

Regulation of Air Pollution

Australia • Brazil • Canada • China • European Union
France • Israel • Japan • South Africa
Switzerland • United Kingdom

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Introduction

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This report by the foreign law research staff of the Law Library of Congress's Global Legal Research Directorate includes surveys of eleven jurisdictions on the regulation of air pollution.

The covered jurisdictions include one supranational entity, the European Union, and a diverse array of countries, including some with common-law legal systems (Australia, Canada, and the United Kingdom), some civil-law countries (Brazil, China, France, Israel, Japan, and Switzerland), and one with a mixed legal system (South Africa). Some of the countries are unitary in nature, while others have federated governments. The report details the regimes these diverse jurisdictions have developed in recent decades to regulate air pollution.

The country surveys cover each jurisdiction's regulation of both stationary and mobile sources of air pollution, and of pollutants including sulfur oxides, nitrogen oxides, carbon monoxide, ozone, particulate matter, and hazardous air pollutants. Fuel quality standards, renewable fuel requirements, and vehicle emissions standards are covered, as are strategies for meeting international requirements to address climate change.

European Union

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SUMMARY The European Union (EU) aims to protect, conserve, and enhance its natural capital; turn itself into a resource-efficient, green, and competitive low-carbon economy; and safeguard the EU's citizens from environment-related pressures and risks to health and wellbeing by 2020. In furtherance of these goals, it has introduced a variety of legislative measures to fight air pollution and improve air quality. The EU itself and its Member States have ratified the relevant international agreements on the topic. These international commitments were enacted into EU legislation. The legislation sets ambient air quality limits and target values for air quality, implements emission mitigation controls, sets caps on Member States' total annual emissions of certain pollutants, sets vehicle emission standards to reduce greenhouse gas (GHG) emissions from transport, sets fuel quality standards, encourages the use of renewable fuels, establishes an emission trading scheme (ETS), sets annual national GHG emission limits for sectors not covered by the ETS, and limits industrial pollution, among other measures.

I. General Introduction

The European Union (EU) prides itself on having some of the highest environmental standards in the world.¹ In 2015, the EU's total greenhouse gas emissions (GHG) were 22% lower compared with 1990 levels, with emission levels varying among the individual Member States.² In order to lower its carbon footprint further, the EU has set the objective of becoming a "smart, sustainable and inclusive economy" by 2020 with policies and actions aimed at making it "more resource-efficient, greener, and more competitive."³ Resource efficiency is understood as a low carbon economy, with an increased use of renewable energy, a modernized transport sector, and energy efficiency.⁴ The latest policy goals for EU environmental law through 2020 can be found in the 7th Environment Action Programme (EAP).⁵ The EAP sets out several key objectives:

¹ *Environment*, EUROPEAN UNION, https://europa.eu/european-union/topics/environment_en (last updated Apr. 16, 2018), archived at <http://perma.cc/MK9W-H3F4>.

² EUROSTAT, ENERGY, TRANSPORT AND ENVIRONMENT INDICATORS 142 (2017), <http://ec.europa.eu/eurostat/documents/3217494/8435375/KS-DK-17-001-EN-N.pdf/18d1ecfd-acd8-4390-ade6-e1f858d746da>, archived at <http://perma.cc/E3B7-4LL9>.

³ *Communication from the Commission. Europe 2020. A Strategy for Smart, Sustainable and Inclusive Growth*, at 5, COM (2010) 2020 final (Mar. 3, 2010), <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52010DC2020&from=EN>, archived at <http://perma.cc/C6Z3-HZG9>.

⁴ *Id.* at 6.

⁵ Decision No. 1386/2013/EU of the European Parliament and of the Council of 20 November 2013 on a General Union Environment Action Programme to 2020 'Living Well, Within the Limits of Our Planet' (7th Environment Action Programme) (EAP), 2013 O.J. (L 354) 171, <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013D1386&from=EN>, archived at <http://perma.cc/NN5R-SJ2R>.

- a. to protect, conserve and enhance the Union's natural capital;
- b. to turn the Union into a resource-efficient, green, and competitive low-carbon economy;
- c. to safeguard the Union's citizens from environment-related pressures, and risks to health and wellbeing;
- d. to maximize the benefits of Union environment legislation by improving implementation;
- e. to improve the knowledge and evidence base for Union environment policy;
- f. to secure investment for environment and climate policy and address environmental externalities;
- g. to improve environmental integration and policy coherence;
- h. to enhance the sustainability of the Union's cities; [and]
- i. to increase the Union's effectiveness in addressing international environmental and climate-related challenges.⁶

II. EU Competence to Legislate in the Field of Environmental Law

The European Union is currently made up of twenty-eight Member States.⁷ Although the Member States remain independent, sovereign states, they have transferred some of their sovereign powers to the institutions of the EU. In general, the EU can only act insofar as the EU Member States have conferred the competence upon it in the EU Treaties to achieve the objectives set out in the Treaties (principle of conferral).⁸ Competences not conferred upon the EU remain with the Member States.⁹ Articles 2-6 of the Treaty on the Functioning of the European Union (TFEU) set out the competences of the EU, which are divided into exclusive, shared, and supporting competences.¹⁰ Exclusive competence means that only the EU may legislate, whereas both the EU and the Member States may legislate in the areas of shared competences.¹¹ As long as the EU has not exercised its shared competence to legislate, the Member States are free to adopt their own measures.¹²

⁶ *Id.* art. 2(1)(a)–(i).

⁷ A list of the Member States is available on the website of the EU. *EU Member Countries in Brief*, EU, https://europa.eu/european-union/about-eu/countries/member-countries_en (last updated Apr. 16, 2018), archived at <http://perma.cc/VE4P-44TW>. The United Kingdom currently remains a full member of the EU.

⁸ Consolidated Version of the Treaty on European Union (TEU), art. 5, 2016 O.J. (C 202) 13, http://eur-lex.europa.eu/resource.html?uri=cellar:9e8d52e1-2c70-11e6-b497-01aa75ed71a1.0006.01/DOC_2&format=PDF, archived at <http://perma.cc/V92F-NZZG>.

⁹ *Id.* art. 4, para. 1.

¹⁰ Consolidated Version of the Treaty on the Functioning of the European Union (TFEU), 2016 O.J. (C 202) 47, http://eur-lex.europa.eu/resource.html?uri=cellar:9e8d52e1-2c70-11e6-b497-01aa75ed71a1.0006.01/DOC_3&format=PDF, archived at <http://perma.cc/8TVM-PUJW>.

¹¹ *Id.* art. 2, paras. 1, 2, art. 4, para. 1.

¹² *Id.* art. 2, para. 2.

Even though the EU was active in setting environmental policy early on, an explicit legal basis for the EU to legislate in this area was not codified in the EU Treaties until 1987, when a new title, “Environment,” was added.¹³ The EU’s competence to legislate in the field of environmental law is listed among the shared competences.¹⁴ It is described in further detail in article 11 and articles 191 to 193 of the TFEU. According to these provisions, the EU can act both internally and externally, meaning that it can enact legislation binding upon the Member States as well as conclude agreements with third countries or international organizations regarding environmental law.¹⁵ These agreements are binding on EU organs and institutions as well as on the Member States.¹⁶ The EU has adhered to various international agreements in the field of environmental law, among them the United Nations Framework Convention on Climate Change (UNFCCC), its Kyoto Protocol, and the Paris Agreement.¹⁷ Because of the shared competence in environmental law, the EU and the Member States will usually conclude mixed agreements in this field, meaning treaties between the EU and the Member States jointly with a third state or organization.¹⁸

As the EU has exercised its shared competence to legislate in the field of environmental law, the Member States are generally precluded from regulating themselves.¹⁹ They are, however, allowed to adopt more stringent regulations than the EU standards upon notification of the European Commission.²⁰ Over the years, the EU has enacted a plethora of legislative measures in the field of environmental law and issued various action programs.

¹³ Single European Act art. 13, 1987 O.J. (L 169) 1, http://eur-lex.europa.eu/resource.html?uri=cellar:a519205f-924a-4978-96a2-b9af8a598b85.0004.02/DOC_1&format=PDF, archived at <http://perma.cc/MY95-HRP7>

¹⁴ TFEU art. 4, para. 2, lit. e.

¹⁵ *Id.* art. 191, para. 4.

¹⁶ *Id.* art. 216 para. 2.

¹⁷ United Nations Framework Convention on Climate Change (UNFCCC), May 9, 1992, 1771 U.N.T.S. 107, http://unfccc.int/files/essential_background/background_publications_htmlpdf/application/pdf/conveng.pdf, archived at <http://perma.cc/2XMZ-7GKG>; Status. *United Nations Framework Convention on Climate Change*, UNITED NATIONS TREATY COLLECTION (UNTC), https://treaties.un.org/Pages/ViewDetailsIII.aspx?src=IND&mtmsg_no=XXVII-7&chapter=27&Temp=mtmsg3&clang=en (last updated Apr. 16, 2018), archived at <http://perma.cc/JY6G-BAUX>; Kyoto Protocol to the United Nations Framework Convention on Climate Change (Kyoto Protocol), Dec. 11, 1997, 2303 U.N.T.S. 162, annex B, <http://unfccc.int/resource/docs/convkp/kpeng.pdf>, archived at <http://perma.cc/3HQM-LT8M>; Status. *Kyoto Protocol*, UNTC, https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtmsg_no=XXVII-7-a&chapter=27&clang=en (last updated Apr. 16, 2018), archived at <http://perma.cc/RF7S-BGQN>; Paris Agreement, Dec. 12, 2015, http://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf, archived at <http://perma.cc/9UKH-4U6T>; Status. *Paris Agreement*, UNTC, https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtmsg_no=XXVII-7-d&chapter=27&clang=en (last updated May 2, 2018), archived at <http://perma.cc/M76Y-4TKJ>.

¹⁸ Marcus Klamert, *The Principle of Loyalty in EU Law* 183, 186 (2014).

¹⁹ TFEU art. 2, para. 2.

²⁰ *Id.* art. 193.

III. Legal Framework

A. Air Quality

1. Ambient Air Quality Directives

Since the 1970s, improving air quality and fighting air pollution has been a focus of EU environmental policy. It therefore enacted a series of directives that set ambient air-quality limits and target values for air quality, and implemented emission mitigation controls.²¹ Directives are binding on EU Member States, but are not directly applicable and therefore need to be transposed into national law.²² The first major legislative instrument was the Air Quality Framework Directive 96/62/EC and its accompanying four “daughter” directives.²³ In 2001, these directives were supplemented by the “Clean Air for Europe (CAFE) Programme,” which laid out a thematic strategy to review the implementation and effectiveness of the directives, improve monitoring of air quality and the provision of information to the public, and set priorities for further action.²⁴

In 2008, the Air Quality Framework Directive and three of the four daughter directives were consolidated into a single Ambient Air Quality Directive.²⁵ The Ambient Air Quality Directive kept the existing standards for the ambient concentration of sulfur dioxide, nitrogen dioxide, and oxides of nitrogen, lead, benzene, and carbon monoxide, and set new ones for particulate matter.²⁶ It also included specific provisions, objectives, and target values for the secondary pollutant ozone and ozone precursor substances such as nitrogen oxides and volatile organic compounds (VOC).²⁷ The Ambient Air Quality Directive also established minimum common requirements and criteria for Member States’ monitoring and assessment of air quality in their designated zones and agglomerations.²⁸

In order to improve air quality and remedy situations in which targets are not met, the Ambient Air Quality Directive includes the following measures and corrective actions:

²¹ *Air Quality – Introduction*, EUROPEAN COMMISSION, <http://ec.europa.eu/environment/air/quality/index.htm> (last updated Jan. 15, 2018), archived at <http://perma.cc/U5DW-GP4V>.

²² TFEU art. 288, para. 3.

²³ Council Directive 96/62/EC of 27 September 1996 on Ambient Air Quality Assessment and Management, 1996 O.J. (L 296) 55, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:31996L0062&from=EN>, archived at <http://perma.cc/Z76D-74ET>.

²⁴ *Communication from the Commission – The Clean Air for Europe (CAFE) Programme: Towards a Thematic Strategy for Air Quality*, at 6, COM (2001) 245 final (May 4, 2001), <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52001DC0245&from=EN>, archived at <http://perma.cc/5Y5B-SB3K>.

²⁵ Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on Ambient Air Quality and Cleaner Air for Europe (Ambient Air Quality Directive), 2008 O.J. (L 152) 1, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32008L0050&from=EN>, archived at <http://perma.cc/6XF2-QWC4>.

²⁶ *Id.* art. 5, para. 1.

²⁷ *Id.* annexes VII, X.

²⁸ *Id.* arts. 6-11, annex III.

- Thresholds, limit values, and target values for each pollutant covered by the directive.²⁹
- Specifically designated national bodies to carry out the tasks of the directive.³⁰
- Air quality plans to address situations where pollution levels exceed limit or target values in a zone or agglomeration. Air quality plans set out measures to attain the limit or target values and may include specific measures to protect sensitive population groups, such as children.³¹
- Short-term action plans if there is a risk that pollution levels may exceed one or more of the alert thresholds.³² These may include measures to reduce road traffic, construction works, certain industrial activities, or domestic heating, as well as specific measures to protect sensitive population groups.³³
- Provide information about ambient air quality, air quality plans, and other related topics to public and environmental, consumer, and other relevant organizations by means of any easily accessible media including the Internet.³⁴
- Publication of annual reports on all the pollutants covered by the legislation of EU Member States.³⁵

The limit values for the covered air pollutants became legally binding upon the Member States with the entry into force of the Clean Air Directive in June 2008. However, Member States were allowed to apply to the Commission for time extensions of three years (particulate matter) or up to five years (nitrogen dioxide, benzene) to meet certain limit values, provided that air quality plans were established for these zones or agglomerations.³⁶

2. *Reduction of National Emissions*

The National Emission Ceiling Directive (NEC Directive), which updated and replaced earlier directives in 2016, sets caps on Member States' total annual emissions of certain pollutants from all land sources in their territory that are not in the EU's Emissions Trading System (ETS).³⁷ The update also implemented the international obligations agreed upon by the EU and its Member

²⁹ *Id.* annexes II, VII, XI, XIV.

³⁰ *Id.* art. 3, annex XV.

³¹ *Id.* art. 23.

³² *Id.* art. 24.

³³ *Id.* art. 24, para. 2.

³⁴ *Id.* art. 26, annex XVI.

³⁵ *Id.* art. 26, para. 2.

³⁶ *Id.* art. 22.

³⁷ Directive (EU) 2016/2284 of the European Parliament and of the Council of 14 December 2016 on the Reduction of National Emissions of Certain Atmospheric Pollutants, Amending Directive 2003/35/EC and Repealing Directive 2001/81/EC (National Emissions Ceilings (NEC) Directive), art. 2, 2016 O.J. (L 344) 1, <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016L2284&from=EN>, archived at <http://perma.cc/6FNN-F4PP>. For the ETS, see *infra* Part III(C).

States in the Convention on Long-Range Transboundary Air Pollution of 1979 (LRTAP Convention) and its revised Gothenburg Protocol.³⁸

The NEC Directive entered into force on December 31, 2016, and Member States have until July 1, 2018, to transpose it into national law.³⁹ It establishes different national emission-reduction commitments for each Member State from 2020 to 2029, and from 2030 onwards for sulfur dioxide, nitrogen oxides, non-methane volatile organic compounds, ammonia, and fine particulate matter.⁴⁰ The emission ceilings for 2010 that were set in the earlier Directive remain applicable until the end of 2019.⁴¹ In order to achieve the objectives of the NEC Directive, each Member State must draw up, adopt, and implement a National Air Pollution Control Program and provide it to the Commission.⁴² These programs are also supposed to contribute to the successful implementation of the air quality plans established under the Ambient Air Quality Directive.⁴³ The programs must be updated every four years.⁴⁴ In addition, Member States are required to prepare and annually update national emission inventories for the pollutants covered by the NEC Directive as well as emission projections for certain pollutants.⁴⁵ Information on National Air Pollution Control Programs, national emission inventories, national emission projections, informative inventory reports, and additional reports must be made available to the public.⁴⁶

3. Compliance with and Update of Air Quality Legislation

Even though air quality has substantially improved across Europe due to the abovementioned measures, air pollutant concentrations are still too high and expose people to serious health risks.⁴⁷ In 2014, all but five EU Member States exceeded the allowed thresholds for particulate matter and nitrogen dioxide set in the Ambient Air Quality Directive. The Commission opened infringement

³⁸ *Id.* recitals 5–7; Convention on Long-range Transboundary Air Pollution (CLRTAP), Nov. 13, 1979, 1302 U.N.T.S. 217, <http://www.unece.org/fileadmin/DAM/env/lrtap/full%20text/1979.CLRTAP.e.pdf>, archived at <http://perma.cc/F9ZJ-DU4Y>; 1999 Protocol to Abate Acidification, Eutrophication and Ground-level Ozone to the Convention on Long-range Transboundary Air Pollution (Gothenburg Protocol), Nov. 30, 1999, as amended on May 4, 2012, 2319 U.N.T.S. 81, http://www.unece.org/fileadmin/DAM/env/documents/2013/air/eb/ECE.EB.AIR.114_ENG.pdf, archived at <http://perma.cc/R47Y-ERQZ>.

³⁹ NEC Directive arts. 20, 22.

⁴⁰ *Id.* art. 4, para. 1, annex II.

⁴¹ *Id.* art. 21, recital 37; Directive 2001/81/EC of the European Parliament and of the Council of 23 October 2001 on National Emission Ceilings for Certain Atmospheric Pollutants, 2001 O.J. (L 309) 22, <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32001L0081&from=EN>, archived at <http://perma.cc/7P96-DL5R>.

⁴² NEC Directive arts. 6, 10.

⁴³ *Id.* recital 18.

⁴⁴ *Id.* art. 6, para. 3.

⁴⁵ *Id.* art. 8, art. 10, para. 2.

⁴⁶ *Id.* art. 14.

⁴⁷ *Air Pollution*, EUROPEAN ENVIRONMENT AGENCY (EEA), <https://www.eea.europa.eu/themes/air/intro> (last updated Oct. 9, 2017), archived at <http://perma.cc/88H5-V2T8>.

proceedings and ten Member States were referred to the Court of Justice.⁴⁸ The respective national emission ceilings for one or more pollutants were also frequently exceeded by Member States.⁴⁹ The EU therefore proposed a Clean Air Policy Package in 2013, which included a Clean Air Programme for Europe⁵⁰ and proposals for the above mentioned NEC Directive from 2016;⁵¹ for a Directive on Limitation of Emissions of Certain Pollutants Into the Air from Medium Combustion Plants (the MCP Directive), which entered into force in 2015;⁵² and to approve the revised Gothenburg Protocol at EU level, which was accepted by the Council in July 2017.⁵³ The goal of the Clean Air Policy Package is to achieve compliance with existing legislation and to further reduce emissions of air pollutants until 2030.⁵⁴

B. Vehicle Emissions

About one-fifth of the CO₂ emissions in the EU can be attributed to traffic, the only major sector in which GHG emission are still increasing.⁵⁵ In order to reduce GHG emissions from transport, the EU sets emission standards for light-duty vehicles (cars and vans), has proposed a strategy to reduce emissions from heavy-duty vehicles (coaches, buses, trucks), requires that new cars display a label indicating the car's fuel efficiency and CO₂ emissions, sets fuel quality standards, and encourages the use of biofuels.

⁴⁸ EUROPEAN PARLIAMENT, IMPLEMENTATION OF THE AMBIENT AIR QUALITY DIRECTIVE. STUDY 23 (Apr. 2016), [http://www.europarl.europa.eu/RegData/etudes/STUD/2016/578986/IPOL_STU\(2016\)578986_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/STUD/2016/578986/IPOL_STU(2016)578986_EN.pdf), archived at <http://perma.cc/6ZSJ-XG8A>.

⁴⁹ *NEC Directive Reporting Status 2017 - The Need to Reduce Air Pollution in Europe*, EEA, <https://www.eea.europa.eu/themes/air/national-emission-ceilings/nec-directive-reporting-status#tab-data-visualisations> (last updated Apr. 16, 2018), archived at <http://perma.cc/NJP2-47GN>.

⁵⁰ *Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions – A Clean Air Programme for Europe (Clean Air Programme for Europe)*, COM (2013) 918 final (Dec. 18, 2013), <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52013DC0918&from=EN>, archived at <http://perma.cc/6D6A-HYK4>.

⁵¹ NEC Directive, *supra* note 37.

⁵² Directive (EU) 2015/2193 of the European Parliament and of the Council of 25 November 2015 on the Limitation of Emissions of Certain Pollutants Into the Air from Medium Combustion Plants (Medium Combustion Plant (MCP) Directive), 2015 O.J. (L 313) 1, <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32015L2193&from=EN>, archived at <http://perma.cc/2QOQ-VZLV>.

⁵³ Council Decision on the Acceptance of the Amendment to the 1999 Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution to Abate Acidification, Eutrophication and Ground-level Ozone, file no. 2013/0448 (NLE) (Apr. 26, 2017), <http://data.consilium.europa.eu/doc/document/ST-7524-2017-ADD-1-COR-1/en/pdf>, archived at <http://perma.cc/AV5Y-LM4M>; Press Release, Council of the EU, Improving Air Quality: EU Acceptance of the Gothenburg Protocol Amendment in Sight (July 17, 2017), <http://www.consilium.europa.eu/en/press/press-releases/2017/07/17/agri-improving-air-quality/>, archived at <http://perma.cc/6NUX-T3U2>.

⁵⁴ *Clean Air Programme for Europe*, *supra* note 50, at 6, para. 3.1.

⁵⁵ *Road Transport: Reducing CO₂ Emissions from Vehicles*, EUROPEAN COMMISSION, https://ec.europa.eu/clima/policies/transport/vehicles_en (last visited Apr. 16, 2018), archived at <http://perma.cc/Z5XZ-2POZ>.

1. Emission Standards for Light-Duty Vehicles

The EU emission standards were enacted as a regulation, meaning they are directly applicable in the EU Member States without any national implementing legislation needed.⁵⁶ The limit for passenger cars that are registered for the first time was originally set as 130 grams (g) of CO₂ emitted per kilometer (km).⁵⁷ The limit was phased in between 2012 and 2015.⁵⁸ Currently, new passenger cars may not emit more than 95 g CO₂ per km on average by 2021.⁵⁹ The targets are phased in from 2020, meaning 95% of new cars will have to comply with the limit in 2020, increasing to 100% in 2021.⁶⁰ New light commercial vehicles (vans), defined as vehicles used to carry goods weighing up to 3.5 tonnes and weighing less than 2610 kg when empty, have different limits.⁶¹ They originally had a target of 175 g of CO₂/km by 2017.⁶² The limit was phased in between 2014 and 2017.⁶³ By 2020, new vans may not emit more than 147 g CO₂/km.⁶⁴ The targets are based on the New European Driving Cycle (NEDC) test procedure. If a manufacturer exceeds the average CO₂ emission limit, a fine will be imposed for each vehicle registered.⁶⁵ From 2019 onwards, the fine for manufacturers of passenger cars and vans will be €95 (around US\$118) for each gram that exceeds the limit.⁶⁶

In November 2017, a legislative proposal amending the current CO₂ emission standards for light-duty vehicles was published.⁶⁷ The current standards will expire on January 1, 2020. The new

⁵⁶ TFEU art. 288, para. 2.

⁵⁷ Regulation (EC) No. 443/2009 of the European Parliament and of the Council of 23 April 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, art. 1, para. 1, 2009 O.J. (L 140) 1, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32009R0443&from=EN>, archived at <http://perma.cc/NP8M-SJGD>.

⁵⁸ *Id.* art. 4.

⁵⁹ *Id.* art. 1, para. 2; Regulation (EU) No. 333/2014 of the European Parliament and of the Council of 11 March 2014 Amending Regulation (EC) No. 443/2009 to Define the Modalities for Reaching the 2020 Target to Reduce CO₂ Emissions from New Passenger Cars, 2014 O.J. (L 103) 15, <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014R0333&from=EN>, archived at <http://perma.cc/FP7F-5AWA>.

⁶⁰ Regulation (EU) No. 333/2014, *supra* note 59, art. 1, para. 4.

⁶¹ Regulation (EU) No. 510/2011 of the European Parliament and of the Council of 11 May 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, art. 2, 2011 O.J. (L 145) 1, <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32011R0510&from=EN>, archived at <http://perma.cc/GGL4-5G8Q>.

⁶² *Id.* art. 1, para. 1.

⁶³ *Id.* art. 4.

⁶⁴ *Id.* art 1, para. 2.

⁶⁵ Regulation (EC) No. 443/2009, *supra* note 57, art. 9; Regulation (EU) No. 510/2011, *supra* note 61, art. 9.

⁶⁶ *Reducing CO₂ Emissions from Vans*, EUROPEAN COMMISSION, https://ec.europa.eu/clima/policies/transport/vehicles/vans_en (last visited Apr. 18, 2018), archived at <http://perma.cc/F7GL-9XEU>.

⁶⁷ *Proposal for a Regulation of the European Parliament and of the Council Setting Emission Performance Standards for New Passenger Cars and for New Light Commercial Vehicles as Part of the Union's Integrated Approach to Reduce CO₂ Emissions From Light-Duty Vehicles and Amending Regulation (EC) No. 715/2007 (Recast)*, COM (2017) 676 final/2 (Jan. 26, 2018), http://eur-lex.europa.eu/resource.html?uri=cellar:609fc0d1-04ee-11e8-b8f5-01aa75ed71a1.0001.02/DOC_1&format=PDF, archived at <http://perma.cc/P698-A46C>.

emission targets will be based on the Worldwide Harmonised Light Vehicle Test Procedure (WLTP), which was introduced on September 1, 2017.⁶⁸ The WLTP is a globally harmonized laboratory test procedure developed within the UN Economic Commission for Europe (UNECE) framework with the support of the European Commission that is supposed to provide fuel consumption and CO₂ emission values that are more representative of real-world conditions.⁶⁹ As the new targets will be WLTP based, the new EU fleet-wide targets from 2020 onwards will not be defined as absolute values in g CO₂/km, but will be expressed as percentage reductions compared to the average of the specific emission targets for 2021 determined for each manufacturer.⁷⁰ The proposal envisages a 15% reduction in 2021 and a 30% reduction from January 1, 2030 onwards.⁷¹

2. Emission Standards for Heavy-Duty Vehicles

Emissions from heavy-duty vehicles (trucks and buses) are currently neither measured nor reported, even though they account for 25% of road transport CO₂ emissions and are expected to increase further in the future.⁷² In 2017, the Commission therefore proposed to set up a system for monitoring and reporting of CO₂ emissions from and fuel consumption by these vehicles as a prerequisite for setting emission standards.⁷³ The proposal requires heavy-duty vehicle manufacturers to calculate the CO₂ emissions and fuel consumption of new vehicles using the new Vehicle Energy Consumption Calculation Tool (VECTO) from January 1, 2019, onwards.⁷⁴ The Commission is expected to publish a proposal on emission standards for CO₂ emissions and fuel efficiency of heavy-duty vehicles by the end of 2018.⁷⁵

⁶⁸ Press Release, European Commission, New and Improved Car Emissions Tests Become Mandatory on 1 September (Sept. 4, 2017), http://ec.europa.eu/growth/content/new-and-improved-car-emissions-tests-become-mandatory-1-september_en, archived at <http://perma.cc/638Q-ZDPH>.

⁶⁹ EUROPEAN COMMISSION, FACT SHEET. EU ACTION TO CURB AIR POLLUTION BY CARS: QUESTIONS AND ANSWERS, MEMO/17/2821 (Aug. 31, 2017), [http://europa.eu/rapid/press-release MEMO-17-2821_en.pdf](http://europa.eu/rapid/press-release_MEMO-17-2821_en.pdf), archived at <http://perma.cc/RZ7V-9CDF>.

⁷⁰ COM (2017) 676 final/2, *supra* note 67, art. 1, para. 4, annex I.

⁷¹ *Id.*

⁷² Commission Regulation (EU) 2017/2400 of 12 December 2017 Implementing Regulation (EC) No. 595/2009 of the European Parliament and of the Council as Regards the Determination of the CO₂ Emissions and Fuel Consumption of Heavy-Duty Vehicles and Amending Directive 2007/46/EC of the European Parliament and of the Council and Commission Regulation (EU) No. 582/2011 (Certification Regulation), recitals 4 & 5, 2017 O.J. (L 349), 1, <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32017R2400&from=EN>, archived at <http://perma.cc/G2PK-JWJD>.

⁷³ *Proposal for a Regulation of the European Parliament and of the Council on the Monitoring and Reporting of CO₂ Emissions from and Fuel Consumption of New Heavy-Duty Vehicles*, COM (2017) 279 final (May 31, 2017), http://eur-lex.europa.eu/resource.html?uri=cellar:a8840d33-4625-11e7-aea8-01aa75ed71a1.0003.02/DOC_1&format=PDF, archived at <http://perma.cc/TNB9-9HJX>.

⁷⁴ *Id.* at 3. VECTO is described in the Certification Regulation, *supra* note 72, art. 5.

⁷⁵ Legislative Train Schedule: Resilient Energy Union with a Climate Change Policy. Heavy-Duty Vehicles CO₂ Emissions and Fuel Efficiency, EUROPEAN PARLIAMENT, <http://www.europarl.europa.eu/legislative-train/theme-resilient-energy-union-with-a-climate-change-policy/file-heavy-duty-vehicles-co2-emissions-and-fuel-efficiency> (last updated Mar. 20, 2018), archived at <http://perma.cc/R4WN-HYVR>.

3. Car Labelling

Furthermore, EU legislation provides that each new car must display a label showing its fuel consumption and CO₂ emissions so that consumers can make an informed choice.⁷⁶ The information on fuel efficiency must also be published in all promotional literature and guides, and be exhibited in a prominent position on a poster or display at the place of sale.⁷⁷

4. Fuel Quality

The Fuel Quality Directive sets quality standards for petrol, diesel fuels, and biofuels used in road vehicles as well as for gas oil used in non-road-mobile machinery.⁷⁸ The rules generally ban petrol with lead and limit the amount of sulfur in diesel fuels.⁷⁹ Petrol and diesel fuels may only be placed on the market in a Member State if they comply with the environmental specifications set out in the Directive.⁸⁰ Fuel suppliers are required to reduce the GHG intensity of the EU fuel mix by 6% by 2020 in comparison to 2010.⁸¹ Furthermore, the Fuel Quality Directive sets sustainability criteria for biofuels when they are to be taken into account for GHG emission reductions in line with the ones set in the Renewable Energy Directive, as outlined below.⁸²

5. Renewable Fuels

The EU promotes the use of biofuels and bioliquids as an alternative to fossil fuels in order to decrease carbon emissions from transport.⁸³ The target is to have 10% of the transport fuel of every EU Member State come from renewable fuels by 2020 as part of the overall goal to fulfill at least 20% of the EU's total energy needs with renewables as set out in the Renewable Energy Directive.⁸⁴ In order to achieve these goals, the EU sets sustainability criteria for biofuels, has

⁷⁶ Consolidated Version of Directive 1999/94/EC of the European Parliament and of the Council of 13 December 1999 Relating to the Availability of Consumer Information on Fuel Economy and CO₂ Emissions in Respect of the Marketing of New Passenger Cars (Car Labelling Directive), arts. 1, 3, 2000 O.J. (L 12) 16, <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:01999L0094-20081211&from=EN>, archived at <http://perma.cc/5PPA-BNCJ>.

⁷⁷ *Id.* arts. 4–6.

⁷⁸ Consolidated Version of Directive 98/70/EC of the European Parliament and of the Council of 13 October 1998 Relating to the Quality of Petrol and Diesel Fuels and Amending Council Directive 93/12/EEC (Fuel Quality Directive), art. 1, 1998 O.J. (L 350) 58, <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:01998L0070-20151005&from=EN>, archived at <http://perma.cc/2Y3P-7B9H>.

⁷⁹ *Id.* art. 3, para. 1, art. 4, para. 1 in conjunction with annex II.

⁸⁰ *Id.* art. 3, para. 2 in conjunction with annex I art. 4, para. 1 in conjunction with annex II.

⁸¹ *Id.* art. 7a, para. 2(a).

⁸² *Id.* art. 7b.

⁸³ *Biofuels*, EUROPEAN COMMISSION, <https://ec.europa.eu/energy/en/topics/renewable-energy/biofuels> (last visited Apr. 16, 2018), archived at <http://perma.cc/MY7N-CZRB>.

⁸⁴ Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the Promotion of the Use of Energy from Renewable Sources and Amending and Subsequently Repealing Directives 2001/77/EC and 2003/30/EC (Renewable Energy Directive), art. 3, 2009 O.J. (L 140) 16, <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32009L0028&from=EN>, archived at <http://perma.cc/QUL4-MM46>.

enacted legislation to combat indirect land use change,⁸⁵ requires EU Member States to submit reports on emissions from cultivation of raw materials for use in biofuels, promotes biofuels as an alternative in aviation, and sets quality standards for biofuels.

Only biofuels and bioliquids that fulfill the following sustainability criteria are entitled to receive government support or can count towards national renewable energy targets:⁸⁶

- They achieve GHG savings of at least 35% in comparison to fossil fuels. This savings requirement rose to 50% in 2017 and again to 60% in 2018, but only for new production plants.
- They are not produced from raw materials obtained from land with high biodiversity value such as primary forests or highly biodiverse grasslands.
- They are not grown in areas converted from land with previously high carbon stock such as wetlands or forests.⁸⁷

In 2016, the Commission published a proposal that updates the targets and the current sustainability criteria for biofuels, bioliquids, and biomass fuels.⁸⁸ Negotiations between the European Parliament, the Council, and the Commission on the legislative proposal started in February 2018 and are still ongoing.⁸⁹

C. 2020 Climate and Energy Package

The “2020 Package” of the EU is a set of legislation that establishes the following three binding targets to ensure that the EU meets its climate and energy targets for the year 2020.⁹⁰

⁸⁵ Directive (EU) 2015/1513 of the European Parliament and of the Council of 9 September 2015 Amending Directive 98/70/EC Relating to the Quality of Petrol and Diesel Fuels and Amending Directive 2009/28/EC on the Promotion of the Use of Energy from Renewable Sources, 2015 O.J. (L 239) 1, <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32015L1513&from=EN>, archived at <http://perma.cc/8AV2-XMNZ>.

⁸⁶ Renewable Energy Directive arts. 2(k), 3, 5, 11, 17.

⁸⁷ *Id.* art. 17.

⁸⁸ *Proposal for a Directive of the European Parliament and of the Council on the Promotion of the Use of Energy From Renewable Sources (Recast)*, COM (2016) 767 final (Feb. 23, 2017), http://eur-lex.europa.eu/resource.html?uri=cellar:3eb9ae57-faa6-11e6-8a35-01aa75ed71a1.0007.02/DOC_1&format=PDF, archived at <http://perma.cc/8F73-HB5A>.

⁸⁹ Legislative Train Schedule: Resilient Energy Union with a Climate Change Policy. Review of the Renewable Energy Directive 2009/28/EC to Adapt It to the EU 2030 Climate and Energy Targets, EUROPEAN PARLIAMENT, <http://www.europarl.europa.eu/legislative-train/theme-resilient-energy-union-with-a-climate-change-policy/file-renewable-energy-directive-for-2030-with-sustainable-biomass-and-biofuels> (last updated Mar. 20, 2018), archived at <http://perma.cc/48FS-YP6F>.

⁹⁰ *2020 Climate & Energy Package*, EUROPEAN COMMISSION, https://ec.europa.eu/clima/policies/strategies/2020_en (last visited Apr. 17, 2018), archived at <http://perma.cc/GK8Q-J2TU>.

- 20% cut in greenhouse gas emissions (from 1990 levels)
- 20% of EU energy from renewables
- 20% improvement in energy efficiency⁹¹

The goals are to be met by the EU's Emissions Trading Scheme (ETS), by binding national annual GHG emission reduction targets for sectors not in the ETS, and by binding national targets for raising the share of renewables in energy consumption as discussed above.⁹²

1. Emissions Trading Scheme (ETS)

The EU's Emissions Trading Scheme (ETS) adheres to the "cap-and-trade" principle, meaning that there is a limited quantity of tradable rights to emit greenhouse gases (emission allowances) available.⁹³ Sectors covered by the ETS include energy industries, large industrial installations, and aviation.⁹⁴ The EU ETS currently covers all EU Member States as well as Iceland, Liechtenstein, and Norway. In addition, on November 23, 2017, the EU and Switzerland signed an agreement to link their GHG emissions trading systems and create a joint CO₂ market.⁹⁵ In a next step, the Swiss parliament and the competent EU institutions (Council and Parliament) need to approve the ratification for the agreement to enter into force.⁹⁶

The EU ETS has a single, EU-wide cap on GHG emissions.⁹⁷ Previously, a system of national caps was in place.⁹⁸ The current default method for allocating emission allowances is auctioning, meaning that companies are required to buy an increasing proportion of allowances through

⁹¹ *Id.*

⁹² Renewable Energy Directive, *supra* note 84.

⁹³ Consolidated Version of Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 Establishing a Scheme for Greenhouse Gas Emission Allowance Trading Within the Community and Amending Council Directive 96/61/EC (ETS Directive), 2003 O.J. (L 275) 32, <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02003L0087-20140430&from=EN>, archived at <http://perma.cc/28PQ-ZEEW>.

⁹⁴ *Id.* annex I.

⁹⁵ Agreement between the European Union and the Swiss Confederation on the Linking of Their Greenhouse Gas Emissions Trading Systems, 2017 O.J. (L 322) 3, [https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:22017A1207\(01\)&from=EN](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:22017A1207(01)&from=EN), archived at <http://perma.cc/LN2S-SQ32>; Press Release, European Commission, EU and Switzerland Sign Agreement to Link Emissions Trading Systems (Nov. 23, 2017), https://ec.europa.eu/clima/news/eu-and-switzerland-sign-agreement-link-emissions-trading-systems_en, archived at <http://perma.cc/PW9N-6ZTJ>.

⁹⁶ Press Release, *supra* note 95.

⁹⁷ ETS Directive, *supra* note 93, art. 9.

⁹⁸ Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 Establishing a Scheme for Greenhouse Gas Emission Allowance Trading Within the Community and Amending Council Directive 96/61/EC (ETS Directive 2003), art. 9, 2003 O.J. (L 275) 32, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32003L0087&from=EN>, archived at <http://perma.cc/V443-28AN>.

auctions.⁹⁹ When the ETS was established, the default method was free allocation.¹⁰⁰ Companies in certain sectors are required to participate in the ETS.¹⁰¹ They either receive or buy emission allowances, which they can trade with others as needed. The Member States are required to use at least 50% of auctioning revenues for climate and energy-related purposes.¹⁰²

In July 2015, a proposal was published for reforming the ETS for the period after 2020. The proposal was adopted in March 2018.¹⁰³ In order to meet the 43% GHG emission reduction target in the ETS sector compared to 2005 levels in line with the EU 2020 Package and the Paris Agreement commitments, the number of emission allowances will be reduced by an annual rate of 2.2% starting in 2021, among other measures.¹⁰⁴

2. *Effort Sharing Decision*

The Effort Sharing Decision sets annual national GHG emission limits for the period 2013–2020 for sectors not covered by the ETS, which include transport, buildings, agriculture, and waste.¹⁰⁵ The national targets aim for a GHG emissions reduction of between 10% and 20% in total compared with 2005 levels.¹⁰⁶ Furthermore, the Effort Sharing Decision also limits the amount of CO₂ equivalent (in tonnes) that each Member State may emit in each year from 2013 to 2020 by establishing annual emission allocations (AEA).¹⁰⁷

In July 2016, the European Commission presented a proposal for a regulation to limit post-2020 national GHG emissions and to meet the Paris Agreement obligations.¹⁰⁸ The proposal was

⁹⁹ ETS Directive, *supra* note 93, art. 10; *Auctioning*, EUROPEAN COMMISSION, https://ec.europa.eu/clima/policies/ets/auctioning_en (last visited Apr. 18, 2018), archived at <http://perma.cc/53L5-XE56>.

¹⁰⁰ ETS Directive 2003, *supra* note 98, art. 10.

¹⁰¹ ETS Directive, *supra* note 93, art 4, annex I.

¹⁰² *Id.* art. 10, para. 3.

¹⁰³ Directive (EU) 2018/410 of the European Parliament and of the Council of 14 March 2018 Amending Directive 2003/87/EC to Enhance Cost-Effective Emission Reductions and Low-Carbon Investments, and Decision (EU) 2015/1814, 2018 O.J. (L 76) 3, <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018L0410&from=EN>, archived at <http://perma.cc/ET2Z-2WBW>.

¹⁰⁴ *Id.* art. 1, para. 12.

¹⁰⁵ Decision No. 406/2009/EC of the European Parliament and of the Council of 23 April 2009 on the Effort of Member States to Reduce Their Greenhouse Gas Emissions to Meet the Community's Greenhouse Gas Emission Reduction Commitments up to 2020 (Effort Sharing Decision), 2009 O.J. (L 140) 136, <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32009D0406&from=EN>, archived at <http://perma.cc/24PB-J4D7>.

¹⁰⁶ *Id.* art. 3, para. 1 in conjunction with annex II.

¹⁰⁷ *Id.* art. 2, para. 2, art 3, para. 2; Commission Decision of 26 March 2013 on determining Member States' annual emission allocations for the period from 2013 to 2020 pursuant to Decision No. 406/2009/EC of the European Parliament and of the Council, 2013 O. J. (L 90) 106, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013D0162&from=en>, archived at <http://perma.cc/CCT6-YU6N>.

