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The Unintended Consequences of EU Law and Policy on Air Pollution

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Air pollution still represents a major environmental hazard in urban areas in the European Union (EU). This article argues that the EU's regulatory framework in this policy area for the past decade contributed to a series of unintended consequences. The increasing influence of climate change objectives on the air pollution agenda led to a shift in the regulatory approach to emissions from vehicles by focusing solely on the overriding interest of reducing carbon dioxide emissions and developing individual policies to that effect. This resulted in a disconnect between regulatory approaches to urban air quality and vehicle emissions standards with the effect of producing unintended consequences of unlawful levels of air pollution, in particular nitrogen oxides and particulate matter emissions as well as unintended consequences for the car industry and consumers. The article applies Merton's framework of unintended consequences, which provides a useful explanatory model of the EU's multi-level governance process in the complex area of environmental law.

1 INTRODUCTION

The scale and severity of the effects of urban air pollution have become increasingly apparent in recent years. The 2016 WHO report on air pollution unequivocally identified it as the biggest environmental risk to health, with an 'increasing number of acute air pollution episodes in many cities worldwide'.¹ While air quality has seen substantial improvements in the European Union (EU), especially in regard to reducing the carbon dioxide (CO₂) emissions as a result of its ambitious climate change agenda, urban air quality still persists as a significant environmental challenge.² Despite the reduction in CO₂ emissions there continue to be unlawful levels of emissions of nitrogen oxide (NO_x) and particulate matter (PM), originating predominantly from road transport. Just in Europe, around 400,000 premature deaths are caused annually by pollution from road transport.³

A good illustration of large-scale breaches of nitrogen oxide and particulate matter air pollution standards in Member States were recently exposed in *ClientEarth v Secretary of State for the Environment, Food and Rural Affairs*, which unveiled the severity of air pollution in the United Kingdom (UK).⁴ In 2010, several limits values for nitrogen dioxide prescribed in the Ambient Air Quality Directive were exceeded in 40 of the 43 zones or agglomerations within the UK. In July 2011, the nongovernmental organization (NGO) ClientEarth initiated a judicial review seeking a declaration that the UK was in breach of its obligation to comply with nitrogen dioxide limits provided in Article 13 of the Air Quality Directive 2008/50 and sought a mandatory order compelling the Secretary of State to produce an air quality plan pursuant to Article 22 of this Directive.⁵ This proceeding raised important questions about the interpretation of obligations imposed on Member States in Articles 22

¹ World Health Organization (WHO), 'Ambient Air Pollution: A Global Assessment of Exposure and Burden of Disease' (WHO 2016) 49.

² European Environment Agency (EEA), 'Air Quality in Europe – 2016 Report' (EEA 2016) 6-9.

³ F Amato et al, 'Urban Air Quality: The Challenge of Traffic Non-exhaust Emissions' (2014) 275 *Journal of Hazardous Materials* 31.

⁴ *R v Secretary of State for the Environment, Food and Rural Affairs* [2015] UKSC 28 (ClientEarth case).

⁵ Directive 2008/50/EC on ambient air quality and cleaner air for Europe [2008] OJ L152/1.

and 23 of the Directive and the jurisdiction of national courts to act in cases when a Member State fails to meet the requirements stipulated in Article 13 of the Directive. The Supreme Court made a declaration that the UK was in breach of Article 13 of the Air Quality Directive 2008/50 and the UK Government agreed to publish new air quality plans by December 2015.⁶

The *ClientEarth* judgment pointed to a wider problem of poor compliance, which is not only confined to the UK but also affects other EU Member States.⁷ Furthermore, the problem of air pollution across the EU raises concerns about the EU's approach to regulating urban air pollution and its contribution to the emergence of unintended consequences which, over time, resulted in unlawful levels of air pollution, especially nitrogen oxides and particulate matter originating predominantly from road transport. Though Member States have a primary responsibility to implement and ensure compliance with EU laws and policies, success in their enforcement at the national level depends on the appropriateness of the regulatory approach adopted by the EU to achieve its environmental objectives.

This article argues that, notwithstanding the significant number of EU measures aimed at improving air pollution over the years, the EU's regulatory framework in this policy area for the past decade contributed to a series of unintended consequences. The increasing influence of climate change objectives on the air pollution agenda led to a change in the regulatory approach to emissions from vehicles by focusing solely on the overriding interest of reducing CO₂ emissions and developing individual policies to that effect. This resulted in a disconnect between regulatory approaches to urban air quality and vehicle emissions standards, with the effect of producing unintended consequences of unlawful levels of air pollution, in particular nitrogen oxides and particulate matter emissions. As this policy of reducing CO₂ levels proved to be very successful, it went unquestioned for longer and consequently exacerbated the air pollution effects. The Volkswagen emissions scandal of 2015 unveiled spill-over effects of unintended consequences of EU air pollution law.⁸ In order to curb the emissions, the car industry will face new and higher compliance costs and it will have to change its business strategy to develop electric and hybrid technologies. The car industry will also have to address the undermined consumer confidence in the aftermath of the scandal.

The article will apply Merton's framework of unintended consequences, which has a significant purchase in EU environmental law.⁹ It provides a useful explanatory model of the EU's multi-level governance process in the complex area of environmental law where anticipating those policy outcomes is particularly challenging. The diversity of the EU as a political system, combined with the complexity of the natural environment, means that environmental policy in the EU may be susceptible to unintended consequences. The EU's overriding interest in regulating CO₂ emissions aligns to Merton's notion of 'imperious

⁶ In 2016, ClientEarth again initiated a judicial review before the High Court claiming that the new air quality plan was flawed by errors of law – [2016] EWHC 2740 (Admin). The High Court ruled that the UK Government erred in law and failed to act by the soonest possible date as provided in Directive 2008/50. In July 2017, the UK Government published the highly controversial Air Quality Plan, which abandoned more immediate attempts to curb vehicle pollution (such as scrappage schemes for diesel or legislate for more clear air zones) in favour of longer-term phasing out of both new petrol and diesel vehicles by 2040. See 'UK Plan for Tackling Roadside Nitrogen Dioxide Concentrations' (July 2017) <https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/633270/air-quality-plan-detail.pdf>.

⁷ ClientEarth case (n 4) para 21.

⁸ A prominent environmental NGO, the International Council on Clean Transportation, conducted independent tests on real-world car emission on three light-duty diesel vehicles and found that that NOx emissions from the Volkswagen Jetta model greatly exceeded the United States emission standards. See <<http://www.theicct.org/news/epas-notice-violation-clean-air-act-volkswagen-press-statement>>.

⁹ RK Merton, 'The Unanticipated Consequences of Purposive Social Action' (1936) 1 American Sociological Review 894.

immediacy of interest' as a factor limiting the correct anticipation of policy outcomes.¹⁰ This overriding interest led to a disconnect between the producers of EU policy (the European Commission, Member State governments, and all other stakeholders) and consumers (EU citizens) and thus explains the EU's failure to anticipate the outcomes of its formal policy on air pollution. Most importantly, Merton's explanatory model reveals the deficiencies of the EU regulatory approach in this policy area, which led to increased air pollution for millions of Europeans. While specific policy recommendations are beyond the scope of this article, there are potentially significant policy implications for the formulation of environmental policy in the EU.

