new economic and planning strategy for the port in 1878 to push these facilities as further away as possible from the city center[34].

Dunkirk was, early on, a place of industrial development for oil investors. In the French port city like in the rest of France and in other countries, many entrepreneurs embraced the oil venture right from the beginning. Towards the end of the 19th century the oil history of French, Russian, Dutch, American, and other countries' oil companies became increasingly linked as their imports and exports of oil were from and to many different sources:

> "In 1891, the André oil company built storage for mineral oils from Baku in Azerbaijan and Batumi in Georgia on the Black Sea on dock 4 of the Dunkirk port, selling them for Branobel, run by brothers Robert and Ludvig Nobel (whose brother Alfred Nobel founded the Nobel Prize). The oil import business changed depending on the prevailing political alliances. Branobel collaborated with Shell and with Mazout (a daughter company of Bnito, owned by the Rothschild family) to keep Standard Oil, an American company, out

[30] C. Hein. "'Old Refineries Rarely Die': Port City Refineries as Key Nodes in The Global Petroleumscape". In: *Canadian Journal of History* 53.3 (2018), pp. 450–479; C. Hein, C. Stroobandt, and S. Hauser. "Petroleumscape as Heritage Landscape: The Case of the Dunkirk Port City Region". In: *Oil Spaces: Exploring the Global Petroleumscape*. Ed. by C. Hein. Routledge, 2021. Chap. 15

[31] Until a fire destroyed it on June 21, 2019, bringing the Philadelphia Energy Solutions refinery to bankruptcy. See: A. Maykuth. *A Chicago company has finalized its purchase of the bankrupt Philly refinery*. June 2020. URL: https://www.inquirer.com/business/philadelphia-energy-solutions-refinery-hilco-sale-closes-20200626.html

[32] C. Hein. "Refineries (Oil)". In: *The Encyclopedia of Greater Philadelphia* (2016)

[33] G. Devos. "Land-use policy in the port of Antwerp (1870-1994)". In: *Struggling for Leadership: Antwerp-Rotterdam Port Competition between 1870–2000*. Springer, 2003, pp. 199–219

[34] S. Hauser, P. Zhu, and A. Mehan. "160 Years of Borders Evolution in Dunkirk: Petroleum, Permeability, and Porosity". In: *Urban Planning* 6.3 (2021)

> of the Russian markets. In 1912, the company G.M Lianozov Sons, the third-largest financial and industrial group in Russia, administered by S. Lianosoff (called the Russian Rockefeller) joined the Russian General Oil Corporation (OIL), a group of over twenty investment banks and French, Russian and Belgian funds, as well as Russian oil industry leaders[35]."

This booming industry came with a growing need of space to accommodate new oil storage and refining sites. In Dunkirk, since the beginning of oil industry until the First World War, private investors established over fifteen oil sites. The port city constantly developed to accommodate always bigger facilities and tanker for the oil industry, even building pipelines in 1909 to bring oil from the port to a warehouse in the city. The constant growth and interest around petroleum went also hand in hand with a greater number of incidents, pushing for the planning of new infrastructure and areas for the industry (Figure3.4).

3.2.2. Embracing Old Practices: From Chemical to Oil Influence

The influence of industrial actors on the creation and application of new regulations linked to spatial planning, health, or security concerns started, in France, with the rise of the chemical industry. Similarly to what was previously explained with the occurrence of disasters, the influence of oil actors on the creation of regulations and on the shape of cities followed the example set by the chemical industry and its actors.

The Pre-Dating Influence of the Chemical Industry

The explosion of the gunpowder factory of Grenelle in Paris, in 1794, devastated entire districts of the French capital, and killed thousands of inhabitants, yet, it had little regulatory consequences[36]. How did French public authorities of the past react to the explosion of Grenelle? Institutions, like the French Ministry of Ecological Transition, have linked the explosion of Grenelle discussed in Section 2.1.1 to the creation of a famous imperial decree in 1810[37]. For many, this Imperial decree relating to factories and workshops which spread an unhealthy or unpleasant odor[38] was the precursor of modern environmental and risk management regulations in France and in Europe[39]. This

[35] C. Hein, C. Stroobandt, and S. Hauser. "Petroleumscape as Heritage Landscape: The Case of the Dunkirk Port City Region". In: *Oil Spaces: Exploring the Global Petroleumscape*. Ed. by C. Hein. Routledge, 2021. Chap. 15

[36] C. Barillé, T. Le Roux, and M. Thébaud-Sorger. "Grenelle 1794: secourir, indemniser et soigner les victimes d'une catastrophe industrielle à l'heure révolutionnaire". In: *Le mouvement social* 4 (2014), pp. 41–71. ISSN: 0027-2671

[37] See, for instance, the webpage of the "Bureau d'Analyse des Risques et Pollutions Industriels" or "Industrial Risks and Pollution Analysis Office", an office of the ministry, linking the two: https://www.aria.developpement-durable.gouv.fr/fiche_detaillee/5692/

[38] Translated from the French: "Décret impérial relatif aux manufactures et ateliers qui répandent une odeur insalubre ou incommode".

[39] Like the first Seveso Directive 82/501/EEC of 1982 or the "Plan de Prévention des Risques Technologiques" (also called PPRT), or "Technological Risk Prevention Plan", in France from the law n°2003-699 of 2003, called law Bachelot, and enforced after the AZF incident of Toulouse in 2001.

rule implemented, among others, distance requirements between industrial sites and houses depending on three categories based on the threat posed by the industrial activity. The link, in appearance obvious, between the incident and the rule is, however, much more distant. The reaction of authorities to implement a new rule seems really slow (16 years), and its aim unrelated to industrial safety. Other authors confirmed this suspicion, pointing out that the general agreement over this decree being a reaction to Grenelle was wrong, or not considered through the right perspective[40].

The title of the rule was a first indicator of this lack of relation: decree on unsanitary or uncomfortable odor[41]. The unsanitary situation and odors relates to the expansion of chemical industry in France, and around Paris more specifically[42]. Nothing indicates a relation with the explosion, especially when limited to the title. There is, however, another kind of link between the explosion of 1794 and the creation of the 1810 decree. As Le Roux details, the actors behind the gunpowder incident, mainly Jean-Antoine Chaptal, also designed the imperial decree which completely ignored gunpowder factories. The incident triggered an awareness around the dangers of industrial facilities, yet the influence of private actors and high-ranking civil servants prevented an efficient and complete rule to appear. Such result becomes clearer when knowing that Chaptal owned a sulfuric acid factory since 1789 near Paris, spreading odors and pollution. He was also co-responsible for the gunpowder factory of Grenelle when it exploded in 1794. The decree and the rules linked to it were merely a way to legitimate industrial sites within the city for the future[43]. Furthermore, it supported the industrialization of France by allowing industrial owners to pollute if they were financially compensating for the damages caused by their activities (if acknowledged by a judge)[44]. Thus, the time difference between the event taking place in Grenelle and the creation of a regulation on industrial facilities, as well as its content, can be understood through the intervention of well-placed people defending both industrial and their own private interests.

In France, the benevolent ignorance of public authorities towards the risks around oil facilities transpired through the lack of precise records on oil sites before the First World War. Industrial owners were reluctant if not completely opposed to administrative control and the application of any kind of regulation on their activities. Local and national authorities seeing the establishment of such industries as a great economic opportunity turned a blind eye to these behaviors. This behavior translated into a lack of resources and competent staff for agencies supposed to control the respect of rules[45]. The medi-

[40] T. Le Roux. "La mise a distance de l'insalubrité et du risque industriel en ville: le decret de 1810 mis en perspectives (1760-1840)". In: *Histoire et mesure* 24.XXIV-2 (2009), pp. 31–70; T. Le Roux. "Accidents industriels et régulation des risques: l'explosion de la poudrerie de Grenelle en 1794". In: *Revue d'histoire moderne contemporaine* 3 (2011), pp. 34–62. ISSN: 0048-8003

[41] In French: "Décret impérial relatif aux manufactures et ateliers qui répandent une odeur insalubre ou incommode".

[42] T. Le Roux. "L'effacement du corps de l'ouvrier. La santé au travail lors de la première industrialisation de Paris (1770-1840)". In: *Le mouvement social* 1 (2011), pp. 103–119

[43] T. Le Roux. *Le laboratoire des pollutions industrielles: Paris, 1770-1830*. Albin Michel, 2011. ISBN: 222623781X

[44] J.-B. Fressoz. "Le décret de 1810 : la libéralisation des «choses environnantes»". In: *Annales des Mines-Responsabilité et environnement*. 2. ESKA, 2011, pp. 16–22. ISBN: 1268-4783

[45] G. Massard-Guilbaud. "La régulation des nuisances industrielles urbaines (1800-1940)". In: *Vingtieme siecle*.

ocrity of reports, when produced, highlighted that public authorities did not want to hamper and meddle with industrial developments and potentially drive these economic actors away from their cities. Authorities gave priority to economic development and eventually ended up protecting the industry rather than the people living around and working for it[46]. This situation is an early example of what Barkan described as "corporate sovereignty" and how industrial companies and actors were actually part of the law-making process[47].

New Oil Industry in Dunkirk, Old Planning and Legal Reactions

At the end of the 19th and beginning of the 20th century, after the closure of an oil refinery or storage site in Dunkirk, public authorities ignored former land uses and their potential impacts on health. Economic considerations pushed to reuse the land in order to support the development of the port city region[48]. Thus, until the second half of the 20th century, public authorities allowed houses, schools, and parks to be built on top of heavily polluted soils formerly hosting petroleum facilities[49].

When locals complained about the air pollution of nearby industrial activities, entrepreneurs denied the negative impacts and rather blamed citizens for settling nearby factories. Such a defense, clearly based on the assumption that citizens could have known the risks in the 19th century, appeared in letters to local authorities found in the archives of Lille, in the North of France, and related to oil facilities. Even though the 1810 decree on security and sanitary measures predated the industrial development of the oil sector, private actors involved in industrial activities hampered or prevented its implementation, as well as any other regulation, both through political means and within their factories[50]. In an extract of the record from the Council of Cleanliness of Dunkirk, written on May 31, 1899, and found in the archives of Lille, the council highlighted the behavior of an industrial owner ignoring the law and the conditions imposed to its activities. Entrepreneurs' rejection of the frame was fierce despite these rules not considering the pollution of water or soil, nor the health of workers[51]. The authorization for an additional storage site for Trystram, in 1894, did not mention any distance requirements with other buildings neither, especially houses, and focused solely on fire hazards (Fig-

Revue d'histoire (1999), pp. 53–65

[46] Massard-Guilbaud. *Histoire de la pollution industrielle: France, 1789-1914*. Vol. 17. EHESS, 2010

[47] J. Barkan. *Corporate sovereignty: Law and government under capitalism*. U of Minnesota Press, 2013. ISBN: 0816686491

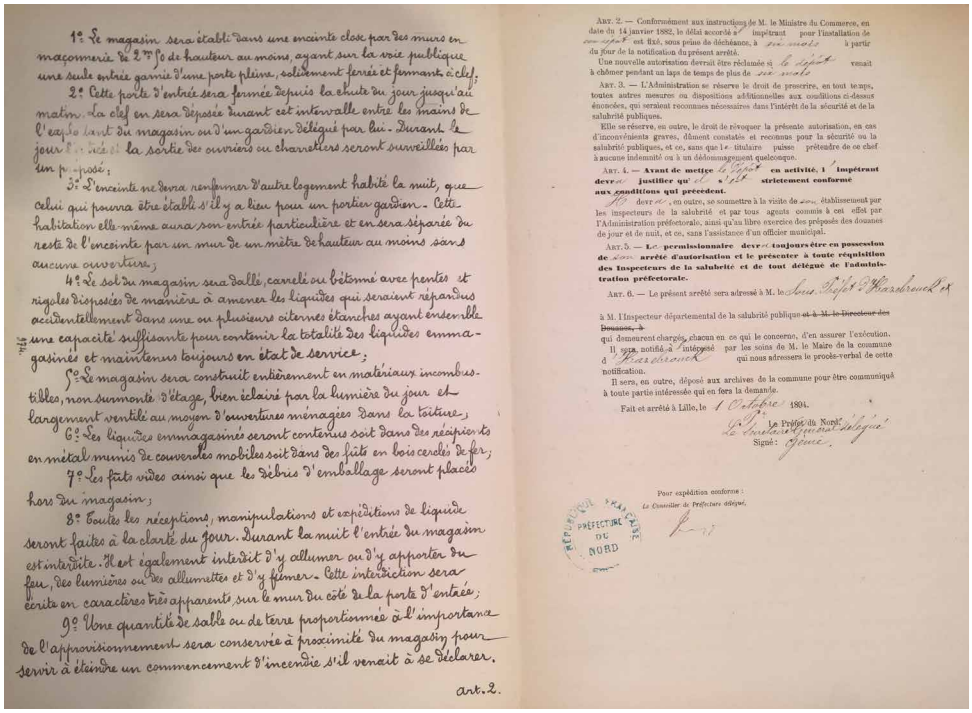
[48] A similar observation was made along the left bank of the river Seine in D. Delahaye *et al.* "Une recherche sur la pollution des sols de la rive gauche". In: *Études Normandes* 48.1 (1999), pp. 179–186

[49] Ministère de la Transition Ecologique et Solidaire. *Géorisques*. URL: http://www.georisques.gouv.fr/; C. Hein, T. Mager, and S. Hauser. "Refining the Heritage Narrative of Post-Oil Landscapes". In: *Transcending the Nostalgic: Deindustrialised Landscapes Across Europe*. Ed. by J. Tomann. Walter de Gruyter GmbH, 2021, pp. 261–280; S. J. Hauser. "Long Live the Heritage of Petroleum: Discoveries of Former Oil Sites in the Port City of Dunkirk". In: *Urban Science* 4.2 (2020), p. 22

[50] T. Le Roux. "La mise a distance de l'insalubrité et du risque industriel en ville: le decret de 1810 mis en perspectives (1760-1840)". In: *Histoire et mesure* 24.XXIV-2 (2009), pp. 31–70

[51] T. Le Roux. "L'effacement du corps de l'ouvrier. La santé au travail lors de la première industrialisation de Paris (1770-1840)". In: *Le mouvement social* 1 (2011), pp. 103–119

ure3.7). This latter example illustrates the support of public authorities, but maybe also their renunciation to impose rules on refractory industrial owners.



1° Le magasin sera établi dans une enceinte close par des murs en maçonnerie de 2 m 70 de hauteur au moins, ayant sur la voie publique une seule entrée garnie d'une porte pleine, solidement fermée et fermant à clef;

2° Cette porte d'entrée sera fermée depuis la chute du jour jusqu'au matin. La clef en sera déposée durant cet intervalle entre les mains de l'exploitant du magasin ou d'un gardien délégué par lui. Durant le jour [illegible] la sortie des ouvriers ou charretiers seront surveillées par un préposé;

3° L'enceinte ne devra renfermer d'autre logement habité la nuit, que celui qui pourra être établi s'il y a lieu pour un portier gardien. Cette habitation elle-même aura son entrée particulière et en sera séparée du reste de l'enceinte par un mur de un mètre de hauteur au moins sans aucune ouverture;

4° Le sol du magasin sera dallé, carrelé ou bétonné avec pentes et rigoles disposées de manière à amener les liquides qui seraient répandus accidentellement dans une ou plusieurs citernes étanches ayant ensemble une capacité suffisante pour contenir la totalité des liquides emmagasinés et maintenus toujours en état de service;

5° Le magasin sera construit entièrement en matériaux incombustibles, non surmonté d'étage, bien éclairé par la lumière du jour et largement ventilé au moyen d'ouvertures ménagées dans la toiture;

6° Les liquides emmagasinés seront contenus soit dans des récipients en métal munis de couvercles mobiles soit dans des fûts en bois cerclés de fer;

7° Les fûts vides ainsi que les débris d'emballage seront placés hors du magasin;

8° Toutes les réceptions, manipulations et expéditions de liquide seront faites à la clarté du jour. Durant la nuit l'entrée du magasin est interdite. Il est également interdit d'y allumer ou d'y apporter du feu, des lumières ou des allumettes et d'y fumer. Cette interdiction sera écrite en caractères très apparents sur le mur du côté de la porte d'entrée;

9° Une quantité de sable ou de terre proportionnée à l'importance de l'approvisionnement sera conservée à proximité du magasin pour servir à éteindre un commencement d'incendie s'il venait à se déclarer.

art. 2.

ART. 2. — Conformément aux instructions de M. le Ministre du Commerce, en date du 14 janvier 1882, le délai accordé à l'impétrant pour l'installation de son usine est fixé, sous peine de déchéance, à six mois à partir du jour de la notification du présent arrêté.

Une nouvelle autorisation devrait être réclamée si le dépôt venait à chômer pendant un laps de temps de plus de six mois.

ART. 3. — L'Administration se réserve le droit de prescrire, en tout temps, toutes autres mesures ou dispositions additionnelles aux conditions ci-dessus énoncées, qui seraient reconnues nécessaires dans l'intérêt de la sécurité et de la salubrité publiques.

Elle se réserve, en outre, le droit de révoquer la présente autorisation, en cas d'inconvénients graves, dûment constatés et reconnus pour la sécurité ou la salubrité publiques, et ce, sans que le titulaire puisse prétendre de ce chef à aucune indemnité ou à un dédommagement quelconque.

ART. 4. — **Avant de mettre le dépôt en activité, l'impétrant devra justifier qu'il s'est strictement conformé aux conditions qui précèdent.**

Il devra, en outre, se soumettre à la visite de son établissement par les inspecteurs de la salubrité et par tous agents commis à cet effet par l'Administration préfectorale, ainsi qu'au libre exercice des préposés des douanes de jour et de nuit, et ce, sans l'assistance d'un officier municipal.

ART. 5. — **Le permissionnaire devra toujours être en possession de son arrêté d'autorisation et le présenter à toute réquisition des Inspecteurs de la salubrité et de tout délégué de l'administration préfectorale.**

ART. 6. — Le présent arrêté sera adressé à M. le Sous-Préfet d'Hazebrouck et à M. l'Inspecteur départemental de la salubrité publique ~~et à M. le Directeur des Douanes, à~~ qui demeurent chargés, chacun en ce qui le concerne, d'en assurer l'exécution.

Il sera notifié à l'intéressé par les soins de M. le Maire de la commune d'Hazebrouck qui nous adressera le procès-verbal de cette notification.

Il sera, en outre, déposé aux archives de la commune pour être communiqué à toute partie intéressée qui en fera la demande.

Fait et arrêté à Lille, le 1 Octobre 1894.

Le Préfet du Nord,
Le Conseiller de Préfecture délégué,
Signé : Jouve.

Pour expédition conforme :
Le Conseiller de Préfecture délégué,

PRÉFECTURE DU NORD

Figure 3.7: Authorization of the Prefect for the construction of a storage site in Hazebrouck, in the north of France, asked by Trystram in 1894. Document found in "Archives Départementales du Nord" in Lille, France.

With the chemical industry receiving help through Chaptal's influence at the end of the 18th century and beginning of the 19th, it set an example for others to follow. Industrial business owners thriving thanks to their activity used their position to get more influence over decision-makers. Like Chaptal denying health and sanitary issues related to the chemical industry in governmental reports, J-B. Trystram, among the very first to invest on oil in Dunkirk, progressively shifted from business owner to politician. He became, among others, President of the Chamber of Commerce and Industry of Dunkirk, Member of the French Parliament, of the Provincial Council and Senator between 1870 and 1905[52]. Trystram used his political weight to protect and promote Dunkirk's port development, and intrinsically oil industry. The Freycinet plan's impact on the port of Dunkirk was an achievement of Trystram and a consequence of his intense lobbying towards the minister of Public works Freycinet[53]. Freycinet's 1878 National Plan for the

[52] A. Merck and J. Tillie. *Trois siècles d'histoire de la Chambre de commerce et d'industrie de Dunkerque.* Editions Histra, 2000

[53] P. Oddone. "Le port de Dunkerque entre tourmentes et réussites économiques". In: *Nord'* 1 (2013), pp. 19–30

Development and Improvement of Railways and Ports in France exemplified the governmental support towards industrial development[54]. In the unlikely situation where local authorities, at the end of the 19th century, wanted to protect the environment and health of their citizens, the content of the plan prevented any local action that could negatively affect the development of port areas. Such a limitation demonstrates the economic priority of the central government, their fear of local actions, and how national authorities disregarded health and security around industrial facilities. The political link and influence of Dunkirk's industrial entrepreneurs represented an early and local example of interconnections between oil actors, politicians, and the creation or application of planning and sanitary rules or policies, which were sometimes linked to only one person. Figure3.5 demonstrates the drastic evolution of the port city of Dunkirk after the implementation of Freycinet's plan.

In 1891, when the refinery Clère-Boilet in Coudekerque-Branche burnt down, for at least the second time, this support cruelly came to light. Disasters such as this one highlighted the opposing interests of inhabitants concerned with their safety and industrial actors focused on continuing and expanding their activities. A local newspaper reported the event and used its visibility to alert on multiple occasions public authorities on the danger of this refinery located in the middle of the city. The journalist conveyed the concerns of the inhabitants pointing out that after successive incidents this refinery was still operating as usual[55]. This anomaly could easily be explained when realizing the political position of the refinery's owner and the consequences on the planning of the city. Clère, the owner of the refinery, also happened to be the mayor of Coudekerque-Branche. This economic and political position easily allowed Clère to connect his oil facility to the municipal railway station that he, himself, funded[56], shaping entire parts of the city according to his needs.

Clère was one example illustrating how oil actors concentrated powers. Such a political and economic position within one hand demonstrated the ease with which industrial actors used their business to intervene in the decision-making and spatial planning of port cities[57]. They influenced the creation and application of rules potentially affecting them, as well as court decisions in case of incidents. The conclusion of the newspaper was to highlight the close relationship between Clère and Trystram, the latter being, at the time of the incident, a French Senator. The deadly disaster led to a prosecution which highlighted that authorities imposed repairs that the owner never implemented. However, the final decision benefited Clère, despite all the irregularities mentioned, such as the lack of compliance to prefectural regulations[58]. Thus, not only private actors influ-

[54] Y. Gonjo. "Le 'plan Freycinet', 1878-1882: un aspect de la 'grande dépression' économique en France". In: *Revue historique* 248.Fasc. 1 (503 (1972), pp. 49–86

[55] J. Denise. *La Belle Époque à Dunkerque*. Vol. 3. 1988

[56] C. Hein, C. Stroobandt, and S. Hauser. "Petroleumscape as Heritage Landscape: The Case of the Dunkirk Port City Region". In: *Oil Spaces: Exploring the Global Petroleumscape*. Ed. by C. Hein. Routledge, 2021. Chap. 15

[57] As exemplified in other cities like Hamburg in C. Hein and D. Schubert. "Resilience, Disaster, and Rebuilding in Modern Port Cities". In: *Journal of Urban History* 47.2 (2021), pp. 235–249. ISSN: 0096-1442

[58] J. Denise. *La Belle Époque à Dunkerque*. Vol. 3. 1988

enced rules to their advantage, but they could already escape their liabilities in case of incidents. This early case of local oil actors' influence foreshadowed what the rise of national and international companies would entail.

3.3. THE ROOT OF OIL MAJORS' PRACTICES IN THE 1870S

THE influence of oil companies on political and administrative institutions slowly but constantly evolved. Their aim was to develop a tighter grasp on the creation and application of rules or policies on all levels to prevent the emergence of texts that would affect their activities and harm their national or international development. Great disasters, advertised in newspapers, were the type of events that could trigger such a creation of stringent conditions over oil activities, with new health and security rules. Yet, other factors, linked, for example, to economic contexts and management, participated in the growth of oil actors' power over decision-makers. Their importance was illustrated early on, and caused a detour to the U.S to understand the origin of oil's power. The scale and efficiency of oil actors and of the industry dramatically changed with the creation of the first "Oil Major" by Rockefeller through the Standard Oil company. His short but undeniable monopoly on oil refining in the U.S transformed the landscape and practices of the oil industry. Moving away from a diversity of local producers and refiners, oil companies became sprawling, affecting all necessary sectors and fields to develop their activities and cement their powers. Rockefeller set an early example at the beginning of the 20th century that many oil companies around the world later extensively applied and strengthened[59].

3.3.1. A SHIFT IN SCALE BETWEEN 1870 AND 1911: ROCKEFELLER'S RISE

THE local cases of Grenelle with Chaptal and Dunkirk with Trystram and Clère showed early forms of lobbying and protection of the industrial sector. The oil actors in Dunkirk were, however, already bound by the influence of Rockefeller, as the oil they were importing was coming from the U.S via the Standard Oil. Rockefeller created, with associates, the Standard Oil company in 1870 in the U.S. At the time, oil industry was starting its development, and a diversity of companies already existed. Many of them were focusing either on the exploitation, storage or refining of oil by building new infrastructure to extract and transform the resource[60]. But beyond direct activities related to oil, the control of all the surrounding infrastructure and its spatial planning became strategic and determinant for the future of the industry. Early on, John D. Rockefeller understood the importance of controlling it to assert the domination of his company over competitors but also on the decision-making process of local, national, and even foreign public authorities (Figure3.8).

[59] D. Yergin. *The prize: The epic quest for oil, money & power.* Simon and Schuster, 2011; T. Mitchell. *Carbon Democracy.* Verso Books, 2013

[60] D. Yergin. *The prize: The epic quest for oil, money & power.* Simon and Schuster, 2011

Figure 3.8: Cartoon of John D. Rockefeller published in Puck v. 49, no. 1251, 1901. Source: Library of Congress: LC-DIG-ppmsca-25503. Found in C. Hein, "Oil Spaces: The Global Petroleumscape in the Rotterdam/The Hague Area," Journal of Urban History, 2018.

In what authors refer to as the Cleveland Massacre of 1872, Rockefeller transformed the face of the oil industry[61]. Benefiting from an overcapacity of the oil sector in Cleveland, U.S, and from its already dominant position, Rockefeller purchased most of its competitors' refineries in a few months. This action resulted from a secret agreement struck between the business owner and the railway company of the area to increase the rates for all of Standard Oil's competitors. Even though this deal was apparently never put in action, rumors around it pushed petroleum business owners, already struggling with overcapacity and thus low prices, to sell before another tremendous loss of value[62]. Through this mechanism Rockefeller owned almost completely the refining capacity of this American region.

[61] R. Chernow. *Titan: The Life of John D. Rockefeller, Sr.* Vintage, 2007. ISBN: 0307429776; C. Hein. "Oil Spaces: The Global Petroleumscape in the Rotterdam/The Hague Area". In: *Journal of Urban History* (2018)

[62] T. Conway. *History of Standard Oil: The Cleveland Massacre.* URL: http://moglen.law.columbia.edu

By gaining control over production sites and the transportation network to export its products, Rockefeller, through his company Standard Oil, shaped the future of the petroleumscape. Efficiency, network, and scale became key elements in the industry's strategy. Production's rationalization through a pooling of the refineries increased efficiency and benefits, which in turn allowed the growth of companies and the creation of greater sites and infrastructure, which again increased their efficiency. This evolution went hand in hand with spatial consequences, reshaping landscapes and connecting places[63]. The industrial growth of petroleum activities needed more space along rivers or near the sea and the network of pipelines and railways, often from port cities to the hinterland, required paths and stations. This network passed through many port cities, participating in their physical, and later administrative, division with industrial areas separated from urban lands, creating two areas with actors sharing different interests[64].

The improvement cycle of the oil industry caused an imbalance in negotiations with other sectors. To get better rates, petroleum companies could pressure their partners (in transport, export or exploration), which increased their benefits and sizes, to the point where public authorities became affected by the financial and network power of oil actors (Figure3.9). The increasing weight of Standard Oil and its grip over economic and energy interests, participated in the development of the global petroleumscape, and directly put Rockefeller in a dominant position even towards federal authorities in the U.S. The company became so prominent that it controlled a tremendous part of the refining capacity of the country[65].

These investments of the Rockefeller family into networks, facilities, and later philanthropy, had a long and persistent influence with long-term benefits for the industry. The success story of the Rockefeller relied on a constant improvement of oil industry's efficiency and on a coherent planning of networks and facilities in hosts cities and port cities. This growing scale and importance of petroleum activities participated in the development of dedicated port areas that became industrial cities within port cities around the world. The evolution of oil landscapes and their need for greater spaces and infrastructure went together with the construction of greater port facilities, away from urban areas.

Standard Oil's influence and domination grew to such an extent that it created a situation of near monopoly in the American petroleum sector. Afraid of the consequences of this monopolistic position on its economy, the U.S government forced the dismantling of Rockefeller's position through the Sherman Antitrust Act of 1890. The aim of public authorities was to prevent mischievous practices on trade or blackmailing of monopolist companies to maintain their dominant position while avoiding the rise of any competi-

[63] C. Hein. "Oil Spaces: The Global Petroleumscape in the Rotterdam/The Hague Area". In: *Journal of Urban History* (2018)

[64] C. Hein. "Imagining fossil-free futures over contemporary petroleumscapes". In: *Atlantis* 26.3 (2016), pp. 8–11

[65] E. Granitz and B. Klein. "Monopolization by "Raising Rivals Costs": The Standard Oil Case". In: *The Journal of Law and Economics* 39.1 (1996), pp. 1–47

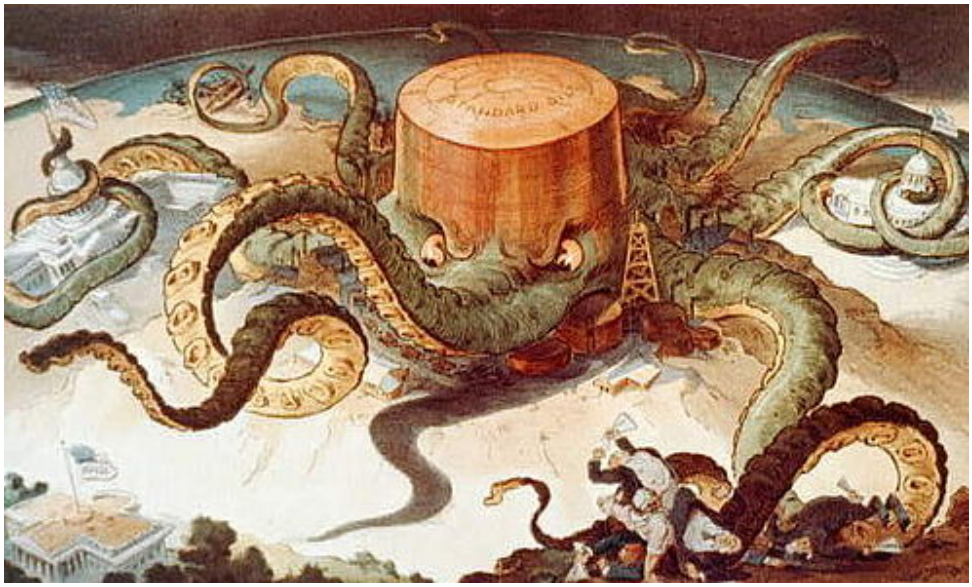


Figure 3.9: Caricature of Standard Oil's Reach as published in Puck magazine, 1904 by Udo J. Keppler, and used in the inaugural address of Carola Hein: Architectures of Black Gold, on January 20, 2016.

tor[66]. The objective was also to prevent the emergence of an actor powerful enough economically and politically to greatly influence, if not control, the content of local and national regulations. In 1911 the American government dissolved the oil company and divided it into multiple entities. However, Standard Oil and Rockefeller's influence became an example to follow for future petroleum companies (Figure3.10). Descendants of Standard Oil as well as foreign growing oil companies took the same path, trying to assert their positions around the world and over local, national, and international institutions and authorities.

Many of the French oil companies and business owners at the end of the 19th and beginning of the 20th century, known as the Cartel of Ten, were buying their petroleum from the Standard Oil[67]. As shown previously with Chaptal, Trystram, ot Clère, public administration executives or politicians could come from the industry, supporting its national and local development through intense political lobbying, easier procedures, or by dismissing negative impacts in reports and rules. Yet, early on, the power of the American company expanded beyond its national borders. By supplying these foreign companies, Rockefeller gained a tremendous lobbying power over other national au-

[66] United States National Archives and Records Administration. *Sherman Anti-Trust Act (1890)*. URL: https://www.ourdocuments.gov

[67] C. Hein, C. Stroobandt, and S. Hauser. "Petroleumscape as Heritage Landscape: The Case of the Dunkirk Port City Region". In: *Oil Spaces: Exploring the Global Petroleumscape*. Ed. by C. Hein. Routledge, 2021. Chap. 15

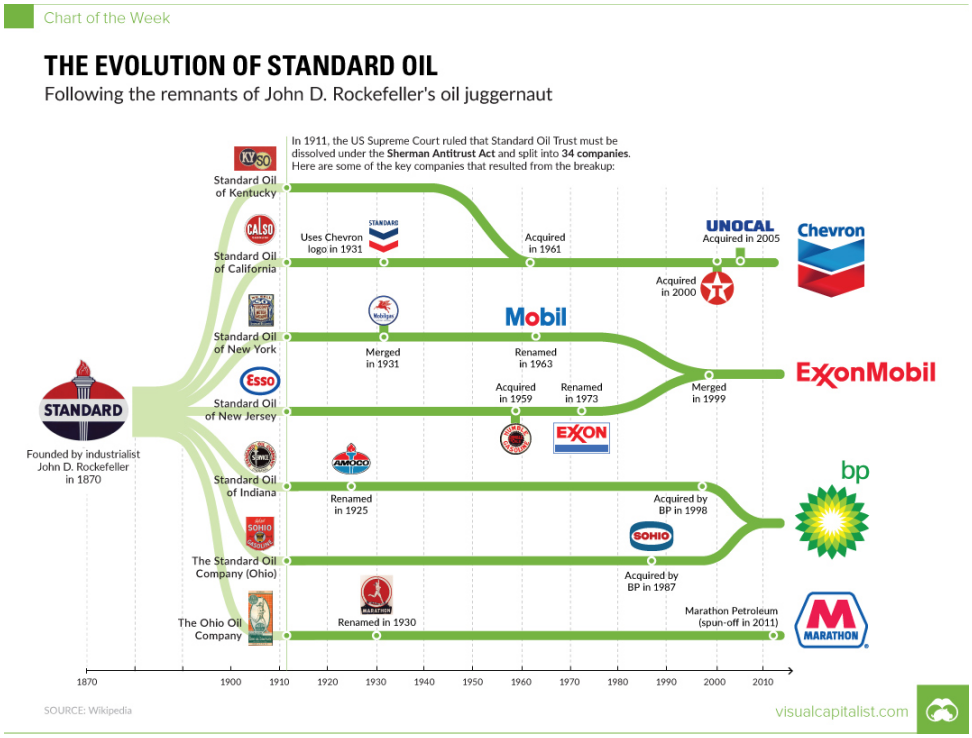


Figure 3.10: Chart on the evolution of Standard Oil following its dissolution. From "Chart: The Evolution of Standard Oil", by Jeff Desjardins, in Visual Capitalist, November 24, 2017. Available Online on Visual Capitalist.

thorities, like in France. The French government realized this situation and enacted or proposed, on multiple occasions, new rules to restrain the influence of foreign entities.

In 1863, the French government enacted a taxation decree on refined products to limit the importation of refined petroleum. This tax, taken in reaction to the growing power of foreign suppliers (American and Russian for instance), forced the settlements of many refineries in France, like in Dunkirk, to escape the taxation. This legal reaction was, however, aimed at protecting the economic activity and independence of the country. Although the strategy of the government supported the French oil industry, it also worsened the risks for nearby inhabitants. The actions of the government successfully increased the number of refineries but overlooked spatial and safety considerations around these facilities as it could have hampered the development of the industry. The rising influence of oil actors further emerged in 1903 when the government proposed and failed to enact a law giving to the French State a monopoly over the refining of petroleum in the country. Taken up again in 1909, law-makers never implemented it as Standard Oil

threatened to cease oil deliveries if its interests in the country were challenged[68]. This failure to frame private, national, and foreign oil actors showed, even before the First World War and the widespread use of petroleum, the tremendous power that oil companies could have over cities' spatial planning and countries' economy and rules.

3.4. The Beginning of the 20th Century and the Global Petroleumscape

Following Rockefeller's rise (and "fall") and the end of the First World War, petroleum activities restarted, changing their scale forever. When innovations linked to military improvements required the use of oil as a primary source of energy, oil businesses not only found a new revenue but became also strategic. Their activities turned into a question of independence and security for national governments, which gave oil actors additional influence. Through their new facilities and power oil companies came up with new designs to influence both public authorities and populations. By adapting urban planning ideas to their needs, like the Garden City imagined by Ebenezer Howard in 1898[69], and using philanthropy to deepen their networks and visibility, oil actors engraved a positive and wealthy image in the mind of people and local authorities. Both tangible and intangible influences and activities of the oil industry, as well as the importance of their combination, led to the creation of the global petroleumscape[70]. This strategy of control of oil companies created long-term spatial and urban practices in port cities hosting their activities to anchor their presence and control over citizens and public authorities.

3.4.1. The Urban Layer Serving the Petroleumscape

The construction of the City of Engineers in Dunkirk is a concrete and visible example of oil actors' impact on social and urban developments. Designed by the Dutch architect Max Wenders in 1931, the "Cité des Ingénieurs" was a housing district for the executives of the oil company (PétroFina) located right next to the refinery[71]. Its construction near the refinery also meant that it was located within the port area, away from the rest of the urban tissue of Dunkirk, and clearly separated from it by the railway network connecting the port to the hinterland[72]. Similar influences appeared in other parts

[68] C. Hein, C. Stroobandt, and S. Hauser. "Petroleumscape as Heritage Landscape: The Case of the Dunkirk Port City Region". In: *Oil Spaces: Exploring the Global Petroleumscape*. Ed. by C. Hein. Routledge, 2021. Chap. 15

[69] P. Batchelor. "The origin of the garden city concept of urban form". In: *Journal of the Society of Architectural Historians* 28.3 (1969), pp. 184–200. ISSN: 0037-9808

[70] C. Hein. "Oil Spaces: The Global Petroleumscape in the Rotterdam/The Hague Area". In: *Journal of Urban History* (2018)

[71] The refinery later became the property of British Petroleum. See: C. Hein, C. Stroobandt, and S. Hauser. "Petroleumscape as Heritage Landscape: The Case of the Dunkirk Port City Region". In: *Oil Spaces: Exploring the Global Petroleumscape*. Ed. by C. Hein. Routledge, 2021. Chap. 15

[72] S. Hauser. "Oil is Dead, its Heritage with it?: The influence of environmental regulations on the evolution of modern planning". In: *16th International Docomomo Conference 2020: Inheritable Resilience: Sharing*

of the world, transferring oil practices and influences around the world, and confirming the 'global' aspect of this oil landscape. Oil companies started, in the 1920s and 1930s, to directly affect the urban design of port cities, and even create new cities in remote areas of Iran around the production sites.

It is in these undeveloped areas that oil companies such as the Anglo-Persian Oil Company[73] built new infrastructure and needed houses to host its work force. Hein and Sedighi mentioned that "APOC constructed a series of small new towns such as Masjed Soleiman, Haftgel, Lali, Aghajari, and Omidieh near new drilling sites in the oilfields of Khuzestan to accommodate workers"[74]. Similarly to the City of Engineers in Dunkirk, these settlements were applying the concept of garden city, with parks and bungalows[75]. In Iran, the case of Abadan stands out. Like in Dunkirk, the oil company provided the best living conditions to its employees by building schools, hospitals, houses, mosques, and other facilities for Iranian workers[76]. However, such infrastructure relied on the oil resource and evolved with it. Often, when oil wells ran dry, so were the cities and their life.

The relationship between petroleum and urban developments took a clear and more direct turn in the period preceding the Second World War. The development of the oil industry in Rotterdam also came with urban and architectural influences. Oil companies used architecture as a mean to standout and better influence decision-makers. Headquarters of Shell, Esso, and the American Petroleum Company were not built near production sites like Rotterdam where the oil infrastructure was, but rather near the House of Representatives and ministries in The Hague. The same went for the example settled by Rockefeller, with the headquarter of the Standard Oil being built in New York in 1922. Such buildings became icons and showed the financial power of oil companies, and their will to exhibit it with outstanding buildings[77]. In Rockefeller's example, the illustration of power appeared through the size, the pyramid shape of the headquarter in New York, U.S, and its top part clearly inspired by one of the Seven Wonders, the Mausoleum of Halicarnassus (Figure3.11). Oil companies and actors used architecture and spatial/urban planning to serve their interest the best. Architecture became a tool to positively affect the perception of people, while they manipulated spatial and urban planning strategies to better influence decision-makers and get a better access to their workforce.

Values of Global Modernities. 2020

[73] Hereafter called APOC, the former British Petroleum, or BP

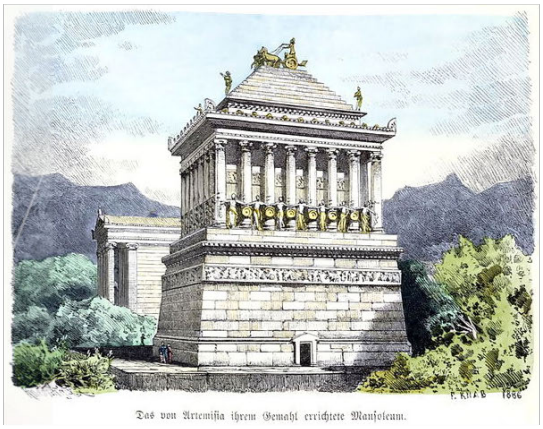
[74] C. Hein and M. Sedighi. "Iran's Global Petroleumscape: The Role of Oil in Shaping Khuzestan and Tehran". In: *Architectural Theory Review* 21.3 (Sept. 2016), pp. 349–374; C. Hein. "'Old Refineries Rarely Die': Port City Refineries as Key Nodes in The Global Petroleumscape". In: *Canadian Journal of History* 53.3 (2018), pp. 450–479

[75] The garden city moovement started with Ebenezer Howard in 1898, with his publication "Garden City of To-morrow".

[76] Hein and Sedighi precise that things changed in 1933 when a new agreement was reached between the Iranian government and APOC, with the latter being responsible for the construction of facilities and the development of the city

[77] C. Hein. "Oil and Water: Port city regions as nodes in the global petroleumscape". In: *Sartoniana*. Ed. by R. Rubens and M. van Dyck. 33rd ed. Gent: Ghent University, 2020. Chap. 13, pp. 193–224

(a)



(b)

Figure 3.11: Comparative picture illustrating architectural similarities between (a) the Standard Oil Headquarter in New York, U.S, from Radiant Luv, CC BY 3.0, via Wikimedia Commons and (b) the Mausoleum of Halicarnassus, from Ferdinand Knab (1834-1902), Public domain, via Wikimedia Commons.

3.4.2. PUBLIC CREDIT AND CONTROL THROUGH PHILANTHROPY

ROCKEFELLER not only focused on improving the efficiency of its company but also the control of the public opinion. Thus, he developed a philanthropy strategy to increase its influence and image in the mind of populations. This philanthropy translated into the creation of a foundation in 1913. The engagement of the Rockefeller Foundation in tackling diseases and spreading education and health around the world were among the most famous objectives of this strategy. This policy led, in many places, to the creation of universities and hospitals, affecting the spatial organization and development of cities beyond the industrial and housing planning[78]. However, this philanthropy also served more practical interests. Fisher explained that the contributions of the foundation to research in social sciences in the 1920s and the 1930s aimed at improving and increasing social control[79]. The foundation believed that through its management it would produce a more humane and efficient administration to serve its expanding purposes. This objective also implied that by acquiring social control and public support, the influence of the company over a city would increase, as well as its lobbying power over both

[78] Examples of hospitals and universities founded by the Rockefeller Foundation can be found, not only in the U.S but across the world like in Europe, and in China. See: C. Hein. "Oil Spaces: The Global Petroleumscape in the Rotterdam/The Hague Area". In: *Journal of Urban History* (2018)

[79] D. Fisher. "Rockefeller Philanthropy: And the Rise of Social Anthropology". In: *Anthropology Today* 2.1 (1986), p. 5

local and national public authorities.

The renewal of the historic district of Williamsburg in Virginia, in the U.S, is another efficient use of Rockefeller's fortune and influence. John D. Rockefeller's son invested, with other supporters, in the restoration of this former colonial village, buying properties there in 1926. The oil businessman used it to receive high civil servants or American and foreign representatives of national administrations, not only to advertise the American history and its own achievements but also to broaden its global influence and network[80]. Philanthropy became an additional tool in the hand of oil actors, used for tax avoidance (especially with Williamsburg) but also for power building[81]. The Rockefeller family was an early and excellent example of widespread influence to gain social control, public credit, allies, and extend companies' influence and profits[82]. The restoration of the historic Williamsburg was a demonstration of oil actors' ability to protect, manage, and rebuild an entire village. Oil companies also advertised the housing districts they built, such as the "Cité des Ingénieurs" or in Abadan, as a demonstration of companies' concerns for the well-being of their employees. The planning of space by oil companies became a tool to promote their products to populations, and to anchor their presence in and the dependence of port cities over their financial power.

3.4.3. IGNORANCE OF THE PAST IN DUNKIRK: THE "CITÉ DES INGÉNIEURS" OF 1932

OIL companies outside the U.S used similar strategies to the one developed by Rockefeller in order to expand their business and rationalize the industry. The First World War revealed to national authorities that dependence on foreign products could not be a long-term option. In the 1920s, the French state took control of oil importing and took over former German installations in the Middle East. Between 1920 and 1930 another seven industrial petroleum sites opened in France, inserting Dunkirk and other French ports into larger petroleum networks[83]. The creation in 1929 of the "Compagnie Française de Raffinage" (French Refining Company) by the French State and some private investors was the first step towards the development of a national oil company. Together with the Belgian Petrofina, they built a refinery in Dunkirk the same year[84].

The construction of this refinery came with new urban developments and practices and triggered the progressive end of small refining companies. In 1932, Petrofina achieved the new refinery in Dunkirk, the "Raffinerie de Pétrole du Nord". The "Cité des Ingénieurs"

[80] C. Hein. "Oil and Water: Port city regions as nodes in the global petroleumscape". In: *Sartoniana*. Ed. by R. Rubens and M. van Dyck. 33rd ed. Gent: Ghent University, 2020. Chap. 13, pp. 193–224

[81] B. D. Karl and S. N. Katz. "The American private philanthropic foundation and the public sphere 1890–1930". In: *Minerva* 19.2 (1981), pp. 236–270. ISSN: 0026-4695

[82] F. Lundberg. *The Rockefeller Syndrome*. Vol. 20171217. ibooks, 2017

[83] C. Hein, C. Stroobandt, and S. Hauser. "Petroleumscape as Heritage Landscape: The Case of the Dunkirk Port City Region". In: *Oil Spaces: Exploring the Global Petroleumscape*. Ed. by C. Hein. Routledge, 2021. Chap. 15

[84] Total. *Total, a Pioneering Spirit*. URL: http://www.total.com/en/our-group/thumbnail/total-leading-energy-operator-almost-century

or city of engineers[85] build with the refinery aimed at keeping the executives of the facility nearby in case of emergency (Figure3.12). The neighborhood comprised twenty-three houses. Through its park-like setting, the company applied the garden city concept and the 1930s modernist idea of connecting places of working and living. The company provided additional public spaces where employees' families could meet and children could play. In Dunkirk, the "Cité des Ingénieurs" exemplified the way people perceived petroleum activities: an agent of welfare providing a better life. The complex demonstrated oil actors' ambition of influencing beyond the range of their activities.

This facility created a new city within Dunkirk and enacted the beginning of a port area dedicated to industries. The industrial site had access to the port, the hinterland and the rest of the world through direct water and railways connections. This network contrasted with the almost complete isolation of the residents of the City of Engineers from the rest of the city. This division was further deepened by multiple railways separating the refining complex and its neighborhood from the rest of Dunkirk (Figure3.12).

The construction of the city of engineers also demonstrated a lack of consideration for past technological disasters, linked or not to petroleum. It highlighted the understanding of private and public authorities, during this period, of security, history and rules. Economic developments prevailed over many other considerations, especially linked to protecting the environment and health. The proximity of the refinery to the "Cité des Ingénieurs" exemplified the ignorance of all previous disasters that affected the port city, such as the fire of Clère's refinery and other ports around the world. The focus was on increasing social control and growth through advertisement, mergers, and assimilation of small companies.

The "Cité des Ingénieurs" with its construction (and reconstruction after the Second World War) is one oil-related example embodying the new urban interest of oil companies. At the time of its construction, even though right next to the refinery, it was a desirable place to live despite the regular incidents. None of the previous disasters linked to oil disturbed inhabitants and private authorities. The oil company built this district in a clear opposition to existing, though unclear, legal and planning frameworks defining a compulsory distance based on the danger or inconvenience the exploitation of an industrial facility can create[86]. This City within Dunkirk demonstrate an absence of enforcement of security and planning regulations in the face of economic development and despite multiple and regular industrial incidents. The construction of this district illustrates the extend of the petroleumscape, of oil companies' control, and how it can influence the imaginary and the memory of people and authorities. Oil companies built

[85] The cité will also be called "Cité BP" after British Petroleum participates in its reconstruction following the end of the Second World War

[86] See, for instance, the amended Law of 19 December 1917 relating to dangerous, unhealthy or inconvenient establishments, or "Loi du 19 décembre 1917 modifiée relative aux établissements dangereux, insalubres ou incommodes" which uses general terms like "must be away from homes" or "not strictly necessary" without precising the distances or the type of activities aimed at. The parliament let the government decide, through a decree, on the details of these conditions. See in French: https://www.legifrance.gouv.fr/loda/id/LEGITEXT000006074238/

Figure 3.12: Aerial picture of the refinery "Raffinerie de Pétrole du Nord", in Dunkirk, in 1936. One can observe the "Cité" on the west corner of the refining complex. Picture from the service "Remonter le temps" of the IGN.

similar housing districts or buildings for their employees around production or refining sites across the world when there was a lack of action from local public authorities[87]. Before the beginning of the environmentalism movement in the 1970s and with the powerful influence and means of the oil industry, housing and industrial sites stayed closely tied, socially and spatially.