¹⁰⁸ *Proposal for a Regulation of the European Parliament and of the Council on Binding Annual Greenhouse Gas Emission Reductions by Member States from 2021 to 2030 for a Resilient Energy Union and to Meet Commitments under the Paris Agreement and Amending Regulation No. 525/2013 of the European Parliament and the Council on a Mechanism for Monitoring and Reporting Greenhouse Gas Emissions and Other Information Relevant to Climate Change (Effort Sharing Regulation)*, COM (2016) 482 final (July 20, 2017), <https://eur-lex.europa.eu/resource>.

accepted in the plenary session of the European Parliament on April 17, 2018.¹⁰⁹ In a next step, the text must be approved by the Council before entering into force.¹¹⁰

D. Industrial Pollution

The EU also tries to reduce harmful industrial emissions by setting limits for emissions of pollutants from large combustion plants with a thermal input of 50 megawatts (MW) or more,¹¹¹ setting emission limits for medium combustion plants over 1 MW and less than 50 MW as enacted in the MCP Directive as part of the Clean Air Policy Package mentioned above,¹¹² and by developing a general framework based on integrated permitting, meaning that permits for plants must take account of a plant's complete environmental performance to avoid pollution being shifted from one medium to another.¹¹³ Permit conditions including emission limit values must be based on the Best Available Techniques (BAT).¹¹⁴

<http://perma.cc/EDH8-46AF>, archived at <http://perma.cc/EDH8-46AF>.

¹⁰⁹ Press Release, European Parliament, EP Backs National CO₂ Cuts and Forestry Plans to Meet Paris Climate Targets (Apr. 17, 2018), <http://www.europarl.europa.eu/news/en/press-room/20180411IPR01515/ep-backs-national-co2-cuts-and-forestry-plans-to-meet-paris-climate-targets>, archived at <http://perma.cc/C8XV-RVP8>.

¹¹⁰ *Id.*

¹¹¹ Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control), ch. III & annex V, 2010 O.J. (L 334) 17, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32010L0075&from=EN>, archived at <http://perma.cc/6GA5-KUXU>.

¹¹² MCP Directive, *supra* note 52, arts. 2, art. 6, para. 1 in conjunction with annex II of Directive 2010/75/EU.

¹¹³ Directive 2010/75/EU, *supra* note 111.

¹¹⁴ *Id.* art. 14.

Australia

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SUMMARY The Australian federal government works with state and territory governments to set national objectives related to air quality and emissions through National Environment Protection Measures. State and territory governments are responsible for implementing the Measures and have monitoring and reporting obligations. The National Clean Air Agreement, signed in 2015, provides the basis for a joint work program related to reducing air pollution and improving air quality. Actions taken under the agreement include new regulations related to product emissions and a new target regarding particle pollution.

The federal government also sets national fuel quality standards and vehicle emissions standards for new and newly imported vehicles; emissions standards for in-service vehicles are the responsibility of state and territory governments. The Australian government has a policy of harmonizing its vehicle emissions standards with international regulations.

The Ministerial Forum on Vehicle Emissions, established in 2015, is examining the potential adoption of Euro 6/VI noxious emissions standards, revised fuel quality standards based on European standards, and the introduction of fuel efficiency standards for light vehicles. It has released draft regulation impact statements on these subjects for the purposes of public consultation. These discuss the importance of harmonizing such standards with international regulations and/or measures taken by Australia's major trading partners in order to ensure that the most efficient vehicles are available to consumers in Australia.

I. Air Quality Management Framework

Australia is a federation encompassing six states and two mainland self-governing territories. This report outlines national-level laws and regulatory measures related to air quality and air pollutant management, with particular reference to vehicle emissions. The 2016 *State of the Environment* report, published by the Australian government, explains the ambient air quality management framework as follows:

Each level of government—Australian, state and territory, and local—plays a role in managing the impacts of air pollution by preventing or minimising air pollutant emissions. For the key air quality standards, the Australian, state and territory governments act cooperatively to set national objectives and develop the NEPMs [National Environment Protection Measures], through the NEPC [National Environment Protection Council].

The Australian Government is responsible for emissions standards for new motor vehicles, motor vehicle fuel standards, the National Pollutant Inventory, the national response to climate change, and international obligations such as the International

Convention for the Prevention of Pollution from Ships (commonly referred to as MARPOL).

State and territory governments are responsible for implementing NEPMs and other measures with appropriate legislation, policies and programs. They report on progress made in achieving the NEPM goals.

Local government authorities are generally responsible for managing air pollution from small businesses and domestic premises, and through their role in urban planning.¹

This report provides information on the NEPMs that relate to air quality; the National Clean Air Agreement, which provides a basis for action at the national, state, and territory levels in a range of areas; national fuel quality standards; national vehicle emissions standards for new and imported vehicles; and the work of the Ministerial Forum on Vehicle Emissions in relation to enhancing the fuel and emissions standards as well as the possible introduction of a mandatory vehicle fuel efficiency standard.

The Australian federal government also has in place various policies and programs related to climate change and reducing greenhouse gas emissions, including certain funds, energy efficiency initiatives, and reporting programs.² Such activities are not covered in this report.

As indicated above, state and territory legislation and programs address the implementation of a range of measures and can also extend beyond the federal laws in some areas; however, specific measures of individual jurisdictions are not covered in this report. As stated in the *State of the Environment* report, “[e]nvironmental agencies in the states and territories are responsible for controlling pollutant emissions from large industrial point sources, such as power stations, refineries, smelters, manufacturing plants, cement works and abattoirs.”³ It further states that

[d]uring the past 30–40 years, state and territory environment protection agencies have employed a variety of regulatory measures (including works approval, licensing and notices) to control and greatly restrict emissions of air pollutants from industrial and commercial sources. More recently, nonregulatory measures (such as codes of practice, market-based mechanisms and cleaner production incentive schemes) have been increasingly used to complement regulatory controls. In some jurisdictions, local government has a role in controlling emissions (mainly of particles and odour) from commercial sources. Local government also tends to be the main tier of government

¹ *Management Framework: Ambient Air Quality (2016)*, AUSTRALIA: STATE OF THE ENVIRONMENT 2016, <https://soe.environment.gov.au/theme/ambient-air-quality/topic/2016/management-framework> (last visited Apr. 9, 2018), archived at <http://perma.cc/48GM-3W55>.

² See *Climate Change: Government and International Initiatives*, DEPARTMENT OF THE ENVIRONMENT AND ENERGY, <http://www.environment.gov.au/climate-change/government> (last visited Apr. 9, 2018), archived at <https://perma.cc/2TGA-U7AC>.

³ *Management of Sources of Pollution*, AUSTRALIA: STATE OF THE ENVIRONMENT 2016, <https://soe.environment.gov.au/theme/ambient-air-quality/topic/2016/management-sources-pollution> (last visited Apr. 9, 2018), archived at <https://perma.cc/G3KM-Z39R>.

responding to complaints at the neighbourhood level about smoke from domestic wood heaters.⁴

II. National Environment Protection Measures

National Environment Protection Measures (NEPMs) are “a special set of national objectives designed to assist in protecting particular aspects of the environment.”⁵ They are made by the National Environment Protection Council (NEPC), as authorized by the National Environment Protection Council Act 1994 (Cth) and complementary state and territory legislation,⁶ and each jurisdiction is responsible for determining how to implement them through their own laws and regulations.⁷ The NEPC itself is made up of representatives from the federal government and the governments of each state and territory.⁸

NEPMs can cover a range of matters, including ambient air quality, guidelines for the assessment of site contamination, water quality, and recycling.⁹ The NEPC is able to make measures related to motor vehicle noise and emissions, but where these involve standards relating to the design, construction, and technical characteristics of new and in-service motor vehicles they must “be developed and agreed in conjunction with the National Transport Commission” and determined in accordance with other relevant legislation.¹⁰

The NEPC has promulgated four NEPMs to date that relate to aspects of air pollution, being on ambient air quality, air toxics, the National Pollutant Inventory, and diesel vehicle emissions.

⁴ *Effectiveness of Management: Ambient Air Quality*, AUSTRALIA: STATE OF THE ENVIRONMENT 2016, <https://soe.environment.gov.au/theme/ambient-air-quality/framework/effectiveness-of-management> (last visited Apr. 9, 2018), archived at <https://perma.cc/TP9X-4B89>.

⁵ *National Environment Protection Measures*, NATIONAL ENVIRONMENT PROTECTION COUNCIL (NEPC), <http://www.nepc.gov.au/nepms> (last visited Apr. 3, 2018), archived at <https://perma.cc/X5JB-8EB8>.

⁶ National Environment Protection Council Act 1994 (Cth) (NEPC Act) s 14, <https://www.legislation.gov.au/Details/C2016C00844>, archived at <https://perma.cc/Y9D3-SC6Y>; National Environment Protection Council Act 1994 (ACT); National Environment Protection Council (New South Wales) Act 1995 (NSW); National Environment Protection Council (Northern Territory) Act (NT); National Environment Protection Council (Queensland) Act 1994 (Qld); National Environment Protection Council (South Australia) Act 1995 (SA); National Environment Protection Council (Tasmania) Act 1995 (Tas); National Environment Protection Council (Victoria) Act 1995 (Vic); National Environment Protection Council (Western Australia) Act 1996 (WA).

⁷ *National Environment Protection Measures*, *supra* note 5.

⁸ NEPC Act s 9; *About NEPC*, NEPC, <http://www.nepc.gov.au/about-us> (last visited Apr. 3, 2018), archived at <https://perma.cc/V4QY-XTL8>.

⁹ *Id.*; NEPC Act s 14(1).

¹⁰ NEPC Act s 14(2).

A. National Environment Protection (Ambient Air Quality) Measure

The NEPM related to ambient air quality was first made in 1998.¹¹ It “sets national standards for the six key air pollutants to which most Australians are exposed: carbon monoxide, ozone, sulfur dioxide, nitrogen dioxide, lead and particles.”¹² Under the NEPM, each state and territory government is required to monitor air quality, using Australian Standard Methods set out in the NEPM, and report against the standards.¹³

In addition to listing standards for each pollutant, the NEPM also establishes a goal for particles (as PM_{2.5}) to be achieved by 2025.¹⁴

B. National Environment Protection (Air Toxics) Measure

The Air Toxics NEPM was established in 2004 for an initial group of pollutants: formaldehyde, toluene, xylene, and polycyclic aromatic hydrocarbons.¹⁵ It “benchmarks monitoring investigation levels that, if exceeded, require further investigation.”¹⁶

Each jurisdiction is required to undertake an assessment of locations within the jurisdiction in order to identify sites where “significantly elevated concentrations” of one or more of the listed air toxics are likely to occur, or sites where there is the “potential for significant population exposure” to such air toxics exists.¹⁷ The measure then sets out appropriate methods for monitoring and assessment of air toxics, with reference to methods used by certain foreign and international agencies, including the United States Environmental Protection Agency, the California Environmental Protection Agency, and the International Organization for Standardization.¹⁸ The jurisdictions have reporting requirements that relate to the identification of relevant sites, monitoring of air toxics, and assessment and any planned actions.¹⁹

¹¹ For related NEPC documents see *National Environment Protection (Ambient Air Quality) Measure*, NEPC, <http://www.nepc.gov.au/nepms/ambient-air-quality> (last visited Apr. 4, 2018), archived at <https://perma.cc/U35B-TZAT>.

¹² *Air Quality Standards*, DEPARTMENT OF THE ENVIRONMENT AND ENERGY (DEE), <http://www.environment.gov.au/protection/air-quality/air-quality-standards> (last visited Apr. 3, 2018), archived at <https://perma.cc/D3G2-EV59>; National Environment Protection (Ambient Air Quality) Measure, *as amended*, sch 1, <https://www.legislation.gov.au/Details/F2016C00215>, archived at <https://perma.cc/FDD5-J3NK>.

¹³ National Environment Protection (Ambient Air Quality) Measure, pt 4 & sch 3.

¹⁴ *Id.* sch 2.

¹⁵ National Environment Protection (Air Toxics) Measure, *as amended*, sch 1, <https://www.legislation.gov.au/Details/F2011C00855>, archived at <https://perma.cc/6KAW-QHNE>.

¹⁶ *Air Toxics: Ambient Air Quality (2016)*, AUSTRALIA STATE OF THE ENVIRONMENT 2016, <https://soe.environment.gov.au/theme/ambient-air-quality/topic/2016/air-toxics>, archived at <https://perma.cc/RJ7P-7S6W>.

¹⁷ National Environment Protection (Air Toxics) Measure, cls 6(1) & 8, sch 2.

¹⁸ *Id.* sch 3.

¹⁹ *Id.* sch 4.

C. National Environment Protection (National Pollutant Inventory) Measure

The goals of the National Pollutant Inventory (NPI) NEPM, made in 1998, are to “collect a broad base of information on emissions and transfers of substances on the reporting list,” and to “disseminate the information collected to all sectors of the community in a useful, accessible and understandable form.”²⁰ The NEPM was amended in 2008 “in order to remove greenhouse gas and energy reporting requirements now covered by the National Greenhouse and Energy Reporting Act 2007.”²¹

The NEPM establishes a publicly accessible database, the NPI, which contains information about emissions and transfers of specified substances.²² Occupiers of reporting facilities estimate emission data and provide this and supporting data to state and territory governments, which then aggregate the data and provide it to the federal government for collation and dissemination.²³

The reporting list for the NPI under the NEPM includes emissions of ninety-three toxic substances.²⁴

D. National Environment Protection (Diesel Vehicle Emissions) Measure

The goal of the NEPM on diesel vehicle emissions, which was made in 2001, is to “reduce exhaust emissions from diesel vehicles, by facilitating compliance with in-service emissions standards for diesel vehicles.”²⁵ The NEPM was “developed to complement other measures to reduce the impact of emissions from diesel vehicles such as: new vehicle emission standards, improved fuel quality and travel demand management.”²⁶ Rather than establishing standards, the NEPM sets out principles for the management of emissions from diesel vehicles²⁷ and provides guidelines

to assist jurisdictions to develop programs for reducing emissions from in-service diesel vehicles, in order to achieve compliance with appropriate in-service emissions standards.

²⁰ National Environment Protection (National Pollutant Inventory) Measure 1998, *as varied*, cl 5, <https://www.legislation.gov.au/Details/F2008C00620>, archived at <https://perma.cc/UV2T-Q3ZA>.

²¹ *National Environment Protection (National Pollutant Inventory) Measure*, NEPC, <http://www.nepc.gov.au/nepms/national-pollutant-inventory>, archived at <https://perma.cc/B583-XZ7X>. See also *NEPM Variation 2007*, NATIONAL POLLUTANT INVENTORY, DEPARTMENT OF ENVIRONMENT AND ENERGY, <http://www.npi.gov.au/about-npi/nepm-variation> (last updated Dec. 21, 2016), archived at <https://perma.cc/W7BC-3JTQ>.

²² National Environment Protection (National Pollutant Inventory) Measure 1998, cl 7.

²³ *Id.* cl 8.

²⁴ *Id.* sch A; *Substance Fact Sheets*, NATIONAL POLLUTANT INVENTORY, DEPARTMENT OF ENVIRONMENT AND ENERGY, <http://www.npi.gov.au/substances/fact-sheets> (last updated June 2, 2014), archived at <https://perma.cc/TJP3-2K3G>.

²⁵ National Environment Protection (Diesel Vehicle Emissions) Measure 2001, *as varied*, cl 10, <https://www.legislation.gov.au/Details/F2009C00402>, archived at <https://perma.cc/DQ7P-7JCB>.

²⁶ *EPHC Archive – Diesel Vehicle Emissions NEPM*, NEPC, <http://www.nepc.gov.au/resource/ephc-archive-diesel-vehicle-emissions-nepm> (last visited Apr. 4, 2018), archived at <https://perma.cc/YG87-N48R>.

²⁷ National Environment Protection (Diesel Vehicle Emissions) Measure 2001, cl 7.

Compliance programs may incorporate a combination of the approaches in the Guidelines. Emission management approaches other than those in the guidelines may also be implemented.²⁸

With respect to standards, the NEPM states that “[p]articipating jurisdictions will use the in-service vehicle emission standards and test determined by the Australian Transport Council or successor body as the benchmark against which to assess the emission performance of diesel vehicles.”²⁹ Under the NEPM, state and territory governments report annually to the NEPC on their assessment of the “need to take action to manage emissions from the in-service diesel fleet” and provide information regarding the actions taken and the effectiveness of such actions.³⁰

III. National Clean Air Agreement

On December 15, 2015, the environment ministers of each Australian jurisdiction established the National Clean Air Agreement.³¹ The Agreement

focuses on actions to reduce air pollution and improve air quality through cooperative action between industry and government at the national, state and local level. The Agreement is designed to incorporate a range of existing, new and complementary measures to improve Australia’s air quality.³²

A factsheet on the Agreement provides the following information:

The agreement will:

- provide a basis for governments to identify, prioritise and focus actions to reduce air pollution and improve air quality
- deliver strategic approaches to address air quality priorities through promoting cooperative action between all levels of government and with business and the community
- have an agreed work plan that details specific practical actions and identifies roles and responsibilities for implementing those actions to address agreed

²⁸ *Id.* cl 8. The Guidelines are contained in schedule A of the NEPM and include guidelines on smoky vehicle programs, emissions testing and repair programs, audited maintenance programs for diesel vehicles, and diesel vehicle retrofit programs.

²⁹ *Id.* cl 12.

³⁰ *Id.* cl 15.

³¹ AUSTRALIAN GOVERNMENT, NATIONAL CLEAN AIR AGREEMENT: TOWARDS A CLEAN AIR FUTURE FOR ALL AUSTRALIANS (Dec. 2015), <http://www.environment.gov.au/system/files/resources/188756ab-ed94-4a3c-9552-62763ca86a7f/files/national-clean-air-agreement.pdf>, archived at <https://perma.cc/B46Z-N4UR>.

³² *National Clean Air Agreement*, DEPARTMENT OF ENVIRONMENT AND ENERGY, <http://www.environment.gov.au/protection/air-quality/national-clean-air-agreement> (last visited Apr. 4, 2018), archived at <https://perma.cc/TCH2-SV8H>.

priorities. The work plan would be periodically reviewed to maintain accountability and ensure continued relevance.³³

At the time the Agreement was made, the environment ministers also agreed to three key initial actions under the Agreement, being the introduction of product emission standards for outdoor power equipment and marine engines (discussed below, Part IV); measures to reduce air pollution from wood heaters; and strengthened ambient air quality reporting standards for particle pollution.³⁴

With respect to wood heaters, the Department of the Environment and Energy states that state and territory governments are working towards adopting standards for new wood heaters and “have agreed to share cost effective approaches tailored for local conditions and priorities.”³⁵

With respect to particle pollution, “[a]ll jurisdictions have agreed to implement strengthened standards for particles, with a longer-term goal to move to even tighter standards for annual average and 24-hour PM_{2.5} particles in 2025.”³⁶ The ambient air quality NEPM was amended to reflect the agreed reporting standards and long-term goal.³⁷

According to the factsheet referred to above,

[a] range of other actions that may be considered under the agreement include:

- Strengthening the sulfur dioxide, nitrogen dioxide and ozone reporting standards in the National Environment Protection (Ambient Air Quality) Measure
- Initiatives to reduce localised emissions, including from non-road diesel engines and ships
- A review of Australia’s fuel quality standards legislation.
- Partnership opportunities with business to influence positive air quality outcomes.
- A focus on strengthening knowledge, education and awareness about air quality.

An Air Project Management Group was established to support the implementation of the Agreement and has developed a priority-setting process to guide considerations when recommending air quality priorities to environment ministers for inclusion in the work plan.³⁸

³³ DEPARTMENT OF THE ENVIRONMENT, NATIONAL CLEAN AIR AGREEMENT – FACT SHEET (2015), <http://www.environment.gov.au/system/files/resources/b5dc33df-06a4-47b7-95bc-57b5c2b7c9b0/files/factsheet-clean-air-agreement.pdf>, archived at <https://perma.cc/E68L-F5CH>.

³⁴ *National Clean Air Agreement*, *supra* note 32.

³⁵ *Id.*

³⁶ *Id.*

³⁷ Variation to the National Environment Protection (Ambient Air Quality) Measure 2015 (Cth), <https://www.legislation.gov.au/Details/F2016L00084>, archived at <https://perma.cc/MBM5-TSQE>.

³⁸ DEPARTMENT OF THE ENVIRONMENT AND ENERGY, NATIONAL CLEAN AIR AGREEMENT PRIORITY SETTING PROCESS 4 (Sept. 2016), <http://www.environment.gov.au/system/files/resources/17c52c58-f3b9-4466-9ea1-d4c7d7657ea8/files/national-clean-air-agreement-priority-setting-process.pdf>, archived at <https://perma.cc/VE4P-W4RC>.

Information regarding the current review of the fuel quality standards legislation is provided below, Part VI.

IV. Product Emissions Standards Act 2017

The Product Emissions Standards Act 2017 (Cth),³⁹ which came into force on September 15, 2017, “establishes a national framework to enable Australia to address the adverse impacts of air pollution from certain products on human and environmental health.”⁴⁰ Under the Act, the relevant federal government minister can prescribe emission-controlled products and make rules relating to those products.⁴¹

Further to the agreed work program under the National Clean Air Agreement, the first emissions-controlled products to be covered by the new framework, as specified in the Product Emissions Standards Rules 2017 (Cth) (effective January 11, 2018), are new outdoor power equipment (“non-road engine”) and marine engines (“propulsion marine engine”).⁴² The Rules establish Australian Emissions Standards for these products, which integrate particular technical requirements that are applicable in the United States under Title 40 of the Code of Federal Regulations.⁴³ The Rules also cover Australian certification of the products and recognize certain foreign certifications.⁴⁴

V. Fuel Quality Standards

The information in this section relates to the fuel quality standards regime currently in place at the national level in Australia. As discussed in Part VII, below, the standards are currently under review by the Ministerial Forum on Vehicle Emissions, including consideration of harmonization with different international standards.

A. Fuel Quality Standards Act 2000

The Fuel Quality Standards Act 2000 (Cth), together with the Fuel Quality Standards Regulations 2001 (Cth),⁴⁵ “provides the legislative basis for national fuel quality and fuel quality information standards for Australia. Where a State or Territory has fuel quality standards in

³⁹ Product Emissions Standards Act 2017 (Cth), <https://www.legislation.gov.au/Details/C2017A00104>, archived at <https://perma.cc/9ANH-UU2A>.

⁴⁰ *Product Emissions Standards*, DEPARTMENT OF THE ENVIRONMENT AND ENERGY, <http://www.environment.gov.au/protection/air-quality/emissions-standards> (last visited Apr. 4, 2018), archived at <https://perma.cc/7MYP-N3W8>.

⁴¹ *Id.*

⁴² *Id.*; Product Emissions Standards Rules 2017 (Cth), cl 6, <https://www.legislation.gov.au/Details/F2018L00021>, archived at <https://perma.cc/AFC3-X63F>.

⁴³ Product Emissions Standards Rules 2017 (Cth), pt 3.

⁴⁴ *Id.* pt 4.

⁴⁵ Fuel Quality Standards Regulations 2001 (Cth), <https://www.legislation.gov.au/Details/F2017C00651>, archived at <https://perma.cc/Y4XK-99TP>.

place, the Commonwealth standards operate concurrently. State or Territory standards apply where they regulate a fuel characteristic not covered by the Commonwealth standards.”⁴⁶

The objectives of the Fuel Quality Standards Act 2000 (Cth) are to

- (a) regulate the quality of fuel supplied in Australia in order to:
 - (i) reduce the level of pollutants and emissions arising from the use of fuel that may cause environmental and health problems; and
 - (ii) facilitate the adoption of better engine technology and emission control technology; and
 - (iii) allow the more effective operation of engines; and
- (b) ensure that, where appropriate, information about fuel is provided when the fuel is supplied.⁴⁷

The Department of the Environment and Energy is responsible for setting fuel standards, monitoring industry compliance with the standards, granting approvals for businesses to supply fuel that varies from the standards, and reviewing fuel standards.⁴⁸ Before taking certain actions under the Act, including making a fuel standard, the relevant federal minister must consult the Fuel Standards Consultative Committee. The Committee includes at least one representative from each state and territory government plus a representative from the federal government, and also includes “at least one person representing fuel producers, a non-government body with an interest in the protection of the environment, and a person representing the interests of consumers.”⁴⁹

An independent review of the Act was completed in April 2016, with the final report showing that the Act has “led to a quantifiable reduction in the level of pollutants and emissions arising from the use of fuel that may cause environmental and health problems.”⁵⁰ The report contained

⁴⁶ *Fuel Quality*, Department of the Environment and Energy, <http://www.environment.gov.au/protection/fuel-quality> (last visited Apr. 4, 2018), archived at <https://perma.cc/FFM4-LJW5>. See also *Fuel Quality Standards*, DEPARTMENT OF THE ENVIRONMENT AND ENERGY, <http://www.environment.gov.au/topics/environment-protection/fuel-quality/standards> (last visited Apr. 6, 2018), archived at <https://perma.cc/8YMS-AEFY>.

⁴⁷ Fuel Quality Standards Act 2000 (Cth), s 3, <https://www.legislation.gov.au/Details/C2016C00558>, archived at <http://perma.cc/4AK6-SQDK>.

⁴⁸ *Fuel Quality*, *supra* note 46. See also *Monitoring, Compliance and Enforcement Program*, DEPARTMENT OF THE ENVIRONMENT AND ENERGY, <http://www.environment.gov.au/protection/fuel-quality/compliance/monitoring> (last visited Apr. 4, 2018), archived at <https://perma.cc/V6HX-HGVJ>; *Applications to Vary National Fuel Standards*, DEPARTMENT OF THE ENVIRONMENT AND ENERGY, <http://www.environment.gov.au/protection/fuel-quality/applications-vary-national-fuel-standards> (last visited Apr. 4, 2018), archived at <https://perma.cc/5XEB-Z9JW>.

⁴⁹ *Fuel Standards Consultative Committee*, DEPARTMENT OF THE ENVIRONMENT AND ENERGY, <http://www.environment.gov.au/protection/fuel-quality/standards/consultative-committee> (last visited Apr. 4, 2018), archived at <https://perma.cc/2MQ6-W9EY>.

⁵⁰ *2015 Review of the Fuel Quality Standards Act 2000*, DEPARTMENT OF THE ENVIRONMENT AND ENERGY, <http://www.environment.gov.au/protection/fuel-quality/legislation/review-2015> (last visited Apr. 9, 2018), archived at <https://perma.cc/F93Y-5NMT>.

several recommendations related to the retention of and possible amendments to the legislative framework.⁵¹

B. National Standards

National fuel quality standards have been set for the following fuels:⁵²

- Petrol (i.e., gasoline):⁵³ Fuel Standard (Petrol) Determination 2001 (Cth)⁵⁴
- Ethanol E85:⁵⁵ Fuel Standard (Ethanol E85) Determination 2012 (Cth)⁵⁶
- Diesel:⁵⁷ Fuel Standard (Automotive Diesel) Determination 2001 (Cth)⁵⁸
- Biodiesel:⁵⁹ Fuel Standard (Biodiesel) Determination 2003 (Cth)⁶⁰
- Autogas (i.e., LPG for use in motor vehicles):⁶¹ Fuel Standard (Autogas) Determination 2003 (Cth)⁶²

⁵¹ PACIFIC ENVIRONMENT LIMITED & MARSDEN JACOB ASSOCIATES, REVIEW OF THE FUEL QUALITY STANDARDS ACT 2000: FINAL REPORT viii–ix (Apr. 2016), <http://www.environment.gov.au/system/files/resources/b9e8164d-7f7f-4671-bf62-cacf2eec245a/files/act-review-final-report.pdf>, archived at <https://perma.cc/T7YK-57CU>.

⁵² *Fuel Quality Legislation and Standards*, DEPARTMENT OF THE ENVIRONMENT AND ENERGY, <http://www.environment.gov.au/topics/environment-protection/fuel-quality/legislation> (last visited Apr. 4, 2018), archived at <https://perma.cc/E7ZM-FRN6>.

⁵³ *Petrol Fuel Quality Standard*, DEPARTMENT OF THE ENVIRONMENT AND ENERGY, <http://www.environment.gov.au/topics/environment-protection/fuel-quality/standards/petrol> (last visited Apr. 11, 2018), archived at <https://perma.cc/A3S8-FGBH>.

⁵⁴ Fuel Standard (Petrol) Determination 2001 (Cth), <https://www.legislation.gov.au/Details/F2008C00344>, archived at <https://perma.cc/Ry88-Y4BG>.

⁵⁵ *Ethanol E85 Fuel Quality and Fuel Quality Information Standards*, DEPARTMENT OF THE ENVIRONMENT AND ENERGY, <http://www.environment.gov.au/topics/environment-protection/fuel-quality/standards/ethanol-e85> (last visited Apr. 11, 2018), archived at <https://perma.cc/4LZU-VQEJ>.

⁵⁶ Fuel Standard (Ethanol E85) Determination 2012 (Cth), <https://www.legislation.gov.au/Details/F2012L01770>, archived at <https://perma.cc/3MML-PT42>.

⁵⁷ *Diesel Fuel Quality Standard*, DEPARTMENT OF THE ENVIRONMENT AND ENERGY, <http://www.environment.gov.au/protection/fuel-quality/standards/diesel> (last visited Apr. 11, 2018), archived at <https://perma.cc/HJA3-R22C>.

⁵⁸ Fuel Standard (Automotive Diesel) Determination 2001 (Cth), <https://www.legislation.gov.au/Details/F2009C00145>, archived at <https://perma.cc/GU7A-HQOC>.

⁵⁹ *Biodiesel Fuel Quality Standard*, DEPARTMENT OF THE ENVIRONMENT AND ENERGY, <http://www.environment.gov.au/protection/fuel-quality/standards/biodiesel> (last visited Apr. 11, 2018), archived at <https://perma.cc/64BF-4XRY>.

⁶⁰ Fuel Standard (Biodiesel) Determination 2003 (Cth), <https://www.legislation.gov.au/Details/F2009C00146>, archived at <https://perma.cc/TK4D-2ADD>.

⁶¹ *Autogas Fuel Quality Standard*, DEPARTMENT OF THE ENVIRONMENT AND ENERGY, <http://www.environment.gov.au/topics/environment-protection/fuel-quality/standards/autogas> (last visited Apr. 11, 2018), archived at <https://perma.cc/6FW9-FK4S>.

⁶² Fuel Standard (Autogas) Determination 2003 (Cth), <https://www.legislation.gov.au/Details/F2014C01226>, archived at <https://perma.cc/MZN2-C6V6>.

In addition, a fuel quality information labeling standard has been made for ethanol E10⁶³ (in petrol) and ethanol E85.⁶⁴ In 2003, under the Fuel Standard (Petrol) Determination 2001 (Cth), Australia capped the level of ethanol that can be added to petrol at 10%;⁶⁵ the fuel quality information standard requires service stations to display labels indicating the percentage of ethanol where petrol contains more than 1% ethanol.⁶⁶

VI. Vehicle Emissions Standards

A. Australian Design Rules and Harmonization

National emissions standards for newly manufactured and imported new or second hand motor vehicles are contained in the Australian Design Rules (ADRs), which are authorized by the Motor Vehicle Standards Act 1989 (Cth).⁶⁷ The ADRs are currently in their third edition. The Department of Infrastructure, Regional Development and Cities (DIRDC), which is responsible for managing policy and standards development on vehicle emissions, explains that

[t]he ADRs apply to vehicles in accordance with the “applicability dates” set out at the beginning (usually in an applicability table) of each standard. These dates (and not the year listed in the title of the standard—which in many cases only represents when the ADR was re-made for the FRL [Federal Register of Legislation]) are the key to identifying which ADR applies for a particular year of manufacture of a new or used vehicle.

Users of the ADRs should be aware that in some circumstances ADRs referred to here can have application to vehicles other than new vehicles. There are two ways this can occur:

Firstly, other laws may call up the ADRs. For example, each state and territory generally requires vehicles manufactured to a particular set of ADRs to continue to comply with them (or a later version) while in-service.

Secondly, the Motor Vehicle Standards Act 1989 call up the ADRs for used commercially imported vehicles. This generally requires vehicles to comply with the ADRs applicable when the vehicles were originally manufactured (Note: used imported

⁶³ *Ethanol Labelling Standard*, DEPARTMENT OF THE ENVIRONMENT AND ENERGY, <http://www.environment.gov.au/topics/environment-protection/fuel-quality/standards/ethanol-e10> (last visited Apr. 6, 2018), archived at <https://perma.cc/8EG4-AL6Q>; Fuel Quality Information Standard (Ethanol) Determination 2003 (Cth), as amended, <https://www.legislation.gov.au/Details/F2006C00551>, archived at <https://perma.cc/33PT-JGQ4>.

⁶⁴ *Ethanol E85 Fuel Quality and Fuel Quality Information Standards*, supra note 55; Fuel Quality Information Standard (Ethanol E85) Determination 2012 (Cth), <https://www.legislation.gov.au/Details/F2012L01771>, archived at <https://perma.cc/2KJL-U29Y>.

⁶⁵ Fuel Quality Standard (Petrol) Determination 2001 (Cth) cl 3.

⁶⁶ Fuel Quality Information Standard (Ethanol) Determination 2003 (Cth) cls 3 & 4.

⁶⁷ Motor Vehicle Standards Act 1989 (Cth), pt 2, <https://www.legislation.gov.au/Details/C2016C00857>, archived at <https://perma.cc/G966-G8C8>.

trucks exceeding 12 tonnes and used imported buses with more than 12 seating positions must comply with the latest ADRs).⁶⁸

As indicated in this explanation, “[t]he regulation of emissions from vehicles once they are on the road (in-service) is the responsibility of the state and territory governments.”⁶⁹

In making the standards contained in the ADRs, the relevant minister is able to incorporate documents “produced by the Economic Commission for Europe, the International Electrotechnical Commission, the International Organization for Standardization or Standards Australia or by any other organisation that is determined, by legislative instrument, by the Minister.”⁷⁰ Before determining the standards, the minister must consult with relevant state and territory authorities, persons or organizations involved in the road vehicle industry, and organizations representing road users.⁷¹

In terms of harmonization, the DIRDC states that

[t]he Australian Government’s policy is to harmonise the national vehicle safety standards with international regulations where possible and consideration is given to the adoption of the international regulations of the United Nations Economic Commission for Europe (UNECE). Australia is a signatory to the UNECE 1958 Agreement and the 1998 Agreement. The policy to harmonise is also important to fulfil World Trade Organisation and Asia Pacific Economic Cooperation commitments.⁷²

B. Current ADRs on Emissions

Emission requirements and standards for new vehicles are currently contained in ADR 79/04 (Emission Controls for Light Vehicles)⁷³ and ADR 80/03 (Emission Control for Heavy Vehicles).⁷⁴ Appendix A of ADR 79/04 incorporates Regulation No. 83 of the United Nations Economic Commission for Europe, titled “Uniform provisions concerning the approval of

⁶⁸ *Third Edition Australian Design Rules*, DEPARTMENT OF INFRASTRUCTURE, REGIONAL DEVELOPMENT AND CITIES, https://infrastructure.gov.au/vehicles/design/adr_online.aspx (last updated Apr. 6, 2018), archived at <https://perma.cc/CEJ8-TY9Y>.

⁶⁹ *Vehicle Emission Standards*, DEPARTMENT OF INFRASTRUCTURE, REGIONAL DEVELOPMENT AND CITIES, <https://infrastructure.gov.au/vehicles/environment/emission/index.aspx> (last updated Apr. 6, 2018), archived at <https://perma.cc/E4M7-4C47>.

⁷⁰ Motor Vehicle Standards Act 1989 (Cth), s 7A.

⁷¹ *Id.* s 8.

⁷² *Australian Design Rules*, DEPARTMENT OF INFRASTRUCTURE, REGIONAL DEVELOPMENT AND CITIES, <https://infrastructure.gov.au/vehicles/design/> (last updated Apr. 6, 2018), archived at <https://perma.cc/N98W-VTON>.

⁷³ Vehicle Standard (Australian Design Rule 79/04 – Emission Control for Light Vehicles) 2011 (Cth), <https://www.legislation.gov.au/Details/F2012C00284>, archived at <https://perma.cc/2VNW-TQ6H>.

⁷⁴ Vehicle Standard (Australian Design Rule 80/03 – Emission Control for Heavy Vehicles) 2006 (Cth), <https://www.legislation.gov.au/Details/F2013C00048>, archived at <https://perma.cc/8GQQ-R3XV>.

vehicles with regard to the emission of pollutants according to engine fuel requirements.”⁷⁵ The current minimum standard in ADR 80/03 is “based on the Euro V standards, with equivalent US or Japanese standards accepted as alternatives.”⁷⁶

In addition to these requirements, ADR 81/02 contains requirements for fuel consumption and emissions labeling for light vehicles.⁷⁷ The required label “indicates the vehicle’s fuel consumption in litres of fuel per 100 kilometres (L/100km) and its emissions of carbon dioxide (CO₂) in grams per kilometre (g/km).”⁷⁸ The intention is to provide information to consumers; there are no current fuel economy standards for light vehicles.

As discussed in Part VII, below, “[t]he Australian Government’s Ministerial Forum on Vehicle Emissions is currently undertaking a review to consider whether Australia should adopt the Euro 6 standards for light vehicles and Euro VI standards for heavy vehicles.”⁷⁹ It is also considering whether to introduce mandatory vehicle fuel efficiency standards.⁸⁰

VII. Ministerial Forum on Vehicle Emissions

On October 31, 2015, the Australian Government announced the establishment of the Ministerial Forum on Vehicle Emissions to conduct a “whole of government review of vehicle emissions.”⁸¹ The Ministerial Forum is “supported by an interdepartmental working group which is examining issues [related] to reduced vehicle emissions, including the implementation of Euro 6 noxious emissions standards, fuel quality standards, fuel efficiency measures (CO₂) for light vehicles, and emission testing arrangements.”⁸²

⁷⁵ *Id.* App. A, https://www.legislation.gov.au/Details/F2012C00284/Html/Volume_2, archived at <https://perma.cc/Q34Y-BFFU>.

⁷⁶ *Vehicle Emission Standards*, *supra* note 69.

⁷⁷ Vehicle Standard (Australian Design Rule 81/02 — Fuel Consumption Labelling for Light Vehicles) 2008 (Cth), <https://www.legislation.gov.au/Details/F2012C00282>, archived at <https://perma.cc/YAT5-39JJ>; *Fuel Consumption Label*, DEPARTMENT OF INFRASTRUCTURE, REGIONAL DEVELOPMENT AND CITIES, https://infrastructure.gov.au/vehicles/environment/fuel_consumption_label.aspx (last updated Apr. 6, 2018), archived at <https://perma.cc/46FT-BBH8>.

⁷⁸ *Fuel Consumption Label*, GREEN VEHICLE GUIDE, <http://www.greenvehicleguide.gov.au/pages/Information/FuelConsumptionLabel> (last visited Apr. 9, 2018), archived at <https://perma.cc/M9AS-3L79>.

⁷⁹ *Vehicle Emission Standards*, *supra* note 69.

⁸⁰ For background information on the consideration of such a measure in Australia, see Matthew James, *Vehicle Fuel Efficiency Standards*, AUSTRALIAN PARLIAMENTARY LIBRARY (June 28, 2013), https://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/pubs/BN/2012-2013/VehicleFuelStandards, archived at <https://perma.cc/X9TS-3KZV>. See also Anna Mortimore, *Australia Has Stalled on Car Efficiency*, THE CONVERSATION (June 8, 2017), <https://theconversation.com/australia-has-stalled-on-car-efficiency-78920>, archived at <https://perma.cc/4L3R-JT5T>.

⁸¹ *Vehicle Safety & the Environment*, DEPARTMENT OF INFRASTRUCTURE, REGIONAL DEVELOPMENT AND CITIES, <https://infrastructure.gov.au/vehicles/environment/> (last updated Apr. 6, 2018), archived at <https://perma.cc/7727-ZQ7C>.

⁸² *Id.*

In announcing the review, the Minister for Urban Infrastructure and Cities, Paul Fletcher, stated as follows:

Presently we do not have the same levels of smog pollution in Australia that other countries face. Nevertheless, we must work hard to keep our air clean and reduce CO2 emissions that contribute to climate change by ensuring our new vehicles meet world's best standards.

Tough noxious emissions standards already ensure that air quality in Australian cities is good by international standards, but we are taking direct action on climate change through a range of initiatives. It is the Australian Government's policy to harmonise our vehicle standards with international standards developed through the United Nations.

We have recently adopted the United Nations based Euro 5 noxious emissions standards for light and heavy vehicles and are now considering the adoption of Euro 6. We are also working with other countries to improve the vehicle testing arrangements for noxious emissions.⁸³

The press release further stated that "Australia already has in place a mandatory consumer information programme that mandates fuel efficiency labelling on new cars, as well as a voluntary programme through the Green Vehicle Guide that aims to assist consumers to make informed purchasing decisions," and that "[t]he Government will examine further measures such as incentives and standards to encourage the purchase of more fuel efficient vehicles."⁸⁴

In February 2016, the Ministerial Forum released a discussion paper on possible measures for reducing Australia's vehicle emissions.⁸⁵ Following consideration of the submissions received on the discussion paper, the Ministerial Forum released three further consultation documents in December 2016:

- A discussion paper on improving the fuel standards under the Fuel Quality Standards Act 2000 (Cth)⁸⁶

⁸³ Press Release, Hon. Paul Fletcher MP, Turnbull Government to Review Approach to Vehicle Emissions (Oct. 31, 2015), http://minister.infrastructure.gov.au/pf/releases/2015/October/pf014_2015.aspx, archived at <https://perma.cc/27U9-KRVH>.

⁸⁴ *Id.*

⁸⁵ MINISTERIAL FORUM ON VEHICLE EMISSIONS, VEHICLE EMISSIONS DISCUSSION PAPER (Feb. 2016), https://infrastructure.gov.au/vehicles/environment/forum/files/Vehicle_Emissions_Discussion_Paper.pdf, archived at <https://perma.cc/6232-ZQRS>.

⁸⁶ MINISTERIAL FORUM ON VEHICLE EMISSIONS, BETTER FUEL FOR CLEANER AIR: DISCUSSION PAPER (Dec. 2016), <http://www.environment.gov.au/system/files/consultations/f3f4acc3-f9e6-4cc3-8a1e-a59a6490cffd/files/better-fuel-cleaner-air.pdf>, archived at <https://perma.cc/2TJL-BDQ2>.

