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Policy preferences and the diversity of instrument choice for mitigating climate change impacts in the transport sector

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Different policy approaches and responses to common environmental challenges, such as climate change, exist between countries, and sometimes even within countries. This situation arises because public policy-makers are not only driven by concerns of theoretical purity but are also influenced by a range of social, political, economic, cultural and administrative matters when selecting techniques or instruments to achieve specific policy goals. This article examines whether the diversity of stated policy instruments to tackle climate change mitigation in the transport sector can be explained according to national policy preferences in a European context. It also investigates whether the mix of national climate change policy instruments for transport exhibits temporal stability, even after national changes in political power. To do so, the article reviews a series of national policy documents that address climate change in the transport sector in four European countries with contrasting administrative traditions – France, Germany, Sweden and the United Kingdom.

Keywords: policy instruments; climate change; mitigation; transport; Europe

1. Introduction

Climate change has become a new priority for many policy sectors over recent decades and the transport sector is no exception in this regard. As well as increasing the number of issues to which transport policy now needs to respond, climate change has also resulted in the formulation of new policy goals and objectives, new policy instruments, policy settings, governance arrangements and even new institutions (see for example Levy and Rothenberg 2002).^{1,2} This has occurred extensively at different policy levels – from the local through to the global level and all levels in between. Policy responses to common societal challenges such as climate change do not necessarily result in common or similar approaches since public policy-makers are not solely driven by concerns of theoretical purity, but are often responding to a whole host of social, political, economic, cultural and administrative concerns when selecting a particular technique by which to obtain their policy goals (Howlett 1991). Common environmental challenges have, for example, resulted in a wide diversity of policy responses in the transport sector across different countries, even close neighbours (Organisation for Economic Cooperation and Development – OECD 2002).

This article seeks to begin to account for some of these national differences in stated policy response. It is concerned with examining the extent to which there are specific national public policy preferences that favour or support the choice of certain policy

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instruments in the context of transport and climate change policy. The flipside of this notion is that the choice of some other policy instruments is inhibited or considered inappropriate or unsuitable because of national public policy preferences. A more detailed understanding about the variation in policy preferences and instrument choice is not only of theoretical interest: it also has potential practical applications in questions related to the transferability of different types of policies and practices. The idea that there may be national differences in policy choices and approaches concerning climate change mitigation is also related to the observation that the national level of decision-making (and national-level actors) is important in determining climate change mitigation policies (see for example Tol 2005). Mitigation often rests on agreements made by national governments in the context of international negotiations, whereas adaptation involves local managers of natural resources, and individual households and companies (Tol 2005).

Information about policy instruments is derived from a comparative analysis of a time series of communications submitted by national governments to the United Nations under the Framework Convention on Climate Change. These documents outline the steps that are being taking to implement Articles 4.1 and 12 of the Framework Convention on Climate Change. This information is complemented by data from several Eurobarometer public opinion surveys related to attitudes among citizens about the importance of climate change and their views about the effectiveness of different environmental policy instruments.

The paper is structured in four main parts. It begins by reviewing the academic literature related to policy preferences and specifying two working hypotheses in relation to policy styles and instrument choice (and mix) for tackling climate change in the transport sector. Second, it outlines the main methods employed and information sources used for examining policy preferences in this paper. In the third part, hypotheses are tested by presenting and analysing evidence from various sources. The paper closes with conclusions and reflections on the existence of national policy preferences on climate change.

2. A review of policy styles

The idea that the politics and policies of states and nations are distinctively clustered is not new to comparative political inquiry (Castles and Obinger 2008). In the early 1980s, the subject received attention from scholars such as Richardson, Gustafsson, and Jordan (1982) who examined the existence of “different systems of decision-making” and “different procedures for making societal decisions” (2). Other authors (e.g. Hood 1983 and 1986) observed that high-level government goals and implementation preferences are not random, but rather tend to cluster into favoured sets of ideas and instruments and which are used over a wide range of policy-making contexts. Meanwhile, Forester (1984) argued that a limited set of contextual variables can lead to a range of distinct sets of discrete decision-making ‘styles’ with significant impacts on the nature and type of decisions that emerge from decision-making processes. Since the 1980s, ideas on policy styles have been further elaborated and applied to various contexts, although these ideas have not been tested in Europe in a very comprehensive and comparable way (i.e. comparing policy approaches across different countries using a common method and comparable information sources over a series of time), and have never been extensively applied to climate change and/or transport policy.

Although a handful of sources can be found in which some broad differences between transport policy-making traditions across Europe are distinguished (e.g. Button 1998; Kerwer and Teutsch 2001; Molle 1990; Stevens 2004), these only generally offer a fairly simple distinction between ‘Continental European’ and ‘Anglo-Saxon’ approaches (sometimes using different labels than these) and do not refer directly to the idea of policy preferences or styles. Button (1998), for example, refers to a ‘Continental’ policy tradition which treats transport as an element of wider social and economic policy and which is much less concerned with the economic efficiency of the transport industries compared to the ‘Anglo-Saxon’ model. Meanwhile, in explaining the long deadlock in European transport policy-making during the 1960s and 1970s, Kerwer and Teutsch (2001) distinguish a tension between interventionist regulatory approaches to transport policy (in countries such as France, Germany and Italy) and more liberal approaches (in countries such as the Netherlands).

Meanwhile, a more limited number of sources can be found which provide a review and inventory of policy options for addressing climate change in the transport sector (e.g. Eisenack *et al.* 2012; Stamos, Mitsakis, and Grau 2015) although these do not account for the variations in policy choices that exist between administrations. In addition, a few recent articles have considered how policy choices for climate change mitigation or adaptation vary in different contexts (e.g. Hughes and Urpelainen 2015) but these have not specifically focused on the transport sector nor have they explicitly considered the existence of distinctive types of policy approaches or policy preferences. While Marsden, Bache, and Kelly (2012) do refer to policy styles in their account of developments in the UK’s transport and climate change policy agenda they do not look closely at the temporal change (or constancy) of specific policy instruments employed.

The notion of policy styles helps to explain the existence of different preferences for specific kinds of policy instruments to deal with certain policy issues. The existence of these different policy styles means that government policy officials (and politicians) typically work within a set of pre-established policy goals and implementation preferences. These then affect the articulation of more detailed policy elements, such as policy objectives and tools, as well as policy targets and calibrations (Howlett 2009). While policy officials can promote particular sets of goals and preferences through their own activities in managing policy processes or their participation in them, overall government aims and general instrument preferences are most often fairly fixed, and officials typically have to work under the conditions of having to match lower-order policy objectives, tools, targets and calibrations to the overall policy aims and instrument preferences that are determined by the predominant policy style (Kooiman 2008; Howlett 2009).