[87] C. Hein. "Oil Spaces: The Global Petroleumscape in the Rotterdam/The Hague Area". In: *Journal of Urban History* (2018)

3.5. Visible Hazards and Unclear Legal Interventions

In this short time the influence of the oil industry spread like an oil spill at sea, quickly and on a large scale. The urban impact of oil companies developed in the previous sections became more prominent after the Second World War. However, the 1920s and 1930s demonstrated the importance that private actors could already have on the creation and application of rules and the spatial development of a city. The urban and architectural imprint that oil companies developed in this short peace time precluded wider opportunities to shape social, economic, politic, legal, and urban fields.

3.5.1. From Local to International Pollution Issues in 1930

In spite of the efforts of oil companies to influence the public opinion, the smog, a deadly phenomenon linked to industrial development and air pollution, attracted the attention of the public. The impact of this air pollution quickly went beyond its regional origin, like the Meuse smog of December 1930 in Belgium. It was not the first case of a smog nor the only one in the area but exemplified the long denial of industrial activities' effects on public health[88]. This smog originated from Belgium, near Liège (or Luik), where an intense industrial activity was taking place. But on that December 1930, the frequent fog became heavier, provoking respiratory issues among the citizens, and causing multiple deaths. Newspapers and scientists extensively discussed it afterwards as it made apparent that industrial activities were causing such smogs, and that air pollution from industries could directly be linked to death[89].

The news coverage of this event reflected its scale. Not only did the incident affect the Meuse area of Belgium but also the entire country and parts of its neighbors. The smog reached the north of France and the south of England with Paris and London reporting the deadly fog, while some news mentioned Germany and The Netherlands being impacted as well[90]. If the meteorology played a role in increasing the effects of industrial pollution, this latter, with its health effects long denied by both private and public actors, became undeniable. Multiple smogs followed, especially during and after the Second World War (like the Saint Louis smog of 1939 in the U.S), but the event taking place in the Meuse area triggered an awareness around the detrimental effects of air pollution from industries. As Alexis Zimmer, a health and environmental historian, explains in his book: "rather than being the occasion for the first scientific demonstration of the mortality of air pollution, this fog was that of the impossibility of continuing to deny it"[91]. The coverage of this event in newspapers and its link to industrial activities raised the awareness of

[88] Deadly fogs happened before in 1897, 1902 and 1911. See:A. Zimmer and B. Nemery. "The Meuse Valley (1930): Just fog or industrial pollution". In: *Air Pollution Episodes* 6 (2017), p. 27

[89] B. Nemery, P. H. M. Hoet, and A. Nemmar. "The Meuse Valley fog of 1930: an air pollution disaster". In: *The lancet* 357.9257 (2001), pp. 704–708

[90] A. Zimmer. *Brouillards toxiques: Vallée de la Meuse, 1930, contre-enquête*. Zones sensibles editions, 2016

[91] Translated from the French: "[...] plutôt que d'être l'occasion de la première démonstration scientifique de la mortalité de la pollution de l'atmosphère, ce brouillard fut celle de l'impossibilité de continuer à la nier" in A. Zimmer. *Brouillards toxiques: Vallée de la Meuse, 1930, contre-enquête*. Zones sensibles editions, 2016.

inhabitants and public authorities beyond the evident consequences of explosions and fires. However, the importance of industries for the economic development of nations, especially in the tensed context of the in-between World Wars, prevented the emergence of new regulations.

3.5.2. LEGAL ACKNOWLEDGMENT OF PETROLEUM AND POLLUTION'S IMPORTANCE

THE peace time between the two World Wars triggered, for national authorities, a new awareness towards the strategic importance of petroleum activities for a nation's economy and power[92]. The regular polluting incidents linked to industrial activities and the social concern around them were, however, challenging this industrial development. While the First World War confirmed the necessity to secure and manage the imports of crude oil and the supply of its refined products, air pollution from industries became impossible to deny for public and private authorities alike. Thus, public authorities stepped in, and produced a range of regulations to frame petroleum activities and their spaces. In an attempt to better control the risk around industrial facilities and the influence of oil actors, these new planning rules, health policies, and taxes were, nevertheless, influenced in their design, thus also in their application, by oil actors and their petroleumscape. This legal landscape of influence is not necessarily an addition to the global petroleumscape developed by Hein, but rather part of its intangible aspect, an indirect consequence of it (Figure3.13). Yet, researchers and decision-makers often underestimate this consequence when trying to tackle or identify the landscape of oil influences or elements of the global petroleumscape[93].

With the destruction and slow economic recovery of the first global conflict, governments realized that stocking and refining oil became a determinant military element. Like many of their neighboring competitors, French oil companies had to import the resource as European reserves could not meet the needs of all nations[94]. The imports of crude oil or refined products and the reliance on foreign suppliers were major concerns for public authorities and their armies. Thus, in 1928, the French parliament enacted a law creating a regime for the importation of oil. From this date onward "the wholesale importation of petroleum crude oil, its derivatives and residues will be carried out under the control of the State"[95]. The State took control of the entire sector to manage the stocks of oil but also prevent foreign companies to gain influence on the government's decision-making process, like Standard Oil in 1909[96]. As oil became a strategic concern, so were the companies carrying explorations and exploitation, as well as their hosting

[92] D. Yergin. *The prize: The epic quest for oil, money & power*. Simon and Schuster, 2011; B. C. Black. "How World War I ushered in the century of oil". In: *The Observer* (2018)

[93] C. Hein. "Sustainable Architecture: Building the future Dunkirk". In: *The Beam* (June 2019). URL: https://medium.com/thebeammagazine/designing-post-carbon-dunkirk-with-students-from-tu-delft-531c770a8939

[94] The supply of the North Sea was unavailable as the first offshore rigs in deep sea appeared after the Second World War in 1947.

[95] Translated from the French law of March 30, 1928: "Loi relative au régime d'importation du pétrole" or Petroleum Import Regime Law. See legifrance.gouv.fr.

[96] Previously developed in this Chapter in the subsection 3.3.1.

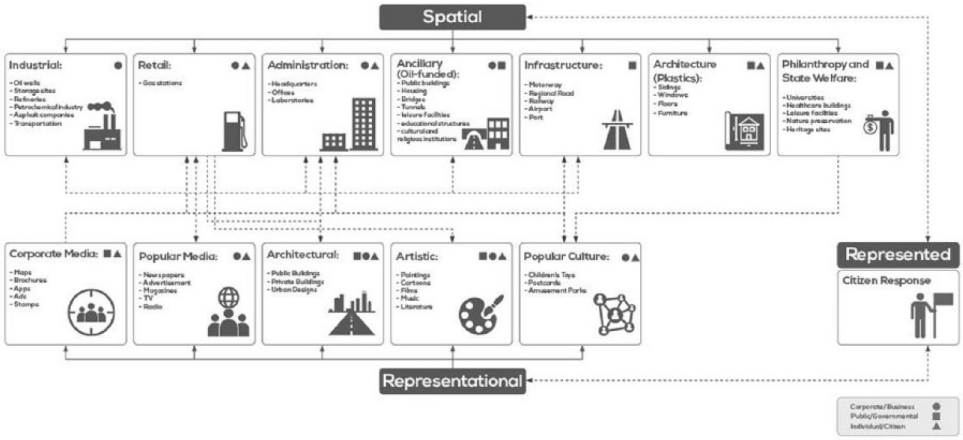


Figure 3.13: Shows the hybrid, multiple, shifting, and uneven ways in which many actors collaborate to create the global petroleumscape. Source: C. Hein. "Oil Spaces: The Global Petroleumscape in the Rotterdam/The Hague Area". In: *Journal of Urban History* (2018).

port cities. Thus, it was of prior importance for governments to support and protect oil companies and settlements.

Similarly to the acknowledgment of petroleum's importance, this period also enabled improvements in protecting health and the environment. These enhancements translated into new spatial planning practices in France. The law Cornudet of March 14, 1919 on the expansion and planning plans of cities[97], the law Aubriot of April 20, 1932 aiming at the elimination of industrial smokes[98] had major implications in the spatial organization of industrial cities. The spatial outcomes of this last law, even if not expressly mentioning it, were zoning divisions between industrial sites and housing areas of cities. This mechanism had great implications for port cities as they are privileged places for the settlement of industrial facilities. It created borders and districts dedicated to industrial activities which, indirectly, condemned the people living in these areas to give up on trying to reduce or complain on smokes and pollution as these zones became officially designated for this purpose. The aim was also to protect industries from the actions of nearby inhabitants rather than inhabitants themselves. Though enacted the same year, public authorities never applied the law Morizet, if not in the department of Seine because of local political questions[99]. It was, however, the first law on atmospheric pollution and the first to set polluting limits and scales to respect[100]. This legal process and its lack of

[97] Translated from the French: "Plans d'extension et d'aménagement des villes".

[98] Translated from the French: "Tendant à la suppression des fumées industrielles (pollution, protection de l'environnement)

[99] L. Kamoun *et al. Un air familier?: sociohistoire des pollutions atmosphériques.* Presses des Mines via OpenEdition, 2017. ISBN: 2356714324

[100] L. Lestel. "Pollution atmosphérique en milieu urbain: de sa régulation à sa surveillance". In: *VertigO-la revue électronique en sciences de l'environnement* Hors-série 15 (2013)

enforcement represented the slow introduction of zoning techniques in legal systems. It is also an acknowledgment of port cities' planning strategy introduced by the Freycinet Plan in 1878, using spatial organization to improve ports' economic efficiency and divide it from the city rather than directly trying to tackle security and pollution issues.

These laws were based on another one enacted years before, in 1917, relating to dangerous, unhealthy or inconvenient establishments[101]. It was classifying industrial sites according to the risks they posed on populations, water, and the natural environment. The creation of this law demonstrated that governments not only relied on the repetition of incidents to improve legal frameworks but also on the repetition of laws themselves. Such a classification of dangerous industrial sites was not a creation but a recovery of rules introduced in the 1810 imperial decree, which even had a similar title, "relating to factories and workshops which spread an unhealthy or unpleasant odor", and a content that was already referring to categories, yet never really applied. The same issues led to similar laws and results, with a lack of acknowledgments from public authorities on the need to enforce, around industrial sites, the application of strict rules.

3.6. CONCLUSION

SUCCESSIVE incidents linked to petroleum activities and their consequences led to the creation of new practices in the spatial planning of port cities. They pushed, together with the search for more economic and industrial efficiency, local public and private actors to settle industrial sites further away from the city into dedicated places, thus participating in the creation of industrial port areas. Public policies such as the Freycinet plan supported this vision of a port serving industrial activities. However, the analysis of archival letters and reports as well as regulations that followed proved the lack of enforcement of planning and regulatory rules even before the creation of the oil industry. Public authorities never implemented the distance requirements for sanitary purposes from the 1810 imperial decree. Regulations existed but the absence of a precise content as a consequence of industrial protection and influence prevented the efficient application of planning strategies. This process had detrimental effects on the environment, and incidentally on inhabitants' health and security as industrial disasters kept on happening around housing areas of port cities. Early developments and influences of oil actors, with their tight and conflicting relationship with law-makers, impacted and delayed the design of protective regulations, thus of safe port cities, basing their development upon reactions to disasters. This mechanism of influences on policies and rules by oil actors and its effects on the spatial organization of port cities demonstrate the importance of regulations on spatial planning practices, hence in shaping both port cities and the petroleumscape.

The spatial division between port and urban areas was, at first, not so much linked to considerations on health and security but rather following a constant quest for better efficiency. Greater oil industries needed larger infrastructure and the place to de-

[101] Translated from the French: "Relative aux établissements dangereux, insalubres ou incommodes"

velop. Together with the development of other industries, it pushed public authorities to transform and relocate ports. The Freycinet plan in France is one example of public action directly affecting the spatial planning of port cities and influenced by economic and industrial considerations. But later developments kept on deepening this division of space and use of the land (Figure3.5), especially after the two World Wars. The lack of enforcement of planning and security measures from regulations dealing with industrial sites in France as opposed to the successful impact of economic initiatives and policies demonstrate the priority given to industrial efficiency and development at the beginning of the 20th century. With the construction of the City of Engineers in Dunkirk in 1931, and other similar neighborhoods across the world, oil companies showed their constant lack of consideration for security and health, as well as for past and deadly incidents. Paradoxically, citizens of Dunkirk viewed this oil neighborhood as a showcase of the wealth that petroleum companies could provide and the better future that could arise from it[102]. The proximity between houses and the refinery, when seen as a disadvantage, was eclipsed by the high standards of living granted by the oil company in this city within the port city of Dunkirk.

In the 1930s, however, the effects of industrial activities (air pollution mainly) became increasingly visible. Its former limitation to neighborhoods around industrial sites drastically expanded with the growth of industrial activities to reach other regions and countries. The effects of these episodes on inhabitants' health became clear with, among others, the Meuse smog in 1930. Public and private authorities could not deny the link between smokes of industries and issues on health anymore. Even if limited, law-makers created new rules in reaction to these deadly disasters with first zoning and distance measures between industrial sites and housing areas, similarly to the rules included in the 1810 decree. The first "environmental" rules appeared through this reactivity, although the solutions developed were to transfer and concentrate industrial activities in dedicated areas (participating in the dedication of port areas for industrial activities). In the case of Dunkirk, it resulted in furthering the process of division started with the Freycinet plan, with additional basins and docks. Yet, former regulations linked to chemical disasters and dealing with the planning and security of industrial sites in cities confirmed that the efficiency of a rule not only depends on the preciseness of its content but also on the tools designed to ensure its application. The continuous repetition of industrial disasters demonstrates a lack of political will to enforce rules protecting the health and environment of inhabitants as they potentially affect the development of essential industrial activities such as those related to the oil industry. Chemical actors' intense lobbying affected the design and application of rules dealing with their industry to prevent law-makers in parliaments and governments from imposing what they considered costly and unnecessary security measures. Their political influence affected the content and applicability of regulations touching upon environmental and health protection or spatial planning. These practices were later implemented and expanded by oil actors as they also challenged new taxation and regimes applicable to the oil industry beyond national borders. Eventually, oil actors and regulations influenced each other, with taxes forcing the construction of refineries and with public authorities' lack of enforcement of

[102] J. Lecuyer. *La cité des ingénieurs figée dans l'instant.* Ed. by La Voix du Nord. May 2002

sanitary and security rules around industrial sites. The importance of this interaction set the stage for oil companies in the decades to follow, and still affects, through its evolution, the decisions of contemporary public authorities. It led to the creation of a culture of protection towards industrial companies and their activities in France[103], as well as in other countries across the world[104].

[103] T. Le Roux. "Accidents industriels et régulation des risques: l'explosion de la poudrerie de Grenelle en 1794". In: *Revue d'histoire moderne contemporaine* 3 (2011), pp. 34–62. ISSN: 0048-8003

[104] B. Balassa. "Industrial protection in the developed countries". In: *Change and Challenge in the World Economy*. Springer, 1985, pp. 427–447

4

The Rise of Oil Companies and a Monopoly of Knowledge (1945-1980s)

The greatest obstacle to discovery is not ignorance, it is the illusion of knowledge.

Daniel J. Boorstin,
American historian.

It is certain, in any case, that ignorance, allied with power, is the most ferocious enemy justice can have.

James Baldwin,
American novelist.

Parts of this chapter have been published in S. Hauser. "The Interplay of Economic Development and Environmental Protection: Dunkirk and the Search for Balance". In: *PORTUSplus* 8.0 (2019); and S. J. Hauser and C. Roche. "Sharing Is Caring, but Is the Shore Cared for? The Sharing Paradox of the French Coast". In: *Urban Science* 4.4 (Nov. 2020), p. 60.

THE Declaration of the Rights of Man and of the Citizen that the National Constituent Assembly of France wrote in 1789 states in its article 5: “The law has the right to forbid only actions harmful to society. Anything that is not forbidden by law cannot be prevented, and no one can be compelled to do what it does not order[1].” The entire declaration is still in force in the French system and included in what is called the “Bloc de Constitutionnalité” or “Constitutional block”: all the documents and principles which have a constitutional value and that laws have to respect[2]. But when the highest level in the legal hierarchy is full of imprecise principles, decision-makers are free to interpret to produce unclear and complex prohibitions. Before the 1980s and the rise of the environmentalism movement in policies, texts and declarations remain voluntarily general on health and environmental protection, with, for instance, no definition of what is “harmful to society”. During the post-War period, public authorities mostly focused on the economic recovery of nations, and ignored the consequences of pollution as well as the health and environmental concerns.

The post-war renewal and the period of full economic growth that went with it, also called the Glorious Thirty[3], benefited the oil industry. The long-standing "peace" following the Second World War allowed oil companies to assert their power by applying the principles of Rockefeller and its first oil major Standard Oil: network, efficiency, and control. Through such a strategy emerged national oil companies with tremendous financial powers and influences over the design of legal frameworks. When the oil shocks put an end to the dream of continuous economic growth at the beginning of the 1970s, in parallel with the rise of environmental concerns internationally, the strategy of oil actors changed. Suddenly they secretly acknowledged their impacts on the environment while lobbying to prevent any action hampering their activity and denying their responsibilities. This was achieved through early scientific researches commissioned by these same oil companies to assess their share on the modification of the global climate. One can observe this rise in the power of oil companies through the scientific reports they produced, the extent of their disasters, and their advertisement campaigns demonstrating first greenwashing practices. Oil actors became holders of the knowledge, using science to dismiss science.

Following the principle of “what is not forbidden by law is allowed”, this chapter asks: how post-war private actors of the oil industry thrived and adapted to new environmental debates while increasing pollution and the number and scale of disasters? This development of the oil industry led it to consume more space to accommodate its facilities. This industrial but also urban expansion pushed oil sites in port areas where space was available and the infrastructure ready to host them, as later demonstrated by a comparison of aerial pictures. Parallel to this growth and its consequences rose a legal production

[1] In French: “La loi n’a le droit de défendre que les actions nuisibles à la société. Tout ce qui n’est pas défendu par la loi ne peut être empêché, et nul ne peut être contraint à faire ce qu’elle n’ordonne pas.” Found on the governmental website of the government Elysée: https://www.elysee.fr/la-presidence/la-declaration-des-droits-de-l-homme-et-du-citoyen.

[2] See the website “Vie-Publique” in French: https://www.vie-publique.fr/fiches/275483-quest-ce-que-le-bloc-de-constitutionnalite

[3] J. Fourastié. *Les trente glorieuses: ou la Révolution invisible de 1946 à 1975.* Fayard, 1979

of imprecise laws and regulations, gray zones in definitions and applications, preventing strict rules to apply to the oil industry. The planning in port cities around industrial facilities relied and is still relying on public authorities' reactions to incidents to improve the efficiency of local, national and European planning systems, and protect citizens. Incidents at sea triggered an evolution in dealing with maritime transportation and in the preservation of coastal environments on which port cities depend as well for their attractiveness. However, the protection of health and natural environments, which must go hand in hand, are often depending on great principles included in highly valued texts (like constitutions) but poorly defined. This lack of precision favors interpretation often to the benefit of polluting companies and their activities. The French Shoreline Act of 1986 exemplifies this power of interpretation in protecting the environment against urban and industrial expansion around highly attractive places. In the end, public authorities kept on relying on disasters to improve regulations dealing with pollution and security, which often translated into new spatial planning and construction strategies in port cities.

4.1. THE POST-WAR ECONOMIC GROWTH AND THE NEW PLANNING STRATEGIES

THE "Glorious Thirty" was, in France and in Western Europe, a period of full economic growth and increasing industrial production and demography, from 1945 to 1973. Private and public investments and affordable energy (cheap petroleum) supported this industrial renewal in France but also in many other European countries. The Marshall Plan, or European Recovery Program, funded by the U.S after the war to prevent the rise of communists in Europe, greatly participated in this renewal. Public authorities used it to purchase oil for European countries, with over 10% of the fund being dedicated to this activity only[4]. Thus, oil companies largely benefited from these subsidies and increased their influences over European countries with the share of oil in the energy consumption of European countries passing from 10% in 1948 to around 30% twelve years later[5]. However, ports mostly relying on the oil industry became exposed to the decisions of oil companies for their economic life.

Since 1947, the law gave to the French government the responsibility to manage ports, their governance and their spatial planning[6]. The central authority became able to name the director and put representatives in the committees managing it. Supported by the national vision and objectives of the State, the port of Dunkirk came back to life after the devastation of the Second World War. Its renewal attracted new industries (iron and steel, oil storage and refineries) and with them a great need for space and infrastructure. This economic opportunity brought by governmental investments to revitalize the port

[4] D. S. Painter. "Oil and the Marshall plan". In: *The Business History Review* (1984), pp. 359–383. ISSN: 0007-6805

[5] T. Mitchell. *Carbon Democracy*. Verso Books, 2013

[6] Law n° 47-1746 of the 6 July 1947 on the organization of the handling work in the ports, or "sur l'organisation du travail de manutention dans les ports".

led to the creation of additional basins, as well as new locks and railways for industries, enacting the landscape transformation of the port area. The modern aspect of ports' governance started in 1965 with the creation of Autonomous Ports[7]. Ports became public institutions of the State with a civil personality and a financial autonomy. However, this autonomy was in name mainly as the government kept a stranglehold over their governing body[8]. This governance led to the allocation of a great amount of land to the port authority of Dunkirk during the 1970s, supporting its successive development phases towards the west[9].

Along with the economic renewal, the urban and industrial expansions continuously consumed more natural spaces and landscapes. The French government then realized that free industrial and urban development was a threat to other important sectors. This unregulated sprawl especially affected coastal areas and led ultimately to the creation of additional town planning regulations in the 1970s and 1980s to protect not only the shore and its inland spaces but also other important sites for agriculture and tourism. The efficiency of such reaction was, nonetheless, relative, but part of a new and wider awareness of the importance of environmental protection. In Dunkirk, the extension of the port areas to the west part of the city already damaged the landscape beyond repairs with the shoreline becoming completely artificial[10].

Aerial pictures expose the urban expansion on the west part of Dunkirk, as well as the great extension of the port (Fig4.1 and Fig4.2). In the 15 years following the war new water facilities, and oil-related buildings appeared. The modification of the landscape shows the impacts of this industrial and urban growth; they completely reshaped the west part of the port. As industries also came with their need for workforce, it caused small cities near the port to develop. These former villages became cities, hosting the workers who came from across the region to work and live in this new active coastal area. After the Second World War, the sanitary and living conditions in the country were alarming, especially in cities like Dunkirk that were almost completely destroyed and with authorities unable to accommodate its growing population[11]. These growing cities, along with new designs and modern techniques, allowed an improvement of citizens' quality of life. The long process of Dunkirk's reconstruction was an opportunity for public authorities and planners to change the situation and improve the urban planning of the city[12].

[7] Law n° 65-491 of the 29 June 1965 on autonomous ports, or "sur les ports maritimes autonomes".

[8] S. Hauser. "The Interplay of Economic Development and Environmental Protection: Dunkirk and the Search for Balance". In: *PORTUSplus* 8.0 (2019)

[9] C. Husser and S. Raison. "Dunkerque: la reconversion de terrains portuaires". In: *Annales des Mines-Réalités industrielles*. 4. FFE. 2015, pp. 66–71

[10] S. J. Hauser and C. Roche. "Sharing Is Caring, but Is the Shore Cared for? The Sharing Paradox of the French Coast". In: *Urban Science* 4.4 (Nov. 2020), p. 60

[11] M.-M. Hilaire. "Démographie et qualité de la vie dans la région du Nord au XXe siècle". In: *Revue du Nord* 56.222 (1974), pp. 385–395; B. Ménager and F. Benedict. "La reconstruction de Dunkerque après la seconde guerre mondiale." In: *Revue du Nord* 77.311 (1995), pp. 633–640

[12] A. Lebel. *La Reconstruction*. Ed. by Ville de Dunkerque. URL: https://www.ville-dunkerque.fr/decouvrir-sortir-bouger/histoire-patrimoine/lhistoire-de-dunkerque/la-reconstruction/

Figure 4.1: Aerial pictures of the Western part of Dunkirk, in 1949 on the left and 1963 on the right. One can observe the extension of the port infrastructure, the rebuilding of the refinery as well as new oil settlements. Out of the 1963 picture, on the west, the port continues with the new steel facility Usinor achieved the same year. Pictures from the service "Remonter le temps" of the IGN.

One oil company, the British Petroleum - hereafter called BP - produced a splendid example of living standards' improvements in Dunkirk. When rebuilding - together with Petrofina - the refinery of Dunkirk destroyed during the war the company, at the time called SGHP-BP in France, re-designed the existing district "Cité des Ingénieurs" for its executives and managers (See Chapter3)[13]. In Dunkirk, the "Cité" was not the only influence of the BP refinery after the Second World War. Because of bombing raids during the Second World War, more than 90% of the city of Dunkirk was destroyed[14], and only a third of the population came back in 1946. In a port city devastated by the last conflict, the lack of housing for its employees pushed authorities of the company to help its employees in building their houses. Besides creating housing and new neighborhoods, these constructions also upgraded the living conditions in Dunkirk. It resulted in the production of another "Cité" on the other side of the railway, within the urban tissue, the "Cité Bayard". The company also built other houses in a distinct part of the port city, taking part in its extension while influencing its shape and development.

This Cité was a model of modernity and comfort until the beginning of the environmentalism movement. The reconstruction of Dunkirk represented a great opportunity for renewal with new urban strategies for the most important French port of the north

[13] J. Lecuyer. *La cité des ingénieurs figée dans l'instant.* Ed. by La Voix du Nord. May 2002

[14] B. Ménager and F. Benedict. "La reconstruction de Dunkerque après la seconde guerre mondiale." In: *Revue du Nord* 77.311 (1995), pp. 633–640

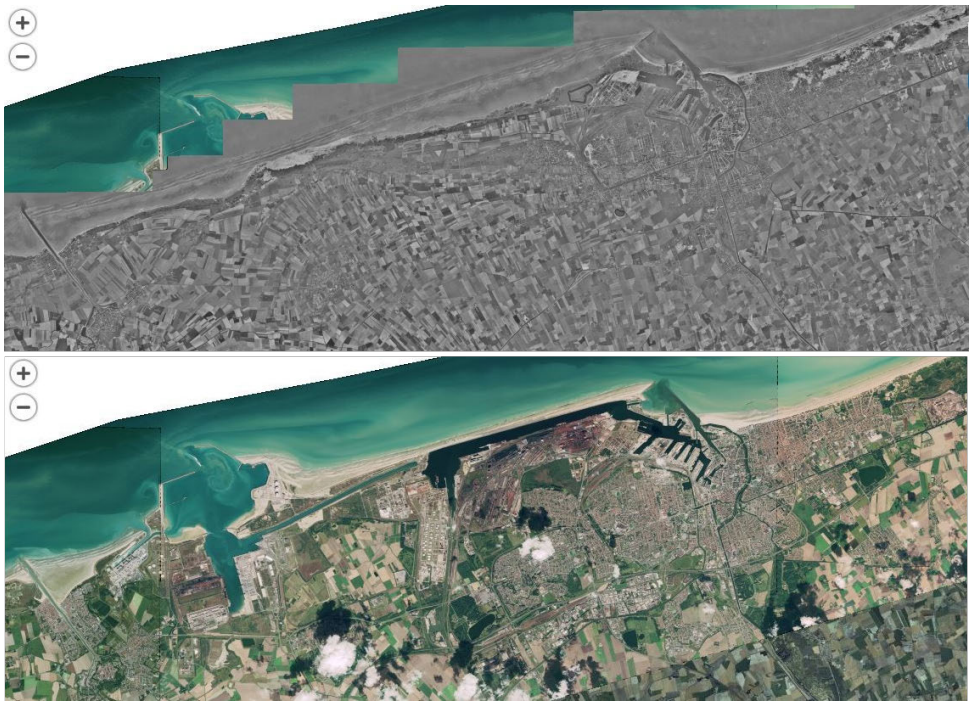


Figure 4.2: Aerial pictures of Dunkirk in 1957 and 2015 with the observable transformations of the port city and its coastline. Pictures from the the service "Remonter le temps" of the IGN.

coast. The period of full employment also led to a demographic explosion in Northwest Europe, in France and in Dunkirk. It was a serious challenge for a devastated port city like Dunkirk and required the urgent construction of dwellings. The real estate pressure coming from this need triggered the urban expansion, which consumed and transformed the (natural) land available around the existing urban tissue. The port expanded dramatically during this period because of the arrival and development of steel and petroleum industries, which subsequently reshaped the coastal image as well as the city's environment. In the 1970s, following the expansion of industrial activities, the Cité emptied, though not due to security measures linked to the development of the port area, but mainly because of the noise and air pollution linked to the settlement of industrial sites around it. The consumption of natural spaces around the city, both for industrial and urban purposes, was the first consequence of this horizontal development, and the reshaping of the coastline. The two successive oil shocks, in 1973 and 1979, put a sudden end to this prosperous growth in Dunkirk[15].

[15]See: J. Fourastié. *Les trente glorieuses: ou la Révolution invisible de 1946 à 1975.* Fayard, 1979

4.2. MARITIME WATERS AS A TRIGGER FOR REACTION

THE Second World War revealed the importance of of oil, but the post-war society discovered the full extent of its possibilities. With the development of car and plastic industries, petroleum products reached another dimension in the life of people. It became omnipresent. The explosion in the use of petroleum products triggered a need for greater production capacities and bigger transportation means in Western countries. But at a time where environmental rules were not yet in action, the constant greater ships built to answer the growing needs of developed and developing countries for petroleum led to more dramatic disasters. Oil spills became recurrent at sea and the scale of their impacts more disastrous for natural environments and coastal populations.

4.2.1. GREATER INDUSTRIAL SCALE FOR GREATER POLLUTION

EVOLUTION in the planning of port cities heavily relied on economic developments and incidents related to facilities located in their territory. New frames and rules related to onshore facilities of the petroleum industry tackled the occurrence of the previously exemplified disasters in Chapter3 after the Second World War. A chronology of incidents reveals however that these onshore accidents were replaced by offshore events, with tankers and platforms. More recurrent, affecting a much larger surface, far more difficult to deal with and with a greater and longer visibility, they slowly appeared at the beginning of the XXth century[16]. Oil spills caused by tankers' sinking became regular especially from the 1970s onward. Their visibility and immediate consequences on the environment significantly affected people's mind and memory.

The economic growth of the post-war period until the oil shocks of 1973 and 1979 went together with a greater need for energy. Thus, the development of a fleet of constantly bigger tankers triggered bigger tragedies related to the transportation of oil. Like a chronic disease, oil spills became regular, a long list of episodes in the series of environmental catastrophes[17]. Many ships' names remain in the collective memory of nations, regions, and communities affected by their pollution.

Oil spills from tankers exemplified the prevalence of economic benefits over a complete knowledge of the risks inherent to its use or, here, transportation. One illustration, considered being the first major spill in modern European history, proved this lack of interest in the anticipation of incidents linked to maritime petroleum transport: the sinking of the Torrey Canyon. The event took place in March 1967, in South West England. After unsuccessfully trying to refloat the ship, the British Government put the oil on fire in an effort to reduce the impact of the pollution. To achieve that aim, the government used multiple air strikes and napalm to also sink the ship. However, the operation failed

[16] Though the fires of the ships transporting oil during the second half of the XIXth century could also be understood as "tanker" disasters.

[17] See among others: The Torrey-Canyon in 1967; the Oceanic Grandeur in 1970 in Australia; the Wafra in 1971 in South Africa; the collision between the Texanita and the Oswego-Guardian in 1972 in South Africa; the Olympic-Bravery and the Boelhen in France and the Urquiola in Spain in 1976. See also: the files of Cedre on `http://wwz.cedre.fr/Ressources/Accidentologie`, and R. Andurand. "Pétrole et marées noires". In: *Preventique Securite* 113 (2010), p. 46.

to mitigate the impact of the spill, and both coasts of England and France were affected by the pollution. It was not the first time coastal communities were experiencing such spills but the scale and the amount of oil discharged highlighted a gap in liabilities of maritime transport companies and in knowledge on how to deal with incidents linked to the resource. The absence of international treaties or conventions on how to deal with this type of disaster showed public authorities' lack of anticipation and transpired in an absence of collaboration between countries[18]. The oil spill was not only affecting the water, but also reached the coasts of England and France, ignoring national borders.

Some regional and international agreements predated the environmentalism movement that started in 1972. Many of them appeared again after disasters, most of them linked to water transportation. The Torrey Canyon incident, for instance, led to the creation of the "Agreement Concerning Pollution of the North Sea by Oil" in 1969, the oldest regional agreement dealing with pollution[19]. However, the efficient application of this agreement had to wait for the end of the 70s and two other incidents to be fully considered and seriously applied[20]. Yet, in 1969, other international rules or conventions were linked to the sinking of the Torrey Canyon[21], like the international convention relating to intervention on the High Seas in case of oil pollution casualties, the International convention on civil liability for oil pollution damage, Brussels' resolution on the establishment of an international compensation fund for oil pollution damage of 1971, and eventually to the MARPOL convention of 1973 developed in the next section[22]. Thus, the supply of regulations and agreements was not necessarily an issue before 1970, but their content was not precise enough nor their application enforced by public authorities.

The repetitive incidents at sea revealed a widespread industrial practice: Private and public actors knew how to use natural resources and benefit from them but not how to deal with it in case of incidents. The Torrey Canyon and the following disasters, in dealing with petroleum as well as with other resources, demonstrated the ignorance of authorities through their lack of appropriate answers[23]. The industrial development and the techniques going with it grew faster than the knowledge on the risks and pollution and how to remediate them. This practice of minimizing hazards of industrial activities had dire consequences, engraved in natural environments, inhabitants, and the plan-

[18] J.-P. Quéneudec. "L'incidence de l'affaire du Torrey Canyon sur le droit de la mer". In: *Annuaire français de droit international* 14.1 (1968), pp. 701–718

[19] See: https://www.bonnagreement.org/about/history

[20] The two incidents mentioned are the blow-out of the Norwegian offshore platform "Ekofisk" in the North Sea in 1977 and the sinking of the tanker "Amoco Cadiz" in France in 1978.

[21] J.-P. Beurier. *Droit international de l'environnement.* Ed. by A. Pedone. 4th ed. Paris: Etudes Internationales, 2010, p. 590

[22] J. Barros and D. Millar Johnston. *The international law of pollution.* New York : The Free Press etc. ; London : Collier Macmillan, [1974], 1974, p. 476; C. Valero. "Erika, Prestige : Deux décennies après, quelles avancées ?" In: *ISEMAR - Institut Supérieur d'Economie Maritime* 215 (2019)

[23] The Torrey Canyon, but also the Ekofisk blowout, the sinking of the Amoco Cadiz and the explosion of Piper Alpha demonstrated a missing adequacy between the scale of oil industry and tools and measures for security. Chemical and nuclear incidents illustrated this process as well with the explosion of Texas City, U.S, in 1947 and the power plant of Chernobyl in 1986 in USSR.

ning of port cities[24].

4.2.2. THE REACTIVITY OF RULES AND COOPERATION

THE multiplication of disasters linked to oil at sea between the 1960s and the 1970s forced governments around the world to set up common rules. In order to tackle the increase of oil spills and prevent their shocking consequences for the populations, the international cooperation generated a major and influential convention treating the pollution from ships in 1973: The Convention for the Prevention of Pollution from Ships or MARPOL for Marine Pollution. Following the repeated incidents of 1976, the International Maritime Organization updated it in 1978. The rules and standards imposed by this text are now global references, applied by most of the countries using shipping[25]. The efficiency of this convention also depends on other treaties allowing dangerous practices to continue but illustrates the possibility of global cooperation and the creation of binding standards in reaction to successive oil disasters at sea(Figure4.3).

The multiplication of maritime incidents linked to oil in the 1970s was paradoxically going hand in hand with the emergence of the environmentalism movement in 1972. Reports such as the Meadows report in 1972[26] and the beginning of world conferences dedicated to nature, such as the Stockholm Conference of 1972[27], supported the rise of environmental protection internationally. By this time however, in the environment of Dunkirk, the urban sprawl already consumed most of the shore and beyond; the port gained land on the sea, and the city expanded inland. Public authorities long considered reports on sustainability and the course of action in the Western world doomsday fantasies; politicians and company owners believed that the economic explosion of the "Glorious Thirties" would last. This feeling transpired in international texts, as their focus was mainly to tackle visible maritime incidents rather than focusing on land pollution and energy efficiency. They also ignored the urbanization and its impacts on the coast, as it was in the hands of national governments.

At the European level, the first programs of action to protect the environment were set out in 1973 by the European Economic Community (the precursor of the European Union)[28]. Constraining rules on environmental quality appeared a few years later and started by focusing on fresh water resources thanks to the "Directive on drinking waters" in 1975 (Council Directive 75/440/EEC of 16 June, 1975 concerning the quality re-

[24] K. Kalmbach. *The Meanings of a Disaster: Chernobyl and Its Afterlives in Britain and France.* Vol. 20. Berghahn Books, 2020. ISBN: 1789207037

[25] B. Taverne. *Petroleum, Industry, and Governments: An Introduction to Petroleum Regulation, Economics, and Government Policies.* Kluwer Law International, 1999

[26] D. H. Meadows *et al. The limits to growth: a report for the club of rome's project on the predicament of mankind.* New American Library, 1972

[27] A United Nations decennial meeting between world leaders to enhance the sustainable development of the world.

[28] S. Baziadoly. "Le droit communautaire de l'environnement depuis l'Acte unique européen jusqu'à la Conférence intergouvernementale". PhD thesis. Paris 2, 1993; C. Roche. *L'essentiel du droit de l'environnement.* 7th ed. GUALINO, 2017

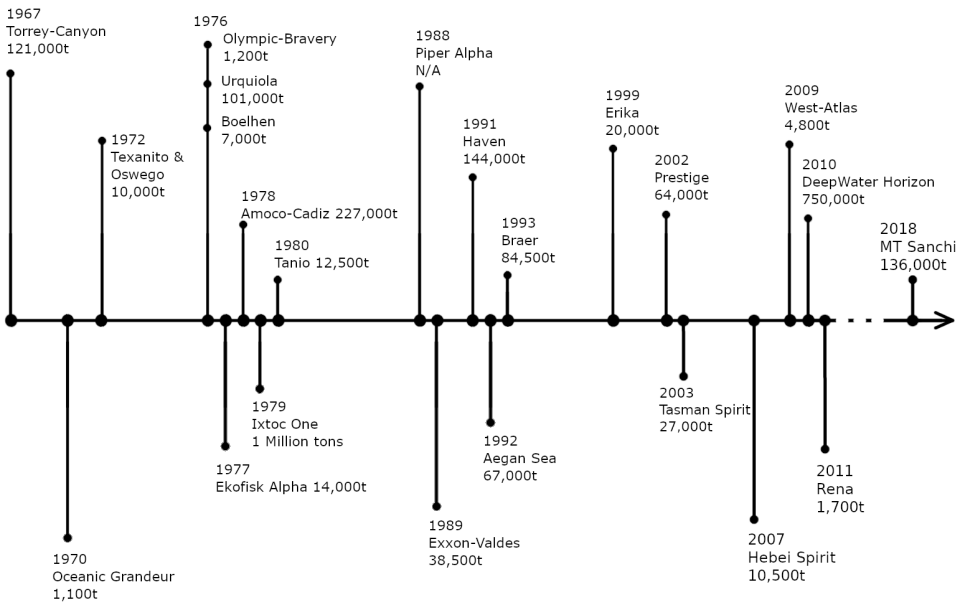


Figure 4.3: Timeline of some major oil spills from tankers since the Torrey-Canyon, chronologically and with an average estimation of oil spilled. By the authors with data partially coming from the website of Cedre http://wwz.cedre.fr/en/Resources/Spills.

quired of surface water intended for the abstraction of drinking water in the Member States). A few years later, in 1979, the directive on birds (Council Directive 79/409/EEC of 2 April, 1979 on the conservation of wild birds) came into force to protect birds and their habitats, on land and at sea, slowly extending the protection of waters to maritime ones. Following European treaties enshrined the importance of environmental protection in European policies (See Chapter5). As a member of European Economic Community, France, Belgium and the Netherlands had to integrate this growing number of new supra-national policies and rules protecting the environment into their own legal systems. This mechanism ended up creating, with the following policies, one of the largest coordinated networks of protected areas in the world.

With the rise of the environmental concern, many international regulations affecting local urban planning policies appeared in the 1970s. The Convention for the protection of the World's Natural and Cultural Heritage of 1972, or the Directive on the conservation of wild birds of 1979 (79/409/EEC) of the Council of the European Communities were first steps towards the protection of both natural environments and the built heritage. This international collaboration led also to the creation of an important mechanism in protecting natural areas in 1971 with the Ramsar Convention on Wetlands of International Importance Especially as Waterfowl Habitat. Its article 4, second paragraph, in-

troduced a tool to tackle and prevent the disappearance of important natural habitat for biodiversity through the compensation system:

> Where a Contracting Party in its urgent national interest, deletes or restricts the boundaries of a wetland included in the List, it should as far as possible compensate for any loss of wetland resources, and in particular it should create additional nature reserves for waterfowl and for the protection, either in the same area or elsewhere, of an adequate portion of the original habitat.

The private actor responsible for the creation of an industrial or housing complex consuming wetlands would have to compensate for the damage through the creation of a new one nearby. Not only does this tool ensures wetlands would not disappear in important places for biodiversity, but it also prevents this consumption in advance as the cost to remediate would affect the budget of such projects. With public authorities in port cities facing increasingly greater industrial complexes, this mechanism ensured the preservation of important habitats for species. However, this rule is a double-edged sword as it still participates in the artificialization of lands. The second side effect of the measure is that it allows dominant companies with tremendous financial mean to change considerable amounts of natural areas as long as they are "recreating" them nearby. Later examples will illustrate this phenomenon (See the LNG Terminal of Dunkirk in Chapter5) but the compensation mechanism led to the reshaping of coastlines that cannot be compensated[29]. The French government introduced this compensation in its legal system in 1976[30]. Around coastal areas, preferred places for the settlement of industrial sites and tourism activities, these wetlands were numerous and threatened by the rapid industrial and urban extension. In Dunkirk, by 1976, the first part of the western coast of the port city and its natural areas already disappeared, affected by the construction of industrial facilities (oil and steel) and the extension of the port area (See Figure4.1). Increasing industrial scales and activities in port cities went also together with more pollution impacting the environment, and risks of disasters that can have detrimental effects on the life of inhabitants.

After disasters at sea highlighted the importance of protecting the environment, industrial issues revealed the growing threats for inhabitants of port cities and the need to protect them. One of the most famous industrial rule in the European system is again linked to another disaster and directly affected the spatial planning around industrial sites. The Seveso Directive of 1982 was a reaction to the contamination created by a chemical plant in the town of Seveso in Italy in 1976. Even if this incident did not cause any direct death, it implied the decontamination of the surrounding region polluted by a cloud of dioxin. As a result, the place is still off limit for any kind of development and be-

[29] Modifying the shape of the coast to host an industrial activity or a basin cannot be compensated somewhere else. Sea currents and natural environments close to the sea remain affected by the transformation and the pollution created by nearby industrial activities.

[30] Second Article of the law No 76-629, of July 10, 1976, on protecting nature or "loi relative à la protection de la nature". See: M. Lucas. "La compensation environnementale, un mécanisme inefficace à améliorer". In: *Revue juridique de l'Environnement* 34.1 (2009), pp. 59–68

came a public park[31]. The question of the Seveso sites relates directly to port cities and port areas specifically. The port area of Dunkirk alone hosts fourteen of such sites, now classified as 'high threshold' or particularly dangerous, many of them being petroleum sites that existed way before implementing the Directive[32]. The content of the regulation exemplified the need not only for the repetition of incidents but also of rules themselves, as one of the main characteristics of the directive is to implement distance requirements between houses and the now called "Seveso sites", depending on the risks they pose. Such distance requirement made an inevitable link to the conditions created more than a century and a half before in the 1810 Imperial decree that was never really enforced. This mechanism demonstrates that many of the much needed tools to protect citizens of industrial cities already existed, but public and private authorities denied their benefits and ignored them to prevent economic activities from being affected by strict rules protecting the health and the environment of citizens.

4.3. THE SEARCH AND USE OF KNOWLEDGE BY PETROLEUM COMPANIES

KNOWING about the effects of their products on the environment in the 1960s did not prevent oil actors to deny climate or environmental research and discourses. Not only were they warned by scientists, but oil companies were among the first to fund environmental research in order to better spread skepticism on rules and reports related to pollution and the environment[33]. Rockefeller demonstrated this ability and will of industrial actors to control, not only networks and rules but also social conducts, and oil industry extended and improved this strategy. It better prepared oil companies to play a double game at the end of the 20th and beginning of the 21st century when a growing number of actors and researchers realized their environmental impacts. Companies spent a tremendous amount of money to highlight their new green strategies while spending even greater sums on protecting their business-as-usual[34].

4.3.1. EARLY GREENWASHING PRACTICES

JAY Westerveld coined the notion of "Greenwashing" in 1986 when enjoying holidays in Fiji in 1983. At first, the notion had nothing to do with industrial activities but

[31] P. Lassini *et al.* "Seveso Oak Forest: The gradual reconstruction of an area contaminated by {TCDD}". In: *Landscape and Urban Planning* 23.3-4 (1993), pp. 221–231. DOI: 10.1016/0169-2046(93)90070-t

[32] See: the website of the city of Dunkirk https://www.ville-dunkerque.fr/vie-quotidienne/prevention-securite/prevention-des-risques-naturels-et-technologiques/risques-technologiques; and the website of OpenDataSoft on Dunkirk's Seveso sites https://data.opendatasoft.com/explore/dataset/metropole-sites-seveso0%40cudunkerque/table/?flg=fr

[33] Center for International Environmental Law. *New Documents Reveal Oil Industry Knew of Climate Risks Decades Earlier Than Suspected; Suggest Coordinated Efforts to Foster Skepticism.* Tech. rep. URL: https://www.ciel.org/news/smoke-and-fumes/

[34] S. Laville. *Top oil firms spending millions lobbying to block climate change policies says report.* Mar. 2019. URL: https://www.theguardian.com/business/2019/mar/22/top-oil-firms-spending-millions-lobbying-to-block-climate-change-policies-says-report

rather came from resorts pushing customers to reuse towels, claiming that it protects the ocean they depend on. Westerveld noted the rapid expansion of the resort complex in the area and made the link between apparent environmental considerations and hidden economic benefits generated by the advertised behavior. He then came up with the notion of "Greenwash" in a magazine publication in 1986, a year after a massive exercise of greenwashing by Chevron[35].

The oil company Chevron created in the mid-1980s a series of posters and a television advertisement on its action towards protecting wildlife. The strategy of Chevron was to display the work of its employees towards the conservation of species around its oil facilities. From butterflies, to bears, felines and owls, the advertisement promoted the "green" practices of the company. The campaign called "People Do" was, however, not showing a single oil infrastructure. Neither posters nor the television spot displayed any oil refinery, well or storage site, but depicted green meadows and forests (Figure4.4). Similar advertisement strategies predated this one[36], with modern industries using this tool to counterbalance or discredit opposing movements, such as the advertisement promoting the clean and safe nuclear energy in the 1960s from the American electric company Westinghouse[37].

Watson in his 2017 article, first published in the newspaper *The Guardian* in August 2016[38] detailed an abnormality characteristic of greenwashing. Differences between the cost of the butterfly preservation action of the company, of 5,000$ per year, and the millions dedicated to the production and broadcasting of the advertisement in America foreshadowed the principle of future strategies of oil companies. The complete imbalance between environmental protection and greenwash spending of oil companies was the beginning of a long-lasting plan to appear as green as possible for the public opinion while dismissing any responsibility for polluting activities[39]. Roadmaps (Figure5.5) edited by oil companies like Shell and BP were using the same approach, drawings typical landscapes and buildings from the countries (green meadows with tulips and windmills in the Netherlands for instance) rather than refineries and storage sites. The following Chapter5 further deepens contemporary greenwashing practices of oil companies and their consequences.

[35] B. Watson. "The troubling evolution of corporate greenwashing". In: *Chain Reaction* 129 (2017), p. 38

[36] See, for instance, a monumental painting of a green Dunkirk with its perfectly white and clean oil facilities around the port created in 1923 and commissioned by the Chamber of Commerce of Dunkirk for commercial and industrial exhibitions. The painting is in the Collection of the Port Museum of Dunkirk.