The article first provides a broad overview of the concept of unintended consequences and outlines the application of Merton's model to EU air pollution law and policy. The article next demonstrates a shift away from the initial approach to urban air quality in favour of an immediate interest in reducing CO₂ emissions. This is done by examining the EU's early approach to urban air quality, including the measures on vehicle emissions, followed by an analysis of the subsequent laws and policies primarily targeted at reducing CO₂ emissions from vehicles. The article then explores the unintended consequences of EU action, including both intended and unintended effects, and examines the correlation between the EU's action and its unanticipated consequences. The article concludes by indicating the limitations of the EU policy process in this area and suggesting potential considerations for improvement.

2 MERTON'S FRAMEWORK OF UNINTENDED CONSEQUENCES AND EU AIR POLLUTION LAW AND POLICY

The concept of unintended consequences has been a standing concern in multiple social contexts. The positivist school of thought, in particular thinkers such as Saint Simon and Comte, argued that the rational application of science to social questions would eliminate unintended consequences.¹¹ Other thinkers, for example Hayek, were sceptical as to claims of reducing unintended consequences.¹² Merton's contribution to the development of this concept lies in his systematic analysis of the problem by considering all the elements and conditions of an action.¹³ He uses the term 'unanticipated consequences of purposive social action' to denote consequences which are the outcomes of a specific action.¹⁴ It is synonymous with 'unintended consequences', which, as De Zwart explains, has come to replace the term unanticipated consequences.¹⁵ Though we often associate unintended consequences with undesirable effects, this is not necessarily the case.¹⁶ Adam Smith famously wrote of an economic actor led 'by an invisible hand to promote an end which was no part of his intention'.¹⁷ Unintended consequences result from the actor's conduct as distinct from the actor's behaviour, because faced with a choice of actions one was chosen.¹⁸ Though Merton recognizes unorganized and formally organized actions, he is more interested

¹⁰ *ibid* 901.

¹¹ S Simon, *Introduction aux Travaux Scientifiques du Dix-neuvième Siècle* (Scherff 1807) and S Simon, *Memoire sur la Science de l'Homme. Volume 40 of Oeuvres de Saint-Simon et d'Enfantin* (Dentu 1876); A Comte, *A General View of Positivism* (Reeves and Turner 1880).

¹² FA Hayek, *The Road to Serfdom* (Routledge & Sons 1944).

¹³ Merton (n 9).

¹⁴ *ibid*.

¹⁵ F de Zwart, 'Unintended but not Unanticipated Consequences' (2015) 44, *Theory and Society* 283, 283-284.

¹⁶ Merton (n 9) 895.

¹⁷ A Smith, *An Inquiry into the Nature and Causes of the Wealth of Nations* (Methuen & Co 1776) IV.2.9.

¹⁸ Merton (n 9) 895.

in the latter as these involve the unintended outcomes of formal policy and provide a clearer opportunity to examine formal processes' purposes and procedures.¹⁹

Merton recognizes three barriers to a correct anticipation of consequences of action.²⁰ The most obvious is lack of adequate knowledge as the correct anticipation of consequences relies on this. The second factor is error that may occur in any stage of purposive action, from the inception of an action to its execution. The third factor refers to situations where an actor is primarily interested in foreseen immediate consequences and excludes other consequences potentially resulting from the same action.²¹ While Merton provides an explanatory model of unintended consequences, Vernon contests that this notion merges together a 'number of quite distinct mechanisms of change, and that none of these mechanisms will bear weight as has often been supposed'.²² Vernon argues that there is no persuasive blanket explanation of unintended consequences such as 'ignorance' put forward by Merton.²³ Thus, he concludes that this notion does not represent a promising explanatory avenue. However, this is not at odds with Merton's interpretation of unintended consequences, as Merton recognizes that factors explaining the consequences are no more than factors and no one of these necessarily 'serve by itself to explain any concrete case'.²⁴

Merton's classification of unintended consequences thus provides a useful research framework for a variety of social contexts, as any individual or collective behaviour may have different impacts on the social setting. The examination of laws and their unintended consequences is even more significant for several reasons.²⁵ Law regulates almost every aspect of social life and imposes rules to be complied with. As Erich Good points out, the protection of society is often invoked as a reason for the adoption of specific regulation, though this may not have the effects sought.²⁶ Likewise, the impacts of laws and regulations should also be examined by scrutinizing the extent of unintended consequences resulting from the application of a specific law. As law applies to everyone within a certain jurisdiction, it becomes imperative to scrutinize its consequences.

The impact of regulation becomes even more important in a more responsive regulatory milieu with greater reliance on formal analysis of risk and benefits. This is certainly the case in regulating environmental risks, where governments and regulators are under pressure to assess the impact of their laws and policies. To that effect, both national governments and the EU have put in place various mechanisms which should assist in predicting the outcomes of laws and policies.²⁷ This interface between environmental law and its consequences can be examined by Merton's theoretical framework, as the three factors that lead to unintended consequences are fully applicable to environmental decision making. The state of scientific and empirical knowledge, error in assessing the risk of evidence and the actor's paramount concerns are the most frequent reasons for failing to anticipate the unintended consequences of laws and regulations.

¹⁹ *ibid* 284.

²⁰ *ibid* 898.

²¹ *ibid* 901.

²² R Vernon, 'Unintended Consequences' (1979) 7 *Political Theory* 57, 5.

²³ *ibid* 71.

²⁴ Merton (n 9) 898.

²⁵ The concept of unintended consequences was also used to examine the effects of statutes and case law. See CR Sunstein, 'Political Equality and Unintended Consequences' (1994) 94 *Columbia Law Review* 1390; see also (2004) 47 *American Behavioral Scientist* 1371; and C Sunstein, 'Endogenous Preferences, Environmental Law' (1993) 22 *Journal of Legal Studies* 217.

²⁶ FW Preston and RI Roots, 'Law and its Unintended Consequences' (2004) 47 *American Behavioral Scientist* 1371.

²⁷ See impact assessment at the EU level: <http://ec.europa.eu/smart-regulation/guidelines/ug_chap3_en.htm>; and Commission (EU), 'Better Regulation for Better Results – An EU Agenda' COM(2015) 215 final, 19 May 2015.

Merton's methodological approach can be specifically applied to the EU's air pollution policy process. First, the factors that Merton identifies as leading to unintended consequences provide an explanatory model of the EU's failure to anticipate the outcomes of its formal policy on air pollution. It is the 'imperious immediacy of interest', Merton's third factor, that limits the correct anticipation of consequences of action in this instance. This occurs when an individual or an entity focuses primarily on accomplishing an immediate interest, so as to purposefully ignore the possibility of unintended consequences of the same action.²⁸ This also begs the question of the rationality of the decision made. Merton argues that an action motivated by an interest does not necessarily entail a 'rational calculation of the elements in the situation'.²⁹ It is rational in the sense that it intends to achieve a particular goal.³⁰ However, it may be irrational in the sense that it could detract from achieving other values, which, while not being key objectives, still form part of the individual's or entity's scale of values.³¹

Second, the application of Merton's approach to EU's regulatory shift to CO₂ emissions and its departure from an earlier air quality approach exposes deficiencies of the EU's policy-making process in this area. It questions the EU's ability to anticipate the consequences of its formal action in an environment where the EU has to reconcile different objectives and a variety of stakeholders' interests and ensure that they all form part of the decision-making process. As Richardson argues, the EU is a unique policy-making system where the openness of the decision-making process to lobbyists and the significant weight of national politico-administrative elites within the process create an unpredictable and multi-level policy-making environment.³² This is particularly pertinent to environmental regulation where the EU regulator, in preparing policy and proposals relating to the environment, public health and consumer safety, is highly dependent on the input of various actors and interests groups which have become part of the decision-making process. Likewise, the intersection of environmental law with many other policy areas brings more stakeholders to the negotiating table. Thus, the EU regulator has to address interests of numerous actors, institutions and processes with different preferences and different policy traditions which may at times lead to policy shift as a result of compromise between actors. In the case of EU air pollution, the political choices made did not match the best interests of the 'consumers' of regulation, namely European citizens. As Sunstein argues 'some environmental outcomes may well be a reflection of the asymmetry between political and consumption choices, an asymmetry sometimes attributable to the peculiar features of political deliberation'.³³

In the case of air pollution, the EU attempts to achieve different policy interests and to that effect deploys various regulatory approaches.³⁴ However, there may be a disconnect between those interests whereby, as Merton argues, the pursuit of a paramount interest may defeat the pursuit of objectives which are not immediate interests but are still located on the EU's scale of values. In the early 1970s, the EU established minimum air quality standards and maximum emission standards for a group of harmful pollutants and regulated these emissions from mobile and stationary sources.³⁵ As road transport represented a major

²⁸ Merton (n 9) 901-903.