Closely linked to the notion of policy styles are ideas about bounded rationality and ‘policy conservatism’. For example, the lack of time and information and an imperfect understanding of causal relations will often result in policy officials relying on ‘standard operating procedures’ (Richardson, Gustafsson, and Jordan 1982, 2) and routinised behaviour in order to reduce complexity (Howlett 2009). Previous policy decisions which turned out to be more or less successful in the past will tend to be repeated, policy officials will tend to stick to more well-known solutions and policy changes will tend to be incremental and minimised as much as possible. As a consequence, many policy decisions exhibit a degree of path dependence (i.e. influenced by decisions taken in the past). According to Lenschow, Liefferink, and Veenman (2005), policy actors generally tend to choose from their existing repertoire of institutional procedures, technologies and organisational forms, while new institutional patterns that break with established practices and procedures are rarely considered since their introduction will generally

involve additional time, personnel and financial resources. While the literature on policy transfer, diffusion and new institutionalism tend to provide a picture of dynamic and rapid policy change through policy networks and learning, and may even give the impression that new policy ideas spread rapidly and extensively (Richardson 2000), this is often far from the reality: in practice, there is typically a substantial amount of inertia and resistance to policy change, especially in the case of instruments and/or procedures that are less-familiar to policy-makers (Pierson 2000).

As well as general inertia and resistance to policy instrument change, certain options may be excluded from the policy selection process because they are considered as unfitting or inappropriate. This may be due to a lack of experience or familiarity with some sorts of policies or instruments, or else due to underlying attitudes among policy officials and/or politicians that certain policies or instruments do not fit with local or national norms. This form of policy 'blinkerredness' or bounded rationality essentially means that some types of policies or instruments are never considered, let alone implemented. In other cases, it means that certain effects/impacts of policies are not highlighted in policy discourses/justifications as if they are somehow 'taboo' (Gössling and Cohen 2014). The exclusion of certain policy options from the selection process can arise for a range of reasons. In some cases they may be considered to pose a high political risk or else constitute a violation of policy-making norms. As such, they represent cognitive barriers to the implementation of certain policies and can, for example, result in reluctance or opposition to use certain instruments and/or to address certain issues or actors. They are often contextually dependent, as in the aversion to set speed limits on German motorways despite evidence that the measure enjoys broad public support and can help to mitigate CO₂ emissions (Hill *et al.* 2012; Schreurs 2016). Meanwhile, other measures which have a clear effect on mitigating climate change can remain restricted to single contexts because of inertia to implementing them elsewhere and/or the lack of political courage (e.g. urban congestion charging where few cities have followed the lead of Gothenburg, London, Milan or Stockholm).

In academic literature on the assessment of policies and measures, a distinction is made between *policy settings*, *policy instruments* and *policy goals* (see for example Hall 1993). The choice of *policy settings* (or policy calibration) can clearly be influenced by a country's socio-economic situation, since decisions about meeting certain standards or norms, or introducing new taxes, fees or subsidies, for instance, will have implications (i.e. costs and benefits) for the economy and for different social and economic groups within a country. While the calibration of policy instruments will certainly be partly based on budgetary constraints and the relative strength of the economy (or the sector affected), it will often also be guided by social and cultural understandings of appropriateness (Lenschow, Liefferink, and Veenman 2005). In terms of the choice of *policy instruments*, there are clearly different measures or techniques by which policy goals are attained (e.g. regulation, fiscal incentives and voluntary agreements). Countries with different traditions may therefore adopt different instruments to regulate the same policy issue, since policy instruments are embedded in the general political culture of governing (*ibid*) and circumscribed by social, political, and economic circumstances which may constrain or encourage the use of particular options (Howlett 1991). Meanwhile, *policy goals* guide the development policy in a particular field and operate within a policy paradigm or a 'framework of ideas' that can also be extremely context dependent, resulting in a variety of policy goals for the same policy issue across different countries. Clearly, there is a close relationship between policy goals, instruments and settings, since they should be mutually consistent: policy goals shape instrument choice and instrument choice in turn influences

policy settings. Furthermore, these choices take place in a specific policy-making environment that is characterised by a certain governance mode or policy style (Howlett 2009). Thus, policy decisions can be seen as the product of a nested or embedded relationship within a larger framework of established governance modes and policy regime logics. This nested relationship implies that only certain combinations of goals, instruments and calibrations are possible if they are mutually coherent.

Some authors argue that policy styles do not just exist between countries but also between policy sectors (e.g. Howlett 2003). The idea that policy sectors in some countries may share common approaches to address common problems or issues can be found in the writings of Salamon (1981), Richardson, Gustafsson, and Jordan (1982), Smith, Marsh, and Richards (1993) and van Waarden (1995). These styles may also differ between agencies responsible for policy formulation and implementation, or between upper and lower levels of bureaucracy. Richardson, Gustafsson, and Jordan (1982) suggest that there may be more than one policy style per country, especially in large and culturally diverse nations. Similarly, Smith, Marsh, and Richards (1993) argue that “the central state is not a unified actor but a range of institutions and actors with disparate interests and varying resources” and that policy process will therefore “vary according to the department/agency that is analyzed” (594). Despite the variation in approaches at the sub-national level and across different policy sectors, Richardson, Gustafsson, and Jordan (1982) maintain the existence of a specific dominant national policy style which remains relatively unchanged over time. One consequence is that national policy choices are largely unaffected by policy exchange, diffusion and transfer despite increasing levels of access to information about practice in other places. In a European context, this implies that closer cooperation between European Union (EU) member states as a consequence of regulatory, fiscal and technical harmonisation does not substantially alter national policy instrument preferences and choices. According to Liefferink and Jordan (2005), for example, “the EU has broadened the range of environmental policy instruments in several countries, without seriously challenging their traditional national ‘repertoires’ of instruments” (111). Another consequence is that national policy choices are not strongly affected by changes in national policy leadership or prevailing political parties – the idea that policy styles and instrument choices remain somewhat insulated from broad political changes.