[37] B. Watson. "The troubling evolution of corporate greenwashing". In: *Chain Reaction* 129 (2017), p. 38

[38] See the article here: `https://www.theguardian.com/sustainable-business/2016/aug/20/greenwashing-environmentalism-lies-companies`

[39] See, for instance, the greenwash strategy of Chevron "We Agree" after Deepwater Horizon in 2000 while the company kept on dismissing its responsibility in the pollution of the Ecuadorian Amazon rain-forest and detailed in M. A. Cherry and J. F. Sneirson. "Chevron, Greenwashing, and the Myth of'Green Oil Companies'". In: *Journal of Energy, Climate, and the Environment* 3 (2012)

Figure 4.4: Advertisement from the oil company Chevron in the mid-1980s on protecting foxes. This poster is part of a wider advertising strategy with television spots portraying workers of the company protecting wildlife around petroleum sites. The spot can be found on: https://youtu.be/bReBO55XzZc. Poster from the website Vintage Ad Browser, available here: http://www.vintageadbrowser.com/.

4.3.2. SELF AND SECRET ENVIRONMENTAL AWARENESS

IRONICALLY petroleum companies were also quick to fund environmental research on the consequences of petroleum activities and products. Multiple reports and investigations of scientists, journalists, and organizations pointed out the early knowledge of oil industry on pollution and climate change. Many scientists like Arrhenius already investigated the link between carbon dioxide and earth's temperature at the end of the 19th and beginning of the 20th century[40], while others like Callendar were already connecting the burning of fossil fuels with the warming of temperatures in 1938, in what is called the "Callendar Effect"[41]. Oil companies not only used their influence over administrations and institutions to mitigate the creation of strict environmental rules, but they also intervened in the scientific field. The relation to reports made by Chaptal on the harmlessness of the chemical industry at the end of the 19th century (see Chapter3) is here clear, though profoundly different. In the 1980s petroleum companies were not creating the reports, but hired independent institutes and researchers to precisely evaluate their impacts. This strategy followed and answered the international emergence of the environmentalism movement of 1972. Arguments were detailed and supported with data and analysis, which took years to analyze. There was a shift in the strategy, with the oil industry being the one to hold information in order to deny policies and claims affecting their activities.

Many documents from petroleum companies highlighted their knowledge of the consequence their products had on the environment[42]. Already in 1946, some of the most prominent companies in the sector formed a plan and a committee: The Smoke and Fumes Committee[43]. This gathering of petroleum actors arose from regular and obvious air pollution in big cities, like the smog of Donora in 1948, of Paris in 1951 and of London in 1952[44]. These events demonstrated the undeniable link between industrial activities and health and environmental deterioration which public authorities and industrial actors, oil actors included, could not ignore any further. Executives of companies now called ExxonMobil, Shell, and Chevron gathered in this committee and funded

[40] S. Arrhenius. "XXXI. On the influence of carbonic acid in the air upon the temperature of the ground". In: *The London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science* 41.251 (1896), pp. 237–276. ISSN: 1941-5982

[41] G. S. Callendar. "The artificial production of carbon dioxide and its influence on temperature". In: *Quarterly Journal of the Royal Meteorological Society* 64.275 (1938), pp. 223–240. ISSN: 0035-9009; H. Rodhe, R. Charlson, and E. Crawford. "Svante Arrhenius and the greenhouse effect". In: *Ambio* (1997), pp. 2–5. ISSN: 0044-7447; S. M. Enzler. "History of the greenhouse effect and global warming". In: *From: mhtml: http://65.55* 68 (1998); J. R. Fleming. "Callendar's Legacy". In: *The Callendar Effect.* Springer, 2007, pp. 89–96; T. R. Anderson, E. Hawkins, and P. D. Jones. "CO2, the greenhouse effect and global warming: from the pioneering work of Arrhenius and Callendar to today's Earth System Models". In: *Endeavour* 40.3 (2016), pp. 178–187. ISSN: 0160-9327

[42] In 2016 the Center for Environmental Law uncovered many of those secret documents showing, among others, that Shell and ExxonMobil knew in the 1980s about the consequences of their products on the climate and the environment. See Center for International Environmental Law. *New Documents Reveal Oil Industry Knew of Climate Risks Decades Earlier Than Suspected; Suggest Coordinated Efforts to Foster Skepticism.* Tech. rep. URL: https://www.ciel.org/news/smoke-and-fumes/

[43] Center for International Environmental Law. *Smoke & Fumes.* URL: https://www.smokeandfumes.org/

[44] L. Lestel. "Pollution atmosphérique en milieu urbain: de sa régulation à sa surveillance". In: *VertigO-la revue électronique en sciences de l'environnement* Hors-série 15 (2013)

scientific research on this matter. The aim was to use science against science, to influence decision-makers in order to prevent the creation of rules protecting health and the environment that they, petroleum actors, believed costly and unnecessary. The committee developed in scale and names, but participants remained. Its funding of scientific research progressively switched in 1958 to the consequences of their products on levels of atmospheric carbon dioxide. In 1968 with the "Robinson Report", scientists warned the American Petroleum Institute (API), already at the initiative of the committee on smoke and fumes, of global and dramatic consequences if emissions were to remain uncontrolled[45]. Thus, oil industry was, even before the creation of the environmentalism movement of the 1970s, well aware of the dramatic consequences of its products, not only on health but also on the climate.

Journalists trying to unearth this secret knowledge identified two companies that extensively investigated environmental and climate issues. ExxonMobil (Exxon at the time of the report) and Shell produced reports respectively in 1982 and 1988, both entitled and focusing on the greenhouse effect (Figure4.5). Both reports detailed catastrophic developments linked to changes in climate trends and sea levels rise in a business-as-usual scenario[46]. Many conclusions of these reports were more pessimistic than contemporary estimations, and already portraying processes that later analyses and observations confirmed. Shell's report depicted changes challenging natural and humans' adaptability, with effects on precipitations, temperatures, crops and the socio-economic situation. Scientists clarified that:

> It would be unrealistic to expect adaptation to occur within a few decades. Therefore, changes in ecosystem stability, disturbance of ecosystem structure and function and even local disappearance of specific ecosystems or habitat destruction could occur.

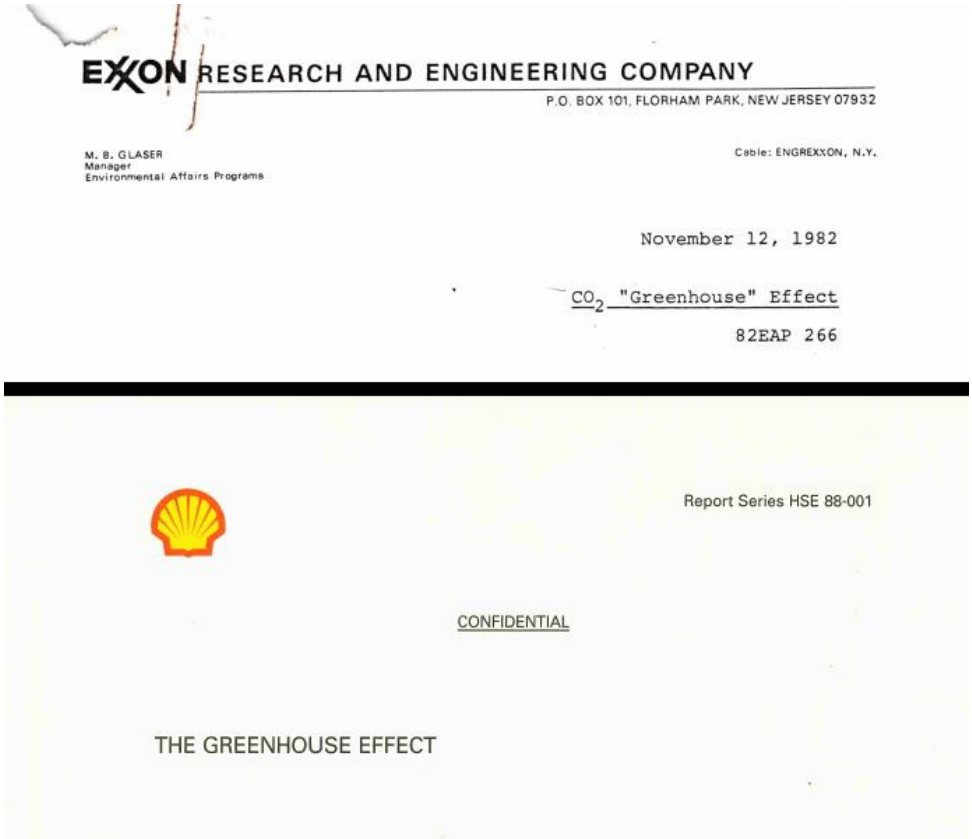
These documents demonstrate that executives of oil companies and the entire industry knew about the consequences of their activities. After the Second World War and with growing evidences on rising levels of atmospheric carbon dioxide, petroleum companies thoroughly investigated the risks inherent to continuing and protecting their business. They also kept such information internal and secret to protect themselves from any kind of liability, while efficiently tackling scientific and regulatory creations that could harm their reputation or interests (Chapter4). Although recommendations and warnings were clear and supported, none of these companies efficiently tackled the problem nor considered it as one. This awareness came, however, at a time where the environmental concern was becoming more prominent, with new international conferences such as the Earth Summits starting in 1972[47] and the famous "Limit to Growth", of the same year, both emphasizing the unsustainability of human activities[48]. Yet, later confirmations

[45] Center for International Environmental Law. *Smoke & Fumes.* URL: https://www.smokeandfumes.org/

[46] Business-as-usual referring to a scenario where oil companies would not be forced to change their activities and kept their current trends of production and pollution.

[47] Earth Summits are United Nations decennial meetings between world leaders to enhance the sustainable development of the world.

[48] D. H. Meadows *et al. The limits to growth: a report for the club of rome's project on the predicament of mankind.* New American Library, 1972



EXXON RESEARCH AND ENGINEERING COMPANY

P.O. BOX 101, FLORHAM PARK, NEW JERSEY 07932

M. B. GLASER
Manager
Environmental Affairs Programs

Cable: ENGREXXON, N.Y.

November 12, 1982

CO_2 "Greenhouse" Effect

82EAP 266

Report Series HSE 88-001

CONFIDENTIAL

THE GREENHOUSE EFFECT

Figure 4.5: First page of the Exxon and Shell reports on the greenhouse effect, respectively from 1982 and 1988. Documents found and available on the website of Climate File.

and additional evidence did not change the course of actions, nor companies were held responsible for voluntary and knowingly changing the climate for their economic benefit[49].

[49] D. Meadows, J. Randers, and D. Meadows. *Limits to growth: The 30-year update.* Chelsea Green Publishing, 2004; R. L. Hirsch. "The inevitable peaking of world oil production". In: *Bulletin of the Atlantic Council of the United States* 16.3 (2005), pp. 1–10; G. Turner. *Is Global Collapse Imminent?* University of Melbourne, Melbourne Sustainable Society Institute, 2014; J. Watts. *Oil and gas firms 'have had far worse climate impact than thought'.* Feb. 2020. URL: https://www.theguardian.com/environment/2020/feb/19/oil-gas-industry-far-worse-climate-impact-than-thought-fossil-fuels-methane

4.4. THE NEW ENVIRONMENTAL CONCERN AND LEGAL ACKNOWLEDGMENTS

THE research collected, through articles and official journals of countries, rules and legal documents touching upon protecting the environment or health of the citizens. The 1810 decree in France was a starting point to try and find as many texts as possible in France, Belgium and the Netherlands (which also includes European texts influencing these legal systems). The differences linked to language and governance made such collection difficult and incomplete[50]. Only the main ones, understood as those mainly discussed or referred to by the literature, were listed, thus making a total of 160 legal documents analyzed, from 1810 until 2017.

The listing of rules allowed the creation of a graph to illustrate the evolution of the legal production linked to spatial planning, safety, health and environmental protection. One can observe that the increasing number of regulations followed the rise of the environmentalism movement (Figure4.6). From 1972 onward, and with the beginning of, among others, the Earth Summits developed earlier, national and international authorities progressively enacted more protective rules to protect citizens and natural environments. The consecration of this awareness appeared through the inclusion of the environmental protection in a founding European treaty. The Single European Act, signed in 1986 and applied in 1987, through its article 25, created a new title in the part three of the European Economic Community[51] called "Environment". As such, the topic of environmental protection and the constant improvement of environmental quality to protect human health became increasingly included in the policies of the organization, and indirectly in all national legal systems. EU institutions, like the Council of Ministers, earned with this treaty the power to create new rules relating to town and country planning, giving European institutions the ability to intervene in planning policies at local an national levels[52]. Yet, even if acknowledging the importance of protecting the environment, the spatial implications of the Single European Act were mainly to support the promotion of the internal market by further removing physical and trade barrier and facilitate the flow of goods and capital[53]. Later treaties and texts enhanced this importance, making the European Union a key actor in environmental protection on the continent and beyond.

The repetition of incidents, both offshore and onshore, supported the rise of the environmentalism movement. A perfect illustration right before the Single European Act would be the case of Lekkerkerk in the Netherlands, where authorities discovered the pollution of an entire neighborhood with chemicals in 1980. To build the district, pri-

[50] The language issue refers to the text being written in Dutch and not English or French (native language of the author), while the governance problem is linked to differences in the political organization of these countries with, for instance, Belgium being a federal state.

[51] Also called Treaty establishing the European Economic Community, or EEC Treaty, or Treaty of Rome, signed on March 25, 1957 by the governments of France, Belgium, the Netherlands, Luxembourg, Italy and West Germany. It is one of the founding treaties of the current European Union.

[52] P. Roberts. "European spatial planning and the environment: planning for sustainable development". In: *European Environment* 6.3 (1996), pp. 77–84. ISSN: 0961-0405

[53] G. Giannakourou. "Towards a European spatial planning policy: theoretical dilemmas and institutional implications". In: *European Planning Studies* 4.5 (1996), pp. 595–613. ISSN: 0965-4313

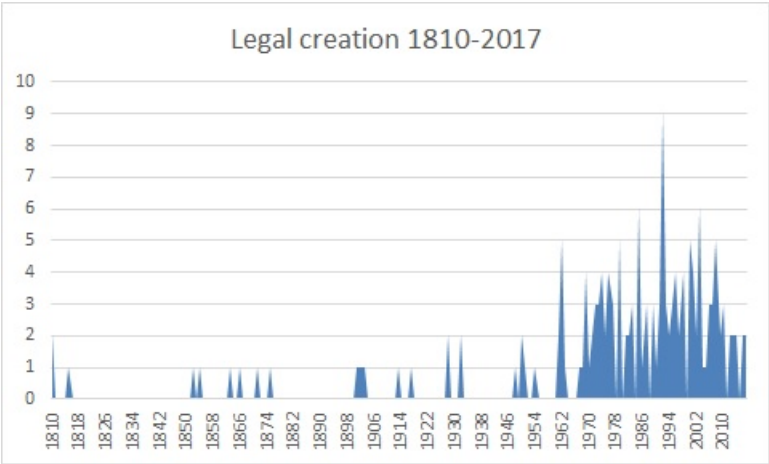


Figure 4.6: Graphic illustrating the legal creation linked to the collection of regulations on safety, health, and environmental protection from 1810 until 2017 in the literature linked to the oil industry, spatial planning, and environmental protection. The collection cannot be considered as complete and is used to illustrate a trend. Figure created with the help of Pierre Barral.

vate actors filled the land with building debris and rubble in which they mixed chemical wastes from painting, printing and other industries[54]. Public authorities had to clean the soil under almost 300 houses, with high levels of pollution in the soil, right next to a river (Figure4.7). Lekkerkerk was one terrifying example of illegal and criminal dumping of wastes, but many other cases followed in the 1980s[55]. The Dutch government reacted quickly through a Clean-up Interim Act in 1983 (Interimwet Bodemsanering) and the Soil Protection Act (Wet Bodembescherming) in 1987 to improve remediation, and legally define the standard qualities for the soil and the groundwater[56]. Public authorities did not consider soil pollution as a threat or a major concern until then. Over ten years after the beginning of the environmentalism movement, it illustrated the extent to which industrial owners were willing to go to protect their activities and benefits.

The emergence of a clear concern towards protecting the environment at international and European levels did not go with a shift in oil industry's strategies. Though greatly important for the environmentalism movement, the Single European Act could not conceal the influence of oil companies and its importance for national governments. At the end of the document, after all the signatures of the national representatives, one can read the declarations made on specific articles by the organization. One specifically aimed at the

[54] F. J. J. Brinkmann. "Lekkerkerk". In: *Studies in Environmental Science*. Vol. 17. C. 1981

[55] J. Zevenbergen. "SDI Development and Law-based Special Recordings: The Case of Soil Pollution Sites in the Netherlands". In: *From Pharaohs to Geoinformatics. FIG Working Week 2005 and GSDI-8*. 2005, p. 12

[56] These legislative standards were highly values around the world and implemented in several other countries, though later improved and redefined. See J. Chorus. *Introduction to Dutch law*. Kluwer Law International BV, 2016

Figure 4.7: Barrels of chemical wastes are dug up in Lekkerkerk in 1980. Picture by Dijk, Hans van / Anefo. Source: Nationaal Archief, Den Haag, nummertoegang 2.24.01.05, bestanddeelnummer 930-7893. Found on Wikimedia.

article 130r of the EEC treaty to limit its application. This article, first of the new title on environment, states:

> Action by the Community relating to the environment shall have the following objectives:
>
> - to preserve, protect, and improve the quality of the environment,
> - to contribute towards protecting human health,
> - to ensure prudent and rational utilization of natural resources.

This first acknowledgment of the importance to protect environment in the EU[57], though described in general terms, saw its application right away limited by a declaration. Aiming specifically at the third point on the prudent and rational use of natural resources, the limitation indicated that "the conference confirms that the Community's activities in the sphere of the environment may not interfere with national policies regarding the exploitation of energy resources"[58]. Bluntly put, precaution and sustainable exploration and exploitation of natural resources were not applicable to any material used for energy, such as hydrocarbons (oil, coal, gas). The strategic and economic status

[57] At the time called the European Economic Community, or EEC.
[58] Publications Office of the European Union. *Eur-Lex*. URL: https://eur-lex.europa.eu/

of energy resources protected the sector against any early firm commitment towards a careful and sustainable use of them. The share of national state in these companies illustrated for long the tight relationship between the two, with national states being for long the main shareholders, and these companies among the biggest if not the biggest company of the country[59].

The rise of environmental concerns in legal texts answered the galloping industrialization of the Thirty Glorious. The rapid growth of cities and industrial areas had detrimental effects on the quality of life of port cities' citizens, which progressively aspired for cleaner water and air. Inhabitants of the city of engineers in Dunkirk were no different and exemplified this trend. Although benefiting from all the modern comfort provided by this sector, the location of the houses was not only right next to the refinery, but also within the industrial territory of the port of Dunkirk. The cité emptied in the 1970s, especially after the activation of the steel site Usinor, less than a kilometer away. Noise, odor, and pollution became the daily life of the inhabitants of the cité. This was linked to the up-scaling of facilities and tools for the oil industry, with great tankers which needed deeper ports to host them, and greater facilities to answer the growing demand for oil products. The transformation, storage, and trade of oil products became an important source of funding for private and public actors, which in turn supported the extension of port areas and increased the pollution[60]. Yet, local actors and authorities progressively pushed forward the environmental question at the forefront of national political debates, especially in places, like port cities and the coast, where multiple and conflicting interests were competing for a limited area.

4.5. NEW MODERN ENVIRONMENTAL RULE: THE FRENCH SHORELINE ACT OF 1986

To grasp the origin of environmental and coastal protection in France, and its impact on the spatial planning of port cities, one needs to understand that in France, like in many national systems, such a protection predates the 1970s environmentalism movement. Regulations affecting industries such as those classifying industrial sites can date back to 1810 or 1917, when those on national parks and water are respectively from 1960 and 1964. This interest towards environmental issues went together with a better understanding of the complexity of cities, the competing interests on their territory, and coincided with an analogy of their functioning with eco-systems, stable on the short term but unpredictable in the long run[61]. Yet, the first texts were scattered regulations under the responsibility of different ministries with no real coordination between them

[59] In France, until 1993, the French State held a great amount of actions in Total and ElfAquitaine, another major national oil company who later merged with Total. See: *Privatisations partielles: Elf et Total en attendant Rhône-Poulenc*. Jan. 1993. URL: https://www.lesechos.fr/1993/01/privatisations-partielles-elf-et-total-en-attendant-rhone-poulenc-896959

[60] B. S. Hoyle, D. Pinder, and British Association for the Advancement of Science. *European cities in transition*. 1992, p. 207

[61] M. Batty and S. Marshall. "The origins of complexity theory in cities and planning". In: *Complexity theories of cities have come of age*. Springer, 2012, pp. 21–45

nor overall vision on how to protect the environment as a whole[62]. This explains why the French government waited until 1971 to create a Ministry of Nature and Environmental Protection (Decree n° 71-94, February 2nd, 1971, and Decree n°71-245 April 2nd, 1971)[63]. The influence of certain high-ranking civil servants, the trip to Chicago by French President Georges Pompidou in 1970 and the prospect of the Stockholm Conference of 1972 mentioned previously supported this idea[64]. Pompidou expressed, during this journey in Chicago, a desire to "create and spread a kind of 'environmental morality' (...)" while sending a warning message on the quality and availability of basic resources like air and water[65].

Despite some early signs, the creation of a ministry dedicated to environmental protection was a surprise for the French administration, including for the new minister Robert Poujade (Minister from January 7, 1971 to March 1st, 1974). The latter detailed the difficulty he faced when setting up this new ministry: "Every month, every week of our existence has been a struggle"[66]. Robert Poujade used the remark of a fellow politician to exemplify his struggles: "What you are doing is new, it is interesting, it may be important. But are you sure that it is not impossible?". The ministry had very limited powers as the government did not give the means to act efficiently and considered it more as a ministry of impulse than of action. Yet, from 1976 onward, the ministry will be at the origin of fundamental texts dealing with environmental protection.

In France, the "law on nature protection"[67] and the "law on classified installations for environmental protection"[68] in 1976 were the first pillars of an environmental protection and awareness. They showed the influence of the "new" ministry. Through these two rules the French legal system acknowledged the importance of safety and environmental protection while increasingly integrating it into different legal fields like urban planning. These legal creations and the following ones illustrated a shift in the focus of public authorities. They were not solely planning or protecting spaces nearby industrial sites anymore, but also considering larger scales like the coastal environment of port city regions. Despite this additional consideration for the protection of the environment and the citizens, urban sprawl continued until 1985 in Dunkirk. The industrial and demographic growth led to the expansion of both the city and the port, which progressively consumed the remaining natural spaces of the coast (Figure4.8). In many other port

[62] S. J. Hauser and C. Roche. "Sharing Is Caring, but Is the Shore Cared for? The Sharing Paradox of the French Coast". In: *Urban Science* 4.4 (Nov. 2020), p. 60

[63] C. Roche. *L'essentiel du droit de l'environnement 2020-2021*. 11th ed. GUALINO, 2020

[64] V. SILVERA. "Le premier remaniement de la structure du septième gouvernement de la cinquième république". In: *La Revue administrative* 24.141 (1971), pp. 277–280; S. Baziadoly. "Le droit communautaire de l'environnement depuis l'Acte unique européen jusqu'à la Conférence intergouvernementale". PhD thesis. Paris 2, 1993

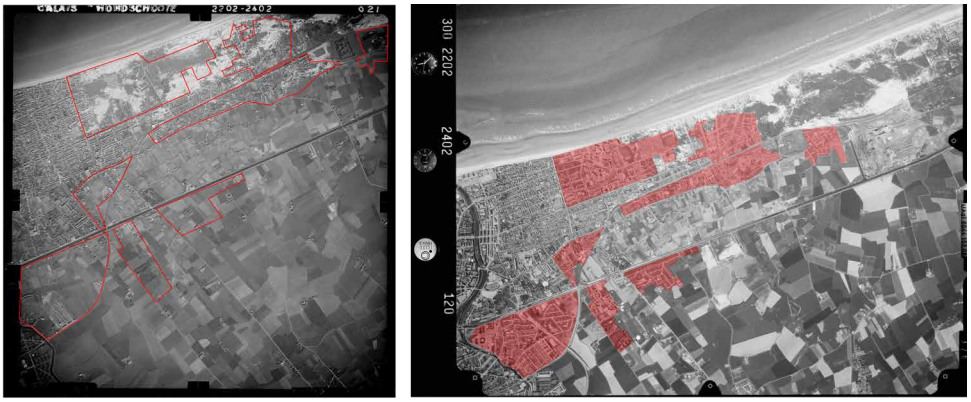
[65] P. Lascoumes. *Instituer l'environnement: vingt-cinq ans d'administration de l'environnement*. Editions L'Harmattan, 1999

[66] R. Barré, T. Lavoux, and V. Piveteau. *Un demi-siècle d'environnement entre science, politique et prospective: En l'honneur de Jacques Theys*. Editions Quae, 2015

[67] See: "Loi N°76-629 Du 10.07.1976 Relative À La Protection De La Nature" in 1976.

[68] See: "Loi N°76-663 Du 19/07/1976 Relative Aux Installations Classées Pour La Protection De L'environnement" in 1976.

cities and coastal places, especially in the south of France, the efficiency of the law was all relative because of its lack of definition and the place given to interpretation[69].



(a) (b)

Figure 4.8: (a) East part of Dunkirk, Leffrinckoucke, in 1957, with shapes of future extensions and densification of the city consuming natural spaces highlighted in red; and (b) east part of Dunkirk, Leffrinckoucke, in 1985, with extensions of the city since 1957 highlighted in red. Pictures of the service "Remonter le temps" from the French National institute of Geographic and Forest Information (IGN).

A reaction appeared with the Shoreline Act in 1986 which illustrated the new concern of the French government in landscape protection[70]. Conscious of its attractiveness for tourism, and the threats that industrial and urban growth posed to natural environments, the government enacted two major and innovative laws for the French legal system. 1985 saw the creation of the Mountain Act (Law n°85-30 of 9 January, 1985, relating to the development and the protection of the mountain or "au développement et à la protection de la montagne"), which was a founding law for the future spatial planning of the country because of its multi-disciplinary nature. This rule was considering tourism, town planning, agriculture and industry together. The Mountain Act directly inspired a similar law for the coast the following year with the Shoreline Act. The purpose was to transfer the environmental protection of the mountains to the coasts, the two environments being similarly threatened and important for tourism[71]. The Shoreline Act was, despite limitations further developed, highly influential for the development of environmental regulations, in legal and political terms, and for the spatial planning of port

[69] S. J. Hauser and C. Roche. "Sharing Is Caring, but Is the Shore Cared for? The Sharing Paradox of the French Coast". In: *Urban Science* 4.4 (Nov. 2020), p. 60

[70] Law n°86-2 of 3 January, 1986, relating to coastal development, protection and enhancement or "à l'aménagement, la protection et la mise en valeur du littoral".

[71] In 2017 tourism represented 7,2% of the French GDP. See: https://www.entreprises.gouv.fr/etudes-et-statistiques/chiffres-cles-tourisme

cities and coastal areas. The question of coastal development, which did not depend on the ministry of the environment, illustrates its influence, with a creation that undoubtedly consolidated an emerging reflection on its protection. The Shoreline Act in 1986 highlighted the weight the ministry had over the French legal system on environmental protection.

These laws forced a change in the political way of thinking about urban planning locally, though gaps and weaknesses remained. Authorities of coastal cities had to shift their approach to land development, moving away from a quantitative strategy of constant extension to a qualitative one, more focused on densification. Implementing this new protective mechanism in the French judicial system supported local associations trying to fight the chaotic urban development brought about by the lack of regulation and the additional pressure of tourism. For the Shoreline Act, the prohibition of any construction on a hundred-meter-long stretch of the shore from the highest point of the sea and the protection of local natural environments formerly seen as potential urban land led to a deep change in urban strategies. However, these legal dispositions often came with exemptions and unclear definitions, allowing interpretations to avoid some of the protection. The apparent political commitment to protect the coastal environment resulted in imprecise definitions and terminology. The multiple exemptions to allow the development of port areas or the urban expansion illustrated the reluctance of public authorities to create a regulation that could negatively affect the economy and the growth of coastal and port cities.

Due to the lack of political investment, this innovative law suffered from unclear terms in its ingenious points. The prohibition within the hundred-meter-long stretch mentioned earlier, which starts from the shore, was limited to spaces not yet urbanized. However, there was no explanation of what was considered being an urbanized area or how temporary installations, energetic or storage facilities were to be classified in this context. Another characteristic element of the law was the prohibition of new construction in coastal cities if it was not contiguous to existing cities or hamlets. Yet once again, there was no clear definition of what constituted a 'contiguous' development. The primary purpose here was more to avoid isolated constructions in the land than to prevent the expansion of the city. As long as the new buildings were close to existing structures, the city could consume the space without transgressing the law. The coastal extension of the southern coast of France pressured by mass tourism exemplified this mechanism, as opposed to northern places like Dunkirk, focusing on industrial developments and where urbanization already consumed a significant amount of natural spaces in 1986. Figure4.9 exemplifies the great modifications that the coast of Dunkirk faced and its clear division. The western part cut the access to the sea for industrial sites to settle and to develop port infrastructure, while the construction of houses expanded on the western coast. Without clear definitions, the flexible terms of the law produced different results linked to differences in economic pressures, rendering interpretation the most important rule of the law.

Public authorities did not consider the Shoreline Act as a long-lasting law in the French

Figure 4.9: Pictures of Dunkirk in 1928 on the left and 1971 on the right, with oil infrastructure in red. Picture made by the author from archival maps provided by the Learning Center of Dunkirk.

order because of its, in appearance, strict limitations and the pressures it had to face. The understanding of the law was open and indirectly transformed judges in guardians of the environment through their strict application of the Shoreline Act. More than a decade later, many private and local actors still contested governmental policies extending the conservation to wetlands, demonstrating the fierce fight that environmental protection represented[72]. As imperfect as it was, the regulation survived and a new project to adapt the old version to climate change began a few years ago. This update pushed lawmakers to precise the content of the act (especially through the ELAN law No 2018-1021 of November 23, 2018 on the "évolution du logement, de l'aménagement et du numérique" or "evolution of housing, development and digital"), permitting fewer areas for misinterpretation while judges kept on being guardians of its application and of protecting local environments. However, local organizations and actors criticized the precisions made by the government as a way to open coastal areas to urbanization and by opposing environmental and social arguments[73]. The precision brought by the addition of many definitions reassured real estate investors on the feasibility of their projects. Though, with Dunkirk, authorities changed the coastline before the Shoreline Act, its restrictions still allowed additional transformation of great importance (Fig4.2)[74]. Years change but priorities remain, with economic and industrial development overriding any apparent protection of natural environments[75]. Imprecise regulations of the past were an economic opportunity for private actors to keep on developing their activities, though forcing them to produce innovative interpretations of rules and legal documents. Yet, the improvement of regulations' clarity and precision can also benefit investors by remov-

[72] N. Baron-Yelles. "French coastal wetlands: in search of sustainability". In: *Tourism Geographies* 1.1 (1999), pp. 108–120. ISSN: 1461-6688

[73] L. Bordereaux and C. Roche. "Littoral et milieux marins". In: *Revue juridique de lenvironnement* 43.2 (2018), pp. 389–408

[74] The new LNG terminal of Dunkirk, finished in 2017 and on the west part of the port completely changed the coastline and destroyed the former natural environment. The European legislation led to a compensation nearby, but contribute to the articialization of the coast.

[75] Even the urban renewal of Dunkirk after the Second World War was slowed down because, among others, of the priority given by public authorities to the renewal of the port area. See: B. Ménager and F. Benedict. "La reconstruction de Dunkerque après la seconde guerre mondiale." In: *Revue du Nord* 77.311 (1995), pp. 633–640

ing the legal uncertainty around their projects near the coast.

4.6. CONCLUSION

POST-WAR times led to a period of growth and full-employment in northwest European countries. Industrial sites developed in port areas where networks and the workforce were available for the settlement and extension of facilities. Oil companies influenced and benefited from the design of these port areas, not only by using a space designed to receive them, but also by pushing public authorities for the layout and development of these areas. In the case of Dunkirk, the city expanded and grew denser to accommodate the demographic growth of the post-war period[76], while its port constantly expanded with more and wider industries and oil sites. The port became a tool for the French central authority to support the economic growth and development of the country, leading to a distinct port area, independent from the rest of the city (Figure4.9). The spatial analysis of Dunkirk's development showcased this growth, but the story of its oil developments is transferable to other places. Port cities like Antwerp and Rotterdam similarly developed by following the evolution of the oil industry and answering its needs[77]. The distance requirements implemented rules led to a disconnection. Port territories constantly expanded further away from city centers and populations with the creation of spatial and environmental regulations by public authorities in reaction to disasters and crisis. The security around industrial activities improved, but ports became cities within cities, with specific authorities and powers, sometimes independent from their cities' interests, policies, and development[78]. The French national government initiated this evolution and further industrialization of port areas after the Second World War, taking over the governance of the main ports to support the economic growth of the country together with French industrial companies. These ports became detached from local influences[79].

Ironically, the rise of environmentalism at the beginning of the 1970s went together with two oil crises in 1973 and 1979. When the protection of natural environment and the need for better air and water quality arose with new planning practices, these oil shocks diverted the new attention given to protecting natural environments. The effects of major and already regular oil spills of the 1970s and 1980s became a secondary concern for public authorities and citizens, and sometimes blamed for oil shortages during the shocks[80]. The shocks came as a reminder of oil's importance in the society. The

[76] S. J. Hauser and C. Roche. "Sharing Is Caring, but Is the Shore Cared for? The Sharing Paradox of the French Coast". In: *Urban Science* 4.4 (Nov. 2020), p. 60

[77] C. Hein. "Analyzing the Palimpsestic Petroleumscape of Rotterdam". In: *Global Urban History* (2016); C. Hein. "Oil Spaces: The Global Petroleumscape in the Rotterdam/The Hague Area". In: *Journal of Urban History* (2018)

[78] S. Hauser. "The Interplay of Economic Development and Environmental Protection: Dunkirk and the Search for Balance". In: *PORTUSplus* 8.0 (2019)

[79] P. Tourret. "Ports français. Les mutations". In: *Outre-Terre* 3 (2012), pp. 321–331

[80] R. P. Runyon and L. Rocks. "The Energy Crisis". In: *Proceedings of the Academy of Political Science* 31.2 (1973), pp. 3–12. ISSN: 0065-0684

sharp increase in the prices of oil barrels drove an explosion of the inflation and of national debts. In such a context, limiting the exploitation by oil companies of their oil fields or framing them into rules designed for environmental protection became a secondary concern. Public authorities of nations were again focusing on the protection of their economy and industrial sector. The Cold War context and the indirect conflicts it created did not calm this need for governments to secure their access to oil resources and prevent the emergence of obstacles in the way of the oil industry's development[81]. Yet, despite national and local supports and the increasing dependence of economies, oil companies closed twenty seven refineries in Europe between 1979 and 1990, leaving a significant amount of space abandoned and polluted[82]. These contaminated sites came in addition to the smaller but numerous oil sites that opened and disappeared, like in Dunkirk, before the Second World War.

Although being one of the principal actors behind the greenhouse effect it itself discovered, the oil industry's growth remained mostly untouched by regulations before the 1990s. As showed earlier with the Single European Act, the importance given in the 1980s to environmental protection and brought by obvious pollution disasters linked to industrial activities was carefully avoiding the energy industry and its already settled sites. The environmentalism movement at the beginning of the 1970s led to the creation of innovative regulatory tools and principles, such as the precautionary principle and the polluter-pays principle[83]. Safety and environmental regulations introduced in the French system also affected planning practices, switching from a focus on industrial sites to the wider scale of the port city region. But their lack of strong and precise definition until the 1990s prevented their efficient application while protecting polluting industries like the oil industry from economically harmful regulations and the actions of local actors. This industrial and economic protection remained in the regulatory frameworks of the following decades, with dire consequences on the environment and on inhabitants. Industrial sites and the oil infrastructure became massive facilities, consuming a great amount of space and extending the scale of their threats and destruction in case of disaster (Chapter5). The absence of clarity in the content of the newly created environmental rules supported this continuous industrial development.

[81] T. Mitchell. *Carbon Democracy*. Verso Books, 2013

[82] B. S. Hoyle, D. Pinder, and British Association for the Advancement of Science. *European cities in transition*. 1992, p. 207

[83] The polluter-pays principle can be found in recommendations of the Organization for Economic Co-operation and Development (OECD) in 1972 and 1974. See The Organisation for Economic Co-operation and Development. *The polluter-pays principle*

5

The Constant Up-scaling of Disasters Since the 1990s

An intense anticipation itself transforms possibility into reality; our desires being often but precursors of the things which we are capable of performing.

Samuel Smiles,
Scottish author and reformist of the 19th century.

If you think technology can solve your security problems, then you don't understand the problems and you don't understand the technology.

Bruce Schneier,
American cryptographer.

Parts of this chapter have been published in S. Hauser. "The Interplay of Economic Development and Environmental Protection: Dunkirk and the Search for Balance". In: *PORTUSplus* 8.0 (2019); S. J. Hauser. "Long Live the Heritage of Petroleum: Discoveries of Former Oil Sites in the Port City of Dunkirk". In: *Urban Science* 4.2 (2020), p. 22; S. J. Hauser and C. Roche. "Sharing Is Caring, but Is the Shore Cared for? The Sharing Paradox of the French Coast". In: *Urban Science* 4.4 (Nov. 2020), p. 60; S. Hauser. *The Post-Covid Time: A Post-Normal or Pre-Environmental Time?* 2020. URL: https://www.portcityfutures.nl/news/the-post-covid-time-a-post-normal-or-pre-environmental-time-0; and S. J. Hauser. *Post-Covid: Post-normal ou pré-normal ?* 2020. URL: https://www.territoire-europe.eu/post-covid-post-normal-ou-pre-normal/.

THE two oil crises of 1973 and 1979 mentioned in the previous chapter triggered a change in the strategies of major oil companies. It led many of these European and American companies to intensify their explorations and exploitation of new fields outside the territories of OPEC's members (Organization of the Petroleum Exporting Countries). These crises ended up supporting their autonomy and development, with companies growing and merging during the 1980s and 1990s (see Figure3.10). This expansion of oil companies went together with a need for greater facilities and tankers, which directly increased the consequences of disasters related to the transformation or transportation of oil products (see Figure4.3).

The continuous up-scaling of disasters increased the visibility of oil pollution and its incidence on the environment. This trend forced public authorities to intervene through regulatory frameworks to protect their natural environment, both at sea and on land. From 1972 onward, over 500 international treaties dealing with environmental protection emerged from conventions and institutions[1]. Many of these treaties allowed a better inclusion of local actors and authorities in the design of port strategies and objectives, but also improved the awareness of citizens through the sharing of information and the development of the transparency principle in the environmental decision-making[2].

Local and global actors rose together with the environmental concern and the better access to information. On the one hand, global actors like international or European institutions form the most efficient environmental scale to harmonize rules and policies in order to prevent one country from jeopardizing a regional, common, or global effort to tackle pollution and the climate issue. On the other hand, while having a better access to environmental information, local citizens are also more aware of local characteristics and needs to judge the compatibility between projects or policies and their territorial context. The European Union managed, with a relative efficiency, to incarnate this role of environmental guardian even if many obstacles, such as the lobbying of pressure groups linked to industrial activities, remain. The different scales of spatial planning created a top-down approach in which the European Union with its continental policy influenced national strategies and the European Court of Justice ensuring the enforcement of rules, as well as a bottom-up one through the inclusion and empowerment of local actors[3]. This phenomenon led citizens to be increasingly incorporated in the planning decisions and projects affecting their local environment.

The lack of foresight in the future of petroleum activities affects all the different levels of governance. The impact of the oil industry over local, national or transnational terri-

[1] S. Maljean-Dubois and L. Rajamani. *La mise en oeuvre du droit international de l'environnement.* Martinus Nijhoff, 2011; Assemblée Générales des Nations Unies. *Lacunes du droit international de l'environnement et des textes relatifs à l'environnement : vers un pacte mondial pour l'environnement.* Tech. rep. Nations Unies, 2018

[2] See the Aarhus Convention of June 1998, also called "Convention on access to information, public participation in decision-making and access to justice in environmental matters". Available on: https://www.unece.org/fileadmin/DAM/env/pp/documents/cep43e.pdf

[3] T. A. Börzel. "Participation through law enforcement: the case of the European Union". In: *Comparative Political Studies* 39.1 (2006), pp. 128–152. ISSN: 0010-4140

tories as well as their influence on legal systems led to a lack of preparedness of public authorities towards the energy and legal transition. Former practices of local authorities in Dunkirk showed that houses and schools replaced oil facilities with no removal of the pollution in the soil[4]. But the gradual abandonment of old facilities by big oil companies[5] reveals another strategy of theirs to avoid responsibilities and expensive clean-up procedures at the closing of oil sites. It contrasts with their contemporary and numerous pledges towards sustainable practices and the protection of the environment.

This Chapter analyzes the evolution of oil companies' influence on legal systems after the emergence of the environmental topic in political discourses and legal texts after the 1980s. The rise of environmentalism in policies and legal documents such as the Single European Act of 1987, or in planning practices and the public opinion went together with an increased visibility of disasters caused by greater consequences, especially in Western Europe. New reactions created innovative powers in the hand of a growing number of actors, like the EU and citizens. The place environmental protection increasingly took in the public debate appears through the examination of legal documents, declarations, policies, and in the challenges that authorities had to face for great infrastructure projects such as the Maasvlakte 2 in Rotterdam. However, the continuous occurrence of industrial disasters in Europe and across the globe demonstrate the immense power of industrial and petroleum actors over the decision-making process. But how did oil companies adapted to this new landscape of actors and hampered the emergence of efficient environmental and health rules? This chapter analyzes their strategies, advertisements, and lobbying practices to demonstrate their evolution in order to protect their dominant position over economies. The pressure of oil actors on the creation of regulations is an important part of the global petroleumscape, and an adaptation of oil actors to changing economic, political, social, and environmental contexts. Their willingness to tackle strict environmental rules linked to emissions, liabilities, and pollution is increasingly challenged by local, national and international actors, even within oil industry's circle[6].

5.1. THE CHAIN OF REACTIVITY: GREATER INCIDENTS FOR GREATER RULES?

OIL disasters at sea contributed to the creation of regulations and the application of additional measures linked to protecting the environment. Their scale, visibility and impacts affected the population, hence the decision-makers, much more than the invisible pollution of former refining sites. The consequences of these disasters highlighted the relationship between water and land activities, how they impact each other. Port cities, as intermediate areas where land and sea meet, are "viscous" spaces where

[4] S. J. Hauser. "Long Live the Heritage of Petroleum: Discoveries of Former Oil Sites in the Port City of Dunkirk". In: *Urban Science* 4.2 (2020), p. 22

[5] like ExxonMobil and Total in Dunkirk with the SRD refinery, former BP, sold by both to Colas in 2010.

[6] R. Bousso. *France's Total quits top U.S. oil lobby in climate split.* Jan. 2021. URL: https://www.reuters.com/article/us-total-api-idUSKBN29K1LM

"land and seaborne urban systems converge"[7], and where the pollution of one environment has consequences on the other. The detrimental effects of oil disasters on the environment and the life of people participated in raising the awareness of citizens on petroleum activities' hazards. The regular incidents related to its transportation and exploitation at sea increased the appetite of population for more information and participation on environmental decisions. It also pushed decision-makers to enact stricter regulations on industrial activities and take a new stance in their political declarations. Frequently, the European Union stepped in following the objectives developed in its early programs on environmental protection and written in the Single European Act.

5.1.1. MARITIME REGULATIONS EXEMPLIFYING A LACK OF ANTICIPATION

MARITIME disasters had, early on, an influence on the emergence of international rules to tackle pollution issues after the last World War (see the Chapter5). Their repetition as well as their visibility, advertisement, and large impacts on coasts led international and national institutions and decision-makers to fasten ongoing discussions and innovations, like the prohibition of single hull oil tanker of the IMO[8]. The Erika packages, for instance, followed the same principle. They are a set of rules imposed to maritime transportation and were the European Union's answer to the sinking of the tanker Erika in 1999 in French Brittany. These regulations implemented additional security measures in the shipping industry within the Union, with more control powers for port authorities and new structures for tankers[9]. More precautions with oil tankers pushed port authorities to adapt their infrastructure and management, not only to the size of these ships but also to security measures and inspections, with dedicated docks for them. Through such evolution in the shape and organization of ports, oil companies with the growth of their infrastructure and transportation means, continued to affect the spatial planning of port cities, especially in port areas. Two other EU packages followed in 2002 and 2009, especially after the sinking of the Prestige, in 2002. The story behind the sinking of this latter is a cruel reminder of what a lack of coordination and solidarity between national governments in Europe can lead to. It also represents the limited visions of States over national stakes rather than over the environment as a whole, highlighting at the same time a characteristic issue of EU's governance.

The sinking of the Prestige, in November 2002, demonstrated how difficult it was to coordinate different states and to go beyond national interests despite existing frameworks. Directives 2001/106/EC, 2001/105/EC in 2001 and the regulation 417/2002 of 2002 to improve the security in the EU, though enacted before, could not prevent this catastrophe and revealed the weaknesses of the framework. The Prestige, a simple hull tanker, sunk

[7] N. Couling and C. Hein. "Viscosity". In: *The Urbanisation of the Sea: From Concepts and Analysis to Design.* Ed. by N. Couling and C. Hein. Nai Publisher, 2020. Chap. 3, pp. 55–60

[8] C. Roche. "Prévention et lutte contre la pollution des mers par les hydrocarbures: Les derniers développements communautaires". In: *Transports (Paris. 1956)* 421 (2003), pp. 280–291. ISSN: 0564-1373

[9] See the Directive 2001/106/EC, 2001/105/EC in 2001 and the regulation 417/2002 of 2002. See also: C. Valero. "Erika, Prestige : Deux décennies après, quelles avancées ?" In: *ISEMAR - Institut Supérieur d'Economie Maritime* 215 (2019)

in the Atlantic ocean, off the Spanish coast of Galicia, during a storm (Figure5.1). After its distress call, Spanish authorities, refusing to host in a nearby port the ship which was already spilling oil, towed the ship away from their coasts. Neither Spanish, nor Portuguese and French authorities agreed to let the ship dock in one of their ports where the oil leak could have been confined[10]. As a result, the tanker split in half a week later in the ocean. All the countries who refused the access to their ports were affected by the oil spill. It is still the worst environmental disaster in Portugal and Spain, and an awful example of what consequences await a lack of transnational coordination and anticipation in relation to pollution and the environment. The absence of strict, clear, and binding rules for everyone to follow plays a role in the inability of European institutions and national authorities to tackle pollution, whether at sea, on land or in the air.

Like the international level with the Marpol convention and its subsequent modifications, the improvement of European maritime safety and pollution prevention relied on incidents. The disastrous ecological impact of oil spills on public opinion pushed national and European political to act towards better protections and stricter frames for industrial activities. With the Prestige, governments could have prevented this incident through a better coordination and solidarity. The knowledge of previous incidents and reactions, such as the Exxon Valdes in 1989 in Alaska, which led American authorities to ban single hull tanker from its waters, could also have triggered a harmonization and an awareness. In the case of the Prestige, Spanish authorities used the European Union combined to a lack of transparency to deviate the attention of the public from their mismanagement of the event[11]. However, the responsibility lies in the practices allowed by all these countries and their lack of consideration for potential damages caused by economic driven policies.

Over thirty years after the sinking and terrible handling of the Torrey-Canyon, regulations slowly evolved. Despite international agreements and the creation of new rules, similar incidents keep on happening and are leading to the same consequences and the same reactions. Environmental disasters at sea, being with tankers or oil platforms, are evidences of an absence of foresight in environmental protection (Fig4.3). The process also reveals the importance of local disasters on the evolution of rules. Distant incidents proved to have a limited, if not invisible, effect on the improvement of natural preservation and security regulations. The Exxon-Valdes example in Alaska demonstrated a default of strong and anticipative measures within legal international texts. The lack of strong regulations to improve the safety of oil transportation networks led to an absence of efficient risk management plans to deal with oil spills and prevent their damages. With the Exxon-Valdes, this protection of the industry contaminated an extensive area of preserved natural spaces, affecting not only the port city of Valdes and its environment, but also the population[12].

[10] See the articles from PressePortal from November 2002: “stern: Portugiesische Marine verantwortlich für Auseinanderbrechen des Öltankers Prestige” and from Safety4Sea in November 2018: “Learn from the past: Prestige sinking, one of the worst oil spills in Europe”

[11] P. Fattal. “Pollutions du Prestige et de l’Erika: deux crises aux enjeux différents”. In: *Revue géographique des Pyrénées et du Sud-Ouest. Sud-Ouest Européen* 17.1 (2004), pp. 61–75

[12] C. H. Peterson *et al.* “Long-term ecosystem response to the Exxon Valdez oil spill”. In: *Science* 302.5653

Figure 5.1: The MV Prestige under emergency tow shortly before it sunk in November 2002. Picture by Bahamas Maritime Authority, CC BY-SA 4.0, via Wikimedia Commons.

Between 1992 and 1999, 593 ships sunk worldwide. 77 of these ships were oil tankers, and though representing only 13% they accounted for 31% of the lost tonnage. The numbers show the tremendous size of these boats in comparison with others and why incidents related to oil transportation have such detrimental effects on people and the environment. These successive disasters linked to oil shipping and their continuous damages with always bigger tankers triggered a (late) international answers on multiple occasions. The time for legal improvement and harmonization came after disasters' demonstration of gaps in frameworks and their use by private actors and companies.