²⁹ *ibid* 902.

³⁰ *ibid*.

³¹ *ibid*.

³² JJ Richardson, *Policy-making in the EU: Interests, Ideas and Garbage Cans of Primeval Soup* (Routledge 2006) 5.

³³ C Sunstein, 'Endogenous Preferences, Environmental Law' (1993) 22 *Journal of Legal Studies* 253.

³⁴ The EU deploys a 'belt and braces' approach in this field: it imposes emissions and environmental quality standards in combination with product and process standards. See more in V Heyvaert and A Čavoški, 'UK Environmental Law Post-Brexit' in M Dougan (ed), *The UK after Brexit* (Intersentia 2017) 115.

³⁵ See JH Jans, *European Environmental Law* (Europa Law Publishing 2000) 359-368.

contributor to air pollution in urban areas, the EU also introduced environmental vehicle products standards regulating emissions of a number of harmful substances. However, climate change concerns as opposed to pollution concerns in EU transportation policy led, over time, to changing the regulatory approach to emissions from vehicles by focusing solely on the paramount and immediate interest of reducing CO₂ emissions. This resulted in a disconnect between regulation of urban air quality and vehicle emissions standards with the effect of producing unintended consequences of unlawful levels of air pollution, in particular nitrogen oxides and particulate matter emissions.

Returning to Merton's argument, this decision was rational in terms of the immediacy of interests the EU wanted to achieve and its ability to attain them. First, this overriding interest of reducing CO₂ fitted well with the EU's objective of strengthening its climate change agenda and its 'actorness' in this area, as well as boosting the EU economy at a time of economic crisis. Regulating vehicle emissions was an obvious choice, as CO₂ emissions were constantly increasing and there were no legally binding measures to regulate them. The EU decided to put in place incentives for the car industry to invest in diesel technology and thus improve the overall performance of diesel car engines.³⁶ Second, pursuing this interest proved to be appealing for major stakeholders in the policy-making process, which is not an easy task in the fragmented EU policy-making structure. After years of negotiation, the EU institutions reached an agreement with the strong car industry lobby to introduce legally binding measures on CO₂ emissions after years of voluntary agreements.³⁷ This agreement was also acceptable for national governments, as it led to a boost of national car industries with a positive effect on national economies. Finally, consumers benefited from financial incentives to shift car purchases to low-carbon technology, in particular diesel engines.

However, this regulatory approach failed to take into account the interests of local and regional authorities in Member States which play a crucial role in implementing the urban air quality laws and policies. They are poorly represented through the Committee of the Regions and they are not nearly as influential as the car industry. The EU's failure to achieve urban air quality standards ultimately shifted the burden to local authorities to address the growing problem of urban air pollution. Thus, this poses questions about deficiencies in formulating the EU laws and policies in the area of environmental law.

3 A DISCONNECT OF REGULATORY APPROACHES: A REGULATORY SHIFT TO REDUCING CARBON DIOXIDE EMISSIONS AS THE EU'S OVERRIDING INTEREST

In considering the disconnect of regulatory approaches that led to these unintended consequences, it is necessary to evidence the emergence of the regulatory shift in relation to vehicle emissions standards by demonstrating the correlation between the EU's action and its effects, as well as the actual purpose of this regulatory shift. This is in line with Merton's argument that proving causality and determining the actual purposes of a given action are two methodological pitfalls in establishing unintended consequences.³⁸ The first pitfall involves the causal imputation, which requires proving the extent to which 'consequences' may

³⁶ See M Cames and E Helmers, 'Critical Evaluation of the European Diesel Car Boom - Global Comparison, Environmental Effects and Various National Strategies' (2013) 25 *Environmental Sciences Europe* 15. This is further explained in Section 3.

³⁷ The European Commission concluded voluntary agreements with the European Automobile Manufacturers' Association (ACEA): Recommendation 1999/125/EC on the reduction of CO₂ emissions from passenger cars [1999] OJ L40/49; and with the Japanese and Korean manufacturers: Recommendation 2000/303 on the reduction of CO₂ emissions from passenger cars (KAMA) [2000] OJ L100/55; and Recommendation on the reduction of CO₂ emissions from passenger cars (JAMA) [2000] OJ L100/57.

³⁸ Merton (n 9) 897.

justifiably be attributed to certain actions.³⁹ The other difficulty is ascertaining the actual purpose of a given action.⁴⁰ As Merton argues, the latter pitfall may be averted in cases of organised action that requires explicit statement of goal and procedure.⁴¹ Thus, in this section I first demonstrate EU measures for improving urban air quality, including the establishment of air quality standards and vehicle emissions standards. This is followed by an examination of the overall change in policy and legal discourse away from urban air quality to the EU's primary and overriding interests to reduce CO₂ as a part of the climate change agenda.

3.1 Urban air quality and vehicle emissions

Since the 1970s, EU environmental law and policy has a long lineage of measures to improve air quality, in particular in urban areas. Its 1973 Environmental Action Programme commitment to 'prevent, reduce and as far as possible eliminate air pollution and nuisances' was enacted by taking diverse measures.⁴² As a majority of the European population lives in cities and is exposed to elevated levels of air pollutants, it was not surprising that urban pollution was one of the first areas to be addressed.⁴³ Traditional air pollutants include sulphur dioxide (SO₂), nitrogen oxides (NO_x), carbon monoxide (CO), lead (Pb), particulate matter (PM), ozone (O₃) and volatile organic compounds (VOCs).⁴⁴ Thus, the main interest of the EU in the 1970s was to ensure good air quality by regulating the emissions of these major environmental pollutants, starting with three directives; Directive 80/779 for sulphur dioxide and suspended particulates,⁴⁵ Directive 82/884 for lead⁴⁶ and Directive 85/203 for nitrogen dioxide⁴⁷. The primary purpose of these directives was to set out air quality limit values, including guide limit values for sulphur dioxide and nitrogen dioxide.⁴⁸ The importance of improving air quality in the urban environment was prominent in this early legislation. The Directive on nitrogen oxide recognizes the 'concept that limit values should apply only in locations where people are likely to be exposed over time periods for which adverse effects might occur' leading to a focus on urban areas.⁴⁹ Member States are also given discretion to fix values lower than the limit value than those established by the EC Directives if they consider it necessary, especially in urban areas.⁵⁰

This initial list of substances was subsequently expanded to thirteen harmful air pollutants.⁵¹ Though the setting of limit values for some of the enumerated substances was delayed due to opposition from industry, this regulatory approach marked an important milestone in EU air pollution policy as the EU succeeded in regulating major air pollutants. Currently, the basic instrument on air quality is the Ambient Air Quality Directive 2008/50, which merged the existing directives into a single instrument with the main objective of regulating the limit values for sulphur dioxide, nitrogen dioxide, particulate matter, lead,

³⁹ *ibid.*

⁴⁰ *ibid.*

⁴¹ *ibid.*

⁴² Declaration of the Council of the European Communities and of the representatives of the Governments of the Member States meeting in the Council of 22 November 1973 on the programme of action of the European Communities on the environment [1973] OJ C112/1.