It is therefore timely, especially within a European context where policies in different sectors are subject to various forces of harmonisation and coordination (see for example Liefferink and Jordan 2005) and where support for parties across a relatively wide political spectrum varies both spatially and temporally, to inquire whether the design and implementation of national policies remains distinct and specific to national contexts. The following two general hypotheses are examined in this article:

- (1) national policy preferences give rise to distinct mixes and types of national policy instruments put forward for tackling climate change (in the transport sector) and
- (2) the mix of national climate change policy instruments for transport exhibits temporal stability due to a combination of underlying social, cultural and economic factors, and this mix is not closely coupled with national changes in political power.³

3. Methods for analysing policy styles

Freeman (1985, 476) identifies two main methodological aspects in examining national policy styles which are used in framing the research method in this article: (1) cases are

located within a typology that reflects different contexts in which diverse policy styles may be found and (2) a sample of policy-specific case studies is made, or existing studies are collected and synthesised, to support generalisations about the typical, common, or dominant national style, with full recognition that such a style may not emerge. These two aspects of the research method are discussed in turn below.

3.1 Selection of case studies

A taxonomy of national political systems originally developed by Jepperson (2002) is employed to select and position the countries included in the case study analysis. This taxonomy is based on dimensions related to national ‘collective action’ and ‘organisation of society’ (Figure 1). The first dimension, ‘collective action’, distinguishes between *liberal* and *statist* forms of collective agency. Under *statist* forms of collective agency (e.g. France and Germany), state bureaucracy has a more dominant role and governments steer and guide society ‘from above’, whereas under more *liberal* forms of collective agency (e.g. Sweden and the UK), the role of the state is weaker and citizens and action groups have a stronger role and influence. The second dimension, ‘organisation of society’, distinguishes between *corporatist* and *pluralist* approaches. This is based on a distinction between *corporatist* forms of collective action, involving institutionalised interest groups integrated into the formal political process (e.g. Germany and Sweden), and *pluralist* forms of collective action in which interest groups compete for political attention and are not formally included in the political process (e.g. France and the UK).

Collective agency:		
Organisation of society:	Liberal	Statist
Corporatist	Social-corporatist	State-corporatist
	Interactions among formally organized interests; government is a partner and facilitator; effectiveness and transparency of policy is important.	Centralized and bureaucratic approach; state legitimizes new societal groups and interests; high state capacity to implement policies.
	Example: Sweden	Example: Germany
Pluralist	Liberal-pluralist	State-nation
	Dynamic issue-focused policy orientation; weak state and competition among interest groups; open and adaptive political environment.	Co-operation between state and private interests as well as citizens; high state capacity; focus on consensus and risk minimization.
	Example: UK	Example: France

Figure 1. National political systems.

Source: Based on Jepperson (2002) and Albrecht and Arts (2005).

Note: The names along the two dimensions of the matrix do not correspond exactly to those used by Jepperson (2002). Jepperson uses the terms *societal*, *statist*, *corporate* and *associational* (rather than *liberalist*, *statist*, *corporatist* and *pluralist*).

According to Jepperson (2002), the taxonomy helps to systematise and explain a wide range of social and political variations in European countries, including their distinctive and persisting ‘institutional logics’ (e.g. state–society relations; interest representation and coordination) and political cultures (e.g. social and political doctrines). The taxonomy of political systems is potentially of great relevance for analysing policy styles, since each of the four types of system is likely to provide the context for different policy instrument preferences and choices. For example, countries with more statist forms of collective agency (where state bureaucracy and control is more dominant) might be expected to show greater preferences for instruments such as regulations, while countries with liberal forms of collective agency (where state bureaucracy is less dominant and more facilitative) might be expected to show greater preferences for financial instruments and education/awareness campaigns. Meanwhile, countries with more corporatist forms of collective action (involving institutionalised interest groups integrated into the formal political process) might be expected to have stronger preferences for voluntary agreements.

Four case study countries are examined in this paper – France, Germany, Sweden and the United Kingdom – covering all four quadrants in the taxonomy of national political systems (Figure 1). Not only do these four European countries represent contrasting political systems (Jepperson 2002), they also reflect the four fundamental administrative traditions that are situated in western industrial democracies: Napoleonic, Germanic, Scandinavian and Anglo-American (see Painter and Peters 2010; Peters, forthcoming).⁴ Analysing time series data for these case studies provides a way of tracing policy instrument choice (and its framing) over time in order to test the hypothesis that national policy styles exhibit temporal stability and are not closely coupled with national changes in political leadership (see above).

3.2 Sources of case study information

Attention in this article is focused on policy instruments that address climate change in the transport sector. Policy inputs, rather than policy outcomes, are the main focus of the article. Five general types of policy instruments are distinguished in the analysis of policy instruments: (1) regulations setting technical standards and rules of conduct/operation; (2) voluntary agreements between governmental and non-governmental groups (often industry); (3) fiscal instruments based on market incentives; (4) information and education provision; and (5) public infrastructure/service provision. These five types are based on a synthesis of two similar, but somewhat different, taxonomies proposed by Banister *et al.* (2000) and Wittneben *et al.* (2009).^{5,6} The taxonomy adopted in this paper has broad similarities with more generic policy taxonomies (i.e. those not related to the transport sector), such as the NATO model (‘nodality’, ‘authority’, ‘treasure’ and ‘organisation’) proposed by Hood (1986), but also differs in the fact that it includes voluntary agreements as a separate type of instrument, since they closely feature in the sets of instruments put forward to tackle climate change mitigation by many countries (and do not easily fit into the conventional policy taxonomy).

Two main sources of information are used to gain an understanding of the types of policy instruments proposed and foregrounded in the four case study countries, and the evolution of instrument choice over time: (1) a time series of European public opinion survey data concerning attitudes about climate change as a global problem, effective policy instruments for dealing with environmental problems, and key actors for dealing with climate change; and (2) a time series of national communications on climate change

(from 2001 onwards) from the four case study countries – France, Germany, Sweden and the United Kingdom. These two data sources are described in turn below.