- A draft regulation impact statement (RIS) on strengthening noxious gas emissions standards for vehicles (under the ADRs)⁸⁷
- A draft RIS on improving the efficiency of new light vehicles⁸⁸

Subsequently, in January 2018, the Ministerial Forum released a draft RIS⁸⁹ proposing improvements to the fuel standards under the Fuel Quality Standards Act 2000 (Cth), with the goal of bringing Australia's fuel quality "into line with international standards."⁹⁰ Submissions on the RIS closed on March 8, 2018.

Following continued public consultation, the Ministerial Forum "intends to provide a draft implementation plan on potential measures for consideration by Government."⁹¹

A. Proposed Changes to Fuel Quality Standards

The draft RIS related to fuel quality standards notes that the existing legislative instruments under the Fuel Quality Standards Act 2000 (Cth) are due to sunset (i.e., cease to have effect) in 2019.⁹² Changes are proposed to "many parameters" in the five existing fuel standards, "most notably, to levels of sulfur, aromatics and possibly octane in petrol, as well as polycyclic aromatic hydrocarbons (PAHs) and cetane in diesel."⁹³ In addition, a new standard is proposed for a B20 diesel-biodiesel blend.⁹⁴

The RIS states that proposed reforms focus on petrol because "Australia's petrol is not as high quality as petrol in other OECD countries."⁹⁵ Three policy options are considered, including (A) maintaining the status quo; (B) revising the fuel standards to harmonize with European standards, including phasing out regular unleaded petrol as well as broadening the scope of the

⁸⁷ MINISTERIAL FORUM ON VEHICLE EMISSIONS, VEHICLE EMISSIONS STANDARDS FOR CLEANER AIR: DRAFT REGULATION IMPACT STATEMENT (Dec. 2016), https://infrastructure.gov.au/vehicles/environment/forum/files/Vehicle_Noxious_Emissions_RIS.pdf, archived at <https://perma.cc/457P-RYZL>.

⁸⁸ MINISTERIAL FORUM ON VEHICLE EMISSIONS, IMPROVING THE EFFICIENCY OF NEW LIGHT VEHICLES: DRAFT REGULATION IMPACT STATEMENT (Dec. 2016), https://infrastructure.gov.au/vehicles/environment/forum/files/Vehicle_Fuel_Efficiency_RIS.pdf, archived at <https://perma.cc/5V4J-4JK3>.

⁸⁹ MINISTERIAL FORUM ON VEHICLE EMISSIONS, BETTER FUEL FOR CLEANER AIR: DRAFT REGULATION IMPACT STATEMENT (Jan. 2018), <http://www.environment.gov.au/system/files/consultations/56be59ae-a8ff-4c7e-8586-6b25b975b212/files/better-fuel-cleaner-air-draft-ris.pdf>, archived at <https://perma.cc/EFW8-ALAR>.

⁹⁰ *Review of the Fuel Standards*, DEPARTMENT OF THE ENVIRONMENT AND ENERGY, <http://www.environment.gov.au/protection/fuel-quality/standards/review> (last visited Apr. 6, 2018), archived at <https://perma.cc/KQF5-W2BR>. See also *Ministerial Forum on Vehicle Emissions*, DEPARTMENT OF INFRASTRUCTURE, REGIONAL DEVELOPMENT AND CITIES, <https://infrastructure.gov.au/roads/environment/forum/index.aspx> (last updated Mar. 13, 2018), archived at <https://perma.cc/7GVZ-HTR4>.

⁹¹ *Ministerial Forum on Vehicle Emissions*, *supra* note 90.

⁹² BETTER FUEL FOR CLEANER AIR: DRAFT REGULATION IMPACT STATEMENT, *supra* note 89, at x.

⁹³ *Id.*

⁹⁴ *Id.*

⁹⁵ *Id.*

diesel standard; and (C) harmonizing with European standards, with the exception of retaining regular unleaded petrol but with a lower sulfur level.⁹⁶

Information is provided regarding the cost-benefit analysis for each of these options, with different implementation dates considered, along with an assessment of the options against certain policy assessment criteria.⁹⁷ It concludes that option C, above, “is likely to produce the greatest community net value.”⁹⁸

The RIS notes that

[i]nternational vehicle manufacturers are designing vehicles to meet the more stringent fuel efficiency and emissions standards adopted by our trading partners. These vehicles are designed to perform optimally on higher quality fuel than is currently available in Australia, particularly in relation to petrol sulfur, aromatic and octane levels.

Harmonisation of Australia’s fuel quality with the quality of fuel that these vehicles are designed to operate on will maximise vehicle emissions control system operability and fuel efficiency outcomes, and will limit vehicle operability issues (for example, to vehicle catalyts).

Harmonisation with European fuel standards was strongly supported by the Federal Chamber of Automotive Industries, which advised that to offer vehicles with world-class pollutant emissions standards, Australia must harmonise fuel standards with leading overseas markets.⁹⁹

B. Proposed Changes to Vehicle Emissions Standards

The draft RIS on noxious gas emissions standards considered the following six regulatory and nonregulatory options:

- Option 1–Business as usual;
- Option 2–Fleet purchasing policies;
- Option 3–Voluntary standards;
- Option 4–Mandate Euro 6 for light vehicles under the Motor Vehicle Standards Act 1989;
- Option 5–Mandate Euro VI for heavy vehicles under the Motor Vehicle Standards Act 1989; and
- Option 6–Mandate both Euro 6 for light vehicles and Euro VI for heavy vehicles under the Motor Vehicle Standards Act 1989.¹⁰⁰

⁹⁶ *Id.*

⁹⁷ *Id.* at x–xi.

⁹⁸ *Id.* at 48.

⁹⁹ *Id.* at 15.

¹⁰⁰ VEHICLE EMISSIONS STANDARDS FOR CLEANER AIR: DRAFT REGULATION IMPACT STATEMENT, *supra* note 87, at 4.

Following a qualitative assessment, options 1, 4, 5, and 6 “were considered viable.”¹⁰¹

The RIS notes that “[i]f the ADRs do not keep pace with international trends, Australia runs the risk of foregoing the benefits of technology available in other developed countries. Manufacturers may find it more cost effective to continue supplying older technology to the Australian market.”¹⁰²

C. Possible Introduction of Vehicle Fuel Efficiency Standards

The draft RIS on vehicle efficiency “examines the case for Australian Government action to reduce greenhouse gas emissions by improving the efficiency of new light passenger and commercial road vehicles supplied to the Australian market for use in transport.”¹⁰³ The RIS notes that “[a] key policy measure adopted in many countries to give manufacturers stronger incentives to supply more efficient vehicles has been the adoption of fuel efficiency or CO2 standards. These standards are in place in approximately 80 per cent of the global light vehicle market—including the US, EU, Canada, Japan, China, South Korea and India.”¹⁰⁴

The RIS examines different regulatory and non-regulatory options that could be adopted to increase the supply of more efficient vehicles in Australia, including a voluntary fuel efficiency standard and a legislated standard.¹⁰⁵ It states that

in the absence of further policy measures, it is likely global vehicle manufacturers will continue to only offer those vehicles that are the most cost effective to supply to the Australian market. In many cases, this will mean that Australian consumers will not be offered some of the most efficient variants available to consumers in other markets with fuel efficiency standards.¹⁰⁶

In terms of legislated fuel efficiency standards, the RIS states that

Fuel efficiency standards would set a national average target for new light vehicles sold in Australia. Entities that supply vehicles to the Australian market would have obligations to report on the volume and efficiency of the vehicles they supply to ensure a national average target is met. Over time, this would contribute to improvements in vehicle efficiency and reductions in greenhouse gas emissions as more efficient vehicles enter the fleet.¹⁰⁷

¹⁰¹ *Id.*

¹⁰² *Id.* at 12.

¹⁰³ IMPROVING THE EFFICIENCY OF NEW LIGHT VEHICLES: DRAFT REGULATION IMPACT STATEMENT, *supra* note 88, at 9.

¹⁰⁴ *Id.* at 20.

¹⁰⁵ *Id.* at 23.

¹⁰⁶ *Id.* at 24.

¹⁰⁷ *Id.* at 27.

The RIS notes that three different overall fleet average targets have been assessed, each with a phase in period of 2020 to 2025, and provides “an estimate of the likely benefits, costs and regulatory burden of implementing these three possible targets.”¹⁰⁸ It also considers the different ways that a mandatory standard might be implemented.¹⁰⁹

¹⁰⁸ *Id.* at 28 & App. B.

¹⁰⁹ *Id.* at 28–29 & App. A.

Brazil

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SUMMARY The Brazilian Constitution of 1988 determines that everyone has the right to an ecologically balanced environment and imposes on the government the duty to defend and preserve it. To implement this principle, in 1990, the law that provides for the country's environmental policy was amended to establish a new environmental policy and a National System of the Environment.

The National Council of the Environment (CONAMA) was created in 1981 for the purpose of advising on and proposing directives for government policies on the environment and natural resources. CONAMA is also in charge of regulating atmospheric emissions limits for pollutants. In this capacity, CONAMA has issued several resolutions that created, *inter alia*, the Program for Control of Air Pollution by Automotive Vehicles; the National Air Pollution Control Program; the Program for the Control of Air Pollution by Motorcycles and Similar Vehicles; Vehicle Pollution Control Plans; and Inspection and Maintenance Programs for Vehicles in Use.

State environmental agencies actively participate in the development of air pollution-related resolutions due to their dominant role in the licensing and supervision of pollution-generating activities. Representatives of Brazilian industry, municipal governments, and civil society are also involved in the discussions, providing resolutions based on the situation of the country.

In the area of renewable fuel, Brazil has been experimenting with programs geared towards ethanol made from sugar cane and biodiesel. In this regard, about 45% of the energy and 18% of the fuels consumed in Brazil are already renewable.

I. Constitutional Principle

Article 225 of the Brazilian Constitution declares that everyone has the right to an ecologically balanced environment, which is considered to be a public good for the people's use and essential for a healthy life.¹ It further determines that the government and the community have a duty to defend and preserve the environment for present and future generations.² To this end, it is the responsibility of the government to, among other things, require a prior environmental impact study as provided by law, which must be made public, for the installation of works or activities that may cause significant degradation of the environment;³ and to control the production,

¹ CONSTITUIÇÃO FEDERAL, art. 225, http://www.planalto.gov.br/ccivil_03/Constituicao/Constituicao.htm, archived at <https://perma.cc/XKK3-L9TM>.

² *Id.*

³ *Id.* art. 225(§ 1)(IV).

commercialization, and employment of techniques, methods, and substances that carry a risk to life, the quality of life, and the environment.⁴

II. Legal Framework

Law No. 6,938 of August 31, 1981, created the National Council of the Environment (Conselho Nacional do Meio Ambiente, CONAMA).⁵ The purpose of the CONAMA is to advise, study, and propose to the Council of Government (Conselho de Governo)⁶ directives for government policies on the environment and natural resources,⁷ and to establish, according to the proposals made by the Brazilian Institute of the Environment and Renewable Natural Resources (Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis, IBAMA),⁸ norms and criteria for the licensing of activities presenting the actual or potential risk of polluting the environment, to be issued by the federal government (*União*), states, the Federal District, and municipalities under the supervision of IBAMA.⁹

In 1990, Law No. 8,028¹⁰ amended Law No. 6,938 to conform it to the Brazilian Constitution of 1988. Article 1 of Law No. 6,938 established the National Environmental Policy (Política Nacional de Meio Ambiente) and the National System of the Environment (Sistema Nacional do Meio Ambiente, SISNAMA).¹¹

The objective of the National Environmental Policy is the preservation, improvement, and recovery of environmental qualities proper to life, and to guarantee the necessary conditions for

⁴ *Id.* art. 225(§ 1)(V).

⁵ Lei No. 6.938, de 31 de Agosto de 1981, art. 6(II), http://www.planalto.gov.br/ccivil_03/Leis/L6938.htm, archived at <https://perma.cc/W6WG-XHU3>.

⁶ The Council of Government is defined by article 6(I) of Law No. 6,938 of August 31, 1981, as modified by Law No. 8,028 of April 12, 1990, as a superior organ, which is part of the National System of the Environment, with the function of advising the President of the Republic on the preparation of national policies for the environment and environmental resources.

⁷ Lei No. 6.938, art. 6(II).

⁸ The Brazilian Institute of the Environment and Renewable Natural Resources was created by Law No. 7.735 of February 22, 1989, as modified by Law No. 11.516 of August 28, 2007, as a federal agency subordinated to the Ministry of Environment, for the purpose of exercising the environmental police power (art. 2(I)); and to execute actions in connection with the national policies for the environment that are related to the federal powers regarding environmental licensing, environmental quality control, authorization for the use of natural resources, and the inspection, monitoring, and control of the environment, in accordance with the directives issued by the Ministry of the Environment (art. 2(II)). Lei No. 7.735 de 22 de Fevereiro de 1989, as modified by Lei No. 11.516 de 28 de Agosto de 2007, http://www.planalto.gov.br/ccivil_03/LEIS/L7735.htm#art2, archived at <https://perma.cc/2X9Q-ZE42>.

⁹ Decreto No. 99.274, de 6 de Junho de 1990, as amended by Decreto No. 3.942 de 27 de Setembro de 2001, art. 7(I), http://www.planalto.gov.br/ccivil_03/decreto/Antigos/D99274.htm, archived at <https://perma.cc/PLH9-US4N>.

¹⁰ Lei No. 8.028, de 12 de Abril de 1990, art. 35, http://www.planalto.gov.br/ccivil_03/Leis/L8028.htm, archived at <https://perma.cc/WLH4-YDUS>.

¹¹ Lei No. 6.938, art.1.

the social and economic development of the country, its national security interests, and the protection of the dignity of human life, in accordance with the principles listed in the law.¹²

The SISNAMA is composed of organs and entities of the federal government (*União*), states, Federal District, territories, and municipalities, as well as the foundations created by the government (*poder público*), which are responsible for the protection and improvement of environmental quality.¹³

Law No. 6,938 is regulated by Decree No. 99,274 of June 6, 1990, which further details the execution of the National Environmental Policy,¹⁴ the organizational structure of SISNAMA,¹⁵ and the composition¹⁶ and competency¹⁷ of CONAMA.

III. Atmospheric Emissions

In the federal government, CONAMA is the regulatory body in charge of regulating atmospheric emissions through resolutions that determine the emission limits of pollutants. In CONAMA, the Ministry of the Environment and IBAMA coordinate the discussions that generate the new emission limits.¹⁸

With regard to the limits of industrial emissions, the Ministry of Environment has declared that the participation of state environmental agencies in the edition of the resolutions is very important because of their dominant role in the licensing and supervision of these activities, and the empirical knowledge these agencies have of the situations in their territories.¹⁹

According to the Ministry of Environment, representatives of Brazilian industry, municipal governments, and civil society are also actively involved in the discussions, providing resolutions based on the overall situation of the country and with the collaboration of all sectors.²⁰

A. CONAMA Resolutions

Since the end of the 1990s, the regulation of air emissions from fixed sources has generated intense debates in CONAMA. Such debates culminated in the issuance of several resolutions, including Resolution No. 382 of December 26, 2006, and Resolution No. 436 of December 22, 2011, which

¹² *Id.* art. 2.

¹³ *Id.* art. 6.

¹⁴ *Id.* art. 1.

¹⁵ *Id.* art. 3.

¹⁶ *Id.* art. 4.

¹⁷ *Id.* art. 7.

¹⁸ *Fontes Fixas*, MINISTÉRIO DO MEIO AMBIENTE, <http://www.mma.gov.br/cidades-sustentaveis/qualidade-do-ar/fontes-fixas> (last visited Apr.12, 2018), archived at <https://perma.cc/43F6-GWZQ>.

¹⁹ *Id.*

²⁰ *Id.*

aligned the country with the most pollution limits, air quality, and the protection of the environment and human health across the globe.²¹

1. CONAMA Resolution No. 18 of May 6, 1986

CONAMA Resolution No. 18 of May 6, 1988²² provides for the creation of the Program for Control of Air Pollution by Automotive Vehicles (Programa de Controle de Poluição do Ar por Veículos Automotores, PROCONVE)²³ for the purpose of reducing the levels of emission of pollutants by automotive vehicles to meet air quality standards, especially in urban centers; promoting national technological development, both in automotive engineering and in the methods and equipment for testing and measuring the emission of pollutants; creating inspection and maintenance programs for motor vehicles in use; promoting awareness of the population regarding the issue of air pollution by motor vehicles; establishing conditions for the evaluation of the results achieved; and promoting the improvement of the technical characteristics of liquid fuels made available to the national fleet of motor vehicles with a view to reducing pollutant emissions to the atmosphere.

2. CONAMA Resolution No. 5 of June 15, 1989

CONAMA Resolution No. 5 of June 15, 1989²⁴ created the National Air Pollution Control Program (Programa Nacional de Controle da Poluição do Ar, PRONAR),²⁵ and determined the need to establish maximum emission limits and adopt national air quality standards, including parameters for the emission of gaseous pollutants and particulate matter (PM) by fixed sources. .

3. CONAMA Resolution No. 3 of June 28, 1990

CONAMA Resolution No. 3 of June 28, 1990,²⁶ provides for the air quality standards set forth in PRONAR. It was based on standards (or recommendations) established by the World Health Organization, which take into account concentration limits compatible with human health and well-being.

²¹ *Id.*

²² Resolução CONAMA No. 18, de 6 de Maio de 1986, http://www.mma.gov.br/port/conama/legislacao/CONAMA_RES_CONS_1986_018.pdf, archived at <https://perma.cc/8855-66VM>.

²³ PROCONVE, http://www.mma.gov.br/images/arquivo/80060/Arquivos/PROCONVE_atualizado%20em%2021nov13.pdf (last visited May 21, 2018), archived at <https://perma.cc/UAQ3-EJEG>.

²⁴ Resolução CONAMA No. 5, de 15 de Junho de 1989, <http://www.mma.gov.br/port/conama/legiabre.cfm?codlegi=81>, archived at <https://perma.cc/4VRY-XZ2J>.

²⁵ PRONAR, http://www.mma.gov.br/estruturas/163/arquivos/pronar_163.pdf (last visited May 21, 2018), archived at <https://perma.cc/X2AX-YCW8>.

²⁶ Resolução CONAMA No. 3, de 28 de Junho de 1990, <http://www.mma.gov.br/port/conama/legiabre.cfm?codlegi=100>, archived at <https://perma.cc/MW4R-KLHS>.

Article 1 defines air quality standards as atmospheric concentrations which, if exceeded, could affect the health, safety, and well-being of the population, as well as cause damage to the flora, fauna, and environment in general.²⁷ Article 2 establishes the concepts to be used for the purposes of the resolution.²⁸ Primary Air Quality Standards are defined according to concentrations of pollutants that, if exceeded, could affect the health of the population.²⁹ Secondary Air Quality Standards address the concentrations of pollutants below which the minimum adverse effect on the population's well-being is expected, as well as the minimum damage to fauna, flora, and the environment in general.³⁰ Air quality standards set the objective to be achieved through the control strategy established by emission standards and should guide the elaboration of Regional Air Pollution Control Plans.³¹

The primary and secondary air quality standard established for ozone is the average concentration over one hour of 160 micrograms per cubic meter of air, which should not be exceeded more than once per year.³²

4. CONAMA Resolution No. 8 of December 6, 1990

CONAMA Resolution No. 8 of December 6, 1990, established maximum limits for the emission of pollutants into the air from external combustion sources of pollution. This resolution complemented PRONAR by setting limits for the concentration of certain pollutants in the air.³³

5. CONAMA Resolution No. 297 of February 26, 2002

CONAMA Resolution No. 297 of February 26, 2002,³⁴ establishes emission limits for polluting gases by mopeds, motorcycles, and similar new vehicles. Resolution No. 297 led to the creation of the Program for the Control of Air Pollution by Motorcycles and Similar Vehicles (Programa de Controle da Poluição do Ar por Motociclos e Veículos Similares, PROMOT)³⁵ with the objective of complementing PROCONVE's regulation and contributing, in particular, to reducing air pollution by mobile sources in the country.

²⁷ *Id.* art. 1.

²⁸ *Id.* art. 2.

²⁹ *Id.* art 2(I).

³⁰ *Id.* art 2(II).

³¹ *Id.* art 2(sole para.).

³² *Id.* art 3(VI).

³³ Resolução CONAMA No. 8, de 6 de Dezembro de 1990, <http://www.mma.gov.br/port/conama/legiabre.cfm?codlegi=105>, archived at <https://perma.cc/A6A5-EP2M>.

³⁴ Resolução CONAMA No. 297, de 26 de Fevereiro de 2002, <http://www.mma.gov.br/port/conama/legiabre.cfm?codlegi=294>, archived at <https://perma.cc/ES9G-PYYF>.

³⁵ PROMOT, http://www.mma.gov.br/estruturas/163/arquivos/promot_163.pdf, archived at <https://perma.cc/K8GR-4FHG>.

6. *CONAMA Resolution No. 382 of December 26, 2006*

CONAMA Resolution No. 382 of December 26, 2006, established maximum emission limits for atmospheric pollutants for fixed sources. It represented a change of approach to the topic. In previous PRONAR resolutions, air quality was considered as the basic parameter, assuming a higher level of emissions where atmospheric conditions were more favorable. In contrast, Resolution 382 establishes specific emission limits for each type of source or fuel used. It applies to all fixed sources installed since its enactment in 2007.³⁶ Industrial facilities, new or old, must meet the requirements. The limits are set by pollutant and by type of source and are listed in the annexes of the Resolution.³⁷

7. *CONAMA Resolution No. 415 of September 24, 2009*

On September 24, 2009, CONAMA approved Resolution 415,³⁸ which introduced the L6 Phase that came into force in 2013. Phase L6 established new limits for the exhaust emission of light passenger vehicles and light commercial vehicles. Both categories are for road use and include both Otto cycle and Diesel cycle vehicles.³⁹

Phase L6 established reductions of 67% and 65% in carbon monoxide (CO) and nitrogen oxide (NO_x) emissions, respectively, in addition to improvements in fuel quality. The main technological innovation foreseen in this phase was the use of self-diagnosis devices, which were made mandatory for light vehicles in the Diesel cycle, as of January 1, 2015.⁴⁰

8. *CONAMA Resolution No. 418 of November 25, 2009*

CONAMA Resolution No. 418 of November 25, 2009, provides criteria for the elaboration of Vehicle Pollution Control Plans (Planos de Controle de Poluição Veicular, PCPV) and for the implementation of Inspection and Maintenance Programs of Vehicles in Use (Programas de Inspeção e Manutenção de Veículos em Uso, I/M) by state and municipal environmental agencies, and determines new emission limits and procedures for the evaluation of the state of maintenance of vehicles in use.⁴¹

The PCPV is an instrument for air quality management of PRONAR and PROCONVE, for the purpose of establishing rules for the management and control of emissions of pollutants and fuel

³⁶ Resolução CONAMA No. 382, de 26 de Dezembro de 2006, <http://www.mma.gov.br/port/conama/res/res06/res38206.pdf>, archived at <https://perma.cc/F5V9-FGUA>.

³⁷ *Id.* art. 1.

³⁸ Resolução CONAMA No. 415, de 24 de Setembro de 2009, <http://www.mma.gov.br/port/conama/legiabre.cfm?codlegi=615>, archived at <https://perma.cc/AB8C-UAFP>.

³⁹ PROCONVE, *supra* note 23 at 3.

⁴⁰ *Id.* at 4.

⁴¹ Resolução CONAMA No. 418, de 25 de Novembro de 2009, <http://www.mma.gov.br/port/conama/legiabre.cfm?codlegi=618>, archived at <https://perma.cc/FE9Z-QJKG>.

consumption of vehicles.⁴² The PCPV is to be prepared by the state environmental agencies after hearing the municipalities and the PCPV of the Federal District should be based on an inventory of emissions from mobile sources and, when applicable, the monitoring of air quality, with the goal of reducing the emission of pollutants and fuel consumption. A Vehicle Inspection and Maintenance Program in Use (I/M) may be included when necessary.⁴³

9. CONAMA Resolution No. 436 of December 22, 2011

CONAMA Resolution No. 436 of December 22, 2011, restricts the emissions of pollutants from thirteen of the main industrial sectors, determining emission limits of the main pollutants with firm deadlines for the implementation of the changes.⁴⁴ It establishes the maximum emission limits for atmospheric pollutants for installed fixed sources or with an application for an installation license prior to January 2, 2007, thus complementing CONAMA Resolutions 5 and 382, imposing new limits on old sources. For most industry segments, the limits have been matched, meaning old factories will have to modernize and substantially reduce their emissions, matching the new plants.⁴⁵

According to the Ministry of Environment, this Resolution induced a technological revolution in Brazil, being one of the measures of greater environmental impact that CONAMA has approved in recent years. It brought about a profound technological change to the country's industrial parks and significantly reduced the emissions of the industries located there, which are the oldest and located within the most consolidated urban areas, thus having greater polluting impacts.⁴⁶

B. Law No. 8,723 of October 28, 1993

On October 28, 1993, Law No. 8,723 was enacted to compel manufacturers of engines, vehicles, and fuel to take the necessary measures to reduce the emission levels of CO, nitrogen oxides (NO_x), hydrocarbons, alcohols, aldehydes (RCHO), soot, PM, and other pollutant compounds in the vehicles sold in the country, and to adapt to the emission limits and deadlines established in Law No. 8,723.⁴⁷

Article 3 of Law No. 8,723 determines that the bodies responsible for establishing procedures for testing, measuring, certifying, licensing, and evaluating emission levels of vehicles, as well as all

⁴² *Id.* art. 3.

⁴³ *Id.* art. 4.

⁴⁴ Resolução CONAMA No. 436, de 22 de Dezembro de 2011, <http://www.mma.gov.br/port/conama/legiabre.cfm?codlegi=660>, archived at <https://perma.cc/Q9VZ-BQRD>.

⁴⁵ “Resolução CONAMA No. 436, de 22 de Dezembro de 2011,” *Fontes Fixas*, MINISTÉRIO DO MEIO AMBIENTE, <http://www.mma.gov.br/cidades-sustentaveis/qualidade-do-ar/fontes-fixas>, archived at <https://perma.cc/T85B-GJQX>.

⁴⁶ *Id.*

⁴⁷ Lei No. 8.723, de 28 de Outubro de 1993, art. 1, http://www.planalto.gov.br/ccivil_03/leis/L8723.htm, archived at <https://perma.cc/V6TU-PYUX>.

complementary measures related to the control of pollutants by motor vehicles, are CONAMA and IBAMA, in line with PROCONVE, respecting the metrological system in force in the country.⁴⁸

The use of automotive fuels classified by IBAMA as having low polluting potential is encouraged and prioritized, especially in metropolitan regions.⁴⁹ State and municipal governments are authorized to establish, through specific plans, standards and additional air pollution control measures for circulating motor vehicles, in accordance with the requirements of PROCONVE and its complementary measures.⁵⁰ Governmental environmental agencies at the federal, state, and municipal levels, as of the publication of Law No. 8,723, monitor the quality of atmospheric air and establish guidelines and programs for its control, especially in urban centers with a population of more than five hundred thousand inhabitants and in the peripheral areas under the direct influence of these regions.⁵¹

C. National Inventory of Atmospheric Emissions by Automotive Road Vehicles

In 2011, the first National Inventory of Atmospheric Emissions by Road Vehicles (1º Inventário Nacional de Emissões Atmosféricas por Veículos Automotores Rodoviários)⁵² was launched as a way of implementing and monitoring the results of PROCONVE and PRONAR. The National Inventory estimates national emissions of air pollutants and greenhouse gases in the cargo and passenger transport sectors.⁵³

The second National Inventory of Atmospheric Emissions by Road Vehicles 2013: Base-Year 2012 continues the strategy of periodically updating the inventory, providing official data from 1980 to 2012 on emissions of pollutants regulated by PROCONVE (CO, NO_x, non-methane hydrocarbons [NMHC], RCHO, and PM), in addition to greenhouse gases (carbon dioxide [CO₂], methane [CH₄], and nitrous oxide [N₂O]). Emissions of PM due to tire wear, brakes, and runways were also inventoried.⁵⁴

⁴⁸ *Id.* art. 3.

⁴⁹ *Id.* art. 11.

⁵⁰ *Id.* art. 12.

⁵¹ *Id.* art. 15.

⁵² 1º INVENTÁRIO NACIONAL DE EMISSÕES ATMOSFÉRICAS POR VEÍCULOS AUTOMOTORES RODOVIÁRIOS 5 (2011), http://www.mma.gov.br/images/arquivo/80060/1o_Inventario_Nacional_de_Emissoes_Atmosfericas_por_Veiculos_Automotores_Rodoviarios.PDF, archived at <https://perma.cc/P5E4-VKLN>. This document presents emissions from 1980 to 2009 and projections for 2020 of pollutants regulated by the PROCONVE and PROMOT programs (CO, NO_x, non-methane hydrocarbons [NMHC], RCHO, and PM) in addition to greenhouse gases (carbon dioxide [CO₂], and methane [CH₄]).

⁵³ INVENTÁRIO NACIONAL DE EMISSÕES ATMOSFÉRICAS POR VEÍCULOS AUTOMOTORES RODOVIÁRIOS 2013: ANO-BASE 2012, at 4, http://www.mma.gov.br/images/arquivo/80060/Inventario_de_Emissoes_por_Veiculos_Rodoviarios_2013.pdf, archived at <https://perma.cc/SU5R-YUCY>.

⁵⁴ *Id.*

The 2011 and 2013 studies were used in preparing the Transport and Urban Mobility Sector Plan for Climate Change Mitigation and Adaptation (Plano Setorial de Transporte e de Mobilidade Urbana para Mitigação e Adaptação à Mudança do Clima, PSTM), and updating the National Plan for Climate Change (Plano Nacional de Mudanças do Clima), in addition to other national and regional applications.

IV. Renewable Fuel

The Brazilian quest for a substitute to fossil fuel started in the 1920s when the Institute of National Technology (Instituto Nacional de Tecnologia, INT) tested biofuels in internal combustion engines.⁵⁵ For economic reasons, on February 20, 1931, Decree No. 19,717 made mandatory the addition of 5% of ethanol (*álcool anidro*) produced in Brazil to all imported gasoline.⁵⁶ On September 23, 1938, in order to develop the production of gasoline and the petroleum industry in Brazil, the government issued Decree-Law No. 737 making mandatory the addition of ethanol (*álcool anidro*) to gasoline produced in Brazil as well.⁵⁷

In 1993, acting on environmental concerns rather than economic ones, the government, in an effort to reduce the emission of pollutants by automotive vehicles, issued Law No. 8,723 (discussed above), which established as mandatory the addition of 22% of ethanol (*álcool etílico anidro combustível*) to gasoline,⁵⁸ and determined the amount of allowable gas emissions for different types of motor vehicles, as well as the periods of time required for the implementation of these measures and compliance by the appropriate industries.⁵⁹

A. Ethanol Program (ProÁlcool)

In the 1970s, the petroleum crisis substantially increased oil prices, and the heavy dependence on imported oil forced Brazil to launch a national program of commercial renewable fuel, the National

⁵⁵ Paulo Teixeira de Sousa et al., *The Ethanol and Biodiesel Programmes in Brazil*, in INTERNATIONAL DEVELOPMENT RESEARCH CENTRE, MAKING CHOICES ABOUT HYDROGEN: TRANSPORT ISSUES FOR DEVELOPING COUNTRIES 118, 154 (Lynn K. Mytelka & Grant Boyle eds., 2008), <http://collections.unu.edu/eserv/UNU:2494/pdf9789280811551.pdf>, archived at <https://perma.cc/LJ7N-GAV6>.

⁵⁶ Decreto No. 19.717, de 20 de fevereiro de 1931, art. 1, <http://www2.camara.leg.br/legin/fed/decret/1930-1939/decreto-19717-20-fevereiro-1931-518991-publicacaooriginal-1-pe.html>, archived at <https://perma.cc/77MT-YW87>.

⁵⁷ Decreto-Lei No. 737, de 23 de Setembro de 1938, art. 1, <http://www2.camara.leg.br/legin/fed/declei/1930-1939/decreto-lei-737-23-setembro-1938-350748-publicacaooriginal-1-pe.html>, archived at <https://perma.cc/Q3J2-A5CX>.

⁵⁸ Lei No. 8.723 de 28 de Outubro de 1993, art. 9. Currently, the executive branch may raise this percentage up to the limit of 27.5%, provided that its technical feasibility is verified, or reduce it to 18%. *Id.* art. 9(§ 1).

⁵⁹ *Id.* arts. 1, 2.

Program of Alcohol (*Programa Nacional do Álcool*, ProÁlcool).⁶⁰ It was designed to be used as an alternative to replace fossil fuel used in automobiles by biofuels, mainly ethanol made from sugar cane.⁶¹

ProÁlcool was created by Decree No. 76,593 of November 14, 1975, which offered government subsidies, tax breaks, and price controls to producers of sugar cane, manioc, and other raw materials, and to investors willing to build distilleries to convert the crops into ethanol.⁶²

B. Biodiesel Program

On July 2, 2003, the Brazilian government issued a decree creating an interministerial group for the purpose of presenting a study about the viability of using biodiesel as an alternative source of energy and suggesting the necessary and proper course of action for the use of biodiesel.⁶³ An additional decree issued on December 23, 2003, created a committee to implement actions directed to the production and use of vegetable-oil biodiesel as an alternative source of energy.⁶⁴

On January 13, 2005, Brazil promulgated Law No. 11,097,⁶⁵ which introduced biodiesel⁶⁶ into the Brazilian energy matrix⁶⁷ and expanded the administrative competency of the National Agency of Petroleum to also include natural gas and biofuels as part of the activities regulated by the agency.⁶⁸ As a consequence, the agency's name was changed to the National Agency of Petroleum, Natural Gas and Biofuels (Agência Nacional do Petróleo, Gás Natural e Biocombustíveis, ANP),⁶⁹ and it was charged with regulating and enforcing activities related to the production, quality control, distribution, re-sale, and commercialization of biodiesel and the mixture of diesel with biodiesel.⁷⁰

⁶⁰ Suani Teixeira Coelho, *Sustentabilidade*, UNICA, UNIÃO DA INDÚSTRIA DE CANA-DE-AÇUCAR (Nov. 13, 2017), <http://www.unica.com.br/convidados/20908199920323508121/sustentabilidade/>, archived at <https://perma.cc/U5KD-4KE9>.

⁶¹ *História do Etanol (O álcool combustível)*, SIAMIG, SINDICATO DA INDÚSTRIA DE FABRICAÇÃO DO ÁLCOOL NO ESTADO DE MINAS GERAIS, <http://www.siamig.com.br/institucional/etanol> (last visited Apr. 12, 2018), archived at <https://perma.cc/U3RV-4KQ7>.

⁶² Decreto No. 76.593 de 14 de Novembro de 1975, arts. 2, 5, 6, 7, <http://www2.camara.leg.br/legin/fed/decret/1970-1979/decreto-76593-14-novembro-1975-425253-publicacaooriginal-1-pe.html>, archived at <https://perma.cc/6WQV-GB2S>.

⁶³ Decreto de 2 de Julho de 2003, art. 1, http://www.planalto.gov.br/ccivil_03/DNN/2003/Dnn9920.htm, archived at <https://perma.cc/2WAK-HMQV>.

⁶⁴ Decreto de 23 de Dezembro de 2003, art. 1, http://www.planalto.gov.br/ccivil_03/DNN/2003/Dnn10093.htm, archived at <https://perma.cc/NVJ9-HS3D>.

⁶⁵ Lei No. 11.097 de 13 de Janeiro de 2005, http://www.planalto.gov.br/ccivil_03/Ato2004-2006/2005/Lei/L11097.htm, archived at <https://perma.cc/9PMW-PH4D>.

⁶⁶ Pursuant to article 4 of Law No. 11.097, which amended Law No. 9.478 of August 6, 1997, “biodiesel” is defined as a biofuel derived from renewable (and biodegradable) biomass (vegetable oils and animal fats) to be used in internal combustion engines with ignition by compression or, according to the rules, for the generation of other type of energy that can partially or totally replace fossil fuels.

⁶⁷ *Id.* art. 2.

⁶⁸ *Id.* art. 5.

⁶⁹ *Id.*

⁷⁰ *Id.* art. 6. Initially, article 2 of Law No. 11,097 set the minimum mandatory percentage of biodiesel to be added to

Law No. 11,097 also amended Article 8 of Law No. 9,478 of August 5, 1997,⁷¹ which regulates the petroleum industry, to include the enforcement of good practices for the conservation and rational use of petroleum, natural gas, and biofuels, and environmental protection in connection with these activities.⁷²

C. Biofuels

The two main liquid biofuels used in Brazil are ethanol obtained from sugarcane and, on a growing scale, biodiesel, which is produced from vegetable oils or animal fats and added to petroleum diesel in variable proportions.⁷³

According to ANP, about 45% of the energy and 18% of the fuels consumed in Brazil are already renewable. In the rest of the world, 86% of the energy comes from nonrenewable energy sources. A pioneer in the use of biofuels, Brazil has reached a position sought by many countries that seek to develop renewable energy sources as strategic alternatives to oil.⁷⁴

the diesel fuel marketed to the final consumer at 5% in any part of the national territory. However, on September 24, 2014, Law No. 13,033 increased the percentage to 6%. Subsequent laws amended this percentage and currently the percentage is 10%. Lei No. 13.033, de 24 de Setembro de 2014, http://www.planalto.gov.br/ccivil_03/_Ato2011-2014/2014/Lei/L13033.htm, archived at <https://perma.cc/5XBV-CFAW>.

⁷¹ Lei No. 11.097, art. 6.

⁷² Lei No. 9.478, de 6 de Agosto de 1997, art. 8(IX), http://www.planalto.gov.br/ccivil_03/Leis/L9478.htm, archived at <https://perma.cc/QPE5-4C7C>.

⁷³ *Biocombustíveis*, AGÊNCIA NACIONAL DE PETRÓLEO, GÁS NATURAL E BIOCMBUSTÍVEL, <http://www.anp.gov.br/biocombustiveis> (last visited Apr. 13, 2018), archived at <https://perma.cc/S2MP-M44T>.

⁷⁴ *Id.*

Canada

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SUMMARY Canada’s Constitution divides the legislative authority to regulate environmental protection between the federal Parliament and the provincial legislatures. The Canadian Environmental Protection Act, 1999 is Canada’s main federal legislation on preventing pollution and protecting the environment. The Canadian federal government has issued regulations to control emissions of criteria air contaminants (nitrogen oxides, sulfur dioxide, carbon monoxide, particulate matter, etc.) as well as greenhouse gases. Generally, the Canadian approach has been to harmonize emissions standards with the United States Environmental Protection Agency’s federal standards.

I. Overview

Canada’s Constitution Act, 1867¹ divides the legislative authority to regulate environmental protection between the federal Parliament and the provincial legislatures.² Canada is a signatory to the Paris Agreement, which it ratified on October 5, 2016.³ Canada’s Nationally Determined Contribution (NDC) is to reduce economy-wide greenhouse gas (GHG) emissions by 30% below 2005 levels by 2030.⁴

On December 9, 2016, Canada adopted the Pan-Canadian Framework on Clean Growth and Climate Change, the federal government’s plan to “meet its emissions reduction targets and grow the economy.”⁵ A central element of the Pan-Canadian Framework is “the commitment to pricing carbon pollution across the country by 2018.”⁶ In order to implement the commitments Canada made under the Paris Agreement, the government has stated that “actions outlined in the Pan-Canadian Framework, supported by federal investments announced in Budget 2017, will enable

¹ Canada’s Constitution Act, 1867, 30 & 31 Victoria, c. 3 (U.K.), <http://laws-lois.justice.gc.ca/eng/const/FullText.html>, archived at <https://perma.cc/DQ2F-6EMN>.

² *Environmental Law*, HISTORICA CANADA (Feb. 1, 2012), <http://www.thecanadianencyclopedia.ca/en/article/environmental-law/>, archived at <https://perma.cc/V864-2ATC>.

³ *Paris Agreement, Status as at 21-05-2018*, UNITED NATIONS TREATY COLLECTION, https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27&clang=en, archived at <https://perma.cc/D868-XUWY>.

⁴ *Canada*, CLIMATE ACTION TRACKER, <http://climateactiontracker.org/countries/canada.html> (last updated Nov. 7, 2017), <https://perma.cc/F92X-2TXE>; UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE (UNFCCC), CANADA’S INDC SUBMISSION TO THE UNFCCC, <http://www4.unfccc.int/submissions/INDC/Published%20Documents/Canada/1/INDC%20-%20Canada%20-%20English.pdf>, archived at <https://perma.cc/57MQ-YGB6>.

⁵ *Pan-Canadian Framework on Clean Growth and Climate Change*, GOVERNMENT OF NORTHWEST TERRITORIES, <http://www.fin.gov.nt.ca/implementing-pan-canadian-carbon-pricing-northwest-territories/pan-canadian-framework-clean-growth> (last visited Apr. 12 2018), archived at <https://perma.cc/J63T-DXWC>.