One can observe that the increasing scale of oil tankers and ships since the end of the 1960s was going hand in hand with larger facilities on land. National and port cities' authorities, to accommodate such enormous ships and stay alive in the competition to share the economic benefits linked to their flow and storage, constantly adapted and extended port areas to meet oil companies' ambition to create new facilities and update their infrastructure. Coastal landscapes around industrial port cities like Dunkirk and Rotterdam suffered tremendous changes to meet this aim. The construction of oil and gas sites led, in spite of all the protection enacted at the end of the 20th century and

(2003), pp. 2082–2086. ISSN: 0036-8075

the beginning of the 21th, to a greater consumption of natural spaces and to the artificialization of the environment through the compensation mechanism explained previously (see Chapter4 and Figure4.2). This artificialization process happened in Dunkirk, Antwerp, Rotterdam, and in every strategic port in the world where public authorities prioritized economic and industrial opportunities and interests over environmental protection and inhabitants' security and health. While not only bringing more pollution risks with new and greater industrial sites, it is also creating pollution in itself as natural spaces recreated (or compensated) are not natural anymore. Thus, rather than reacting to pollution there is a need to shift from an economic and reactive-driven strategy to an environmental, anticipative, and socially inclusive one which, if efficiently applied, can bring great and demonstrated economic benefits[13].

5.1.2. INDUSTRIAL PROTECTION AND THE CYCLE OF DISASTERS

RECENT industrial disasters illustrate how public authorities seem to regularly forget about past events for the sake of economic development. The disastrous explosion which destroyed the port, and most of the city, of Beirut on the fourth of August 2020 is a cruel reminder of what mismanagement of chemicals and incompatible city-port interface planning can bring in strategic industrial ports of nations. This event also highlights the lack of consideration and knowledge of the past as well as the negligence of both public and private authorities again in the 21st century. Multiple and dramatic examples are here to advise urban planners when dealing with port areas to consider such potential negligence holistically: accessibility, fire, explosion, and air, soil and water pollution among many others.

If the ammonium nitrate stored in the port of Beirut is responsible for this explosion and the number of casualties, the proximity between urban and port areas is an aggravating factor. In the capital of Lebanon, like in many other port-city, the close relationship that urban and industrial areas of a same city have is also spatially represented. The scale of the destruction caused by the blast is so great that it affected buildings up to four kilometers away from the port area. This distance is far beyond the five hundred meters interval separating the point of explosion and the beginning of the urban area[14]. This dreadful tragedy exhibits shortcomings when managing chemical products, their potential effects, and the adequacy of the storage area with its surroundings. The repetition of such incidents is not new, nor is the lack of intervention to tackle it.

Beirut is not the first ammonium nitrate explosion to destroy a city or a port-city, and one can only wish it is the last. In 1916, an explosion in an arsenal caused by a similar substance destroyed the city of Lille in the North of France[15]. In 1947, the port-city of

[13] U. Deichmann and F. Zhang. *Growing green: the economic benefits of climate action.* World Bank Publications, 2013; F. FitzRoy. "A Green New Deal: The Economic Benefits of Energy Transition". In: *Substantia* 3.2 (2019), pp. 55–67

[14] B. Le Cain. *Trois cartes pour comprendre la violence des explosions à Beyrouth.* Aug. 2020. URL: https://www.letelegramme.fr/dossiers/explosions-sur-le-port-de-beyrouth/trois-cartes-pour-comprendre-la-violence-des-explosions-a-beyrouth-05-08-2020-12594324.php

[15] F. Lecluyse. *À Lille, l'explosion des Dix-huit Ponts signait en 1916 un Beyrouth lillois.* Lille, Aug. 2020. URL:

Texas City in the US experienced a similar destruction because of a comparable amount of substance than in the port city of Beirut. The same even happened again in Toulouse, France, in 2001 with the explosion of a fertilizer factory[16]. This last and more recent one, though on a much smaller scale and not taking place in a port city, is a splendid example. First built outside of the city, the urban expansion linked to a demographic growth led progressively the city to engulf the industrial site into its urban tissue, increasing risks and potential damages in case of incident[17]. The event forced French public authorities to create specific zoning plans to adapt the urban tissue to the threats of industrial sites (Figure5.2). The same issues led to many dramatic disasters around the world with, among others, the catastrophe of Bhopal and Mexico in 1984[18]. European institutions like the European Parliament mentioned, after the disaster affecting Toulouse, its regrets to see the lack of consideration for its repeated warnings on shortages of qualified inspectors and safety around classified industrial sites in Europe, revealing a global lack of control on private companies' compliance with security rules[19]. This warning echoes the issue observed in Chapter3 with the Imperial Decree and the absence of mean to ensure its application.

Dreadful and memorable industrial disasters keep on happening, being, or not, linked to petroleum activities. Industrial sites have always been threats to the security and health of people. The creation and improvement of security measures are, however, still lagging several steps behind industrial developments and their constant greater facilities. It became a challenge for urban planners and the expansion of cities as the scale of the threat is regularly developing. From the explosion of Grenelle in 1794, until the 2020 explosion of Beirut, disasters regularly prove the lack of consideration towards health, security and the importance of preemptive logic when planning cities around industrial sites. This problem is even more important in port cities like Dunkirk that host many industrial and dangerous sites, now classified as Seveso sites. The spatial division, that came as a solution to the development of industrial activities in port, improves the security of inhabitants, though adding a challenge when it is time to deal with wide monofunctional areas (ports) difficult to transform and that spread over a great amount of space[20].

If the link between security rules and the oil industry is not direct, there is a visible link to its intensive lobbying. Through the petroleumscape they produced, their influence over and network around decision-makers, oil companies try to prevent the emergence

https://www.lavoixdunord.fr/848158/article/2020-08-06/lille-l-explosion-des-dix-huit-ponts-signait-en-1916-un-beyrouth-lillois

[16] Hereafter refered to as AZF, short for AZote Fertilisants, the name of the facility.

[17] N. Dechy *et al.* "First lessons of the Toulouse ammonium nitrate disaster, 21st September 2001, {AZF} plant, France". In: *Journal of Hazardous Materials* 111.1-3 (2004), pp. 131–138

[18] P. Fontanille. "La maîtrise de l'urbanisation autour des sites industriels à risques majeurs/The control of urban development around dangerous industrial sites". In: *Géocarrefour* 71.1 (1996), pp. 7–9

[19] European Parliament. *European Parliament resolution on the explosion at a factory in Toulouse (France).* Tech. rep. 2001. URL: https://op.europa.eu/en/publication-detail/-/publication/d22e3365-3369-4fb6-ab80-6922f4f59278

[20] S. Kato and J. Ahern. "Multifunctional landscapes as a basis for sustainable landscape development". In: *Journal of the Japanese Institute of Landscape Architecture* 72.5 (2009), pp. 799–804. ISSN: 1340-8984

Figure 5.2: Technological Risk Prevention Plan or PPRT of the port of Dunkirk, from the "Direction Régionale Environnement, Aménagement, Logement" or DREAL.

of environmental rules affecting industrial activities. Environmental principles included in international, European, or national texts saw their content and scope progressively, if not immediately, limited to benefit not only to oil industry but also to other industrial actors. The use of terms in the definition of such principles rendered their application impossible, especially on the international level where there is a necessity to find a compromise between all the interests of the different countries[21].

The legal answer to industrial pollution also highlights the intervention of industrial representatives with regulations missing their target. The risk management strategy and the legal approach of governments in dealing with contaminated spaces and soils gradually improved often in reaction to pollution scandals. This change in the management of polluted spaces drove public authorities to assess the quality of the soil on their territory. As a consequence, governments gradually shifted the focus of regulations from a governmental liability to the liability of the owner of the contaminated land[22]. This phenomenon transpired through the Dutch case of Lekkerkerk in 1980 and developed in Chapter4, where a lengthy political process led to the enactment of new laws to tackle

[21] R. Romi. *Droit internation et Européen de l'environnement.* 3rd ed. LGDJ, 2017

[22] M. J. L. Groen. "Developing Ways to Strategize Risk and Benefit Pertaining to Brownfield Sites". PhD thesis. Tilburg University, 2011, p. 109

soil pollution fifteen years later, in 1995[23]. However, this text introduced an unusual principle which ended up protecting former polluters of the land through the notion of "guilty ownership". The actual land owner became responsible for the pollution and sanitation of the land, rather than the original polluter[24]. Thus, through this principle, decision-makers, influenced by industrial companies who felt a coming change in the legal field, protected polluting companies if they swiftly got rid of the land they polluted with their activities. Yet, at the same time, the law introduced additional pieces of information on soil pollution both for local authorities and citizens to by registering and informing on polluted sites in the country.

One can identify the influence of oil companies by observing the failure to take into account past events, and the absence or inefficient reactions they triggered from decision-makers. Public and private authorities could have prevented disasters like Deepwater Horizon in the Gulf of Mexico in 2010, if they had learned from other offshore platform incidents like Piper Alpha, in 1988 in the North Sea. This latter disaster exemplified the lack of adaptation after the Ekofisk blowout of 1977 in the same North Sea[25]. The mechanism is the same as the one detailed earlier with the sinking of tankers: there is a need for catastrophes to observe the failure of regulatory frameworks and improve them until the next one. An illustration of this process could be Newton's Cradle: The first moving marble being the disaster, impacting the environment, the citizens, local authorities, forcing the last marble, the law-makers, to react and impact them back, until the next disaster(Figure5.3). This movement is, however, increasingly influenced by the reactive or preemptive actions of new empowered actors such as citizens, non-governmental organizations linked to the environment, and European institutions. Regular reforms of port authorities and management in Europe led to including more local actors and more powers for public authorities to control port activities, which improved the security of maritime traffic and industrial activities[26].

5.2. THE EMPOWERMENT AND RISE OF NEW ACTORS

RISING environmental concerns at the end of the 20th and beginning of the 21st century produced several innovations. Legal texts, though reactive, created new practices and empowered a diversity of actors, existing and new, physical and institutional ones in Europe. From 1987 onward, the EU constantly stepped up its action in protecting citizens, their health and environment, introducing and applying new principles. Local, national and European scales moved accordingly with more inclusive practices and binding treaties. Their lack of precise definition is still an obstacle to the efficient tackling of contemporary environmental issues, yet these tools are progressively used by

[23] E. Hondius, J. Chorus, and W. Voermans. *Introduction to Dutch law*. 5th. 2016

[24] J. Zevenbergen. "SDI Development and Law-based Special Recordings: The Case of Soil Pollution Sites in the Netherlands". In: *From Pharaohs to Geoinformatics. FIG Working Week 2005 and GSDI-8*. 2005, p. 12

[25] C. Woolfson. "Preventable disasters in the offshore oil industry: from Piper Alpha to Deepwater Horizon". In: *New solutions: a journal of environmental and occupational health policy* 22.4 (2013), pp. 497–524

[26] With, for instance, the Erika packages of the European Union in 2001, or the French reform of port authorities of 2008 developed in the following section.

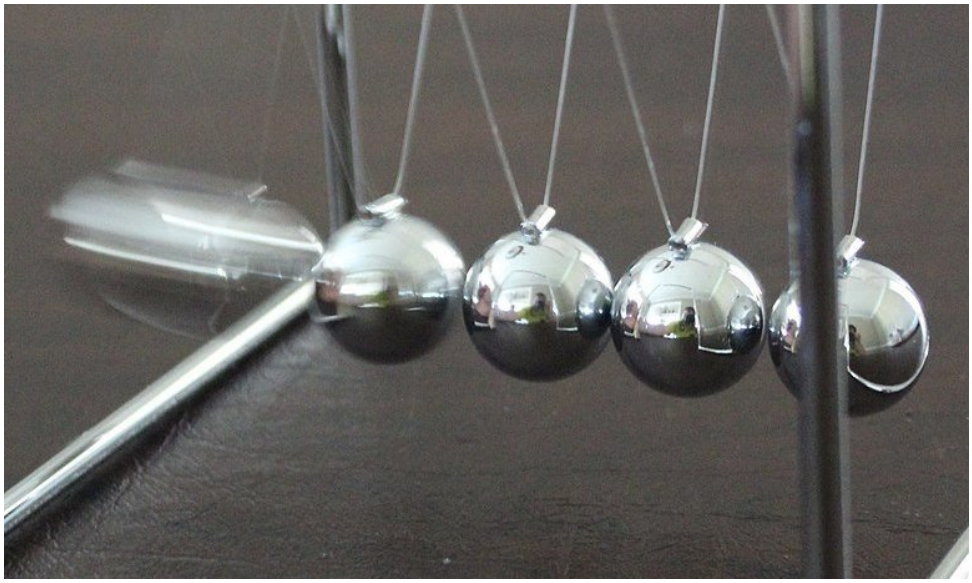


Figure 5.3: A Newton's Cradle with one ball just about to strike the others. Picture from 'The Dean of Physics', CC BY-SA 4.0, via Wikimedia Commons.

citizens, associations, public authorities and judges. Inclusive policies acknowledged, for instance, the importance of inhabitants and their knowledge of local specialties. The environmentalism movement had to reach all these levels to become efficient, as locals know better the needs and the supra-national scale is the best to efficiently tackle pollution and the challenge of climate change.

5.2.1. THE EUROPEAN GUARDIAN

THE European Union did not wait for the Single European Act of 1987 to implement rules to protect the environment. As explained in the previous chapter, the directives on drinking water and birds intervened to protect the quality of natural environments and essential resources. This early consideration for an environmental policy on the European scale prefigured the next cornerstone of European politicians and institutions. Though included in the shared competences by treaties, the EU became a major actor in protecting the environment, setting up minimum standards for everyone to follow.

This supra-national organization became, with its development and the competences given by its Member States, one of the most productive actors in the environmental field. Through directives, the continental institution regulates, among others, activities potentially impacting the environment, health and security of its citizens. Ironically, oil industry participated to the effort of legal harmonization at the time of the EEC (European

Economic Community, before the EU), with trans-national projects of oil companies being hampered by the fragmentation of rules compared to their American counterparts[27]. The relative success behind the environmental protection of the EU lies in objectives for members to reach and its binding frame, a rare thing for an international organization. Directives aim for results and objectives but let Member States free to decide which method is the most adapted, this way the supra-national organization lets local characteristics play their role in the decision making, with, for instance, stricter measures. Such legal commitments are efficient to tackle pollution issues with potentially transnational consequence, but the lack of remains in many texts as compromise and unanimity are the main keywords behind any political commitment of European countries.

The division of competences between Member States and the EU is, however, complex and confusing for laypeople[28], making the relative success of European environmental policies difficult to grasp. Two principles deeply embedded in the functioning of the EU are, however, playing a significant role in this process. The article 5 of the Treaty on European Union included, in the exercise of EU competences, the notions of proportionality and subsidiarity, with a protocol detailing their application[29]. The first principle simply defines that EU actions cannot go beyond what is necessary to achieve its objectives. This mechanism protects the sovereignty and powers of national governments. The definition of subsidiarity is given in the paragraph 3 of the article and is clear:

> "Under the principle of subsidiarity, in areas which do not fall within its exclusive competence, the Union shall act only if and in so far as the objectives of the proposed action cannot be sufficiently achieved by the Member States, either at central level or at regional and local level, but can rather, by reason of the scale or effects of the proposed action, be better achieved at Union level."

Subsidiarity is, thus, the reason behind the (relative) efficiency of environmental rules in Europe. Considering that issues related to pollution, energy, health and environment are affecting the entire continent, European authorities are the best placed to tackle them. The Single European Act, detailed in Chapter4 was already acknowledging this

[27] M. Boon. "Oil Pipelines, Politics and International Business: The Rotterdam Oil Port, Royal Dutch Shell and the German Hinterland, 1945-1975". Thesis. 2014

[28] To sum up, three categories exist:The exclusive competences, based on the article 3 of the Treaty on the Functioning of the EU (or TFEU, one of the two founding treaties of the EU, the other one being the Treaty on European Union or TEU. The TFEU is also called the Treaty of Rome, signed in 1957 and changed on multiple occasions to adapt to the evolution of the organization). In the areas covered under this article, such as the conservation of marine biological resources, customs and competition rules, the EU can alone take measures. The shared competences (Art.4 TFEU) refer to a situation where "the EU and EU countries are able to legislate and adopt legally binding acts. EU countries exercise their own competence where the EU does not exercise, or has decided not to exercise, its own competence". See the website EUR-Lex on the division of competences within the EU: `https://eur-lex.europa.eu/`. It includes areas such as, but not limited to, transport, energy and the environment; The supporting competences (Art.6 TFEU) are areas where the EU can only support and coordinate or complement actions that Member States are taking. It encompasses policies such as those impacting the industry, culture and tourism.

[29] Consolidated version of the Treaty on the Functioning of the European Union - PROTOCOLS - Protocol (No 2) on the application of the principles of subsidiarity and proportionality. See EUR-Lex, document 12008E/PRO/02.

scale as the most relevant one. The EU needs such prevalence, especially knowing that it aims at a "high level of protection" in its environmental policy[30]. The lack of definition or precision on what is a high level of protection in these important treaties is, however, a great drawback to the development of efficient rulings. It provides for private actors like oil companies ways out through a variety of interpretations.

Information from official European websites and institutions is, however, confusing. On EUR-Lex, the legal portal of the EU, the precautionary principle is associated with the article 191 of the TFEU, and mentions the importance of its definition on the protection of environment and health[31]. Nevertheless, the article 191 of the TFEU is not defining the principle but rather mentions it as an important tool to prevent environmental damages. This example illustrates a general lack of precision in environmental rules, but also a common political 'chilliness' to define powerful tools and planning rules against established industrial activities. This absence of definition allows broader interpretations and application of the notion while not clearly determining port cities land uses[32]. This role of precising regulations and principles, in both the EU and in national systems, ended up being the responsibility of judges, like those of the Court of Justice of the European Union.

Taking the European scale as an illustration is of great importance in view of its weight in the environmental protection of Member States since the 1980s. Afraid of the power and influence that European decision-makers could take with the rise of the environmental subject, national governments preserved essential competences for their economies. It is no surprise to find both the environment and the energy subjects in the shared competences where national authorities keep control, while competition rules and commercial policies are dealt as exclusive competences of the EU. The aim of this division can be put in parallel with the declaration on the article 130r of the EEC treaty mentioned in Chapter4[33] and ensuring the control of national authorities over their energy policies in rising environmental discourses. This influence over national and European decision-makers is part of the global petroleumscape notion, with oil companies developing their landscape of influence according to social but also, in this case, political evolution.

[30] See article 130r of the Maastricht Treaty or Treaty on the European Union signed in 1992. It confirms, among others, principles such as precaution, polluter-pays and the importance of harmonization while considering the diverse regional characteristics of the EU.

[31] See the communication of the European Commission of February 2000: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:52000DC0001

[32] L. A. Momirski, Y. van Mil, and C. Hein. "Straddling the Fence: Land Use Patterns in and around Ports as Hidden Designers". In: *Urban Planning* 6.3 (2021), pp. 136–151. ISSN: 2183-7635

[33] The content and objective of this declaration was included in both the article 194 of the TFEU, and in the Directive 94/22 on the prospection, exploration and production of hydrocarbons

5.2.2. LOCAL INCLUSION IN THE DECISION-MAKING

SINCE the end of the second World War, the management of the ports in France remained under the exclusive competence of the State[34]. The French modern governance and organization of port authorities appeared in 1965 with introducing the status of "Autonomous Ports" for strategic ports for industries and trade[35]. This stranglehold of the central government over the management of ports exemplified the importance of port cities for national objectives and economy.

In the 1980s in France started a process of decentralization[36]. Recognizing the need and calls of public local authorities for more powers to govern themselves, the government distributed planning and management powers, formerly held by the central government, to local authorities. Local and regional levels gained additional competences and a greater influence over economic and environmental matters[37]. Regarding their new spatial and urban planning competencies, local authorities and especially intercommunal structures became major actors in coastal management. The Shoreline Act supported this vision with tourism questions being essentially the responsibility of municipalities[38]. This transfer went with additional financial resources to allow local actors to implement these changes[39]. However, for port cities, the governance did not fundamentally change as port administration included little local authorities before the beginning of the new millennium[40].

A major change in the practices and functioning of public institutions challenged this strategy in 1998. The United Nations Economic Commission for Europe adopted the Aarhus Convention also called "Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters". This binding text ensured the free access for everyone to environmental information held by public

[34] Since the Law n° 47-1746 of July 6, 1947 on the organization for handling work in the ports, or "sur l'organisation du travail de manutention dans les ports".

[35] Law n° 65-491 of June 29, 1965 on autonomous ports, or "sur les ports maritimes autonomes".

[36] It started in 1982 with the laws called "Laws Defferre", from Gaston Defferre, minister of the interior and of decentralization in the government of Pierre Mauroy, under the president François Mitterrand. See especially the law n° 83-8 of January 7, 1983 and law n° 83-663 of July 22, 1983 on the division of powers between municipalities, departments, regions and the State or "relative à la répartition des compétences entre les communes, les départements, les régions et l'État"

[37] The law of 1983 confirms the sharing of competencies and aim between the three main local authorities. "The municipality, the departments and the regions contribute, with the State, to the administration and the planning of the territory, to the economic, health, cultural and scientific development and to the improvement of the living environment". The municipal scale being the smallest scale while the regional is the largest.

[38] N. Boillet. "La gouvernance du littoral". In: *Revue juridique de l'environnement* 5 (2012), pp. 33–55

[39] J. Debrie, V. Lavaud-Letilleul, and F. Parola. "Shaping port governance: the territorial trajectories of reform". In: *Journal of Transport Geography* 27 (2013), pp. 56–65. ISSN: 0966-6923; P. Cariou, L. Fedi, and F. Dagnet. "The new governance structure of French seaports: an initial post-evaluation". In: *Maritime Policy & Management* 41.5 (2014), pp. 430–443. ISSN: 0308-8839

[40] S. Hauser. "The Interplay of Economic Development and Environmental Protection: Dunkirk and the Search for Balance". In: *PORTUSplus* 8.0 (2019); This is also true in other European port cities, like Antwerp. See: M. Dooms, A. Verbeke, and E. Haezendonck. "Stakeholder management and path dependence in large-scale transport infrastructure development: the port of Antwerp case (1960–2010)". In: *Journal of Transport Geography* 27 (2013), pp. 14–25. ISSN: 0966-6923

institutions and the right to take part in environmental decision making, or plans and programs affecting the environment[41]. The convention empowered citizens by making valuable information on their environment available and allowing them to efficiently challenge projects.

In France, this change occurred in 2008 with a law reforming the management and functioning of the port[42]. The processes of globalization and containerization revealed the incompatibility between a central governance of a national government and the fast evolution needed to remain competitive. At the beginning of the 21st century, the court of audits pointed out the weaknesses of this management[43]. Beyond the simple change of name triggered by the law (from Autonomous Ports to Large Seaports), port authorities became owners of their land and responsible for its development[44]. Local authorities, inhabitants, ports' employees and local qualified people are now included in the decision-making with their involvement in the Board of Directors of port authorities. The aim was to align with current trends in the management of ports[45] but also to facilitate the acceptance of projects by local actors. The inclusion allowed, for instance, an alignment between the objectives of ports and cities' authorities.

This effort to reconnect citizens with their ports reached many port cities around the world. A better communication with the public and sharing of information around ports' activities and strategies improved the management of economic and urban projects in port cities[46]. The new governance reduced, sometimes, protests around new infrastructure[47], complications caused by incompatibilities with urban strategies, and thus reduced uncertainties for private actors investing in port areas. This willingness to inform the public aimed at improving their awareness around port activities to better under-

[41] See the website of the European Commission: https://ec.europa.eu/environment/aarhus/

[42] With the Law n° 2008-660 of July 4, 2008 on the reform of port or "portant réforme portuaire".

[43] Translated from the French "Cour des Comptes", which a national financial jurisdiction in charge of financial and legal audits of public institutions and policies.

[44] P. Cariou, L. Fedi, and F. Dagnet. "The new governance structure of French seaports: an initial post-evaluation". In: *Maritime Policy & Management* 41.5 (2014), pp. 430–443. ISSN: 0308-8839; S. Hauser. "The Interplay of Economic Development and Environmental Protection: Dunkirk and the Search for Balance". In: *PORTUSplus* 8.0 (2019)

[45] Port authorities in Europe adapted to the landscape of infrastructure and the expectation of private actors linked to the development of containerization. Their primary task became the administration of the port area to improve ports' access to private companies and their competitiveness. See L. Lévêque. "Le nouveau rôle des autorités portuaires dans l'adaptation des clusters aux enjeux de la globalisation". In: *L'Espace Politique. Revue en ligne de géographie politique et de géopolitique* 16 (2012).

[46] H. Pundt and A. Heilmann. "Building Collaborative Partnerships: An Example of a 3rd Mission Activity in the Field of Local Climate Change Adaptation". In: *Universities as Living Labs for Sustainable Development*. Springer, 2020, pp. 621–636

[47] See for instance South Korean examples since 2003 in The Organisation for Economic Co-operation and Development. *The Governance of Land Use in Korea*. OECD, Nov. 2019. ISBN: 9789264400221. URL: https://www.oecd-ilibrary.org/urban-rural-and-regional-development/the-governance-of-land-use-in-korea%7B%5C_%7Dfae634b4-en; or the action-oriented planning projects of the Gehl Institute in San Francisco or London, in the second volume of "Planning By Doing"; According to Enyedi, "the main aim of public participation is to help decision making. If authorities neglect public participation, it may lead to protest movements and actions", see G. Enyedi. *Public participation in socially sustainable urban development*. UNESCO, 2004.

stand the objectives of authorities and visit the port for citizens to provide constructive feedback. The movement translated into the establishment of "Port Centers" in port cities, with Dunkirk following the movement in 2018[48], an initiative created and supported by the AIVP[49]

Some examples can, however, demonstrate the power of public participation in the realization of projects supported by authorities of ports and cities. The lengthy procedure behind the construction of Rotterdam's port extension illustrated, however, the weight of public participation in the elaboration of important projects. Oppose to its previous extensions, Rotterdam's authorities had to abide to new environmental rules for the project of Maasvlakte 2. In 1989 in the Netherlands, the government published the National Milieubeleidsplan, or National Environmental policy plan, to reduce all kind of pollution after the many incidents of the 1970s and 1980s. Through this new policy, and until 2005, every citizen, even with no interests in the subject, could challenge a project in courts[50]. Discussed at the beginning of the 1990s, the municipal authority of Rotterdam expected Maasvlakte 2, the new extension of the port, to operate in 2000. New environmental rules linked to protecting habitats and species[51] as well as including public participation in the project impeded public and private authorities to quickly deliver the extension. Though the effects of local participation on the result are still debated, their influence remained impossible to deny. Citizens challenged the project in court, where judges forced stakeholders to implement financial and environmental compensations to reduce the consequences of the projects on local inhabitants[52]. Maasvlakte 2 opened in 2013, tripled the container capacity of the port and expanded the port by twenty percent, but exemplified the future of new port projects not considering citizens' opinion. These delays in such a tremendous project explain the evolution of the conditions to challenge project. Only people with interest to the matter and environmental NGOs can intervene in implementing projects since 2005[53].

5.2.3. FROM SECONDARY TO UBIQUITY: THE CLIMATE

IF the environmental concern emerged at the international level at the beginning of the 1970s, it did not immediately thrive. Industrial companies like the oil ones long denied their environmental impacts, and used the petroleumscape to their advantage, influencing decision-makers to prevent the emergence of binding rules over their businesses. One example of the difficult rise of discussions related to protecting the environment and climate change is the Earth Summit developed in Chapter4. The Earth Summits started in 1972 in Stockholm. This first conference of world leaders brought for

[48] See: http://www.dunkerqueportcenter.fr/

[49] Which stands for "Association Internationale des Villes Portuaires", for international association of port cities, see: https://www.aivp.org/agir-durablement/port-center-by-aivp/.

[50] J. Chorus. *Introduction to Dutch law*. Kluwer Law International BV, 2016

[51] A reference here to the European Directive on Birds, 79/409/EEC from 1979, and on Habitats, 92/43/EEC from 1992.

[52] B. van Gent. "Port of Rotterdam and Maasvlakte 2: Polder Environmentalism, Indecision and Ambition". In: *Ad Astra* (2014)

[53] J. Chorus. *Introduction to Dutch law*. Kluwer Law International BV, 2016

the first time ecological issues within the international political discourse. The following one, however, remains forgotten in environmental history and in the common knowledge. The conference held in Nairobi, Kenya, in 1982, failed to keep the environmental concern alive, mainly because of the political context. With the Reagan administration in the U.S, the tensions linked to the Cold War increased and the environmental pledges of previous governments became irrelevant to its immediate economic and military objectives. The American administration thus ignored the Earth Summit of 1982, leading to its failure. The context of the time confirmed for environmental laws what prevailed for other laws in the past and that Cicero explained in the antiquity with: "in times of war, the law falls silent"[54].

The Nairobi Summit illustrated the future difficulty to gather global political actors behind a common environmental cause[55]. In a period of geopolitical and economic troubles, environmental issues are irrelevant regarding national objectives of development, and an obstacle in the way of industrial growth. New international evolution towards environmental concerns appeared again in 1992 with the well-known Rio Summit. It resulted in the Rio declaration which listed 27 principles for a sustainable management of world's resources and inspired many other international texts. The famous Kyoto protocol of 1997 which detailed objectives to reduce greenhouse gas emissions directly derived from the Rio Summit. Though accepted by many countries at the time, the U.S (like many others) once again remained out of this commitment, out of concern for the economic impact on its industry. Limiting greenhouse gas emissions meant to impose restrictive rules upon heavy emitter like the oil industry, inconceivable for such a strategic industry.

The outcomes of this Kyoto protocol are widely debated in the literature[56]. Yet, its acceptance and extensions showed a slow shift towards environmental policies. On the one hand, it confirmed, for instance, the European commitment, politically, to protect the environment and its acknowledgment of climate change. On the other hand, it illustrated the weight of industrial activities for economies, but also on the population, and the decision-makers of countries in their ability to take any kind of commitment. The rejection of the Kyoto protocol by the Bush administration is again an illustration of the oil and coal powerful lobby within the American economic life[57]. And though many

[54] Translated popularly from the latin "Inter arma enim silent leges".

[55] S. Maljean-Dubois and M. Wemaëre. *COP 21?: la diplomatie climatique de Rio (1992) à Paris (2015)*. Editions A. Pedone., 2015. ISBN: 223300762X

[56] M. G. J. Den Elzen and A. P. G. De Moor. "Analyzing the Kyoto Protocol under the Marrakesh Accords: economic efficiency and environmental effectiveness". In: *Ecological Economics* 43.2-3 (2002), pp. 141–158. ISSN: 0921-8009; C. Böhringer and C. Vogt. "Economic and environmental impacts of the Kyoto Protocol". In: *Canadian Journal of Economics* 36.2 (2003). ISSN: 00084085. DOI: 10.1111/1540-5982.t01-1-00010; W. M. Huang, G. W. Lee, and C. C. Wu. "GHG emissions, GDP growth and the Kyoto Protocol: A revisit of Environmental Kuznets Curve hypothesis". In: *Energy Policy* 36.1 (2008). ISSN: 03014215. DOI: 10.1016/j.enpol.2007.08.035; C. Almer and R. Winkler. "Analyzing the effectiveness of international environmental policies: The case of the Kyoto Protocol". In: *Journal of Environmental Economics and Management* 82 (2017), pp. 125–151. ISSN: 0095-0696

[57] S. Dessai. "The climate regime from The Hague to Marrakech: Saving or sinking the Kyoto Protocol". In: *Tyndall Centre for Climate Change Research Working Paper* 12 (2001)

countries adopted a political stance favoring environmental protection, the lack of binding objectives and the current climate crisis demonstrated an absence of efficient action despite all the pledges. The failure of these early commitments highlights a similar influence even in the countries ratifying international and environmental texts.

The ease with which protective rules change following the change of political leaders illustrates the debate around the importance of environmental principles and urgency. Their evolution in the international discussion reveals, however, the struggle of oil companies to keep a consistent influence towards policies and in the face of constantly more informed citizens. The u-turn of the Trump administration and its disengagement from any kind of national and international rules restricting industrial development was correctly foreseen by Yergin in 2011 as a disputed topic for future international discussions. Even though the political change happening in the U.S with the new Biden administration in 2021 went together with the country coming back into the Paris agreement:

> "One further factor critical to the future of oil emerged as a decisive factor only after the turn of the century: climate change. Initially, representatives of 84 countries signed the 1997 Kyoto protocol aimed at reducing CO2 emissions. The European Countries later adopted the treaty and made climate change a cornerstone of their policies. But the US senate effectively rejected the Kyoto treaty by a vote of 95 to 0. There were three major concerns. The first was the impact of CO2 restrictions on the overall economy and economic growth. The second specifically concerned restrictions on coal, from which half of the nation's electricity was generated. And the third was that the treaty would require cutbacks from the industrial countries, but not developing countries. [...] Carbon management is likely to be a contentious focus for international diplomacy in the years ahead[58]."

Except for the year 2020, dominated by the covid pandemic, recent times have been mostly dedicated to tackling climate change. The many climate neutral objectives of governments around the world, the discovery of pollution scandals (like plastic pollution, the influence of Monsanto and the diesel gate), the rise of environmentalists in governments, and the growth of renewable energies in the energy mix are evidences of the contemporary importance that climate and environmental protection took in policies. The acknowledgment of this topic led to the creation of what the literature refers to as the "principle of integration" in the TFEU[59], in its article 11:

> Environmental protection requirements must be integrated into the definition and implementation of the Union's policies and activities, in particular with a view to promoting sustainable development.

Since the end of the first wave of the pandemic, however, environmental protection is being put in the background again. The spread of the virus drastically limited global trade and put many industries on their knees, the oil industry included. To face this

[58] D. Yergin. *The prize: The epic quest for oil, money & power.* Simon and Schuster, 2011

[59] See for instance C. Roche. *L'essentiel du droit de l'environnement 2020-2021.* 11th ed. GUALINO, 2020

unexpected challenge and restore global economic growth, many national authorities eased environmental rules for industrial companies, ignoring the long and difficult making of environmental principles and protections[60]. This support towards faster and easier industrial expansion in dedicated areas such as port areas will have dire consequences on the environment and health of citizens living in industrial clusters like Dunkirk, creating additional risks and reducing environmental standards[61]. Translated into 2020's post-covid context, Cicero's quote would become "in times of economic war/struggle, the environmental concern falls silent", despite apparent and numerous pledges of governments to tackle climate change.

5.3. THE LACK OF ANTICIPATION IN POLICIES: THE HAND OF OIL?

OIL industry in the 1980s became increasingly powerful and aware of the consequences of its products on the environment. Benefiting from new exploration and exploitation opportunities in countries with more flexible rules for industrial activities, oil companies slowly moved their refining facilities around new producing sites. European governments, where the consumption of oil products kept on decreasing, saw their refining sites slowly closing, like in Dunkirk, and gathered in strategic places like Rotterdam or Antwerp, soon last standing sites in Northwest Europe[62]. Oil companies' influence and lobbying power remained strong in Europe in order to protect their investments and prevent sudden international rules to emerge against their activities. This strategy of polluting somewhere else while still influencing environmental policies of Europe is, however, in total contradiction with their recent environmental pledges. This lobbying power is a key obstacle in the way of anticipative planning and environmental policies. The long transformation process of Dunkirk's refinery and the recent investments towards LNG infrastructure illustrate the fossil-fuel oriented vision of authorities and the remaining influence of oil companies over the spatial planning of Dunkirk. Figure5.4 shows the constant expansion of the port area to the west. Although the port authority tries to develop the container port and activity, the main project behind this drastic and recent extension is still linked to fossil fuels with the LNG Terminal finished in 2017.

[60] S. Hauser. *The Post-Covid Time: A Post-Normal or Pre-Environmental Time?* 2020. URL: https://www.portcityfutures.nl/news/the-post-covid-time-a-post-normal-or-pre-environmental-time-0

[61] Like demonstrated by the Lubrizol fire of Rouen, France, in 2019, and later developed in this chapter. See: L. Vadelorge. "Lubrizol-Rouen 2019: catastrophe environnementale et crise de l'aménagement du territoire". In: *Metropolitiques. eu* (2019); and "Lubrizol, symptôme de la dérégulation de l'environnement". In: *Reporterre* (Oct. 2019). URL: https://reporterre.net/Lubrizol-symptome-de-la-deregulation-de-l-environnement

[62] R. Van den Bergh, M. Nivard, and M. Kreijkes. "Long-Term Prospects for Northwest European Refining. Asymmetric Change: A Looming Government Dilemma?" In: *Den Haag: Clingendael International Energy Programme* (2016)

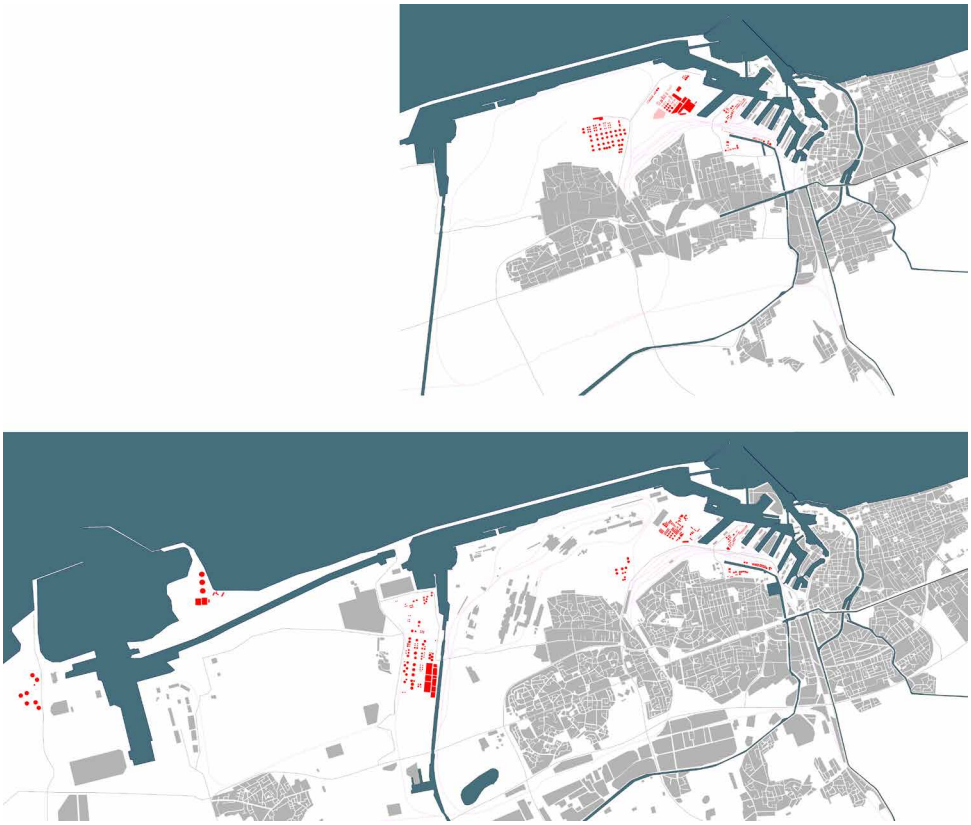


Figure 5.4: Pictures of Dunkirk in 1971 on the top and 2018 on the bottom, with oil infrastructure in red. Picture made by the author from archival maps and data provided by the Learning Center of Dunkirk.

5.3.1. A NEW TREND OF RELOCATION

OVER the last thirty years, the urban consumption of space stopped in Dunkirk along with economic and demographic downturns[63]. At the same time, new industrial infrastructures emerged with the support of local and national investments, extending the port area to the west[64]. The evolution of the legal framework and growing environmental protection in the 1970s can explain such limited urban extension but cannot be

[63] S. J. Hauser and C. Roche. "Sharing Is Caring, but Is the Shore Cared for? The Sharing Paradox of the French Coast". In: *Urban Science* 4.4 (Nov. 2020), p. 60

[64] Such as the Liquid Natural Gas Terminal, or LNG, which opened in 2017. Total together with "Electricité de France" built the facility between 2011 and 2016 on one of the last untouched coastal areas of the city, the dune of Clipon, a classified natural area for fauna and flora (ZNIEFF in French, "Zone naturelle d'intérêt écologique, faunistique et floristique"), and constituted the 14th Seveso site of the port, 4 kilometers away from the biggest nuclear power plant of Western Europe, in Gravelines.

considered as the only factor[65]. A decreasing population since 1982 in Dunkirk illustrated a shift in the attractiveness of the port city, passing from 73 120 inhabitants in 1982 to 69 500 in 2006[66]. The economic context of the area after the second oil shock of 1979 was not the one of "the Glorious Thirty" anymore, and political leaders failed to expect this situation. The industry sector struggled to maintain its activities and oil facilities (refineries and storage sites) are closing one after another since the 2010s.

The oil-related sector, with its various activities and sites, has always been a great provider of jobs in Dunkirk and in other industrial port-cities[67]. Yet, the recent closing of refineries in Dunkirk represents a trend in which petroleum companies prefer to move their facilities and employees closer to production sites rather than investing in Europe where there is a slow but constant decrease of consumption and an overcapacity of the refining sector[68]. In economic, environmental and social perspectives, the closing of refineries is a disaster for the port city and its surroundings. An economic one for public authorities through a loss of tax income, an increasing unemployment rate, and for private companies of the port cities depending on its products or maintenance[69]. Environmental because of their long-standing activities, which heavily polluted the soil and underground water, as well as the transformation of the landscape and land they took part in. Eventually social, when one considers the amount of people directly or indirectly relying on the oil industry for their profession.

This slow abandonment of European port cities by the oil industry is an economic tragedy affecting port city regions in Northwest Europe that grew dependent on the oil industry. The decisions to close are not in the hand of port cities' authorities, but in the headquarters of oil companies. This fact, led by economic considerations, prevents local authorities from developing preemptive strategies to deal with the closures of oil facilities for both port and city authorities. This decentralized decision-making also caused the emergence of great clusters for the oil industry like Antwerp and Rotterdam, taking part in the disappearance of other sites less important and profitable for companies such as the refineries of Dunkirk. These remaining European hubs concentrating storage and refining sites will be the last one standing with great oil facilities. All the other port cities that relied on oil activities to develop will have to rethink their planning strategies ac-

[65] To take two examples on different scales: the first European action plan towards environment was created by the Council of the European Communities in 1973; the Shoreline Act of the French legal system on the planning, protection and enhancement of the coast change coastal planning practices in 1986. See: S. J. Hauser and C. Roche. "Sharing Is Caring, but Is the Shore Cared for? The Sharing Paradox of the French Coast". In: *Urban Science* 4.4 (Nov. 2020), p. 60

[66] Institut National de la Statistique et des Etudes Economiques. *Dossier Complet: Commune de Dunkerque.* URL: https://www.insee.fr/fr/statistiques/2011101?geo=COM-59183

[67] In 2016, the industrial cluster of the port of Rotterdam, though not entirely dedicated to petroleum but mainly relying on it, provided over 93 000 jobs. See Port of Rotterdam Authority. *Over 120 Industrial Companies. One Powerful Cluster. Make it Happen.* Tech. rep. The Port of Rotterdam

[68] See, for instance, Total building new refineries such as the one in Jubail in Saudi Arabia or near Alberta in Canada. See also BP's report "global statistical review of world energy": British Petroleum. *BP statistical review of world energy.* Dataset. 2017

[69] See the "Toile Industrielle" of Dunkirk illustrating the industrial ecology in the port where many companies are connected and providing resources or materials to each other

cordingly to transform sites and activities[70]. In a context where renewable energies are gaining momentum in discourses and policies, one can observe an absence of anticipation on the full extent of consequences that such energy transition implies. Beyond the economic questions, pollution is another problem to face for which private and public authorities need to innovate and experiment. Transforming the oil infrastructure will not only take time but also affect the planning as well as both the natural and built environment of industrial port cities.

Many oil actors put the responsibility of relocation on national and local political leaders and law-makers through implementing stricter environmental rules. Industrial actors saw regulations such as those on the reduction of emissions, pollution of air, soil and water, and the restoration of the soil to its original condition as constraining rules affecting their competitiveness in comparison with companies in other countries facing less constraining rules. Beyond the overcapacity of the sector and the decreasing use of fossil fuels in the area, oil companies often justified the closures, transformation, or transfer of oil sites, like in Dunkirk, to new rules impeding their business. This strategy was, however, in contradiction with exceptional sales figures and dividends for decades[71], tax incentives and financial supports from national governments, later developed in this chapter.

5.3.2. A UBIQUITOUS INDUSTRY

TOTAL , Shell, ExxonMobil, Chevron, and British Petroleum are some of the most famous and powerful oil companies in the world. Many of them are originally linked to John D. Rockefeller and the Standard Oil. Their weight on the oil and gas market trade and production, but also their cooperative and lobbying force on governments to influence safety and environmental rules led to the creation of names to describe these oil companies, their impacts and powers. They became known in the literature and to journalists as the "Big Oil" or "Supermajors" to illustrate their collaborative work in lobbying and their financial power. The notion of "Palimpsestic Petroleumscape" coined by Hein to describe the effect of petroleum activities on tangible and intangible structures relates to this overall influence of petroleum companies[72]. Like the octopus taking over the capitol and other companies in figure3.9 oil actors extended their reach to all possible aspects of governance, power, production and economy. The industry was also reaching the imagination of people who saw it as a wealthy and undying sector, provider of energy, jobs and comfort. The construction of the city of engineers in Dunkirk and the district around the refineries of Abadan in Iran, discussed in Chapter3, were supporting this feeling, exacerbated by additional advertisements through postcards and road-

[70] R. Van den Bergh, M. Nivard, and M. Kreijkes. "Long-Term Prospects for Northwest European Refining. Asymmetric Change: A Looming Government Dilemma?" In: *Den Haag: Clingendael International Energy Programme* (2016); C. Hein. "Oil Spaces: The Global Petroleumscape in the Rotterdam/The Hague Area". In: *Journal of Urban History* (2018)

[71] N. Wakim. *Pétrole : plus de 80 milliards de profit pour les majors en 2018.* Feb. 2019. URL: https://www.lemonde.fr/economie/article/2019/02/07/petrole-plus-de-80-milliards-de-profit-pour-les-majors-en-2018%7B%5C_%7D5420468%7B%5C_%7D3234.html

[72] C. Hein. "Analyzing the Palimpsestic Petroleumscape of Rotterdam". In: *Global Urban History* (2016)

maps that were widely spread during the second half of the 20th century (Figure5.5).

Figure 5.5: Free road maps handed out by diverse petroleum companies at gas stations in the 1950s and 1960s. Source in C. Hein. "Oil Spaces: The Global Petroleumscape in the Rotterdam/The Hague Area". In: *Journal of Urban History* (2018).

"The transformation of oil into large and unaccountable government incomes is not a cause of the problem of democracy and oil, but the outcome of particular ways of engineering political relations and of flows of energy"[73]. With the growth of oil dependence around the world came the power of oil companies to further affect political, economic and legal decisions. Each major represents the interests and access to the energy of one country and government willing to promote and defend it, inside or outside its own borders (ExxonMobil in the U.S, Shell in the Netherlands, Total in France, British Petroleum in the United Kingdom, etc.). Companies became technological and economic flagships of these countries: at the time of this writing, ExxonMobil is the 54th biggest company in terms of market capitalization in the U.S, while Chevron is 62th, and Saudi Aramco the 2nd. Total and Shell are both 4th in, respectively, France and the Netherlands[74]. Thus, the influence of Supermajors in shaping political and legal landscapes but also people's mindsets grew more noticeable, and studies dedicated to specific fields affected by it highlighted its importance[75]. Though extensive, the numerous analyzes are detailing a small fraction of over a hundred and fifty years of private exercise of power. Regular and

[73] T. Mitchell. *Carbon Democracy*. Verso Books, 2013

[74] See: `https://companiesmarketcap.com/`.

[75] L. McQuaig. *It's the crude, dude: War, big oil and the fight for the planet.* Doubleday Canada, 2004; D. Yergin. *The prize: The epic quest for oil, money & power.* Simon and Schuster, 2011; T. Mitchell. *Carbon Democracy.* Verso Books, 2013; C. Hein. "Oil Spaces: The Global Petroleumscape in the Rotterdam/The Hague Area". In: *Journal of Urban History* (2018)

recent discoveries showed that what was unearthed so far was only the tip of the iceberg. These explorations are of prior importance in achieving a fair and complete energy transition that companies have been constantly denying and delaying.

> The reality is that as much as we know about fossil fuel interests' denial and delay, we've really found those skeletons in the closet just by looking through a tiny keyhole – everything we know is based on just a few hundred documents scrounged from various sources [...].
>
> From my perspective every indication of this evidence is once that closet door gets blown open, the skeletons are going to come tumbling out[76].