The public opinion data examined in this article come from various Eurobarometer surveys carried out in all European member states on behalf of the European Commission. Each of these surveys consists of approximately 1000 face-to-face interviews per country. Eurobarometer opinion surveys address major topics concerning European citizenship (e.g. welfare, health, culture, environment, economy and defence) and from time to time focus on environment and climate-related issues. Special Eurobarometer surveys from 2009, 2011, 2013 and 2015 included questions on attitudes about the importance of climate change as a global problem. Meanwhile, special Eurobarometer surveys from 2007, 2011 and 2014 canvassed public opinion about the effectiveness of different policy options for dealing with environmental problems, and surveys from 2011 and 2014 recorded views on responsibilities for tackling climate change (see Appendices 1, 2 and 3 for the precise questions asked in these surveys [online supplemental data]).⁷

It is recognised that public opinion surveys do not always reflect the policy instruments that are ultimately chosen and implemented. Neither do the public opinion survey data fully reflect the true effectiveness of instruments (see also Stead 2008). Nevertheless, there is a large body of research across several decades that points to some degree of correspondence between public opinion and policy choices (see for example Brooks 1985, 1987 and 1990 for early literature on the opinion-policy nexus in the UK, France and Germany, respectively). As such, the Eurobarometer public opinion survey data help to illustrate that public support for different policy issues and responses are not homogenous across the EU, and that these differences in opinion may underlie preferences for different types of policy instrument.

The second source of data used in this paper is a time series of national communications on climate change prepared by France, Germany, Sweden and the United Kingdom. These communications are prepared by national governments on a regular basis under the United Nations Framework Convention on Climate Change (UNFCCC).^{8,9} Since the adoption of the Framework Convention in 1992, governments in industrialised countries have been required to submit national communications in 1994, 1997, 2001, 2006, 2010 and 2014. All national communications produced since 2001 by the four case study countries are analysed in this article. Although the specification of policies and measures to tackle climate change is obligatory under the UNFCCC, the specific types of policies and measures that can be included are not prescribed, meaning that individual countries are at liberty to specify their own set of policies and measures in their national communications.¹⁰

The policies and measures proposed in the communications can certainly be expected to reflect the different social and economic circumstances of countries and their vulnerability to climate change. However, the main focus of enquiry in this article is whether national sets of policies and measures are influenced by underlying preferences for certain types and combinations of measures. It is recognised that the inclusion of instruments in the national communications does not necessarily give a comprehensive view – other instruments may be in use but might not be mentioned. Moreover, some countries may highlight a few key measures in their national communications while other countries may present more extensive lists. Consequently, the existence of more extensive sets of measures in the communications does not therefore imply that more instruments have been adopted in one country than another. It is also important to note that the instruments listed in the national communications can vary substantially in terms

of impact on climate change: some may have significant impacts on climate change mitigation while others may have very modest (or even insignificant) impacts. Nevertheless, the national communications are useful in analysing the overall framing of policy instruments for tackling climate change mitigation in the transport sector across different countries and over time (i.e. detecting what is emphasised and what is not).¹¹

Underlying the analysis of policy instrument framing is the view that the content of policy documents, such as the diagnosis of the problem and the prescriptions for ensuing action, reflects and synthesises prior knowledge, experience and basic values of the key stakeholders involved in the document's formulation (van Hulst and Yanow 2016). As such, policy framing is closely shaped by prior notions about the ways certain problems can and should be handled (Rein and Schön 1977; van Hulst and Yanow 2016). It is recognised that other policy narratives and overviews of policy instruments can sometimes be found for different countries on the subject of transport and/or climate change mitigation, some of which may even have been drafted by the same administration responsible for the national communication documents. However, this paper focuses its attention on the policy instruments which are foregrounded in the national communication documents only, and does not attempt to compare these with those included in any other sources.

4. A comparison of policy styles

4.1 Public attitudes on climate change policy and policy instruments

Before examining policy instrument choice in France, Germany, Sweden and the United Kingdom, European opinion survey data is reviewed in order to illustrate the variation in public attitudes about the national importance of climate change as a global issue, opinions about the effectiveness of different types of policy measures for dealing with environmental problems, and views about the most appropriate actors to tackle climate change.

According to European public opinion survey data carried out between 2009 and 2015, more than one in six Europeans consider climate change to be the most serious problem facing the world (Table 1). However, views vary substantially between countries in the EU. In Sweden, for example, around a third of respondents consistently consider climate change to be the single most serious problem facing the world – much higher than the European average. In general, climate change is identified as a serious problem

Table 1. European attitudes about climate change as a serious global problem, 2009–2015.

Country	Proportion of respondents who consider climate change as the single most serious problem facing the world			
	2009	2011	2013	2015
France	20%	20%	14%	18%
Germany	24%	25%	27%	26%
Sweden	36%	30%	39%	37%
UK	18%	18%	12%	14%
EU28	18%	20%	16%	15%

Source: GESIS (2012) and European Commission (2011b; 2014a; 2015).

facing the world by more respondents from Germany than in France or the UK. Strikingly, these differences in national attitudes do not mirror the potential costs of climate change to these nations – estimates suggest that higher costs will be incurred by France, Germany and the UK, and much lower costs will be borne by Sweden on a per capita basis (see Giordani 2014). Although views about the seriousness of climate change show some fluctuation over time (and EU member states), it is consistently considered to be more serious by respondents from Sweden in comparison to respondents from France, Germany and the United Kingdom between 2009 and 2015. In Germany, climate change is consistently judged to be a more serious global problem than the EU average. Opinions from France are close to the EU average and respondents from the United Kingdom generally attach slightly less importance to climate change as a global issue when compared to the EU average (Table 1).

In terms of public attitudes to different types of policy responses, citizens across the EU consider heavier fines for polluters, higher financial incentives for environmental protection, better enforcement of legislation and more information on environmental issues to be the most effective measures (Table 2). Higher environmental taxation and

Table 2. Views on the most effective means for dealing with environmental problems in France, Germany, Sweden and the UK.

	Percentage of respondents naming the following options ^a :					
	Heavier fines for polluters	Higher financial incentives for environmental protection	Increasing environmental taxation	Stricter environmental legislation	Better enforcement of environmental legislation	More information on environmental issues
France						
2007	41	30	21	26	36	27
2011	33	17	21	20	23	26
2014	36	32	25	22	29	33
Germany						
2007	45	32	13	25	40	21
2011	39	31	19	23	30	20
2014	46	32	25	24	38	23
Sweden						
2007	21	51	23	21	33	35
2011	17	49	20	19	26	27
2014	20	56	28	22	34	29
UK						
2007	34	30	14	20	25	36
2011	32	26	10	18	18	32
2014	37	30	16	19	27	39
EU						
2007	37	29	14	25	33	30
2011	37	26	15	23	25	26
2014	40	33	18	25	30	31

Source: European Commission (2008; 2011a; 2014b).