⁶ *Id.*

Canada to meet or even exceed its target to reduce emissions to 30% below 2005 levels by 2030.”⁷ Canada is also a party to the Climate and Clean Air Coalition to Reduce Short-Lived Climate Pollutants, “which is a voluntary initiative aimed at protecting the environment and public health and addressing climate change.”⁸

The Canadian Environmental Protection Act, 1999 (CEPA)⁹ is Canada’s main federal legislation on preventing pollution and protecting the environment. At the federal level, Environment and Climate Change Canada (ECCC) and Transport Canada (TC) have the mandate to regulate emissions from internal combustion engines. Under CEPA, Environment Canada has the “authority to regulate emissions from on-road engines, as well as from most categories of off-road engines.”¹⁰ The CEPA “transfers the legislative authority for regulating emissions from on-road vehicles and engines to Environment Canada from Transport Canada’s Motor Vehicle Safety Act.”¹¹ TC, on the other hand, has the responsibility to regulate emissions from aircraft, railway locomotives and commercial marine vessels.¹² The Canadian federal government has issued regulations to control emissions of criteria air contaminants (CAC) (nitrogen oxides, sulfur dioxide, carbon monoxide, particulate matter, etc.) as well as GHGs.¹³ Generally, the Canadian approach has been to harmonize emissions standards with the United States Environmental Protection Agency’s federal standards:

In 1988, on-road vehicle emission standards were first aligned with the US federal standards. In February 2001, the Minister of the Environment in the *Federal Agenda on Cleaner Vehicles, Engines and Fuels* set out a number of policy measures that continued the harmonization of on-road emission standards, as well as expanded this harmonization by developing emission standards for off-road engines and standards for fuels that are aligned with the federal US requirements.¹⁴

⁷ UNFCCC, *Canada’s 2017 Nationally Determined Contribution Submission to the United Nations Framework Convention on Climate Change*, <http://www4.unfccc.int/ndcregistry/PublishedDocuments/Canada%20First/Canada%20First%20NDC-Revised%20submission%202017-05-11.pdf>, archived at <https://perma.cc/8FSJ-GNZZ>.

⁸ Jonathan Cocker, *Canada*, ENV’T & CLIMATE CHANGE L. REV. (2d ed. Feb. 2018), <https://thelawreviews.co.uk/chapter/1153045/canada>, archived at <https://perma.cc/Z3V9-Z6BK>.

⁹ Canadian Environmental Protection Act, 1999, S.C. 1999, c. 33, <http://laws-lois.justice.gc.ca/eng/acts/c-15.31/FullText.html>, archived at <https://perma.cc/UF6N-Y2WS>.

¹⁰ *Canada: Regulatory Background*, TRANSPORTPOLICY.NET, <https://www.transportpolicy.net/standard/canada-regulatory-background/> (last visited Apr. 11, 2018), archived at <https://perma.cc/TL2M-CSBX>.

¹¹ *Air Pollution: Regulations for Vehicles and Engines*, ENVIRONMENT AND CLIMATE CHANGE CANADA, <https://www.canada.ca/en/environment-climate-change/services/air-pollution/sources/transportation/regulations-vehicles-engines.html> (last updated July 17, 2013), archived at <https://perma.cc/JY2R-A7BH>.

¹² *Canada: Regulatory Background*, TRANSPORTPOLICY.NET, *supra* note 10.

¹³ *Emission Standards: Canada*, DIESELNET, <https://www.dieselnet.com/standards/ca/>, archived at <https://perma.cc/9UZZ-W73H>.

¹⁴ *Id.* (footnote in original omitted).

Each Canadian province and territory also has its own environmental legislation, “regulating day-to-day environmental management.”¹⁵

The National Pollutant Release Inventory (NPRI) tracks pollution in Canada, providing a “publicly accessible inventory of pollutant releases to air, water and land” and “disposals and transfers for recycling.”¹⁶ The NPRI “contains information reported annually by industrial facilities (meeting certain criteria) and published by Environment Canada under the authority of CEPA 1999. The NPRI also includes information on air emission estimates compiled for facilities not required to report and various nonindustrial sources (e.g., motor vehicles).”¹⁷ NPRI information is mainly used to “identify and monitor sources of pollution in Canada, develop indicators for the quality of air, water and land, and evaluate releases and transfers of substances of concern.”¹⁸ This combined information can then be used to “identify and take action on environmental priorities, or to implement policy initiatives and risk management measures.”¹⁹

II. Emission Standards

A. Greenhouse Gas Emissions

The federal government sets GHG emission limits on light-duty vehicles through the Passenger Automobile and Light Truck Greenhouse Gas Regulations²⁰ (made pursuant to the Canadian Environmental Protection Act, 1999), which are harmonized with US standards set out in the US Code of Federal Regulations (CFR). The Regulations were issued in October 2010.

Section 2 of the Regulations stipulates that the “purpose of these Regulations is to reduce greenhouse gas emissions from passenger automobiles and light trucks by establishing emission standards and test procedures that are aligned with the federal requirements of the United States.”²¹ The Regulations “prescribe progressively more stringent annual emission standards for new vehicles of model years 2011 to 2016.”²² These Regulations require that “manufacturers and importers meet fleet average GHG Emission Standards as well vehicle specific standards for

¹⁵ Cocker, *supra* note 8.

¹⁶ *National Pollutant Release Inventory*, ENVIRONMENT AND CLIMATE CHANGE CANADA, <http://www.ec.gc.ca/inrp-npri/default.asp?lang%BCEn&n%BC4A577BB9-1> (last updated Dec. 6, 2016), archived at <https://perma.cc/5PHD-35MZ>.

¹⁷ *National Pollutant Release Inventory (NPRI) Reporting*, NATIONAL COUNCIL FOR AIR AND STREAM IMPROVEMENT, <http://www.ncasi.org/Programs/Chemical-Reporting/National-Pollutant-Release-Inventory/Index.aspx> (last visited Apr. 11, 2018), archived at <https://perma.cc/ZV3N-HLZY>.

¹⁸ *Id.*

¹⁹ *Id.*

²⁰ Passenger Automobile and Light Truck Greenhouse Gas Emission Regulations (SOR/2010-201), <http://laws-lois.justice.gc.ca/eng/regulations/SOR-2010-201/FullText.html>, archived at <https://perma.cc/28YB-WMMT>.

²¹ *Id.* § 2.

²² ENVIRONMENT CANADA, 2014 CANADA’S EMISSIONS TRENDS (2014) <https://www.ec.gc.ca/GES-GHG/default.asp?lang=En&n=E0533893-&printfullpage=true>, archived at <https://perma.cc/3JDC-HEOY>.

emissions of methane and nitrous oxides.”²³ A summary of the Regulations by the law firm Gowling WLG notes that “[f]lexibility is provided including incentives for vehicles with dual-fuel capability and advanced technology vehicles. There are optional standards for companies selling smaller volumes of vehicles. Companies are required to submit annual reports, and to maintain records to confirm compliance with the Regulations.”²⁴

The Government of Canada adopted amendments to the Regulations in 2014 that established a “progressively more stringent annual fleet average GHG emission standards over the 2017 to 2025 model years.”²⁵ The amended regulations included the following requirements:

For model years 2017 to 2025, cars will be required to achieve, on average, 5% annual reductions in GHG emissions. As light trucks are typically used by farmers and construction workers, it is equally important that these vehicles can perform the work they are required to do. To that end, the proposed regulations provide short-term relief in the form of less-aggressive annual reductions. Consequently, light trucks will be required to achieve, on average, 3.5% annual GHG emission reductions from model year 2017 to 2021 and 5% reductions from 2022 to 2025. This will give time for companies to find technological solutions that lead to reduced emissions without affecting the utility of their trucks. With these regulations, it is projected that 2025 vehicles will consume up to 50% less fuel than 2008 vehicles—leading to significant savings at the pump. On average, a Canadian driving a model year 2025 vehicle will realize fuel savings of around \$900 per year compared to driving today’s new vehicles. It is also estimated that 2025 model year vehicles will emit close to 50% less GHGs than 2008 vehicles.²⁶

Heavy-duty Vehicle and Engine Greenhouse Gas Emission Regulations²⁷ also exist that “set performance-based greenhouse gas emission standards for new on-road heavy-duty vehicles (such as highway tractors, buses and dump trucks) and their engines made in 2014 and later years.”²⁸ These standards and procedures are also “aligned with those of the US Code of Federal

²³ *Passenger Automobile and Light Truck Greenhouse Gas Emissions Regulations*, LEXOLOGY.COM (Jan. 7, 2011), <https://www.lexology.com/library/detail.aspx?g=d98b3953-9ef6-4a7d-bdaa-8bc852104c9f>, archived at <https://perma.cc/HUW8-EBTR>.

²⁴ *Id.*

²⁵ See Regulatory Impact Analysis Statement, Regulations Amending the Passenger Automobile and Light Truck Greenhouse Gas Emission Regulations, SOR/2014-207 (Sept. 19, 2014), <http://www.gazette.gc.ca/rp-pr/p2/2014/2014-10-08/html/sor-dors207-eng.html>, archived at <https://perma.cc/WX48-ZSAG>.

²⁶ *Backgrounder Regulating Greenhouse Gas Emissions from Light-Duty Vehicles (2017–2025)*, ENVIRONMENT AND CLIMATE CHANGE CANADA, <http://www.ec.gc.ca/default.asp?lang=En&n=56D4043B-1&news=1F13DA8A-EB01-4202-AA6B-9E1E49BBD11E> (last updated June 25, 2013), archived at <https://perma.cc/CKG9-9P3S>; ENVIRONMENT AND CLIMATE CHANGE CANADA, CONSULTATION DOCUMENT – PROPOSED REGULATIONS TO FURTHER LIMIT GREENHOUSE GAS EMISSIONS FROM NEW ON-ROAD LIGHT-DUTY VEHICLES, <http://www.ec.gc.ca/lcpe-cepa/default.asp?lang=En&n=F24B936F-1> (last updated Apr. 24, 2013), archived at <https://perma.cc/Y9XA-3Z7U>.

²⁷ Heavy-duty Vehicle and Engine Greenhouse Gas Emission Regulations (SOR/2013-24), <http://laws-lois.justice.gc.ca/eng/regulations/SOR-2013-24/index.html>, archived at <https://perma.cc/9D7J-999N>.

²⁸ *Heavy-duty Vehicle and Engine Greenhouse Gas Emission Regulations*, CANADIAN ENVIRONMENTAL PROTECTION ACT REGISTRY, <https://pollution-waste.canada.ca/environmental-protection-registry/regulations/view?Id=119> (last updated Apr. 17, 2018), archived at <https://perma.cc/SY74-MSLY>.

Regulations (CFR) for on-road heavy-duty vehicles and engines.”²⁹ On March 4, 2017, Canada published proposed standards to “reduce greenhouse gas (GHG) emissions from new on-road heavy-duty vehicles As proposed, the new regulation would apply to model year (MY) 2018 to 2027 vehicles.”³⁰

B. Smog-related Emission Regulations

On January 1, 2003, the On-Road Vehicle and Engine Emission Regulations were promulgated under CEPA 1999, setting smog-related³¹ “air pollutant emission standards for new passenger cars, light-duty trucks, motorcycles, heavy-duty vehicles (such as highway tractors, buses and dump trucks) and their engines beginning with the 2004 model year.”³² The Regulations “aligned vehicle and engine certification requirements with those of the US EPA beginning January 1, 2004 and including the US Tier 2 standards for new light-duty vehicles, light-duty trucks and medium-duty passenger vehicles, and Phase 1 (US2004) and Phase 2 (US2007) programs for new heavy-duty vehicles and engines.”³³ According to TransportPolicy.net (a collaboration between the International Council on Clean Transportation and DieselNet),

[t]he Regulations set out technical standards for vehicles and engines for exhaust, evaporative and crankcase emissions, on-board diagnostic systems and other specifications related to emission control systems. The Regulations defined several phase-in schedules, as follows: Tier 2 standards for light-duty vehicles and light light-duty trucks (2004-2007); Tier 2 standards for heavy light-duty trucks and medium-duty passenger vehicles (2004-2009); Phase 1 (2005) and Phase 2 (2008-2009) standards for complete heavy-duty vehicles; and Phase 1 (2004-2006) and Phase 2 (2007-2010) standards for heavy-duty engines.³⁴

On July 16, 2015, amendments were adopted to the On-Road Vehicle and Engine Emission Regulations “that harmonize Canadian requirements with the US EPA Tier 3 emission regulations, starting with the 2017 model year.”³⁵ Key elements of the amended regulations include the following:

²⁹ Environment Canada, Heavy-duty Vehicle and Engine Greenhouse Gas Emission Regulations Guidance Document (Feb. 2015), <https://www.canada.ca/en/environment-climate-change/services/canadian-environmental-protection-act-registry/publications/vehicle-emission-regulations-guidance-document/chapter-b.html>, archived at <https://perma.cc/23HU-GQEP>.

³⁰ International Council on Clean Transportation, Proposed Second-Phase Greenhouse Gas Emission Standards for Heavy-duty Engines and Vehicles in Canada (June 2017), https://www.theicct.org/sites/default/files/publications/ECCC-HDV-Phase-2_ICCT_Policy-Update_15062017_vF.pdf, archived at <https://perma.cc/7JJW-DDL9>.

³¹ *Vehicle Emissions*, CANADIAN VEHICLE MANUFACTURERS’ ASSOCIATION, <https://www.cvma.ca/priorities/environment/vehicle-emissions/>, archived at <https://perma.cc/2WSJ-PE57>.

³² On-Road Vehicle and Engine Emission Regulations, SOR/2003-2, <http://laws-lois.justice.gc.ca/eng/regulations/SOR-2003-2/FullText.html>, archived at <https://perma.cc/6HEM-3W6Q>.

³³ *Canada: Light-Duty: Emissions*, TRANSPORTPOLICY.NET, <https://www.transportpolicy.net/standard/canada-light-duty-emissions/> (last visited Apr. 11, 2018), archived at <https://perma.cc/S7LB-4HUS>.

³⁴ *Id.*

³⁵ *Emission Standards: Canada*, *supra* note 13.

- Tighter ‘Tier 3’ emission standards start being phased-in with the 2017 model year and will be fully implemented by 2025:
 - standards up to 80% and 70% more stringent for volatile organic compounds (VOCs)/nitrogen oxide (NOx) and particulate matter (PM) respectively, compared to Tier 2 standards
 - more stringent evaporative emission standards
- A system for generating, banking and trading emission credits, including the possibility of earning early credits beginning in the 2015 model year.
- Increased time during which a vehicle must comply with the standards (i.e. a vehicle’s useful life) from 10 years or 192,000 kilometers to 15 years or 240,000 kilometers.
- Changes to improve the administration of the Parent Regulations and other regulations that cover the same vehicle classes including: simplifying the requirements regarding information to be submitted for vehicles imported into Canada and provisions for the submission of reports electronically.³⁶

The On-Road Vehicle and Engine Emission Regulations also set out emission standards for motorcycles, which are also aligned with US EPA emission standards.

C. Power Plant Emission Standards

In 2012 the Canadian government issued the Reduction of Carbon Dioxide Emissions from Coal-fired Generation of Electricity Regulations,³⁷ which “set a stringent performance standard for new coal-fired electricity generation units and those that have reached the end of their useful life.”³⁸ The Regulations

require[] any new coal-fired electricity generation unit, and old units that have reached the end of their useful life, to perform at the level of an efficient combined cycle gas turbine facility, or close. Since two-thirds of Canada’s coal-fired units will reach the end of their useful lives by 2030, this ‘clean or close’ choice will leave total Canadian thermal power plant emissions in 2030 at approximately 60 Mt [metric tons] per annum—a 50 percent reduction from 2005 levels that will leave Canada with one of the cleanest power systems in the world.³⁹

³⁶ Frequently Asked Questions – Regulations Amending the On-Road Vehicle and Engine Emission Regulations and Other Regulations Made Under the Canadian Environmental Protection Act, 1999, ENVIRONMENT AND CLIMATE CHANGE CANADA, <http://ec.gc.ca/lcpe-cepa/default.asp?lang=En&xml=9F40F55C-8046-4631-BD7E-DDCD BD0F7A0A> (last updated July 7, 2017), <https://perma.cc/59RE-Z7LF>.

³⁷ Reduction of Carbon Dioxide Emissions from Coal-fired Generation of Electricity Regulations (SOR/2012-167), <http://laws-lois.justice.gc.ca/eng/regulations/SOR-2012-167/FullText.html>, archived at <https://perma.cc/TP5E-G7UK>.

³⁸ *About the Regulations*, CANADIAN ENVIRONMENTAL PROTECTION ACT REGISTRY, <https://pollution-waste.canada.ca/environmental-protection-registry/regulations/view?Id=116> (last updated Apr. 10, 2018), archived at <https://perma.cc/BG2K-YF33>.

³⁹ Peter Burn, *Power Plant Emissions Regulations in the United States and Canada: Looking Behind the Headlines*, CENTRE FOR INTERNATIONAL GOVERNANCE INNOVATION (CIGI Commentary, Oct. 13, 2015), <https://www.cigionline.org/publications/power-plant-emissions-regulations-united-states-and-canada-looking-behind-headlines>, archived at <https://perma.cc/VZH9-Z8YQ>.

More specifically,

[t]he Regulations impose a performance standard (an emissions limit) of 420 t [metric tons] of CO₂/GWh of electricity produced by electricity generating units fuelled by coal, coal derivatives and petroleum coke. New units coming online after July 1, 2015, are subject to the performance standard from the start of operation. Units operational prior to 2015 must comply with the performance standard once they have reached the end of their useful life, which is defined as follows in the Regulations:

- Units commissioned before January 1, 1975, are subject to the performance standard after 50 years of operation, or no later than December 31, 2019;
- Units commissioned after December 31, 1974, and before January 1, 1986, are subject to the performance standard after 50 years of operation, or no later than December 31, 2029, whichever date comes first; and
- Units commissioned after December 31, 1985, are subject to the performance standard after 50 years of operation.

The Regulations also include compliance flexibility options to ensure a reliable supply of electricity while achieving the objectives of the Regulations.⁴⁰

On February 2018, the Government published proposed amendments that “would require all coal-fired electricity generating units to comply with an emissions performance standard of 420 tonnes [metric tons] of carbon dioxide per gigawatt hour of electricity produced (t of CO₂/GWh) by 2030, at the latest. Some units will be required to comply with this performance standard earlier.”⁴¹

III. Fuel Quality Standards

Fuel regulations set limits for certain components in fuels that are produced, imported, or sold in Canada, for on-road or off-road use. The Gasoline Regulations⁴²

limit the concentration of lead in gasoline that is produced, imported, sold or offered for sale in Canada and limit the concentration of phosphorus in unleaded gasoline. The regulations also specify the acceptable analytical methods for determining the concentration of lead and phosphorus in gasoline and impose record-keeping and reporting obligations for leaded gasoline. Gasoline for use in aircraft is exempt from the regulations

⁴⁰ Regulations Amending the Reduction of Carbon Dioxide Emissions from Coal-fired Generation of Electricity Regulations, CANADA GAZETTE, Pt. I, Vol. 152, No. 7 (Feb. 17, 2018) <http://www.gazette.gc.ca/rp-pr/p1/2018/2018-02-17/html/reg3-eng.html>, archived at <https://perma.cc/B5BG-7T78>.

⁴¹ *Id.*

⁴² Gasoline Regulations (SOR/90-247), <http://laws-lois.justice.gc.ca/eng/regulations/SOR-90-247/FullText.html>, archived at <https://perma.cc/J6DS-8TGA>.

and leaded gasoline for use in competition vehicles is not subject to the lead concentration restrictions.⁴³

The Regulations limit the lead and phosphorus content in gasoline produced, imported, or sold in Canada to 5 milligrams per liter (mg/L) and 1.3 mg/L, respectively.⁴⁴ These regulations do not apply to gasoline used in aircrafts and competition vehicles.⁴⁵

The Sulphur in Diesel Fuel Regulations⁴⁶ set maximum limits for sulfur in diesel fuel for use in on-road vehicles.⁴⁷ On June 1, 2006, the maximum limit was set at 15 mg/kilogram (kg) for on-road diesel fuel “produced or imported for use or sale in Canada and for on-road diesel fuel that is sold or offered for sale.”⁴⁸ Prior to 2006 the limit was 500 mg/kg.

The Sulphur in Gasoline Regulations⁴⁹ limited the amount of sulfur in gasoline to 14 mg/kg starting January 1, 2017, with the limit reducing further to 12 mg/kg on January 1, 2020. “Alternatively, gasoline producers and importers can elect to apply a pool average sulphur [sulfur] limit, in which case the pool average limit becomes 10 mg/kg, with a never-to-be-exceeded batch limit of 80 mg/kg.”⁵⁰

The Benzene in Gasoline Regulations⁵¹ “set limits for the amount of benzene contained in gasoline and prohibit the sale of gasoline having a concentration of more than 1.5% benzene by volume. They also set limits for the benzene emissions number which relates gasoline composition to

⁴³ *Gasoline Regulations*, ENVIRONMENT AND CLIMATE CHANGE CANADA, <https://www.canada.ca/en/environment-climate-change/services/managing-pollution/energy-production/fuel-regulations/gasoline.html> (last updated Aug. 18, 2017), archived at <https://perma.cc/QV32-VQVH>.

⁴⁴ *Gasoline Regulations* (SOR/90-247), §§ 4, 6.

⁴⁵ *Id.* § 3(1)–(2).

⁴⁶ *Sulphur in Diesel Fuel Regulations* (SOR/2002-254), <http://laws-lois.justice.gc.ca/eng/regulations/SOR-2002-254/FullText.html>, archived at <https://perma.cc/RQ2Z-MUJL>.

⁴⁷ *Canadian Environmental Protection Act: Fuel Quality and Vehicle and Engine Emissions*, ENVIRONMENT AND CLIMATE CHANGE CANADA, <https://www.canada.ca/en/environment-climate-change/services/canadian-environmental-protection-act-registry/general-information/fact-sheets/fuel-quality-vehicle-engine-emissions.html> (last updated Apr. 6, 2017), archived at <https://perma.cc/92YU-QY5Q>.

⁴⁸ ENVIRONMENT AND CLIMATE CHANGE CANADA, FORMATIVE EVALUATION OF CEPA 1999, ¶ 2.7.4, <https://ec.gc.ca/lcpe-cepa/default.asp?lang=En&n=B0CA29F1-1&offset=12&toc=hide> (last updated May 9, 2013), archived at <https://perma.cc/H88D-CAXD>.

⁴⁹ *Sulphur in Gasoline Regulations* (SOR/99-236), <http://laws-lois.justice.gc.ca/eng/regulations/SOR-99-236/FullText.html>, archived at <https://perma.cc/74BF-TEQ9>.

⁵⁰ *Sulphur in Gasoline Regulations*, ENVIRONMENT AND CLIMATE CHANGE CANADA, <https://www.canada.ca/en/environment-climate-change/services/managing-pollution/energy-production/fuel-regulations/sulphur-gasoline.html> (last updated Apr. 6, 2017), archived at <https://perma.cc/4GVX-D2TY>.

⁵¹ *Benzene in Gasoline Regulations* (SOR/97-493), <http://laws-lois.justice.gc.ca/eng/regulations/SOR-97-493/FullText.html>, archived at <https://perma.cc/7G9J-NSA3>.

predicted emissions of benzene from gasoline-powered vehicles.”⁵² A summary of the regulations are found on the Government of Canada website:

The regulations prohibit the supply of gasoline that contains benzene at a concentration exceeding 1.0% by volume as of July 1, 1999. They also prohibit the sale or the offer for sale of gasoline that contains benzene at a concentration that exceeds 1.5% by volume after July 1, 2000, in the “northern supply area” (as defined by the regulations), and effective October 1, 1999, everywhere else in Canada. The regulations also prohibit the supply of gasoline after July 1, 1999, that exceeds a benzene emission number of 71 during the summer, and 92 during the winter.⁵³

IV. Clean and Renewable Fuel Standards

Renewable fuel regulations⁵⁴ at the federal level require “fuel producers and importers to have an average renewable fuel content of at least 5% based on the volume of gasoline that they produce or import into Canada and of at least 2% based on the volume of diesel fuel and heating distillate oil that they produce or import into Canada.”⁵⁵ The regulations include “provisions that govern the creation of compliance units, allow trading of these units among participants and also require record-keeping and reporting to ensure compliance.”⁵⁶ Some provinces also have renewable fuel standards equal to or higher than the current federal requirements.⁵⁷

The Canadian government plans to put in place clean fuel standard regulations under the Canadian Environmental Protection Act, 1999 to help reduce Canada’s GHG emissions. The objective of the proposed regulations “is to achieve 30 megatonnes of annual reductions in GHG emissions by 2030, contributing to Canada’s effort to achieve its overall GHG mitigation target of 30% emission reduction below 2005 levels by 2030.”⁵⁸ The intent of the new standards would be

⁵² *Benzene in Gasoline Regulations*, GOVERNMENT OF CANADA, <https://pollution-waste.canada.ca/environmental-protection-registry/regulations/view?Id=1> (last updated Apr. 18, 2018), archived at <https://perma.cc/VNR2-RPQE>.

⁵³ *Benzene in Gasoline Regulations: Frequently Asked Questions*, GOVERNMENT OF CANADA, <https://www.canada.ca/en/environment-climate-change/services/canadian-environmental-protection-act-registry/benzene-gasoline-regulations-frequently-asked-questions.html> (last visited Mar. 14, 2018), archived at <https://perma.cc/Q68D-XK4L>.

⁵⁴ Renewable Fuels Regulations (SOR/2010-189), <https://www.canada.ca/en/environment-climate-change/services/managing-pollution/energy-production/fuel-regulations/renewable.html>, archived at <https://perma.cc/58KH-3S7E>.

⁵⁵ *Renewable Fuel Regulations*, ENVIRONMENT AND CLIMATE CHANGE CANADA, <https://www.canada.ca/en/environment-climate-change/services/managing-pollution/energy-production/fuel-regulations/renewable.html> (last updated Aug. 18, 2017), archived at <https://perma.cc/MP2Y-S6Z8>.

⁵⁶ *Id.*

⁵⁷ For provincial-level renewable fuel standards See App. A: Provincial Renewable Fuel Requirements [Current to February 11, 2016], in ENVIRONMENT AND CLIMATE CHANGE CANADA, RENEWABLE FUELS REGULATIONS REPORT: DECEMBER 15, 2010 TO DECEMBER 31, 2012, <http://ec.gc.ca/energie-energy/default.asp?lang=En&n=EE22EC31-11&offset=11&toc=hide>, archived at <https://perma.cc/AB6L-AD3S>.

⁵⁸ *Clean Fuel Standard Regulatory Framework*, ENVIRONMENT AND CLIMATE CHANGE CANADA, <https://www.canada.ca/en/environment-climate-change/services/canadian-environmental-protection-act-registry/publications/clean-fuel-standard-regulatory-framework.html> (last updated Dec. 13, 2017), archived at <https://perma.cc/7ZFH-WBMV>.

a performance-based approach that would incent the use of a broad range of low carbon fuels, energy sources and technologies, such as electricity, hydrogen, and renewable fuels, including renewable natural gas. It would establish lifecycle carbon intensity requirements separately for liquid, gaseous and solid fuels, and would go beyond transportation fuels to include those used in industry and buildings. The approach would not differentiate between crude oil types produced in Canada or imported. The clean fuel standard would complement the pan-Canadian approach to pricing carbon pollution.⁵⁹

On December 13, 2017, Environment and Climate Change Canada published a regulatory framework on the clean fuel standard. The framework “outlines the key elements of the design of the clean fuel standard regulation, including its scope, regulated parties, carbon intensity approach, timing, and potential compliance options such as credit trading.”⁶⁰ The Environment and Climate Change Canada website describes some of the next steps leading to promulgation of the final regulations:

- Winter 2017 - Consultations on the framework and technical aspects of the regulations with multi-stakeholder consultative and technical working groups
- Further public engagement to be organized as required (e.g., webinars)
- Late-2018 - Publication of proposed regulations in Canada Gazette, Part I
- Mid-2019 - Publication of final regulations in the Canada Gazette, Part II⁶¹

V. Ozone Standard

Canadian Ambient Air Quality Standards (CAAQS)⁶² are “the driver for air quality management across Canada”⁶³ and are agreed by the Canadian Council of Ministers of the Environment (CCME), an intergovernmental forum for “collective action on environmental issues of national and international concern”⁶⁴ made up of ministers from the federal government, ten provincial governments, and three territorial governments. The air quality standards were established as nonbinding objectives⁶⁵ under sections 54 and 55 of the Canadian Environmental Protection Act,

⁵⁹ *Clean Fuel Standard*, ENVIRONMENT AND CLIMATE CHANGE CANADA, <https://www.canada.ca/en/environment-climate-change/services/managing-pollution/energy-production/fuel-regulations/clean-fuel-standard.html> (last updated Jan. 1, 2018), archived at <https://perma.cc/5JCW-AZQZ>.

⁶⁰ *Id.*

⁶¹ *Id.*

⁶² Canadian Council of Ministers of the Environment (CCME), Canadian Ambient Air Quality Standards (CAAQS) for Fine Particulate Matter (PM_{2.5}) and Ozone (Oct. 2012), https://www.ccme.ca/files/current_priorities/aqms_elements/caaqs_and_azmf.pdf, archived at <https://perma.cc/BU8B-X6NN>.

⁶³ *Current Priorities: CAAQS*, CCME, https://www.ccme.ca/en/current_priorities/air/caaqs.html (last visited Apr. 17, 2018), archived at <https://perma.cc/GC9A-5AJD>.

⁶⁴ *About*, CCME, <https://www.ccme.ca/en/about/index.html> (last visited Apr. 17, 2018), archived at <https://perma.cc/RL8S-H753>.

⁶⁵ *Canadian Ambient Air Quality Standards*, ONTARIO’S MINISTRY OF THE ENVIRONMENT AND CLIMATE CHANGE, <https://www.ontario.ca/document/air-quality-ontario-2015-report/canadian-ambient-air-quality-standards> (last updated Apr. 28, 2017), archived at <https://perma.cc/8GBH-YLWW>.

1999 on May 25, 2013.⁶⁶ The CAAQS are part of a “collaborative national Air Quality Management System (AQMS)”⁶⁷ to better protect human health and the environment. According to the CCME website, CAAQS have been developed for “sulphur dioxide, fine particulate matter and ozone. Industry associations, non-governmental organisations and Indigenous organisations participate in the development and review of CAAQS. CAAQS are reviewed every five years to ensure they are stringent enough to protect human health and the environment.”⁶⁸ According to Ontario’s Ministry of the Environment and Climate Change website,⁶⁹

[t]he CAAQS replaced the existing Canada-wide Standards (CWS) for ozone and PM_{2.5} in 2013 by setting stricter targets, and introducing an annual standard for PM_{2.5}. An annual standard helps protect human health from long-term or chronic exposure to fine particles. The purpose of the CAAQS is to drive continuous improvement in air quality. In 2015, provinces and territories were formally required to report ambient air quality measurements against the CAAQS. Table 1 shows the 2015 standards for achieving the CAAQS.

Table 1: CAAQS Standards		
Ozone 8h	PM _{2.5} 24h	PM _{2.5} Annual
63 ppb	28 µg/m ³	10 µg/m ³

The figure for ozone reflected in the preceding table is based on the “annual 4th highest daily maximum eight-hour running average, averaged over three consecutive years.”⁷⁰ The standard set for 2020 is 62 ppb [parts per billion].⁷¹ “The CAAQS for ozone are currently under review.”⁷²

⁶⁶ *Backgrounder: Canadian Ambient Air Quality Standards*, ENVIRONMENT AND CLIMATE CHANGE CANADA, <http://www.ec.gc.ca/default.asp?lang=En&n=56D4043B-1&news=A4B2C28A-2DFB-4BF4-8777-ADF29B4360BD> (last updated Aug. 14, 2013), archived at <https://perma.cc/8ZM7-TEKH>.

⁶⁷ *Canadian Ambient Air Quality Standards*, ALBERTA ENVIRONMENT AND PARKS, <http://aep.alberta.ca/air/management-frameworks/canadian-ambient-air-quality-standards/default.aspx> (last updated Apr. 13, 2018), archived at <https://perma.cc/EXJ8-ASUP>.

⁶⁸ *Current Priorities: CAAQS*, *supra* note 63.

⁶⁹ *Canadian Ambient Air Quality Standards*, ONTARIO’S MINISTRY OF THE ENVIRONMENT AND CLIMATE CHANGE, *supra* note 65.

⁷⁰ *Id.*

⁷¹ *Canadian Ambient Air Quality Standards (CAAQS) for Fine Particulate Matter (PM2.5) and Ozone*, *supra* note 62.

⁷² *Current Priorities: CAAQS*, *supra* note 63.

China

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SUMMARY Since the initial passage of the framework Environmental Protection Law in 1979, China has passed many laws, regulations, and standards addressing environmental protection. The Law on Prevention and Control of Air Pollution, the primary law dealing with air pollution, provides comprehensive measures on air pollution prevention and control.

Construction of new industrial facilities that may affect the atmospheric environment must be preceded by environmental impact assessments, and standards for the emission of atmospheric pollutants and the total emission control requirements for key atmospheric pollutants must be met. Polluting entities must also obtain a pollutant discharge permit for industrial emissions or the emission of specified hazardous and toxic atmospheric pollutants. Effective January 1, 2018, a newly designed environmental protection tax replaced the pollution discharge fee. The tax applies to specified air pollutants, not including carbon dioxide.

Pollutants discharged by motor vehicles and vessels as well as non-road mobile machinery must not exceed the stipulated emission standards. China has been implementing vehicle emissions standards that mainly follow the EU standards. The China 5 standard for light-duty vehicles is similar to the Euro 5 standard with some deviations.

National standards for fuel consumption limits have been established for various types of vehicles. The current Phase IV standards for passenger cars, which took effect on January 1, 2016, set a fleet average target of 5.0 L/100km for new vehicles sold in 2020.

China has created a New Energy Vehicle (NEV) credit system under which passenger car manufacturers will be required to earn NEV credits starting in 2019. The excess NEV credits, if any, may be used to offset an automaker's negative corporate average fuel consumption (CAFC) points that occurred by exceeding the CAFC target set by the state.

I. Introduction

Air pollution and carbon emissions in China have mainly been attributable to coal burning and industrial production during the early stage of economic development. In urban areas, especially megacities such as Beijing and Shanghai, emissions from vehicles have become an increasing problem.¹ In recent years, it has been observed that the emissions of long-regulated sulfur dioxide (SO₂) and total suspended particulates (TSP, including particulate matter [PM₁₀]), have passed their peak and are diminishing. The situation of fine particulate matter (PM_{2.5}) and ground-level ozone (O₃) concentration, however, is worsening. Regional air pollution problems are becoming

¹ Yana Jin et al., *Air Pollution Control Policies in China: A Retrospective and Prospects*, INT'L J. ENVIRON. RES. & PUB. HEALTH (Dec. 9, 2016), available at <http://www.mdpi.com/1660-4601/13/12/1219/pdf>, archived at <https://perma.cc/22PF-983Y>.

significant. Sometimes vast regions, such as all of eastern and central China, are under very high concentrations of PM_{2.5} and O₃.²

The environmental protection agency in the central government, the Ministry of Environmental Protection (MEP), was previously responsible for the prevention and control of air pollution. Greenhouse gas emissions control, climate change, and energy management, were the responsibility of the National Development and Reform Commission (NDRC). In April 2018 a new Ministry of Ecology and Environment (MEE) was established.³ The new MEE absorbed the environmental protection functions of the former MEP and several other central government departments, as well as the pollution-related functions of the NDRC.⁴

II. National Policies

The government has recognized that air pollution is severe and that the pressure to control pollution is expected to increase due to growing energy consumption resulting from the industrialization and urbanization of the country.⁵ Air pollution has been addressed in a series of national policies, including the national five-year plans for economic and social development, which set clean-air targets for the country with corresponding time limits.

A. Air Pollution Prevention and Control Action Plan

The administration led by Xi Jinping and Li Keqiang illustrated its strong will to improve air quality in its first year, during which the State Council issued the Air Pollution Prevention and Control Action Plan in September 2013. The Action Plan provides guidance for national efforts to control air pollution in the present and near future.⁶

In the Action Plan, the State Council emphasizes that the protection of the atmospheric environment “assures the people’s welfare, the sustainable development of [the] economy, [and] enhances a well-off society and the great rejuvenation of the China Dream.”⁷ The Plan recognizes that “air pollution is serious in China,” describing the problem as follows:

[The r]egional air quality problem characterized by the inhalable particulate matter (PM₁₀) and fine particles (PM_{2.5}) has become increasingly prominent, which harms people’s health and affects social harmony and stability. As the deepening of the industrialization and

² *Id.*

³ MEE News Release, Ministry of Ecology and Environment Inaugurated (Apr. 18, 2018), http://english.mep.gov.cn/News_service/news_release/201804/t20180419_434955.shtml, archived at <https://perma.cc/6QTR-5XBM>.

⁴ Ma Tianjie & Liu Qin, *China Reshapes Ministries to Better Protect Environment*, CHINA DIALOGUE (Mar. 14, 2018), <https://www.chinadialogue.net/article/show/single/en/10502-China-reshapes-ministries-to-better-protect-environment>, archived at <https://perma.cc/P5XB-3JLV>.

⁵ State Council, Air Pollution Prevention and Control Action Plan (Guo Fa [2013] No. 37, Sept. 10, 2013), http://www.gov.cn/zwqk/2013-09/12/content_2486773.htm (in Chinese), archived at <https://perma.cc/63LS-QXDJ>; English translation at <http://en.cleanairechina.org/file/loadFile/26.html>, archived at <https://perma.cc/S5FB-4ECZ>.

⁶ *Id.*

⁷ *Id.*

urbanization, energy resource consumption keeps growing, and the [urgency of implementing efforts of] air pollution prevention and control continues to increase.⁸

The Action Plan sets quantitative targets for improving the air quality of the whole country and of key regions within specified time limits, and provides ten key actions covering major aspects of air quality management, which include the following:

- By 2017, the urban concentration of PM₁₀ must decrease by 10% compared with 2012, and as a result the annual number of days with fairly good air quality should gradually increase.
- Concentrations of PM_{2.5} in the heavily polluted Beijing-Tianjin-Hebei, Yangtze River Delta, and Pearl River Delta regions must fall by around 25%, 20%, and 15%, respectively.
- PM_{2.5} annual concentrations in Beijing must be controlled below 60 milligrams per cubic meter (mg/m³).⁹

B. The 13th Five Year Plan

China's 13th Five-Year (2016–2020) Plan for Economic and Social Development contains strong commitments to improve air quality and control emissions.¹⁰ The Plan describes the country's clean-air action plan as follows:

We will formulate a plan for ensuring air quality standards in cities are met, strictly enforce obligatory targets, see that cities at and above the prefectural level achieve a 25% reduction in the number of days of heavy air pollution, and channel greater effort into reducing fine particulate matter emissions in key regions. We will establish a monitoring system to ensure that environmental protection standards for vehicles, watercraft, and fuel oil are achieved. We will work to increase the proportion of natural gas users in cities. We will strengthen monitoring of windblown dust from unpaved roads and construction sites and prohibit open straw burning.¹¹

The Five-Year Plan commits to reduce emissions, ensure compliance with emissions standards, and promote the use of clean energy:

We will ensure that all industrial polluters meet emissions standards. We will improve emissions standards, strengthen supervisory monitoring of industrial pollution sources, publish a blacklist of enterprises that fail to meet emissions standards, and require such enterprises to make corrections within a stipulated time frame. All heavily polluting enterprises located within urban districts will either be relocated, upgraded, or, in accordance with the law, shut down. We will conduct the second national survey of pollution sources. We will reform the total emissions control system for major pollutants so that more pollutants are covered. . . . We will promote the use of alternative clean energy

⁸ *Id.*

⁹ *Id.*

¹⁰ The 13th Five-Year Plan for Economic and Social Development of the People's Republic of China (2016–2020), <http://en.ndrc.gov.cn/newsrelease/201612/P020161207645765233498.pdf>, archived at <https://perma.cc/7L3R-P8J2>.

¹¹ *Id.* ch. 44, § 1.

in urban “villages” and [outskirts], and replace small and medium coal-fired facilities. . . . Chief industries will be transformed to achieve clean production.¹²

III. Laws, Regulations, and Standards

During the past four decades, China has adopted many laws, regulations, and standards addressing environmental protection. Implementation of the environmental protection laws used to be weak, but has becoming increasingly stronger over the past few decades when the severe air pollution has caused huge health damages and social losses.¹³

A. Environmental Protection Law

The Environmental Protection Law is the framework law that provides general provisions regulating all aspects of environmental protection and pollution control. The Environmental Protection Law was first adopted in 1979 on a trial basis, and formally promulgated on December 26, 1989. The Law was most recently revised in 2014, with the revisions taking effect on January 1, 2015.¹⁴

B. Law on Prevention and Control of Air Pollution (Air Law)

After the first passage of the Environmental Protection Law, China passed approximately thirty special laws regulating various areas of environmental protection, approximately ninety administrative regulations, and many more standards.¹⁵ Among them, the Law on Prevention and Control of Air Pollution (Air Law) is the primary law dealing with air pollution, providing comprehensive measures of air pollution prevention and control.

The Air Law was first adopted in 1987 and has been revised several times since then, including a major revision in 2015 that took effect on January 1, 2016.¹⁶ The revised Air Law sets a specific goal of improving air quality and emphasizes the control of air pollution caused by coal burning, industrial production, motor vehicles and vessels, dust, and agricultural activities. It calls for comprehensive measures to be taken to restrict atmospheric pollutants and greenhouse gases,

¹² *Id.* ch. 44, § 2.

¹³ Jin et al., *supra* note 1.

¹⁴ PRC Environmental Protection Law (adopted by the Standing Committee of the National People’s Congress (NPC) on Dec. 26, 1989, revised Apr. 24, 2014, effective Jan. 1, 2015), http://zfs.mep.gov.cn/fl/201404/t20140425_271040.shtml (in Chinese), archived at <https://perma.cc/E92B-E2HZ>; English translation at <https://www.chinadialogue.net/Environmental-Protection-Law-2014-eversion.pdf>, archived at <https://perma.cc/Q2A9-V6ZK>.

¹⁵ *Environmental Protection Law First Major Revision in 25 Years*, CHINA.COM.CN (Apr. 25, 2014), http://guoqing.china.com.cn/2014-04/25/content_32201755.htm (in Chinese), archived at <https://perma.cc/PS2J-BUKL>.