The incident of Lubrizol in Rouen, a river port city of France, on September 26, 2019, recently highlighted the persistent industrial protection and the dangers it represents. This facility transforms and stores chemicals, with most of them being derivatives of petroleum products. The fire of this factory revealed that regional authorities allowed its extension with no prior environmental assessment. A decree (a document precising rules to be applied and created by the government) enacted in 2018 subtly changed the nomenclature of Seveso sites, with some being removed from a list on which an independent authority intervenes to evaluate the impact of extensions on the environment[77]. This trend shows the current course of action, even before the pandemic, giving priority to industrial and economic development over the strict management of dangerous sites. The post-pandemic context, in an economic perspective, is supporting this idea of re-industrialization of France. In industrial port cities like Dunkirk, hosting several of such dangerous sites, this easing of rules upon industrial activities can have dire consequences on the quality of the environment, thus, on citizens. Yet, judges of national and European courts regularly confirm in their interpretation of regulations that economic interests cannot prevail over ecological ones[78]. Such policies are often to the detriment of environmental and citizens' protection, though welcomed as economic opportunities creating jobs for local populations. Regularly, economic crises exemplify mismanagement practices and overshadow all other concerns of the time to support growth's renewal: environmental actions slowed down after 2008 while the pandemic of 2020 triggered supports from government for polluting, yet important and strategic industrial and economic activities, like the one linked to the petroleum or airline sectors.

[76] E. Holden. *How the oil industry has spent billions to control the climate change conversation.* Jan. 2020. URL: https://www.theguardian.com/business/2020/jan/08/oil-companies-climate-crisis-pr-spending

[77] S. J. Hauser. *Post-Covid: Post-normal ou pré-normal ?* 2020. URL: https://www.territoire-europe.eu/post-covid-post-normal-ou-pre-normal/

[78] CJEC July 11, 1996, Royal society for the protection of birds, n°C-44/95 and C-388/15. See L. Krämer. "The Court of Justice of the European Union". In: *Environmental Policy in the EU: Actors, Institutions and Processes.* Ed. by A. Jordan and V. Gravey. 4th ed. Routledge, 2021. Chap. 7; R. Rézenthel. "L'intérêt général, un fondement incontournable des activités portuaires". In: *Les ports en France: Quelle stratégie portuaire pour un développement de l'activité ?* Ed. by S. Cros and F. Lerique. Eska, 2021, pp. 128–138

5.3.3. DOUBLE-GAME OF OIL MAJORS: PLEDGES AND LOBBYING

PETROLEUM companies used the legal protection, obtained through their lobbying over national governments, to continue their business-as-usual practices. Following their mastering of scientific information to dismiss accusations (Chapter5), they adopted a similar strategy when it came to law and respecting the "rule of law". For the United Nations, "the rule of law is a principle of governance in which all persons, institutions and entities, public and private, including the State itself, are accountable to laws that are publicly promulgated, equally enforced and independently adjudicated [...][79]." This is a sharp and clear explanation: all enacted rules apply to everyone in the same way, what the law defines must be applied and respected by all. Yet what happens when the law is ignoring some aspects of a field or exempting some people or entities, and when lawmakers are being influenced, in the design and writing of a text, by the persons and industries they are supposed to regulate?

The answer to this question has been "not much" for a long time. Economic benefits as well as the strategic importance of petroleum activities has put companies dealing with it above the law. When the energy system of a nation is relying on one company, then environmental, health and risks concerns are secondary to the development and the protection of this company, especially when there is also an imbalance in information held on both private and public sides. Oil companies' approach towards end-users paid off with the population supporting their activities against rules or policies affecting it. People associated environmental protection and rules over industries as threats towards the creation of jobs. Private and public discourses spread this fear of environmental rules affecting the employment market, though regular investigations dismantled this myth[80]. This understanding has also been shaped by oil industry through its long lasting and heavy lobbying in all kind of media (Figure5.6).

Another practice helped industrial companies to clean their image, and even sometimes made them appear as safeguarding the environment: green-washing. The term was coined in 1986 by the environmentalist Jay Westerveld to define misleading environmental claims, though originally coming from a hotel's incentive to reuse towels[81]. At the same period, Chevron was already using it in its advertisement strategy through posters and television spots (See Figure4.4). The oil company introduced itself as a guardian of biodiversity despite its polluting activities and at a time when the oil industry already knew about the detrimental effects of its products on the climate and the environment. Chevron was not the first nor the last. Other Supermajors followed the same steps, trying to convince people on their environmental commitments.

At the beginning of the 20th century, this lobbying intensified, and oil companies constantly tried to appear greener and more concerned about the environment. Ironically, Total, the French Supermajor, created its philanthropic foundation in 1992, after the

[79] See: "What is the rule of law?", United Nations and the Rule of Law, available online.

[80] E. Goodstein. "Jobs or the Environment? No Trade-off". In: *Challenge* 38.1 (1995). ISSN: 0577-5132. DOI: 10.1080/05775132.1995.11471801

[81] B. Watson. "The troubling evolution of corporate greenwashing". In: *Chain Reaction* 129 (2017), p. 38

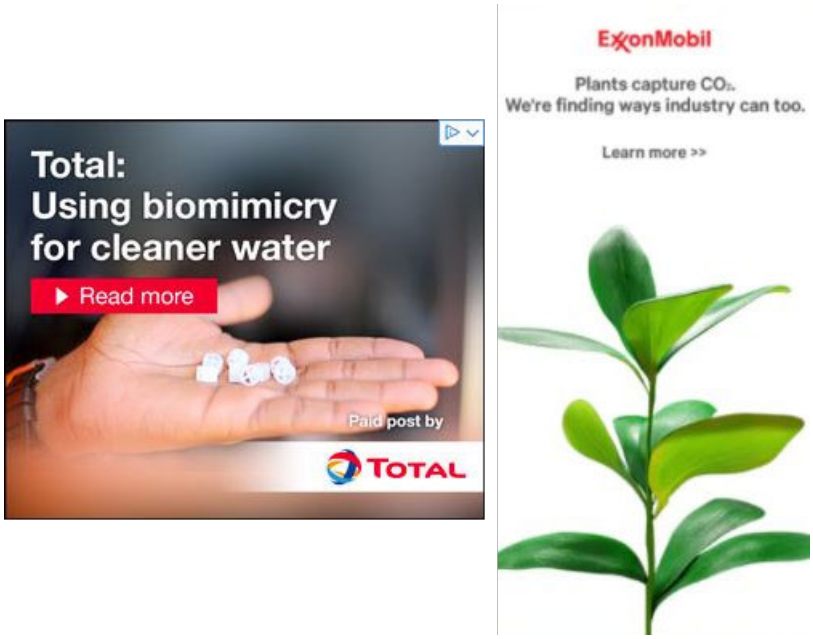


Figure 5.6: Advertisement of Total on the left and ExxonMobil on the right, found on the information medium Euronews to convince users on their green transition.

Earth Summit of Rio. Through this institution, the company funded actions towards road safety, education, culture and heritage, and, ironically again, towards the protection of the climate, oceans and seas that it contributes to damage[82]. The industrial facilities of the oil company disappear in port cities, but its influence remains in other forms, closer to inhabitants with local social and cultural action, but away from the polluter image associated with its former industrial buildings. In the pieces unearthed by Jelmer Mommers, a Dutch journalist, researcher and editor, some of Shell's documents exemplified this consideration for their environmental image. It revealed a desire to create new concepts in the company's strategy. Internal documents focused on all aspects of life that advertisement can influence, from inclusion, energy, and environment by playing with words and pictures(Figure5.7). Jess Worth, co-director of campaign group Culture Unstained, explained that the aim was to "bury the findings, muddy the waters, and turn climate change into a 'debate'" rather than a fact that needed actions[83]. In order to protect and maintain their activities, oil companies had to influence the public opinion and make people challenge policies for their support to gain momentum. The do's and don'ts of Shell's internal document "Listening and Responding - The Profits and Principles Advertising Campaign" of 1999 demonstrated the ease with which the company could distract people through a change in the use of terms and images. This same strategy was

[82] See the website of the Total Foundation https://www.foundation.total/

[83] M. Hope. *How Shell Greenwashed its Image as Internal Documents Warned of Fossil Fuels' Contribution to Climate Change*. Ed. by DeSmog UK

used to respect the rule-of-law, as imprecise regulations allowed oil actors to bend and interpret the content to their advantage when not directly influencing its writing.

Figure 5.7: One of the page of an internal document of Shell for its campaign "Listening and Responding - The Profits and Principles Advertising Campaign" of 1999. Documents found and available on the website of Climate File.

When public authorities debated commitments on the reduction of gas emissions, oil companies like Shell lobbied against it openly. EU's 2007 "Climate action and renewable energy package", for instance, was planning to reform the Emissions Trade Scheme (ETS) to charge more refineries. Lobbyist stepped in, sending letters to the European Commission arguing that it would prevent new investments, warning the institution of the potential impacts of such a regulation on employments[84]. This latter argument has been falling apart for decades now, with few places like Rotterdam and Antwerp being mentioned by industrial actors and experts as "last men standing" for refineries in North West Europe despite all the existing incentives for the industry[85]. Only the most competitive places offering a strategic value keep on being upgraded, while others are doomed

[84] L. Stockman, A. Rowell, and S. Kretzmann. "Shell's Big Dirty Secret. Insight into the world's most carbon intensive oil company and the legacy of CEO Jeroen van der Veer". In: (2009)

[85] R. den Bergh, M. Nivard, and M. Kreijkes. "Long-Term Prospects for Northwest European Refining. Asymmetric Change: A Looming Government Dilemma?" In: *Den Haag: Clingendael International Energy Programme* (2016)

to close in the short term and find new opportunities to revitalize their port activities, similarly to what happened in Dunkirk. The ETS mechanism is a financial windfall for polluting companies, as it allows them to sell to other companies the credits to pollute that they did not use. Meant to be an incentive for companies to invest on new techniques emitting fewer greenhouse gases, it ended up being generously attributed to polluting facilities, thanks to a great lobbying. These overflowing credits are giving additional funding to great polluter out of thin air, without pushing them to reinvest[86]. This is the reason why these same companies that were doubtful towards this system at the beginning are now trying to protect it[87].

In this time of environmental focus, the oil industry spends billions euros in lobbying against strict rules while dedicating a small part of their budget on renewable energies. Though denying their negative lobbying on the emergence of environmental rules, reports constantly acknowledged the hard lobbying strategies of oil companies[88]. The current strategy of oil actors is to emphasize their investments into renewable and low carbon projects. The issue behind this shift, produced by the COP21 of 2015, is their continuous and tremendous investments in fossil fuel explorations and exploitation. According to Rystad Energy, the five greatest European oil companies spent in 2019 around five billions of dollars in projects linked to renewable energies, which represented 5% of their total investments in the production of energy[89]. At the same time, Big Oil companies spent nearly 250 million euros since 2010, and in the European Union only, to strengthen their influence on European institutions and protect their activities through lobbying[90].

Climate change is not the only consequence of petroleum products to consider. The widespread pollution of plastics is also a major threat to the protection of species but also for human health. Political promises to end the creation and sell of single use plastic are still waiting for effective implementation and producers are already bending it

[86] See for instance the documentary realized by Cash Investigation, in French, on May 17, 2016, "Climate: the big bluff of multinationals" translated from its original French title "Climat : le grand bluff des multinationales".

[87] Cash Investigation. *Climat : le grand bluff des multinationales.* 2016. URL: https://www.francetvinfo.fr/replay-magazine/france-2/cash-investigation/cash-investigation-du-mardi-24-mai-2016%7B%5C_%7D1454987.html

[88] A. Kolk and D. Levy. "Winds of change:: corporate strategy, climate change and oil multinationals". In: *European Management Journal* 19.5 (2001), pp. 501–509. ISSN: 0263-2373; A. K. Ahmadov and C. van der Borg. "Do natural resources impede renewable energy production in the EU? A mixed-methods analysis". In: *Energy policy* 126 (2019), pp. 361–369. ISSN: 0301-4215; S. Laville. *Top oil firms spending millions lobbying to block climate change policies says report.* Mar. 2019. URL: https://www.theguardian.com/business/2019/mar/22/top-oil-firms-spending-millions-lobbying-to-block-climate-change-policies-says-report

[89] G. Csomós. "Relationship between large oil companies and the renewable energy sector". In: *Environmental Engineering and Management Journal* 13.11 (2014), pp. 2781–2787; B. Deboyser. *Les géants du pétrole se donnent une image verte mais investissent toujours massivement dans les énergies fossiles.* Jan. 2020. URL: https://www.revolution-energetique.com/les-geants-du-petrole-se-donnent-une-image-verte-mais-investissent-toujours-massivement-dans-les-energies-fossiles/

[90] S. Laville. *Fossil fuel big five 'spent €251m lobbying EU' since 2010.* Oct. 2019. URL: https://www.theguardian.com/business/2019/oct/24/fossil-fuel-big-five-spent-251m-lobbying-european-union-2010-climate-crisis

writing reusable on their products. Plastics became the new fundamental investment of oil companies through an inconsiderate diversification of their activities and, like for climate change, in spite of all evidences of its detrimental effects on nature, species and human health. Shell and Exxon are, for instance, investing in new facilities in the U.S to build new factories using ethane to produce plastic[91]. As the last link of the food chain, humans are indirectly consuming the plastic animal ingested through their life, and concentrations in both natural environments and human bodies are increasing together with the number of health issues related to it (Figure5.8)[92].

This lobbying on production is similarly applied to waste with its shipping to developing countries. Kenya was one of these countries newly trying to stop its importation of plastic waste. The industry tried to prevent this engagement to avoid rising complaints of people in western countries towards a polluting product they could not see much before. The strategy to resist the enactment of concrete measures lay in spreading doubts about scientific discourses, highlighting the scarcity of certainties and absence of consensus among studies[93]. However, with more countries stopping their imports of plastic wastes (more than 180 agreed to restrict their imports), its visibility will increase in western countries, places of great production and consumption. Thus people's rejection of plastic, already rising, might explode, threatening oil businesses and investments not only in the plastic sector but also in fossil fuels with the "Keep it in the Ground" movement and the effects of the Covid epidemic of 2020 on oil prices.

Yet again, oil actors are still pushing to find outlets for their pollutants. "The records, obtained through Freedom of Information Act requests by Unearthed, a London-based affiliate of the environmental group Greenpeace, paint a picture of close ties between the trade representatives, administration officials and industry representatives"[94]. On questions around plastic like fossil-fuels, when policies and rules are touching oil activities or businesses, even to defend the environment or future generations, oil companies have powerful strings and means to use on political systems. When writing his book "Carbon Democracy", Mitchell realized this influence and explained that: "It became increasingly clear that carbon energy and modern democratic politics were tied intricately together. Rather than a study of democracy and oil, it became a book about democracy as oil"[95].

A Dutch example serves as an excellent illustration of these continuous close ties between oil companies and public authorities. Gerrit Zalm, member of Shell's supervisory board since 2013, was also Minister of Finance in the Dutch government between 2003 and 2007. In 2006, thus under his supervision, the Dutch State struck a deal with Shell

[91] *Ethane Crackers Spark Pollution Concerns.* Oct. 2019. URL: https://www.loe.org/shows/segments.html?programID=19-P13-00043%7B%5C&%7DsegmentID=1

[92] S. L. Wright and F. J. Kelly. "Plastic and Human Health: A Micro Issue?" In: *Environmental Science & Technology* 51.12 (2017), pp. 6634–6647

[93] L. McQuaig. *It's the crude, dude: War, big oil and the fight for the planet.* Doubleday Canada, 2004

[94] H. Tabuchi, M. Corkery, and C. Mureithi. *Big Oil Is in Trouble. Its Plan: Flood Africa With Plastic.* Aug. 2020. URL: https://www.nytimes.com/2020/08/30/climate/oil-kenya-africa-plastics-trade.html

[95] T. Mitchell. *Carbon Democracy.* Verso Books, 2013

Figure 5.8: Image of a World Wildlife Fund (WWF) campaign "Your plastic diet" to illustrate the average amount of plastic people can eat during a week. Based on a study carried out by the University of Newcastle, this amount could be up to 5 grams a week, which is the weight of a credit card. Image © WWF-World Wide Fund For Nature (Singapore) Limited.

which reduced dividend tax from 25 to 15 percent. This new and favorable tax program showed again how oil actors intervene in the decision-making process in order to protect and expand oil companies' influence. Oil companies around the world are using similar practices in different countries to prevent the emergence of legal and financial obstacles in the way of industrial growth and profits[96]. The apparent innovative and subtle way of

[96] See the article on the tax avoidance of Shell and dividends in the Netherlands from https://nltimes.nl/2018/06/18/dutch-govt-fire-tax-deal-shell

oil companies intervention in the decisions of governments still relies on old practices and ties developed to lock them in a beneficial and dominant position.

5.4. NEW PETROLEUM IS STILL OLD PETROLEUM

MANY port cities around the world relied on and are still economically dependent over petroleum. At the end of the 19th and beginning of the 20th century, Dunkirk like Rotterdam and Antwerp grew through the development of oil industry. The political and administrative support oil actors received in their early stage remained and evolved in time. Oil companies became so powerful financially, socially and politically that they maintained and strengthened the support of their governments. Rising concerns in social and political levels over environment, pollution, waste, energy transition, climate change, technological risks and health did not prevent oil activities to thrive even more in the 1980s and 1990s. Even if its built heritage is disappearing in Western countries, oil companies are moving them in production places like the Middle East and Canada. However, its invisible heritage persists, in laws and soils, adding complexity to "wicked" and contemporary problems linked to spatial planning, environmental protection and health[97].

Until recently, petroleum companies overflowed the market with cheap oil, thus preventing renewable energies to be competitive. Ironically, during the Covid period at the beginning of 2020, this overflowing petroleum "killed" many oil-related companies, especially in the U.S. There significant investments have been made by oil actors to exploit shale oil. The closing of borders and trade stopped the air and car traffic, or at least led to its drastic reduction, which in turn created an over-production. This chain of events triggered low prices, with even negative values for a short time. With a price per barrel of oil too low to generate profits, many companies went bankrupt[98]. ExxonMobil, a direct descendant of Rockefeller's Standard Oil and one of the biggest oil company in the world and first energy company in the U.S, even saw its market capitalization being surpassed by one focusing on renewable energies[99]. The pandemic, together with the long energy transition effort, pushed forward renewable sources, forced oil companies to change their strategies and re-assess the value of their assets - oil still underground being included in it until then[100]. Through this process most "Big Oil" lost billions in

[97] C. W. Churchman. "Guest editorial: Wicked problems". In: (1967); S. J. Hauser. "Long Live the Heritage of Petroleum: Discoveries of Former Oil Sites in the Port City of Dunkirk". In: *Urban Science* 4.2 (2020), p. 22

[98] M. Hamdaoui. "Oil Markets in the Post-Covid-19 World". In: *Economic Trends* (2020); R. Selmi, J. Bououiyour, and S. Hammoudeh. "Negative Oil: Coronavirus, a" black swan" event for the industry?" In: (2020); L. Hampton. *U.S. energy bankruptcy surge continues on credit, oil-price squeeze.* Aug. 2020. URL: https://www.reuters.com/article/us-north-america-oil-idUSKCN25727Wlaw%20firm's%20data%20showed.

[99] Agence France-Presse. *Renewable player overtakes ExxonMobil in market value.* Oct. 2020. URL: https://www.france24.com/en/20201008-renewable-player-overtakes-exxonmobil-in-market-value; A. Lawrence. "Reconceptualizing contemporary energy markets". In: *Competition & Change* (2021). ISSN: 1024-5294

[100] T. Elsen. *The Energy Transition: Impact on the factors shaping International Oil Companies strategy.* Tech. rep. TU Delft, 2020; J. Ambrose. *Seven top oil firms downgrade assets by 87bn dollars in nine months.* Ed. by

value and the schism between American and European oil companies' strategies over environmental pledges became more visible.

The apparent shift of European oil industry towards sustainability and "green" practices is, however, an illusion. Recent investments of oil companies into plastic factories and oil refineries in Canada and the Middle-East show a lack of consideration for the consequences of their activities and rather the development of other "business-as-usual" practices. Besides, it highlights complete freedom of action and an absence of accountability for their old, constant and long-lasting pollution. Unregulated and powerful companies, as in technologies and oil, dictate their rules which often follow their own economic interests, while supporting each others[101]. There is an immediate and long-term influence of oil companies to sustain their activities. But in the face and timeline of climate change and environmental sustainability, these long-term strategies seem to be rather short-termed visions; especially when looking at growing numbers and scales of natural disasters enhanced by global warming. This growth-oriented and limited vision on economic development echoes back to the lack of prospective and holistic studies in the literature analyzed from Scopus (Figure1.2). With the benevolent behavior of public authorities towards oil industry from its early development, one can wonder if the secret awareness of oil companies on the consequences of their products was such a secret for governments. These same governments are usually important partners and shareholders of these companies. Does this imply that governments knew and turned a blind eye for the sake of this strategic sector? Eventually, oil actors' long-term investments and strategies of influence went and are still going hand in hand with a long-term blindness on environmental and human health issues as well as on planning challenges in port cities formerly hosting them like Dunkirk.

Representatives of oil industry became experts in green discourse, plans and pledges. This green-washing applied by the key actors behind global warming is a danger and an additional proof of the unregulated system supposedly limiting them. Using a green image for marketing is great for the company image, terrible for all the rest. People buying their "green" products feel discharged of their responsibility towards environment as they see the higher price of these as a mark of their eco-friendly production. This process is not only limited to petroleum but exists in all marketing sectors. The French company Total might have heavily invested in renewable energies, but fueling a car at their station is still supporting its petroleum-related activity which relies on exploration and exploitation of fossil-fuels, sometimes in sensitive natural areas or with potential violations of human rights[102]. Governments and law-makers must step forward in order

The Guardian. 2020. URL: https://www.theguardian.com/business/2020/aug/14/seven-top-oil-firms-downgrade-assets-by-87bn-in-nine-months

[101] A. Cole. "Google and Amazon are now in the oil business". In: *Vox* (2020). Ed. by Vox. URL: https://www.vox.com/recode/2020/1/3/21030688/google-amazon-ai-oil-gas

[102] F. Brillet. *Comment Total prend le virage de l'énergie responsable.* July 2019. URL: https://www.capital.fr/entreprises-marches/comment-total-prend-le-virage-de-lenergie-responsable-1343714; A. Bogrand *et al.* "Empty Promises Down the Line? A Human Rights Impact Assessment of the East African Crude Oil Pipeline". In: (2020). ISSN: 1787486427; P. Mougeolle. "Practitioner's Perspective: A Brief Commentary on the French Total Climate Case". In: *CCLR* (2020), p. 128

to efficiently regulate the field with clear and constraining rules, out of any influence of oil companies. They have to produce incentives for end-users to end their dependence over oil products. Despite explicit threats caused by climate change and the urgency to act, regulations at international, European and national scales still cannot meet this challenge as they are hindered by previous rules protecting petroleum activities.

Demonstrations of this hindrance are visible in legal systems, even in the European Union, though it is often discussed as an example in the literature[103]. The Directive 2012/18/EU of the European Parliament and of the Council of July 4, 2012 on the control of major-accident hazards involving dangerous substances, though enacted two years after the disaster of Deepwater Horizon (Figure5.9), is one example. Despite the terrible incident taking place on BP's offshore platform which affected a tremendous amount of natural places, this directive, although treating major-accident hazards and dangerous substances exclude in its second article "the offshore exploration and exploitation of minerals, including hydrocarbons"[104]. In its recitals[105], the authors, the European Parliament and Council, precise that "certain industrial activities should be excluded from the scope of this Directive provided they are subject to other legislation at Union or national level providing for an equivalent level of safety". Yet, the reference used to exemplify the European response to Deepwater Horizon on the website of the European Commission appeared one year later with the Directive 2013/30/EU of the European Parliament and of the Council of June 12, 2013 on safety of offshore oil and gas operations[106]. This rule, though described as a reference for offshore exploitation by European public authorities, regularly refers to the appreciation of Member States to assess skills and liabilities of companies responsible for explorations and exploitation though acknowledging that: "under existing liability regimes, the party responsible may not always be clearly identifiable and may not be able, or liable, to pay all the costs to remedy the damage it has caused"[107]. European institutions recognize the fragmentation of current frameworks, yet let Member States judge the liabilities of companies.

The underlying issue is that regulations approved by national governments allow companies to divide themselves to prevent their responsibilities from being engaged. With Shell, for instance, the first shareholder is "Nederlands Centraal Instituut Voor Giraal Effectenverkeer Bv", or NECIGEF, which holds over 21% of the total shares of the company in 2019[108]. According to the Bank for International Settlements: "Necigef is a wholly

[103] J. Vogler and H. R. Stephan. "The European Union in global environmental governance: Leadership in the making?" In: *International Environmental Agreements: Politics, Law and Economics* 7.4 (2007), pp. 389–413. ISSN: 1567-9764

[104] Text available online on EUR-Lex: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32012L0018

[105] Recitals are a part of the preamble of directives setting out the reasons behind the act.

[106] See the web page of the European Commission: https://ec.europa.eu/energy/topics/energy-security/offshore-oil-and-gas-safety/offshore-oil-and-gas-operations-directive

[107] See the ninth recitals of its preamble.

[108] Royal Dutch Shell plc. *Shell Annual Report 2019 - Significant Shareholding*. Tech. rep. 2019. URL: https://reports.shell.com/annual-report/2019/additional-information/shareholder-information/significant-shareholdings.php

Figure 5.9: Deepwater Horizon offshore drilling unit on fire in 2010 in the Gulf of Mexico. From Wikimedia Commons and taken by United States Coast Guards.

owned subsidiary of AEX-Clearing & Depository B.V. which is a wholly owned subsidiary of Amsterdam Exchanges N.V"[109], this latter being now called Euronext, a merger of many European stock exchanges. Major companies create smaller and multiple branches for the sole purpose of limiting the liability to this branch, thus the financial impact, in case of trouble[110].

Discourses of important oil companies' representatives can also give insights on this influence and the role of public authorities in their activities. For instance, Patrick Pouyanné, chairman and CEO of Total, in 2014 said that "even though Total is a private company, it is the largest French company, and in a way it represents the country itself"[111]. If one can understand this sentence as demonstrating the power of private companies and their influence, it also indicates that their actions can be those of national governments. This

[109] See the page of the Bank for International Settlements: https://www.bis.org/cpmi/publ/d20r14.htm
[110] See for instance the mechanism of Financial Vehicles Corporation, of FVC.
[111] Translated from the French "Même si Total est une société privée, c'est la plus grande entreprise française, et elle représente d'une certaine manière le pays lui-même". See: Agence France-Presse. *Poutine rencontre pour la première fois le nouveau PDG de Total.* Nov. 2014. URL: https://lexpansion.lexpress.fr/actualites/1/actualite-economique/poutine-rencontre-pour-la-premiere-fois-le-nouveau-pdg-de-total%7B%5C_%7D1627195.html

represents the "corporate sovereignty" and power that Barkan developed in 2013, and the need to consider the relationship between great industrial companies and public authorities as one[112]. The company protects its shareholders and activities by influencing the law-making process while at the same time being protected and supported by the government[113].

The trial of the Erika illustrates another effect of legal imprecision or protection of the industrial sector. The trial of this disaster from 1999 ended in 2012 with the highest jurisdiction (Cour de Cassation) giving its judgment[114]. During this last procedure, the prosecutor general, following the formulation of the applicable rules, claimed the impossibility to sue the company as the incident took place in international waters[115]. Though the judges condemned Total for its role in the disaster, this intervention demonstrates the efficiency of oil companies' influence over all political and administrative levels, with legal frames playing in their favor. Their intervention in the design of rules and their power of lobbying ended up creating a protective international framework for oil companies, especially when the rules come from the International Maritime Organization in which maritime States dominate the discussions. This case demonstrate also the 'global' characteristic of the petroleumscape[116], and the importance of regulations in designing it. One can note, however, that the judges of Paris' court of appeal, before the judgment of the "Cour de Cassation", recognized the fault of imprudence from Total for its lack of inspection of the ship and confirmed the notion of ecological damage and its reparation[117]. The protection of economic interests remains, but judges increasingly attach the environmental subject to it.

5.5. CONCLUSION

SUCCESSIVE disasters, across the world, linked to oil activities and products, undeniably affected urban planning practices in port cities, and rules of national and European systems. The Seveso Directive of 1986 and the Erika packages of 2001 in the EU were both the result of industrial disasters with spatial planning and governance effects in port cities (respectively with distances and enforcement of security rules). Other reactive mechanisms such as the French PPRT (Technological Risk Prevention Plan), in-

[112] J. Barkan. *Corporate sovereignty: Law and government under capitalism.* U of Minnesota Press, 2013. ISBN: 0816686491

[113] A. Deneault. "Total, un gouvernement bis". In: *Le Monde diplomatique* 8 (2018), p. 21. ISSN: 0026-9395. URL: https://www.monde-diplomatique.fr/2018/08/DENEAULT/58987

[114] Judgment n°3439 of September 25, 2012. See on the website of the court (Cour de Cassation) https://www.courdecassation.fr/jurisprudence_2/chambre_criminelle_578/3439_25_24144.html

[115] V. de Senneville. *« Erika » : la Cour de cassation condamne Total et confirme sa responsabilité dans la tragédie.* Sept. 2012. URL: https://www.lesechos.fr/2012/09/erika-la-cour-de-cassation-condamne-total-et-confirme-sa-responsabilite-dans-la-tragedie-380155

[116] C. Hein. "Oil Spaces: The Global Petroleumscape in the Rotterdam/The Hague Area". In: *Journal of Urban History* (2018)

[117] See P. Delebecque, RTD Com. 2010 p.622-623. The definition of the ecological damage is: a non-negligible damage to the elements or functions of ecosystems or to the collective benefits drawn by man from the environment (article 1247 of the French Civil Code). See C. Valero. "Erika, Prestige : Deux décennies après, quelles avancées ?" In: *ISEMAR - Institut Supérieur d'Economie Maritime* 215 (2019)

troduced after the explosion of the Seveso site AZF in Toulouse, France, in 2001, implemented stricter zoning and distance systems, with additional building conditions or restrictions for houses settled within the danger zones of industrial sites (Figure5.2). Such plans inevitably affected the shape of port cities, with port areas being industrial clusters, as well as the inhabitants living near the city-port border. The improvement of the security kept on going with a greater physical division (distance and fences) between ports and cities. The sinking of multiple tankers also influenced the control of port authorities over the maritime traffic, the quality of ships and of port infrastructure, and increased the cooperation between authorities beyond national borders. Illustrations of this new collaborative work through international regulatory interventions are the MARPOL international convention of 1973 or the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPARCON) of 1992.

The increasing scale of disasters forced the improvement of the security around industrial facilities and port territories by pushing them further away from the city into dedicated port areas. However, and despite all the disasters, oil companies furthered their efforts to control or influence decision-makers and institutions for their own benefits, and lobbied against any kind of national commitment towards protecting the environment that would affect their activities. The difficult inclusion of inhabitants and organizations in the decision-making process of public authorities and their limited possibilities to challenge environmental regulations in courts, like the European Court of Justice, are obstacles to the efficient enforcement of protective rules[118]. Yet, this inclusion and access to justice for inhabitants participate to the monitoring of rules and industrial sites, revealing the importance that regulations can play through different interventions. Past and current catastrophes proved the remaining weaknesses of planning and regulatory practices with their detrimental effects on the environment, and incidentally on people's health and security. The urban tissue catching up with industrial facilities formerly on the periphery of cities showed public authorities' lack of consideration for anticipative and safe planning strategies in spite of the many disasters that kept happening around such sites.

In the case of the City of Engineers in Dunkirk, it is not the implementation of the law[119] nor the action of the private company that led to its destruction. Employees formerly living in the 'Cité' mentioned that by 1995 BP's City of Engineers was deserted because of the noise and air pollution from new industries that settled in the port area[120].

[118] L. Krämer. "The Court of Justice of the European Union". In: *Environmental Policy in the EU: Actors, Institutions and Processes.* Ed. by A. Jordan and V. Gravey. 4th ed. Routledge, 2021. Chap. 7

[119] The law on classified installations for the protection of the environment of 1976 created protective measures around industrial facilities, yet, with preexisting sites, a simple declaration to the prefecture was required to continue working. This mechanism is called "droit d'antériorité" or right of priority or of prior and was also meant to protect industries from any kind of appeal from nearby citizens after the creation of the law. See M.-P. Deswarte-Jullien. "Analyse juridique du décret n° 77.1133 du 21 septembre 1977 pris pour l'application de la loi n° 76.663 du 19 juillet 1976 relative aux installations classées pour la protection de l'environnement". In: *Revue juridique de l'Environnement* 3.2 (1978), pp. 127–146; and M. Prieur. "Le recours devant les juridictions administratives en matière d'installations classées pour la protection de l'environnement". In: *Revue juridique de l'Environnement* 3.2 (1978), pp. 121–126

[120] J. Lecuyer. *La cité des ingénieurs figée dans l'instant.* Ed. by La Voix du Nord. May 2002

Still maintained, the company partially destroyed the 'Cité' in 2002, before it completely disappeared in 2018 when began the transformation by the last owner, Colas, of the refining site. The dismantling and cleaning phase of the industrial facility should finish in 2021, erasing all visible traces of nearly a century of oil refining before returning the land to the port authority of Dunkirk to host new activities. Yet, this disappearance of the visible part of the oil heritage does not imply a complete and thorough cleaning of the pollution. The French environmental code explains in its article L512-6-1 that the decontamination must be compatible with the future use of the site in cooperation with the local authority. Nevertheless, the prefect, the local representative of the government, is the one deciding whether the decontamination process is sufficient or not. This procedure implies that a compatible cleaning of the soil does not mean a totally decontaminated site.

The disappearance of oil's built heritage has been deepened by the economic and sanitary situation of 2020. The Coronavirus pandemic currently affecting the world has been a severe hit for petroleum activities[121] and also impacted planning practices[122]. Oil industry's evolution and disappearance in Dunkirk is a representation of future challenges that port cities' actors will soon have to face. This recent concern for the energy transition in local, national, and European discourses must not focus only on actual and visible buildings. To achieve the energy transition objective, public authorities must also consider the history and legacy, visible and invisible, let by petroleum companies and their influence since the 1860s. The up-scaling and regular occurrence of technological disasters (Figure**??**) must trigger new processes to achieve the fair transition wished by the people and the European Commission[123]. These transformations must go together with better planning practices in port city regions in order to improve health and safety conditions for inhabitants of industrial port cities[124]. The efficiency of these transformations relies also on a better enforcement and monitoring of regulations linked to spatial planning, and environmental and health protection, as well as sufficient means for controlling agencies. Though oil sites were concentrated in port areas since the Second World War, they have grown from a close relationship, between cities and inhabitants, that still affects planning strategies and the public health. A real and efficient transition, away from fossil fuels industries, has to re-discover this heritage, and address its issues to put an end to the repetition of disasters and tackle the inefficiency of regulations. The increasing scale of the industrial sites since the 1970s created extensive port areas in port cities that became obstacles for the transition(Figure5.4). With oil com-

[121] J. Ambrose. *Global oil demand may have passed peak, says BP energy report.* 2020. URL: https://www.theguardian.com/business/2020/sep/14/global-oil-demand-may-have-passed-peak-says-bp-energy-report

[122] B. Bonciani. *Port City Scenarios During and After Covid-19: The case of Livorno.* 2020. URL: https://www.portcityfutures.nl/news/port-city-scenarios-during-and-after-covid-19-the-case-of-livorno (visited on 03/31/2021)

[123] The European Commission. *The European Green Deal, COM/2019/640 final.* Tech. rep. 2019. URL: https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1588580774040%7B%5C&%7Duri=CELEX%7B%5C%%7D3A52019DC0640

[124] S. Hauser. *The Post-Covid Time: A Post-Normal or Pre-Environmental Time?* 2020. URL: https://www.portcityfutures.nl/news/the-post-covid-time-a-post-normal-or-pre-environmental-time-0

panies selling their facilities and abandoning European ports at the beginning of the 2000s, the responsibility of these transitions fell on the last owner. But the processes to clean and transform oil sites in port areas require tremendous financial and technological means[125]. The decline of industrial activities following the pandemic and the energy transition must trigger anticipative actions in the economic and spatial planning strategies of port cities' authorities.

[125] J. Forslund *et al.* "Does remediation save lives?—On the cost of cleaning up arsenic-contaminated sites in Sweden". In: *Science of the total environment* 408.16 (2010), pp. 3085–3091. ISSN: 0048-9697

6

Past, Present, Futures: From Heydays to Complex Legacy

I think we risk becoming the best informed society that has ever died of ignorance.

Ruben Blades,
Panamanian musician, composer and politician.

It takes a lot of courage to release the familiar and seemingly secure, to embrace the new. But there is no real security in what is no longer meaningful. There is more security in the adventurous and exciting, for in movement there is life, and in change there is power.

Alan Cohen,
American businessman.

Parts of this chapter have been published in S. Hauser. "The Interplay of Economic Development and Environmental Protection: Dunkirk and the Search for Balance". In: *PORTUSplus* 8.0 (2019); S. J. Hauser. "Long Live the Heritage of Petroleum: Discoveries of Former Oil Sites in the Port City of Dunkirk". In: *Urban Science* 4.2 (2020), p. 22; and S. Hauser. *The European Green Deal: New Opportunities for Port Cities?* 2020. URL: https://www.portcityfutures.nl/news/the-european-green-deal-new-opportunities-for-port-cities.

THE importance of the oil sector in national and local economies and policies was, is and will remain tremendous. Oil industry provided employments and development opportunities on local and regional scale, while affecting the spatial planning and environment of their host cities. Its responsibility for and its visibility in oil disasters and pollution of the soil is as great as its power over all levels of the decision-making process. Yet, while it was not much held responsible for the consequences of its past activities and keep on doing business-as-usual, oil infrastructure and the influence of the oil industry in policies and rules became an obstacle for port-cities' authorities in their attempt to achieve the energy and industrial transition. How can stakeholders, like public authorities, local actors, or researchers, face this complexity to efficiently plan the transformation of this oil legacy?

The invisible influence of oil companies is often ignored though affecting the population and the planning of port cities. Past legal protections influenced by oil industry are now hampering the emergence of efficient transitional and environmental tools in legal systems and policies. This old tangible and intangible heritage of the oil industry meant to ensure its sustainable growth became a burden, sometimes hidden in the ground and sometimes forgotten in rules. Identifying and dealing with this heritage is, however, of great importance to implement the fair energy transition advertised by contemporary public authorities. This chapter explains the importance of knowing the past of oil industry in port cities to plan for a logic and efficient future while trying to achieve the objectives of the energy transition. To develop this argument, there is a need to analyze the evolution of the land use in port cities dependent on oil activities through historical and contemporary aerial pictures and maps. The transformations of industrial sites, the evolution of regulations and policies, as well as the actions of institutions, organizations, or research groups are also determinant to examine in order to find and develop best practices dealing with the oil heritage as a whole.

6.1. KNOWING THE PAST TO PLAN THE FUTURE

THE oil industry is, though playing a major role in it, not the only one to pose a threat on the life of citizens and on port cities' planning strategies. The post-war period of full economic growth in Northwest European countries participated in the emergence of new and constantly greater infrastructure in ports. Authorities responsible for their settlement regularly showed that reactions to disasters have the tendency to fade away with time, causing the repetition of similar mistakes on a regular basis for the sake of economic developments. However, when the same economic benefit drives these industries away from their territory, local public authorities of port cities are left with polluted brownfields in their port areas to transform and a sudden increase in unemployment. There is, in this perspective, a lack of anticipation from political actors in dealing with "dying" industries that use relocation and closures as economic opportunities. In many Northwest countries of Europe, local authorities experienced a similar challenge still hampering the development of many cities with mining or textile industries. This past economic disaster must also push decision-makers to anticipate inevitable indus-

trial closures.

6.1.1. THE FORGOTTEN HERITAGE

FOR public authorities, the challenge is not only limited to dealing with the visible heritage of petroleum industry and its transformation but to also consider its invisible consequences. One of them is the pollution of the soil caused by the longstanding and many activities of oil companies in port cities. This pollution has a long-term effects on land use and sanitary policies, as well as on the quality of the natural environment[1]. The absence of detailed information on the location of petroleum sites, like other industrial and polluting sites, constitutes a peril for inhabitants' health as they might live on heavily polluted areas, using the underground water or cultivating their gardens.

Since the beginning of petroleum developments in the 1860s, entrepreneurs thrived on the territory of port cities like Dunkirk, Rotterdam and Antwerp, building many sites. Most of them were located either at the border or sometimes within the city. With the growth of the port-city, parcels hosting the sites formerly located outside the city are now part of the urban tissue. Land uses changed in time, passing from industrial site to, in most cases, residential areas, with little concern for the quality of the soil and the future use of the land. With the environmental concern rising only in the 1970s, public and private authorities mostly ignored the pollution and its potential effects on health before that date[2], while even silencing public debates[3].

The absence of accurate monitoring over past land uses created a memory issue around the location and duration of industrial sites such as the petroleum ones. Dunkirk is an excellent example of this, with a lack of complete information available on past oil settlements in the port city[4]. When considering an industry which started in the 1860s, one can understand that records on its settlements can be vague if not non-existent. When recorded, the authorizations and their publications on official repositories are not always detailed, ignoring either the location, the dates or the type of installation. Such missing information led eventually to gaps in contemporary lists of industrial activities that took place on the territory of industrial port cities, with clear consequences on the health of inhabitants and the efficiency of future planning documents.

[1] See Y. K. Kharaka and N. S. Dorsey. "Environmental issues of petroleum exploration and production: Introduction". In: *Environmental Geosciences* 12.2 (2005), pp. 61–63. ISSN: 1075-9565; M. Delucchi. "Impacts of biofuels on climate change, water use, and land use". In: *Annals of the New York Academy of Sciences* 1195.1 (2010), p. 28. ISSN: 0077-8923; W. Yu *et al.* "Analyzing and modeling land use land cover change (LUCC) in the Daqing City, China". In: *Applied Geography* 31.2 (2011), pp. 600–608. ISSN: 0143-6228

[2] P. Brimblecombe. "Air pollution and health history". In: *Air pollution and health.* Elsevier, 1999, pp. 5–18; S. Mosley. "Environmental history of air pollution and protection". In: *The Basic Environmental History.* Springer, 2014, pp. 143–169

[3] T. Le Roux. "La «médiatisation» de l'insalubrité industrielle: un espace public de débats progressivement étouffé, 1770-1810". In: *Le Temps des médias* 2 (2015), pp. 34–51. ISSN: 1764-2507

[4] S. J. Hauser. "Long Live the Heritage of Petroleum: Discoveries of Former Oil Sites in the Port City of Dunkirk". In: *Urban Science* 4.2 (2020), p. 22

Through a combination of methodologies dealing with archives, maps, planning documents and historical writings, it is possible to complete official records on industrial sites. The overlap of information on the current map of Dunkirk revealed the influence of past oil activities on the urban planning of the city. The publications this research led to proved that patches of land in the port-city of Dunkirk experienced the settlement of oil storage or a transformation of their land use without being cleaned[5]. This continuous ignorance of historical developments led to current incompatibilities in land-uses and to the creation of "pollution mines" in port-cities that hosted petroleum facilities. At places of former oil sites, public authorities allowed the construction of houses, schools and parks, thus putting the health of citizens at risk (Fig6.1).

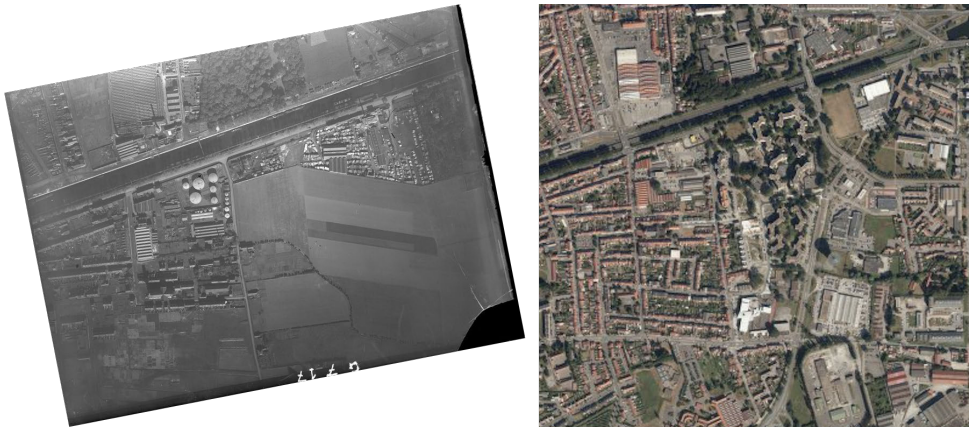


Figure 6.1: Aerial picture of the area of Dunkirk around the refinery Trystram. The left picture was taken in 1920 and the right one in 2012. One can observe the apparent change in land use. Pictures from the service "Remonter le temps" of the IGN.

The Figure6.2 is, however, only showing sites appearing on official records and those discovered through this research. Many remain lost as the official listing lost track of these facilities, thus of all potential pollution of Dunkirk's soil. The development of the petroleum industry being similar in time and techniques around Europe, this issue is transferable to other port cities that hosted oil industries early on[6]. The moving of facilities from places to places observed in Dunkirk (Fig6.3), but also in other port cities like Rotterdam and Philadelphia[7] demonstrate the high mobility of the petroleum industry in its early developments and the hidden potential of its pollution. Too often public and private authorities of the time ignored or hid this burdensome heritage of the past, cre-

[5] The official record of industrial sites in France, Basias, on georisques.gouv.fr, mentions, when known, the location of the site and if authorities have cleaned the place or not. See S. J. Hauser. "Long Live the Heritage of Petroleum: Discoveries of Former Oil Sites in the Port City of Dunkirk". In: *Urban Science* 4.2 (2020), p. 22

[6] Like Antwerp where incidents linked to petroleum were already mentioned in the minutes of the "Chambre de Commerce" of Dunkirk in 1866

[7] C. Hein. "Refineries (Oil)". In: *The Encyclopedia of Greater Philadelphia* (2016)

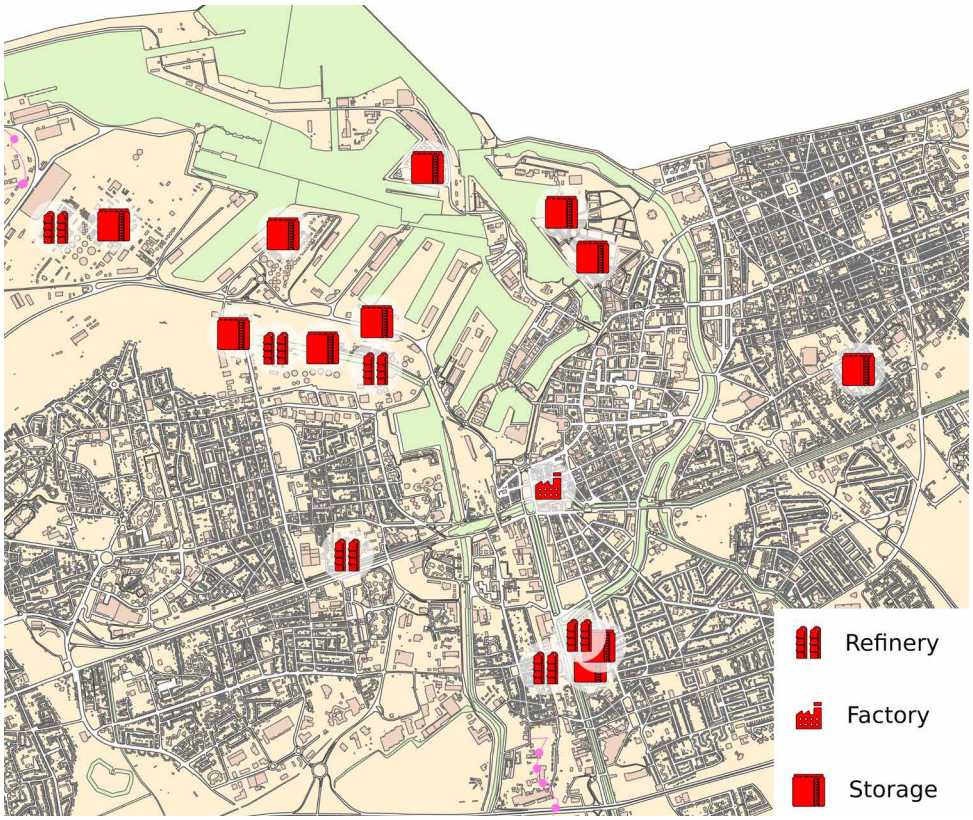


Figure 6.2: Mapping of the oil-related sites (refineries, factories and storages) that emerged since 1860 in the port city of Dunkirk. Made by the author and based on the actual map of the city from the Learning Center of Dunkirk.

ating locked-in situation for future generations that want to turn the page of oil activities.

6.1.2. PAST SENSITIVITY OR PATH DEPENDENCE: HOW THE PAST CAN BLOCK FUTURES

THE notion of path dependence is important in order to explain how contemporary developments stem from past events and choices. De Martino, an Italian architect and academic, defines path dependence as a process where:

> "[...]history matters and practices built in the past define the option range for future directions. This defines feedback loops that imprison the actors, making them unable to look at possible alternatives"[8].

[8] P. De Martino. "Land in Limbo: Understanding path dependencies at the intersection of the port and city of Naples". PhD thesis. 2021, pp. 1–288

Figure 6.3: Mapping of the urban expansion of Dunkirk, from 1879 until 2018, based on its actual shape. Sites moved progressively away from the city center, from the periphery of the city to dedicated and more spacious port areas. Made by the author and based on the archival maps of the city kindly provided by the Learning Center of Dunkirk.