Note: ^aThe totals for each country exceed 100% since respondents were allowed to choose up to two options.

stricter environmental legislation are considered to be less effective than the previously mentioned measures. In France, Germany, Sweden and the UK, public opinions about the effectiveness of these measures are fairly consistent over time.¹² In comparison to the EU average, German respondents do not consider that information on environmental issues is a very effective measure, and Swedish respondents do not consider that imposing heavier fines for polluters is a very effective policy response. Meanwhile, French, German and Swedish respondents consider higher environmental taxation to be more effective than respondents from many other countries. Of the two countries with the more statist forms of collective agency (France and Germany), higher preferences for regulation are evident in Germany than the EU average, while preferences for regulation in France are close to the EU average.

Public opinions about the responsibility of different actors for tackling climate change also provide another general illustration of the variation in thinking about the governance of climate change across European member states. As a whole, Europeans consider that the responsibility for tackling climate change should primarily rest with national governments, the EU and industry (Table 3). The level of responsibility of sub-national governments (i.e. regional and local) for tackling climate change is generally considered to be lower than for national governments, even in countries like Sweden where local government enjoys relatively high levels of autonomy and decision-making power (Loughlin, Hendriks, and Lidström 2011). However, opinions about the level of responsibility of individuals and industry in tackling climate change vary quite substantially between countries. For example, German respondents consider that climate change should be primarily tackled by business and industry

Table 3. Views on responsibility for tackling climate change in France, Germany, Sweden and the UK.

	Percentage of respondents naming the following options ^a :					
	EU	National government	Sub-national government	Individuals	Business and industry	Environmental groups ^b
France						
2011	49	52	22	29	41	–
2014	49	51	18	29	42	27
Germany						
2011	48	50	23	36	57	–
2014	41	45	12	31	52	11
Sweden						
2011	45	50	23	45	30	–
2014	59	71	33	57	39	20
UK						
2011	22	38	23	20	16	–
2014	36	55	19	31	29	22
EU						
2011	35	41	17	21	35	–
2014	39	48	19	25	41	19

Source: European Commission (2011b; 2014a).

Notes: ^aThe totals for each country exceed 100% since respondents were allowed to choose multiple options.

^bEnvironmental groups were not included in the 2011 survey questions.

(Table 3), which fits with the more corporatist approach associated with the country. This is noticeably lower in countries with more liberal forms of collective agency such as Sweden and the UK.

4.2 Instrument choice for climate change mitigation

Table 4 summarises the frequency of different types of policy instruments for addressing climate change in the transport sector that are contained in the national communications from France, Germany, Sweden and the UK since 2001.¹³ The content of these national communications is discussed according to country below.

As outlined above, greater preferences for instruments such as regulations might be expected in a pluralist state with a dominant state bureaucracy, such as France. However, there is little indication from Table 4 that regulations feature more prominently than other types of instruments. Neither do they feature more prominently when compared to the instruments contained in the national communications from Sweden and the UK, where the role of the state is weaker than France (Figure 1). In terms of temporal change of policy instrument choice in France, few clear trends are evident in policy instrument type and number (i.e. instrument density according to terminology used by Knill, Schulze, and Tosun 2012). What is clear, however, is that voluntary agreements rarely feature as instruments of choice.

Table 4. Summary of the number and type of policy instruments for addressing climate change in the transport sector contained in UNFCCC communications.

	2001	2006	2010	2014	Mean
France					
Regulation	1	0	2	1	1
Voluntary agreements	2	0	0	0	1
Fiscal	3	1	2	4	3
Information/education	3	1	3	0	2
Infrastructure	1	1	2	1	1
Germany					
Regulation	2	0	1	2	1
Voluntary agreements	3	1	2	2	2
Fiscal	5	6	3	4	5
Information/education	1	1	1	0	1
Infrastructure	1	0	0	0	0
Sweden					
Regulation	2	2	1	3	2
Voluntary agreements	1	1	0	0	1
Fiscal	4	5	6	5	6
Information/education	1	0	0	0	0
Infrastructure	1	0	0	1	1
United Kingdom					
Regulation	1	0	0	2	1
Voluntary agreements	3	3	2	2	3
Fiscal	3	2	5	3	3
Information/education	0	3	5	0	2
Infrastructure	1	0	2	2	1

Greater preferences for instruments such as regulations and voluntary agreements might be expected in a corporatist state with a strong state bureaucracy such as Germany. Voluntary agreements do indeed feature fairly strongly in the mix of instruments. However, regulations do not feature much more prominently than other types of instruments. Instruments related to infrastructure provision rarely feature in the German national communications. As in the case of France (see above), few clear temporal trends in the type and number of policy instruments included in the national communications are evident between 2001 and 2014. Regulations do not feature any more prominently when compared to the instruments contained in the national communications from Sweden and the UK, countries where the role of the state is weaker.

In Sweden, with a liberal corporatist context, a preference for fiscal instruments, education/awareness campaigns and voluntary agreements might be expected. While fiscal instruments do feature relatively strongly in this table education/awareness campaigns and voluntary agreements do not. Regulations also feature relatively frequently in the table (across most years). The type and number of instruments contained in the national communications from Sweden since 2001 do not experience many major changes over time.

As a liberal-pluralist state, the UK might be expected to be more predisposed to fiscal instruments and education/awareness campaigns. This is apparent in some, but certainly not all, national communications (e.g. no information/education instruments are contained in the 2001 and 2014 submissions). Strikingly, voluntary agreements also feature relatively frequently in the table despite the UK having less corporatist tendencies than countries such as Germany and Sweden.

From a visual comparison of the temporal trends in the number and type of instruments proposed in the national communications (Table 4) with the changes in national government in the four case study countries (Figure 2), no strong associations are apparent. In other words, no major shifts occurred in the type of policies being proposed around 2002 and 2012 in France, or 2005 in Germany, or 2006 and 2014 in Sweden or 2010 in the UK. In general, national communications from countries with more corporatist tendencies (such as Germany and Sweden) contain fewer education/information and infrastructure policy instruments, or at least mention them less frequently. Meanwhile, national communications from countries with less corporatist tendencies (such as France and the UK) make fewer references to regulations.

Data on total transport infrastructure and maintenance spending in France, Germany, Sweden and the United Kingdom also lend further weight to the hypothesis that few major shifts in infrastructure policy have occurred between 2008 and 2014, at least in terms of total spending per GDP (Table 5).