⁴³ EEA, 'Assessment and Management of Urban Air Quality in Europe' (EEA 1998) ix.

⁴⁴ *ibid.*

⁴⁵ Directive 80/779/EEC on air quality limit values and guide values for sulphur dioxide and suspended particulates [1980] OJ L229/30.

⁴⁶ Directive 82/884/EEC on a limit value for lead in the air [1982] OJ L378/15.

⁴⁷ Directive 85/203/EEC on air quality standards for nitrogen dioxide [1985] OJ L87/1.

⁴⁸ Guide limit values were laid down in the sulphur dioxide and nitrogen dioxide directives.

⁴⁹ RE Hester and RM Harrison, *Air Quality in Urban Environments* (Royal Society of Chemistry 2009) 133.

⁵⁰ Directive 85/203 (n 47) art 4; and Directive 80/779 (n 45) art 4(1).

⁵¹ Directive 96/62/EC on ambient air quality assessment and management [1996] OJ L296/55.

benzene and carbon dioxide.⁵² Local transport authorities play an important role in the implementation of this directive, especially in regard to urban pollution from vehicles as they can adopt measures to limit transport emissions through traffic planning and management.⁵³

Vehicle emissions standards always formed a part of the EU's regulatory approach to air pollution. Road traffic is the predominant source of atmospheric emissions and the highest concentrations of major air pollutants coincide with the location of major cities.⁵⁴ This means that vehicle emission standards are inseparable from the EU urban air quality objectives. The EU pursued the same regulatory approach by establishing the limit values for major air pollutants. The first measure regulating emissions from vehicles, dating from 1970, established limit values for emissions from petrol and diesel engine passenger cars and light commercial vehicles, including emissions of carbon monoxide; unburnt hydrocarbons; of nitrogen oxides and, specifically for diesel engines, of particulate pollutants.⁵⁵ Several subsequent directives were adopted with the aim of regulating diesel car engines.⁵⁶ In the 1990s, a number of measures were adopted with the aim of improving the quality of petrol and diesel fuels.⁵⁷ The two main actions were the ban on petrol with lead and the limitation of sulphur in diesel fuels in order to improve air quality and reduce greenhouse gas emissions.

The adoption of the Thematic Strategy on Air Pollution in 2005 under the Sixth Environmental Action Programme further intensified the EU's efforts in improving air quality. The Strategy set out ambitious objectives for 2020 to combat further destruction of the ecosystem and to reduce premature deaths as a result of environmental impact, which required a further decrease of SO₂, NO_x, VOCs and PM_{2.5} emissions. It identified a more comprehensive monitoring of ambient levels of PM_{2.5} emissions in urban areas as a first step in improving urban air quality.⁵⁸ This prompted the adoption of the Regulation 715/2007 with the aim of harmonizing the technical requirements across the EU by introducing the Euro 5 and 6 standards.⁵⁹ These set out different limit values for four air pollutants: carbon monoxide, unburnt hydrocarbons, nitrogen oxides and particulate pollutants from light passenger cars and commercial vehicles.⁶⁰ Moreover, the directive requires the testing of vehicles before they are put on the market by national technical services in Member States.

3.2 The EU's 'imperious interest' to reduce carbon dioxide emissions

With the entry into force of the Kyoto Protocol in 2005, a greater push could be observed at the international level to integrate climate change policy more deeply into other policy areas. At the EU level, this led to a major shift in regulatory approach from 2006 by narrowing

⁵² Directive 2008/50/EC (n 5).

⁵³ *ibid* annex XV.

⁵⁴ EEA (n 43) 12.

⁵⁵ Directive 70/220/EEC on the approximation of the laws of the Member States relating to measures to be taken against air pollution by gases from positive-ignition engines of motor vehicles [1970] OJ L76/1.

⁵⁶ Directive 72/306/EEC on the approximation of the laws of the Member States relating to the measures to be taken against the emission of pollutants from diesel engines for use in vehicles [1972] OJ L190/1; and Directive 88/77/EEC on the approximation of the laws of the Member States relating to the measures to be taken against the emission of gaseous pollutants from diesel engines for use in vehicles [1988] OJ L36/33.

⁵⁷ Directive 93/12/EEC relating to the sulphur content of certain liquid fuels [1974] OJ L/74/81; Directive 1999/32/EC relating to a reduction in the sulphur content of certain liquid fuels and amending Directive 93/12/EEC [1999] OJ L121/13; Directive 98/70/EC relating to the quality of petrol and diesel fuels and amending Council Directive 93/12/EEC [1998] OJ L350/58.

⁵⁸ Commission (EU), 'Thematic Strategy on Air Pollution' COM(2005) 446 final, 7, 21 September 2005.

⁵⁹ Regulation (EC) No 715/2007 on type approval of motor vehicles with respect to emissions from light passenger and commercial vehicles (Euro 5 and Euro 6) and on access to vehicle repair and maintenance information [2007] OJ L171/1.

⁶⁰ *ibid* annex I.

down the air pollution agenda and focusing primarily on the reduction of CO₂ emissions as a major greenhouse gas. This move was seen as necessary to satisfy several immediate objectives of the EU. The first was to deliver the ambitious EU climate change agenda as a response to international binding targets to which the EU committed to under the Kyoto Protocol.⁶¹ The other reason was to enhance the EU's long-term efforts to position itself as a leading global actor in fighting climate change, which required a comprehensive effort to develop policies and measures at the EU level involving all sectors. Already at the European Council in 2007 we could see an explicit statement of this goal.⁶² The overall EU target was set to a 30 percent reduction of greenhouse gas emissions by 2020 compared to 1990 levels.⁶³ Finally, the EU grasped the opportunity to engage the car industry, which finally accepted the imposition of legally binding CO₂ targets for vehicles. This would ultimately lead to boosting the EU economy at the time of a growing economic crisis.

The obvious decision in terms of delivering the policy objectives was to focus on transport policy, and in particular, road transport. This was confirmed at the 2007 European Council where a central role was given to a sustainable and more environmentally efficient EU transport policy, together with the implementation of the emission trading scheme.⁶⁴ Road transport was identified as a sector with continuously rising CO₂ emissions, notably in urban areas, thereby both jeopardizing progress in improving the urban air quality but also risking progress in all other sectors.⁶⁵ Likewise, a 'green and low-carbon' car industry represented an ideal sector and a perfect proxy to boost the economy and jobs at a time of economic crisis, while contributing towards sustainable growth through apparently clean and green technologies.⁶⁶ An important reason was also to make the EU car industry more competitive on the American and Asian markets where car manufacturers invested heavily in developing low-carbon vehicles.