There is a debate around the use of the notion to prove that the current situation has been determined by specific events from the past. Though appealing, there are some preconceptions to highlight in order to bring clarity without diving deep into the debate. If the rise of Rockefeller undeniably affected the evolution of oil industry at the end of the ninetieth and beginning of the twentieth century, the sequence of events that followed, like the use of petroleum as fuel for navies and the World Wars, participated in the path-dependence equilibrium. This long-standing growth and influence of oil companies does not solely depend on that period's choices but on all the external factors that later contributed to preserve the path-dependence equilibrium[9]. The importance of these factors is often underestimated, like the growing power of oil companies over policies and rules to protect their activities. Present and futures are shaped by previous events and decisions, but not determined by them. The distinction is important, as shapes can change and be overturned, like legal precedents or jurisprudence, as opposed to determined situations. The current lock-in situation into something bad, understood here as the slow energy transition and the deterioration of natural environments, is avoidable through prudent steps or innovations[10].

Public authorities also have to deal with obstacles in the design of legal and spatial planning tools. They are influenced or determined by what happened 150 years ago, but shaped by a sequence of events and choices. This mechanism implies that law-makers still hold the possibility act differently. Previous explanations proved that the sequence of incidents and legal or political reactions to them in Europe did not provide efficient

[9] S. J. Liebowitz and S. E. Margolis. "Path dependence". In: *Encyclopedia of law and economics* (1999)
[10] S. E. Page. "Path dependence". In: *Quarterly Journal of Political Science* 1.1 (2006), pp. 87–115

legal tools to tackle oil's dependence and influence. But it created texts, principles, and tools in European and national legal systems. They exist, but need clearer explanations and definitions[11], institutions to monitor their respect and application[12], and avoid exemptions providing ways out for oil companies and other industrial actors. Regulations are dependent over interpretations or subsidiarity, bringing inconsistency and a variety of outcomes depending on the different cases[13]. There is a need for the development of new, strict, and protective applications of existing principles, like the non-regression principle, or to create clear definitions and attribution of competencies. Innovative and strict regulations, beyond the European or national scales, can bring more advantages to all parties than rigid texts and legal systems locked into a slow and predictable evolution that benefits only a few actors[14].

The interpretation of pro-environmental judges can sometimes help to answer the shortcomings of legal texts, similar to what happened with the Shoreline Act in France (Chapter4). National and especially European judges as last levels of the judicial system in the EU can enforce and ensure the application of regulations strictly, if freed from national influences. Through their decisions and interpretations of unclear rules, they can influence the relationship of port cities' citizens with their built and planned environment[15]. The EU itself relies on its courts to protect rules that national governments are sometimes unwilling to implement in their own legal system. A new interpretation on the subsidiarity principle, for instance, would improve the environmental protection, the energy transition and the end of oil influence as they are typically fields where states proved their lack of efficiency, and where the European scale is the most adapted level to efficiently deal with it. States do not seem to put the right measures in place without favoring national companies. This situation makes the intervention of the EU a necessity, despite strong lobbying activities in European institutions, primary because of the relevance of its scale in protecting the environment and populations, and the participation of a multiplicity of actors. However, the way founders designed fundamental treaties of the EU shaped the current functioning of the supra-national institution, with tremendous decision-powers let in the hands of national governments and their representation in EU's institutions[16].

[11] Assemblée Générales des Nations Unies. *Lacunes du droit international de l'environnement et des textes relatifs à l'environnement : vers un pacte mondial pour l'environnement.* Tech. rep. Nations Unies, 2018

[12] C. Roche. "Prévention et lutte contre la pollution des mers par les hydrocarbures: Les derniers développements communautaires". In: *Transports (Paris. 1956)* 421 (2003), pp. 280–291. ISSN: 0564-1373

[13] Camphuysen and Vollaard illustrated this problem through the Dutch case, with the law making it difficult to link oil discharge with a specific vessel. An aerial observer needs to confirm the illegal action. Thus, nine times out of ten, the ship cannot be identified. See: K. Camphuysen and B. Vollaard. "Oil pollution in the Dutch sector of the North Sea". In: *Oil Pollution in the North Sea.* Springer, 2015, pp. 117–140

[14] M. E. Porter. "America's green strategy," Scientific American, April. p. 96". In: (1991); N. A. Ashford and R. P. Hall. "The importance of regulation-induced innovation for sustainable development". In: *Sustainability* 3.1 (2011), pp. 270–292

[15] M. Lo Prete. "La vulnérabilité des villes portuaires méditerranéennes françaises et italiennes au prisme des contentieux". In: *Les Annales de la Recherche Urbaine.* Vol. 110. 1. Persée-Portail des revues scientifiques en SHS, 2015, pp. 206–215

[16] With the European Council, which is one of the important institutions of the EU, and comprise the heads of states or governments and decides on the priorities of the EU. The other institutions being, among the principals, the European Parliament and the European Commission, the president of the latter being proposed

Path dependence would not lead to the creation of more rules protecting the environment, but past actors or decisions can shape rules to make them sensitive to specific purposes. The Emission Trading System of the EU (EU ETS) is an illustration of it. Excellent idea on the paper that a strong lobbying originating from past developments turned into a profitable business rather than an incentive to innovate and pollute less. Oil actors together with other industrial stakeholders shaped that environmental system to create money out of nothing through quotas. Path dependence would prevent such a creation, whereas external factors influencing the equilibrium between economic profit and the environmentalism movement brought this compromise.

To tackle this blocking mechanism which industries are now (ironically) defending would be to implement direct prices over carbon emissions and fixed by institutions rather than exchangeable quotas with prices led by the market producing few to no incentive at all[17]. In the case of the refinery Total in the metropolitan area of Dunkirk, for instance, these quotas produced almost 9 million euros for the company between 2012 and 2014, although refining activities stopped on this site in 2011[18]. Direct prices over carbon emissions could eventually appear, proving the flexibility and absence of dependence in this specific domain. Everyone would pay the same, money would not be created out of thin air and would not be the only focus of the mechanism, every company would face the same rules, with big companies polluting the most, with many of them in port cities, having more financial means to face their tremendous emissions. It would force companies into trying to drastically reduce their production of GHG, especially considering the price of the ton of carbon[19]. This would require a common, global commitment towards a universal price. Such a mechanism, though necessary, is unlikely to appear considering the long stance of national governments towards industrial protection. The EU ETS is, for instance, still in force as industrial companies are now protecting it despite being opposed to its implementation at the beginning because, as Golub says, "of the uncertainty and the transaction costs they face by abandoning what is often a well understood regulatory approach over which they exercise considerable influence"[20].

by the European Council to the Parliament.

[17] C. De Perthuis and R. Trotignon. "Governance of CO2 markets: Lessons from the EU ETS". in: *Energy Policy* 75 (2014), pp. 100–106. ISSN: 0301-4215

[18] See quotas given in the "arrêtés" of May 31, 2007, and January 24, 2014, fixing the list of operators to which greenhouse gas emission allowances are assigned and the amount of allowances allocated for, respectively, the period 2008-2012 and 2013-2020. Prices were evaluated based on the values recorded in Réseau Action Climat France. *Observatoire Climat-Energie*. 2019. URL: https://www.observatoire-climat-energie.fr/climat/industrie/prix-du-carbone-ets/ (visited on 06/18/2021)

[19] See: D. Dron. "Se doter d'un prix du carbone pour faciliter la transition énergétique? Certes, mais cela ne suffit pas". In: *Annales des Mines-Responsabilité et environnement*. 1. FFE, 2018, pp. 59–63. ISBN: 1268-4783; C. Gollier. "Le prix du risque climatique et le prix du carbone". In: *Revue d'economie financiere* 1 (2019), pp. 171–182. ISSN: 0987-3368; D. J. C. MacKay *et al.* "Price carbon—I will if you will". In: *Nature* 526.7573 (2015), pp. 315–316. ISSN: 0028-0836

[20] J. Golub. *New instruments for environmental policy in the EU*. Routledge, 1998

6.2. NEW HORIZON AND EUROPEAN PLEDGES

PUBLIC authorities in Europe acknowledged the complexity of regulations and the economic burden that it can represent for companies. On the one hand, the movement of simplification in the French system is almost as old as the codification of right with laws referring to it in 1790, but ironically it became regular from the 1970s onward and keep on being discussed[21]. On the other hand, it appeared in the 1990s in the European legal system. For both, however, commitments and action to tackle the complexity issue appeared at the beginning of the new millennium[22]. This acknowledgment of the burden of laws, their costs and complexity compared to their objectives, led to annual reports assessing the progress, like "The European Union's effort to simplify legislation: 2019 Annual Burden Report" from the European Commission[23] or the Interinstitutional Agreement on Better Law-Making in 2016[24]. The REFIT platform discussed earlier, which started in 2012 and ended in 2019, recommended for instance "concrete actions to make legislation more efficient and effective based on stakeholders' input or its own analysis" in the Annual Burden Report.

This simplification, which sometimes started with the environmentalism movement, must keep on accompanying it. The efficiency of environmental rules relies on clear texts for all to follow and understand. The pledges of European institutions "to preserve, protect, and improve the quality of the environment"[25] and the more recent 2050 carbon neutrality objective depend on legal clarity and applicable principles and tools. Improving the clarity of legal texts can also bring economic benefits by removing legal uncertainty for people and companies over the interpretation of complex legal documents[26]. Moreover, it would fasten the transformation process of dying and polluted sites in port areas by clearly defining liabilities, standards and objectives to attain.

6.2.1. TRANSFORMATION OF ABANDONED SITES: THE IMPORTANCE OF ANTICIPATION

THE transformation of former or abandoned industrial facilities has always been a troublesome task for public authorities. However, solutions exist to transform and keep this heritage alive. The gas factory "Westergasfabriek" of Amsterdam, or the Renault car factory in Boulogne Billancourt, constitute excellent examples of successful

[21] See recent laws dealing with simplification, like the law n° 2011-525 of May 17, 2011, on simplification and improvement of the quality of right, "de simplification et d'amélioration de la qualité du droit", or the law n° 2020-1525 of December 7, 2020, on the acceleration and simplification of public action, "d'accélération et de simplification de l'action publique".

[22] M. van de Kerchove. "Rien n'est simple. Tout se complique. La complexité, limite à la simplification du droit". In: *Qu'en est-il de la simplification du droit ?* Ed. by F. Rueda and J. Pousson. Toulouse: Presses de l'université de Toulouse 1 Capitole, 2010, pp. 101–118. ISBN: 978-2-36170-005-8

[23] Available on https://ec.europa.eu/info/sites/info/files/annual_burden_survey_2019_4_digital.pdf

[24] Available on https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32016Q0512%2801%29

[25] See Chapter 4 on the Single European Act.

[26] W. Brown. "Legal certainty and competition law: Can they be reconciled?" PhD thesis. 2018

transformations and preservation of industrial heritage[27]. The oil heritage can similarly be preserved, like in Antwerp on the site of 'Petroleum Zuid' where parts of the infrastructure became immovable heritage. Pipelines, houses and warehouses, including remnants of the house of the American Petroleum Company and storage tanks will remain in a project that includes a mix use of urban and commercial uses[28].

But public and private authorities are still considering petroleum activities as an economic asset more than as a potential burden for the future of the city. The Philadelphia Energy Solutions refinery of Philadelphia in the U.S, operated for almost 150 years until a series of explosions and a fire destroyed it on June 21, 2019. Although the company tried for a long time to sell the facility or close it, the pollution of the site prevented any transition as estimations for the cleaning were tremendous on the 1,300 acres site. Thus, the refinery kept operating until the (expected) disaster led the company holding the site to bankruptcy and shut down the facility. Recently bought by a real estate developer to develop a commercial hub, the question of pollution and environmental justice are raised by the neighbors[29]. This process illustrates the challenges around the transformation of such long standing oil sites, heavily polluted and economic supports of cities. Disasters are not only leading legal innovations but can also be awaited by industrial owners to delay as much as possible a costly transformation. This private and short-term way of thinking prevents, however, public authorities to anticipate the closure and plan efficiently the future of the land.

Leading port authorities and organizations understood the importance of anticipation to reach national and European environmental objectives. The port of Rotterdam and the AIVP ('Association Internationale Villes et Ports' or International Association of Cities and Ports) with their respective 'Port Vision Rotterdam' and 'Agenda 2030', implemented anticipation in line with the United Nations Sustainable Development Goals (UN SDGs) and with the Carbon Neutral objective of the European Union by 2050[30]. Authorities of the port of Rotterdam already anticipated which sectors would grow and what would be their need in 1998 with a 'Projections 2020', betting on container, distribution, and chemistry[31]. Though the energy transition and the sustainable development of activities are important parts of the contemporary plans, the two institutions do not focus solely on them. Social, environmental, health, technological and collaborative innovations are also embedded in the documents. Local authorities, international organizations, and non-binding declarations and documents are laying down new opportunities for development by anticipating industrial transformations and needs. Their prospec-

[27] Association des Directeurs Immobiliers. *La reconversion des friches industrielles et urbaines: de la transformation des sites à la mutation des territoires.* Ed. by Le Moniteur. 2015, p. 315

[28] M. Van Dijck. "Beschermingen Petroleum-Zuid in Antwerpen". In: *Agentschap Onroerend Erfgoed* (Mar. 2016)

[29] J. Hurdle. *In a Refinery's Ashes, Hope for an End to Decades of Pollution.* Yale, Jan. 2021. URL: https://e360.yale.edu/features/in-a-refinerys-ashes-hope-for-an-end-to-decades-of-pollution

[30] See the website of the port of Rotterdam on its objectives for 2030 https://www.portofrotterdam.com/en/port-authority/about-the-port-authority/the-port-authority-in-society/rotterdam-port-vision and the agenda of the AIVP https://www.aivpagenda2030.com/

[31] A. Graafland. *Cities in Transition.* 010 Publisher, 2001

tive planning of port spaces and their economic policies are not binding but serve as a support to influence the law-making process. The holistic approach is now the one being favored to tackle the contemporary *Wicked problems* that port and city authorities have to face (energy transition, climate crisis, environmental quality, sustainable growth, environmental justice, etc.), with local and external actors being the motors of spatial and legal innovations.

In Dunkirk and its region, local authorities learned anticipation through the experience of other industries. In the North province of France in which Dunkirk is part, the textile industry is still in the memories of the population and its buildings still part of the city-scape. Public authorities of the European Metropolis of Lille, in a long-standing effort to convert these buildings and land, transformed these facilities into universities, theaters, or even into centers of excellence and innovation dedicated to digital industry like Euratechnologies (Figure6.4). In Dunkirk, a similar phenomenon led to the transformation of the "Halle aux Sucres", a port facility used for the storage of sugar, into a building now hosting the Learning Center "Ville Durable" (sustainable city) and many public institutions, agencies, and associations. These examples highlight the possibilities behind the transformation process of former polluting and important sectors of a region. However, these successes cannot hide other cases in which citizens are still waiting for the transformation of former industrial sites. Over twenty years after the closing of facilities, many buildings related to textile activities (and their pollution) remain abandoned in the middle of contemporary cities, waiting for the implementation of projects[32]. This case is an illustration of the burden that oil facilities will be on port authorities plans if they do not anticipate the end of their activities.

In the specific case of Dunkirk, public and private authorities in the port anticipated the transformation of oil sites. On the one hand, the refinery of Total stopped its refining activities in 2010 and was transformed it into a training school and an oil depot, with a new facility dedicated to the second generation of bio-fuels nearby. On the other hand, the former refinery of BP, eventually called SRD (Société de la Raffinerie de Dunkerque), definitely closed in 2016. Its demolition and cleaning started a few years later and are supposed to end in 2021 to host new activities. These sites being on the territory of the port and managed by port authorities rather than within the urban area facilitated an already complex transition[33]. The land management purpose of the port authority, enacted in 2008, as well as the gradual inclusion of local authorities and actors in the decision-making, participated in these swift transitions[34].

In the port area of Dunkirk, the housing district “Cité des Ingénieurs” together with the former BP refinery, have now disappeared from the landscape. The future will tell the efficiency of the new practices it applied to demolish and clean the site and to what extent

[32] See, for instance, the former wool factory of Roubaix, “La Lainière de Roubaix”, closed in 2000, and progressively demolished since 2009, while still waiting for a new activity.

[33] The pollution of the soil, the kilometers of pipes, as well as the dangerous materials and potential bombs from the two World Wars made this cleaning procedure a work of precision and prevention.

[34] S. Hauser. “The Interplay of Economic Development and Environmental Protection: Dunkirk and the Search for Balance”. In: *PORTUSplus* 8.0 (2019)

Figure 6.4: The site Euratechnologies of Lille Lomme. Picture from: Velvet, CC BY-SA 3.0, via Wikimedia Commons.

the cleaning of the soil was carried out. The cleaning, though still necessary considering the pollution caused by the oil industry, just has to be compatible with the future use of the site[35]. Here, new industrial activities do not need a more complete and thorough cleaning procedure than what a housing transformation would require[36]. But the demolition also meant the loss of this heritage and the long history of oil in Dunkirk for the citizens, as nothing will remain from the former refining site.

Students took part in the debate around the transformation of oil sites in Dunkirk to anticipate the unique challenges and highlight the importance of the discussion. The studios 'Beyond Oil' from the faculty of Architecture at TU Delft, organized in collaboration with the Learning Center of Dunkirk participated in this debate in 2018 and 2019. Instead of being included in the decision-making process of the transformation of former oil sites, Master students in architecture came up as innovative designers and used

[35] It is a general rule for the last user of the land when the facility was classified for the protection of the environment. See: C. Restrepo and C. Delavenne. "Sols pollués et potentiellement pollués: transférer l'obligation de remise en état". In: *lemoniteur.fr* (2016)

[36] The general rule is the compatibility of the soil with the future use of the land and in economically acceptable conditions. See the article L556-1 of the French Environmental Code. Available: https://www.legifrance.gouv.fr/affichCodeArticle.do?cidTexte=LEGITEXT000006074220&idArticle=LEGIARTI000023687440&dateTexte=&categorieLien=cid

Dunkirk as a laboratory of ideas to renew abandoned and polluted industrial sites in the port city[37]. Local and national, as well as public and private authorities, together with students, are taking Dunkirk as an experimental ground to develop an innovation and energy hub, away from fossil fuels[38].

The creation and modification of legal planning documents or strategies for public authorities of port cities is a long and difficult process. Thus, these documents are also attempts at foreseeing the future by determining the needs of inhabitants, economic investors and public authorities for the following decade(s). In industrial cities, safety and environmental measures around factories prevent great patches of land to be freely used or transformed. Thus, when the stopping of industrial activities occur suddenly, not only do the use of these patches needs to be investigated but the transformation of the industrial complex that shut down becomes a new subject to take into consideration, with all its issues (pollution, transformation, economic loss, etc.). In France, regulations brought more clarity especially over polluting sites and the liabilities in case of pollution[39]. Bringing anticipation in the making of these local spatial plans and strategies will also bring flexibility to the document to adapt to the situation, time for innovative approaches, and prevent the long abandonment of a significant amount of space and buildings. This inclusion of preemptive actions in local planning policies has to go hand in hand with clearer rules defining the liabilities of companies that used the land and the competencies of all public actors. Local authorities of port and industrial cities can then significantly reduce, if not avoid, the detrimental impacts of abandoned industrial sites both on their attractiveness and economic life.

6.2.2. THE EUROPEAN NEUTRALITY OBJECTIVE

THE first "climate law" of the EU, as referred to by the European Commission[40], was meant to emerge with a proposal scheduled in March 2020[41]. Though following and

[37] The work was exhibited in the Learning Center of Dunkirk during the first half of 2019: "Or Noir: Ruée, Marée, Virage". See also: C. Hein and P. De Martino. "Designing post-carbon Dunkirk with the students from TU Delft". In: *The Beam* (Feb. 2018). URL: https://medium.com/thebeammagazine/designing-post-carbon-dunkirk-with-the-students-from-tu-delft-28f44c40d761; C. Hein. "Sustainable Architecture: Building the future Dunkirk". In: *The Beam* (June 2019). URL: https://medium.com/thebeammagazine/designing-post-carbon-dunkirk-with-students-from-tu-delft-531c770a8939

[38] Like the Horizon 2020 carbon capture project, or 3D project, launched by a consortium of 11 European actors, among which Total is part, to build an industrial unit of carbon capture in Dunkirk. See on the website of the European Commission: https://cordis.europa.eu/project/id/838031

[39] See the law n° 2014-366, of March 24, 2014 for access to housing and renovated town planning, "pour l'accès au logement et un urbanisme rénové" or "ALUR", with better information available for the public, and making the former owner or producer of the pollution liable.

[40] See the website of the European Commission on the "European Climate Law": https://ec.europa.eu/clima/policies/eu-climate-action/law_en

[41] The agenda was set in the communication on the European Green Deal published on December 11, 2019, "Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions. The European Green Deal, COM/2019/640 final". Available online: https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1588580774040&uri=CELEX%3A52019DC0640,

deepening the objectives set by the "2020 Climate & Energy Package"[42], the communication of December 2019 acknowledged the complexity of existing legal frameworks, the need for better liabilities and legal certainty. However, European authorities ignored the importance of ports in this transition process, as they appeared only once in the text[43]. The Covid pandemic of 2020 did not delay the process, with a proposal being published in March 2020[44], and amended in September 2020 to include a more ambitious reduction of EU emission of 55% by 2030[45]. But the priority given to the sanitary answer and the economic renewal by national and European authorities prevented (so far) the law from going further in the legislative process.

Regarding the simplification process of legal systems, some progress has been done on the European level since 2012 with a better monitoring around the creation of rules. One of the monitoring tools is REFIT, the European Commission's regulatory fitness and performance programme, which "aims to ensure that EU laws deliver on their objectives at a minimum cost for the benefit of citizens and businesses"[46]. Public authorities in Europe acknowledged the importance to simplify their multi-layered and overlapping legal systems, though the main aim is to facilitate the work of businesses more than anything else[47]. To improve the transparency and the participation of the public, the mechanism is open to citizens' and stakeholders' inputs to highlight complexities and suggest modifications of rules. Though taking place only recently, the efforts put by national and European authorities towards simplifying legal texts and systems is an undeniable recognition of the importance to take regulations into consideration to achieve the energy transition and reach environmental objectives on the continent[48].

The importance of efficient and harmonized regulations at all levels is of prior importance in tackling greenhouse gas emissions. For instance, this influence of oil companies over decision-makers and policies could be at the origin of the wrong assessment of their actual weight on their greenhouse gas emissions. Researchers recently showed that the

[42] A set of rules created in 2007 and fixing key targets to reduce greenhouse gas emissions, promote renewable energy, and improve energy efficiency. See: https://ec.europa.eu/clima/policies/strategies/2020_en

[43] S. Hauser. *The European Green Deal: New Opportunities for Port Cities?* 2020. URL: https://www.portcityfutures.nl/news/the-european-green-deal-new-opportunities-for-port-cities

[44] Proposal for a regulation of the European Parliament and of the Council establishing the framework for achieving climate neutrality and amending Regulation (EU) 2018/1999 (European Climate Law), COM/2020/80 final. Available online: https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1588581905912&uri=CELEX:52020PC0080

[45] Amended proposal for a regulation of the European Parliament and of the Council on establishing the framework for achieving climate neutrality and amending Regulation (EU) 2018/1999 (European Climate Law), COM(2020) 563 final. Available online: https://data.consilium.europa.eu/doc/document/ST-10868-2020-INIT/en/pdf

[46] See the webpage of the European Commission on the REFIT programme https://ec.europa.eu/info/law/law-making-process/evaluating-and-improving-existing-laws/refit-making-eu-law-simpler-less-costly-and-future-proof

[47] The previous link on the explanation of the REFIT programme from the European Commission's website clearly highlight this aim: "Small and medium sized enterprises - representing 99% of all businesses in the EU - benefit particularly from REFIT as they can be particularly affected by burdens and complexity of the rules".

[48] In France, since 2017, there is a rule of one regulatory decree created by the government for two removed

share of oil companies in the production of methane was 25 to 40% higher than what advertised on official statistics[49]. Thus, air quality policies and rules on industrial emissions are of paramount importance when knowing that methane has an atmospheric lifetime of around 12 years and a 20-year global warming potential of 84[50]. So with efficient and binding constraints on methane emissions from industries and oil industry in particular, public authorities can properly mitigate the effects of greenhouse gas emissions within two decades considering the lifetime of methane in the atmosphere[51].

In petroleum clusters like Rotterdam, public and private actors investigate innovative ideas to reduce the impact of their greenhouse gas and polluting emissions. Stakeholders from industries and port authorities in Rotterdam consider the upgrading of refineries with the use of hydrogen produced from renewable energies as one solution to achieve "a more sustainable fuel production"[52]. Although this innovation would reduce the emissions of refineries in the area, the activity remains highly polluting and its output would still be petroleum products. The idea is gaining momentum with Shell's plan to build by 2023 a hydrogen plant in Maasvlakte 2 to transport is through pipelines to its refinery in Pernis. The project includes the construction of a 2GW offshore wind farm to provide the electricity for the production of hydrogen[53]. These projects confirm the place of Rotterdam as one of the last standing place in Western Europe for refining activities, and the will of public and private authorities to maintain this position as long as possible. Upgrading oil refineries is no transition as oil will keep on being extracted by oil companies to produce, among others, fossil fuels. The process becomes indeed more sustainable (in time) but not ecologically or environmentally. The turn that private and public actors are taking towards LNG is, even if less polluting, still related to oil exploration and exploitation techniques, while its great need for space participate in the artificialization of natural lands in coastal areas. But public authorities are slowly considering the end of financial and political supports to oil activities with, for instance, the European Investment Bank proposing to stop its fossil-fuels lending by the end of 2020[54]. Though delayed through the lobbying of companies and countries, this proposal constitutes a step forward and a public acknowledgment of the "dying" oil industry in Europe.

[49] B. Hmiel *et al.* "Preindustrial 14 CH 4 indicates greater anthropogenic fossil CH 4 emissions". In: *Nature* 578.7795 (2020), pp. 409–412. ISSN: 1476-4687

[50] This global warming potential is an indicator of the heat absorption potential of a gas in the atmosphere, CO2 being the reference with a value of 1. In other words, it means that 1 ton of methane corresponds to the effect that 84 tonnes of CO2 would have in the atmosphere. See G. Myhre *et al.* "Chapter 8: Anthropogenic and Natural Radiative Forcing". In: *Climate Change 2013: The Physical Science Basis* (2014)

[51] J. Watts. *Oil and gas firms 'have had far worse climate impact than thought'*. Feb. 2020. URL: https://www.theguardian.com/environment/2020/feb/19/oil-gas-industry-far-worse-climate-impact-than-thought-fossil-fuels-methane

[52] Port of Rotterdam. *Research into the use of green hydrogen in refinery process*. 2017. URL: https://www.portofrotterdam.com/en/news-and-press-releases/research-into-the-use-of-green-hydrogen-in-refinery-process

[53] Port of Rotterdam. *Rotterdam boosts hydrogen economy with new infrastructure*. 2020. URL: https://www.portofrotterdam.com/en/news-and-press-releases/rotterdam-boosts-hydrogen-economy-with-new-infrastructure

[54] J. Ekblom. *European Investment Bank postpones decision on fossil fuel lending*. Oct. 2019. URL: https://www.reuters.com/article/us-europe-eib-fossilfuels/european-investment-bank-postpones-decision-on-fossil-fuel-lending-idUSKBN1WU1PI

In the communications of the European Commission around the environmental theme, its neutrality objective goes hand in hand with the notion of environmental justice. The aim of the Commission is to prevent the abandonment of communities and countries relying on or affected by fossil fuels activities on the side of the energy transition. This notion of environmental justice goes together, and among others, with a need for legal improvements in order to prevent 'Big Oil' from avoiding its responsibilities in the cleaning and transformation of its former oil sites, on land or at sea. With the SRD refinery of Dunkirk, BP, Total and ExxonMobil were parties in its functioning, yet after buying it in 2010 Colas had to close in 2016 and clean it almost by itself. This procedure of the last owner paying rather than a ratio based on the occupation time of companies defies the principle of polluter-pays and is a protecting frame for former oil industries. Such a mechanism goes against the notion of environmental justice considering the origin of the pollution. It provides ways out for polluting companies when the time comes to deal with their pollution[55].

Many actors, including politicians and NGOs, saw the Covid pandemic of 2020 as an opportunity to push for a greener and more sustainable (re)development for the post-covid period. Many of these actors pleaded for including constraining environmental rules and objectives in the financial help that governments provided to companies. However, the recovery packages and other financial plans helping the economic sectors, on both national and European scales, did not implement the ideas wished by many actors, including some stakeholders behind the creation of such plans like the members of the European Commission and Parliament. Yet, to achieve the environmental pledges made by national and European decision-makers, legal documents and strategies need to include more anticipation and innovation. The success of future policies must not only rely on technological breakthroughs but also on planning, legal and political solutions, as well as on a better knowledge of port cities' history and developments. It is in the interest of all levels, from local to international, to prevent long standing polluted and abandoned sites while realizing carbon neutrality. Oil infrastructure in port areas will become a burden for authorities if their transformation is not anticipated in local, regional, and national policies. The anticipation of industrial activities' end in port areas can prevent the long abandonment of large and polluted areas in port territories that could hamper the economic renewal of the port. Public authorities lack, in the design of their legal texts, of precision to define clear liabilities and on the importance to tackle issues related to the industrial heritage. The fair transition discussed in European texts preceding the pandemic must come back to life and the Commission must strengthen it, otherwise parts of the European population will lag behind in the transition process and slow down the continental effort o achieve the energy transition. The development of more stringent rules to individual's behaviors by public authorities was to protect people, thus stricter rules protecting the environment can follow the same logic as it will serve the future of populations:

> It appears to us that despite its 'coercive' aspect, a more restrictive legisla-

[55] See, among others, article L541-2 and following of the French environmental code; See also P. Billet. *La réhabilitation des sites pollués en droit publics: certitudes sur quelques incertitudes.* L'Harmattan, 2018

> tive development as regards the prohibition of behavior 'contrary to life' would ultimately tend towards increased freedom. By prohibiting fatal excess, these are all paths of enrichment and appeasement that will open up. Prohibiting a man from driving while drunk restricts his freedom for the moment, but opens up the possibility of a future. It's time to stop us from driving the world in an eco-drunken state. The ban can take a form of 'soft dissuasive', for example with crippling taxes, but we must be careful that the right to pollute does not become a simple question of the level of wealth. [...] If nothing is done, we will suffer considerable deprivation of liberty due to the collapse. It seems obvious to me that small imposed efforts to prevent this catastrophe are actually working in the direction of freedom. And I suppose that when a new relation to reality becomes evident, the legislative dimension will no longer be necessary.[56].

Port authorities are already acting together towards less polluting practices, sometimes going beyond what laws and policies recommend. In Dunkirk it happened through multiple innovations to reduce wastes and emissions:

- the "Report Modal" with which over 70% of the goods are being transported by rails or boats to reduce truck traffic in and around the city.
- the creation of the "Toile Industrielle" or industrial web, to illustrate, coordinate and anticipate industrial activities and inter-dependencies in Dunkirk and beyond (Figure6.5). The waste or heat produced by one site is a material for the production of another site, thus improving circularity and creating an 'industrial ecosystem'[57].
- the growing use of cold ironing to provide electricity to the ships at berth in the port of Dunkirk in order to reduce air pollution in the region. Rotterdam and Antwerp are also increasingly implementing this technology, though globally beneficial only if the electricity is produced from renewable sources.

6.3. PORT CITY FUTURES

RESEARCH and collaborations around topics related to port cities and the environmental theme recently gained momentum. Scholars, professionals and public actors acknowledged together the economic, social, cultural and environmental importance of port cities and their regions. Their collaborative work led to the creation of networks and organizations aiming at improving the governance, spatial planning and adaptability of port cities to developing economic, technological and climate challenges.

[56] A. Barrau. *Le plus grand défi de l'histoire de l'humanité.* 2019

[57] For instance, the heat produced by the nuclear power plant of Gravelines is used in the process of the LNG Terminal of Dunkirk to transform the liquid into gas again before distribution. See O. Dufourg. *Loon-Plage: une sacrée canalisation entre le terminal méthanier et la centrale nucléaire...* July 2016. URL: https://www.lavoixdunord.fr/20801/article/2016-07-07/loon-plage-une-sacree-canalisation-entre-le-terminal-methanier-et-la-centrale

Figure 6.5: The "Toile Industrielle", illustrating the relationships between industrial sites. A work of Jean-François Vereecke, CC BY-SA 4.0, https://creativecommons.org/licenses/by-sa/4.0, via Wikimedia Commons.

The multiplicity and complexity of port cities' issues relates perfectly to the *Wicked Problems* of Churchman, thus requiring this pool of expertise from many fields[58]. The development, through these collaborations, of a holistic approach in which the entire issue is more than just the sum of individual problems is key to safer and more efficient planning strategies in port cities. If solving one problem will lead to the creation of another one, the only solution is to consider as many problems as possible together, most of them being linked to each other.

The growing inclusion of actors in the decision-making process of port authorities is a step forward in this holistic approach. But it must go together with a better consideration for the multiplicity of subjects that a port city transition implies. The sometimes conflicting relationships within port cities in using land and water push authorities to consider new uses and designs for these areas on a regional scale. The title of this section is a clear reference to the initiative of the Leiden-Delft-Erasmus collaboration called 'PortCityFutures' gathering scholars and professionals to reflect on the future of this im-

[58] C. W. Churchman. "Guest editorial: Wicked problems". In: (1967)

portant territory[59].

6.3.1. TOWARDS MULTI/INTER/TRANS-DISCIPLINARY SOLUTIONS

THE terms multi-, inter-, and transdisciplinarity are often used in the literature and in contemporary research to develop inclusive approaches and solve current planning or governance issues. However, confusions remain on their definitions and use:

- Multidisciplinarity refers to a collaboration of people from different fields investigating a problem from their own perspective and knowledge to produce a synthesis of their individual conclusions.
- Interdisciplinarity defines a situation where these same people are comparing their results and informing each other to create a combined result. However, the members of the team remain fairly limited to their field of expertise.
- Transdisciplinarity is a research method in which people go beyond or out of their knowledge to truly understand the full extent of a problem and its complexity rather than considering only parts of it. The sharing of knowledge is an important part of the process, and can lead to the creation of a new 'intellectual space'[60].

A member of the PortCityFutures group, the human geographer Sarah Hinman, made an interesting analogy to easily remember the differences between those terms. During a meeting, the researcher referred to the fruit salad, describing multidisciplinarity as a table with many bowls, each filled with one specific fruit, interdisciplinarity as a big bowl with pieces of many fruits together, and the transdisciplinarity as a blended juice of all the fruits to create something new where all tastes and colors merge into one thing. The creation of a new field to tackle the complexity of port cities' challenges is a long and difficult but necessary process, where experts need to go beyond their comfort zone to efficiently exchange with other disciplines and learn new approaches. *Wicked Problems* cannot be solved through individual perspectives as port cities' planning often relate to multiple fields such as law, economy, sociology, urban planning, health, risk management etc.

Recent funding programs of the European Union to develop innovative solutions, like the European H2020 and its following version Horizon Europe[61], request this holistic approach. The calls are now requiring the inclusion of many different fields and expertise, not only in research but also in practice to get access to the fund and develop novel approaches to current social, technological and economic problems. Stakeholders in education and research also acknowledged this need for a diversity of approaches by hiring people outside of the classic range of their faculties. This research in history and urban

[59] See the website of the PortCityFutures initiative: https://www.portcityfutures.nl/home

[60] S. L. T. McGregor. "The nature of transdisciplinary research and practice". In: *Kappa Omicron Nu human sciences working paper series* (2004); D. L. Schmalz, M. C. Janke, and L. L. Payne. "Multi-, inter-, and transdisciplinary research: Leisure studies past, present, and future". In: *Journal of Leisure Research* 51.5 (2019), pp. 511–516

[61] See the webpage of the European Commission website on the subject: https://ec.europa.eu/info/horizon-europe

planning in a faculty of architecture and led by a researcher from a legal background is an example of this new trend.

This research proves the great importance of inter- and transdisciplinary approaches, while illustrating the significance of history and laws in facing contemporary challenges. When dealing with urban and spatial planning strategies, these two fields are often neglected by both private and public authorities as well as by researchers. The UN SDGs are clearly referring to transdisciplinarity with, for instance, the 11th goal "Make cities and human settlements inclusive, safe, resilient and sustainable" or the 13th goal "Take urgent action to combat climate change and its impacts"[62]. These goals do not relate only to urban planning or environmental science respectively, but to a wide range of disciplines. The historical and legal fields are part of it, and must be included in the new 'salad' or 'juice' to transcend the segmented thinking, which creates more problems than it solves. Inter- and transdisciplinary approaches showed the limits of this previous mechanism if their concepts are not sidelined by "hard" disciplines such as physics and chemistry[63]. These approaches are best suited to match the complexity of contemporary issues in industrial port cities and explain how the past shaped the present. The aim is to positively influence future planning strategies of port cities and the creation of regulations affecting them through a shared knowledge and the creation of new bridges between fields[64].

6.3.2. NETWORKS AND EXCHANGES

INITIATIVES bolstering the networking of port and cities actors, together with including citizens, proved the efficiency of the process. The AIVP illustrate the movement with its creation in 1988 going together with the beginning of containerization in maritime shipping. Since then the organization grew to become a leading actor in the transformation of port and city's relationships, sometimes following political events[65], sometimes being precursors in the development of future policies[66]. By making scholars work together with local authorities and private actors, exchanging on their knowledge and practices, such organizations are supporting the creation of innovative solutions through the use of inter- and transdisciplinary approaches. The expansion of Learning Centers in port cities around the world is an acknowledgment of the positive effect the inclusion of the public and the advertisement of port activities produce on port management. "If people have a voice in the making of the regulations which affect them, they are more able to understand and accept law"[67].

[62] See the website of the United Nations on sustainable development: https://sdgs.un.org/goals

[63] J. T. Klein. "Prospects for transdisciplinarity". In: *Futures* 36.4 (2004), pp. 515–526. ISSN: 0016-3287

[64] G. del Cerro Santamaria. "Rapid Urbanization, Ecology and Sustainability. The Need for a Broad Strategy, Holism and Transdisciplinarity". In: *Transdisciplinary Journal of Engineering and Science* (2019)

[65] Like the Montreal Charter of 1993 following the Rio Earth Summit of 1992.

[66] With, for instance, the creation of 'Port Center by AIVP' in 2010 and the creation of Dunkirk's port center in 2018.

[67] Cited in T. Mitchell. *Carbon Democracy.* Verso Books, 2013 from L. Cohen. *Making a new deal: Industrial workers in Chicago, 1919-1939.* Cambridge University Press, 1990. ISBN: 0521428386

The importance of networks to answer contemporary challenges echoes the rise of Rockefeller at the beginning of the oil industry. Similarly to his network of influence to secure the sustainability of his business, port cities' actors must learn to use networks and each other's experience to transfer and improve best practices in port city planning. The 'Toile Industrielle' discussed in the previous section demonstrate the use of networking in port areas to optimize the use of resources. This web also improves economic and political strategies as actors can see the implication of their decisions over one site on the entire 'industrial ecosystem'. The creation of networks brings anticipation into the design of future planning documents and economic strategies.

The constellation of actors involved in the decision-making of port cities' strategies must also be represented in research activities. Conferences, scientific events, and research projects need more representative of the private sector and of public authorities to provide more grounded perspectives. Explanations on their practices, what is possible and impossible is a valuable asset to consider in the design of research projects and innovations. European funding programs understood the value of this approach and promote it in their calls and attributions. Such collaborations have proved their use in creating visions for the future and discuss issues created in each scenario that their debate created[68].

6.4. CONCLUSION

To refer to the first sentence of the introduction, there is a widespread quote in the oil debate saying that "the Stone Age did not end for lack of stone, and the Oil Age will end long before the world runs out of oil". Many people working in the oil sector used this sentence to explain that oil dependency does not rely on world's oil supply, like the minister of oil for Saudi Arabia between 1962 and 1986 Ahmed Zaki Yamani, or Don Huberts when he was head of Shell Hydrogen in an article of The Economist in 1999[69]. Behind this formulation, one could understand that social and political behaviors or pressures are the driving forces behind oil's industry might. This assumption would lead to the oblivion of more than a century and a half of oil companies' development and control over social and political conducts that created the contemporary dependence of the world to petroleum products. A solid domination that remains today and hampers the energy transition in its technological, political, economic, and legal aspects.

Many governments and parliaments in Europe recently declared a climate emergency to urge private and public decision-makers to act towards reducing greenhouse gas emissions[70]. These commitments remain, however, political declarations, lacking efficient

[68] See the value deliberation toolbox designed through an international conference on port-city cultures and based on scenarios for Rotterdam: https://www.delftdesignforvalues.nl/projects/value-deliberations-energy-transition-port-city-cultures/

[69] The Economist. *Fuel cells meet big business.* Reykjavik, July 1999. URL: https://www.economist.com/business/1999/07/22/fuel-cells-meet-big-business

[70] The French parliament included in a law the ecological emergency and the climate crisis (law n° 2019-1147, November 8, 2019, on the energy and the climate) and currently discusses a bill on the fight against cli-

and concrete actions, and waiting for legal support and financial means. The European climate law discussed previously or the French bill on the fight against climate change and strengthening resilience to its effects[71] exemplify the weak translation of political declarations in regulations. Many scientists, like the French astrophysicist Aurélien Barrau, now defend the need for strict measures to face this acknowledged climate crisis and the national and international objectives of carbon neutrality. One of the major recommendations is to stop the exploitation of oil fields, discovered or not, and let the oil in the ground. This led to the movement "Keep It In The Ground", taken up by associations and citizens across the world[72], to stop fossil fuels' developments and incentives, and forbid all new oil explorations and exploitation. Some governments, like the French one, have acknowledged this need, and have forbidden all new explorations and exploitation of oil fields[73]. But even this law does not prevent the French oil major Total[74] to discover and exploit new fields in foreign countries. Traditional oil companies are fighting against this movement to prevent such commitments from governments. Abandoning exploration and exploitation of oil fields would mean bankruptcy for oil companies as their assets are including this oil still in the ground[75]. That is in part what happened after the Covid crisis with its consequences on oil prices, and with oil companies' assets being reevaluated[76]. The pressure of institutions and citizens to achieve the energy transition, must push national and institutional incentives for oil activities to end and be redirected towards the development of alternative energies.

Many European oil companies understood that their public support was fading, thus forcing them to change their strategies. European oil companies, as opposed to American ones, are now cutting ties with powerful lobby groups that support rollbacks of regulations on environmental subjects. They now constantly invest more into diversify-

mate change and the strengthening of resilience in the face of its effects, "projet de loi portant lutte contre le dérèglement climatique et le renforcement de la résilience face à ses effets"; the European Parliament declared the climate emergency on November 28, 2019 (European Parliament resolution of 28 November 2019 on the climate and environment emergency (2019/2930(RSP))). Many other countries within Europe and beyond also declared a climate emergency with, for instance, Canada, Austria, Ireland, and Japan.

[71] The French bill on the fight against climate change and strengthening resilience to its effects is meant to drastically reduce greenhouse gas emissions in France, in line with a better social justice. However, both the "Conseil économique, social et environnemental" (CESE) and the "Haut Conseil pour le Climat" (HCC), two public council advising the government on its policies, concluded that the propositions will have a limited impact compared to the national aim of GHG reductions. See for the CESE: https://www.lecese.fr/. See for the HCC: https://www.hautconseilclimat.fr/

[72] See Greenpeace webpage https://www.greenpeace.org/usa/issues/keep-it-in-the-ground/ or the KeepItInTheGround call of hundreds associations across the globe on the webpage http://keepitintheground.org/

[73] The French government recently banned any new exploration and exploitation of oil fields on its territory, see the law n° 2017-1839 of December 30, 2017 putting an end to the exploration and exploitation of hydrocarbons and laying down various provisions relating to energy and the environment, "mettant fin à la recherche ainsi qu'à l'exploitation des hydrocarbures et portant diverses dispositions relatives à l'énergie et à l'environnement". See L. Bordereaux and C. Roche. "Littoral et milieux marins". In: *Revue juridique de lenvironnement* 43.2 (2018), pp. 389–408

[74] Now called TotalEnergies since 2021 to advertise its turn towards other energies.

[75] A. Barrau. *Le plus grand défi de l'histoire de l'humanité.* 2019

[76] J. Ambrose. *Seven top oil firms downgrade assets by 87bn dollars in nine months.* Ed. by The Guardian. 2020. URL: https://www.theguardian.com/business/2020/aug/14/seven-top-oil-firms-downgrade-assets-by-87bn-in-nine-months

ing their activities, especially towards renewable energies[77]. Though encouraging, these actions cannot hide their continuous lobbying and investments to protect petroleum activities, as well as their responsibility for climate change and global warming, regularly highlighted throughout this document. Their impacts on port cities' past, present, and future developments remain determinant and influenced the life of many citizens. Their past activities and responsibilities in polluting a significant amount of land are still threats to the health of port cities' inhabitants. These past activities also led to changes in the climate, which became an additional planning challenge for port city authorities to deal with. Oil companies in Europe are anticipating the progressive end of their business-as-usual activities. This shift in their strategy must push port and port cities' authorities, as well as national governments, to act accordingly and anticipate the potential closure of industrial facilities and the transformation of oil sites. The sudden and unplanned closure of the two refineries of Dunkirk illustrate this need to avoid a longer transformation process or the abandonment of polluted sites in the territory of port cities.

The complexity of the current situation, inherited from past behaviors, actions, and events, is undeniable. The transformation of these sites is still uncertain and affects port cities in diverse ways, creating economic, social, political, legal, health, and environmental issues. In order to adequately answer the challenges of the energy transition, private and public actors, local, national, European, and international, must consider new, holistic, and anticipative approaches. Partnerships and exchanges between professional and academics across all disciplines, including local, institutional, and political actors, must become the norm when planning for the future of port cities, the transformation of their industrial heritage, and to efficiently plan the energy transition.

[77] C. Krauss. *U.S. and European Oil Giants Go Different Ways on Climate Change.* Dec. 2020. URL: https://www.nytimes.com/2020/09/21/business/energy-environment/oil-climate-change-us-europe.html; R. Bousso. *France's Total quits top U.S. oil lobby in climate split.* Jan. 2021. URL: https://www.reuters.com/article/us-total-api-idUSKBN29K1LM

7

Epilogue

We live in a world in which a tree is worth more financially dead than alive. In a world in which a whale is worth more dead than alive. For so long as our economy works in that way and corporations go unregulated they are going to continue to destroy trees, to kill whales, to mine the earth and to continue to pull oil out of the ground even though we know that this is destroying the planet, and we know it is going to leave a worse world for future generations. This is short-term thinking based on this religion of profit at all cost as if somehow magically each corporation acting in itself's interest is going to produce the best result. This has been a fact in the environment for a long time. What's frightening and what's hopefully the last straw that will make us wake up as a civilization to how flawed this theory has been in the first place is to see that now we are the tree, we are the whale, our attention can be mined. We are more profitable to a corporation if we are spending time staring at a screen, staring at an ad, and if we are spending our life in a rich way, and so we are seeing the results of that. We are seeing corporations using powerful artificial intelligence to outsmart us and figure out how to pull our attention to things they want us to look at rather than the things that are the most consistent with our goals, and our values and our lives.

Justin Rosenstein,
software programmer who worked for Google and Facebook, in the movie by Jeff Orlowski, "The Social Dilemma".

THE aim of this research is to show the influence of the oil industry and its actors on the development and shaping of port cities. This control is the result of the power of oil companies on hidden designers: regulations linked to spatial planning, and the protection of the environment and health. Taking Dunkirk as the main example, the objective is also to demonstrate the hindering weight of oil companies on rules and policies linked to the energy transition, and the constant up-scaling of their disastrous activities on natural environments. Their historical development and practices led to the creation of obstacles in contemporary and future planning strategies. The example of Dunkirk demonstrate how past activities can still pollute a city and threaten the health of its inhabitants (Figure6.3)[1]. The trans-disciplinary approach used to illustrate and explain this perspective aims at combining legal, historical, environmental, and urban planning knowledge altogether. Authors widely discuss the oil adventure, its narrative, steps, and how it shaped the present, especially through the lenses of economy, history, and political science[2]. Yet, the long-term consequences of a free and powerful oil lobby on the creation and application of regulations, the shaping of port cities through these regulations they influenced and the current, as well as future, impacts on the environment and energy transition issue remain mostly ignored. This situation is also due to the inaccessibility of legal documents for uninitiated people, as texts are complex, heavily written, and making a colossal amount of connections between each other.

This research develops perspectives on spatial planning, and environmental and health protection beyond the exclusive legal perspective. To refer back to the analysis of references from Scopus discussed in the introduction (Figure1.2), another objective of this research is to attract the attention of researchers on the imbalance, in the literature, between topics linked to development of port and cities, and those discussing their future planning and industrial transformations. The aspiration is to push public and local decision-makers to design consistent and holistic policies that deal with the energy transition in its entirety rather than in its individual impacts. Thus, rules need to be clear with defined and applicable objectives, while their creation includes a diversity of actors and excludes conflict of interest. This multiplicity of views on the same problem will bring the much needed anticipation in spatial management plans to deal with contemporary challenges linked to climate change, global warming, pollution, and the energy transition in all its aspects. The combination of historical, spatial, and legal analysis throughout this document and based on Dunkirk aims at demonstrating the possibilities enabled by inter- or trans-disciplinary perspectives to improve the coherence of land uses and spatial strategies.