¹⁶ PRC Law on Prevention and Control of Air Pollution (adopted by the NPC Standing Committee on Sept. 5, 1987, last revised Aug. 29, 2015, effective Jan. 1, 2016), http://www.npc.gov.cn/npc/xinwen/2015-08/31/content_1945589.htm (in Chinese), archived at <https://perma.cc/YVZ6-2E9T>.

including particulate matter, sulfur dioxide, nitrogen oxides, volatile organic compounds, and ammonia.¹⁷

IV. Air Quality Standards

A. Legal Provisions

According to the Environmental Protection Law and the Air Law, the environmental protection agency under the State Council is tasked with formulating national environmental quality standards, including air quality standards.¹⁸ Provincial governments may establish local standards on items not covered in the national standards and set stricter limits on items covered by the national standards.¹⁹ Regions that have not met the national standards must formulate an attainment plan showing how they will meet the standards by a certain time.²⁰

For regions that exceed national total emissions targets of key air pollutants or could not achieve the improvement targets of ambient air quality set by the state, the local government leaders will be “interviewed” by the central or provincial environmental protection authorities and new projects in that region will be prohibited from undergoing required environmental impact assessments.²¹

B. Ambient Air Quality Standards, GB 3095-2012

The Ambient Air Quality Standards that are currently effective, GB 3095-2012, were released by the then Ministry of Environmental Protection on February 29, 2012. The Standards set mandatory limits for the primary pollutants—SO₂, nitrogen dioxide (NO₂), carbon monoxide (CO), O₃, PM₁₀, and PM_{2.5}—and took effect nationwide on January 1, 2016.²²

The Standards set two classes of limit values: Class I standards apply to regions that need special protection such as natural reserves and natural scenic areas, while Class II standards apply to all other areas including residential, mixed-use, industrial, and rural areas.²³ For example, the limit for the daily average of O₃ is 100 micrograms per cubic meter (µg/m³) under Class I, compared to 160 µg/m³ under Class II. The hourly average limit of O₃ is 160 µg/m³ under Class I and 200 µg/m³ under Class II.²⁴

¹⁷ *Id.* art. 2.

¹⁸ Environmental Protection Law art. 15; Air Law art. 8.

¹⁹ Environmental Protection Law art. 15.

²⁰ *Id.* art. 28.

²¹ Air Law art. 22.

²² Ambient Air Quality Standards, GB 3095-2012 (issued by the MEP and AQSIQ on Feb. 29, 2012, effective Jan. 1, 2016), <http://210.72.1.216:8080/gzaqi/Document/gzlbz.pdf>, archived at <https://perma.cc/8PHM-FPJ5>.

²³ *Id.*

²⁴ *Id.*

V. Control of Coal Use

The Air Law calls for changing the energy structure to reduce the percentage of coal used for energy consumption and promotes the clean and efficient use of coal.²⁵ Article 32 of the Air Law provides that the central and local governments will take measures to improve the energy infrastructure and popularize the production and utilization of clean energy; optimize the utilization of coal to be cleaner and more efficient; reduce the proportion of coal in primary energy consumption; and reduce the discharge of atmospheric pollutants during the production, utilization, and transformation of coal.²⁶

The Law requires coal plants to have on-site washing equipment to remove sulfur and ash content, to meet environmental standards.²⁷ Importing, selling, or using substandard coal is prohibited, and the state encourages the use of high-quality coal.²⁸ The Law requires oil refinery companies to produce fuel oil in accordance with the fuel quality standards. Importing, selling, and burning petroleum coke that fails to comply with quality standards are prohibited.²⁹

VI. Clean-Air Requirements for Industrial Facilities

A. Environmental Impact Assessments

Construction of new industrial facilities that may affect the atmospheric environment must be preceded by an environmental impact assessments according to article 18 of the Air Law.³⁰ The standards for emissions of atmospheric pollutants and the total emission control requirements for key atmospheric pollutants must be complied with if a proposed construction project will discharge atmospheric pollutants.³¹

B. Pollutant Discharge Permit

Polluting entities must obtain a pollutant discharge permit for industrial emissions or the emission of specified hazardous and toxic atmospheric pollutants. A pollutant discharge permit is also required for entities manufacturing and operating coal-burning heat sources.³² Detailed rules about the issuance of pollutant discharge permits are provided by the Interim Measures on

²⁵ Air Law arts. 32–42.

²⁶ *Id.* art. 32.

²⁷ *Id.* art. 33.

²⁸ *Id.* art. 35.

²⁹ *Id.* art. 37.

³⁰ *Id.* art. 18.

³¹ *Id.*

³² *Id.* 19.

Administration of Pollution Discharge Permit, which were issued by the MEP on December 23, 2016.³³

C. Pollutant Discharge Fees and Environmental Protection Tax

China previously collected a pollutant discharge fee on pollutants discharged into the environment, as provided by the Environmental Protection Law.³⁴ Effective January 1, 2018, the Environmental Protection Tax Law replaced the pollutant discharge fee with a newly designed environmental protection tax.³⁵ Under the Environmental Protection Tax Law, entities directly discharging pollutants into the environment, including air pollutants, water pollutants, solid waste, and noise, are subject to the tax.³⁶ The Law lists specific air pollutants that are subject to the tax; CO₂ is not included.³⁷

VII. Vehicle Emissions Standards

A. Legal Provisions

The Air Law calls for low-carbon and eco-friendly transportation. It provides that the state must adopt fiscal, taxation, government procurement, and other measures to promote the use of energy-efficient and new-energy vehicles, vessels, and non-road mobile machinery, and that the development of high-fuel-consumption and high-emission motor vehicles, vessels, and non-road mobile machinery will be restricted to reduce fossil fuel consumption.³⁸

According to the Air Law, pollutants discharged by motor vehicles, vessels, and non-road mobile machinery must not exceed the stipulated emission standards. The Law prohibits manufacturing, importing, or selling motor vehicles, vessels, and non-road mobile machinery that exceeds the emission standards.³⁹

B. Vehicle Emissions Standards

The current emissions standard for light-duty vehicles, the Limits and Measurement Methods for Emissions From Light-duty Vehicles (China 5), GB 18352.5–2013, was issued by the MEP and the General Administration of Quality Supervision, Inspection and Quarantine (AQSIQ) in May

³³ Interim Measures on Administration of Pollution Discharge Permit (issued by the MEP on Dec. 23, 2016), http://www.mep.gov.cn/gkml/hbb/bwj/201701/t20170105_394012.htm?COLLCC=871453746& (in Chinese), archived at <https://perma.cc/MCE2-J2KJ>.

³⁴ Environmental Protection Law art. 43.

³⁵ PRC Environmental Protection Tax Law (adopted by the NPC Standing Committee on Dec. 25, 2016, effective Jan. 1, 2018), http://www.npc.gov.cn/npc/xinwen/2016-12/25/content_2004993.htm (in Chinese), archived at <https://perma.cc/9RJQ-ETMD>.

³⁶ *Id.* arts. 2&3.

³⁷ *Id.* Annex II.

³⁸ Air Law art. 50.

³⁹ Air Law art. 51.

2013. Light-duty vehicles sold and registered in China were required to comply with this standard effective January 1, 2018.⁴⁰ China has been issuing vehicle emissions standards mainly following the EU standards. The China 5 standard for light-duty vehicles is similar to the Euro 5 standard, with some deviations.⁴¹

China also issued the following emissions standards for heavy-duty vehicles, three-wheeled and low-speed vehicles, motorcycles, and non-road mobile machinery:

- Limits and Measurement Methods for Exhaust Pollutants from Compression Ignition and Gas-Fueled Positive Ignition Engines of Vehicles (III, IV, V), GB 17691–2005, effective January 1, 2007.⁴²
- Limits and Measurement Method for Exhaust Pollutants from Gasoline Engines of Heavy-duty Vehicles (III, IV), GB 14762–2008, effective July 1, 2009.⁴³
- Limits and Measurement Methods for Exhaust Pollutants from Diesel Engines of Three-wheel & Low-speed Goods Vehicles (I, II), GB 19756–2005, effective January 1, 2006.⁴⁴
- Limits and Measurement Methods for Emissions from Motorcycles (IV), GB 14622–2007, effective July 1, 2008.⁴⁵

⁴⁰ The Limits and Measurement Methods for Emissions from Light-duty Vehicles (China 5), GB 18352.5–2013 (issued by MEP and AQSIQ on Sept. 17, 2013), <http://kjs.mep.gov.cn/hjbhzbzwb/dqhjbh/dqydywrwpfbz/201309/W020131105534056881723.pdf> (in Chinese), archived at <https://perma.cc/DJ2U-P2WK>.

⁴¹ *China: Light-Duty: Emissions*, TRANSPORTPOLICY.NET, <https://www.transportpolicy.net/standard/china-light-duty-emissions/> (last visited Apr. 20, 2018), archived at <https://perma.cc/7W4A-M3QJ>.

⁴² Limits and Measurement Methods for Exhaust Pollutants from Compression Ignition and Gas Fueled Positive Ignition Engines of Vehicles (III, IV, V), GB 17691–2005 (issued by MEP and AQSIQ on May 30, 2005), <http://kjs.mep.gov.cn/hjbhzbzwb/dqhjbh/dqydywrwpfbz/200701/W020110127400649893698.pdf> (in Chinese), archived at <https://perma.cc/8UKY-VMQ8>.

⁴³ Limits and Measurement Method for Exhaust Pollutants from Gasoline Engines of Heavy-duty Vehicles (III, IV), GB 14762-2008 (issued by MEP and AQSIQ on Apr. 2, 2008), <http://kjs.mep.gov.cn/hjbhzbzwb/dqhjbh/dqydywrwpfbz/200804/W020111121354629553675.pdf> (in Chinese), archived at <https://perma.cc/DU8L-GM4C>.

⁴⁴ Limits and Measurement Methods for Exhaust Pollutants from Diesel Engines of Three-wheel & Low-speed Goods Vehicles (I, II), GB 19756—2005 (issued by MEP and AQSIQ on May 30, 2005), <http://kjs.mep.gov.cn/hjbhzbzwb/dqhjbh/dqydywrwpfbz/200601/W020110127403616308220.pdf> (in Chinese), archived at <https://perma.cc/XBJ5-LNMY>.

⁴⁵ Limits and Measurement Methods for Emissions from Motorcycles (IV), GB 14622–2007 (issued by MEP and AQSIQ on Apr. 3, 2007), <http://kjs.mep.gov.cn/hjbhzbzwb/dqhjbh/dqydywrwpfbz/200704/W020120104512013466312.pdf> (in Chinese), archived at <https://perma.cc/7VDS-HZ6Q>.

- Limits and Measurement Methods for Exhaust Pollutants from Diesel Engines of Non-road Mobile Machinery (III, IV), GB 20891–2014, effective October 1, 2014.⁴⁶
- Limits and Measurement Methods for Exhaust Pollutants from Small Spark Ignition Engines of Non-road Mobile Machinery (I, II), GB 26133–2010, effective March 1, 2011.⁴⁷

VIII. Fuel Efficiency

A. Fuel Consumption Limits

According to China's Energy Conservation Law, which was first enacted in 1997 and most recently revised in 2016, the state encourages the development and use of clean fuels and alternative fuels in transportation.⁴⁸ The relevant departments under the State Council formulate standards for fuel consumption limits for vehicles and vessels, and vehicles and vessels that cannot meet the fuel consumption standards are prohibited from being operated.⁴⁹

China's Energy-Saving and New Energy Vehicle Industry Development Plan (2012–2020) sets the expected fleet average targets of 6.9 liters (L) per 100 kilometers (km) by 2015 and 5.0 L/100km by 2020.⁵⁰ National fuel consumption limits have been established for various types of vehicles. The current Phase IV standards for passenger cars, the Fuel Consumption Limits for Passenger Cars, GB 19578–2014, was released in December 2014.⁵¹ Effective January 1, 2016, the Phase IV standards set a fleet average target of 5.0 L/100km for new vehicles sold in 2020, equivalent to a 27.5% reduction from the previous target of 6.9 L/100km in 2015.⁵²

⁴⁶ Limits and Measurement Methods for Exhaust Pollutants from Diesel Engines of Non-road Mobile Machinery (III, IV), GB 20891–2014 (issued by MEP and AQSIQ on May 16, 2014), <http://kjs.mep.gov.cn/hjbhzbz/bzwb/dqjhbh/dqydywrwpfbz/201405/W020140603336102800621.pdf> (in Chinese), archived at <https://perma.cc/F9JW-YRXW>.

⁴⁷ Limits and Measurement Methods for Exhaust Pollutants from Small Spark Ignition Engines of Non-road Mobile Machinery (I, II), GB 26133–2010 (issued by MEP and AQSIQ on Dec. 30, 2010), <http://kjs.mep.gov.cn/hjbhzbz/bzwb/dqjhbh/dqydywrwpfbz/201101/W020130206491873646734.pdf> (in Chinese), archived at <https://perma.cc/8V9W-7VPG>.

⁴⁸ PRC Energy Conservation Law (adopted by the NPC Standing Committee on Nov. 1, 1997, revised Oct. 28, 2007, effective Apr. 1, 2008) art. 45, http://www.gov.cn/flfg/2007-10/28/content_788493.htm (in Chinese), archived at <https://perma.cc/9YEH-FVAJ>.

⁴⁹ *Id.* art. 46.

⁵⁰ State Council, Energy-Saving and New Energy Vehicle Industry Development Plan (2012–2020) (June 28, 2012), http://www.gov.cn/zw/gk/2012-07/09/content_2179032.htm (in Chinese), archived at <https://perma.cc/GH9K-9R95>.

⁵¹ Fuel Consumption Limits for Passenger Cars, GB 19578–2014 (issued by the AQSIQ and Standardization Administration of China on Dec. 22, 2014, effective Jan. 1, 2016), <http://www.miit.gov.cn/n1146295/n1652858/n1653018/c3780606/part/3780612.pdf> (in Chinese), archived at <https://perma.cc/N6AH-7ARS>.

⁵² *China: Light-Duty: Fuel Consumption*, TRANSPORTPOLICY.NET (last visited Apr. 20, 2018) <https://www.transportpolicy.net/standard/china-light-duty-fuel-consumption/>, archived at <https://perma.cc/8GNT-K3C5>.

B. CAFC and New Energy Vehicle Credits

The Phase IV standards include a corporate average fuel consumption (CAFC) standard for manufacturers, and each manufacturer's passenger car fleet must meet the CAFC target of the given year.⁵³

On September 27, 2017, China's Ministry of Industry and Information Technology (MIIT) and several other central government departments jointly issued the Measures on Parallel Administration of Passenger Car Enterprise Average Fuel Consumption and New Energy Vehicle (NEV) Credits, which took effect on April 1, 2018.⁵⁴ The Measures apply to passenger cars only.⁵⁵ The NEVs under the Measures include pure electric passenger cars, plug-in hybrids, and fuel-cell passenger cars.⁵⁶ The Measures establish a "parallel administration" system of auto companies' CAFC and NEV sales aimed at promoting new-energy cars and providing additional compliance flexibility to the existing fuel-consumption regulation. China's NEV mandate is similar to California's Zero Emission Vehicle (ZEV) mandate.⁵⁷

According to the Measures, auto companies producing or importing over 30,000 non-NEV passenger cars per year will be required to earn NEV credits equal to a set percentage of their non-NEV sales in China starting in 2019. The required annual NEV credit percentage is 10% in 2019 and will increase to 12% in 2020.⁵⁸ Credits each NEV may generate vary: each plug-in hybrid may generate two credits, the credits each purely electric car may generate depends on the electric battery range, and the credits each fuel-cell car may generate depends on the rated power of the fuel cell system.⁵⁹

A company generates surplus NEV credits if its actual NEV credits are greater than the NEV target.⁶⁰ Similarly, it generates surplus CAFC credits if its actual CAFC is lower than its CAFC target.⁶¹ The surplus NEV credits can be used to offset the CAFC credit deficit if its actual CAFC is higher than its target.⁶² The Measures create a market where the credits can be traded:

⁵³ *Id.*

⁵⁴ Measures on Parallel Administration of Passenger Car Enterprise Average Fuel Consumption and New-Energy Vehicle Credits (issued by the MIIT, Ministry of Finance, Ministry of Commerce, General Administration of Customs, and AQSIQ on Sept. 27, 2017, effective Apr. 1, 2018), <http://www.miit.gov.cn/n1146290/n4388791/c5826378/content.html> (in Chinese), <https://perma.cc/L2CP-5XTS>.

⁵⁵ *Id.* art. 2.

⁵⁶ *Id.* art. 4.

⁵⁷ *China's New Energy Vehicle Mandate Policy (Final Rule)*, INTERNATIONAL COUNCIL ON CLEAN TRANSPORTATION (Jan. 2018), https://www.theicct.org/sites/default/files/publications/ICCT_China-NEV-mandate_policy-update_20180111.pdf, archived at <https://perma.cc/86KZ-UA5H>.

⁵⁸ Measures, *supra* note 54, art. 17.

⁵⁹ *Id.* Annex II.

⁶⁰ *Id.* art. 14.

⁶¹ *Id.* art. 8.

⁶² *Id.* art. 26.

- Surplus NEV credits can be sold to other companies.
- Surplus CAFC credits can be banked and carried forward to help with CAFC compliance in future years or transferred to affiliated companies to help offset a CAFC credit deficit.
- To offset an NEV credit deficit, an automaker needs to purchase NEV credits from other companies.
- To offset a CAFC credit deficit, more options are provided, including using banked CAFC credits, transferring CAFC credits from affiliated companies, using selfgenerated NEV credits, and purchasing NEV credits from other companies.⁶³

⁶³ *China's New Energy Vehicle Mandate Policy (Final Rule)*, *supra* note 57.

France

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SUMMARY The French air quality management framework is based on a mix of international agreements, European directives, and domestic legislation. The first significant domestic legislation on air pollution came in 1961. Since 1996, French law has recognized the people’s right to breathe air that is not harmful to their health. Air quality is managed at the national and local levels through various regulatory measures. An extensive air quality monitoring system is in place throughout France, comprised of a network of licensed nonprofit groups coordinated by the Central Laboratory for Air Quality Monitoring. This air quality monitoring system informs the implementation of air quality improvement measures. Emissions of certain substances are prohibited or limited through means such as mandatory technical standards regarding the manufacture, sale, storage, use, maintenance, and/or disposal of various products and goods. Pollution is also prevented through “atmosphere protection plans,” which all urban areas of over 250,000 inhabitants must implement to meet air quality standards set by the government. Furthermore, emergency measures may be taken whenever the air quality limits of a certain area are exceeded or risk being exceeded. In these circumstances, the local prefect may restrict or entirely suspend the activities that contribute to the pollution spike. This may include, if necessary, entirely prohibiting the operation of certain vehicles in the affected area. Additionally, a 2015 law authorized local authorities to establish restricted traffic zones in urban zones and other areas subject to an atmosphere protection plan. French air quality control also relies on national objectives on the emissions of several air pollutants, including a national carbon budget, which is a general cap on greenhouse gas emissions for a five-year period. The national objectives on other emissions are medium and long term reduction goals for sulfur dioxide, nitrogen oxides, non-methane volatile organic compounds, ammonia, and fine particles. These objectives are to be attained through the implementation of a National Low-Carbon Strategy (for the national carbon budget) and a National Atmospheric Pollutant Emissions Reduction Plan (for the objectives on other emissions). These two plans overlap in many areas, although they also have their specific points. They each detail a series of different measures to reduce emissions, including tax and financial incentives, establishing more traffic restriction zones, developing infrastructures for clean alternative fuels, developing new technologies, changing agricultural practices, developing alternatives to burning waste, making buildings more energy efficient, and raising public awareness.

I. Legal Framework

The French air quality management framework is based on a mix of international agreements, European directives, and domestic legislation.¹ France is a party to the 1979 Geneva Convention on Long-range Transboundary Air Pollution and all its protocols,² the 1992 Rio Convention on Climate Change,³ the 1997 Kyoto Protocol,⁴ and the 2015 Paris Agreement.⁵ France is also bound by European Union texts such as Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe⁶ and Directive 2016/2284 on the Reduction of National Emissions of Certain Atmospheric Pollutants.⁷ Directive 2008/50/EC has been incorporated in French domestic legislation,⁸ but not Directive 2016/50/EC.

The first significant domestic legislation on air pollution came in 1961, with a law on atmospheric pollution and odors.⁹ This marked the beginning of gradually stronger policy responses to air pollution, with a landmark law being adopted in 1996: the Law on Air and Rational Energy Usage (often referred to under its French acronym, LAURE).¹⁰ Although many of its provisions have been superseded by more recent legislation, this law is significant, among other reasons, for being

¹ PASCAL PLANCHET, DROIT DE L'ENVIRONNEMENT [ENVIRONMENTAL LAW] 161–62 (2015).

² Convention on Long-range Transboundary Air Pollution (CLRTAP), Nov. 13, 1979, 1302 U.N.T.S. 217, <http://www.unece.org/fileadmin/DAM/env/lrtap/full%20text/1979.CLRTAP.e.pdf>, archived at <http://perma.cc/F9ZJ-DU4Y>.

³ United Nations Framework Convention on Climate Change (UNFCCC), May 9, 1992, 1771 U.N.T.S. 107, http://unfccc.int/files/essential_background/background_publications_htmlpdf/application/pdf/conveng.pdf, archived at <http://perma.cc/2XMZ-7GKG>.

⁴ Kyoto Protocol to the United Nations Framework Convention on Climate Change (Kyoto Protocol), Dec. 11, 1997, 2303 U.N.T.S. 162, annex B, <http://unfccc.int/resource/docs/convkp/kpeng.pdf>, archived at <http://perma.cc/3HQM-LT8M>.

⁵ Paris Agreement, Dec. 12, 2015, http://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf, archived at <http://perma.cc/9UKH-4U6T>.

⁶ Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on Ambient Air Quality and Cleaner Air for Europe (Ambient Air Quality Directive), 2008 O.J. (L 152) 1, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32008L0050&from=EN>, archived at <http://perma.cc/6XF2-QWC4>.

⁷ Directive (EU) 2016/2284 of the European Parliament and of the Council of 14 December 2016 on the Reduction of National Emissions of Certain Atmospheric Pollutants, Amending Directive 2003/35/EC and Repealing Directive 2001/81/EC, <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016L2284&from=FR>, archived at <https://perma.cc/RU7R-DKML>.

⁸ Décret n° 2010-1250 du 21 octobre 2010 relatif à la qualité de l'air [Decree No. 2010-1250 of 21 October 2010 Regarding Air Quality], <https://www.legifrance.gouv.fr/eli/decret/2010/10/21/DEVE1016116D/jo/texte>, archived at <https://perma.cc/RFP9-P6MT>.

⁹ Loi No. 61-842 du 2 août 1961 relative à la lutte contre les pollutions atmosphériques et les odeurs et portant modification de la loi du 19 décembre 1917 [Law No. 61-842 of 2 August 1961 Regarding the Fight Against Atmospheric Pollutions and Odors and Amending the Law of 19 December 1917], https://www.legifrance.gouv.fr/jo_pdf.do?id=JORFTEXT000000684032, archived at <https://perma.cc/V4X2-HVWC>.

¹⁰ Loi n° 96-1236 du 30 décembre 1996 sur l'air et l'utilisation rationnelle de l'énergie [Law No. 96-1236 of 30 December 1996 on Air and Rational Energy Usage], <https://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000000381337&categorieLien=id>, archived at <https://perma.cc/JHB9-GKZ7>.

the first to recognize a right “for everyone to breathe air that is not harmful to their health.”¹¹ Other noteworthy laws include the so-called Grenelle II Law of 2010¹² and the 2015 Law on Energy Transition for Green Growth.¹³ All provisions currently in effect are codified in the Code de l’Environnement (Environmental Code).¹⁴ Additionally, air quality is managed at the national and local levels through regulatory measures such as regional schemes on climate, air and energy (*Schémas régionaux du climat, de l’air et de l’énergie*, SRCAE) and territorial climate energy plans (*Plans climat-énergie territoriaux*, PCET).¹⁵ With some exceptions, the present report will mostly focus on regulations and policies at the national level.

II. Air Quality Monitoring

An extensive air quality monitoring system was progressively put in place from 1997 onward, first in towns of over 25,000 inhabitants, and by January 2000 throughout the entire national territory.¹⁶ The air quality monitoring system relies on a network of licensed nonprofit groups referred to as licensed associations for air quality monitoring [*Associations agréées de surveillance de la qualité de l’air*, AASQAs].¹⁷ The leadership of each AASQA is composed of representatives from the national government, regional and local authorities, industries that emit monitored substances, recognized environmental advocacy groups and consumer advocacy groups, and at least one representative from the healthcare professions.¹⁸ There are currently eighteen AASQAs covering the entire French territory under the coordination of the Central Laboratory for Air Quality Monitoring (Laboratoire central de surveillance de la qualité de l’air).¹⁹

¹¹ *Id.* art. 1 (all translations by author); PLANCHET, *supra* note 1, at 162.

¹² Loi n° 2010-788 du 12 juillet 2010 portant engagement national pour l’environnement [Law No. 2010-788 of 12 July 2010 for a National Commitment to the Environment], <https://www.legifrance.gouv.fr/eli/loi/2010/7/12/DEVX0822225L/jo/texte>, archived at <https://perma.cc/4XM8-JQ4B>.

¹³ Loi n° 2015-992 du 17 août 2015 relative à la transition énergétique pour la croissance verte [Law No. 2015-992 of 17 August 2015 Regarding Energy Transition for Green Growth], <https://www.legifrance.gouv.fr/eli/loi/2015/8/17/DEVX1413992L/jo/texte>, archived at <https://perma.cc/T9JN-P9NH>.

¹⁴ CODE DE L’ENVIRONNEMENT [ENVIRONMENTAL CODE], <https://www.legifrance.gouv.fr/affichCode.do?cidTexte=LEGITEXT000006074220&dateTexte=20180412>, archived at <https://perma.cc/R2QR-77C9>.

¹⁵ PLANCHET, *supra* note 1, at 165; C. ENVIRONNEMENT, arts. L222-1, L229-26.

¹⁶ MICHEL PRIEUR, DROIT DE L’ENVIRONNEMENT [ENVIRONMENTAL LAW] 665–66 (2016).

¹⁷ *Id.*; *Le dispositif de surveillance de la qualité de l’air en France* [The Air Quality Monitoring System in France], MINISTÈRE DE LA TRANSITION ÉCOLOGIQUE ET SOLIDAIRE [MINISTRY FOR ENVIRONMENTAL AND SOLIDARITY TRANSITION] (Nov. 14, 2017), <http://www.statistiques.developpement-durable.gouv.fr/lessentiel/ar/227/0/dispositif-surveillance-qualite-lair-france.html>, archived at <https://perma.cc/674H-4TPG>.

¹⁸ *Id.*; C. ENVIRONNEMENT, art. R221-9.

¹⁹ *Le dispositif de surveillance de la qualité de l’air en France* [The Air Quality Monitoring System in France], MINISTÈRE DE LA TRANSITION ÉCOLOGIQUE ET SOLIDAIRE, *supra* note 17.

III. Atmosphere Protection Plans and Air Quality Standards

Measures to prevent pollution include prohibitions or limitations on the emission of certain substances. This is done through mandatory technical standards regarding the manufacture, sale, storage, use, maintenance, and/or disposal of various products and goods.²⁰ The legislation and regulations mandating these technical standards are often found in the Environmental Code, but are sometimes found in other French legal codes,²¹ such as the Road Code (for vehicles)²² or the Building and Housing Code (for buildings).²³

Pollution is also prevented through “atmosphere protection plans.” All urban areas of over 250,000 inhabitants must implement policies to limit air pollution to meet standards set by the government.²⁴ These standards are established by the French government but must be consistent with standards set by the European Union and, when applicable, the World Health Organization.²⁵ These standards concern levels of nitrogen dioxide (NO₂), oxides of nitrogen (NO_x), sulfur dioxide (SO₂), lead (Pb), particulate matter 10 micrometers or less in diameter (PM₁₀) and 2.5 micrometers or less in diameter (PM_{2.5}), carbon monoxide (CO), benzene (C₆H₆), ozone (O₃), as well as concentrations of arsenic, cadmium, nickel, and benzo[*a*]pyrene.²⁶ The Environmental Code standards are expressed, depending on the substance in question, in terms of annual averages, daily averages, or hourly averages, with some substances being subject to limits expressed in more than one type of average.²⁷ Nitrogen dioxide emissions, for example, are limited to both an annual average of 40 micrograms per cubic meter of air (µg/m³) and an hourly average of 200 µg/m³ that must not be exceeded for more than eighteen hours per year.²⁸

²⁰ PLANCHET, *supra* note 1, at 163.

²¹ *Id.*

²² CODE DE LA ROUTE [ROAD CODE], arts. L318-1 to L318-4, R318-1 to R318-10, https://www.legifrance.gouv.fr/affichCode.do;jsessionid=7AD8E325EB9339510171A71C95A27823.tplgfr36s_3?cidTexte=LEGITEXT000006074228&dateTexte=20180413, archived at <https://perma.cc/GP4K-FLBQ>.

²³ CODE DE LA CONSTRUCTION ET DE L’HABITATION [BUILDING AND HOUSING CODE], arts. L111-9 to L111-10-5, R111-21, R111-21-1, <https://www.legifrance.gouv.fr/affichCode.do?cidTexte=LEGITEXT000006074096&dateTexte=20180413>, archived at <https://perma.cc/WZ4D-GEQN>.

²⁴ C. ENVIRONNEMENT, art. L222-4, L222-5.

²⁵ *Id.* art. L221-1.

²⁶ *Id.* art. R221-1; *Les critères nationaux de qualité de l’air* [National Air Quality Criteria], AIRPARIF [LICENSED ASSOCIATION FOR AIR QUALITY MONITORING], <https://www.airparif.asso.fr/reglementation/normes-francaises> (last visited Apr. 13, 2018), archived at <https://perma.cc/PV7N-YNZ3>.

²⁷ *Id.*

²⁸ *Id.*

The current French air quality standards are as follows:

Pollutants	Limit value	Quality objectives	Recommendation and information threshold	Alert threshold	Critical level
Nitrogen dioxide (NO₂)	<p>Annual mean: Since the 01/01/10 : 40 µg/m³.</p> <p>Hourly mean: Since the 01/01/10 : 200 µg/m³ not to be exceeded more than 18 per year.</p>	Annual mean: 40 µg/m ³ .	Hourly mean: 200 µg/m ³ .	<p>Hourly mean: 400 µg/m³ exceeded on 3 consecutive hours.</p> <p>200 µg/m³ if the information level has already been reached the day before and the current day, and if a new exceedence is forecasted for the next day.</p>	
Nitrogen oxides (NO_x)					Annual mean (NO₂ equivalent) : 30 µg/m ³ (for the vegetation protection).
Sulphur dioxide (SO₂)	<p>Hourly mean: 125 µg/m³ not to be exceeded more than 3 per year.</p> <p>Daily mean: Since the 01/01/05 : 350 µg/m³ not to be exceeded more than 24 per year.</p>	Annual mean: 50 µg/m ³ .	Hourly mean: 300 µg/m ³ .	Hourly mean 500 µg/m ³ exceeded on 3 consecutive hours.	Annual & winter mean (for the vegetation protection) : 20 µg/m ³ .
Lead (Pb)	Annual mean: Since the 01/01/02 : 0,5 µg/m ³ .	Annual mean: 0,25 µg/m ³ .			
Particles with a diameter of 10 micrometers or less (PM₁₀)	<p>Annual mean: Since the 01/01/05 : 40 µg/m³.</p> <p>Hourly mean: Since the 01/01/2005 : 50 µg/m³ not to be exceeded more than 35 per year.</p>	Annual mean: 30 µg/m ³ .	Daily mean: 50 µg/m ³ .	Daily mean: 80 µg/m ³ .	
Carbon monoxide (CO)	Maximum daily on a 8-hour mean: 10 000 µg/m ³ .				

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Benzene (C6H6)	Annual mean: Since the 01/01/10 : 5 µg/m³.	Annual mean: 2 µg/m³.			
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Pollutant	Limit value	Quality objectives	Recommendation and information threshold	Alert threshold	Target value
Ozone (O3)		<p>Protection of human Health, on a maximum daily eight-hour mean: 120 µg/m³ per civil year.</p> <p>Protection of vegetation, AOT40* from May to July 8am to 8pm : 6 000 µg/m³.h</p>	Hourly mean: 180 µg/m³.	<p>Alert threshold for the Human health protectionAlert threshold for the Human health protection, on a hourly mean: 240 µg/m³ per hour</p> <p>Alert threshold for a progressive implementation of emergency measures, hourly means:</p> <p>1st threshold: 240 µg/m³ exceeded during 3 consecutive hours.</p> <p>2nd threshold: 300 µg/m³ exceeded during 3 consecutive hours.</p> <p>3rd threshold: 360 µg/m³.</p>	<p>Protection of human Health: 120 µg/m³ for the daily maximum on a 8hour average not to be exceeded more than 25 days per calendar year calculated on a 3 year average. This target value is applicable from 2010.</p> <p>Protection of vegetation: AOT 40* from May to July from 8am until 8pm: 18 000 µg/m³.h on a 5 year average. This target value is applicable from 2010.</p>

*AOT40 (expressed in (µg/m3) · hours) means the sum of the difference between hourly concentrations greater than 80 µg/m3 (= 40 parts per billion) and 80 µg/m3 over a given period using only the one-hour values measured between 8.00 and 20.00 Central European Time (CET) each day.

Pollutant	Limit value	Quality objectives	Target value	Exposure reduction target relative to the AEI*2011		Exposure concentration obligation
				Initial Concentration	Reduction target in percent	
Particles with a diameter of 2.5 micrometers or less (PM2.5)	Annual mean: 27µg/m³ decreasing every year by equal annual percentage to reach 25µg/m³ by 2015.	Annual mean: 10 µg/m³.	Annual mean: 20 µg/m³.			20 µg/m³

				<table border="1"> <tr> <td><= à 8,5 µg/m³</td> <td>0%</td> </tr> <tr> <td>>8,5 and <13 µg/m³</td> <td>10%</td> </tr> <tr> <td>>=13 and <18 µg/m³</td> <td>15%</td> </tr> <tr> <td>>=18 and <22 µg/m³</td> <td>20%</td> </tr> <tr> <td>>= à 22 µg/m³</td> <td>All appropriate measures to archive 18 µg/m³</td> </tr> </table>	<= à 8,5 µg/m ³	0%	>8,5 and <13 µg/m ³	10%	>=13 and <18 µg/m ³	15%	>=18 and <22 µg/m ³	20%	>= à 22 µg/m ³	All appropriate measures to archive 18 µg/m ³
<= à 8,5 µg/m ³	0%													
>8,5 and <13 µg/m ³	10%													
>=13 and <18 µg/m ³	15%													
>=18 and <22 µg/m ³	20%													
>= à 22 µg/m ³	All appropriate measures to archive 18 µg/m ³													

Pollutant	Target value* which should be met by the 31st of December 2012
Arsenic	6 ng/m ³
Cadmium	5 ng/m ³
Nickel	20 ng/m ³
Benzo(a)pyrène (used as a tracer of the carcinogenic risk of polycyclic aromatic hydrocarbons - PAHs)	1 ng/m ³

* Averaged over the calendar year of the total content in the PM10 fraction.

Source: French Standards, AIRPARIF, <https://www.airparif.asso.fr/en/reglementation/normes-francaises> (last visited Apr. 13, 2018), archived at <https://perma.cc/Q6GR-5MQH>. Reproduced with permission of Airparif.

IV. Emergency Measures

Whenever the air quality limits of a certain area are exceeded or risk being exceeded, the prefect responsible for that geographic area must immediately inform the public and take measures to mitigate the pollution spike’s magnitude and its effect on the population.²⁹ After informing the mayors of towns within the affected zone, the prefect may restrict or entirely suspend the activities that contribute to the pollution spike.³⁰ The restrictions must be proportionate to the pollution risk.³¹ Activities that may be restricted include (but are not limited to) automobile traffic—for

²⁹ C. ENVIRONNEMENT, art. L223-1.

³⁰ *Id.*

³¹ PLANCHET, *supra* note 1, at 163.

example, through the temporary lowering of speed limits.³² If necessary, traffic may be entirely prohibited for certain categories of vehicles during the duration of the pollution emergency, and the prefect may encourage the use of public transportation by lowering transportation rates or by making it entirely free.³³

There have been several examples of pollution-related emergency measures over the last several years. On December 6 and 7, 2016, for example, vehicle traffic in Paris and several nearby suburbs was limited due to an excess of fine particles in the air.³⁴ Driving certain vehicles, such as heavy trucks and vehicles with uncatalyzed exhaust pipes, was entirely prohibited during that time.³⁵ For most other vehicles, an “alternating traffic” plan was enforced: driving vehicles with a license plate ending with an even number was authorized on December 6 and prohibited on December 7, while vehicles with a license plate ending with an odd number were prohibited on December 6 and authorized on December 7.³⁶ Certain vehicles were exempted from this emergency plan, and could therefore be driven on both days: “Green” vehicles (such as electric cars, natural gas vehicles, and hybrids); vehicles necessary for the performance of public services (such as garbage trucks, police vehicles, fire trucks, ambulances, and postal vehicles); vehicles used for the city’s food supply (vehicles used to supply the city’s markets, grocery stores, cafes, and restaurants); and light-weight and medium-weight vehicles that are absolutely necessary to conduct a professional activity and that are easily identifiable as such (buses, taxis, tow-trucks, small trucks, etc.).³⁷

A few weeks later, on January 23–25, 2017, new pollution spikes in several French regions, including Paris and Lyon (France’s third largest city), caused the respective prefects of these regions to implement emergency plans.³⁸ The plan for Lyon relied principally on an “alternating traffic” scheme similar to the one described above.³⁹ However, a new type of scheme was implemented in Paris: “differentiated traffic” (*circulation différenciée*).⁴⁰ This new plan relies on a mandatory classification of vehicles into one of six categories according to the vehicle’s emissions level. Paris’ differentiated traffic plan prohibited the operation of the vehicles categorized in the two most polluting categories.⁴¹ Another differentiated traffic plan, which this

³² C. ENVIRONNEMENT, art. L223-1.

³³ *Id.* art. L223-2.

³⁴ *Circulation alternée à Paris et en banlieue: qui peut rouler ?* [Alternating Traffic in Paris and Suburbs: Who Can Drive?], LE PARISIEN (Dec. 7, 2016), <http://www.leparisien.fr/info-paris-ile-de-france-oise/transports/circulation-alternee-qui-peut-rouler-mardi-05-12-2016-6415992.php>, archived at <https://perma.cc/M3D5-QGPR>.

³⁵ *Id.*

³⁶ *Id.*

³⁷ *Id.*

³⁸ *Circulation différenciée ou alternée: qui est affecté et qui peut circuler?* [Differentiated or Alternate Traffic: Who is Affected and Who May Drive?], LE MONDE (Jan. 23, 2017), http://www.lemonde.fr/pollution/article/2017/01/22/pics-de-pollution-qui-est-affecte-et-qui-pourra-circuler-en-voiture-lundi_5066989_1652666.html, archived at <https://perma.cc/44EX-968D>.

³⁹ *Id.*

⁴⁰ *Id.*

⁴¹ *Pollution: la circulation différenciée reconduite mardi et mercredi en Ile-de-France* [Pollution: Differentiated Traffic Rules Renewed for Tuesday and Wednesday in Ile-de-France], LE PARISIEN (Jan. 23, 2017),

time prohibited the operation of vehicles in the three most polluting categories, was implemented in the Paris region on June 22, 2017.⁴²

V. Vehicle Emissions Standards and Restricted Traffic Zones

The 2015 Law on Energy Transition for Green Growth authorized local authorities to establish restricted traffic zones (also referred to as environmental zones) in urban zones and other areas subject to an atmosphere protection plan.⁴³ All vehicles operating within these restricted traffic zones must display a special sticker indicating their emissions categorization.⁴⁴ These restricted traffic zones may be permanent or weather-dependent.⁴⁵ Vehicles that do not have the required sticker are prohibited from permanently restricted traffic zones at all times, but are allowed in weather-dependent zones so long as there is no air pollution spike.⁴⁶ There are at least twenty-eight environmental zones throughout France, including Paris and its region, and the cities of Strasbourg, Grenoble, and Lyon.⁴⁷

The sticker, referred to as the “CRIT’Air sticker” (*vignette CRIT’Air*), classifies vehicles into one of six categories, plus an additional “uncategorized” type that is not eligible for a sticker.⁴⁸ The categories are principally based on European emissions standards (EURO rating) and the date on which the vehicle was manufactured.⁴⁹

<http://www.leparisien.fr/info-paris-ile-de-france-oise/transports/paris-la-circulation-differenciee-reconduite-mardi-23-01-2017-6608367.php>, archived at <https://perma.cc/24YH-KJNQ>.

⁴² *Circulation différenciée: les véhicules polluants interdits ce jeudi dans Paris* [Differentiated Traffic: Polluting Vehicles Forbidden in Paris this Thursday], LE PARISIEN (June 22, 2017), <http://www.leparisien.fr/info-paris-ile-de-france-oise/transports/les-vehicules-polluants-interdits-ce-jeudi-dans-paris-21-06-2017-7075470.php>, archived at <https://perma.cc/4ZZV-L9TN>.

⁴³ Loi n° 2015-992 du 17 août 2015 relative à la transition énergétique pour la croissance verte [Law No. 2015-992 of 17 August 2015 Regarding Energy Transition for Green Growth], art. 48, <https://www.legifrance.gouv.fr/eli/loi/2015/8/17/DEVX1413992L/jo/texte>, archived at <https://perma.cc/T9JN-P9NH>.

⁴⁴ C. ROUTE, arts. L318-1, R411-19.

⁴⁵ *France Has Introduced the Crit’Air Vignette!*, CRIT’AIR, <https://www.crit-air.fr/en.html> (last visited Apr. 16, 2018), archived at <https://perma.cc/UYT3-7XUB>.

⁴⁶ *The French ZCR and ZPA Environmental Zones*, CRIT’AIR, <https://www.crit-air.fr/en/information-about-the-critair-vignette/french-environmental-zones-zcr/french-environmental-zones.html> (last visited Apr. 16, 2018), archived at <https://perma.cc/T4TC-DWLX>.

⁴⁷ *France Has Introduced the Crit’Air Vignette!*, CRIT’AIR, *supra* note 46.