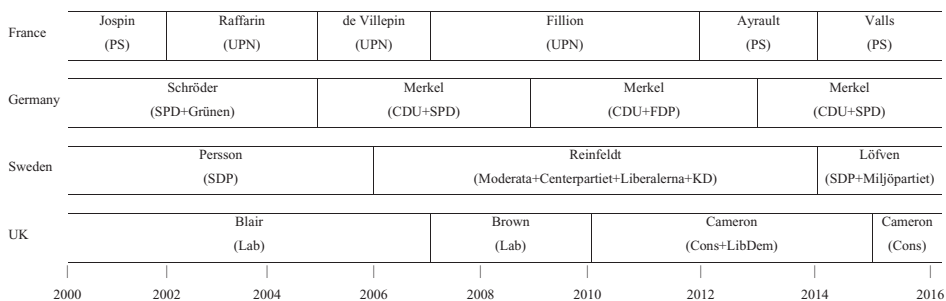


Figure 2. Governments in France, Germany, Sweden and the UK, 2000–2016.

Table 5. Total inland transport infrastructure investment as a percentage of GDP in France, Germany, Sweden and the UK, 2008–2014.

	2008	2010	2012	2014
France	0.9	0.9	1.0	1.0
Germany	0.6	0.6	0.6	0.6
Sweden	0.8	0.8	0.8	0.7
United Kingdom	0.7	0.7	0.6	0.7

Source: International Transport Forum (2017).

In terms of climate change adaptation instruments (rather than mitigation instruments discussed above), preliminary inspection of the national communications on climate change reveals that they contain little detail about these instruments for specific sectors such as transport. Of the few instruments specifically related to the transport sector included in the communications (aside from the mention of several adaptation-related studies), most tend to focus on the adaptation of physical transport infrastructure. The instruments identified in the communications are typically related to the use of more climate resistant materials and techniques in infrastructure construction (e.g. road and bridge construction), different arrangements for infrastructure maintenance (e.g. more regular replacement of road surfaces) and/or the construction of protective structures to allow infrastructure to withstand more extreme weather conditions, such as drainage channels and flood barriers (see also Koetse and Rietveld 2012).¹⁴ As such, it seems less possible to relate adaptation instruments to policy styles than to relate mitigation instruments to policy styles.

5. Conclusions

The empirical evidence contained in this article, derived from a combination of European opinion surveys, national communications on climate change and national adaptation strategies, helps to test the hypotheses that: (1) national policy preferences within Europe are not homogeneous but are instead quite distinct and (2) that choices of national policy instruments exhibit temporal stability which are not closely coupled with national changes in political leadership. In general, there is some evidence to support the view that national policy instruments and their framing may be heterogeneous across Europe and conform to the typology proposed. However, the clustering of instrument types along the broad lines proposed in the article (i.e. more regulation in countries with more statist tendencies and more information/education and fiscal instruments in countries with less statist tendencies) does not appear to hold true.

In terms of the temporal change of measures, there is some evidence to support the second hypothesis that there is substantial continuity of policy instruments in each country over time and that there is little direct relation with national political changes. In other words, variations in the number and type of instruments proposed and foregrounded in the national communications do not closely coincide with shifts in national political leadership or the main parties in government in any of the four countries studied. While total annual transport infrastructure investment per capita varies significantly from country to country (International Transport Forum 2017), spending in individual countries does not vary very much over time, even after changes in national political

leadership or the main parties in government (Table 5). Although this is not a conclusive observation, it does help to add weight to the idea expressed in the second hypothesis that stated policy choices and preferences are relatively stable over time within countries, and are not closely coupled with national changes in political leadership. Furthermore, the evidence from European public opinion surveys reveals that public views remain relatively stable over time when questioned about the importance of climate change, the role of actors to deal with it, and the appropriateness of different policy measures to tackle it.

The periodic national communications submitted by governments under the UNFCCC provide a useful base for comparing the choice and the foregrounding of policy instruments across countries and over time. Clearly, national communications do not necessarily provide a comprehensive view of all the instruments that are in use in a particular country. In some cases, additional policy narratives and policy instruments can be found from the same administration on the subject of transport and/or climate change mitigation that are more extensive than the national communications. Nevertheless, the national communications provide a very useful starting point for performing consistent comparative analysis of stated policy instrument choice, both across different countries and over time. Using a similar approach to the one adopted in this article, exercises could also be carried out to explore the existence of policy preferences in other countries and/or other policy sectors (e.g. agriculture, industry, waste). These would also help to further investigate the extent to which any policy preferences are specific to certain sectors.

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Supplemental data


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Notes

1. One example of the creation of a new institution was the London Climate Change Agency Limited (LCCA), a municipal company owned by the London Development Agency that was established in 2006 to design, finance, construct, own and operate decentralised low energy and zero-carbon projects for London in partnership with private sector companies (e.g. EDF Energy). The LCCA was integrated into the London Development Agency in 2009.
2. Despite the formulation of new policy goals and objectives, new policy instruments, policy settings, governance arrangements and even new institutions in response to possible climate

- change impacts, some authors have argued that climate change policy in the transport sector is more ‘symbolic’ than effective in some situations (see for example Bache *et al.* 2015).
3. The temporal stability of policy styles is broadly consistent with Peters’ views on administrative traditions (Peters, *forthcoming*) which suggest that established patterns of administration or policy persist over time.
 4. Peters recognises that a number of other administration traditions can be found outside western industrial democracies (e.g. Islamic, Confucianist and Latin American).
 5. The taxonomy of policy instruments proposed by Banister *et al.* (2000) includes the following four types: (1) market-based instruments; (2) regulation based instruments; (3) lifestyle based instruments and (4) public infrastructure/services.
 6. The taxonomy proposed of policy instruments by Wittneben *et al.* (2009) includes the following four types: (1) planning (distributive); (2) regulation (normative); (3) economic instruments (re-distributive) and (4) soft instruments (informative).
 7. Clearly, the Eurobarometer opinion surveys on the perceived effectiveness of different policy options for dealing with environmental problems and the responsibilities of different actors for tackling climate change represents a wider view than the transport sector alone.
 8. The national communications are publicly available from http://unfccc.int/national_reports/annex_i_natcom/submitted_natcom/items/7742.php.
 9. Regular submission of these national communications is a binding requirement of the UNFCCC, requiring all signatories to “formulate, implement, publish and regularly update national and, where appropriate, regional programmes containing measures to mitigate climate change” (Article 4, paragraph 1b). In addition, all industrialised countries (‘Annex I countries’) are required to incorporate “a detailed description of the policies and measures that it has adopted” in the national programmes (under Article 12, paragraph 2a).
 10. See Lesnikowski *et al.* (2016) for a reflection on the methodological limitations associated with using this type of material.
 11. Databases produced by the International Energy Agency (Addressing Climate Change Database, <http://www.iea.org/policiesandmeasures/climatechange>), the European Environment Agency (Database on climate change mitigation policies and measures in Europe, <http://pam.apps.eea.europa.eu>) and the ODYSSEE-MURE project (<http://www.measures-odyssee-mure.eu/topics-energy-efficiency-policy.asp>) also provide comparative information about policies and measures for tackling climate change across different countries although they generally do not provide much more detail than the national communications submitted under the UNFCCC.
 12. It is noticeable that public opinions about the effectiveness of almost all policy measures in all four countries experienced a slight decline in 2011 compared to 2007 and 2014.
 13. A full list of instruments addressing the transport sector contained in the national communications from France, Germany, Sweden and the UK can be found in Appendices A–D.
 14. In general, the amount of information on national adaptation policy instruments is more limited than for mitigation policy in the national communications. Compared to mitigation policy, climate change adaptation policy is often documented in a less comparable format and there is less information about adaptation policy related to the transport sector to make comparisons over time or between countries.