In order to satisfy these key goals, the EU had to move away from its earlier approach and focus exclusively on policies and laws that would lead to the reduction of CO₂ emissions. This new regulatory approach was not perceived as incompatible with the attainment of urban air quality objectives. This is best evidenced by the impact assessments accompanying several major legislative measures. In proposing the two EU acts, which set up a legislative framework for reducing CO₂ emissions from vehicles, namely Regulations 443/2009 and 510/2011, there was no discussion about the correlation between the new performance standards for passenger cars as a part of the EU strategy to reduce CO₂ emission and their effect on urban air quality.⁶⁷ The document only briefly mentions the possibility of measuring

⁶¹ Commission (EU), 'Results of the Review of the Community Strategy to Reduce CO₂ Emissions from Passenger Cars and Light-commercial Vehicles' COM(2007) 19 final, 7 February 2007 2.

⁶² Council of the European Union, 'Presidency Conclusion of the Brussels European Council 8-9 March 2007', 7224/1/07 (2 May 2007) para 29.

⁶³ *ibid* para 31.

⁶⁴ *ibid* para 35.

⁶⁵ COM(2007) 19 (n 61) 3, 7. More importantly, the automobile industries failed to reach set targets by 2008; see Regulation (EC) No 443/2009 setting emission performance standards for new passenger cars as part of the Community's integrated approach to reduce CO₂ emissions from light-duty vehicles [2009] OJ L140/1 recitals 8 and 9.

⁶⁶ Commission (EU), 'Exploiting the Employment Potential of Green Growth' SWD(2012) 92 final, 18 April 2012. In its Roadmap for moving to a competitive low-carbon economy in 2050, every sector of the economy must contribute and, depending on the scenario compared to 1990, transport emissions need to be between +20 and -9 percent by 2030 and decrease by 54-67 percent by 2050.

⁶⁷ Commission (EU), 'Impact Assessment Accompanying the Documents Proposal for a Regulation of the European Parliament and of the Council Amending Regulation (EC) No 443/2009 to Define the Modalities for Reaching the 2020 Target to Reduce CO₂ Emissions from New Passenger Cars and Proposal for a Regulation of the European Parliament and of the Council Amending Regulation (EU) No 510/2011 to Define the Modalities

the emissions of other pollutants as a response to citizens' concerns. A more recent policy document, the Clean Air Policy Package, reinforced the climate change agenda by upholding measures which are not in line with the urban air quality objectives. Though at the time the correlation between diesel cars and air pollution was well known,⁶⁸ this policy document does not recognize the need to tighten the EU vehicle emissions standards beyond Euro 6 to achieve new air policy targets for 2025 and 2030.⁶⁹ Thus, in time, the measures taken to achieve the climate change objectives, by focusing exclusively on CO₂ emission from cars, inadvertently led to a regulatory disconnect resulting in the unintended consequences of unlawful levels of air pollution.

To enable this regulatory shift, the EU needed to secure the agreement of Member States. This was achieved at the 2006 Council of the EU which reiterated that 'in line with the EU strategy on CO₂ emissions from light duty vehicles, the average new car fleet should achieve CO₂ emissions of 140g CO₂ /km (2008/09) and 120g CO₂ /km (2012)'.⁷⁰ Both the Commission and the European Parliament embraced this change.⁷¹ The EU's new regulatory approach had to be built on the overriding consensus to reduce CO₂ emissions. The European Commission was instrumental in instituting this new policy by promoting legislative discourse on CO₂ emissions from vehicles and building a coalition of support, including national governments, the car industry and consumers. In its 2007 Review of the Community Strategy to reduce CO₂ emissions from passenger cars and light-commercial vehicles, the Commission had to depart from its earlier approach that was primarily reliant on voluntary agreements with the car industry. The Commission called for an integrated approach, bringing together the EU institutions, Member States, car manufacturers and consumers to tackle climate change impacts of road transport.⁷² However, greater participation of local and regional authorities responsible for air quality was not perceived as important. The Commission recognized the importance of research and development in CO₂ reduction technologies as the best means to set and achieve more ambitious targets and pledged to support this research through the establishment of the European Road Transport Research Advisory Council.⁷³ This was promptly followed by a set of legislative measures designed to address various aspects of CO₂ car emission policies.

One of the first measures addressing CO₂ emissions was Regulation 443/2009, which prescribed emission performance standards for new passenger cars by setting the average CO₂ emission at 130g CO₂/km as a target to be met by 2015, with the intention of making further reduction to 95g CO₂/km from 2020.⁷⁴ Interestingly, the impact assessment accompanying this proposal does not discuss the impact of this measure on urban air quality nor does it address the emissions or measurement of other pollutants from vehicles, though it was one of the citizens' concerns.⁷⁵ The regulation prescribes both coercive measures and incentives for the car industry. In the case of non-compliance, car manufacturers have to pay a fine in accordance with the sliding scale provided in the regulation.⁷⁶ The regulation offers

for Reaching the 2020 Target to reduce CO₂ Emissions from New Light Commercial Vehicles' SWD(2012) 213 final, 11 July 2012.

⁶⁸ See M Weiss et al, 'Analyzing On-Road Emissions of Light-Duty Vehicles with Portable Emissions Measurement Systems (PEMS)' (Joint Research Centre 2011).

⁶⁹ Commission (EU), 'A Clean Air Programme for Europe' COM(2013) 918 final, 18 December 2013.

⁷⁰ Council of the European Union, 'Renewed EU Sustainable Development Strategy', 10917/06 (26 June 2006) 10917/06.

⁷¹ COM(2007) 19 (n 61) 2.

⁷² *ibid* 4.

⁷³ *ibid* 10.

⁷⁴ Regulation 443/2009 (n 65) art 1.

⁷⁵ SWD(2012) 213 (n 67).

⁷⁶ Regulation 443/2009 (n 65) art 5.

several incentives to European manufacturers with the aim of enhancing their competitiveness. It leaves great flexibility to manufacturers as to how to meet their targets and offers some concessions for small-volume and niche manufacturers by setting lower targets. It also incentivizes the development of new technologies and the production of low-emitting cars. Similarly, Regulation 510/2011 sets emission performance standards for light commercial vehicles within the EU's integrated approach to reduce CO₂ emission from road transport and provides for the same types of incentives for the car industry, including pooling options, super credits and incentives to use eco-innovation technologies.⁷⁷

The lack of attention to other environmental objectives was further evidenced by the EU's approach to encourage involvement of national governments. Attainment of the 'imperious interest', as Merton puts it, of reducing CO₂ emissions was also contingent on Member States acting in a similar direction. Thus, in its review of the EU strategy to reduce CO₂ emissions from vehicles, the Commission encouraged Member States to introduce car taxation policies and other fiscal incentives to support this shift to low-carbon road transport.⁷⁸ In terms of the former, the introduction of different car taxes, including registration, circulation and fuel taxes as well as other financial instruments was used to support the introduction of fuel efficient and low CO₂ emitting cars.⁷⁹ This would additionally incentivize car manufacturers to invest in the development of clean light-duty vehicles at the EU market, which in turn would contribute to meeting climate change targets and would avoid the fragmentation of the EU internal market.⁸⁰ Most Member States reacted positively and introduced lower taxes for diesel engines.⁸¹ For example, Belgium introduced significantly lower taxes for diesel cars, which led to a proportionately high ownership of diesel cars; 61 percent one of cars in Belgium in 2010 were diesel.⁸² In terms of consumers, preferential car taxes influenced their purchase decisions. Consumers in the EU were responsive to this shift towards diesel as confirmed by the official data of the European Environment Agency showing that, in the EU-28, the number of registered diesel vehicles increased significantly since 2011.⁸³ This is further corroborated by available data from 2013 whereby 53 percent of all newly registered cars in the EU were diesel cars.⁸⁴ Additionally, the EU launched measures to improve consumer information about running costs, environmental performance and vehicle tax levels that inform consumer decision making.⁸⁵

The focus on the immediate reduction of CO₂ emissions also offered attractive future opportunities for the car industry. In its 2010 European Green Vehicles Strategy, the

⁷⁷ These mechanisms facilitate the car manufacturers meeting emission targets. For example, manufacturers may form a pool and act collectively to attain their emissions targets. Regulation (EU) No 510/2011 setting emission performance standards for new light commercial vehicles as part of the Union's integrated approach to reduce CO₂ emissions from light-duty vehicles [2011] OJ L145/1: CO₂ emission target of 175 grams of CO₂/km as from 2017; and 147 grams of CO₂/km from 2020.