⁴⁸ Arrêté du 21 juin 2016 établissant la nomenclature des véhicules classés en fonction de leur niveau d’émission de polluants atmosphériques en application de l’article R. 318-2 du code de la route [Order of 21 June 2016 Establishing the Nomenclature of Vehicles Categorized According to their Levels of Air Pollution Emissions in Application of Article R.318-2 of the Road Code], Annex, https://www.legifrance.gouv.fr/affichTexte.do?jsessionid=083F314642589299B51CFF4776A6E309.tplgfr21s_1?cidTexte=JORFTEXT000032749723&dateTexte=20160623, archived at <https://perma.cc/5KHB-L4AS>.

⁴⁹ *Id.*

The CRIT'Air categories are as follows:

Crit'Air-Classification

Image table@Crit'Air.fr/Green-Zones GmbH

Crit'Air-Class	Two-, three- and light motorized four-wheelers	CARS		Light Utility Vehicles < 3,5 t		Big Trucks, Lorries and Busses	
	Hydrogen – and Electric Vehicles						
	Gas powered vehicles Rechargeable Hybrid Vehicles						
Crit'Air-Classe	Two-, three- and light motorized four-wheelers	First registration date or Euro standard					
		Cars		Light Utility Vehicles < 3,5 t		Big Trucks, Lorries and Busses	
		Diesel	Petrol	Diesel	Petrol	Diesel	Petrol
	EURO 4 starting 01.01.2017 for Motorcycles and starting 01.01.2018 for Mopeds	-	EURO 5 and 6 01.01.2011	-	EURO 5 and 6 01.01.2011	-	EURO 6 starting 01.01.2014
	EURO 3 from 01.01.2007 until 31.12.2016 for Motorcycles and up to 31.12.2017 for Mopeds	EURO 5 and 6 starting 01.01.2011	EURO 4 from 01.01.2006 until 31.12.2010	EURO 5 and 6 starting 01.01.2011	EURO 4 from 01.01.2006 until 31.12.2010	EURO 6 starting 01.01.2014	EURO 5 from 01.10.2009 until 31.12.2013
	EURO 2 from 01.07.2004 until 31.12.2006	EURO 4 from 01.01.2006 until 31.12.2010	EURO 2 and 3 from 01.01.1997 until 31.12.2005	EURO 4 from 01.01.2006 until 31.12.2010	EURO 2 and 3 from 01.10.1997 until 31.12.2005	EURO 5 from 01.10.2009 until 31.12.2013	EURO 3 and 4 from 01.10.2001 until 30.09.2009
	No class for all types from 01.06.2000 until 30.06.2004	EURO 3 from 01.01.2001 until 31.12.2005	-	EURO 3 from 01.01.2001 until 31.12.2005	-	EURO 4 from 01.10.2006 until 30.09.2009	-
	-	EURO 2 from 01.01.1997 until 31.12.2000	-	EURO 2 from 01.10.1997 until 31.12.2000	-	EURO 3 from 01.10.2001 until 30.09.2006	-
No Crit'Air	No class for all types until 31.05.2000	EURO 1 and before until 31.12.1996	EURO 1 and before until 31.12.1996	EURO 1 and before until 30.09.1997	EURO 1 and before until 30.09.1997	EURO 1, 2 and before until 30.09.2001	EURO 1, 2 and before until 30.09.2001

Source: Crit'Air Classification, CRIT' AIR, <https://www.crit-air.fr/en/information-about-the-critair-vignette/the-french-vignette-critair/who-will-get-which-critair-colours.html> (last visited Apr. 16, 2018), archived at <https://perma.cc/KR4S-KPSG>. Reproduced with permission of CRIT' Air.

VI. Carbon Budgets and Low-Carbon Strategy

On November 18, 2015, the French government issued its first national carbon budget and low-carbon initiative.⁵⁰ These were issued in pursuance of a provision of the 2015 Law on Energy Transition for Green Growth, codified in the Environmental Code, that requires the government to decree, “for the 2015–2018 period, and then for every consecutive five-year period, a national greenhouse gas ceiling called the ‘carbon budget’.”⁵¹ The 2015 law also requires the government to decree a “national low-carbon intensity development strategy, called ‘low-carbon strategy’ . . . which defines the road to follow towards a policy to reduce greenhouse gas emissions in conditions that are economically sustainable in the medium and long terms.”⁵² The law specifies that the low-carbon strategy must “take into account the specificities of the agricultural sector,” in particular cattle farming.⁵³ Furthermore, the government should be careful that national efforts to decrease emissions are not cancelled out by increased high-carbon imports.⁵⁴

1. National Carbon Budget

The French national carbon budgets are essentially “caps on greenhouse gas emissions established for successive five-year periods, designed to set the downward trend in emissions.”⁵⁵ The national carbon budget for 2015–CO18 was set at 110 metric tons (t) of CO₂ equivalent (CO₂ eq) per year for economic sectors that fall within the European Union Emissions Trading System (excluding international aviation), 332 t of CO₂ eq for other sectors, and 442 t of CO₂ eq for all sectors combined.⁵⁶ The subsequent all-sectors-combined budgets were set at 399 t of CO₂ eq for 2019–2023 and 358 t of CO₂ eq for 2024–2028.⁵⁷

⁵⁰ *La France se dote de «budgets carbone» pour réduire ses émissions de CO₂* [France Adopts “Carbon Budgets” to Reduce its CO₂ Emissions], LE PARISIEN (Nov. 18, 2015), <http://www.leparisien.fr/environnement/energies/la-france-se-dote-de-budgets-carbone-pour-reduire-ses-emissions-de-co2-18-11-2015-5289663.php>, archived at <https://perma.cc/398V-M6KC>; Décret n° 2015-1491 du 18 novembre 2015 relatif aux budgets carbone nationaux et à la stratégie nationale bas-carbone [Decree No. 2015-1491 of 18 November 2015 Regarding National Carbon Budgets and the National Low-Carbon Strategy], <https://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000031493783&categorieLien=id>, archived at <https://perma.cc/5MDK-FA9Q>.

⁵¹ C. ENVIRONNEMENT, art. L222-1A.

⁵² C. ENVIRONNEMENT, art. L222-1B.

⁵³ *Id.*

⁵⁴ *Id.*

⁵⁵ *Adoption of the National Low-carbon Strategy for Climate*, GOUVERNEMENT.FR (Nov. 27, 2015), <http://www.gouvernement.fr/en/adoption-of-the-national-low-carbon-strategy-for-climate>, archived at <https://perma.cc/8XYM-2BPY>.

⁵⁶ Décret n° 2015-1491 du 18 novembre 2015 relatif aux budgets carbone nationaux et à la stratégie nationale bas-carbone [Decree No. 2015-1491 of 18 November 2015 Regarding National Carbon Budgets and the National Low-Carbon Strategy], art. 3.

⁵⁷ *Id.*

2. National Low-Carbon Strategy

According to the National Low-Carbon Strategy, France aims to reduce its carbon footprint through the following measures:⁵⁸

- a reduction in the carbon intensity of the economy: developing renewable energies, using bio-based materials (e.g. timber in construction), encouraging cleaner, more mindful travel, especially via low-carbon technologies, and awareness-raising among consumers ;
- a major development of energy savings in all sectors, especially industry, buildings and transport ;
- the development of the circular economy: eco-design, recycling and reuse.

The means to reach those goals include raising the awareness of companies, institutions, and the general public; creating a guarantee fund for energy transition and encouraging energy efficiency investments; raising the portion of energy consumption taxes corresponding to carbon consumption; encouraging sustainable land management; encouraging research and development of new technologies for a carbon-free economy; developing low-carbon transportation, buildings, agriculture, and industry; encouraging the development of a bio-based economy; and protecting and expanding forest ecosystems.⁵⁹

With regard to energy consumption taxes, the government aims to increase the portion corresponding to carbon consumption from €22 (about US\$27) per metric ton of CO₂ in 2016 to €56 (US\$69) per metric ton of CO₂ in 2020 and €100 (US\$124) in 2030.⁶⁰ With regard to low-carbon transportation, the national strategy takes 2013 levels of emissions as a point of reference and aims to reduce transportation emissions by at least 70% of these levels by 2050. This is to be achieved in large part by improving vehicle energy efficiency (with a goal of new light-duty vehicles having an average fuel efficiency of 2 liters (L)/100km [118 miles/gallon] by 2030) and developing the infrastructure for low-carbon transport (charging points for electric cars, etc.).⁶¹ For low-carbon buildings, the national strategy's target is to reduce residential-tertiary sector emissions by at least 87% of 2013 levels by 2050, through regulations increasing the energy and environmental performance of new buildings and policies to increase retrofitting efforts for existing buildings.⁶² For low-carbon energy, the goal is to reduce industry emissions by 75% of 2013 levels by 2050, mainly by improving energy efficiency, recycling and reuse of materials, replacing carbon-intensive materials with less carbon-intensive ones, energy recovery, and energy

⁵⁸ MINISTÈRE DE L'ÉCOLOGIE, DU DÉVELOPPEMENT DURABLE ET DE L'ÉNERGIE [MINISTRY OF THE ENVIRONMENT, SUSTAINABLE DEVELOPMENT, AND ENERGY], STRATÉGIE NATIONALE BAS-CARBONE [NATIONAL LOW-CARBON STRATEGY]: SUMMARY FOR DECISION-MAKERS 5, https://unfccc.int/files/focus/long-term_strategies/application/pdf/national_low_carbon_strategy_en.pdf (last visited Apr. 16, 2018), archived at <https://perma.cc/QP2N-ND8U>.

⁵⁹ *Id.* at 7–16.

⁶⁰ *Id.* at 8.

⁶¹ *Id.* at 11.

⁶² *Id.* at 12.

substitution.⁶³ The plan also notes that “in the longer term, the development and deployment of carbon capture and storage (CCS) will play a significant role in achieving targets.”⁶⁴

VII. National Atmospheric Pollutant Emissions Reduction Plan

In May 2017, the French government issued national objectives on the emissions of several air pollutants.⁶⁵ These objectives, defined in reference to 2005-level emissions, are as follows:

	From 2020 to 2024	From 2025 to 2029	From 2030 Onward
Sulfur Dioxide (SO ₂)	-55 %	-66 %	-77 %
Nitrogen Oxides (NO _x)	-50 %	-60 %	-69 %
Non-Methane Volatile Organic Compounds (NMVOC)	-43 %	-47 %	-52 %
Ammonia (NH ₃)	-4 %	-8 %	-13 %
Fine Particles (PM _{2.5})	-27 %	-42 %	-57 %

Source: Décret No. 2017-949 du 10 mai 2017 fixant les objectifs nationaux de réduction des émissions de certains polluants atmosphériques en application de l’article L. 222-9 du code de l’environnement art. 1, <https://www.legifrance.gouv.fr/eli/decret/2017/5/10/DEVR1707211D/jo/texte>, archived at <https://perma.cc/7WUR-KR5Y>.

Concurrently, the government issued a National Air Pollutant Emission Reduction Plan (*Plan national de Réduction des Emissions de Polluants Atmosphériques*, PREPA),⁶⁶ as required by the Environmental Code.⁶⁷ This Plan consists of a long list of measures to be implemented in the 2017–2021 time frame in the industry, transportation, building, and agriculture sectors, as well as measures to improve research, innovation, and participation and coordination between governmental institutions and authorities at all levels.⁶⁸ This Plan is meant to comply with the

⁶³ *Id.* at 14.

⁶⁴ *Id.*

⁶⁵ Décret No. 2017-949 du 10 mai 2017 fixant les objectifs nationaux de réduction des émissions de certains polluants atmosphériques en application de l’article L. 222-9 du code de l’environnement [Decree No. 2017-949 of 10 May 2017 Establishing National Objectives for the Reduction of Emissions of Certain Atmospheric Pollutants, in Application of Article L.222-9 of the Environmental Code], <https://www.legifrance.gouv.fr/eli/decret/2017/5/10/DEVR1707211D/jo/texte>, archived at <https://perma.cc/7WUR-KR5Y>.

⁶⁶ Arrêté du 10 mai 2017 établissant le plan national de réduction des émissions de polluants atmosphériques [Order of 10 May 2017 Establishing the National Air Pollutant Emission Reduction Plan], https://www.legifrance.gouv.fr/jo_pdf.do?numJO=0&dateJO=20170511&numTexte=37&pageDebut=&pageFin=, archived at <https://perma.cc/WN4U-VS63>.

⁶⁷ C. ENVIRONNEMENT, art. L222-9.

⁶⁸ Arrêté du 10 mai 2017 établissant le plan national de réduction des émissions de polluants atmosphériques, Annex.

objectives of the Gothenburg Protocol and European Directive 2016/2284.⁶⁹ It is worth noting that there appears to be a certain amount of overlap between this Plan and the National Low-Carbon Strategy described above.

With regard to industry, the principal measures included in the Plan include the strengthening of air emissions controls, the tightening of regulatory requirements, and the reinforcement of the General Tax on Polluting Activities (*Taxe Générale sur les Activités Polluantes*, TGAP).⁷⁰

For transportation, the Plan includes measures towards increased tax convergence between gasoline and diesel, incentives for bicycle usage, more traffic restriction zones, replacement or conversion of existing vehicles, development of infrastructures for clean alternative fuels, limiting the amount of sulfur in marine fuels, verification of actual vehicle emissions, and an initiative with Mediterranean countries to set up a low-emission zone in the Mediterranean area.⁷¹ For the residential and tertiary building sectors, the Plan includes measures to lower the sulfur content of domestic heating oil, incentives to make existing buildings more energy efficient and for the replacement of poorly performing heating equipment, support for the development of alternatives to the burning of waste, prohibiting the sale of personal garden incinerators, and raising public awareness.⁷²

With regard to agriculture, the National Air Pollutant Emission Reduction Plan includes measures to reduce emissions of ammonia and particulates, develop alternatives to burning agricultural residues, study and monitor the dissemination of phytopharmaceutical products in the air, enforce the prohibition on aerial application of pesticides, provide financial incentives towards the reduction of volatile ammonia, and spread agricultural technologies and practices that help reduce air pollution.⁷³

⁶⁹ CLAIRE ROSEVÈGUE & NADINE ALLEMAND, MINISTÈRE DE LA TRANSITION ÉCOLOGIQUE ET SOLIDAIRE [MINISTRY FOR ENVIRONMENTAL AND SOLIDARITY TRANSITION], FRENCH PLAN TO REDUCE EMISSIONS OF AIR POLLUTANTS 3 (June 2, 2017), https://www.unece.org/fileadmin/DAM/env/documents/2017/AIR/WGSR/1_French_plan_to_reduce_emissions_of_air_pollutants_Claire_Rosevegue.pdf, archived at <https://perma.cc/ZV5P-P2C6>.

⁷⁰ Arrêté du 10 mai 2017 établissant le plan national de réduction des émissions de polluants atmosphériques, Annex.

⁷¹ *Id.*

⁷² *Id.*

⁷³ *Id.*

Israel

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SUMMARY Israel recognizes the importance of reducing fossil-fuel consumption for both strategic and environmental reasons. Israel is therefore a signatory to a number of environmental protection international agreements, including the 2016 Paris Agreement. Israel has an extensive legislative and regulatory framework addressing clean air requirements, ozone standards, greenhouse gas tailpipe emission standards, and clean air requirements for industrial facilities. The government has adopted multiple decisions on the development of clean air strategies, projects, and standards for the production and use of renewable fuel.

I. Introduction

Israel considers a reduction in its reliance on natural gas and its replacement with renewable fuels to be important objectives, both strategically and for environmental reasons. Meeting these goals is expected to reduce the dependence of the state on imports of oil and protect the environment by reducing levels of pollution.¹

The regulation of fuel emissions and policies for the encouragement of renewable fuel sources are based on a variety of laws, regulations, government decisions, and programs.² The main legislative instrument for the control of air quality is the Abatement of Nuisances Law 5721-1961. This Law makes it illegal to cause any considerable or unreasonable noise or air pollution, including odors, “if it disturbs or is likely to disturb a person in the vicinity or a passerby.”³ The Law authorizes the Ministry of Environmental Protection “to issue nuisance removal orders, and, in case of noncompliance, to remove the nuisance and to charge the person responsible with double the

¹ Ingman D. et al., MoEP, Review of Standards for Adaptability and Persistence of Local Fuel Transportation, Distribution and Storage Infrastructures for Alternative Fuels (e.g. methanol [M30, M60, M85], ethanol [E10, E85], isobutanol [DME]) at 80 (Apr. 2, 2016), <http://www.sviva.gov.il/InfoServices/ReservoirInfo/DocLib4/R0401-R0500/R0422.pdf>, archived at <https://perma.cc/3Y3Y-CZ6B>.

² Unofficial translations of some environmental legislation are available on the Israel Ministry of Environmental Protection (MoEP) website, at <http://www.sviva.gov.il/English/Legislation/Pages/Legislation.aspx> (last visited Apr. 13, 2018), archived at <https://perma.cc/EPA5-AYXK>. For a list and full text of primary legislation and amendments on environment protection see the Knesset (Israel Parliament) website, using the term הגנת הסביבה (environment protection), at <http://main.knesset.gov.il/Activity/Legislation/Laws/Pages/LawLaws.aspx?t=lawlaws&st=lawlaws&sl=10>, archived at <https://perma.cc/D9QP-UC53>. Up-to-date texts of all legal sources cited in this report are available in the Nevo Legal Database, <http://www.nevo.co.il>, and the Takdin Legal Database, <http://www.takdin.co.il> (both by subscription, in Hebrew, last visited Apr. 9, 2018).

³ Abatement of Nuisances Law 5721-1961, SEFER HAHUKIM [SH] [BOOK OF LAWS (the official gazette)] 5761 No. 332 p. 58, as amended, unofficial English translation available at <http://www.sviva.gov.il/English/Legislation/Pages/PollutionAndNuisances.aspx>, archived at <https://perma.cc/86KE-SV3Q>.

expenses. All payments and fines under the law are paid to a designated fund, established under the Maintenance of Cleanliness Law.”⁴

The Clean Air Law, 5768-2008 came into effect in January 2011.⁵ The Law provides a comprehensive framework for the reduction and prevention of air pollution by “imposing obligations on the government, local authorities, and the industrial sector.”⁶ Among requirements imposed by the Law are the establishment of emission limits, the issuance of emission permits from major industrial polluters, the publication of air quality data and forecasts, the monitoring and sampling of air pollutants, and the introduction of enforcement mechanisms. The Law includes strict penalties for violators.⁷ Specific standards of industrial and vehicle pollution sources are regulated under various pieces of legislation regarding licensing, reporting and registering.

Israel signed the Paris Agreement on April 22, 2016.⁸ The Ministry of Environment Protection (MoEP) noted that,

[t]o comply with the Agreement, national level preparation is required that relates, first and foremost, to implementation of the national target for greenhouse gas (GHG) emissions reduction in 2030. This target was determined in Government Decision 542 from September 2015 and was submitted as part of Israel’s intended Nationally Determined Contribution (INDC) to the Climate Change Convention Secretariat.⁹

In furtherance of this objective, the Israel National Plan for Implementation of the Paris Agreement (INPIPA), was adopted in September 2016. It addresses several issues, including

- reduction of GHG emissions,
- monitoring and control,
- international financing,
- participating in international negotiations, and
- development of a training program.¹⁰

⁴ Abatement of Environmental Nuisances Law, 1961, *summarized at Pollution and Nuisances*, MOEP, <http://www.sviva.gov.il/English/Legislation/Pages/PollutionAndNuisances.aspx> (last visited Apr. 13, 2018), archived at <https://perma.cc/QN2X-EHKN>.

⁵ Clean Air Law, 5768-2008, SH 5768 No. 2174 p. 752, *as amended*.

⁶ *Pollution and Nuisances*, *supra* note 4.

⁷ UNEP, ISRAEL AIR QUALITY CATALOGUE 1–2 (2015), <https://wedocs.unep.org/bitstream/handle/20.500.11822/17221/Israel.pdf?sequence=1&isAllowed=y>, archived at <https://perma.cc/XX2F-WR5Y>.

⁸ Paris Agreement, Dec. 12, 2015, available at http://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf, archived at <https://perma.cc/J534-K5BC>.

⁹ MoEP, Israel National Plan for Implementation of the Paris Agreement (INPIPA) (Sept. 2016), <http://www.sviva.gov.il/InfoServices/ReservoirInfo/DocLib2/Publications/P0801-P0900/P0836eng.pdf>, archived at <https://perma.cc/6ZGN-HT26>.

¹⁰ *Id.*

This report addresses Israeli legislation, regulatory norms, government programs, and INPIPA provisions regarding clean air requirements, focusing particularly on issues concerning ozone standards, greenhouse gas tailpipe emission standards, clean air requirements for industrial facilities, and programs establishing renewable fuel standards.

II. Air Quality Standards

National ambient air quality standards were first established in Israel in 1992 within the framework of the Abatement of Nuisances Law 5721-1961.¹¹ The current standards were determined under the authority provided to the Minister of Environment Protection in accordance with the Clean Air Law, 5768-2008. The 2008 Law authorizes setting target values for the presence in the air of specified compounds.¹² These include

(1) values whose exceedance constitutes potential danger or harm to the life, health and quality of life of human beings, to property and to the environment, including in soil, water, fauna and flora, and which should be striven to achieve as a target (in this Law: target values) . . . ;

(2) values whose exceedance constitutes considerable or unreasonable air pollution, to be set on the basis of the target values and of updated scientific and technological knowledge, and in consideration of the practical possibility of preventing exceedance from the target values (in this Law: ambient air quality values) . . . ; [and]

(3) values whose exceedance, in short term exposure, causes or is liable to cause danger or harm to the health of human beings, and which require undertaking immediate measures to prevent their exceedance or to prevent the damage derived from their exceedance (in this Law: alert threshold)¹³

The current standards for the above categories are provided by the Clean Air (Air Quality Values) Regulations (Temporary Provision), 5771-2011, with effect to March 1, 2021.¹⁴

The regulations set target and ambient values for a list of chemical compounds, including ozone. The regulations determine the target value for ozone as 100 micrograms per cubic meter (mcg/cm) in eight hours.¹⁵ The ambient value for ozone was set at 140 mcg/cm in eight hours with ten annual

¹¹ Abatement of Nuisances Law 5721-1961, SH 5761 No. 332 p. 58, *as amended*.

¹² Clean Air Law, 5768-2008, § 6, SH 5768 No. 2174 p. 752, *as amended*.

¹³ *Id.*

¹⁴ Clean Air (Air Quality Standards) Regulations 5771-2011, KOVETZ HATAKANOT [KT] [SUBSIDIARY LEGISLATION] 5771 No. 7002 p. 970, *as amended*, up-to-date text available in the Nevo Legal Database (in Hebrew, by subscription), *archived at* <https://perma.cc/6ALJ-94K3>, partial translation (not including supplements) *available at* http://www.sviva.gov.il/English/Legislation/Documents/Clean_Air_Laws_and_Regulations/CleanAirRegulations-AirQualityValues-2011.pdf, *archived at* <https://perma.cc/ZM5B-HRW6>.

¹⁵ Clean Air (Air Quality Standards) Regulations 5771-2011, 1st Supp.

deviations permitted.¹⁶ The alert threshold for ozone was set at 240 mcg/cm in three consecutive hours.¹⁷

III. Clean Air Requirements for Industrial Facilities

A. Emission Permits for Industry Pollutants

Under the Clean Air (Emissions Permits) Regulations 5770-2010, which came into force in 2010, applications for emissions permits are required to be prepared according to specific guidelines based on reference documents (BREFs) on Best Available Techniques (BAT).¹⁸

Maximum permissible emission levels are regulated under the Licensing of Businesses Law, 5728-1968, and determined within the framework of conditions in the businesses licenses of small and medium installations.¹⁹ Accordingly, “[u]niform specifications have been set for some sectors. Businesses are monitoring to ensure ongoing compliance with environmental license conditions.”²⁰

B. Reporting and Registering Duties

Israel has committed to the implementation of a Pollutant Release and Transfer Register (PRTR) “within the framework of the country’s joining the OECD.”²¹ This includes imposing an obligation on factories to report on emissions and transfers, establish a data management system, and publish the resulting data for public consumption.²²

The Protection of the Environment (Releases and Transfers to the Environment Reporting and Registering Obligations) Law, 5772-2012²³ imposes reporting obligations on facilities that have a significant impact on the environment. The annex to the law includes a list of 114 pollutants and seventy-four activities by several industrial sectors. This information is publicly accessible on an

¹⁶ *Id.*, 2d Supp.

¹⁷ *Id.*, 3d Supp.

¹⁸ Clean Air (Emissions Permits) Regulations 5770-2010, § 14, KT 5770 No. 6904 at 1334, *as amended*; *see also* ISRAEL AIR QUALITY CATALOGUE, *supra* note 7, at 2.

¹⁹ Licensing of Businesses Law, 5728-1968, SH 5728 No. 537 at 204, *as amended*.

²⁰ ISRAEL AIR QUALITY CATALOGUE, *supra* note 7, at 2.

²¹ *See 2016 Emissions and Transfers*, MOEP, at 5, http://www.sviva.gov.il/English/env_topics/IndustryAndBusinessLicensing/PRTR/PRTRReportingInIsrael/Documents/PRTR-2016-data-published-sept-2017.pdf, *archived at* <https://perma.cc/P7F6-ZF4U>. For 2016 PRTR figures *see* MOEP, POLLUTANT RELEASE AND TRANSFER REGISTER SUMMARY AND ANALYSIS OF 2016 REPORTS (Sept. 2017), http://www.sviva.gov.il/English/env_topics/IndustryAndBusinessLicensing/PRTR/PRTRReportingInIsrael/Documents/PRTR-2016-data-published-sept-2017.pdf, *archived at* <https://perma.cc/R8AM-6TFS>.

²² *Id.*

²³ Protection of the Environment (Releases and Transfers to the Environment Reporting and Registering Obligations) Law, 5772-2012, SH 5772 No. 2348 p. 238, *as amended*.

internet-based PRTR.²⁴ The guidelines for the PRTR system were set in the Kiev Protocol on Pollutant Release and Transfer Registers, which Israel acceded to in January 2013.²⁵

C. Environmental Impact Index of Public Companies

The MoEP introduced an Environmental Impact Index of Public Companies in 2014. This Index ranks the potential environmental impact of factories across Israel based on

data from the PRTR submitted by the company, the proximity of its factory to population centers and water sources, risks arising from the storage of hazardous materials at the facility, and compliance with environmental protection laws. The index allows investors to receive straightforward information about a company's environmental risk level.²⁶

The MoEP's website lists the "20 Companies with the Most Potential to Pollute."²⁷

D. Regional Program for Reduction of Industrial Emissions

In 2008 the government adopted a national plan for the reduction of industrial emissions in the Haifa Bay region. The plan was updated in September 2015. The main elements of the 2015 Haifa Bay Action Plan call for setting regional targets for the reduction of air pollutant emissions from industrial sources and from vehicular emissions, relocating hazardous facilities such as fuel farms and fuel tanks to less populated sites, and making environmental information accessible.²⁸

IV. Reduction of Vehicular Pollution

In recent years Israel has undertaken several measures to reduce vehicle pollution. These include the adoption of EU vehicle emission standards, encouraging the importation and operation of efficient fuel vehicles through the use of tax incentives, retrofitting heavy fleet vehicles with filters

²⁴ *Pollutant Release and Transfer Register (PRTR)*, MOEP, http://www.sviva.gov.il/English/env_topics/IndustryAndBusinessLicensing/PRTR/Pages/default.aspx (last visited Apr. 5, 2018), archived at <https://perma.cc/2K2D-KV4L>.

²⁵ *Protocol on Pollutant Release and Transfer Registers*, MOEP, http://www.sviva.gov.il/English/env_topics/InternationalCooperation/IntlConventions/Pages/KievProtocol.aspx (last visited Apr. 5, 2018) archived at <https://perma.cc/PN6Y-A3LB>.

²⁶ ISRAEL AIR QUALITY CATALOGUE, *supra* note 7, at 5. For the criteria used to determine public company index rankings see *2015 Environmental Impact Index: Public Companies*, MOEP, http://www.sviva.gov.il/English/env_topics/Sustainable%20Development/Environmental-Impact-Index/Pages/2015-Public%20Companies-Impact-Index.aspx (last visited Apr. 12, 2018), archived at <https://perma.cc/DH5R-MR4T>.

²⁷ *2015 Environmental Impact Index: Public Companies*, *supra* note 26.

²⁸ For specific details see *Haifa Bay Action Plan to Reduce Pollution and Environmental Risks*, MOEP, http://www.sviva.gov.il/English/env_topics/IndustryAndBusinessLicensing/Haifa-Bay-Industrial-Zone/Action-Plan-to-Reduce-Pollution/Pages/Plan-to-Reduce-Air-Pollution-and-Environmental-Risks-in-Haifa-Bay-2015-2020.aspx (last visited Apr. 13, 2018), archived at <https://perma.cc/FS7D-GYX6>.

and other technologies, removing old and polluting vehicles from use, and equipping fleets with new vehicles. The following discussion provides specific information on these measures.²⁹

A. Exhaust Emission Standards

According to information provided by the MoEP,

[i]n the mid-1990s Israel adopted European vehicle emission standards (Euro standards) and the US Tier standards for gasoline-powered passenger cars and light-duty diesel engine vehicles. (While the standards requirements were the same, Israeli standards sometimes went into effect after they went into effect in Europe or the US).

The standards have become gradually stricter - with new standards going into effect every few years. This has resulted in a significant reduction of vehicular pollution emissions on Israeli roads since the 1990s.

Today, every new vehicle that is imported into or sold in Israel must comply with government requirements that it not exceed the maximum permitted values of pollution emissions for that vehicle.³⁰

B. Fuel Quality Standards

Israel adopted Euro 5 fuel quality standards, which dictated a 10 parts per million (ppm) sulfur limit, in January 2009.³¹

C. Establishment and Enforcement of Vehicle Emission Limits

A 2015 United Nations Environmental Protection Agency report summarizes steps taken by Israel regarding the establishment and enforcement of vehicle emission limits:

Vehicle emission standard requirements are identical to EU limits in terms of Euro rating.

Rules and technical specifications have been set for air pollution emission tests from diesel and gasoline-powered vehicles in vehicle inspection stations during annual road worthiness tests.

Israel's air quality monitoring network includes transportation stations situated at road level along main transportation arteries to monitor the primary pollutants emitted from vehicles.

²⁹ *Government Measures to Reduce Vehicular Pollution*, MOEP, http://www.sviva.gov.il/English/env_topics/AirQuality/PollutionFromTransportation/GovtMeasures/Pages/default.aspx (last visited Apr. 13, 2018), archived at <https://perma.cc/KPQ5-JWUN>.

³⁰ *Government Measures to Reduce Vehicular Pollution*, IMEP, http://www.sviva.gov.il/English/env_topics/AirQuality/PollutionFromTransportation/GovtMeasures/Pages/default.aspx#GovXParagraphTitle3 (last visited Apr. 10, 2018), archived at <https://perma.cc/A75K-TTJG>.

³¹ *Id.*

Mobile enforcement units are responsible for roadside enforcement. Vehicles with excessive emissions are taken off the road.

An 83% purchase tax is imposed on all vehicles powered by conventional combustion engines.

The “green tax” car reform directly links the purchase tax on a vehicle to its emission levels, providing an incentive for buying low polluting vehicles: cleaner conventional combustion engine cars enjoy a purchase tax rebate and low purchase taxes are imposed on hybrids (30%) and electric cars (8%).

Publication of air pollution emission data is required in all vehicle advertisements as of 2009.

In January 2015, the Ministry of Environmental Protection issued instructions on air pollution reduction to owners of heavy vehicle fleets. The instructions set an average target for the vehicle fleet to ensure compliance with Euro 4 and Euro 5 emission standards by 2018 and require the gradual use of alternative propulsion systems (electric, hybrid, natural gas, or biodiesel) so that by 2020, 3% of the fleet will be powered by alternative fuels.

Monitoring trends show a decrease in carbon monoxide and hydrocarbon emissions due to improvements in emission reduction technologies including catalytic converters which are mandatory since 1994.³²

D. Minimizing Pollution from Heavy Vehicle Fleets

1. 2015 Rules

In January 2015 the MoEP issued rules for heavy vehicle fleets. Among other things the rules were intended to reduce air pollution by removing older and more polluting heavy vehicles from the road and replacing them with electric or natural gas vehicles.³³ The rules

1. Set an average emissions target for a fleet of vehicles, so that by 2018, it will meet the Euro 4 and Euro 5 emission standards.
2. Prohibit the use of particularly polluting vehicles.
3. Require that engines be turned off when vehicles are idle.
4. Require gradual use in alternative fuel vehicles (electric, hybrid, natural gas, or biodiesel), so that by 2020, 3% of the fleet will be powered by alternative fuels.
5. Set rules to prevent visible smoke emission from vehicles.

³² “Vehicle Emission Limit,” ISRAEL AIR QUALITY CATALOGUE, *supra* note 7, at 5–6.

³³ *Reducing Pollution from Heavy Vehicle Fleets*, MOEP, http://www.sviva.gov.il/English/env_topics/AirQuality/PollutionFromTransportation/GovtMeasures/Pages/Reducing-Pollution-from-Heavy-Vehicle-Fleets.aspx (last visited Apr. 3, 2018), archived at <https://perma.cc/ZA4W-A8HT>.

6. Require drivers to be trained in cost-effective and “green” driving.
7. Require fleet owners to register, submit reports, and publicize those reports, so that the public will be able to monitor the compliance of these companies to the pollution targets.³⁴

2. 2018 Rules

New rules issued by the MoEP will enter into effect in November 2018. The rules will require the installation of special particle filters in heavy fleet vehicles as a condition for renewal of operating licenses. The rules will also require labeling vehicles according to a rating of their impact on air pollution under the following categories: “clean vehicle” (electric), “reduced pollution vehicle,”; and “polluting vehicle.” The rules will apply to heavy fleet vehicles using diesel that were registered in Israel “up to 2005” (presumably including 2005) and are used for the transport of at least eight passengers, or commercial vehicles with a total weight of 12 metric tons or higher. The rules are expected to reduce air pollution from vehicles in Israel by 30%.³⁵

The MoEP has undertaken to fully subsidize the acquisition of Retrofit Diesel Particulate Filter (DPF) Exhaust Systems. DPF-approved systems are those proven to have reduced particulate matter by 98%.³⁶ The MoEP will also provide compensation for the disposal of heavy fleets in accordance with the criteria posted on its website.³⁷

E. “Clean Car Revolution” Initiatives

Since 2016, the MoEP has launched a number of programs and projects aimed at reducing vehicular air pollution. A list of clean car revolution initiatives is available at the MoEP’s website and includes the following:

- Subsidizing the Purchase of Hybrid Taxis
- Electric Buses
- Electric Car Ride-Share
- Particulate Filters on Garbage Trucks
- Low-Emission Zones in Urban Centers

³⁴ *Id.*

³⁵ *Plan to Minimize Air Pollution from Diesel Operated Vehicles*, MOEP, http://www.sviva.gov.il/subjectsEnv/SvivaAir/CarPollution/program-heavy-diesel-engines-2018/Pages/about-program-heavy-diesel-engines-2018.aspx?utm_source=from-LP-to-about-pg&utm_campaign=heavy-diesel-engines-2018 (in Hebrew; last visited Apr. 6, 2018), archived at <https://perma.cc/U4WK-NNTJ>.

³⁶ *Particulate Matter*, MOEP, <http://www.sviva.gov.il/InfoServices/ReservoirInfo/DocLib2/Publications/P0701-P0800/P0762/Particulate-Matter.pdf> (in Hebrew; last visited Apr. 6, 2018), archived at <https://perma.cc/FM2K-EUME>.

³⁷ *Id.*

- Reducing Pollution from Commuting with Private Cars
- Program to Reduce Pollution from Diesel Vehicles³⁸

V. Reducing Greenhouse Gases

A. Israel National Plan for Implementation of the Paris Agreement

Israel signed the 2015 Paris Agreement³⁹ on April 22, 2016.⁴⁰ Intended to enhance the implementation of the 1992 United Nations Framework Convention on Climate Change, the Agreement “aims to strengthen the global response to the threat of climate change.”⁴¹

The Agreement calls for reducing emissions and limiting the rise in average global temperature, increasing the capacity to adapt to the existing impacts of climate change, and assuring the availability of financial resources to support the global effort toward mitigation and adaptation to climate change. The Agreement further “requires all Parties to put forward their best efforts through ‘nationally determined contributions’ (NDCs) and to strengthen these efforts in the years ahead. This includes requirements that all Parties report regularly on their emissions and on their implementation efforts.”⁴²

In September 2016 the Israeli government issued the Israel National Plan for Implementation of the Paris Agreement (INPIPA).⁴³ INPIPA was formulated in accordance with recommendations made by an interministerial committee that had been appointed to review and recommend ways for Israeli implementation of the Agreement.⁴⁴ INPIPA addresses implementation of various objectives of the Agreement, including a reduction of emissions, providing as follows:⁴⁵

In September 2015, within the framework of Decision 542, Israel’s government set a national target of reducing GHG emissions to 8.8 [metric] tons CO₂ equivalent [tCO₂e] per capita by 2025 and 7.7 tons CO₂e per capita by 2030. In order to meet the national target, sector-specific targets were set for reducing electricity consumption by at least 17% and reducing private car mileage by at least 20% by 2030, relative to a Business as Usual (BAU) scenario. An additional target was set for the production of at least 17% of total electricity generation from renewable energy by 2030. Compliance with the GHG emissions mitigation target, as determined in the government decision, will require the

³⁸ See *Clean Car Revolution*, MOEP, http://www.sviva.gov.il/English/env_topics/AirQuality/PollutionFromTransportation/Clean-Car-Revolution/Pages/default.aspx (last visited Apr. 10, 2018), archived at <https://perma.cc/775Y-EGBV>.

³⁹ Paris Agreement, *supra* note 8.

⁴⁰ INPIPA, *supra* note 9.

⁴¹ Paris Agreement, *supra* note 8, art. 2(1).

⁴² *Paris Agreement: Essential Elements*, UN CLIMATE CHANGE, http://unfccc.int/paris_agreement/items/9485.php, archived at <https://perma.cc/E8K3-3676>.

⁴³ INPIPA, *supra* note 9.

⁴⁴ *Id.* at 9.

⁴⁵ *Id.* at 4–5.

reduction of some 24.5 million tons carbon dioxide equivalent (tCO₂e) in 2030, relative to anticipated emissions under the BAU scenario. Further to Government Decision 542, Government Decision 1403 of April 2016 outlines a national plan for implementation of the targets. Following is the estimated emissions reduction potential of the plan:

Summary of GHG Emissions Reduction Measures and their Mitigation Potential:

Measure	Average Mitigation Potential in 2030 (million tCO ₂ e) under a BAU scenario
Energy efficiency in electricity consumption	7.1
Reduction of coal use *closure of units 1–4/and change in the loading order of the power plants	3.6–9.7
Electricity production from renewable energy Only relates to an addition above BAU assuming compliance with the 10% target in 2020	3.1
Reduction in refrigerant gases (F-Gas)	1.5
Waste treatment	1.6
Reduction in fuel use and emissions from production processes	1.3
Reduction in private car mileage (establishment of public transportation) *relates only to addition above BAU	1.5
Fuel efficiency in transportation *relates only to addition above BAU	1.5
Total mitigation through implementation of the central measures	21.2–27.3
Mitigation required to comply with the target	24.5

B. Government Decisions on GHG Emissions Reduction

To advance these goals the government issued several decisions addressing such issues as operational methods, funding allocations, cooperation with the private sector, development of research activities, and target dates.⁴⁶ Among the relevant decisions are the following:

- Instituting National Effort for Development of Technologies that Reduce Global Use in Transportation and Strengthening High Tech Industries (Government Decision No. 1354, Feb. 7, 2010)⁴⁷

⁴⁶ *Id.*

⁴⁷ Prime Minister's Office (PMO), Instituting National Effort for Development of Technologies that Reduce Global Use in Transportation and Strengthening High Tech Industries (Government Decision No. 1354, 02/07/10), https://www.gov.il/he/Departments/policies/2010_des1354, archived at <https://perma.cc/5VD5-LMQL>.

- Operating a National Program for Development of Technologies that Reduce Global Use of Fuel in Transportation and Strengthening High Tech Industries in the Field (Government Decision No. 2790, Jan. 30, 2011)⁴⁸
- Reduction of Israeli Dependence on Fuel in Transportation (Government Decision No. 5327, Jan. 13, 2013)⁴⁹

A specific decision was adopted by the government on GHG reduction on September 20, 2015:

In January 2015, an inter-ministerial committee was established in order to recommend to the Israeli government a national greenhouse gas (GHG) emissions reduction target for 2030, as well as abatement actions. The committee's activities included: developing an updated projection of GHG emissions and electricity consumption under a business-as-usual (BAU) scenario, conducting a qualitative analysis to identify key technological abatement measures relevant to Israel, examining different target scenarios based on the identified abatement measures, and ultimately – providing a recommended national GHG emissions reduction target.

The committee published a report in 2015, shortly before the government approved its official GHG emissions reduction target.⁵⁰

On September 20, 2015 the Government adopted Decision No. 542, which sets “a target of 17% reduction in electricity consumption by 2020 relative to the electricity consumption forecast for 2030 under the business as usual scenario (within the framework of a decision on the reduction of greenhouse gas emissions and increased energy Efficiency).”⁵¹ Decision 542 sets a national per capita GHG emissions reduction target of 8.8 tCO₂e (metric tons of carbon dioxide equivalent) by 2025 and 7.7 tCO₂e by 2030.⁵² The Israeli government submitted its official GHG reduction target to the UN Framework Convention on Climate Change on September 29, 2015.⁵³

On April 10, 2016, the Israeli Cabinet approved Government Decision No. 1403, the National Plan for Implementation of the Greenhouse Gas Emissions Reduction Targets and for Energy Efficiency. The Plan allocated NIS 300 million (about US\$86 million) for 2016–2019 for an action plan to reach this target and NIS 500 million (about US\$143 million) in government guarantees for 2016–2025.⁵⁴

⁴⁸ Operating a National Program for Development of Technologies that Reduce Global Use of Fuel in Transportation and Strengthening High Tech Industries in the Field (Government Decision No. 2790, 01/30/11), PMO, *id.*, https://www.gov.il/he/Departments/policies/2011_des2790, archived at <https://perma.cc/QBG2-9KQX>.