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Appendix A. Summary of main policy instruments for addressing climate change mitigation in the transport sector contained in UNFCCC communications from France.¹

	Third national communication, due 2001	Fourth national communication, due 2006 ²	Fifth national communication, 2010 ²	Sixth national communication, due 2014
Regulation	<ul style="list-style-type: none"> • Increase roadside speed checks 		<ul style="list-style-type: none"> • Regulation on emissions from air-conditioning units in vehicles • Requirement to assess transport emissions when developing urban plans 	<ul style="list-style-type: none"> • Ban the use of gas with Global Warming Potential in air-conditioning units in vehicles
Voluntary agreements	<ul style="list-style-type: none"> • Extend ACEA voluntary agreements to two-wheeled and lightweight utility vehicles • Agreements between air and rail companies for access to airports 			
Fiscal	<ul style="list-style-type: none"> • Fiscal incentives for replacing vehicles with more efficient ones • Tax credits for low-emission vehicles • Higher penalties for speed violations 	<ul style="list-style-type: none"> • Subsidies for crops that can be used as biofuels 	<ul style="list-style-type: none"> • Fiscal incentives for biofuels • Eco-tax trucks for HGVs according to mileage travelled 	<ul style="list-style-type: none"> • Eco-tax on HGVs according to mileage travelled on major roads • Purchase incentives for vehicles with low CO₂ emissions • Purchase tax on cars with high CO₂ emissions • Tax exemption for biofuels to increase renewable energy use
Information/education	<ul style="list-style-type: none"> • Energy consumption labelling for vehicles • Energy-efficiency training for drivers • Promote awareness about how drivers can save energy 	<ul style="list-style-type: none"> • Mandatory labelling of CO₂ consumption by new vehicles 	<ul style="list-style-type: none"> • CO₂ label for new vehicles • Introduce questions on eco-driving in the training and testing of drivers • Strengthening eco-driving training 	
Infrastructure	<ul style="list-style-type: none"> • Improve public transport services to and from airports 	<ul style="list-style-type: none"> • Develop the TGV network as an alternative to air transport 	<ul style="list-style-type: none"> • Develop and modernise railway lines and transfer points • Develop and modernise the Seine-Nord Canal • Develop public transport and bicycle infrastructure 	<ul style="list-style-type: none"> • Develop high speed railway lines (HSL) and dedicated public transport lanes (1800km outside the Ile-de-France by 2020)

¹Strategy documents, evaluation studies, research commitments, policy targets and general policy statements or plans are excluded from the list of measures. Actions to implement or enforce obligatory EU standards are also excluded.

²Policy instruments for 2006 and 2010 were translated from French by the author.

Appendix B. Summary of main policy instruments for addressing climate change mitigation in the transport sector contained in UNFCCC communications from Germany¹

	Third national communication, due 2001	Fourth national communication, due 2006	Fifth national communication, due 2010	Sixth national communication, due 2014
Regulation	<ul style="list-style-type: none"> • Replace HFC air conditioning systems with CO₂ systems • Ban on SF₆ in automobile tyres 		<ul style="list-style-type: none"> • Regulation on biofuel content of petrol 	<ul style="list-style-type: none"> • Regulation on biofuel content of petrol • CO₂ emission standards for cars and light vehicles
Voluntary agreements	<ul style="list-style-type: none"> • Agreement with the German automobile industry to further reduce average fuel consumption of new cars • Agreement with the automobile industry to use of low-viscosity oils and low-roll-resistance tyres in new vehicles • Agreement between automobile and energy companies on alternative fuels for motor vehicles 	<ul style="list-style-type: none"> • Agreement with the German automobile industry to further reduce average fuel consumption of new cars 	<ul style="list-style-type: none"> • Agreement with the German automobile industry to further reduce average fuel consumption of new cars • Agreement with the automobile industry to use of low-viscosity oils and low-roll-resistance tyres in new vehicles 	<ul style="list-style-type: none"> • Agreement with the shipping industry on the efficiency of vessels • Voluntary commitment from the International Civil Aviation Organization to increase the efficiency of aviation
Fiscal	<ul style="list-style-type: none"> • Tax on sulphurous fuel to promote the use of sulphur-free fuel • Motorway tolls for HGV's • Emissions-based motor-vehicle tax for automobiles • Emissions-based take-off and landing fees at German airports • Harmonise tax deductions for commuting to reduce advantages of private transport 	<ul style="list-style-type: none"> • Excise duty on fuels that do not comply with the sulphur limit • Motorway tolls for HGVs based on distance travelled and emissions • Emissions-based road tax for cars • Emissions-based take-off and landing fees at German airports • Harmonise tax deductions for commuting to reduce advantages of private transport • Ecological tax reform 	<ul style="list-style-type: none"> • Extend motorway tolls for HGVs • CO₂-based motor-vehicle tax • Ecological tax reform 	<ul style="list-style-type: none"> • Tolls for HGVs • Vehicle tax based on CO₂-emissions and engine size • Air traffic tax on flights departing from Germany • Emissions trading scheme for aviation
Information/education	<ul style="list-style-type: none"> • Information campaign on climate protection in the transport sector 	<ul style="list-style-type: none"> • Information campaign on climate protection in the transport sector 	<ul style="list-style-type: none"> • CO₂-based labelling for automobiles 	
Infrastructure	<ul style="list-style-type: none"> • Expand the railway network 			

¹Strategy documents, evaluation studies, research commitments, policy targets and general policy statements or plans are excluded from the list of measures. Actions to implement or enforce obligatory EU standards are also excluded.