⁷⁸ This became even more important after a failure to pass the Directive on passenger car related taxes, which was envisaged as another measure to help in reduction of CO₂ emissions from vehicles; see Commission (EU), 'Proposal for a Council Directive on Passenger Car Related Taxes' COM(2005) 261 final, 5 July 2005.

⁷⁹ COM(2007) 19 (n 61) 9.

⁸⁰ *ibid.*

⁸¹ See I Mayeres and S Proost, 'The Taxation of Diesel Cars in Belgium – Revisited', (2013) 54 Energy Policy 33; L Schipper and L Fulton, 'Dazzled by Diesel? The Impact on Carbon Dioxide Emissions of the Shift to Diesels in Europe through 2009' (2013) 54 Energy Policy 3.

⁸² Mayeres and Proost (n 81) 36.

⁸³ See the EEA reports on CO₂ emissions since 2011: <<http://www.eea.europa.eu/publications/co2-emissions-performance-of-car>>.

⁸⁴ The Society of Motor Manufacturers and Traders Limited, 'New Car CO₂ Report 2015: The 14th Report' (2015) 10.

⁸⁵ Directive 1999/94/EC relating to the availability of consumer information on fuel economy and CO₂ emissions in respect of the marketing of new passenger cars [2000] OJ L2/16.

Commission called for intensive coordination among different sectors (industrial, transport, energy, trade, climate action and environment, employment, health and consumers, research) as well as increased cooperation with the car manufacturing industry and other stakeholders.⁸⁶ It focuses on three main areas, including energy efficiency, reduction of CO₂ emissions and reliable logistics and mobility by primarily encouraging research and setting common standards to boost productivity growth and industrial competitiveness.⁸⁷ To that effect, several funding sources were set out for the car industry; the initial funding included loans from the European Investment Bank and the EU's Seventh Research Framework Programme.⁸⁸ This provided a significant stimulus for the car industry, which was aware of increasing environmental pressure but also a more competitive market and rising consumer awareness.⁸⁹ In its statement in 2011, the European Automobile Manufacturers' Association openly emphasized that research and development will 'shift towards further reduction of CO₂ emissions, higher energy efficiency and lower noise pollution'.⁹⁰ With €41.5 billion invested annually, the automobile sector is the EU's largest investor in research and development.⁹¹

The main focus of research and technological improvements for car manufacturers has been investment in diesel technology over the years.⁹² This was regarded as a preferable option in addressing the regulatory pressures within the climate change agenda for several reasons. Due to a different mode of operation, the diesel engine has a greater thermodynamic efficiency and hence a higher fuel economy than the petrol engine.⁹³ Moreover, this was a technology that was already widely developed as it was accepted by car manufacturers as a promising route to reach targets agreed in the voluntary agreements with the Commission in 1998.⁹⁴ As Cames and Helmers point out, Europe's car fleets have been persistently transformed from being petrol-driven to diesel-driven over the last 20 years.⁹⁵ This was concurrent with the improvement of diesel car engines over the last decade, including the introduction of diesel engines with direct injection, increasing fuel pressure and turbo charging.⁹⁶ This technology was marketed by manufacturers as improving vehicle performance while increasing fuel economy, all of which helps to lower CO₂ emissions.⁹⁷ A

⁸⁶ Commission (EU), 'A European Strategy on Clean and Energy Efficient Vehicles' COM(2010) 186 final, 28 April 2010. The Strategy is a part of the Europe 2020 flagship initiative 'Resource-efficient Europe', which aimed to modernize and decarbonize the transport by contributing to the competitiveness of the EU car industry.

⁸⁷ European Commission, 'European Green Cars Initiative: Public-Private Partnership: Multi-annual Roadmap and Long-term Strategy' (2011) 5.

⁸⁸ See <https://ec.europa.eu/transport/themes/urban/programmes_projects_en>.

⁸⁹ See T Wiesenthal et al, 'Research of the EU Automotive Industry into Low-Carbon Vehicles and the Role of Public Intervention' (Joint Research Centre 2010) 10.

⁹⁰ EUCAR, 'The Automotive Industry R&D Challenges of the Future' (Report) (2008) <http://www.eucar.be/wp-content/uploads/2015/01/EUCAR_Message_2008-2.pdf>.

⁹¹ ACEA, 'The Automobile Industry Pocket Guide 2015/2016' (2016) 69 <http://www.acea.be/uploads/press_releases_files/POCKET_GUIDE_2015-2016.pdf>.

⁹² See C Berggren et al, 'Hybrids, Diesel or Both? The Forgotten Technological Competition for Sustainable Solutions in the Global Automotive Industry' (2009) 9 International Journal of Automotive Technology and Management; Wiesenthal et al (n 89); VW, 'Annual Report, Driving Ideas' (28 September 2008) <<http://annualreport2008.volkswagenag.com/servicepages/welcome.html>>.

⁹³ JL Sullivan et al., 'CO₂ Emission Benefit of Diesel (versus Gasoline) Powered Vehicles' (2004) 38 Environmental Science and Technology 3217.

⁹⁴ Commission (EU), 'Implementing the Community strategy to Reduce CO₂ Emissions from Cars: An Environmental Agreement with the European Automobile Industry', COM(1998) 495 final, 29 July 1998.

⁹⁵ Cames and Helmers (n 36); Schipper and Fulton (n 81).

⁹⁶ Cames and Helmers (n 36) 5.

⁹⁷ See for example the V6 TDI Model: <<http://www.volkswagen.co.uk/technology/diesel/v6-tdi>>.

good illustration was Volkswagen's selling strategy where selling 'clean' diesels was central to its ambition to increase market share in the United States.⁹⁸

4 ANTICIPATED AND UNINTENDED CONSEQUENCES OF EU ACTION ON CAR EMISSIONS

As Merton explains, the outcomes of a policy action include intended and anticipated consequences, as well as the unintended consequences which are not limited to undesirable outcomes of formal action.⁹⁹ Nonetheless, the anticipation of the undesirable results is also part of that process, though, for reasons stated by Merton, it may happen that they are ignored or overlooked.¹⁰⁰ By focusing exclusively on CO₂ reductions, the EU excluded consideration of how urban air quality objectives might be reconciled with this new regulatory approach to vehicle emission standards, which does not equally address emissions of other pollutants. Measures and policies adopted under the umbrella of the regulatory shift reflected the overriding consensus in achieving the immediate interest to reduce CO₂ emissions as a part of the climate change agenda. The Commission focused primarily on securing the participation of the car industry, without engaging other significant stakeholders such as local and regional authorities. However, the pursuit of the EU's overriding interest led to unintended consequences of undermining urban air quality objectives, including unlawful emissions of certain pollutants and spill-over effects on the car industry and consumers. It also placed the burden of air pollution, the unintended consequences of EU air pollution law and policy, onto urban conurbations, although they did not play any role in the policy-making process. Thus, this section will uncover both anticipated and unintended consequences and discuss attribution of these consequences to the EU's action.