The oil industry and its disasters were not the first to influence the shape of cities nor the creation or application of regulations (Chapter3). But oil companies' wealth, influence, and economic prosperity prevented, before the Second World War, the emergence

[1] S. J. Hauser. "Long Live the Heritage of Petroleum: Discoveries of Former Oil Sites in the Port City of Dunkirk". In: *Urban Science* 4.2 (2020), p. 22

[2] D. Yergin. *The prize: The epic quest for oil, money & power.* Simon and Schuster, 2011; T. Mitchell. *Carbon Democracy.* Verso Books, 2013; S. Alexander. *The new economics of oil.* Melbourne Sustainable Society Institute, the University of Melbourne, 2014; C. Hein. "Refineries (Oil)". In: *The Encyclopedia of Greater Philadelphia* (2016)

of any strict frame to regulate their location, safety, environmental impacts or political influence. Despite all the oil-related disasters that affected port cities like Dunkirk, the settlement of industrial sites further away from urban areas into dedicated port zones was not driven by safety or health concerns. This improvement of inhabitants' security was also not the fact of improved legal enforcement but rather caused by the search for better economic efficiency through greater infrastructure and networks in ports. The Freycinet plan of 1878 was a support to industrial activity and development before being a spatial planning strategy in Dunkirk. Disasters only led, one after the other, to slow reactive improvements around petroleum sites and the planning of surrounding districts. However, reactions from national law-makers or local public authorities were sometimes missing, like in Dunkirk, where the first and determinant factor dividing the port and the city was the implementation of the Freycinet plan to improve the industrial efficiency of French port cities. Following oil disasters demonstrated the lack of constraining measures towards the oil industry and of consideration for its immediate surroundings. This absence of strict legal constraints on industrial activities showed early on the important role of regulations in the spatial planning of urban areas. It also demonstrated the deep link between private companies and public authorities highlighted in Barkan's book "Corporate Sovereignty" in 2013. To tackle failing legal frameworks, one must understand industrial actors or companies and law-makers as one system from which both entities share benefits. This intertwined relationship was demonstrated since the end of the 18th century with Chaptal (Chapter3), and again a few years ago with declarations from Total's officials (Chapter5)[3].

The air and water pollution linked to industrial development before the 1970s led to the rise of the environmentalism movement internationally at the end of the 20th century (Chapter4). With the Earth Summit of Stockholm in 1972, new environmental principles and trends in policy-making emerged. However, the two consecutive oil shocks of 1973 and 1979 reminded law-makers and citizens of the tremendous importance and dependence they had towards this resource. These events, combined with the end of the economic and full-employment dream of the Glorious Thirties, led governments to prioritize economic growth and to protect strategic oil companies. This refers back to the book of Tucker published in 2013, which explains that companies and governments often minimize the impacts of industrial disasters because of the detrimental effects it can have on industries and on the economy of the region[4]. It is a mutual relationship where industries benefit from an absence of accountability after disasters, while governments protect their employment rates and economic context. Put in parallel with Barkan's book of the same year describing the need to approach industrial power and political sovereignty as one topic, the continuous support of public authorities towards industrial activities becomes evident[5]. Though emerging with the support of local and national governments, industrial actors like oil companies overcame the hierarchical situation through regular adaptions and evolution to intervene directly in the law-making

[3] J. Barkan. *Corporate sovereignty: Law and government under capitalism.* U of Minnesota Press, 2013. ISBN: 0816686491

[4] E. Tucker. *Working disasters: the politics of recognition and response.* Routledge, 2016. ISBN: 1351840541

[5] J. Barkan. *Corporate sovereignty: Law and government under capitalism.* U of Minnesota Press, 2013. ISBN: 0816686491

process. Yet, at the same time and before everyone else in the 1980s, the oil industry realized the implications of its activities on the environment and the global climate more accurately. Instead of acting to prevent further damages, oil actors kept on influencing policies to protect their business-as-usual practices, so long as the public did not firmly believe it. Oil companies stepped up their lobbying following the rise of environmental concerns, and used greenwashing to divert the attention of the population and avoid liabilities. This intensive lobbying was both directed towards the citizens and the decision-makers in order to protect oil companies' growth and the up-scaling of their industrial sites. The aim was also to create a debate on whether climate change was caused by human activities or a natural phenomenon in order to delay the production of new environmental rules. This debate still hinders the energy transition, the enforcement of regulations, and the transformation and decontamination of former industrial sites.

With the rise of public awareness towards the environment and the growing importance of new actors, innovative rules, principles and policies improved spatial planning strategies, thus, protections for inhabitants (Chapter5). Spatial planning regulations started to consider space in a larger scale than the immediate surroundings of industrial sites when dealing with environmental and health protection. The scale of industrial disasters followed this evolution in scale, with greater zones being affected by pollution, or with the global consequences of climate change becoming more visible. The development of a constraining international system over the protection of the environment and the climate was, however, an illusion, demonstrated by the many conferences and summits on the topic. With the enrollment of parties and the respect of rules relying purely on the free will of governments and politicians, no strict constraints were applied to oil companies as larger petroleum and climate disasters demonstrated. European Union's system is differently efficient because of its supra-national force. The competences devolved to the European level by national governments are limited to certain fields, and framed into the notions of proportionality and subsidiarity. National governments keep a significant influence over the functioning of this supra-national institution. Besides, despite efforts to improve the transparency within European institutions, oil companies also benefit from privileged access to European representatives and decision-makers, in order to efficiently influence the ultimate form of a policy or regulation[6]. With the progress of European integration, European institutions became an important target for industrial lobbying groups and an alternative in case national governments are less favorable to their interests[7]. Though this system works in appearance better, the European legal system is an experiment, not a model. Jacques Delors, a French politician who has been president of the European Commission between 1985 and 1995, supported this image when he described the EU as an UPO, an Unidentified Political Object[8]. With this definition, the European level can and must experiment innovative and anticipa-

[6] P. Bouwen. "Corporate lobbying in the European Union: the logic of access". In: *Journal of European public policy* 9.3 (2002), pp. 365–390. ISSN: 1350-1763; Corporate Europe Observatory. *The Corporate Europe Observatory guide to the murky world of EU lobbying*. Report. 2017

[7] A. Verdun. "Policy-making and integration in the European Union: Do economic interest groups matter?" In: *The British Journal of Politics and International Relations* 10.1 (2008), pp. 129–137. ISSN: 1369-1481

[8] Translated from the French OPNI, "Objet Politique Non-Identifié", that Jacques Delors used in a speech at Luxembourg, on September 9, 1985.

tive solutions in its policies and documents. The improvement of European legal frames would, for instance, benefit from an absence of industrial lobbying groups linked to oil companies within decision-making institutions of the European Union.

The European Union's institutions are playing a major role in shaping environmental rules in European countries legal systems, but the European level is an additional layer to consider when implementing measures. Yet, these regulatory systems already shine by their lack of access, their complexity, and the overproduction of rules. The regulatory inflation is an issue affecting the certainty of the right, as it relates to a constant growth in the number of legal texts still in effect. At the beginning of the year 2019, in France alone, the consolidated right represented 84 619 legislative articles and 233 048 regulatory articles[9]. The amount of texts available in addition to their inter-relation or interdependence require, to fully grasp the meaning of a rule, the gathering of a collection of texts using unclear and heavy terms[10]. Despite the well-known sentence "nobody is supposed to ignore the law", their formulation, number, and ever changing nature make this implied rule for all to follow a legal fiction even for law-makers. Recent communications of the European Union, but also from international and national institutions, highlighted this issue and the need to address it[11]. And while the oil industry is physically disappearing from port cities, its blocking influence in legal systems remains, as well as the pollution stemming from its activities, with its heritage being forgotten both by citizens and public authorities.

In the end, the supply of oil in the ground is not a problem anymore, the real question is can we afford to burn it[12]? The same goes with laws. The supply is not a problem, but can public authorities afford to wait for a catastrophe to react and carry out the le-

[9] In French they are respectively translated as "articles législatifs", linked to a parliamentary creation, and "articles réglementaires", related to the power of the national government. See: https://www.vie-publique.fr/en-bref/23812-lactivite-legislative-et-la-production-de-normes-en-2018

[10] Take the article 6 of the French Environmental Charter, from the constitutional law n°2005-205, of March 1st, 2005, and translated as: "Public policies must promote sustainable development [...]". They have to promote, not to implement, nor to aim for a constant improvement. The aim remains distant and abstract, though being included in the French Constitutional Bloc. See: R. Rézenthel. "L'intérêt général, un fondement incontournable des activités portuaires". In: *Les ports en France: Quelle stratégie portuaire pour un développement de l'activité ?* Ed. by S. Cros and F. Lerique. Eska, 2021, pp. 128–138

[11] Public authorities know this problem and are trying to address it since the 1970s, but the political effort intensified in the 2000s when obstacles to economic activities linked to the certainty of the right became more visible. More detailed, in French, in M. van de Kerchove. "Rien n'est simple. Tout se complique. La complexité, limite à la simplification du droit". In: *Qu'en est-il de la simplification du droit ?* Ed. by F. Rueda and J. Pousson. Toulouse: Presses de l'université de Toulouse 1 Capitole, 2010, pp. 101–118. ISBN: 978-2-36170-005-8. See, for instance, the French law n°2015-177 of February 16, 2015, on the modernization and simplification of law and procedures in the fields of justice and home affairs, or "Loi relative à la modernisation et à la simplification du droit et des procédures dans les domaines de la justice et des affaires intérieures", or the Interinstitutional Agreement on Better Law-Making, L123/1 from April 13, 2016, between the European Parliament, the Council of the European Union and the European Commission. See also the report of the United Nations on the weaknesses of international texts discussing the environment; Assemblée Générales des Nations Unies. *Lacunes du droit international de l'environnement et des textes relatifs à l'environnement : vers un pacte mondial pour l'environnement.* Tech. rep. Nations Unies, 2018

[12] S. Alexander. *The new economics of oil.* Melbourne Sustainable Society Institute, the University of Melbourne, 2014

gal changes needed to implement the energy transition? The climate change disaster is currently unveiling itself and should be one that justifies such transitions. Parliaments across the globe declared the climate emergency and acknowledged its importance. Yet, the transition to renewable energies is not necessarily the real challenge. The issue lies in the transformation of oil sites and their cleaning as well as getting rid of the long-standing influence of oil and industrial companies over politicians, law-makers, and regulations to achieve a fair and efficient transition with constraining objectives. The sudden closure of the two refineries in Dunkirk, the extensive areas they cover, and their slow transformation demonstrate the need for anticipation in the management of industrial sites. The energy transition needs not only ambitious political actions but also an effective body to ensure the respect and application of rules by industrial companies. Previous examples demonstrated that innovative rules mean nothing without a monitoring agency equipped with sufficient resources for its mission. In the absence of such an efficient institution, local and supra-national actors like the EU must took over this surveillance. The harmonization effort of the EU has definitely contributed to a better protection of the environment and follows the recommendations of the United Nations to tackle the lack of efficiency of international environmental law: the fragmentation of environmental tools is an obstacle to efficient and enforceable regulations[13]. With the notion of environmental justice gaining momentum in Europe and beyond, as well as with the growing inclusion of the public in the decision-making process locally and nationally, citizens involved themselves in the defense of their environment. This movement pushed judges and European institutions to intervene more often, which forced governments to act towards better protections and liabilities to gain public's support. Tackling the difficult access of citizens to courts can be an additional tool to improve the monitoring and enforcement of new regulations on industrial companies.

Public and private actors need to stop using the environment as a tool to promote economic or political achievements or ambitions and act for its protection. The advertisement, internationally, of the objectives agreed during the COP21 was tremendous, but the results since 2015 are limited and point towards a failure of most countries to meet their objectives. "I think it's easier to speak rhetorically about the importance of climate change than it is to do the hard work of putting in place the regulatory framework that actually ensure pollution declines," [14]. Port cities as economic and demographic hubs, but also as interfaces between land and sea, will be among the firsts to deal with the effects of climate change long denied by oil companies. Their authorities must anticipate the necessary steps according to their local characteristics, not only to transform dying industrial activities such as petroleum ones but also to tackle the future effects of climate change. The way of producing local rules and planning strategies must evolve and not wait for actions and regulations from national authorities. The port of Dunkirk becoming an energy laboratory for the conversion of oil polluted sites, for innovative fuels, and for carbon capture is a step towards the transformation of its industrial port[15]. So-

[13] Assemblée Générales des Nations Unies. *Lacunes du droit international de l'environnement et des textes relatifs à l'environnement : vers un pacte mondial pour l'environnement.* Tech. rep. Nations Unies, 2018

[14] From Pam Kiely, EDF's (Environmental Defense Fund) senior director of regulatory strategy, in sciencemag: https://www.sciencemag.org/news/2020/12/paris-climate-pact-5-years-old-it-working

[15] The dismantling and cleaning of the SRD refinery of Dunkirk required new tools and practices to effi-

cial pressure on environmental questions after disasters as well as new interpretations of rules by judge and local public authorities brought and are bringing legal changes. The growing importance of environmental protection in rules and political discourses is an illustration[16]. The tremendous amount of money dedicated by oil companies to lobbying activities and advertisement to fight back this movement is another proof of the central place environmental topics took in the political and legal context.

The extensive talks and debates around climate change and how to tackle it is also hindering the energy transition. This flow of information and discussions over climate change is hiding an urgent need to bring another debate at the forefront which is adaptation. As oil companies and industrial actors always resisted frameworks impacting their activities and having detrimental effects on their profits, there is a need for local and supra-national authorities to prepare for adaptation to changes in climate that are already visible across the globe (fires in Australia, Siberia, Amazonia, Turkey and Africa; extreme weathers in Europe, America and South East Asia; droughts; pandemics). Rather than waiting for the creation or implementation of new regulations, local authorities must anticipate them and use their own interpretation to aim beyond the limited and unclear objectives of legal texts (Chapter6). Local actors must overcome past decisions and policies if they hinder the adaptation and sustainable development of cities, port cities, and countries[17]. Instead of compliance to policies created at the national level, local documents and strategies can benefit from the flexibility of simple compatibility to adapt to their local context and potentially go further than objectives defined in national policies.

An obstacle to implementing efficient and long-lasting policies could be short political terms, though elections can also relieve citizens and the world from troublesome governments. This stands as long as the government is engaged in protecting the environment and tackling industrial pollution. The succession of elections, the decreasing interest of the population in politics, and the unfulfilled promises of elected officials led to more electoral clientelism with opportunistic, thus short-termed, policies. There is an incompatibility between the long-term process of climate adaptation and environmental protection and the short term of political mandates and economic visions. This way of thinking is what led, in Dunkirk, to the irremediable change of the landscape and the

ciently and safely achieve the transformation of the site. See: https://www.actu-environnement.com/ae/news/Depolluer-deconstruire-raffinerie-dunkerque-BIM-33000.php4. The refinery BioTfueL of Total in Dunkirk is another attempt to switch towards the production of a new generation of biofuels. See: https://totalenergies.com/fr/expertise-energies/projets/bioenergies/biotfuel-convertir-residus-vegetaux-carburant. The DMX project in Dunkirk, with, among other partners, Total, aims at improving carbon capture systems for industrial sites. See: https://cordis.europa.eu/project/id/838031.

[16] S. Laville. *Top oil firms spending millions lobbying to block climate change policies says report*. Mar. 2019. URL: https://www.theguardian.com/business/2019/mar/22/top-oil-firms-spending-millions-lobbying-to-block-climate-change-policies-says-report

[17] See the actions of the mayor of Grande-Synthe, part of the metropolitan area of Dunkirk, against the inaction of the government to tackle climate change and rising sea levels: https://www.lesechos.fr/politique-societe/societe/le-maire-de-grande-synthe-poursuit-letat-pour-inaction-climatique-870715

coastline, as well as to the great pollution of its soil. Figure7.1 illustrates this evolution of the urban tissue of Dunkirk and the numerous (identified) oil sites that settled in the port city. At the same time it demonstrates how the development of the port area divided the city, cut the access to the sea on its western part, and contributed to change the natural landscape. The pressure of the oil industry, though not the only factor, greatly contributed to these changes in Dunkirk. An independent agency or ministry, relatively freed from the regular political shifts and the lobbying pressures, can answer the much needed continuity required for environmental policies and objectives.

Figure 7.1: Mapping of the urban expansion of Dunkirk with the identified oil sites, from 1879 until 2018, based on its actual shape. Made by the author and based on the archival maps of the city kindly provided by the Learning Center of Dunkirk.

While looking for new ways to reduce carbon emissions, governments and companies are investing in and promoting carbon capture and storage within former oil wells at sea. Many authors pointed out the lack of efficiency and the potential dangers around this strategy[18]. Though much more natural and simpler, there is another practice that could reduce the production of carbon dioxide while tackling heat effects and the loss of biodiversity. Though currently used as a greenwashing tool, a compensation mechanism linked to reforestation of territories or protection of forests could, if implemented correctly, solve some of the current issues. Not only would it help to capture carbon dioxide, but if right species and a diversity of them are used, it could support ecosystems, protect biodiversity, as well as improve air quality and tackle the heat-island effect in cities. Al-

[18] P. Markewitz *et al.* "Worldwide innovations in the development of carbon capture technologies and the utilization of CO 2". In: *Energy & environmental science* 5.6 (2012), pp. 7281–7305; M. Kalkuhl, O. Edenhofer, and K. Lessmann. "The role of carbon capture and sequestration policies for climate change mitigation". In: *Environmental and Resource Economics* 60.1 (2015), pp. 55–80. ISSN: 0924-6460; K. Jean. "Capturer massivement les émissions de CO2 plutôt que de les réduire: pourquoi c'est une illusion". In: *Bastamag* (2018)

though this is not the panacea[19], if implemented in or around cities, it could tackle the heat produced by their concrete and asphalt covers. This mechanism could improve the quality of life within urban areas while tackling and reducing many of the contemporary environmental issues with little investments in uncertain and costly technologies[20].

The typical extraction, transformation, and use of oil is dying, but the companies that built their wealth and power on it are not, and their practices remain. Oil companies are transitioning, especially in Europe, towards more sustainable ways to produce energy, not only to protect their image but also in an anticipative move triggered by the environmental objectives of governments worldwide. This anticipation of future needs has always been an important strategy for companies, and their shift must spark a better planning of industrial sites in port cities and beyond by local public authorities. If a complete decontamination of the soil, at the end of industrial activities, is not required because of the future land use, it also means that the replacing activity will have detrimental effects on the environment and on the health of citizens. The objective advocated in this research is not only to remove the pollution and better plan future economic or industrial activities but also to remove oil industry's regulatory obstacles and influence to prepare the energy transition and anticipate its spatial planning, environmental, and health consequences in industrial port cities like Dunkirk. The long-term objective of actions tackling the influence of the oil industry must be to return back to the relationship of the 1860s between private and public actors: a situation where the power of oil companies and the one of law-makers are two distinctive topics again and not one system anymore. To identify the texts, policies, and practices shaped by oil companies, it is of paramount importance to support and develop interdisciplinary studies on the problem. Only by treating this *Wicked Problem* as a whole can public authorities efficiently face the challenges linked to climate change as well as to the protection of the environment and the health of port cities inhabitants.

[19] The Albedo effect that tree cover could have would reduce the effect of its carbon capture over climate change and global warming.

[20] T. Susca, S. R. Gaffin, and G. R. Dell'Osso. "Positive effects of vegetation: Urban heat island and green roofs". In: *Environmental pollution* 159.8-9 (2011), pp. 2119–2126. ISSN: 0269-7491; G. L. Feyisa, K. Dons, and H. Meilby. "Efficiency of parks in mitigating urban heat island effect: An example from Addis Ababa". In: *Landscape and urban planning* 123 (2014), pp. 87–95. ISSN: 0169-2046; See also the website of the United Nations on the topic: https://www.un.org/development/desa/en/news/forest/forests-and-cities.html

General Bibliography

7.1. Articles, Books, Conference Proceedings, Report and Thesis

FOCUS: European refinery closures continue as foreign competition increases. (2014). Oil and Energy Trends, 39(3), 3–6. https://doi.org/https://doi.org/10.1111/oet.12139

Ackoff, R. (1974). Redesigning the future. New York, 29.

Adshead, J. (2011). The quest for sustainable buildings: Getting it right at the planning stage. Green Buildings and the Law, 76–93.

Ahmadov, A. K., & van der Borg, C. (2019). Do natural resources impede renewable energy production in the EU? A mixed-methods analysis. Energy Policy, 126, 361–369.

Aktürk, G., & Hauser, S. J. (2021). Detection of Disaster-Prone Vernacular Heritage Sites at District Scale: The Case of Fındıklı in Rize, Turkey. International Journal of Disaster Risk Reduction, 102238.

Albishausen, N. (2020). The Impact of the COVID-19 Pandemic on the US Shale Industry: An (Expert) Review.

Alexander, S. (2014). The new economics of oil. Melbourne Sustainable Society Institute, the University of Melbourne.

Almer, C., & Winkler, R. (2017). Analyzing the effectiveness of international environmental policies: The case of the Kyoto Protocol. Journal of Environmental Economics and Management, 82, 125–151.

Amphoux, M. (1953). Une nouvelle industrie française: le raffinage du pétrole. Annales de Géographie, 44, 509–533.

Anderson, T. R., Hawkins, E., & Jones, P. D. (2016). CO2, the greenhouse effect and global warming: from the pioneering work of Arrhenius and Callendar to today's Earth System Models. Endeavour, 40(3), 178–187.

Andurand, R. (2010). Pétrole et marées noires. Preventique Securite, 113, 46.

Arrhenius, S. (1896). XXXI. On the influence of carbonic acid in the air upon the temperature of the ground. The London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science, 41(251), 237–276.

Aseeva, A. (2018). (Un) Sustainable Development (s) in International Economic Law: A Quest for Sustainability. Sustainability, 10(11), 4022.

Ashford, N. A., & Hall, R. P. (2011). The importance of regulation-induced innovation for sustainable development. Sustainability, 3(1), 270–292.

Assemblée Générales des Nations Unies. (2018). Lacunes du droit international de l'environnement et des textes relatifs à l'environnement : vers un pacte mondial pour l'environnement.

Association des Directeurs Immobiliers. (2015). La reconversion des friches industrielles et urbaines: de la transformation des sites à la mutation des territoires (Le Moniteur (ed.)).

Auby, J.-B., Périnet-Marquet, H., & Noguellou, R. (2012). Droit de l'urbanisme et de la construction (9th ed.). Montchrestien.

Azman Momirski, L. (2015). Urban waterfronts in Koper: a comparison of spatial issues in the initial and current plans for Koper's port. Annales-Anali Za Istrske in Mediteranske Studije-Series Historia et Sociologia, 25(1), 19–32.

Baillot d'Estivaux, Y. (n.d.). L'incendie du port de Bordeaux en 1869. 130, 26.

Balassa, B. (1985). Industrial protection in the developed countries. In Change and Challenge in the World Economy (pp. 427–447). Springer.

Barillé, C., Le Roux, T., & Thébaud-Sorger, M. (2014). Grenelle 1794: secourir, indemniser et soigner les victimes d'une catastrophe industrielle à l'heure révolutionnaire. Le Mouvement Social, 4, 41–71.

Barkan, J. (2013). Corporate sovereignty: Law and government under capitalism. U of Minnesota Press.

Barlow, C. W. (1969). Corporate packaging management.

Baron-Yelles, N. (1999). French coastal wetlands: in search of sustainability. Tourism Geographies, 1(1), 108–120.

Barrau, A. (2019). Le plus grand défi de l'histoire de l'humanité.

Barré, R., Lavoux, T., & Piveteau, V. (2015). Un demi-siècle d'environnement entre science, politique et prospective: En l'honneur de Jacques Theys. Editions Quae.

Barros, J., & Millar Johnston, D. (1974). The international law of pollution. New York : The Free Press etc. ; London : Collier Macmillan.

Basa, I. (2009). Environmental discourse of architecture. International Journal of Environmental Studies, 66(2), 271–279. https://doi.org/10.1080/00207230902859796

Batchelor, P. (1969). The origin of the garden city concept of urban form. Journal of the Society of Architectural Historians, 28(3), 184–200.

Batty, M., & Marshall, S. (2012). The origins of complexity theory in cities and planning. In Complexity theories of cities have come of age (pp. 21–45). Springer.

Baziadoly, S. (1993). Le droit communautaire de l'environnement depuis l'Acte unique européen jusqu'à la Conférence intergouvernementale. Paris 2.

Baziadoly, S., & Bettati, M. (1996). Le Droit communautaire de l'environnement depuis l'Acte unique europeen jusqu'a la Conference intergouvernementale. In Collection de droit international. Ed. Bruylant.

Beltran, A. (2010). A comparative history of national oil companies. Peter Lang.

Ben-Hakoun, E., Shechter, M., & Hayuth, Y. (2016). Economic evaluation of the environmental impact of shipping from the perspective of CO 2 emissions. Journal of Shipping and Trade, 1(1), 1–36.

Ben-Hakoun, E., Van De Voorde, E., & Shiftan, Y. (2021). Marine environmental emission reduction policy in the liner shipping the economic impact from trade lane perspective. Maritime Policy & Management, 1–29.

Beurier, J.-P. (2010). Droit international de l'environnement (A. Pedone (ed.); 4th ed.). Etudes Internationales.

Bezat, J.-M., & Wakim, N. (2018). Patrick Pouyanné, PDG de Total : « Après 2020, on risque de manquer de pétrole ». Le Monde.

Billet, P. (2018). La réhabilitation des sites pollués en droit publics: certitudes sur quelques incertitudes. L'Harmattan.

Billiet, C. M., Earnhart, D., & Rousseau, S. (2018). Sanctioning of environmental crime in the European Union: The case of Flanders, Belgium. Crime, Law and Social Change, 69(5), 703–723.

Black, B. C. (2018). How World War I ushered in the century of oil. The Observer.

Bocken, H. (1987). Black points: Liability for clean-up costs. Resources and Conservation, 14, 105–118.

Bogrand, A., Brodeur, C., Mbenna, D., Akoli Atine, J., Ayebare, C., Twesigye, B., & Sellwood, S. A. (2020). Empty Promises Down the Line? A Human Rights Impact Assessment of the East African Crude Oil Pipeline.

Böhringer, C., & Vogt, C. (2003). Economic and environmental impacts of the Kyoto Protocol. Canadian Journal of Economics, 36(2). https://doi.org/10.1111/1540-5982.t01-1-00010

Boillet, N. (2012). La gouvernance du littoral. Revue Juridique de l'environnement, 5, 33–55.

Boillet, N., & Goffaux-Callebaut, G. (2018). Patrimoine maritime: entre patrimoine culturel et patrimoine naturel, Actes du colloque de Brest 23 et 24 juin 2016. Editions Pedone.

Boon, M. (2014). Oil Pipelines, Politics and International Business: The Rotterdam Oil Port, Royal Dutch Shell and the German Hinterland, 1945-1975.

Bordereaux, L., & Roche, C. (2018). Littoral et milieux marins. Revue Juridique de Lenvironnement, 43(2), 389–408.

Borowik, A., Wyszkowska, J., Kucharski, M., & Kucharski, J. (2019). Implications of soil pollution with diesel oil and BP petroleum with ACTIVE Technology for soil health. International Journal of Environmental Research and Public Health, 16(14), 2474.

Börzel, T. A. (2006). Participation through law enforcement: the case of the European Union. Comparative Political Studies, 39(1), 128–152.

Bouwen, P. (2002). Corporate lobbying in the European Union: the logic of access. Journal of European Public Policy, 9(3), 365–390.

Brétt, D., Svobodová, E., Handrychová, B., & Pacina, J. (2019). Information system of vanished industrial and technical culture heritage in central Europe. 19th International Multidisciplinary Scientific Geoconference, 19, 919–926.

Brewer, G. D. (1999). The challenges of interdisciplinarity. Policy Sciences, 32(4), 327–337.

Brimblecombe, P. (1999). Air pollution and health history. In Air pollution and health (pp. 5–18). Elsevier.

Brinkmann, F. J. J. (1981). Lekkerkerk. Studies in Environmental Science, 17(C).

British Petroleum,. (2017). BP statistical review of world energy.

Brown, W. (2018). Legal certainty and competition law: Can they be reconciled? Stellenbosch: Stellenbosch University.

Čadež, T., & Hernandez Hevia, M. (2016). Environmental migration in Turkey: Challenges, recognition and implications for policy.

Calderaro, N. (2010). La loi Littoral et le juge. Vingt ans de jurisprudence sur la façade méditerranéenne françaiseTwenty years of jurisprudence on the French Mediterranean coast. Méditerranée. Revue Géographique Des Pays Méditerranéens/Journal of Mediterranean Geography, 115, 69–77.

Callendar, G. S. (1938). The artificial production of carbon dioxide and its influence on temperature. Quarterly Journal of the Royal Meteorological Society, 64(275), 223–240.

Camphuysen, K., & Vollaard, B. (2015). Oil pollution in the Dutch sector of the North Sea. In Oil Pollution in the North Sea (pp. 117–140). Springer.

Cariou, P., Fedi, L., & Dagnet, F. (2014). The new governance structure of French seaports: an initial post-evaluation. Maritime Policy & Management, 41(5), 430–443.

Castel-Branco, C., & Ishikawa, M. (2016). Sustainable Post-Disaster Solutions—London 1666, Lisbon 1755 and Japan 2011—Learning from the Past. Journal of Environmental Science and Engineering A, 196.

Center for International Environmental Law. (n.d.). Plastic Industry Awareness of the Ocean Plastics Problem. https://www.ciel.org/wp-content/uploads/2017/09/Fueling-Plastics-Plastic-Industry-Awareness-of-the-Ocean-Plastics-Problem.pdf

Chernow, R. (2007). Titan: The Life of John D. Rockefeller, Sr. Vintage.

Cherry, M. A., & Sneirson, J. F. (2012). Chevron, Greenwashing, and the Myth of'Green Oil Companies'. Journal of Energy, Climate, and the Environment, 3.

Chevron Corporation. (2008). Deep Seething Sea: Unlocking oil that lies beneath menacing forces of nature. Next*.

Chorus, J. (2016). Introduction to Dutch law. Kluwer Law International BV.

Churchman, C. W. (1967). Guest editorial: Wicked problems.

Cohen, L. (1990). Making a new deal: Industrial workers in Chicago, 1919-1939. Cambridge University Press.

Collin Delavaud, A. (2004). Laurent Carroué-Géographie de la mondialisation. L'Information Géographique, 68(2), 191.

Collins, P. (1971). Architectural judgment. McGill-Queen's University Press.

Cornu, G. (2000). Dictionnaire Juridique (8th ed.). Presses Universitaires de France.

Corporate Europe Observatory. (2017). The Corporate Europe Observatory guide to the murky world of EU lobbying.

Couling, N., & Hein, C. (2020). Viscosity. In N. Couling & C. Hein (Eds.), The Urbanisation of the Sea: From Concepts and Analysis to Design (pp. 55–60). Nai Publisher.

Csomós, G. (2014). Relationship between large oil companies and the renewable energy sector. Environmental Engineering and Management Journal, 13(11), 2781–2787.

Daligaux, J. (2001). La périurbanisation en Provence: visages d'hier et d'aujourd'hui, interrogations pour demain. Le cas du Var et des Bouches-du-Rhône/Periurbanisation in Provence: past and present images and questions for tomorrow. The case of the Var and the Bouches-du-Rh. Géocarrefour, 76(4), 289–302.

Daligaux, J. (2003). Urbanisation et environnement sur les littoraux : une analyse spatiale. Rives Méditerranéennes, 15, 11–20. https://doi.org/10.4000/rives.12

Davoudi, S., Crawford, J., & Mehmood, A. (2009). Planning for climate change: strategies for mitigation and adaptation for spatial planners. Earthscan.

de Abreu, M. C. S., & de Andrade, R. de J. C. (2019). Dealing with wicked problems in socio-ecological systems affected by industrial disasters: A framework for collaborative and adaptive governance. Science of the Total Environment, 694, 133700.

de Haan, F. J., Ferguson, B. C., Adamowicz, R. C., Johnstone, P., Brown, R. R., & Wong, T. H. F. (2014). The needs of society: A new understanding of transitions, sustainability and liveability. Technological Forecasting and Social Change, 85, 121–132.

de Hollander, A. E. M., & Staatsen, B. A. M. (2003). Health, environment and quality of life: an epidemiological perspective on urban development. Landscape and Urban Planning, 65(1–2), 53–62.

De Martino, P. (2021). Land in Limbo: Understanding path dependencies at the intersection of the port and city of Naples. In A+ BE| Architecture and the Built Environment (Issue 09).

De Perthuis, C., & Trotignon, R. (2014). Governance of CO2 markets: Lessons from the EU ETS. Energy Policy, 75, 100–106.

Dearing, J. A., Battarbee, R. W., Dikau, R., Larocque, I., & Oldfield, F. (2006). Human–environment interactions: learning from the past. Regional Environmental Change, 6.

Debrie, J., Lavaud-Letilleul, V., & Parola, F. (2013). Shaping port governance: the territorial trajectories of reform. Journal of Transport Geography, 27, 56–65.

Dechezleprêtre, A., & Sato, M. (2017). The impacts of environmental regulations on competitiveness. Review of Environmental Economics and Policy, 11(2), 183–206.

Dechy, N., Bourdeaux, T., Ayrault, N., Kordek, M.-A., & Coze, J.-C. Le. (2004). First lessons of the Toulouse ammonium nitrate disaster, 21st September 2001, AZF plant, France. Journal of Hazardous Materials, 111(1–3), 131–138.

Deichmann, U., & Zhang, F. (2013). Growing green: the economic benefits of climate action. World Bank Publications.

del Cerro Santamaria, G. (2019). Rapid Urbanization, Ecology and Sustainability. The Need for a Broad Strategy, Holism and Transdisciplinarity. Transdisciplinary Journal of Engineering and Science.

Delahaye, D., Folligné, P., Guermond, Y., Vapaille, J., & Zambeaux, R. (1999). Une recherche sur la pollution des sols de la rive gauche. Études Normandes, 48(1), 179–186.

Delucchi, M. (2010). Impacts of biofuels on climate change, water use, and land use. Annals of the New York Academy of Sciences, 1195(1), 28.

den Bergh, R., Nivard, M., & Kreijkes, M. (2016). Long-term prospects for northwest european refining. Asymmetric change: A looming government dilemma. CIEP Energy Paper by the Clingendael International Energy Programme (CIEP).

den Bergh, R., Nivard, M., & Kreijkes, M. (2016). Long-Term Prospects for Northwest European Refining. Asymmetric Change: A Looming Government Dilemma? Den Haag: Clingendael International Energy Programme.

Den Elzen, M. G. J., & De Moor, A. P. G. (2002). Analyzing the Kyoto Protocol under the Marrakesh Accords: economic efficiency and environmental effectiveness. Ecological Economics, 43(2–3), 141–158.

Deneault, A. (2018). Total, un gouvernement bis. Le Monde Diplomatique, 8, 21. https://www.monde-diplomatique.fr/2018/08/DENEAULT/58987

Denise, J. (1988). La Belle Époque à Dunkerque (Vol. 3).

Derissen, S., Quaas, M. F., & Baumgärtner, S. (2011). The relationship between resilience and sustainability of ecological-economic systems. Ecological Economics, 70(6), 1121–1128.

Descamps, H. (2005). Liability for environmental damage in Belgium (Flemish Region) in 2005. ERA Forum, 6(3), 401–414.

Dessai, S. (2001). The climate regime from The Hague to Marrakech: Saving or sinking the Kyoto Protocol. Tyndall Centre for Climate Change Research Working Paper, 12.

Deswarte-Jullien, M.-P. (1978). Analyse juridique du décret n° 77.1133 du 21 septembre 1977 pris pour l'application de la loi n° 76.663 du 19 juillet 1976 relative aux installations classées pour la protection de l'environnement. Revue Juridique de l'Environnement, 3(2), 127–146.

Devos, G. (2003). Land-use policy in the port of Antwerp (1870-1994). In Struggling for Leadership: Antwerp-Rotterdam Port Competition between 1870–2000 (pp. 199–219). Springer.

Dewailly, J.-M., & Barbaza, Y. (1974). Conflits de fonction dans un secteur à vocation touristique: le littoral entre Dunkerque et la frontière belge. Bulletin de l'Association de Géographes Français, 51(417), 203–213.

Di Domenico, C., & Di Domenico, M. (2007). Heritage and urban renewal in Dundee: Learning from the past when planning for the future of a post-industrial city. Journal of Retail & Leisure Property, 6(4), 327–339.

Dooms, M., Verbeke, A., & Haezendonck, E. (2013). Stakeholder management and path dependence in large-scale transport infrastructure development: the port of Antwerp case (1960–2010). Journal of Transport Geography, 27, 14–25.

Douet, J. (2016). Industrial heritage re-tooled: The TICCIH guide to industrial heritage conservation. Routledge.

Dron, D. (2018). Se doter d'un prix du carbone pour faciliter la transition énergétique? Certes, mais cela ne suffit pas. Annales Des Mines-Responsabilité et Environnement, 1, 59–63.

Ducruet, C. (2007). A metageography of port-city relationships. In J. Wang, D. Olivier, T. Notteboom, & B. Slack (Eds.), Ports, Cities, and Global Supply Chains (pp. 157–172). Routledge.

Dühr, S., Stead, D., & Zonneveld, W. (2007). The Europeanization of spatial planning through territorial cooperation. Planning, Practice & Research, 22(3), 291–307.

Dupuy, R.-J. (1985). La Zone, patrimoine commun de l'humanité.

Elsen, T. (2020). The Energy Transition: Impact on the factors shaping International Oil Companies strategy.

Embury-Dennis, T. (2017). Costa Rica's electricity generated by renewable energy for 300 days in 2017. The Independent.

Enyedi, G. (2004). Public participation in socially sustainable urban development. UNESCO.

Enzler, S. M. (1998). History of the greenhouse effect and global warming. From: Mhtml: Http://65.55, 68. European Parliament. (2001). European Parliament resolution on the explosion at a factory in Toulouse (France). Publications Office of the European Union. https://op.europa.eu/en/publication-detail/-/publication/d22e3365-3369-4fb6-ab80-6922f4f59278

Fan, H., Zivin, J. S. G., Kou, Z., Liu, X., & Wang, H. (2019). Going Green in China: Firms' Responses to Stricter Environmental Regulations. National Bureau of Economic Research.

Fattal, P. (2004). Pollutions du Prestige et de l'Erika: deux crises aux enjeux différents. Revue Géographique Des Pyrénées et Du Sud-Ouest. Sud-Ouest Européen, 17(1), 61–75.

Fauchille, P. (1922). Traité de droit international public (Vol. 1). Rousseau & cie.

Fedi, L. (2013). La consécration et les défis du port aménageur. Le Droit Maritime Français.

Fenton, P. (2020). Port-City Redevelopment and Sustainable Development. In A. Carpenter & R. Lozano (Eds.), European Port Cities in Transition: Moving Towards More Sustainable Sea Transport Hubs (pp. 19–36). Springer International Publishing.

Feyisa, G. L., Dons, K., & Meilby, H. (2014). Efficiency of parks in mitigating urban heat island effect: An example from Addis Ababa. Landscape and Urban Planning, 123, 87–95.

Fieldson, R. (2004). Architecture & Environmentalism: Movements & Theory in Practice. Editorial Team, 20.

Fisher, D. (1986). Rockefeller Philanthropy: And the Rise of Social Anthropology. Anthropology Today, 2(1), 5.

FitzRoy, F. (2019). A Green New Deal: The Economic Benefits of Energy Transition. Substantia, 3(2), 55–67.

Fleming, J. R. (2007). Callendar's Legacy. In The Callendar Effect (pp. 89–96). Springer.

Fontanille, P. (1996). La maîtrise de l'urbanisation autour des sites industriels à risques majeurs/The control of urban development around dangerous industrial sites. Géocarrefour, 71(1), 7–9.

Forbes, R. J. (1936). Bitumen and petroleum in antiquity (Vol. 1). Brill Archive.

Forrestal, J. (1951). The Forrestal diaries (W. M. and E. S. Duffield (ed.)). Viking Press.

Forslund, J., Samakovlis, E., Johansson, M. V., & Barregard, L. (2010). Does remediation save lives?—On the cost of cleaning up arsenic-contaminated sites in Sweden. Science of the Total Environment, 408(16), 3085–3091.

Fourastié, J. (1979). Les trente glorieuses: ou la Révolution invisible de 1946 à 1975. Fayard.

Fressoz, J.-B. (2011). Le décret de 1810 : la libéralisation des «choses environnantes». Annales Des Mines-Responsabilité et Environnement, 2, 16–22.

Fujita, M. (1985). Towards General Equilibrium Models of Urban Land Use. Revue Économique, 36(1). https://doi.org/10.2307/3501681

Giannakourou, G. (1996). Towards a European spatial planning policy: theoretical dilemmas and institutional implications. European Planning Studies, 4(5), 595–613.

Gilliland, J. A., & Novak, M. (2006). Jason A. Gilliland and Mathew Novak on positioning the past with the present: The use of fire insurance plans and GIS for urban environmental history. Environmental History, 11(1), 136–139.

Girardet, H. (2013). Cities, people, planet: urban development and climate change . NJ: John Wiley.

Goldsmith, E. R. D., Allen, R., Allaby, M., Davoll, J., & Lawrence, S. G. (1972). Blueprint for survival.[Basic thesis that economic and population growth must be halted]. Ecologist;(United Kingdom), 2(1).

Gollier, C. (2019). Le prix du risque climatique et le prix du carbone. Revue d'economie Financiere, 1, 171–182.

Golub, J. (1998). New instruments for environmental policy in the EU. Routledge.

Gonjo, Y. (1972). Le "plan Freycinet", 1878-1882: un aspect de la "grande dépression" économique en France. Revue Historique, 248(Fasc. 1 (503), 49–86.

Goodstein, E. (1995). Jobs or the Environment? No Trade-off. Challenge, 38(1). https://doi.org/10.1080/05775132.1995.11471801

Gore, A. (1998). Clinton-Gore Livability Agenda: Building Livable Communities for the 21 st Century.

Graafland, A. (2001). Cities in Transition. 010 Publisher.

Granitz, E., & Klein, B. (1996). Monopolization by "Raising Rivals Costs": The Standard Oil Case. The Journal of Law and Economics, 39(1), 1–47.

Granot, H. (1998). The dark side of growth and industrial disasters since the Second World War. Disaster Prevention and Management: An International Journal.

Green, J., Hadden, J., Hale, T., & Mahdavi, P. (2021). Transition, hedge, or resist? Understanding political and economic behavior toward decarbonization in the oil and gas industry. Review of International Political Economy, 1–28.

Greenhouse effect working group Shell Internationale. (1988). The Greenhouse Effect.

Groen, M. J. L. (2011). Developing Ways to Strategize Risk and Benefit Pertaining to Brownfield Sites. Tilburg University.

Guggemos, F., Misak, É., & Mombel, D. (2016). Panorama énergies-climat.

Guldi, J., & Armitage, D. (2014). The history manifesto. Cambridge University Press.

Hachez-Leroy, F. (2014). Le patrimoine industriel du Nord–Pas-de-Calais : histoire, culture et innovations. Patrimoine Industriel, 65.

Hack, G., L. Birch, E., H. Sedway, P., & J. Silver, M. (2010). Local Planning: Contemporary Principles and Practices. Journal of Planning Education and Research, 30, no. 2, 211–212.

Hall, P. V, & Jacobs, W. (2012). Why are maritime ports (still) urban, and why should policy-makers care? Maritime Policy & Management, 39(2), 189–206.

Hamdaoui, M. (2020). Oil Markets in the Post-Covid-19 World. Economic Trends.

Hardin, G. (1968). The Tragedy of the Commons. Science, 1243, 63.

Harvey, D. C. (2001). Heritage pasts and heritage presents: Temporality, meaning and the scope of heritage studies. International Journal of Heritage Studies, 7(4), 319–338.

Harvey, D. C. (2008). The history of heritage. The Ashgate Research Companion to Heritage and Identity, 19–36.

Hauser, S. J. (2019). The Interplay of Economic Development and Environmental Protection: Dunkirk and the Search for Balance. PORTUSplus, 8(0).

Hauser, S. J. (2020). Long Live the Heritage of Petroleum: Discoveries of Former Oil Sites in the Port City of Dunkirk. Urban Science, 4(2), 22.

Hauser, S. J. (2020). Oil is Dead, its Heritage with it?: The influence of environmental regulations on the evolution of modern planning. 16th International Docomomo Conference 2020: Inheritable Resilience: Sharing Values of Global Modernities.

Hauser, S. J., & Roche, C. (2020). Sharing Is Caring, but Is the Shore Cared for? The Sharing Paradox of the French Coast. Urban Science, 4(4), 60.

Hauser, S., Zhu, P., & Mehan, A. (2021). 160 Years of Borders Evolution in Dunkirk: Petroleum, Permeability, and Porosity. Urban Planning, 6(3).

Hay, J., Thébaud, O., & Agundez, J. P. (2008). Marées noires: Enjeux économiques. Editions Quae.

Hein, C. (2005). Resilient Tokyo: disaster and transformation in the Japanese city. The Resilient City: How Modern Cities Recover from Disaster, 213–234.

Hein, C. (2010). Global landscapes of oil. New Geographies, 2, 33–42.

Hein, C. (2015). Port Cityscapes: conference and research contributions on port cities. Planning Perspectives, 31(2), 313–326.

Hein, C. (2016). Analyzing the Palimpsestic Petroleumscape of Rotterdam. Global Urban History.

Hein, C. (2016). Imagining fossil-free futures over contemporary petroleumscapes. Atlantis, 26.3, 8–11.

Hein, C. (2016). Port cities and urban waterfronts: How localized planning ignores water as a connector. Wiley Interdisciplinary Reviews: Water, 3(3), 419–438.

Hein, C. (2016). Refineries (Oil). The Encyclopedia of Greater Philadelphia.

Hein, C. (2017). The Routledge Handbook of Planning History. Routledge.

Hein, C. (2018). “Old Refineries Rarely Die”: Port City Refineries as Key Nodes in The Global Petroleumscape. Canadian Journal of History, 53(3), 450–479.

Hein, C. (2018). Oil Spaces: The Global Petroleumscape in the Rotterdam/The Hague Area. Journal of Urban History.

Hein, C. (2020). Oil and Water: Port city regions as nodes in the global petroleumscape. In R. Rubens & M. van Dyck (Eds.), Sartoniana (33rd ed., pp. 193–224). Ghent University.

Hein, C., Mager, T., & Hauser, S. (2021). Refining the Heritage Narrative of Post-Oil Landscapes. In J. Tomann (Ed.), Transcending the Nostalgic: Deindustrialised Landscapes Across Europe (pp. 261–280). Walter de Gruyter GmbH.

Hein, C., & Schubert, D. (2021). Resilience, Disaster, and Rebuilding in Modern Port Cities. Journal of Urban History, 47(2), 235–249.

Hein, C., & Sedighi, M. (2016). Iran’s Global Petroleumscape: The Role of Oil in Shaping Khuzestan and Tehran. Architectural Theory Review, 21(3), 349–374.

Hein, C., Stroobandt, C., De Martino, P., & Hauser, S. (2020). Dunkerque : De port pétrolier à territoire de transition post-pétrole. In C. Borde, J.-F. Grevet, S. Martin, & L. Warlouzet (Eds.), La résilience des villes-portuaires européennes. Crises et réinventions (XVIe-XXIe siècle).

Hein, C., Stroobandt, C., & Hauser, S. (2021). Petroleumscape as Heritage Landscape: The Case of the Dunkirk Port City Region. In C. Hein (Ed.), Oil Spaces: Exploring the Global Petroleumscape. Routledge.

Hein, C., & van de Laar, P. T. (2020). The Separation of Ports from Cities: The Case of Rotterdam. In A. Carpenter & R. Lozano (Eds.), European Port Cities in Transition: Moving Towards More Sustainable Sea Transport Hubs (pp. 265–286). Springer International Publishing.

Hein, C., & Van Mil, Y. (2020). Mapping as Gap-Finder: Geddes, Tyrwhitt, and the Comparative Spatial Analysis of Port City Regions. Urban Planning, 5(2), 152–166.

Hilaire, M.-M. (1974). Démographie et qualité de la vie dans la région du Nord au XXe siècle. Revue Du Nord, 56(222), 385–395.

Hirsch, R. L. (2005). The inevitable peaking of world oil production. Bulletin of the Atlantic Council of the United States, 16(3), 1–10.

Hirsch, R. L., Bezdek, R. H., & Wendling, R. M. (2005). Peaking oil production: sooner rather than later? Issues in Science and Technology, 21(3), 25–30.

Hmiel, B., Petrenko, V. V, Dyonisius, M. N., Buizert, C., Smith, A. M., Place, P. F., Harth, C., Beaudette, R., Hua, Q., & Yang, B. (2020). Preindustrial 14 CH 4 indicates greater anthropogenic fossil CH 4 emissions. Nature, 578(7795), 409–412.