Appendix C. Summary of main policy instruments for addressing climate change mitigation in the transport sector contained in UNFCCC communications from Sweden¹

	Third national communication, due 2001	Fourth national communication, due 2006	Fifth national communication, due 2010	Sixth national communication, due 2014
Regulation	<ul style="list-style-type: none"> • Systems for quality assurance of transport services • Environmental standards governing the vehicle fleet of the National Road Administration 	<ul style="list-style-type: none"> • Procurement rules on low-emission vehicles for government agencies • Legislative proposal obliging filling stations to supply renewable fuels 	<ul style="list-style-type: none"> • Regulation that larger filling stations must sell renewable fuel 	<ul style="list-style-type: none"> • Regulation that larger filling stations must sell renewable fuel • Emission standards for new vehicles • Quota for the availability of transport biofuels on the market
Voluntary agreements	<ul style="list-style-type: none"> • Agreement with Swedish vehicle manufacturers for developing less polluting vehicles 	<ul style="list-style-type: none"> • Commitment from the automotive industry on carbon dioxide emissions from new cars 		
Fiscal	<ul style="list-style-type: none"> • Tax on vehicle ownership according to vehicle weight • Lower motor vehicle fuel tax on alternative biomass motor fuels • Reduce VAT on public transport • Shipping charges differentiated according to environmental performance 	<ul style="list-style-type: none"> • Petrol and diesel subject to energy tax and carbon dioxide tax • Carbon dioxide tax and energy tax exemptions for biofuels • Taxation changed so that company car users pay for fuel for private driving • Grants from municipalities and national government for the purchase of low-emission cars • Local incentives for low-emission cars, such as free parking and exemption to congestion charges 	<ul style="list-style-type: none"> • Petrol and diesel subject to energy tax and carbon dioxide tax • Carbon dioxide tax and energy tax exemptions for biofuels • Rebate on the purchase of new eco-classified cars • Vehicle tax differentiated according to CO₂ emissions • Higher personal tax allowance for users of company cars that are electric, hybrid or capable of running on biofuels • Local incentives for low-emission cars, such as free parking and exemption to congestion charges 	<ul style="list-style-type: none"> • Petrol and diesel subject to energy tax and carbon dioxide tax • Carbon dioxide tax and energy tax exemptions for biofuels • Vehicle tax differentiated according to CO₂ emissions • Annual vehicle tax exemption for the first 5 years of new low-emissions vehicles • Higher personal tax allowance for users of company cars that are electric, hybrid or capable of running on biofuels
Information/education	<ul style="list-style-type: none"> • Eco-driving ("Sparsam körning") programme 			
Infrastructure	<ul style="list-style-type: none"> • Increased investment in railway infrastructure 			<ul style="list-style-type: none"> • Investments in new transport infrastructure

¹Strategy documents, evaluation studies, research commitments, policy targets and general policy statements or plans are excluded from the list of measures. Actions to implement or enforce obligatory EU standards are also excluded.

Appendix D. Summary of main policy instruments for addressing climate change mitigation in the transport sector contained in UNFCCC communications from the UK.¹

	Third national communication, due 2001	Fourth national communication, due 2006	Fifth national communication, due 2010	Sixth national communication, due 2014
Regulation	<ul style="list-style-type: none"> • Legislation to improve the quality and capacity of public transport 			<ul style="list-style-type: none"> • Fuel Quality Directive requiring energy suppliers to reduce GHG emissions per of unit of energy • Environmental criteria in rail operating franchises
Voluntary agreements	<ul style="list-style-type: none"> • Voluntary agreements with car manufacturers on average CO₂ emissions from new cars • Agreements with the International Civil Aviation Organisation (ICAO) on emissions • Agreements with the International Maritime Organisation (IMO) on emissions 	<ul style="list-style-type: none"> • Renewable Transport Fuel Obligation requiring an agreed percentage of fuel sales are from renewable sources • Voluntary agreements with the automotive industry 	<ul style="list-style-type: none"> • Renewable Transport Fuel Obligation • Agreements with the ICAO on emissions 	<ul style="list-style-type: none"> • Renewable Transport Fuel Obligation • Agreements with the ICAO on emissions
Fiscal	<ul style="list-style-type: none"> • Local authorities permitted to implement congestion charging and workplace parking levies • Vehicle excise duty reforms according to CO₂ emissions • Company car taxation according to CO₂ emissions 	<ul style="list-style-type: none"> • Fuel duty incentives for bioethanol and biodiesel • Vehicle excise duty reforms 	<ul style="list-style-type: none"> • Fuel duty incentives for bioethanol and biodiesel • Vehicle excise duty reforms • Company car taxation according to CO₂ emissions • Subsidies for buying new electric and plug-in hybrid cars • Reform to Air Passenger Duty 	<ul style="list-style-type: none"> • Incentives for purchasing new ultra-low emission cars • Grants for operators to purchase low-carbon buses • Fund for local sustainable transport schemes
Information/education		<ul style="list-style-type: none"> • Fuel efficiency labelling • Active travel plans for schools • Sustainable Travel Towns and Cycle Demonstration Towns initiatives to showcase innovation 	<ul style="list-style-type: none"> • Energy efficiency labelling • Active travel plans for schools • Sustainable Travel Towns and Cycle Demonstration Towns initiatives to showcase innovation • Campaign promoting fuel-efficient driving and vehicle purchasing (ACT ON CO₂) • Eco-driving campaign (EST Scotland) 	
Infrastructure	<ul style="list-style-type: none"> • Increased levels of investment in public transport 		<ul style="list-style-type: none"> • Investments in railway infrastructure • Increased funding for local transport infrastructure 	<ul style="list-style-type: none"> • Investments in rail infrastructure vehicles • Infrastructure for recharging electric vehicles • Cycle-rail facilities and cycle safety improvements

¹ Strategy documents, evaluation studies, research commitments, policy targets and general policy statements or plans are excluded from the list of measures. Actions to implement or enforce obligatory EU standards are also excluded.