4.1 Intended and anticipated outcome of the EU's policy: carbon dioxide emissions from vehicles reduced

There is no doubt that the EU's paramount concern in reducing CO₂ emissions, implemented through a combination of the wide range of measures, coupled with numerous incentives for the car industry, led to the attainment of this specific and desirable goal. According to the official statistics of the European Environment Agency, CO₂ emissions were below the targets set by Regulation 443/2009 for new passenger cars.¹⁰¹ In 2015, the average CO₂ emissions from the new car fleet were, on average, 119.5g/km which is well below 130g CO₂/km target and a reduction of 3.1 per cent compared to emissions in 2014.¹⁰² The CO₂ target of 95 grams of CO₂/km by the year 2021 prescribed by this regulation, is also expected to be reached.¹⁰³

Legal and policy measures aimed at reducing these emissions by incentivizing research and development of new technologies made significant contributions. Studies conducted by the Joint Research Centre confirmed that on-road CO₂ emissions of light-duty diesel and gasoline vehicles generally remained below respective emission standards.¹⁰⁴ For some countries such as France the development of diesel technology and the introduction of small diesel vehicles are regarded as the main reasons for low CO₂ emissions.¹⁰⁵ It is also

⁹⁸ Volkswagen used a very catchy slogan: 'green has never felt so good.'

⁹⁹ Merton (n 9) 895.

¹⁰⁰ *ibid* 898-902.

¹⁰¹ EEA, 'Monitoring CO₂ Emissions from New Passenger Cars and Vans in 2015' (EEA 2016) 6.

¹⁰² *ibid*.

¹⁰³ See <http://ec.europa.eu/clima/policies/transport/vehicles/cars/index_en.htm>.

¹⁰⁴ Weiss et al (n 68) 5.

¹⁰⁵ EEA (n 101) 21.

important to note that almost all car manufacturers were compliant and on track to reach their 2015 targets.¹⁰⁶

4.2 The effect of the unintended consequences of EU's policy

The EU's 'imperious immediacy' in reducing CO₂ emissions from vehicles excluded the consideration of other environmental interests that are equally important in regulating air pollution, most importantly urban air quality. The EU's regulatory shift led by this overriding interest resulted in several unintended consequences, including the unlawful emissions of nitrogen oxides and pollutant matters. As a result, a large proportion of EU citizens and ecosystems still remain exposed to air pollution in excess of EU and WHO standards.¹⁰⁷ In 2016, the European Environment Agency published data showing exceeding levels of pollution in urban areas in the EU, most notably NO_x.¹⁰⁸ Just in 2015, the annual limit value for nitrogen dioxide was 'widely exceeded across Europe, with 93 per cent of all exceedances occurring close to roads'.¹⁰⁹ The limits values were exceeded for particulate matter too. The daily limit values were exceeded in 21 out of 28 Member States, which illustrates the scope and breadth of the problem.¹¹⁰

One of the main anthropogenic sources of PM and nitrogen oxides is the combustion process, most notably in fossil fuel vehicles and power plants. Transport is one of the largest contributors to Europe's air pollution caused by NO_x, 'accounting for 46% of total EU-28 emissions just in 2013'.¹¹¹ Further data show that the investments in new low-carbon technologies, in particular the diesel boom, contributed significantly to the overall NO_x and particulate matter emissions in the EU. In its 2015 report, the European Environment Agency concluded that the increase in diesel cars, which was encouraged by financial incentives in many Member States, is seen as an important cause of fine particulate matter and nitrogen oxides pollution.¹¹²

The unintended consequences of excessive levels of these pollutants have had serious impacts on the health of citizens of the EU, especially in urban areas. Exposure to these pollutants is one of the main reasons for premature death and shorter life expectancy, especially in the well-known hot-spot regions such as parts of Benelux, northern Italy and the southeast of England.¹¹³ As Kelly points out, the epidemiological and toxicological research supports a link between urban air pollution and an increased incidence and/or severity of airway disease.¹¹⁴ There is a spill-over effect whereby the health implications led to increasing medical costs, reduced productivity and economic losses. Exposure to air pollution also has had an impact on European ecosystems. Again, one of the most harmful air pollutants is nitrogen oxides, which contribute to the acidification of soil, lakes and rivers, causing the loss of animal life, plants and biodiversity.¹¹⁵

The unintended consequences also reveal the important role local and regional authorities should have in formulating the urban air pollution policy. As a reaction to these health concerns, politicians in major European cities such as London and Paris had to step in

¹⁰⁶ *ibid* 44.

¹⁰⁷ EEA (n 2) 6.

¹⁰⁸ *ibid*.

¹⁰⁹ *ibid* 8; see EEA, 'Air Quality in Europe – 2015 Report' (EEA 2015) 8.

¹¹⁰ EEA (n 27).

¹¹¹ EEA (n 2) 18.

¹¹² EEA, 'Monitoring CO₂ Emissions from New Passenger Cars and Vans in 2014' (EEA 2015) 43.

¹¹³ EEA (n 109) 44.

¹¹⁴ FJ Kelly and JC Fussell, 'Air Pollution and Airway Disease' (2011) 41 *Clinical and Experimental Allergy* 1059.

¹¹⁵ EEA (n 2) 9.

to remedy the situation caused by the EU air pollution policy, despite the lack of their voice in the EU policy-making process. There have been calls in these cities for a ban of diesel vehicles and greater reliance on green technologies. Just after the Volkswagen scandal, the Liberal Democrats in the London Assembly demanded a ban on diesel vehicles or the introduction of more stringent tests to detect pollution.¹¹⁶ The Environment Committee of the London Assembly published a report in 2015, which considered various alternatives to diesel technology as diesel exhaust is a major contributor to air pollution in London and accounts for 40 percent of the capital's NOx emissions.¹¹⁷ The 2010 Report of the Committee on the Medical Effects of Air Pollutants calculated that the effect on mortality of particulate air pollution 'was equivalent to nearly 29,000 deaths in 2008 in the UK as a whole'.¹¹⁸ It is estimated that just in 2010, across London over 3,000 extra deaths per year were attributed to toxic particles in the air.¹¹⁹ Besides considering the ban on diesel vehicles, the Committee has called for the promotion of low emission technologies for heavy vehicles, such as plug-in hybrid, plug-in electric, hydrogen fuel cell electric.¹²⁰ Similarly, the mayor of Paris announced a ban on diesel vehicles made before 2011 from Paris streets as an urgent measure to improve the health of residents.¹²¹ More recently, in May 2016, a coalition of 20 mayors from major European cities issued a public statement and called for tighter air pollution limits on new diesel cars after the failure of the European Parliament to introduce stricter limit values for NOx from vehicles.¹²²

The regulatory shift in EU air pollution policy from vehicles may result in several other spill-over effects emerging as additional serious and costly unintended consequences for the car industry in the aftermath of the Volkswagen scandal. Though it may be still too early to identify the full impact of the scandal, this incident will certainly raise the costs of compliance for the car industry, which is evident from the immediate legislative activism of the EU institutions in the aftermath of the Volkswagen scandal.¹²³ Compliance with new standards and new targets certainly adds financial and institutional strains on car manufacturers, which will consequently be reflected in the costs of producing cars. This will have an impact on consumers as the costs will be passed on to them. Though the effect on sales may take longer to kick in, there is already a noticeable decrease in the number of diesel cars sold.¹²⁴ This demonstrates that the confidence of consumers is somewhat shaken. Most consumers make purchase choices based on price, while a smaller number will think about environmental concerns of purchasing a diesel car. However, their choice may be impacted

¹¹⁶ 'Calls to Ban Diesel Cars from London over VW Emissions Scandal' (BBC 1 November 2015).