⁴⁹ Reduction of Israeli Dependence on Fuel in Transportation (Government Decision No. 5327, 01/13/13), PMO, *id.*, https://www.gov.il/he/Departments/policies/2013_des5327, archived at <https://perma.cc/9JTN-TYPW>.

⁵⁰ *Reducing Greenhouse Gases: Climate Change Mitigation*, MOEP, http://www.sviva.gov.il/English/env_topics/climatechange/Mitigation/Pages/default.aspx (last visited Apr. 11, 2018), archived at <https://perma.cc/NG4F-6499>.

⁵¹ ISRAEL AIR QUALITY CATALOGUE, *supra* note 7, at 3.

⁵² *Reducing Greenhouse Gases: Climate Change Mitigation*, *supra* note 50.

⁵³ *Id.*

⁵⁴ INPIPA, *supra* note 9. A discussion of INPIPA is provided below.

An energy efficiency reduction program for small and medium-sized enterprises was launched in 2013. The program includes subsidized consultations on energy consumption and the identification of energy-saving solutions.⁵⁵

C. Incentives for Clean Production and the Installation of Pollution Prevention Technologies

The following is a list of areas in which the Israeli government has offered incentives for the development and use of pollution prevention technologies:

- Natural gas
- A national plan for greenhouse gas emissions reduction, which was approved by the government in November 2010, included a subsidy program for energy efficiency and greenhouse gas reduction investments in the industrial, commercial and municipal sectors. As part of the package, approved projects based on innovative technologies developed by Israeli companies which are commercially installed for the first time were eligible for an additional subsidy.
- The Office of the Chief Scientist in the Ministry of Economy supports the development of innovative technologies, including the clean-tech market.
- The Ministry of Economy provides financial assistance to support pilot plants for technology demonstration and is helping to establish green industrial zones, based on integrated environmental management.
- The EU-funded MED TEST II project in collaboration with UNIDO helps to build capacity for green Industry and facilitate transfer of environmentally sound technology. 7 Israeli industrial companies have been chosen to take part in the project, which is now in the implementation phase.
- The aim of a planned Resource Efficiency and Clean Production Knowledge Center is to promote environmental innovation and provide advice and support for industries and businesses required to comply with IPPC legislation. The Center will collect and disseminate information on strategies and policies to promote green growth and resource efficiency.⁵⁶

D. “Green Tax” Reform

On March 14, 2018, the Knesset Finance Committee unanimously approved a tax reform measure concerning energy sources. The reform was led by the Ministries of the Treasury and Energy, and was intended to increase the use of natural gas in public transportation, industry, and the production of electricity and to decrease the use of solar and coal. Accordingly,

[t]he excise tax on coal will rise from NIS 46 per ton to NIS 142 per ton. The significance of the decision is to raise the electricity tariffs by about 2% starting from 2019. The Committee's demand that the cost of coal will come into force as of March 2019.

⁵⁵ *Id.*

⁵⁶ ISRAEL AIR QUALITY CATALOGUE, *supra* note 7, at 4.

According to the Committee's decision, the increase in taxation on natural gas, which is expected to come into force gradually from 2024, will apply if at least 25 filling stations operate with natural gas.

As part of the plan, in the first years, taxation on natural gas for transportation will stand at 0.02, and after six years it will begin to rise gradually and eventually in 2028 the excise tax will be NIS 1.4 per kilo. At the same time, as stated, the overcharging arrangement will be gradually canceled, so that the difference will be saved in favor of the feasibility of using natural gas for owners of commercial heavy vehicles.

It was further decided that NIS 100 million would be allocated to encourage the construction of natural gas filling stations, which would finance the construction of 25 planned stations.

In addition, the reform includes tax incentives and an investment in the upgrading of the NIS 150 million natural gas distribution network in Israel, intended to promote the entry of gas stations in 2019. This is part of an investment of NIS 500 million in a plan to dismantle the distribution lines defined by the government. In addition, the reform includes encouraging the use of compressed natural gas (CNG) in public transportation tenders, accelerated depreciation for 25% and 4-year CNG vehicles, and exemption from a license fee under a temporary order for 5 years. As for taxis, the reform allocates NIS 30 million for assistance in purchasing hybrid taxis and the benefit of accumulated use of full reduction of import taxes after 4 years.

It was further determined that until January 2023, the Director General of the Ministry of Energy and the Director of the Tax Authority will report to the Committee on the rates of purchases of heavy vehicles that do not prevent polluting fuels and the progress of construction of natural gas filling stations. Of vehicles powered by natural gas will be tested for the route and alternatives to it.

In addition, by mid-March 2020, the Director-General of the Ministry of Energy, the Chairman of the Electricity Authority and the Finance Ministry's Budget Director, will report to the Committee on the effect of raising the tax on coal.⁵⁷

VI. Renewable Fuel Standards

According to the MoEP, in order to evaluate the level of reduction in GHG emissions resulting from biofuel use it is common to use the “well to wheel” system:

This method refers to greenhouse gases emitted throughout the entire life cycle of the fuel: for biofuels, from plant growth, through processing and distribution, to engine combustion. According to this method, the reduction in greenhouse gas emissions is no more than a few tens of percent per liter of fossil fuel replaced with biofuel.⁵⁸

⁵⁷ Sonia Grodiski, *The “Green Taxation” Reform Was Approved; Will It Encourage Transition to Natural Gas in the Economy*, GLOBES (Mar. 14, 2018), <https://www.globes.co.il/news/article.aspx?did=1001227829>, archived at <https://perma.cc/QW3N-2LRU>.

⁵⁸ *Biofuels: Biodiesel and Bioethanol*, MOEP, <http://www.sviva.gov.il/subjectsEnv/SvivaAir/CarPollution/Types/Pages/BioFuel.aspx> (in Hebrew; last visited Apr. 12, 2018), archived at <https://perma.cc/2CAV-B427>; see also *Fuel for Vehicles Engines – Methyl Esters of Fatty Acids for Diesel Engines – Test Requirements and Methods*

Dealing in methanol in quantities greater than 100 kg or with the sodium base at a concentration of at least 20% and in excess of 100 kg requires a license. Similar licensing requirements apply to dealing with hazardous substances in quantities and concentrations exceeding those specified in the Hazardous Substances Regulations (Classification and Exemption) 1996-1996.⁵⁹

Prior to the issuance of a license the MoEP checks the storage methods, possible risks, production methods, and pollution associated with the substance that is the subject of the permit.⁶⁰

The following are specific standards for the dilution of biodiesel and bioethanol:

Biodiesel

According to the MoEP,

Biodiesel is mainly produced from soy or palm oil. It can also be produced from used food oil or animal fat. These nutrients, along with alcohol (mostly methanol) and other chemicals, undergo a chemical process called Trans esterification to produce biodiesel. Diesel fuel can be diluted with bio-diesel at concentrations of up to 5% without any need for changes in the engine. This value is also the permissible value for the standard in the Israeli standard for diesel for transportation. This standard is formal and binding. Most of the use of biodiesel is in Europe, where it is added to diesel at concentrations of 5%, 7%, 20% and even 100% in vehicles designed for this.

Bioethanol

Regarding bioethanol production the MoEP provides as follows:

Bioethanol is produced in the process of fermentation of sugars for the production of alcohol (ethanol type). Ethanol sources are sugar cane (mainly in Brazil) or corn and other starch-containing grains (mainly in the US). Bioethanol can be diluted in gasoline at concentrations of up to 5% without any need for changes in the engine. Ethanol is added to gasoline at concentrations of 5% (in Europe), 10%, 20%, 85% (in Brazil and the USA), and 100% for vehicles designed for this purpose.⁶¹

(FAME), THE STANDARDS INSTITUTION OF ISRAEL (SII), <https://portal.sii.org.il/heb/standardization/teken/?tid=bf3a4a8f-64a8-4246-9f10-0fb40bd61620> (in Hebrew; last visited Apr. 12, 2018), archived at <https://perma.cc/HE8D-HNEV>.

⁵⁹ *Biofuels: Biodiesel and Bioethanol*, supra note 58.

⁶⁰ *Id.*

⁶¹ *Id.*; see also *Fuel Car Engines: Ethanol as a Component at Night for Gasoline Requirements and Testing Methods*, SII, <https://portal.sii.org.il/heb/standardization/teken/?tid=3b192c3a-8e39-4846-9ad1-7c4925458c3e> (last visited Apr. 12, 2018), archived at <https://perma.cc/2K7J-746H>.

Japan

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SUMMARY The Air Pollution Control Act is the main legislation concerning air pollution in Japan. Regarding protection of the ozone layer, the Ozone Layer Protection Act regulates the manufacture and import of specified substances that deplete the ozone layer. The use, management, and disposal of fluorocarbons are strictly regulated by the Fluorocarbons Management Act, the Home Appliances Recycling Law, and the Automobile Recycling Law.

Emission standards for automobiles have been established by the relevant ministries under the Air Pollution Control Act and the Road Transport Vehicle Act. Nitrogen oxides (NO_x) and particulate matters (PM) are further regulated in metropolitan areas. Under the Air Pollution Control Act, the Minister of Environment may prescribe maximum permissible limits for the properties of automobile fuel, or maximum permissible limits for the quantity of substances contained in automobile fuel.

Under the Act on Rationalizing Energy Use, the Ministry of Economy, Trade and Industry (METI) and the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) have established standards for the improved fuel efficiency of automobiles taking into consideration the highest level fuel efficiency.

When a person intends to establish facilities that generate soot and smoke, specified particulates, or other pollutants, her or she must submit advance notice the prefectural governor under the Air Pollution Control Act.

The government is currently trying to increase the amount of power sourced by renewable energy. The Act on Special Measures Concerning Procurement of Electricity from Renewable Energy Sources by Electricity Utilities requires electric companies to purchase electricity generated by renewable energy source at a certain price. To protect desirable farmland and fishery areas while promoting renewable power generation facilities, the Renewable Energy Generation in Farmland Act facilitates the orderly establishment of such facilities. The government also supports development of large-scale energy storage systems for power generated by renewable sources.

I. Basic Framework

Japan's Basic Environment Act articulates the country's basic policies regarding environmental conservation.¹ Based on the Act, the government has established the Basic Environment Plan,² and has also established environmental quality standards with regard to air pollution, water

¹ 環境基本法 [Basic Environment Act], Act No. 91 of 1993, *amended by* Act No. 46 of 2014, art. 1.

² *Id.* art. 15.

pollution, soil contamination, and noise.³ The prefectural governors may also formulate environmental pollution control programs for specific areas if environmental pollution in the area is currently serious or could be worsened due to the rapidly increasing population and the concentration of industry.⁴

The Air Pollution Control Act is the main legislation concerning air pollution in Japan. The Act promotes the implementation of measures against hazardous air pollutants and sets maximum permissible limits for automobile exhaust.⁵

In addition, Japan is a party to several relevant international agreements, having ratified the 1985 Vienna Convention for the Protection of the Ozone Layer⁶ and the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer in 1988.⁷ Regarding global warming, the government adopted the Plan for Global Warming Countermeasures in May 2016⁸ and ratified the Paris Agreement in November 2016.⁹ In the Plan, the government set a greenhouse gas (GHG) emission reduction target of 26% by 2030 (25.4% compared to 2005).¹⁰

The Ministry of the Environment (MOE) plays a central role in the government's environmental conservation policy.¹¹ The Ministry of Economy, Trade and Industry (METI) has jurisdiction over energy efficiency, renewable energy (especially solar photovoltaic power), and global warming.¹² The Ministry of Land, Infrastructure, Transport and Tourism (MLIT) is in charge of making

³ *Id.* art. 16.

⁴ *Id.* art. 17.

⁵ 大気汚染防止法 [Air Pollution Control Act], Act No. 97 of 1968, amended by Act No. 41 of 2015, art. 1.

⁶ United Nations Treaty Collection (UNTC), Ch. 27, 2, Vienna Convention for the Protection of the Ozone Layer, https://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtsg_no=XXVII-2&chapter=27&clang=en, archived at <https://perma.cc/3H9U-YW7P>.

⁷ UNTC, Ch. 27, 2, a Montreal Protocol on Substances that Deplete the Ozone Layer, https://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtsg_no=XXVII-2-a&chapter=27&clang=en, archived at <https://perma.cc/48MN-LHAB>.

⁸ 「地球温暖化対策計画」の閣議決定について [Regarding Cabinet Decision of “Plan for Global Warming Countermeasures”], MOE (May 13, 2016), <https://www.env.go.jp/press/102512.html>, archived at <https://perma.cc/DX8G-MBY7>.

⁹ UNTC, Ch. 27, 7.d Paris Agreement, https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtsg_no=XXVII-7-d&chapter=27&clang=en (last visited Apr. 30, 2018), archived at <https://perma.cc/4GS9-UL4X>.

¹⁰ 地球温暖化対策計画 [Plan for Global Warming Countermeasures], Cabinet Decision (May 13, 2016), <https://www.env.go.jp/earth/ondanka/keikaku/onntaikaku-zentaiban.pdf>, archived at <https://perma.cc/LM7P-HLW7>. See also Overview of the Plan for Global Warming Countermeasures, Cabinet Decision on May 13, 2016, MOE (Tentative Translation), <https://www.env.go.jp/press/files/en/676.pdf>, archived at <https://perma.cc/L7ES-NK33>.

¹¹ Environmental Conservation Policy of the Government and the Task of the Ministry of the Environment, MOE (Feb. 2006), <http://www.env.go.jp/en/aboutus/pamph/html/00pan040.html>, archived at <https://perma.cc/7J3T-AWTN>. The entire document is available through <http://www.env.go.jp/en/aboutus/pamph/html/> (last visited Apr. 30, 2018), archived at <https://perma.cc/4POU-HMRV>.

¹² *Energy and Environment Policy*, METI, http://www.meti.go.jp/english/policy/energy_environment/index.html (last visited Apr. 30, 2018), archived at <https://perma.cc/7V3G-EZZP>.

buildings more energy efficient, developing greenhouse gas countermeasures for individual vehicles, and promoting low-carbon urban development.¹³ The Ministry of Agriculture, Forestry and Fisheries (MAFF) also has some jurisdiction over environmental issues, such as agricultural greenhouse gases and renewable energy from biomass.¹⁴

II. Ozone Layer Protection

A. Ozone Layer Protection Act

The Diet (Japan's parliament) enacted the Act on the Protection of the Ozone Layer Through the Control of Specified Substances and Other Measures (Ozone Layer Protection Act) in 1988.¹⁵ The Act establishes measures for controlling the manufacture of, reducing emissions from, and rationalizing the use of specified substances that deplete the ozone layer.¹⁶ The controlled substances are specified in a cabinet order that corresponds to substances in annexes to the Montreal Protocol.¹⁷

The Minister of METI issues permits for manufacturing specified substances or approvals for their import in order to keep the level of production and consumption of each specified substance within the limits that Japan must observe based on the provisions of the Montreal Protocol.¹⁸

A person who seeks to manufacture specified substances must obtain a permit from the Minister of METI for the quantity of the specified substance the person seeks to manufacture during the year. However, permission is not required when a person manufactures a certain specified substance in a quantity that has been already been allowed by the Minister in another permitting procedure.¹⁹ A person who manufactures a specified substance in a quantity not exceeding the fixed quantity specified by a cabinet order²⁰ is also not required to obtain permission, but is required to report the quantity to the Minister.²¹ When a person has destroyed a specified substance, used it as a raw material in a manufacturing process of a substance other than the specified substance, or used it for a purpose specified by a cabinet order, the person may

¹³ MLIT, *White Paper on Land Infrastructure, Transport and Tourism in Japan* ch. 8, § 1. 1 (2016), <http://www.mlit.go.jp/common/001216023.pdf>, archived at <https://perma.cc/5Z7E-BT42>.

¹⁴ *Environmental Issues*, MAFF, <http://www.maff.go.jp/e/policies/env/index.html> (last visited May 1, 2018), archived at <https://perma.cc/65FC-7Y3D>.

¹⁵ 特定物質の規制等によるオゾン層の保護に関する法律 [Act on the Protection of the Ozone Layer Through the Control of Specified Substances and Other Measures], Act No. 53 of 1988, amended by Act No. 64 of 2014.

¹⁶ *Id.* art. 1.

¹⁷ 特定物質の規制等によるオゾン層の保護に関する法律施行令 [Enforcement Order of Act on the Protection of the Ozone Layer Through the Control of Specified Substances and Other Measures], Cabinet Order No. 308 of 1994, amended by Cabinet Order No. 411 of 2014, art. 1 & attached tables.

¹⁸ *Id.* art. 7.

¹⁹ *Id.* art. 4, para. 1.

²⁰ Enforcement Order of Ozone Layer Protection Act art. 2.

²¹ Ozone Layer Protection Act art. 4, para. 3.

manufacture the specified substance in the specified quantity upon confirmation from the Minister of METI.²²

A person who seeks to import a specified substance must receive approval to import²³ pursuant to the Foreign Exchange and Foreign Trade Act.²⁴ A person who has exported a specified substance must notify the Minister of METI every year of the export quantity in the previous year and other matters.²⁵

The Ozone Layer Protection Act obligates persons who use specified substances to endeavor to reduce their emissions and rationalize the use of specified substances.²⁶ The Minister of METI and the Minister of the Environment have issued guidelines for reducing emissions and rationalizing the use of specified substances.²⁷ The guidelines suggest that persons who use the specified substances (1) make their facility a sealed structure, (2) add cooling and steam condensation functions for the specified substances, (3) introduce substitute substances, and (4) recycle the specified substances that are used for cleaning solutions, among other things.²⁸

B. Act on the Rational Use and Proper Management of Fluorocarbons

Under the Act on Rational Use and Proper Management of Fluorocarbons (Fluorocarbons Management Act), the government takes measures for the “rational use” of fluorocarbons and the “proper management” of fluorocarbons used in specified products in order to control fluorocarbon emissions into the atmosphere.²⁹

The “rational use” of fluorocarbons means reducing the use of fluorocarbons by such measures as manufacturing alternative substances that will not deplete the ozone layer and will not have a serious impact on global warming, and reducing the amount of fluorocarbons used in products.³⁰ The Minister of METI has issued guidelines for manufacturers of products that use

²² *Id.* arts. 11–13.

²³ *Id.* art. 6.

²⁴ 外国為替及び外国貿易法 [Foreign Exchange and Foreign Trade Act], Act No. 228 of 1949, *amended by* Act No. 38 of 2017, art. 52.

²⁵ Ozone Layer Protection Act art. 17.

²⁶ *Id.* art. 19.

²⁷ *Id.* art. 20; 特定物質の排出抑制・使用合理化指針 [Guidelines for Reducing Emissions and Rationalizing Use], MOE and METI Notification No. 2 (Jan. 4, 1989), *amended by* MOE and METI Notification No. 1 (Mar. 26, 2008), <http://www.env.go.jp/hourei/11/000631.html>, archived at <https://perma.cc/BEL9-D7J6>.

²⁸ *Id.*

²⁹ フロン類の使用の合理化及び管理の適正化に関する法律 [Act on Rational Use and Proper Management of Fluorocarbons], Act No. 64 of 2001, *amended by* Act No. 39 of 2013, art. 1, http://www.japaneselawtranslation.go.jp/law/detail_main?re=02&ia=03&ph=&vm=02&id=2848, archived at <https://perma.cc/2E96-52VL>.

³⁰ *Id.* art. 2, para. 6.

fluorocarbons.³¹ The guidelines state that manufacturers must establish a “plan of rationalization” for the use of fluorocarbons and submit an annual report to the METI.³²

The “proper management” of fluorocarbons used in specified products means that fluorocarbon users must properly measure emissions of, fill specified products with, make efforts to reduce overall emissions of, and recover, recycle, and destroy fluorocarbons.³³ “Specified products” means Class I specified products, including air conditioners and refrigeration equipment or freezing equipment for commercial use, and Class II specified products, including air conditioners for automobiles that use fluorocarbons as a refrigerant.³⁴

The Minister of METI has established standards regarding the measures to be taken by persons who manage Class I specified products.³⁵ A person who manages more than Class I specified products is obligated to annually report the estimated leakage amount of fluorocarbons calculated by the method specified by an ordinance.³⁶ Any person intending to engage in filling and recovery operations for a particular fluorocarbon (Class I fluorocarbon filling and recovery operator) must be registered with the relevant municipal heads or prefectural governors having jurisdiction over the areas where the operations are to be conducted.³⁷ A person who manages Class I specified products must hire a registered Class I fluorocarbon filling and recovery operator when fluorocarbon is added to or recovered from the Class I specified products.³⁸ A person who manages Class I specified products must also deliver the fluorocarbons added to the Class I specified products to a registered fluorocarbon filling and recovery operator when the person disposes of the product.³⁹ Quantities of fluorocarbons filled or collected by a fluorocarbon filling and recovery operator are reported to designated information process centers.⁴⁰

A person intending to engage in recycling operations for Class I fluorocarbons must obtain a license from the competent ministers for each place of business where the person will operate the business.⁴¹ Such Class I fluorocarbon recycling operators collect fluorocarbons from Class I fluorocarbon filling and recovery operators and recycle the fluorocarbons. When recycling, the

³¹ フロン類の製造業者等向けガイドライン [Guidelines for Fluorocarbons Manufacturers], Ozone Layer Protection Promotion Room, Chemical Substance Management Division, Manufacture and Industry Bureau, METI (July 7, 2015), http://www.meti.go.jp/policy/chemical_management/ozone/furon-gas-guidline20151217.pdf, archived at <https://perma.cc/XRR9-6Y4F>.

³² *Id.*

³³ Fluorocarbons Management Act art. 2, para. 9.

³⁴ *Id.* art. 2, paras. 3–5.

³⁵ *Id.* art. 16, para. 1.

³⁶ *Id.* art. 19.

³⁷ *Id.* art. 27.

³⁸ *Id.* arts. 37 & 39.

³⁹ *Id.* art. 41.

⁴⁰ *Id.* arts. 76 & 78.

⁴¹ *Id.* art. 50.

operators must follow the standards for recycling fluorocarbons specified by the ordinances of the competent ministries.⁴²

A person intending to engage in fluorocarbon destruction operations must obtain a license from the competent ministers for each place of business where the person will conduct operations.⁴³ A fluorocarbon destruction operator must collect fluorocarbons when a Class I fluorocarbon filling and recovery operator has so requested or a fluorocarbon recycling operator request to collect them because the recycling operator cannot process unless there are reasonable grounds for refusal.⁴⁴

A person who recovers or transports fluorocarbons used in Class II specified products upon maintenance of vehicles must comply with the standards for recovery or transport of fluorocarbons specified by ordinances of the competent ministries.⁴⁵ The recovery and destruction of fluorocarbons used in Class II specified products are governed by the End-of-Life Vehicles Recycling Act (see the following section) in addition to the Fluorocarbons Management Act.⁴⁶

The Act prohibits the release of fluorocarbons used in specified products into the atmosphere without good reason.⁴⁷ It also requires products containing fluorocarbons to bear labels stating such prohibition and the necessity of collecting fluorocarbons upon disposal of the product, among other things.⁴⁸

Violations of the Act are criminally punishable.⁴⁹

C. Home Appliance and Automobile Recycling Laws

The Home Appliances Recycling Act⁵⁰ obligates manufactures of air conditioners and refrigerators to collect and recycle fluorocarbons from these appliances. The Act on Recycling of End-of-Life Vehicles obligates fluorocarbon recovery operators who are registered under the Act to collect end-of-life automobiles, collect fluorocarbons from them, and hand over the remaining car to car dismantling operators.⁵¹

⁴² *Id.* art. 58, para. 1.

⁴³ *Id.* art. 63, para. 1.

⁴⁴ *Id.* art. 69, paras. 1 & 2.

⁴⁵ *Id.* art. 88.

⁴⁶ *Id.* art. 89.

⁴⁷ *Id.* art. 86.

⁴⁸ *Id.* art. 87.

⁴⁹ *Id.* ch. V, arts. 103–109.

⁵⁰ 特定家庭用機器再商品化法 [Specified Home Appliances Recycling Act], Act No. 97 of 1998, *amended by* Act No. 74 of 2011, art. 18, para. 2; Specified Home Appliances Recycling Act Enforcement Order, Cabinet Order No. 378 of 1998, *amended by* Cabinet Order No. 81 of 2015, art. 2.

⁵¹ 使用済自動車の再資源化等に関する法律 [Act on Recycling, etc. of End-of-Life Vehicles], Act No. 87 of 2002, *amended by* Act No. 61 of 2017, art. 11.

III. Automobile Emission Standards

A. Emission Standards

Under the Air Pollution Control Act, the Minister of the Environment prescribes maximum permissible limits for various pollutants contained in automobile emissions under specified conditions.⁵² Current standards are set forth in the MOE Notification No. 141, the Motor Vehicle Exhaust Emission Standards.⁵³

Based on the Road Transport Vehicle Act,⁵⁴ the Minister of MLIT also issues regulations in connection with the emission of automobile exhaust, which must be consistent with the MOE Notification.⁵⁵ In the Notification Detailing the Safety Standards of the Road Transport Vehicle, the MLIT specifies the test method and the maximum emissions for carbon monoxide (CO), non-methane hydrocarbons (NMHC), nitrogen oxides (NO_x), and particulate matter (PM) per unit,⁵⁶ as reflected in the following chart:

	CO	NMHC	NO _x	PM
Max	1.92	0.08	0.08	0.007
Average	1.15	0.05	0.05	0.005

Source: MLIT Notification No. 619 of 2002.⁵⁷

B. Automobile NO_x/PM Reduction Law

In consideration of the problem of air pollution caused by NO_x and PM emitted from automobiles in areas where traffic is concentrated, the Automobile NO_x/PM Reduction Act establishes NO_x and PM emission standards for certain automobiles registered in specified areas, and restricts the

⁵² Air Pollution Control Act art. 19, para. 1.

⁵³ 自動車排出ガスの量の許容限度 [Motor Vehicle Exhaust Emission Standards], MOE Notification No. 1 of 1974, *amended by* MOE Notification No. 141 of 2006. An English translation of the chart of the standards is available at https://www.env.go.jp/en/air/aq/mv/table_290628.pdf, *archived at* <https://perma.cc/FYB8-RESJ>.

⁵⁴ 道路運送車両法 [Road Transport Vehicle Act], Act No. 185 of 1951, *amended by* Act No. 40 of 2017.

⁵⁵ Air Pollution Control Act art. 19, para. 2.

⁵⁶ 道路運送車両の保安基準 [Safety Standards of the Road Transport Vehicle], Ministry of Transport Ordinance No. 67 of 1951, *amended by* MLIT Ordinance No. 39 of 2017, art. 31; 道路運送車両の保安基準の細目を定める告示 [Notification Detailing the Safety Standards of the Road Transport Vehicle], MLIT Notification No. 619 of 2002, *as amended*, arts. 41, 119 & 197. *See also* 保安基準等関係基準の各条文検索一覧表 [Chart of Each Article of the Safety Standards and Other Standards], MLIT, at 4, <http://www.mlit.go.jp/notice/noticedata/pdf/200904/00005130.pdf> (last visited Apr. 17, 2018), *archived at* <https://perma.cc/RHV4-KHA7>.

⁵⁷ 道路運送車両の保安基準の細目を定める告示 [Notification Detailing the Safety Standards of the Road Transport Vehicle], MLIT Notification No. 619 of 2002, *as amended*, arts. 41, 119 & 197.

amount of NO_x and PM emissions from automobiles for business activities.⁵⁸ The specified areas are metropolitan areas where traffic is concentrated, as designated by governors.⁵⁹ The specific automobiles are trucks and buses (not only diesel-fueled ones) and diesel passenger cars. The owners of automobiles that do not satisfy the emission standards cannot register them within the specified areas and will not be permitted to operate in those areas.⁶⁰ Automobiles that were previously registered but are now subject to restrictions under the Act do not pass the required inspection and therefore the car registration cannot be renewed.⁶¹ However, when the owners of such automobiles install MLIT-certified devices to reduce emissions, such automobiles may be registered.⁶²

The emission standards under the Act are as follows:

Car Type	Permissible Limits		
	Fuel	NO _x	PM
Passenger cars & Special car with capacity of maximum 10 persons	Diesel	0.48 g/km 100 ppm	0.055 g/km
Automobiles (Buses, trucks, etc.) 1.7 ton or less (GVW)	Gasoline or LPG	0.48 g/km	
	Diesel	0.48 g/km 100 ppm	0.055 g/km
Automobiles more than 1.7 ton & 2.5 ton or less	Gasoline or LPG	0.63 g/km	
	Diesel	0.63 g/km 130 ppm	0.06 g/km
Automobiles more than 2.5 ton & 3.5 ton or less	Gasoline or LPG	5.9 g/kWh [kilowatt hours] 580 ppm	

⁵⁸ 自動車から排出される窒素酸化物及び粒子状物質の特定地域における総量の削減等に関する特別措置法 [Act on Special Measures for Total Emission Reduction of Nitrogen Oxides from Automobiles in Specified Areas], Act No. 70 of 1992, *amended by* Act No. 105 of 2011, art. 1.

⁵⁹ *Id.* arts. 15 & 17.

⁶⁰ 自動車 NO_x PM 法の車種規制 [Regulation by Automobile Models under Automobile NO_x/PM Law], MOE, http://www.env.go.jp/air/mat/mat01_02.pdf (last visited Apr. 30, 2018), *archived at* <https://perma.cc/W5PN-SD4X>.

⁶¹ Road Transport Vehicle Act art. 62.

⁶² NO_x PM 低減改造認定制度を創設しました [Establishment of NO_x PM Reduction Certification System], MLIT (Aug. 23, 2005), http://www.mlit.go.jp/kisha/kisha05/09/090823_.html, *archived at* <https://perma.cc/YX9A-7GDG>.

	Diesel	5.9 g/kWh 340 ppm	0.175 g/kWh
Automobiles more than 3.5 ton	Gasoline or LPG	5.9 g/kWh 580 ppm	
	Diesel	5.9 g/kWh	0.49 g/kWh

*Source: Emission Standards (Summary), MLIT, as translated by author.*⁶³

C. Automobile Fuel Quality Regulations

Under the Air Pollution Control Act, the Minister of Environment may prescribe maximum permissible limits for the properties of automobile fuel, or maximum permissible limits for the quantity of substances contained in automobile fuel, in order to keep emissions from automobiles below the permissible limits.⁶⁴ The MOE has issued a notification to set the standards.⁶⁵ The Minister of Economy, Trade and Industry may also issue an ordinance on the quality of gasoline and diesel to be used as fuels for automobiles, based on the Act on Quality Control for Gasoline and Other Fuels.⁶⁶ The Air Quality Control Act states that the Minister must set standards for gasoline in compliance with the MOE standards.⁶⁷ The METI Ordinance currently sets the standards as follows:

Gasoline	
Lead	Non-detectable
Sulfur content	10 ppm
MTBE	7% vol. max
Oxygen content	1.3% mass. max
Benzene	1% vol. max
Kerosene	4% vol. max
Methanol	Non-detectable
Ethanol	3% vol% max
Washed gum	5 mg/100 ml. max
Color	Orange

⁶³ 排出基準 (要約) [*Emission Standards (Summary)*], MLIT, http://www.tb.mlit.go.jp/kanto/jidou_gian/nox_pm/date/standard.pdf (last visited Apr. 30, 2018), archived at <https://perma.cc/A7BK-BTS7>.

⁶⁴ Air Pollution Control Act art. 19-1, para. 1.

⁶⁵ 自動車の燃料の性状に関する許容限度及び自動車の燃料に含まれる物質の量の許容限度 [Upper Limit of Conditions of Automobile Fuels and Maximum Limits of Substances Contained] <https://www.env.go.jp/hourei/04/000022.html> (last visited Apr. 30, 2018), archived at <https://perma.cc/ZHP2-5NHG>.

⁶⁶ 揮発油等の品質の確保等に関する法律 [Act on Quality Control for Gasoline and Other Fuels], Act No. 88 of 1976, amended by Act No. 69 of 2014, arts. 13 & 17-7, <http://www.japaneselawtranslation.go.jp/law/detail/main?re=02&ia=03&ph=&vm=02&id=2999>, archived at <https://perma.cc/B6HY-XH2K>.

⁶⁷ Air Pollution Control Act art. 19-1, para. 2.

Diesel	
Sulfur	10 ppm
Cetane Index	45 min.
Distillation, T90%	360°C max
Triglyceride1	0.01 mass% max
Fatty Acid Methyl Ester	0.1 mass% max or 0.5 max% and Methanol: 0.01 mass% max; Acid Value: 0.13 mg KOH/g max; Formic Acid+Acetic Acid+Propionic Acid: 0.003 mass% max; and Oxidation stability: 65 minutes min (temporary alternative: 0.12 mg KOH/g max)

Source: Based on information provided in MITI Ordinance No. 24 of 1977.⁶⁸

D. Fuel Efficiency

Pursuant to the Act on Rationalizing Energy Use, the Ministers of METI and MLIT have established and publicized “standards of judgment” for manufacturers of automobiles with regard to improvements in fuel efficiency.⁶⁹ The standards of judgment are established by considering the highest level of automobile fuel efficiency, future prospects for related technological developments, and other circumstances,⁷⁰ referred to collectively as the “top runner standards.”⁷¹

The Ministers set the standards by joint ordinances. The chart below shows 2015 fuel efficiency targets for gasoline and diesel passenger cars. The numbers apply to the average fuel efficiency of cars of each weight category that importers or manufacturers sold. The measurement method is the JC08 mode. In the case of diesel cars, the fuel economy numbers are divided by 1.1.⁷² Targets for 2020 were set in 2013:

⁶⁸ 揮発油等の品質の確保等に関する法律施行規則 [Enforcement Ordinance of the Act on Quality Control for Gasoline and Other Fuels], Ministry of International Trade and Industry (MITI) Ordinance No. 24 of 1977, *amended* by METI Ordinance No. 43 of 2016, arts. 10 & 22.

⁶⁹ エネルギーの使用の合理化等に関する法律 [Act on Rationalizing Energy Use], No. 49 of 1979, *amended* by Act No. 65 of 2015, art. 78, para. 1, http://www.japaneselawtranslation.go.jp/law/detail_main?re=02&ia=03&ph=&vm=02&id=2857, *archived at* <https://perma.cc/D7XR-ZHL6>.

⁷⁰ *Id.* art. 78, para. 1.

⁷¹ “Top Runner Standards refer to standard values established based on the most fuel-efficient vehicles available on the market and in view of the future prospects for technology development.” *New Standards for Fuel Efficiency of Small Freight Vehicles (Top Runner Standards)*, METI (Mar. 2015), http://www.meti.go.jp/english/press/2015/0320_01.html, *archived at* <https://perma.cc/D3JQ-T7AE>.

⁷² 乗用自動車のエネルギー消費性能の向上に関するエネルギー消費機器等製造事業者等の判断の基準等 [Standards for Manufacturers of Energy Consumption Machines/Devices Regarding Improvements of Fuel Efficiencies of Passenger Cars], METI-MLIT Notification No. 11 of 2013 (Dec. 27, 2013), 1-1(3),

Curb Weight (kg)	Fuel Economy Target (km/L)
- 600	22.5
601 - 740	21.8
741 - 855	21.0
856 - 970	20.8
971 - 1080	20.5
1081 - 1195	18.7
1196 - 1310	17.2
1311 - 1420	15.8
1421 - 1530	14.4
1531 - 1650	13.2
1651 - 1760	12.2
1761 - 1870	11.1
1871 - 1990	10.2
1991 - 2100	9.4
2101 - 2270	8.7
2271 -	7.4

Source: METI-MLIT Notification No. 11 of 2013, as translated & adapted by author.⁷³

The fuel efficiency targets of buses, trucks, and tractors were also set by a METI and MLIT notification.⁷⁴ A chart reflecting those standards is available on the MLIT website.⁷⁵

It, http://www.enecho.meti.go.jp/category/saving_and_new/saving/summary/pdf/top_runner/01toprunner_zyouyouzidouusya.pdf, archived at <https://perma.cc/4GJK-V2PP>.

⁷³ 乗用自動車のエネルギー消費性能の向上に関するエネルギー消費機器等製造事業者等の判断の基準等 [Standards for Manufacturers of Energy Consumption Machines/Devices Regarding Improvements of Fuel Efficiencies of Passenger Cars], METI-MLIT Notification No. 11 of 2013 (Dec. 27, 2013), at 1-1(7), http://www.enecho.meti.go.jp/category/saving_and_new/saving/summary/pdf/top_runner/01toprunner_zyouyouzidouusya.pdf, archived at <https://perma.cc/4GJK-V2PP>.

⁷⁴ *Id.*; 貨物自動車のエネルギー消費性能の向上に関するエネルギー消費機器等製造事業者等の判断の基準等 [Standards for Manufacturers of Energy Consumption Machines/Devices Regarding Improvements of Fuel Efficiencies of Trucks], METI MLIT Notification No. 1 of 2015 (July 10, 2015), <http://www.mlit.go.jp/common/001023499.pdf>, archived at <https://perma.cc/J25N-HJAZ>.

⁷⁵ 自動車の燃費基準値 [Fuel Efficiency Standards of Automobiles], MLIT (Mar. 2018), <http://www.mlit.go.jp/common/001225548.pdf>, archived at <https://perma.cc/NW52-EK BX>. These standards are a part of 自動車燃費一覧 (平成 30 年 3 月) [Compendium of Automobile Fuel Efficiencies (Mar. 2018)], MLIT, http://www.mlit.go.jp/jidosha/jidosha_fr10_000035.html, archived at <https://perma.cc/T9A5-NLYP>. Charts in English are available on Transport Policy's website, at <https://www.transportpolicy.net/standard/japan-light-duty-fuel-economy/> (last visited May 1, 2018), archived at <https://perma.cc/22FH-C72L>.

IV. Requirements for Opening New Industrial Facilities

The Air Pollution Control Act regulates the emission from factories and workplaces of soot and smoke, volatile organic compounds (VOCs), specified particulates, and mercury. “Soot and smoke” includes

- sulfur oxides generated by the combustion of fuel or other items;
- soot and dust generated by the combustion of fuel or other items or by the use of electricity as a source of heat; and
- specified cadmium, chlorine, hydrogen fluoride, lead, and other substances that are generated as a result of combustion, synthesis, decomposition, or other processes that are likely to harm human health or living conditions.⁷⁶

The government may identify areas with concentrations of factories or workplaces where it is difficult to attain air quality standards by using only the emission standards, whereupon the prefectural governor must formulate and implement aggregate volume standards of sulfur oxide and NO_x. Factories and workplaces that are larger than the scale that the prefectural governor specifies in accordance with the standards prescribed by MOE ordinance are subject to such regulation.⁷⁷

When a person intends to establish facilities that generate general particulates, the person must submit a notification to the prefectural governor before beginning to operate the facility. Such notification must include information about the structure and planned use of the facility.⁷⁸ Subsequent operation of the facility must comply with the standards in terms of the structure, use, and management of the facility as set by the MOE.⁷⁹ When a prefectural governor finds that the person is not complying with the standards, the governor may order him or her to comply within a specified period and/or temporarily suspend use of the facility.⁸⁰

Persons intending to establish facilities that generate soot and smoke, VOCs, specified particulates, or mercury must submit notifications to the prefectural governor more than sixty days before beginning construction.⁸¹ In addition to information about the structure and use of the facility, such notifications must include information on the methods for disposing of soot and smoke or VOCs, or the methods for disposing of or preventing dispersal of specified particulates.⁸² A governor may order changes or abolition of a plan set forth in a notification if he or she thinks the

⁷⁶ Air Pollution Control Act art. 2, para. 1.

⁷⁷ *Id.* art. 5-2, para. 1.

⁷⁸ *Id.* art. 18.

⁷⁹ *Id.* art. 18-3.

⁸⁰ *Id.* art. 18-4.

⁸¹ *Id.* arts. 6, 10, 17-5, 17-9, 18-6, 18-9, 18-23 & 18-27.

⁸² *Id.*

facility will emit more soot and smoke, VOCs, or specified particulates than regulated.⁸³ Documents stating the quantities of sulfur oxides and NO_x generated and the way in which sulfur oxides and NO_x will be emitted by the factories or workplaces must be attached to the notification.⁸⁴

In addition, under the Automobile NO_x/PM Act, a person who intends to establish a theater, hotel, office building, or other building of a certain size that generates heavier traffic must submit a notification to the prefectural governor. The notification must include information on the use, size, and layout of parking for the building; expected emissions of NO_x from vehicles coming to the building; and methods the person will take to reduce emission of NO_x from vehicles.⁸⁵

V. Promotion of Renewable Energy

A. Feed-In-Tariff Act

The 2015 Long-Term Energy Supply and Demand Outlook by METI aims to have power sourced by renewable energy at 22–24% of total power generation in Japan by 2030.⁸⁶ To promote the use of renewable energy sources for electricity, the Act on Special Measures Concerning Procurement of Electricity from Renewable Energy Sources by Electricity Utilities (the FIT Act) was enacted in 2011 and became effective in 2012.⁸⁷ The FIT Act requires electricity companies to purchase electricity generated by renewable energy sources (solar photovoltaic, wind power, hydraulic power below 30 megawatts, geothermal, and biomass)⁸⁸ at a certain price.⁸⁹ Costs incurred by the utility in purchasing renewable energy-sourced electricity must be transferred to all electricity customers, who pay the surcharge for renewable energy in proportion to their electricity usage.⁹⁰

A person who intends to generate electricity by a power generation facility using a renewable energy source must obtain certification from the Minister of METI in order to provide the power to an electricity utility.⁹¹ To be certified, the following requirements must be met:

⁸³ *Id.* arts. 9, 17-11, 18-8 & 18-26.

⁸⁴ *Id.* art. 6, para. 2.