Hobma, F. A. M., & Jong, P. (2016). Planning and Development Law in the Netherlands. An Introduction. Instituut voor Bouwrecht.

Holling, C. S. (2001). Understanding the complexity of economic, ecological, and social systems. Ecosystems, 4(5), 390–405.

Hondius, E., Chorus, J., & Voermans, W. (2016). Introduction to Dutch law (5th ed.).

Hopkins, R. (2012). Peak oil and transition towns. Architectural Design, 82(4, Scarcity: Architecture in an Age of Depleting Resources), 72–77. https://doi.org/10.1002/ad.1432

Hossain, K. (1979). Law and policy in petroleum development: changing relations between transnationals and governments. New York: Nichols Publishing Company.

Hoyle, B. S., Pinder, D., & British Association for the Advancement of Science. (1992). European cities in transition.

Hoyle, B. S. (1989). The port—City interface: Trends, problems and examples. Geoforum, 20(4), 429–435.

Huang, W. M., Lee, G. W. M., & Wu, C. C. (2008). GHG emissions, GDP growth and the Kyoto Protocol: A revisit of Environmental Kuznets Curve hypothesis. Energy Policy, 36(1). https://doi.org/10.1016/j.enpol.2007.08.035

Husser, C., & Raison, S. (2015). Dunkerque: la reconversion de terrains portuaires. Annales Des Mines-Réalités Industrielles, 4, 66–71.

Hutter, B. M. (1997). Compliance: Regulation and environment. Oxford University Press.

InfluenceMap. (2019). Big Oil's Real Agenda on Climate Change.

Innanen, S. (2004). Environmental impact assessment in Turkey: capacity building for European Union accession. Impact Assessment and Project Appraisal, 22(2), 141–151.

Jacques, P. J., Dunlap, R. E., & Freeman, M. (2008). The organisation of denial: Conservative think tanks and environmental scepticism. Environmental Politics, 17(3), 349–385.

Jaffe, A. B., Peterson, S. R., Portney, P. R., & Stavins, R. N. (1995). Environmental regulation and the competitiveness of US manufacturing: what does the evidence tell us? Journal of Economic Literature, 33(1), 132–163.

Janipour, Z., de Nooij, R., Scholten, P., Huijbregts, M. A. J., & de Coninck, H. (2020). What are sources of carbon lock-in in energy-intensive industry? A case study into Dutch chemicals production. Energy Research & Social Science, 60, 101320.

Jégouzo, Y. (2008). L'évolution des instruments du droit de l'environnement. Pouvoirs, 4, 23–33.

Johnson, P., & Thomas, B. (1995). Heritage as business. Heritage, Tourism and Society, 170–190.

Jovinelly, J. (2007). Oil: The Economics of Fuel. The Rosen Publishing Group, Inc.

Kaal, H. (2011). A conceptual history of livability: dutch scientists, politicians, policy makers and citizens and the quest for a livable city. City, 15(5), 532–547.

Kalkuhl, M., Edenhofer, O., & Lessmann, K. (2015). The role of carbon capture and sequestration policies for climate change mitigation. Environmental and Resource Economics, 60(1), 55–80.

Kalmbach, K. (2020). The Meanings of a Disaster: Chernobyl and Its Afterlives in Britain and France (Vol. 20). Berghahn Books.

Kalmbach, K., Marklund, A., & Åberg, A. (2020). Crises and technological futures: Experiences, emotion, and action. Technology and Culture, 61(1), 272–281.

Kamoun, L., Frioux, S., Roussel, I., Mélard, F., & Charvolin, F. (2017). Un air familier?: sociohistoire des pollutions atmosphériques. Presses des Mines via OpenEdition.

Karakitapoglu, E. B. (2015). Public participation in EIA process of small hydro power plants (HES) in Turkey.

Karl, B. D., & Katz, S. N. (1981). The American private philanthropic foundation and the public sphere 1890–1930. Minerva, 19(2), 236–270.

Kato, S., & Ahern, J. (2009). Multifunctional landscapes as a basis for sustainable landscape development. Journal of the Japanese Institute of Landscape Architecture, 72(5), 799–804.

Kharaka, Y. K., & Dorsey, N. S. (2005). Environmental issues of petroleum exploration and production: Introduction. Environmental Geosciences, 12(2), 61–63.

Kirkwood, N. (2003). Manufactured sites: integrating technology and design in reclaimed landscapes. In Manufactured Sites (pp. 16–24). Taylor & Francis.

Klein, J. T. (2004). Prospects for transdisciplinarity. Futures, 36(4), 515–526.

Kolk, A., & Levy, D. (2001). Winds of change:: corporate strategy, climate change and oil multinationals. European Management Journal, 19(5), 501–509.

Krämer, L. (2021). The Court of Justice of the European Union. In A. Jordan & V. Gravey (Eds.), Environmental Policy in the EU: Actors, Institutions and Processes (4th ed.). Routledge.

Kulaç, O., & Torlak, E. (2018). Climate Change Policy of Turkey: An Analysis of Regular Progress Reports. Present Environment and Sustainable Development, 12(1), 189–201.

Lascoumes, P. (1999). Instituer l'environnement: vingt-cinq ans d'administration de l'environnement. Editions L'Harmattan.

Lassini, P., Ballardini, P., Mambriani, A., & Monzani, F. (1993). Seveso Oak Forest: The gradual reconstruction of an area contaminated by TCDD. Landscape and Urban Planning, 23(3–4), 221–231. https://doi.org/10.1016/0169-2046(93)90070-t

Lawrence, A. (2021). Reconceptualizing contemporary energy markets. Competition & Change.

Le Roux, T. (2009). La mise a distance de l'insalubrité et du risque industriel en ville: le decret de 1810 mis en perspectives (1760-1840). Histoire et Mesure, 24(XXIV–2), 31–70.

Le Roux, T. (2011). Accidents industriels et régulation des risques: l'explosion de la poudrerie de Grenelle en 1794. Revue d'histoire Moderne Contemporaine, 3, 34–62.

Le Roux, T. (2015). La «médiatisation» de l'insalubrité industrielle: un espace public de débats progressivement étouffé, 1770-1810. Le Temps Des Médias, 2, 34–51.

Le Roux, T. (2016). Chemistry and industrial and environmental governance in France, 1770–1830. History of Science, 54(2), 195–222.

Le Roux, T. (2011). L'effacement du corps de l'ouvrier. La santé au travail lors de la première industrialisation de Paris (1770-1840). Le Mouvement Social, 1, 103–119.

Le Roux, T. (2011). Le laboratoire des pollutions industrielles: Paris, 1770-1830. Albin Michel.

Leggett, J. K. (2001). The carbon war: global warming and the end of the oil era. Routledge.

Leguil, C., & Russ, J. (2012). La pensée éthique contemporaine:«Que sais-je?» n° 2834. Presses Universitaires de France.

Leonard, A. E., & Spellane, P. (2013). Using Old Maps and New Methods to Discover the Early Chemicals and Petroleum Industries of Newtown Creek in New York City. Journal of Map & Geography Libraries, 9(1–2), 25–43. https://doi.org/10.1080/15420353.2012.726205

Lestel, L. (2013). Pollution atmosphérique en milieu urbain: de sa régulation à sa surveillance. VertigO-La Revue Électronique En Sciences de l'environnement, Hors-série 15.

Lévêque, L. (2012). Le nouveau rôle des autorités portuaires dans l'adaptation des clusters aux enjeux de la globalisation. L'Espace Politique. Revue En Ligne de Géographie Politique et de Géopolitique, 16.

Levin, K., Cashore, B., Bernstein, S., & Auld, G. (2012). Overcoming the tragedy of super wicked problems: constraining our future selves to ameliorate global climate change. Policy Sciences, 45(2), 123–152.

Liberatore, A. (1997). The integration of sustainable development objectives into EU policy-making. Routledge: London.

Liebowitz, S. J., & Margolis, S. E. (1999). Path dependence. Encyclopedia of Law and Economics. Lits, B. (2021). Exploring astroturf lobbying in the EU: The case of responsible energy citizen coalition. European Policy Analysis, 7(1), 226–239.

Lo Prete, M. (2015). La vulnérabilité des villes portuaires méditerranéennes françaises et italiennes au prisme des contentieux. Les Annales de La Recherche Urbaine, 110(1), 206–215.

López, L. (2012). La importancia de la interdisciplinariedad en la construcción del conocimiento desde la filosofía de la educación/The importance of interdisciplinarity in the construction of knowledge from philosophy of education.

Lucas, M. (2009). La compensation environnementale, un mécanisme inefficace à améliorer. Revue Juridique de l'Environnement, 34(1), 59–68.

Lundberg, F. (2017). The Rockefeller Syndrome (Vol. 20171217). ibooks.

Lunel, P., Braun, P., Flandin-Blety, P., & Texier, P. (1986). Pour une histoire du droit de l'environnement. Revue Juridique de l'environnement, 11(1), 41–46.

Maas, W., & Hackauf, U. (2010). Green Dream: How future cities can outsmart nature. Nai Publisher.

MacKay, D. (2008). Sustainable Energy-without the hot air. UIT Cambridge.

MacKay, D. J. C., Cramton, P., Ockenfels, A., & Stoft, S. (2015). Price carbon—I will if you will. Nature, 526(7573), 315–316.

Maldonado, J. K. (2014). A multiple knowledge approach for adaptation to environmental change: lessons learned from coastal Louisiana's tribal communities. Journal of Political Ecology, 21(1), 61–82.

Maljean-Dubois, S., & Rajamani, L. (2011). La mise en oeuvre du droit international de l'environnement. Martinus Nijhoff.

Maljean-Dubois, S., & Wemaëre, M. (2015). COP 21?: la diplomatie climatique de Rio (1992) à Paris (2015). Editions A. Pedone.

Marchiafava, G., & Rézenthel, R. (2015). Le régime des ports maritimes en Italie et en France. Le Droit Maritime Français.

Markewitz, P., Kuckshinrichs, W., Leitner, W., Linssen, J., Zapp, P., Bongartz, R., Schreiber, A., & Müller, T. E. (2012). Worldwide innovations in the development of carbon capture technologies and the utilization of CO 2. Energy & Environmental Science, 5(6), 7281–7305.

Martens, M. (2007). Constitutional right to a healthy environment in Belgium. Review of European Community & International Environmental Law, 16(3), 287–297.

Massard-Guilbaud. (2010). Histoire de la pollution industrielle: France, 1789-1914 (Vol. 17). EHESS.

Massard-Guilbaud, G. (1999). La régulation des nuisances industrielles urbaines (1800-1940). Vingtieme Siecle. Revue d'histoire, 53–65.

Maugeri, L. (2013). The shale oil boom: a US phenomenon. Harvard Kennedy School, Belfer Center for Science and International Affairs.

McGregor, S. L. T. (2004). The nature of transdisciplinary research and practice. Kappa Omicron Nu Human Sciences Working Paper Series.

McIntyre, O. (2018). Transnational environmental regulation and the normativisation of global environmental governance standards. Journal of Property, Planning and Environmental Law.

McQuaig, L. (2004). It's the crude, dude: War, big oil and the fight for the planet. Doubleday Canada.

Meadows, D. H., Meadows, D. L., Randers, J., & Behrens, W. W. (1972). The limits to growth: a report for the club of rome's project on the predicament of mankind. New American Library.

Meadows, D., Randers, J., & Meadows, D. (2004). Limits to growth: The 30-year update. Chelsea Green Publishing.

Mega, V. P. (2016). Conscious Coastal Cities. Springer International Publishing.

Mega, V. P. (2016). Sustainable Regeneration of Coastal Cities. In Conscious Coastal Cities: Sustainability, Blue Green Growth, and The Politics of Imagination (pp. 223–252). Springer International Publishing.

Mega, V. P. (2016). Coastal Cities for and with Local and World Citizens. In Conscious Coastal Cities: Sustainability, Blue Green Growth, and The Politics of Imagination (pp. 253–268). Springer International Publishing.

Mega, V. P. (2016). Opportunities, Tensions and Risks for Coastal Cities. In Conscious Coastal Cities: Sustainability, Blue Green Growth, and The Politics of Imagination (pp. 39–62). Springer International Publishing.

Ménager, B., & Benedict, F. (1995). La reconstruction de Dunkerque après la seconde guerre mondiale. Revue Du Nord, 77(311), 633–640.

Merck, A., & Tillie, J. (2000). Trois siècles d'histoire de la Chambre de commerce et d'industrie de Dunkerque. Editions Histra.

Merk, O., & Notteboom, T. (2015). Port hinterland connectivity.

Meyer, H., D'Laine, C., & Henk, P. (1999). City and port: Transformation of Port Cities. London, Barcelona, New York and Rotterdam.

Ministère chargé de l'environnement. (n.d.). Explosion de la poudrerie de Grenelle. 14. http://barpipdf.geniecube.info/5692.pdf

Mitchell, T. (2013). Carbon Democracy. Verso Books.

Moatty, A., & Vinet, F. (2016). Post-disaster recovery: the challenge of anticipation. E3S Web of Conferences, 7, 17003.

Momirski, L. A., van Mil, Y., & Hein, C. (2021). Straddling the Fence: Land Use Patterns in and around Ports as Hidden Designers. Urban Planning, 6(3), 136–151.

Monios, J., Bergqvist, R., & Woxenius, J. (2018). Port-centric cities: The role of freight distribution in defining the port-city relationship. Journal of Transport Geography, 66, 53–64.

Moos, M., Whitfield, J., C. Johnson, L., & Andrey, J. (2006). Does Design Matter? The Ecological Footprint as a Planning Tool at the Local Level. Journal of Urban Design, 195–224. https://doi.org/10.1080/13574800600644381

Mosley, S. (2014). Environmental history of air pollution and protection. In The Basic Environmental History (pp. 143–169). Springer.

Moufflet, J.-F. (2017). Les archives à la carte: potentialités de la cartographie numérique pour les archives. Gazette Des Archives, 245(1), 241–255.

Mougeolle, P. (2020). Practitioner's Perspective: A Brief Commentary on the French Total Climate Case. CCLR, 128.

Myhre, G., Shindell, D., Bréon, F. M., Collins, W., Fuglestvedt, J., Huang, J., Koch, D., Lamarque, J. F., Lee, D., & Mendoza, B. (2014). Chapter 8: Anthropogenic and Natural Radiative Forcing. Climate Change 2013: The Physical Science Basis.

Nemery, B., Hoet, P. H. M., & Nemmar, A. (2001). The Meuse Valley fog of 1930: an air pollution disaster. The Lancet, 357(9257), 704–708.

Noble, H., & Heale, R. (2019). Triangulation in research, with examples. Evidence-Based Nursing, 22(3), 67–68.

Nouschi, A. (2001). La France et le pétrole de 1924 à nos jours. Editions A & J Picard.

Oddone, P. (2013). Le port de Dunkerque entre tourmentes et réussites économiques. Nord', 1, 19–30.

O'neill, J. (2001). Building better global economic BRICs.

Ostrom, E. (1990). Governing the commons: the evolution of institutions for collective action. Cambridge, Cambridge University Press.

Page, S. E. (2006). Path dependence. Quarterly Journal of Political Science, 1(1), 87–115.

Painter, D. S. (1984). Oil and the Marshall plan. The Business History Review, 359–383.

Parlement Français. (2017). Code de l'environnement.

Parlement Français. (2017). Code des Transports.

Pearlmutter, D. (2007). Architecture and climate: The environmental continuum. Geography Compass, 1(4), 752–778.

Peterson, C. H., Rice, S. D., Short, J. W., Esler, D., Bodkin, J. L., Ballachey, B. E., & Irons, D. B. (2003). Long-term ecosystem response to the Exxon Valdez oil spill. Science, 302(5653), 2082–2086.

Petrocultures Research Group. (2016). After Oil: Explorations and Experiments in the Future of Energy. Culture, and Society, Petrocultures Research Group, Edmonton, AB.

Pierson, P. (2004). Politics in Time: History, Institutions, and Social Analysis. Princeton University Press.

Port of Antwerp. (2015). Port of Antwerp, Europe's leading integrated oil and chemical cluster.

Port of Rotterdam Authority. (n.d.). Over 120 Industrial Companies. One Powerful Cluster. Make it Happen.

Porter, M. E. (1991). America's green strategy," Scientific American, April. p. 96.

Prieur, M. (1978). Le recours devant les juridictions administratives en matière d'installations classées pour la protection de l'environnement. Revue Juridique de l'Environnement, 3(2), 121–126.

Pundt, H., & Heilmann, A. (2020). Building Collaborative Partnerships: An Example of a 3rd Mission Activity in the Field of Local Climate Change Adaptation. In Universities as Living Labs for Sustainable Development (pp. 621–636). Springer.

Quéneudec, J.-P. (1968). L'incidence de l'affaire du Torrey Canyon sur le droit de la mer. Annuaire Français de Droit International, 14(1), 701–718.

Rae, A. (2011). Learning from the past? A review of approaches to spatial targeting in urban policy. Planning Theory & Practice, 12(3), 331–348.

Ramos, S. J. (2017). Resilience, path dependence, and the port: The case of Savannah. Journal of Urban History, 0096144217704183.

Ranchy, S. (2008). Le statut juridique des zones industrielles littorales et la pollution des sols: état de la réglementation et perspectives.

Reps, J. W. (1956). William penn and the planning of philadelphia. The Town Planning Review, 27(1), 27–39.

Restrepo, C., & Delavenne, C. (2016). Sols pollués et potentiellement pollués: transférer l'obligation de remise en état. Lemoniteur.Fr.

Rézenthel, R. (n.d.). Les ports maritimes et trente ans d'application de la loi relative au littoral. 776.

Rézenthel, R. (2015). Le directeur du port. Le Droit Maritime Français.

Rézenthel, R. (2016). Les ports maritimes et trente ans d'application de la loi relative au littoral. Le Droit Maritime Français.

Rézenthel, R. (2017). La liberté contractuelle et les activités portuaires. Le Droit Maritime Français.

Rézenthel, R. (2018). L'aménagement et la gestion des ports au regard de l'intérêt général. Le Droit Maritime Français.

Rézenthel, R. (2018). La réforme portuaire à dix ans. Le Droit Maritime Français.

Rézenthel, R. (2019). Le droit portuaire la lettre et l'esprit des textes. Le Droit Maritime Français.

Rézenthel, R. (2021). L'intérêt général, un fondement incontournable des activités portuaires. In S. Cros & F. Lerique (Eds.), Les ports en France: Quelle stratégie portuaire pour un développement de l'activité ? (pp. 128–138). Eska.

Ripple, W. J., Wolf, C., Newsome, T. M., Galetti, M., Alamgir, M., Crist, E., Mahmoud, M. I., Laurance, W. F., & 15, 364 scientist signatories from 184 countries. (2017). World Scientists' Warning to Humanity: A Second Notice. BioScience, 67(12), 1026–1028.

Rittel, H. W. J., & Webber, M. M. (1973). Dilemmas in a general theory of planning. Policy Sciences, 4(2). https://doi.org/10.1007/BF01405730

Roberts, P. (1996). European spatial planning and the environment: planning for sustainable development. European Environment, 6(3), 77–84.

Roche, C. (2003). Prévention et lutte contre la pollution des mers par les hydrocarbures: Les derniers développements communautaires. Transports (Paris. 1956), 421, 280–291.

Roche, C. (2017). L'essentiel du droit de l'environnement (7th ed.). GUALINO.

Roche, C. (2018). Les enjeux éthiques : la mer comme patrimoine commun ? In Pedone (Ed.), Le patrimoine maritime : entre patrimoine culturel et patrimoine naturel (pp. 37–45).

Roche, C. (2020). L'essentiel du droit de l'environnement 2020-2021 (11th ed.). GUALINO.

Rodhe, H., Charlson, R., & Crawford, E. (1997). Svante Arrhenius and the greenhouse effect. Ambio, 2–5. Romi, R. (2017). Droit internation et Européen de l'environnement (3rd ed.). LGDJ.

Rosenbloom, D., Meadowcroft, J., & Cashore, B. (2019). Stability and climate policy? Harnessing insights on path dependence, policy feedback, and transition pathways. Energy Research & Social Science, 50, 168–178.

Roso, V., Woxenius, J., & Lumsden, K. (2009). The dry port concept: connecting container seaports with the hinterland. Journal of Transport Geography, 17(5), 338–345.

Royal Dutch Shell plc. (2019). Shell Annual Report 2019 - Significant Shareholding. https://reports.shell.com/annual-report/2019/additional-information/shareholder-information/significant-shareholdings.php

Roymans, N., Gerritsen, F., der Heijden, C., Bosma, K., & Kolen, J. (2009). Landscape biography as research strategy: The case of the South Netherlands project. Landscape Research, 34(3), 337–359.

Rozakis, L. C., & Stephanou, A. C. (1983). The New law of the sea: selected and edited papers of the Athens Colloquium on the Law of the Sea, September 1982. North-Holland.

Runyon, R. P., & Rocks, L. (1973). The Energy Crisis. Proceedings of the Academy of Political Science, 31(2), 3–12.

Ruth, M., & Franklin, R. (2014). Livability for all? Conceptual limits and practical implications. Applied Geography, 49, 18–23.

Schmalz, D. L., Janke, M. C., & Payne, L. L. (2019). Multi-, inter-, and transdisciplinary research: Leisure studies past, present, and future. Journal of Leisure Research, 51(5), 511–516.

Schunz, S. (2012). Explaining the evolution of European Union foreign climate policy: A case of bounded adaptiveness. European Integration Online Papers, 2012–006.

Schuur, E. A. G., McGuire, A. D., Schädel, C., Grosse, G., Harden, J. W., Hayes, D. J., Hugelius, G., Koven, C. D., Kuhry, P., & Lawrence, D. M. (2015). Climate change and the permafrost carbon feedback. Nature, 520(7546), 171–179.

Selmi, R., Bououiyour, J., & Hammoudeh, S. (2020). Negative Oil: Coronavirus, a" black swan" event for the industry?

Sidjanski, D. (1995). Nouvelles tendances des groupes de pression dans l'Union européenne. Politiques Publiques En Europe, Paris, L'Harmattan.

Sijmons, D. (2012). Simple rules: Emerging Order? A designer's Curiosity about Complexity theories. In Complexity Theories of Cities Have Come of Age (pp. 281–309). Springer.

Sillans, C. (2000). " Au service du Diable": pour une histoire de la gestion des risques: incendies et organisations de secours: Lyon, 1852-1913 (pp. 121–126). Lyon 2. http://theses.univ-lyon2.fr/documents/lyon2/2000/sillans_cp=0&a=top

SILVERA, V. (1971). Le premier remaniement de la structure du septième gouvernement de la cinquième république. La Revue Administrative, 24(141), 277–280.

Smouts, M.-C. (2005). Du patrimoine commun de l'humanité aux biens publics globaux. Patrimoines Naturels Au Sud. Territoires, Identités et Stratégies Locales, Paris, IRD, 53–69.

Sorensen, A. (2017). Institutions, Comparison, and Temporal Processes. In The Routledge Handbook of Planning History (p. 26). Routledge.

Stockman, L., Rowell, A., & Kretzmann, S. (2009). Shell's Big Dirty Secret. Insight into the world's most carbon intensive oil company and the legacy of CEO Jeroen van der Veer.

Susca, T., Gaffin, S. R., & Dell'Osso, G. R. (2011). Positive effects of vegetation: Urban heat island and green roofs. Environmental Pollution, 159(8–9), 2119–2126.

Tanik, A., & Tekten, D. (2018). Planning Climate Change Adaptation Activities for Turkey. International Journal of Environmental Science and Development, 9(9).

Taverne, B. (1999). Petroleum, Industry, and Governments: An Introduction to Petroleum Regulation, Economics, and Government Policies. Kluwer Law International.

Tempel, N. (2012). Post-industrial landscapes. Industrial Heritage Re-Tooled: The TICCIH Guide to Industrial Heritage Conservation, 142–148.

Teschner, N. (2018). The battle over the commons in port cities. Urban Geography. The European Commission. (2019). The European Green Deal, COM/2019/640 final. https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1588580774040&uri=CELEX%3A52019DC0640

The Organisation for Economic Co-operation and Development. (n.d.). The polluter-pays principle.

The Organisation for Economic Co-operation and Development. (n.d.). Turkey (Environmental Assessment).

The Organisation for Economic Co-operation and Development. (2019). Turkey Highlights 2019.

The Organisation for Economic Co-operation and Development. (2019). The Governance of Land Use in Korea. OECD. https://www.oecd-ilibrary.org/urban-rural-and-regional-development/the-governance-of-land-use-in-korea_fae634b4-en

Thelliez, E. (1957). Les industries de l'agglomération dunkerquoise. Revue Du Nord, 39(155), 13–49. https://doi.org/https://doi.org/10.3406/rnord.1957.5665

Torres, P. H. C. (2020). Reaction or anticipation? The role of urban and regional planning in adapting to the climate emergency. In Regions e-Zine.

Tourret, P. (2012). Ports français. Les mutations. Outre-Terre, 3, 321–331.

Tucker, E. (2016). Working disasters: the politics of recognition and response. Routledge.

Turner, G. (2014). Is Global Collapse Imminent? University of Melbourne, Melbourne Sustainable Society Institute.

Vadelorge, L. (2019). Lubrizol-Rouen 2019: catastrophe environnementale et crise de l'aménagement du territoire. Metropolitiques. Eu.

Valero, C. (2019). Erika, Prestige : Deux décennies après, quelles avancées ? ISEMAR - Institut Supérieur d'Economie Maritime, 215.

van de Kerchove, M. (2010). Rien n'est simple. Tout se complique. La complexité, limite à la simplification du droit. In F. Rueda & J. Pousson (Eds.), Qu'en est-il de la simplification du droit ? (pp. 101–118). Presses de l'université de Toulouse 1 Capitole.

Van den Bergh, R., Nivard, M., & Kreijkes, M. (2016). Long-Term Prospects for Northwest European Refining. Asymmetric Change: A Looming Government Dilemma? Den Haag: Clingendael International Energy Programme.

Van den Steen, I., Wayens, B., & Wolff, E. (2005). Evolution de l'utilisation du sol le long du littoral belge. Belgeo. Revue Belge de Géographie, 3, 327–348.

van Gent, B. (2014). Port of Rotterdam and Maasvlakte 2: Polder Environmentalism, Indecision and Ambition. Ad Astra.

van Klink, A. (2003). The Kempen nexus. The spatial-economic development of Rotterdam and Antwerp. In Struggling for leadership: Antwerp-Rotterdam port competition between 1870–2000 (pp. 143–159). Springer.

Van Lang, A. (2012). La loi littoral et la protection des espaces naturels. Revue Juridique de l'environnement, 5, 105–116.

Vanholder, M. (1973). Belgisch Milieurecht.

Verdun, A. (2008). Policy-making and integration in the European Union: Do economic interest groups matter? The British Journal of Politics and International Relations, 10(1), 129–137.

Vinh-De, N. (1998). Qu'est-ce que l'éthique de l'environnement? Horizons Philosophiques, 9(1), 87–107.

Vivoda, V. (2010). International oil companies, US Government and energy security policy: an interest-based analysis. International Journal of Global Energy Issues, 33(1–2), 73–88.

Vogler, J., & Stephan, H. R. (2007). The European Union in global environmental governance: Leadership in the making? International Environmental Agreements: Politics, Law and Economics, 7(4), 389–413.

Wahlen, M. (1993). The global methane cycle. Annual Review of Earth and Planetary Sciences, 21(1), 407–426.

Wankel, C. (2009). Encyclopedia of Business in Today's World: A-C (Vol. 1). Sage.

Watson, B. (2017). The troubling evolution of corporate greenwashing. Chain Reaction, 129, 38.

Weber, E. P., & Khademian, A. M. (2008). Wicked problems, knowledge challenges, and collaborative capacity builders in network settings. Public Administration Review, 68(2). https://doi.org/10.1111/j.1540-6210.2007.00866.x

Wilkinson, P. (2008). Peak oil: Threat, opportunity or phantom? Public Health, 2008 Jul;1.

Williams, P. (2013). Climate change, its effects, and the political economy of adaptation and mitigation: turkey and the eastern Mediterranean region. In Climate change, sustainable development, and human security: a comparative analysis (pp. 281–305). Lexington Books.

Woolfson, C. (2013). Preventable disasters in the offshore oil industry: from Piper Alpha to Deepwater Horizon. New Solutions: A Journal of Environmental and Occupational Health Policy, 22(4), 497–524.

Wright, S. L., & Kelly, F. J. (2017). Plastic and Human Health: A Micro Issue? Environmental Science & Technology, 51(12), 6634–6647.

Yanxun, S., Yani, W., Hui, Q., & Yuan, F. (2011). Analysis of the groundwater and soil pollution by oil leakage. Procedia Environmental Sciences, 11, 939–944.

Yergin, D. (2011). The prize: The epic quest for oil, money & power. Simon and Schuster. Yin, R. K. (2009). Case study research: Design and methods (Vol. 5). sage.

Yu, W., Zang, S., Wu, C., Liu, W., & Na, X. (2011). Analyzing and modeling land use land cover change (LUCC) in the Daqing City, China. Applied Geography, 31(2), 600–608.

Zevenbergen, J. (2005). SDI Development and Law-based Special Recordings: The Case of Soil Pollution Sites in the Netherlands. From Pharaohs to Geoinformatics. FIG Working Week 2005 and GSDI-8, 12.

Zimmer, A. (2016). Brouillards toxiques: Vallée de la Meuse, 1930, contre-enquête. Zones sensibles editions.

Zimmer, A., & Nemery, B. (2017). The Meuse Valley (1930): Just fog or industrial pollution. Air Pollution Episodes, 6, 27.

Zondag, B., Bucci, P., Gützkow, P., & de Jong, G. (2010). Port competition modeling including maritime, port, and hinterland characteristics. Maritime Policy & Management, 37(3), 179–194.

Zonneveld, W. (2005). Expansive spatial planning: the new European transnational spatial visions. European Planning Studies, 13(1), 137–155.

7.2. MAIN REGULATIONS AND DATABASES

Agreement for cooperation in dealing with Pollution of the North Sea by Oil, signed on June 9, 1969.

Arrêté fixant la liste des exploitants auxquels sont affectés des quotas d'émission de gaz à effet de serre et le montant des quotas affectés pour la période 2008-2012 (Order setting the list of operators to which greenhouse gas emission allowances are assigned and the amount of allowances allocated for the period 2008-2012), May 31, 2007.

Arrêté modifié fixant la liste des exploitants auxquels sont affectés des quotas d'émission de gaz à effet de serre et le montant des quotas affectés à titre gratuit pour la période 2013-2020 (Amended order setting the list of operators to which greenhouse gas emission allowances are assigned and the amount of allowances allocated free of charge for the period 2013-2020), January 24, 2014.

Convention for the Protection of the World's Natural and Cultural Heritage, November 16, 1972.

Convention on access to information, public participation in decision-making and access to justice in environmental matters, June 25, 1998.

Convention on Wetlands of International Importance Especially as Waterfowl Habitat, February 2, 1971.

Council Directive on the conservation of wild birds, 79/409/EEC, April 2, 1979.

Council Directive on the conservation of natural habitats and of wild fauna and flora, 92/43/EEC, May 21, 1992.

Council Directive on the major accident hazards of certain industrial activities, 82/501/EEC, June 24, 1982.

Décret de taxation sur l'importation de produits raffinés(Tax Decree on the imports of refined products), July 16, 1863.

Décret Impérial portant réglement pour l'exploitation des dépôts et magasins d'huiles minérales ou autres hydrocarbures (laying down regulations for the operation of deposits and stores of mineral oils or other hydrocarbons), April 18, 1866.

Décret Impérial relatif aux manufactures et ateliers qui répandent une odeur insalubre ou incommode (Imperial decree relating to factories and workshops which spread an unhealthy or unpleasant odor), October 15, 1810.

Directive of the European Parliament and of the Council on the control of major-accident hazards involving dangerous substances, amending and subsequently repealing Council Directive 96/82/EC, 2012/18/UE, July 4, 2012.

Interimwet Bodemsanering (Clean-up Interim Act), January 1983.

Interinstitutional Agreement between the European Parliament, the Council of the European Union and the European Commission on Better Law-Making, L123/1, April 13, 2016.

International convention on civil liability for oil pollution damage, signed on November 29, 1969.

International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, December 18, 1971.

International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties, signed on November 29, 1969.

Kyoto protocol to the United Nations framework convention on climate change, signed on December 11, 1997.

Loi Aubriot "tendant à la suppression des fumées industrielles" (aiming at the elimination of industrial smokes), April 20, 1932.

Loi Bachelot n° 2003-699 on "Plan de Prévention des Risques Technologiques" (Technological Risk Prevention Plan), July 30, 2003.

Loi constitutionnelle n° 2005-205 relative à la Charte de l'environnement (on the environmental charter), March 1st, 2005.

Loi Cornudet on "Plans d'extension et d'aménagement des villes" (on the expansion and planning plans of cities), March 14, 1919.

Loi Defferre n° 83-8 relative à la répartition de compétences entre les communes, les départements, les régions et l'Etat (on the distribution of powers between municipalities, departments, regions and the State), January 7, 1983.

Loi ELAN n° 2018-1021 relative à l'évolution du logement, de l'aménagement et du numérique (on the evolution of housing, development and digital), November 23, 2018.

Loi Morizet relative au Conseil Général de la Seine (relating to the General Council of the Seine), April 20, 1932.

Loi n° 2008-660 portant réforme portuaire (on the reform of ports), July 4, 2008.

Loi n° 2010-788 portant engagement national pour l'environnement (with a national commitment to the environment), July 12, 2010.

Loi n° 2011-525 de simplification et d'amélioration de la qualité du droit (simplification and improvement of the quality of law), May 17, 2011.

LOI n° 2014-366 pour l'accès au logement et un urbanisme rénové (for access to housing and renovated town planning), March 24, 2014.

Loi n° 2015-177 relative à la modernisation et à la simplification du droit et des procédures dans les domaines de la justice et des affaires intérieures (on the modernization and simplification of law and procedures in the fields of justice and home affairs), February 16, 2015.

Loi n° 2017-1839 mettant fin à la recherche ainsi qu'à l'exploitation des hydrocarbures et portant diverses dispositions relatives à l'énergie et à l'environnement (ending the research and exploitation of hydrocarbons and laying down various provisions relating to energy and the environment), December 30, 2017.

Loi n° 2019-1147 relative à l'énergie et au climat (on the energy and the climate), November 8, 2019.

Loi n° 2020-1525 d'accélération et de simplification de l'action publique (on the acceleration and simplification of public action), December 7, 2020.

Loi n° 47-1746 sur l'organisation du travail de manutention dans les ports (on the organization for handling work in the ports), September 6, 1947.

Loi n° 65-491 sur les ports maritimes autonomes (on autonomous ports), June 29, 1965.

Loi n° 76-629 relative à la protection de la nature (on the protection of nature), July 10, 1976.

Loi n° 76-663 relative aux installations classées pour la protection de l'environnement" (on classified installations for environmental protection), July 19, 1976.

Loi n° 83-663 complétant la loi n° 83-8 du 7 janvier 1983 relative à la répartition de compétences entre les communes, les départements, les régions et l'Etat (supplementing the law n° 83-8 of January 7, 1983 relating to the distribution of competences between the communes, the departments, the regions and the State), July 22, 1983.

Loi n° 85-30 relative au développement et à la protection de la montagne (on the development and the protection of the mountain), January 9, 1985.

Loi n° 86-2 relative à l'aménagement, la protection et la mise en valeur du littoral (on coastal development, protection and enhancement), January 3, 1986.

Loi relative au régime d'importation du pétrole (Petroleum Import Regime Law), March 30, 1928.

Rio Declaration on Environment and Development, June 3-14, 1992.

Sherman Anti-Trust Act, US, July 2, 1890.

The Convention for the Prevention of Pollution from Ships, November 2, 1973.

The Single European Act, signed on February 17, 1986.

Treaty establishing the European Coal and Steel Community, April 18, 1951.

Treaty of Lisbon, signed on December 13, 2007.

Treaty of Rome establishing the European Economic Communities, signed on March 25, 1957.

Treaty on the European Union, or Maastricht Treaty, signed on February 7, 1992.

Flemish Government. Navigator Wetgeving Leefmilieu, Natuur en Energie.

Publications Office of the European Union. Eur-Lex. https://eur-lex.europa.eu/

Secrétariat Général du Gouvernement. Légifrance. https://www.legifrance.gouv.fr/

Service Public Fédéral Belge. Justel.

United Nations Convention on the Law of the Sea, December 10, 1982.

United States National Archives and Records Administration.https://www.ourdocuments.gov

Wet Bodembescherming (Soil Protection Act), July 3, 1986.

7.3. NEWSPAPERS AND MAGAZINES

Ethane Crackers Spark Pollution Concerns. Published October 25,2019. https://www.loe.org/shows/segments.html?programID=19-P13-00043&segmentID=1

Privatisations partielles: Elf et Total en attendant Rhône-Poulenc. Published January 7, 1993.

Lubrizol, symptôme de la dérégulation de l'environnement. Reporterre. Published online October 2019.

Agence France-Presse. Renewable player overtakes ExxonMobil in market value. Published October 8, 2020.

Agence France-Presse. Poutine rencontre pour la première fois le nouveau PDG de Total. L'Express. Published November 28, 2014.

Ambrose J. Global oil demand may have passed peak, says BP energy report. Published 2020.

Ambrose J. Seven top oil firms downgrade assets by 87bn dollars in nine months. The Guardian. Published 2020.

Ambrose J. "Shell and BP Bounce Back into Profit Even as Oil's Glory Days Fade." The Guardian. Published 2021.

Bousso R. France's Total quits top U.S. oil lobby in climate split. Reuters. Published January 15, 2021.

Brillet F. Comment Total prend le virage de l'énergie responsable. Published online July 3, 2019.

Cole A. Google and Amazon are now in the oil business. Vox, ed. Vox. Published online 2020.

de Senneville V. « Erika » : la Cour de cassation condamne Total et confirme sa responsabilité dans la tragédie. Les Echos. Published September 2012.

Deboyser B. Les géants du pétrole se donnent une image verte mais investissent toujours massivement dans les énergies fossiles. Révolution Energétique. Published January 17, 2020.

Dufourg O. Loon-Plage: une sacrée canalisation entre le terminal méthanier et la centrale nucléaire. La Voix du Nord. Published July 7, 2016.

Ekblom J. European Investment Bank postpones decision on fossil fuel lending. Reuters. Published October 15, 2019.

Fairlie H. The Establishment. Published 1959.

Hampton L. U.S. energy bankruptcy surge continues on credit, oil-price squeeze. Published August 11, 2020.

Hein C. Sustainable Architecture: Building the future Dunkirk. Beam. Published online June 2019.

Hein C, De Martino P. Designing post-carbon Dunkirk with the students from TU Delft. Beam. Published online February 2018.

Holden E. How the oil industry has spent billions to control the climate change conversation. The Guardian. Published January 8, 2020.

Hurdle J. In a Refinery's Ashes, Hope for an End to Decades of Pollution. Published January 28, 2021.

Jean, Kévin. "Capturer Massivement Les Émissions de CO2 Plutôt Que de Les Réduire: Pourquoi c'est Une Illusion." Bastamag, 2018.

Kottasová I. Shell quits major US oil lobby over climate change. CNN Business. Published April 2, 2019.

Krauss C. U.S. and European Oil Giants Go Different Ways on Climate Change. The New York Times. Published December 11, 2020.

Laville S. Top oil firms spending millions lobbying to block climate change policies says report. The Guardian. Published March 22, 2019.

Laville S. Fossil fuel big five "spent €251m lobbying EU" since 2010. Published October 24, 2019.

Le Cain B. Trois cartes pour comprendre la violence des explosions à Beyrouth. Le Télégramme. Published August 5, 2020.

Lecluyse F. À Lille, l'explosion des Dix-huit Ponts signait en 1916 un Beyrouth lillois. La Voix du Nord. Published August 6, 2020.

Lecuyer J. La cité des ingénieurs figée dans l'instant. La Voix du Nord. Published May 16, 2002.

Maykuth A. A Chicago company has finalized its purchase of the bankrupt Philly refinery. The Philadelphia Inquirer. Published June 26, 2020.

1. Nafeez A. A former BP Geologist: Peak Oil is here and it will break economies. The Guardian. Published December 23, 2013.

1. Pheulpin S. Littoral : les sénateurs replongent et vont plancher sur un nouveau texte. Le Moniteur. Published January 25, 2018.

Rezenthel R. Ville-Port: un rapprochement progressif. Portus 8. Published online 2004:18-21.

Senneville V de. « Erika » : la Cour de cassation condamne Total et confirme sa responsabilité dans la tragédie. Les Echos. Published September 25, 2012.Shabecoff P. U.S. Goes to Ecology Parley Under Cloud of Doubt. The New York Times. Published 1982.

Tabuchi H, Corkery M, Mureithi C. Big Oil Is in Trouble. Its Plan: Flood Africa With Plastic. The New York Times. Published August 30, 2020.The Economist. Fuel cells meet big business. The Economist. Published July 22, 1999.

Van Dijck M. Beschermingen Petroleum-Zuid in Antwerpen. Agentschap Onroer Erfgoed. Published online March 17, 2016.

Wakim N. Pétrole : plus de 80 milliards de profit pour les majors en 2018. Le Monde. Published February 7, 2019.

Walker A. US oil prices turn negative as demand dries up. Published April 21, 2020.

Watts J. Oil and gas firms "have had far worse climate impact than thought." The Guardian. Published February 19, 2020.

7.4. MOVIES AND DOCUMENTARY

Cash Investigation. Climat : Le Grand Bluff Des Multinationales. France Télévision; 2016.

Orlowski J. The Social Dilemma. Netflix; 2020.

7.5. WEB-PAGES, BLOGS AND WEBSITES

Actu Environnement. https://www.actu-environnement.com/

Bonciani B. Port City Scenarios During and After Covid-19: The case of Livorno. PortCityFutures. Published 2020. https://www.portcityfutures.nl/news/port-city-scenarios-during-and-after-covid-19-the-case-of-livorno

Center for International Environmental Law. Smoke & Fumes. https://www.smokeandfumes.org/

Conway T. History of Standard Oil: The Cleveland Massacre. http://moglen.law.columbia.edu

Douglas P. The Delft Thunderclap of 1654. https://www.newnetherlandinstitute.org/

European Commission. CORDIS EU research results. https://cordis.europa.eu/en

European Commission. Responsible Research & Innovation. https://ec.europa.eu/programmes/horizon2020/en/h2020-section/responsible-research-innovation

Hauser S. The European Green Deal: New Opportunities for Port Cities? PortCityFutures. Published 2020. https://www.portcityfutures.nl/news/the-european-green-deal-new-opportunities-for-port-cities

Hauser S. The Post-Covid Time: A Post-Normal or Pre-Environmental Time? PortCityFutures. Published 2020. https://www.portcityfutures.nl/news/the-post-covid-time-a-post-normal-or-pre-environmental-time-0

Hauser SJ. Post-Covid: Post-normal ou pré-normal ? Territoire Europe. Published 2020. https://www.territoire-europe.eu/post-covid-post-normal-ou-pre-normal/

Hope M. How Shell Greenwashed its Image as Internal Documents Warned of Fossil Fuels' Contribution to Climate Change. https://www.desmog.com/2018/04/11/how-shell-greenwashed-its-image-internal-documents-warned-fossil-fuels-contribution-climate-change/

Lebel A. La Reconstruction. https://www.ville-dunkerque.fr/decouvrir-sortir-bouger/histoire-patrimoine/lhistoire-de-dunkerque/la-reconstruction/

Les Echos. Le maire de Grande-Synthe poursuit l'Etat pour « inaction climatique ». https://www.lesechos.fr/politique-societe/societe/le-maire-de-grande-synthe-poursuit-letat-pour-inaction-climatique-870715

Ministère de la Transition Ecologique et Solidaire. Géorisques. http://www.georisques.gouv.fr/

Moretti B. Port City Discourse: A New Vocabulary for Research and Action. PortCityFutures. Published 2021. Accessed March 31, 1989. https://www.portcityfutures.nl/news/port-city-discourse-a-new-vocabulary-for-research-and-action

Port of Rotterdam. Research into the use of green hydrogen in refinery process. Published 2017. https://www.portofrotterdam.com/en/news-and-press-releases/research-into-the-use-of-green-hydrogen-in-refinery-process

Port of Rotterdam. Rotterdam boosts hydrogen economy with new infrastructure. Published 2020. https://www.portofrotterdam.com/en/news-and-press-releases/rotterdam-boosts-hydrogen-economy-with-new-infrastructure

Réseau Action Climat France. Observatoire Climat-Energie. Prix Moyen Du Carbone Dans Le Cadre de l'ETS, 2019, https://www.observatoire-climat-energie.fr/climat/industrie/prix-du-carbone-ets/

Tianchen D, Hein C, Baciu D. Understanding how words matter for port heritage: towards a network perspective. PortCityFutures. Published 2021. https://www.portcityfutures.nl/news/understanding-how-words-matter-for-port-heritage-towards-a-network-perspective

Total. Total, a Pioneering Spirit. http://www.total.com/en/our-group/thumbnail/total-leading-energy-operator-almost-century

TotalEnergies. BioTfueL : vers un développement des biocarburants de 2e génération. https://totalenergies.com/fr/expertise-energies/projets/bioenergies/biotfuel-convertir-residus-vegetaux-carburant

United Nations, Department of Economic and Social Affairs. As cities boom, forests key to meeting demands for water, food and energy – UN. https://www.un.org/development/desa/en/news/forest/forests-and-cities.html

List of Publications

.1. Peer-Reviewed Publications

- S. Hauser. "The Interplay of Economic Development and Environmental Protection: Dunkirk and the Search for Balance". In: *PORTUSplus* 8.0 (2019)
- S. J. Hauser. "Long Live the Heritage of Petroleum: Discoveries of Former Oil Sites in the Port City of Dunkirk". In: *Urban Science* 4.2 (2020), p. 22
- S. J. Hauser and C. Roche. "Sharing Is Caring, but Is the Shore Cared for? The Sharing Paradox of the French Coast". In: *Urban Science* 4.4 (Nov. 2020), p. 60
- G. Aktürk and S. J. Hauser. "Detection of Disaster-Prone Vernacular Heritage Sites at District Scale: The Case of Fındıklı in Rize, Turkey". In: *International Journal of Disaster Risk Reduction* (2021), p. 102238. ISSN: 2212-4209
- C. Hein, T. Mager, and S. Hauser. "Refining the Heritage Narrative of Post-Oil Landscapes". In: *Transcending the Nostalgic: Deindustrialised Landscapes Across Europe*. Ed. by J. Tomann. Walter de Gruyter GmbH, 2021, pp. 261–280. In Press.
- C. Hein, C. Stroobandt, and S. Hauser. "Petroleumscape as Heritage Landscape: The Case of the Dunkirk Port City Region". In: *Oil Spaces: Exploring the Global Petroleumscape*. Ed. by C. Hein. Routledge, 2021. Chap. 15
- S. Hauser. "Oil is Dead, its Heritage with it?: The influence of environmental regulations on the evolution of modern planning". In: *16th International Docomomo Conference 2020: Inheritable Resilience: Sharing Values of Global Modernities*. 2020

.2. Non-peer-reviewed

- S. J. Hauser. *WHO & UfM Joint Webinar on Environment and Health in Seaport Cities–a report*. 2021
- G. Aktürk and S. J. Hauser. *Blue Paper # 5: Sea snot as a visible sign of climate change*. 2021
- S. Hauser. *The Post-Covid Time: A Post-Normal or Pre-Environmental Time?* 2020. URL: https://www.portcityfutures.nl/news/the-post-covid-time-a-post-normal-or-pre-environmental-time-0
- S. J. Hauser. *Post-Covid: Post-normal ou pré-normal ?* 2020. URL: https://www.territoire-europe.eu/post-covid-post-normal-ou-pre-normal/
- S. Hauser. *The European Green Deal: New Opportunities for Port Cities?* 2020. URL: https://www.portcityfutures.nl/news/the-european-green-deal-new-opportunities-for-port-cities

22#02

The Oil is Dying? Long Live its "Heritage"!

The Refining of Legal Systems and Port-Cities' Planning

Stephan Hauser

Oil is a dangerous product. Its transport, storage and refining present numerous environmental and health challenges. Local, national and European regulators have taken steps to locate it in space since the beginning of industrial oil drilling in the 1860s. But key leaders of the oil industry in Northwest Europe, and beyond, have also served as policy makers and aimed to keep legal constraints (decrees, laws, taxes) as limited as possible to prevent the emergence of obstacles in the development of their industry. This process led to a cruel lack of anticipation in the design of rules and urban spaces when dealing with safety. Public authorities continuously established limited frames upon the oil industry and wrote rules in general terms to protect this strategic industry. Today, the pollution and the risks oil companies generated restrict opportunities for the future re-use of industrial sites, and there has been little done on the law-making scale to guide the transformation of oil spaces. Using the case of port cities like Dunkirk, in France, that have emerged as oil ports for their respective countries over the last 150 years, this thesis examines the emergence and application of spatial and environmental regulations along with oil industrial expansion. The objective is to highlight the need to shift from the current reactive process of improving legal frames after a disaster to one that anticipate and deal with the visible and invisible oil heritage.

A+BE | Architecture and the Built Environment | TU Delft BK