¹¹⁷ London Assembly, 'Driving Away from Diesel: Reducing Air Pollution from Diesel Vehicles' (Environment Committee of the London Assembly 2015).

¹¹⁸ 'The Mortality Effects of Long-Term Exposure to Particulate Air Pollution in the United Kingdom' (COMEAP 2010), 88 <https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/304641/COMEAP_mortality_effects_of_long_term_exposure.pdf>.

¹¹⁹ London Assembly (n 117) 7. This figure is often contested as too low, as new research discloses that in 2010 around 9,500 premature deaths were caused from air pollution in London; ClientEarth, 'London's Shocking Air Pollution Death Toll Revealed' (15 July 2015) <<http://www.clientearth.org/londons-shocking-air-pollution-death-toll-revealed/>>.

¹²⁰ London Assembly (n 117) 19.

¹²¹ M Rosemain, 'Paris Smog Obscuring Eiffel Tower Threatens Diesel-Car Dominance' (Bloomberg 19 June 2015).

¹²² 'La Santé des Citoyens Passe avant celle des Lobbys Industriels' (Le Monde 16 March 2016).

¹²³ See the effects of the Regulation (EU) 2016/427 amending Regulation (EC) No 692/2008 as regards emissions from light passenger and commercial vehicles (Euro 6) [2016] OJ L82/1.

¹²⁴ P Campbell, 'Diesel Sales Fall to Lowest in Seven Years after VW Scandal' (Financial Times 24 October 2016).

by government's schemes to scrap old diesel cars and incentives to buy low emission cars.¹²⁵ This may have a negative effect for the EU car market as the EU is the largest market for diesel vehicles.

In order to respond to the new regulatory and compliance rules, and address consumers' preferences, car manufacturers have to rethink their business strategies in regard to diesel, especially after the Volkswagen scandal, which has left these in disarray. Moreover, by switching to diesel, the EU missed the opportunity to comprehensively develop electric and hybrid technologies. Thus, a changed business strategy will most likely include investments into cleaner technologies such as hybrid and electric cars. As these new technologies are expensive and sophisticated, in the medium term, they will drive car prices up and they still may not be as affordable as diesel or petrol cars. Moreover, it will be very difficult for the EU car industry to compete with non-European manufacturers which already developed clean technology. For example, Toyota (of Japan) currently leads in hybrid engines while Tesla (of the United States) leads in electric cars. This is yet another unintended consequence of the EU's policy on vehicle emission. Ultimately, these unintended consequences for manufacturers and consumers pose a wider question on the future of climate change policy, which for some time was highly dependent on the use of diesel vehicles as affordable option for consumers. This puts in question the future attainment of the EU's international climate change obligations.

5 CONCLUSION

Unintended consequences of the EU's air pollution law and policy resulted from the EU's primary focus on reducing CO₂ emissions and undermined the equally important environmental objective of urban air quality. To that effect, the EU adopted a number of legislative and policy measures, mostly providing incentives for car manufacturers to further develop diesel technology as an ideal way to reach EU CO₂ targets. This resulted in intended consequences of reducing CO₂ emissions. However, the unintended consequences are grave and include unlawful levels of air pollution in urban areas, in particular nitrogen oxide and particulate matter. Though it is still too early to measure, the implications for car manufacturers are significant. They are faced with compliance costs that will be passed on to consumers, as well as the need to quickly transform their business strategies to become more competitive and more innovative in electric and hybrid technologies.

What does this tell us about policy making in the EU? This example gives more insight into the challenges in formulating environmental policies in a multi-level entity. The EU is comprised of various policy-making levels, where policy and legal measures are defined at the EU and national level, but mostly enforced at the regional or local level. Instead of ensuring a stronger voice for those levels, the EU has to ensure the participation of key interest groups on which political deliberation depends. Due to the car industry's refusal to accept binding CO₂ targets, the EU had to accept voluntary agreements with car manufacturers. Over time, the EU succeeded in bringing the car industry on board to achieve its climate change agenda. Whether this was a premeditated policy shift or not, the new policy objectives were to be achieved by diesel technology that was already in place and very lucrative and appealing for the car industry. At the same time, it fitted perfectly with the immediate objectives the EU was trying to achieve; reducing CO₂ emission by focusing on emission trading scheme and road transport. The key shift to CO₂ emissions came after 2005, when the Kyoto Protocol came into force.

¹²⁵ G Sandeman, 'Chris Grayling Advises Motorists to "Think hard" before Buying Diesel' (The Guardian 25 February 2017).

The areas that are most adversely affected by NO_x and particulate emissions in the EU are large urban conurbations. Some of these areas do not have unified political structures. For example, the West Midlands conurbation in the UK is one of the worst affected areas for air pollution in the UK and it is split between numerous councils and authorities. The diffuse organization of many such areas across the EU renders them silent in policy making on emissions regulation at the EU level. The actors who can mobilize expertise and resources, such as the European car industry, and have institutional representation at the EU and national levels were able to pursue ‘an immediacy of interest’ in reducing CO₂ emissions. This led to an unintended consequence of NO_x and particulate emissions worsening air quality for millions of Europeans in urban areas.

Still, these unintended consequences open questions that may represent another avenue of research. Despite the early signs of discrepancies between emission levels in laboratory conditions and real driving conditions,¹²⁶ it seems that EU was primarily concerned with attaining the immediate and foreseen objectives, i.e. reduction of CO₂ emissions. In the case of emissions policy in the EU there seems to have been a case of ‘cognitive dissonance’ where the key institutional actors were unable to accept that, while CO₂ emissions were down, there have been negative effects through NO_x and particulate emissions. The success of reducing CO₂ emissions further perpetuated the air pollution effects. As environmental regulation is dependent on the input of scientific expertise, this phenomenon poses a significant risk to the application of impartial scientific advice.

There are several potential implications of this example of unintended consequences for regulation more generally. First, it suggests that parties affected by regulation should have sufficient participation in the formulation of regulation or policy. European urban conurbations and their citizens had little input into the EU’s climate change agenda, yet they have been adversely affected by persistent air pollution. There may be greater scope for local and regional actors in the formulation of environmental policy in the EU. Second, in assessing risk of action in any domain it is imperative that actors who are affected by a course of action are identified and risks are highlighted. In pursuing a policy of reducing CO₂ emissions the EU and Member States failed to identify the effect this would have on air pollution in urban areas. The impact assessment methodology used by the Commission could be broadened to allow for a more detailed examination of economic, social and environmental impacts of a proposal across relevant cross-sectoral policy areas, such as industry and transport. Third, the environment is complex and variable, yet the EU’s regulatory approach focused on a single issue. The primacy of CO₂ reductions subsumed other considerations, in particular air quality in European cities. This suggests that environmental regulation should be holistic rather than centred on a single issue. Finally, the EU failed to take into account the effect that CO₂ regulation had on the behaviour of actors. The promotion of diesel may have incentivized Volkswagen to develop and deploy ‘cheat’ devices as the regulatory aims and discourse were about CO₂ reduction. Ideally, environmental policy makers should have greater foresight on how actions of certain parties will change based on the incentives created by any new policy. The policy implications of this research should highlight to policy makers that a particular course of action in the environmental field may carry risks of reverberative effects that are potentially more far-reaching and critical than in other sectors.

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¹²⁶ Weiss et al (n 68).

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