⁸⁵ Automobile NO_x/PM Reduction Act art. 20. *See also* 自動車 NO_x・PM 法の改正について [Regarding Amendment of Automobile NO_x/PM Reduction Act] § 3, MOE (Dec. 2007), http://www.env.go.jp/air/car/pamph_kaiseihou/04.pdf, archived at <https://perma.cc/Y2WZ-HVUK>. The entire pamphlet is available through http://www.env.go.jp/air/car/pamph_kaiseihou/, archived at <https://perma.cc/VU5F-XDNF>.

⁸⁶ METI, LONG-TERM ENERGY SUPPLY AND DEMAND OUTLOOK (July 2015), http://www.meti.go.jp/english/press/2015/pdf/0716_01a.pdf, archived at <https://perma.cc/KT96-H9WA>.

⁸⁷ 電気事業者による再生可能エネルギー電気の調達に関する特別措置法 [Act on Special Measures Concerning Procurement of Electricity from Renewable Energy Sources by Electricity Utilities (FIT Act)], Act No. 108 of 2011, amended by Act No. 59 of 2016, art. 1, http://www.japaneselawtranslation.go.jp/law/detail_main?re=02&ia=03&ph=&vm=02&id=2573, archived at <https://perma.cc/AH6T-9LHJ>.

⁸⁸ *Id.* art. 2, para. 4.

⁸⁹ *Id.* art. 2, para. 5 & art. 16.

⁹⁰ *Id.* arts. 31 & 36.

⁹¹ *Id.* art. 9, para. 1.

- The electricity generating business must be deemed to promote usage of electricity generated by a renewable source based on the standards provided by the METI Ordinance.
- The electricity generating business must be expected to run smoothly and with certainty.
- The renewable energy power generation facility must be able to generate power steadily and efficiently over the Procurement Period and conform to other standards provided for by the METI Ordinance.⁹²

When these requirements were initially implemented large numbers of businesses sought certification as solar power suppliers because the prices at which utilities were required to buy electricity from solar power suppliers were relatively high. However, many certified business did not start for various reasons, such as a failure to establish a facility.⁹³ The METI requested relevant information from such businesses and cancelled their certifications if they could not start a business within a certain amount of time.⁹⁴ The 2016 amendment of the Act addresses this issue. As stated above, in order to be certified, the business plan is now examined, not just the facility. The amended Act also requires owners of renewable energy facilities to enter into an interconnection agreement with the relevant utility before certification.⁹⁵ In addition, certifications for those who were certified soon after the FIT Act became effective and had not started their business by the end of March 2017 expired.⁹⁶

To give power-generating businesses predictability regarding their profits, the Minister of METI may set tariffs in advance for the following fiscal years⁹⁷ and must set a target price for tariffs over the long term.⁹⁸ To reduce electricity purchase costs, the amended Act introduced a reverse auction system for determination of electricity tariffs. When the Minister expects that the tariff for electricity from a particular renewable source can be reduced by using an auction system, the Minister may conduct such an auction.⁹⁹ Suppliers then submit bids and compete for the right to supply a fixed amount of power to the utilities. The bids are accepted from the lowest bid upwards, until the capacity available at the auction is fully allocated.¹⁰⁰

⁹² *Id.* art. 9, para. 3.

⁹³ FIT 発電事業の適正化 [Optimization of FIT Electricity Generation Business], AGENCY FOR NATURAL RESOURCES AND ENERGY (Jan. 24, 2018), http://www.meti.go.jp/committee/sougouenergy/denryoku_gas/saiseikanou_jisedai/pdf/002_05_00.pdf, archived at <https://perma.cc/Q4YG-3VEE>.

⁹⁴ *Id.* See also FIT Act (original Act No. 108 of 2011) art. 6, para. 6.

⁹⁵ FIT Act art. 9, para. 2, item 5.

⁹⁶ Optimization of FIT Electricity Generation Business, *supra* note 93.

⁹⁷ FIT Act art. 3, para. 2.

⁹⁸ *Id.* art. 3, para. 12.

⁹⁹ *Id.* art. 4.

¹⁰⁰ *Id.* art. 7.

The METI calculated that the annual surcharges collected from an average household that consumes 300 kWh per year would be ¥8,100 (about US\$80) in 2016.¹⁰¹ In 2018, the purchase price of solar PV electricity for 10 kW to 2,000 kW is 18 yen (US\$0.16),¹⁰² reduced from the 2016 price of 24 yen (US\$0.22). For the price of solar PV power at 2,000 kW or more, the reverse auction system has applied since 2017.¹⁰³

B. Renewable Energy Generation in Farmland Act

After the FIT Act was implemented, the Act on Promoting Generation of Electricity from Renewable Energy Sources Harmonized with Sound Development of Agriculture, Forestry and Fisheries (Renewable Energy Generation in Farmland Act) was enacted in 2013 to prevent harm to farmland and fishery areas by the establishment of renewable energy power generation facilities and to facilitate their orderly establishment.¹⁰⁴

Under the Act, the national government establishes a basic policy to harmonize promotion of power generation from renewable sources and the sound development of agriculture, forestry, and fisheries.¹⁰⁵ Municipal governments establish basic plans of renewable energy generation management based on the national basic policy.¹⁰⁶ A business that intends to establish a power generation facility by using renewable sources within the area where the municipal basic plan applies must obtain an approval from the municipal government under the basic plan.¹⁰⁷

The Act intended that power generation facilities would be established on land that is not desirable for farming rather than on fertile land. In addition, a percentage of the profit from power

¹⁰¹ News Release, METI, Agency for Natural Resources and Energy, Settlement of FY 2016 Purchase Prices and FY 2016 Surcharge Rates Under the Feed-In Tariff Scheme for Renewable Energy (Mar. 18, 2016), http://www.meti.go.jp/english/press/2016/0318_03.html, archived at <https://perma.cc/LRY3-GB4N>.

¹⁰² 買取価格・期間等（2018年度以降）[Purchase Price Terms, etc. (Fiscal Year 2018 and After)], Agency for Natural Resources and Energy, http://www.enecho.meti.go.jp/category/saving_and_new/saiene/kaitori/fit_kakaku.html, archived at <https://perma.cc/AS4T-RTZ4>.

¹⁰³ *Id.*

¹⁰⁴ 農林漁業の健全な発展と調和のとれた再生可能エネルギー電気の発電の促進に関する法律 [Act on Promoting Generation of Electricity from Renewable Energy Sources Harmonized with Sound Development of Agriculture, Forestry and Fisheries], Act No. 81 of 2013, art. 1, http://www.japaneselawtranslation.go.jp/law/detail_main?re=02&ia=03&ph=&vm=02&id=3036, archived at <https://perma.cc/9ZWW-ZBM3>. See also 農林漁業の健全な発展と調和のとれた再生可能エネルギー電気の発電の促進に関する法律（骨子） [Act on Promoting Generation of Electricity from Renewable Energy Sources Harmonized with Sound Development of Agriculture, Forestry and Fisheries (Outline)], MAFF (Dec. 2013), http://www.maff.go.jp/j/shokusan/renewable/energy/pdf/re_ene3.pdf, archived at <https://perma.cc/4WQA-SD7L>.

¹⁰⁵ Renewable Energy Generation in Farmland Act art. 4; 農林漁業の健全な発展と調和のとれた再生可能エネルギー電気の発電の促進による農山漁村の活性化に関する基本的な方針 [Basic Policy on Revitalization of Farm, Mountain and Fishery Villages by Promoting Generation of Electricity from Renewable Energy Sources Harmonized with Sound Development of Agriculture, Forestry and Fisheries], MAFF, METI and MOE Notification No. 2 (May 16, 2014), amended by MAFF, METI and MOE Notification No. 3 (May 27, 2016), <http://www.maff.go.jp/j/shokusan/renewable/energy/pdf/hoshin.pdf>, archived at <https://perma.cc/SUF3-QSQ7>.

¹⁰⁶ Renewable Energy Generation in Farmland Act art. 5.

¹⁰⁷ *Id.* art. 7.

generation must be used for revitalization of the area.¹⁰⁸ The Act enables municipalities to issue one permit that substitutes for various permits under various laws, such as the Farmland Act, the Cattle Business Promotion Act, the Forestry Act, the Natural Park Act, etc.¹⁰⁹

C. Storage of Energy Generated by Renewable Source

Because solar photovoltaic and wind power generation is affected by weather, energy storage is important for managing volatility in electricity production. When energy can be stored, the excess electricity produced from renewable resources during ideal energy generation conditions can be stored and used during cloudy (in the case of solar energy) or calm (in the case of wind energy) weather conditions. The METI has supported development of large-scale energy storage systems since 2012.¹¹⁰

¹⁰⁸ 農山漁村再生可能エネルギー法 Q & A [Renewable Energy in Farm, Mountain Fishery Villages Act Q&A], MAFF, at 1 (Sept. 27, 2016), <http://www.maff.go.jp/j/shokusan/renewable/energy/attach/pdf/houritu-2.pdf>, archived at <https://perma.cc/T8YD-LVSX>.

¹⁰⁹ Renewable Energy Generation in Farmland Act arts. 9–15.

¹¹⁰ 再エネの安定化に役立つ「電力系統用蓄電池」 [“Large-scale Storage Battery” Useful for Stabilization of Renewable Energy], AGENCY FOR NATURAL RESOURCES AND ENERGY (Feb. 27, 2018), <http://www.enecho.meti.go.jp/about/special/johoteikyo/keitoyochikudenchi.html>, archived at <https://perma.cc/MVK3-4YDA>. See also Kikuo Takagi, *Battery Energy Storage Systems for Maximizing Renewable Energy Introduction: Approaches and Cases in Japan* (Paper presented at U.S.-Japan Renewable Energy Policy Business Roundtable, Dec. 11, 2013), <http://www.enecho.meti.go.jp/notice/event/045/pdf/event045008.pdf>, archived at <https://perma.cc/LKN5-EHTX>.

South Africa

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SUMMARY South Africa’s Air Quality Act of 2004 put in place various measures for the prevention of pollution and national norms and standards for the regulation of air quality in the country. It also authorizes the Minister of Environmental Affairs to enforce its provisions through the issuance of policy documents and regulations.

In 2007 the Minister issued the National Framework for Air Quality Management. In 2009, the Minister issued national ambient air quality standards for seven pollutants, including carbon dioxide and ozone. After a statutorily mandated review, in 2012 the Minister replaced the 2007 National Framework and in the same year issued national ambient air quality standards for particulate matter with an aerodynamic diameter of less than 2.5 microns. In 2013, the Minister issued emissions standards for a number of listed activities deemed detrimental to the environment. In 2014, the Minister issued regulations for the phasing out of certain ozone-depleting substances. In 2015, the Minister declared small-scale char and small-scale charcoal plants “controlled emitters” and imposed emissions limits on such activities. In 2017, the Minister declared a number of greenhouse gases (including carbon dioxide and methane) “priority pollutants.”

While South Africa does not appear to have vehicle fuel emissions standards in place, it imposes environmental levies on carbon dioxide emissions of new vehicles imported to or manufactured in South Africa.

I. Introduction

South Africa’s GHG emissions are among the highest in the world and its absolute carbon dioxide (CO₂) emissions rank among the top twenty countries, “with emissions per capita in the region of 10 metric tons per annum.”¹ The 2011 National Climate Change White Paper described this challenge as follows:

The energy intensity of the South African economy, largely due to the significance of mining and minerals processing in the economy and our coal-intensive energy system, has resulted in an emissions profile that differs substantially from that of other developing countries at a similar stage of development as measured by the Human Development Index. Since coal is the most emissions-intensive energy carrier, South Africa[’]s economy is very emissions-intensive. Furthermore, emissions from land-use change (primarily deforestation) contribute a significantly smaller share to our emission profile than for many other developing countries. In 2000, average energy use emissions for developing countries constituted 49% of total emissions, whereas South Africas [sic] energy use emissions

constituted just under 80% of total emissions. Even in some fast-developing countries with a similar reliance on coal for energy, energy use emissions are lower than South Africa.²

South Africa has national and international legal obligation to reduce its emissions. The Bill of Rights section of the South African Constitution includes an environment clause, which states that

[e]veryone has the right –

- a. to an environment that is not harmful to their health or well-being; and
- b. to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that –
 - i. prevent pollution and ecological degradation;
 - ii. promote conservation; and
 - iii. secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.³

South Africa is party to a number of multinational environmental agreements. These include the United Nations Framework Convention on Climate Change (UNFCCC), which South Africa ratified in 1997; the Kyoto Protocol, which South Africa ratified in 2002; and the Paris Agreement on Climate Change, ratified by South Africa in 2016.⁴ In the 2009 Copenhagen Climate Change Conference, South Africa committed to reducing its GHG emissions by 34% below its current levels (see below) by 2020 and 42% below current levels by 2025, “with emissions peaking in 2020–2025, stabilizing in 2025–2035 and declining in absolute terms from around 2035.”⁵

As part of its plan to implement the environment clause of the Constitution and its obligations under international law, South Africa enacted the National Environmental Management: Air Quality Act in 2004. The Act delegates a great deal of power to the executive branch to, among other things, put in place national policy and a regulatory framework for pollution prevention and the enhancement of air quality.

This report summarizes some of the key policy and regulatory documents issued for the purpose of implementing the Act and South Africa’s obligations under international law.

² DEPARTMENT OF ENVIRONMENTAL AFFAIRS, NATIONAL CLIMATE CHANGE RESPONSE WHITE PAPER 26 (Oct. 12, 2011), https://www.environment.gov.za/sites/default/files/legislations/national_climatechange_response_whitepaper.pdf, archived at <https://perma.cc/W6WQ-YGZZ>.

³ S. AFR. CONST., 1996, § 24, available on the South African government website, at <https://www.gov.za/documents/constitution/chapter-2-bill-rights#24>, archived at <https://perma.cc/YXV8-DLAZ>.

⁴ 2012 NATIONAL FRAMEWORK FOR AIR QUALITY MANAGEMENT IN THE REPUBLIC OF SOUTH AFRICA § 2.4 (Dec. 2012), available on the Centre for Environmental Rights website, at https://cer.org.za/wp-content/uploads/2013/12/Framework-for-Air-Quality-Management_new.pdf, archived at <https://perma.cc/77YM-FD7T>; Paul Herman, *Parliament Ratifies Paris Climate Change Agreement*, NEWS24 (Nov. 1, 2016), <https://www.news24.com/Green/News/parliament-ratifies-paris-climate-change-agreement-20161101>, archived at <https://perma.cc/999V-DCPU>.

⁵ DEPARTMENT OF ENVIRONMENTAL AFFAIRS, NATIONAL CLIMATE CHANGE RESPONSE WHITE PAPER, *supra* note 1, at 25.

II. National Environmental Management: Air Quality Act

A. Delegated Powers

The Air Quality Act, which, among other things, seeks to impose “reasonable measures for the prevention of pollution” and national norms and standards to regulate air quality, accords the executive branch a great deal of national regulatory authority for purposes of realizing the Act’s objectives. The executive branch, more specifically the Minister of Environmental Affairs, is mandated to establish a national framework for the effective implementation of the objectives of the Act, including

- a. mechanisms, systems and procedures to attain compliance with ambient air quality standards;
- b. mechanisms, systems and procedures to give effect to the Republic’s obligations in terms of international agreements;
- c. national norms and standards for the control of emissions from point and non-point sources;
- d. national norms and standards for air quality monitoring;
- e. national norms and standards for air quality management planning;
- f. national norms and standards for air quality information management; and
- g. any other matter which the Minister considers necessary for achieving the object of this Act.⁶

In addition to specific mandates stipulated in its different sections, the Act accords the Minister of Environmental Affairs the following general regulatory powers:

The Minister may make regulations that are not in conflict with this Act, regarding—

- (a) any matter necessary to give effect to the Republic’s obligations in terms of an international agreement relating to air quality and climate change;
- (aA) information relating to energy that is required for compiling atmospheric emissions;
- (b) matters relating to environmental management co-operation agreements, to the extent that those agreements affect air quality;
- (c) emissions, including the prohibition of specific emissions, from point, non-point and mobile sources of emissions, including motor vehicles;
- (d) open fires and incinerators;
- (e) ozone-depleting substances;
- (f) codes of practice;

⁶ National Environmental Management: Air Quality Act 39 of 2004, § 7, 20 STATUTES OF THE REPUBLIC OF SOUTH AFRICA – LAND (updated through 2016), available on the University of Pretoria website, at <http://www.lawsofsouthafrica.up.ac.za/index.php/browse/environment-and-conservation/national-environmental-management-air-quality-act-39-of-2004/act/39-of-2004-national-environmental-management-air-quality-act-19-may-2014-to-date-pdf/download>, archived at <https://perma.cc/ML2M-NSED>.

- (g) records and returns;
- (h) labelling;
- (i) trading schemes;
- (j) powers and duties of air quality officers;
- (k) appeals against decisions of officials in the performance of their functions in terms of the regulations;
- (l) incentives to encourage change in behaviour towards air pollution by all sectors in society;
- (lA) the procedure and criteria to be followed in the determination of an administrative fine in terms of section 22A.
- (m) requirements in respect of monitoring;
- (n) the avoidance or reduction of harmful effects on air quality from activities not otherwise regulated in terms of this Act;
- (o) any matter that may or must be prescribed in terms of this Act; or
- (p) any other matter necessary for the implementation or application of this Act.⁷

Regulations on these matters maybe issued to “restrict or prohibit any act, either absolutely or conditionally;” may be made applicable nationally, provincially, or target a specific area or category of areas; or may be applicable to all persons or certain categories of person.⁸ Such regulations may impose fines of up to South Africa Rand R5million (about US\$418,578) and/or a maximum of five years in prison for first-time violators of its provisions and double the amount of fines and prison term for recidivists.⁹

In addition to the Ministry of Environmental Affairs, a number of other national departments are accorded jurisdiction in matters relating to management of atmospheric emissions. These include the Department of Energy, which is responsible for emissions resulting from the use of fossil fuels and the Department of Mineral Resources, which, among other matters, deals with emissions from mining haul roads and emissions from fires in working and abandoned coal mines.¹⁰

B. 2012 National Framework for Air Quality Management

As noted above, the Air Quality Act mandates that the Minister Establish a National Framework for Air Quality Management, which must be reviewed at least every five years.¹¹ The Minister issued a national framework in 2007, which was repealed and replaced by the 2012 National

⁷ National Environmental Management: Air Quality Act § 53.

⁸ *Id.* § 55.

⁹ *Id.*

¹⁰ NATIONAL FRAMEWORK FOR AIR QUALITY MANAGEMENT IN THE REPUBLIC OF SOUTH AFRICA, *supra* note 3, § 3.2.4.

¹¹ National Environmental Management: Air Quality Act § 7.

Framework for Air Quality Management (the National Framework).¹² According to the Act, the National Framework “binds all organs of state in all spheres of government”¹³ and “serves as a blueprint for air quality management.”¹⁴

C. Ambient Air Quality Standards

The Act mandates that the Minister identify substances in ambient air that present a threat to health or the environment and establish national standards for ambient air quality, including the permissible amount or concentration of each substance in ambient air. The Minister is also authorized to impose national emissions standards for each substance.¹⁵

In 2009, the Minister established national ambient air quality standards for seven different pollutants: sulfur dioxide (SO₂), nitrogen dioxide (NO₂), particulate matter (PM₁₀), ozone (O₃), benzene (C₆H₆), lead (Pb), and carbon monoxide (CO).¹⁶ For instance, the ambient air quality standards for ozone are as follows:

Averaging Period	Concentration	Frequency of Exceedence	Compliance Date
8 hours (running)	120 ug/m ³ (61 ppb)	11	immediate
The reference method for the analysis of ozone shall be UV photometric method as described in SANS 13964			

Source: National Ambient Air Quality Standards, G.G. No. 1210.

In 2012, the Minister issued national ambient air quality standards for particulate matter with an aerodynamic diameter of less than 2.5 microns (PM_{2.5}).¹⁷ The standards are set as follows:

¹² NATIONAL FRAMEWORK FOR AIR QUALITY MANAGEMENT IN THE REPUBLIC OF SOUTH AFRICA, *supra* note 3, § 7.

¹³ National Environmental Management: Air Quality Act § 7.

¹⁴ NATIONAL FRAMEWORK FOR AIR QUALITY MANAGEMENT IN THE REPUBLIC OF SOUTH AFRICA, *supra* note 3, § 2.2.3.

¹⁵ National Environmental Management: Air Quality Act § 9.

¹⁶ National Environmental Management: Air Quality Act: National Ambient Air Quality Standards, GOVERNMENT NOTICE (G.N.) 1210 (DEC. 24, 2009), available at <http://www.lawsofsouthafrica.up.ac.za/index.php/browse/environment-and-conservation/national-environmental-management-air-quality-act-39-of-2004/regulations-and-notices/39-2004-national-environmental-management-air-quality-act-regs-gn-1210-in-gg32816-pdf/download>, archived at <https://perma.cc/F5ME-8SND>.

¹⁷ National Environmental Management: Air Quality Act: National Ambient Air Quality Standard for Particular Matter with Aerodynamic Diameter Less than 2.5 Micron Metres (PM_{2.5}), G.N. 486 (June 29, 2012), available on the Rhodes University website, at https://www.ru.ac.za/media/rhodesuniversity/content/environment/documents/NEMA_Air_Qual_Act_2004.pdf, archived at <https://perma.cc/5GCS-L4LE>.

Averaging Period	Concentration	Frequency of Exceedence	Compliance Date
24 hours	65 ug/m ³	4	Immediate–31 December 2015
24 hours	40 ug/m ³	4	1 January 2016–31 December 2029
24 hours	25 ug/m ³	4	1 January 2030
1 year	25 ug/m ³	0	Immediate–31 December 2015
1 year	20 ug/m ³	0	1 January 2016–31 December 2029
1 year	15 ug/m ³	0	1 January 2030
The reference method for the determination of PM _{2.5} Fraction of suspended particulate matter shall be EN 14907			

Source: National Ambient Air Quality Standard for Particulate Matter with Aerodynamic Diameter Less than 2.5 Micron Metres (PM_{2.5}), G.N. 486.

D. Listed Activities and Minimum Emissions Standards

The Air Quality Act requires the Minister to issue a list of activities that he “reasonably believes have or may have a significant detrimental effect on the environment, including health, social conditions, economic conditions, ecological conditions and cultural heritage.”¹⁸ A person who wishes to engage in a listed activity cannot do so without first obtaining an atmospheric emission license.¹⁹ Among the items that an atmospheric emission license must include are “the maximum allowed amount, volume, emission rate or concentration of pollutants that may be discharged in the atmosphere . . . under normal working conditions and . . . normal start-up, maintenance and shutdown conditions,” as well as “point source emission measurement and reporting requirements.”²⁰

In 2013, the Minister issued list of various activities and associated minimum emission standards.²¹ For instance, the emission standards for catalytic cracking units are set as follows:

¹⁸ National Environmental Management: Air Quality Act § 21.

¹⁹ *Id.* § 22.

²⁰ *Id.* § 43.

²¹ National Environmental Management: Air Quality Act: List of Activities which Result in Atmospheric Emissions which have or may have a Significant Detrimental Effect on the Environment, including Health, Social Conditions, Economic Conditions, Ecological Conditions or Cultural Heritage, G.N. No. 893 (Nov. 22, 2013), available at <http://www.lawsouthafrica.up.ac.za/index.php/browse/environment-and-conservation/national-environmental-management-air-quality-act-39-of-2004/regulations-and-notice/39-of-2004-national-environmental-management-air-quality-act-regs-gn-893-12-jun-2015-to-date-pdf/download>, archived at <https://perma.cc/2T6D-5PBP>.

Description:	Refinery catalytic cracking units		
Application:	All installations.		
Substance or mixture of substances		Plant status	mg/Nm³ under normal conditions of 10% O₂, 273 Kelvin and 101.3 kPa.
Common name	Chemical symbol		
Particulate matter	N/A	New	100
		Existing	120
Oxides of nitrogen	NO _x expressed as NO ₂	New	400
		Existing	550
Sulphur dioxide	SO ₂	New	1500
		Existing	3000

Source: National Environmental Management: Air Quality Act: List of Activities which Result in Atmospheric Emissions which have or may have a Significant Detrimental Effect on the Environment, including Health, Social Conditions, Economic Conditions, Ecological Conditions or Cultural Heritage, G.N. No. 893, Part 3 (Nov. 22, 2013).

E. Emission Standards for Controlled Emitters

The Act authorizes the Minister to declare “any appliance or activity” a “controlled emitter” if the appliance or activity results, or the Minister reasonably believes could result, “in atmospheric emissions which through ambient concentrations, bio-accumulation, deposition or any other way, present a threat to health or the environment.”²² A notice declaring an activity or an appliance to be a controlled emitter must “establish emission standards, which must include standards setting the permissible amount, volume, emission rate or concentration of any specified substance or mixture of substances that may be emitted from the controlled emitter.”²³ The Act bars any person from selling or using an appliance or engaging in an activity declared as a controlled emitter unless the appliance or the activity meets the standards set by the Minister.²⁴

In 2015, the Minister issued a notice declaring all small-scale char and small-scale charcoal plants in the country to be controlled emitters and imposed emission limits.²⁵ The limits are set as follows:

²² National Environmental Management: Air Quality Act § 23.

²³ *Id.* § 24.

²⁴ *Id.* § 25.

²⁵ National Environmental Management: Air Quality Act 39 of 2004, Declaration of a Small-Scale Char and Small-Scale Charcoal Plants as Controlled Emitters and Establishment of Emission Standards, G.N. 602 (Sept. 18, 2015), available at <http://www.lawsofsouthafrica.up.ac.za/index.php/browse/environment-and-conservation/national-environmental-management-air-quality-act-39-of-2004/regulations-and-notices/39-of-2004-national-environmental-management-air-quality-act-regs-gn-602-18-sep-2015-to-date-pdf/download>, archived at <https://perma.cc/TZ23-ZWET>.

Description	The production of char or charcoal		
Application	All small -scale char plant or small -scale charcoal plant.		
Substance or mixture of substances		Plant status	Limit value (dry mg/Nm³at 273K and 101.3kPa)
Common name	Chemical or Commonly-used symbol		
Particulate Matter	PM	New	50
		Existing	100
Polycyclic Aromatic Hydrocarbons	PAH	New	0.1
		Existing	0.5

Source: Declaration of a Small-Scale Char and Small-Scale Charcoal Plants as Controlled Emitters and Establishment of Emission Standards § 7, G.N. 602 (Sept. 18, 2015).

F. Priority Air Pollutants

The Act permits the Minister to designate certain substances “priority air pollutants” and to require persons dealing with such substances to prepare, submit for approval, and implement pollution prevention plans.²⁶ Such requirements must “contain a requirement that the person . . . monitors, evaluates and reports on the implementation of the pollution prevention plan.”²⁷

In 2017, the Minister declared the following greenhouse gases to be priority pollutants: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆).²⁸ Persons engaged in the production processes listed in the declaration, including coal mining, cement production, and electricity production facilities, are required to submit pollution prevention plans to the Minister and must monitor, evaluate, and report on the implementation of such plans.²⁹

G. National Atmospheric Emissions Inventory

In 2015, the Minister issued the National Atmospheric Reporting Regulations, the purpose of which is “to regulate reporting of data and information from an identified point, non-point and mobile sources of atmospheric emissions to an internet-based National Atmospheric Emissions

²⁶ National Environmental Management: Air Quality Act § 29.

²⁷ *Id.*

²⁸ National Environmental Management: Air Quality Act 39 of 2004: Declaration of Greenhouse Gases as Priority Air Pollutants, G.N. 710, § 2 (July 21, 2017), available at <http://www.lawsouthafrica.up.ac.za/index.php/browse/environment-and-conservation/national-environmental-management-air-quality-act-39-of-2004/regulations-and-notice/39-of-2004-national-environmental-management-air-quality-act-regs-gn-710-21-jul-2017-to-date-pdf/download>, archived at <https://perma.cc/P35W-E32Y>.

²⁹ *Id.* §§ 3–5.

Inventory System (NAEIS) towards the compilation of atmospheric emission inventories.”³⁰ The Regulations create a classification for several emissions sources and data providers, and require persons identified as data providers to register on the NAEIS.³¹ Data providers are classified into four groups, all of which must submit annual reports: persons who engage in listed activities, controlled emitters, mines, and facilities identified under applicable municipal bylaws.³²

H. Greenhouse Gas Emissions Reporting

In 2017, The Minister issued the National Greenhouse Gas Emissions Reporting Regulations, 2016.³³ The purpose of the Regulations is to “to introduce a single national reporting system for the transparent reporting of greenhouse gas emissions.”³⁴ Much like the National Atmospheric Reporting Regulations, these Regulations create categories of data providers and requires them to register and submit periodic reports.³⁵

I. Phase-Out and Management of Ozone-Depleting Substances

In 2014, the Minister issued the Regulations Regarding the Phasing-out and Management of Ozone-Depleting Substances.³⁶ Unless it is for a “critical use,” the Regulations bar anyone from “producing, importing, exporting, using or placing on the market” chlorofluorocarbons, bromochlorofluorocarbons, halons, carbon tetrachloride, 1,1,1-trichloroethane, hydrobromofluorocarbons, and bromochloromethane.³⁷ They also prohibit the stockpiling of certain listed ozone-depleting substances and require persons who had already stockpiled such substances at the time of enactment of the Regulations to submit an abatement plan.³⁸ In addition, the Regulations put in place a schedule for completely phasing out the importing of hydrochloroflourocarbons by 2040.³⁹

³⁰ National Environmental Management: Air Quality Act 39 of 2004, National Atmospheric Emissions Reporting Regulations, 2015, G.N. R283 (Apr. 2, 2015), https://www.gov.za/sites/www.gov.za/files/40762_gen275.pdf, archived at <https://perma.cc/ZUY8-XJSU>.

³¹ *Id.* §§ 1 & 5.

³² *Id.* § 8 & Annexure 1.

³³ National Environmental Management: Air Quality Act 39 of 2004, National Greenhouse Gas Emissions Reporting Regulations, 2016, G.N. 275 (Apr. 3, 2017), <http://www.lawsouthafrica.up.ac.za/index.php/browse/environment-and-conservation/national-environmental-management-air-quality-act-39-of-2004/regulations-and-notices/39-of-2004-national-environmental-management-air-quality-act-regs-genn-275-3-apr-2017-to-date-pdf/download>, archived at <https://perma.cc/926G-CSMM>.

³⁴ *Id.* § 2.

³⁵ *Id.* §§ 3, 4, 5 & 7.

³⁶ National Environmental Management: Air Quality Act 39 of 2004: Regulations Regarding the Phasing-Out and Management of Ozone-Depleting Substances, G.N 351 (May 8, 2014), <http://www.lawsouthafrica.up.ac.za/index.php/browse/environment-and-conservation/national-environmental-management-air-quality-act-39-of-2004/regulations-and-notices/39-of-2004-national-environmental-management-air-quality-act-regs-gn-351-8-may-2014-to-date-pdf/download>, archived at <https://perma.cc/XG37-J938>.

³⁷ *Id.* § 3.

³⁸ *Id.* § 4.

³⁹ *Id.* § 5.

III. Fuel Emission Standards

It appears that South Africa does not currently have vehicle CO₂ emissions standards.⁴⁰ However, South Africa does have what is known as an environmental levy “based on CO₂ emissions of new motor vehicles imported into or manufactured” in the country.⁴¹ The CO₂ emissions subject to the environmental levy are calculated as follows:

- (a) using the CO₂ emissions stated in the test report of the vehicle type obtained as prescribed in the rules; or
- (b) if such report has not been obtained or is not submitted upon request to the Commissioner, by application of the following methods:
 - i. motor vehicles specified in item 151.01 –
 - (aa) if the engine capacity does not exceed 3 000 cm³ [cubic centimeters]: CO₂ emissions (g/km) = 120 + (0.05 x engine capacity in cm³)
 - (bb) if the engine capacity exceeds 3 000 cm³: CO₂ emissions (g/km) = 175 + (0.05 x engine capacity in cm³)
 - ii. motor vehicles specified in item 151.02 –
 - CO₂ emissions (g/km) = 195 + (0,07 x engine capacity in cm³).⁴²

IV. Carbon Tax Bill

South Africa may soon impose a carbon tax on emissions. On December 14, 2017, the country’s National Treasury issued the second draft bill on carbon tax for public comment and introduction before Parliament.⁴³ Based on the “polluter pays” principle, if enacted in its current form, the proposal would introduce a carbon tax in phases in which the rate would be set at R120 (about US\$10) per metric ton of carbon dioxide above the tax-free allowances.⁴⁴ The rate would increase every year parallel to consumer price inflation plus 2% up to December 31, 2022.⁴⁵ After that, the

⁴⁰ FRANCISCO POSADA, ICCT, SOUTH AFRICA’S NEW PASSENGER VEHICLE CO₂ EMISSION STANDARDS: BASELINE DETERMINATION AND BENEFITS ASSESSMENT 13 (Jan. 2018), https://www.theicct.org/sites/default/files/publications/South-Africa-PV-emission-stds_ICCT-White-Paper_17012018_vF.pdf, archived at <https://perma.cc/9E65-RFKG>.

⁴¹ Karin Lehmann, *South Africa’s Climate Change Commitments and Regulatory Response Potential*, in CLIMATE CHANGE: LAW AND GOVERNANCE IN SOUTH AFRICA 8-1, 8-14 (Tracy-Lynn Humby et al. eds., 1st ed. 2016).

⁴² Customs and Excise Act 91 of 1964, Schedule 1, Part 3, Section D, Note 5(a)–(b) (commencement Jan. 1, 1965), <http://www.sars.gov.za/AllDocs/LegalDoclib/SCEA1964/LAPD-LPrim-Tariff-2012-11 - Schedule No 1 Part 3D.pdf>, archived at <https://perma.cc/SD35-JSXD>.

⁴³ Media Statement, Department of National Treasury of Republic of South Africa, Release of Carbon Tax Bill for Introduction in Parliament and Public Comment (Dec. 14, 2017), http://www.treasury.gov.za/comm_media/press/2017/2017121401 MEDIA STATEMENT - CARBON TAX.BILL.pdf, archived at <https://perma.cc/5YXE-5KTT>.

⁴⁴ Draft Carbon Tax Bill, B-2017, §§ 5 & 7 (2017), http://www.treasury.gov.za/public_comments/CarbonTax/Bll2017/Draft Carbon Tax Bill December 2017.pdf, archived at <https://perma.cc/SH5R-TAFD>.

⁴⁵ *Id.* § 5.

rate would be determined by the amount of the consumer price inflation for the preceding tax year.⁴⁶

⁴⁶ *Id.*

Switzerland

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SUMMARY The Swiss Constitution tasks the Swiss Confederation with enacting legislation to protect the Swiss population and the natural environment against damage or nuisance. In furtherance of that goal, Switzerland has ratified the major relevant international treaties that deal with air pollution and greenhouse gas emissions and implemented the requirements into national law. It uses various measures to reduce air pollution and greenhouse gas emissions, in particular it sets ambient limit values; prohibits the manufacturing, import, export, or use of substances that deplete the ozone layer; levies incentive taxes on petrol and diesel, extra-light fuel oil, volatile organic compounds, and the production, extraction, and import of thermal fuels; participates in emissions trading; sets building and vehicle emissions standards; requires fuel importers and operators of fossil-thermal power plants to compensate for CO₂ emissions; makes voluntary agreements with industry sectors to reduce emissions; promotes climate program training and communication; and set up a technology fund to guarantee loans for companies that are developing and marketing new products and methodologies for reducing greenhouse gas emissions. Furthermore, it encourages the use of renewable fuels (biofuels) by exempting domestic manufacturers and importers from the mineral oil tax that is generally levied on fuels if the biofuels fulfill the ecological and social requirements set out in the relevant legislation.

I. General Introduction

Switzerland is a confederation that is made up of twenty-six cantons (states), each of which has its own government, parliament, and courts. Its constitution provides that the “Confederation shall legislate on the protection of the population and its natural environment against damage or nuisance” and “shall ensure that such damage or nuisance is avoided.”¹ The cantons are generally responsible for the implementation of the relevant federal regulations in this area.²

At the end of 2017, Switzerland had a population of 8.48 million, which is an increase of 0.7% compared to 2016, but lower than the average population growth of around 1% during the years 2007 to 2016.³ It is located in the middle of Europe, with the Swiss Plateau, the Jura Mountains, and the Alps covering most of the country’s 41,285 square-kilometer (about 15,940 square-mile)

¹ Bundesverfassung [BV] [Swiss Constitution] (Apr. 18, 1999), SYSTEMATISCHE RECHTSSAMMLUNG [SR] [SYSTEMATIC COMPILATION OF LAWS] 101, art. 74, paras. 1, 2, <https://www.admin.ch/opc/de/classified-compilation/19995395/201801010000/101.pdf>, archived at <http://perma.cc/68KJ-ZYR7>, unofficial English translation available at <https://www.admin.ch/opc/en/classified-compilation/19995395/201801010000/101.pdf>, archived at <http://perma.cc/AR8P-J2L6>.

² *Id.* art. 74, para. 3.

³ Press Release, Federal Statistical Office, Net Decline in Population Growth in 2017 (Apr. 6, 2018), <https://www.bfs.admin.ch/bfsstatic/dam/assets/4782550/master>, archived at <http://perma.cc/P67D-88NJ>.

surface area. The Alps act as a climate divide.⁴ It neighbors the European Union (EU) which is a major economic partner. The EU and Switzerland have concluded a number of bilateral agreements and Switzerland generally aims to align its laws with EU legislation.⁵

From 1864, when industrialization began, to 2012, the temperature in Switzerland rose by about 1.8°C, thereby exceeding the global average increase of 0.85°C by more than double. The rise in temperature is most likely caused by increased greenhouse gas (GHG) emissions.⁶ In 2015, Switzerland emitted a total 48.14 million metric tons (t) of CO₂ equivalent (CO₂ eq) into the atmosphere.⁷ Most of this can be attributed to traffic (15.47 million t), the manufacturing industry (9.79 million t), and residential households (8.59 million t). Agriculture accounted for 6.50 million t, the services industry for 4.13 million t, and waste for 3.65 million t.⁸ In a global comparison, Switzerland's GHG emissions make up only 0.1% of global emissions.⁹ It is nonetheless committed to an active climate policy, in particular because it is affected by the melting of glaciers.¹⁰ Future GHG emissions will determine to what extent the climate will change and if the temperature increase in Switzerland will continue.¹¹ However, even though the Swiss economy and population kept growing in the years from 1990 to 2015, GHG emissions per capita and per gross domestic product (GDP) declined by 27% and 39%, respectively, in the same time frame.¹²

⁴ SWITZERLAND'S SEVENTH NATIONAL COMMUNICATION AND THIRD BIENNIAL REPORT UNDER THE UNFCCC. FOURTH NATIONAL COMMUNICATION UNDER THE KYOTO PROTOCOL TO THE UNFCCC 11 (Jan. 1, 2018), https://unfccc.int/files/national_reports/annex_i_natcom/submitted_natcom/application/pdf/624078315_switzerland-nc7-br3-1-che_nc7_br3_2018.pdf, archived at <http://perma.cc/T56X-QXC8>.

⁵ *Id.* at 10.

⁶ *Climate Change in Switzerland*, FEDERAL OFFICE OF METEOROLOGY AND CLIMATOLOGY [METEOSWISS], <http://www.meteoswiss.admin.ch/home/climate/climate-change-in-switzerland.html> (last updated Jan. 1, 2018), archived at <http://perma.cc/VT74-WFYZ>.

⁷ Bundesamt für Umwelt [BAFU] [Federal Office for the Environment] [FOEN], Treibhausgasemissionen in der Schweiz. Entwicklung in CO₂-Äquivalente und Emissionen nach Sektoren [Greenhouse Gas Emissions in Switzerland. Development in CO₂ Equivalent and Emissions by Sectors], Sept. 1, 2017, <https://www.bfs.admin.ch/bfsstatic/dam/assets/3362335/master>, archived at <http://perma.cc/3DA6-MAFG>.

⁸ *Id.*

⁹ FOEN, SCHWEIZER KLIMAPOLITIK AUF EINEN BLICK [SWISS ENVIRONMENTAL POLICY IN A NUTSHELL] 3 (2014), https://www.bafu.admin.ch/dam/bafu/de/dokumente/klima/ud-umwelt-diverses/schweizer_klimapolitik_aufeinenblick.pdf.download.pdf/schweizer_klimapolitikaufeinenblick.pdf, archived at <http://perma.cc/UL3Z-B8ZL>.

¹⁰ *Id.*

¹¹ METEOSWISS, *supra* note 6.

¹² SWITZERLAND'S SEVENTH NATIONAL COMMUNICATION AND THIRD BIENNIAL REPORT UNDER THE UNFCCC, *supra* note 4, at 12.

II. Legal Framework

A. International Law

1. *Convention on Long-range Transboundary Air Pollution*

Switzerland has signed and ratified the 1979 Convention on Long-range Transboundary Air Pollution (CLRTAP) and its eight Protocols.¹³ The Convention entered into force for Switzerland on May 6, 1983.¹⁴ The CLRTAP aims to reduce and prevent air pollution, including transboundary air pollution, by means of information exchanges, consultation, research, monitoring, and development of policies and strategies.¹⁵ The Convention was initially regarded as a “flexible framework for cooperation.” The eight protocols extended the number of substances covered by the CLRTAP and laid down legally binding targets to be taken by the State Parties to cut air pollutants emissions.¹⁶ State Parties are obligated to report on their measures on a periodical basis.

2. *United Nations Framework Convention on Climate Change and Kyoto Protocol*

Switzerland ratified the United Nations Framework Convention on Climate Change (UNFCCC) in December 1993 and it entered into force for Switzerland in March 1994.¹⁷ In 2003, Switzerland ratified the Kyoto Protocol to the UNFCCC, which entered into force for Switzerland in 2005.¹⁸ Switzerland pledged to reduce its GHG emissions to an average of 8% against 1990 levels for the commitment period of 2008–2012. The commitments were implemented into national law in the first CO₂ Act of 1999.¹⁹

¹³ Convention on Long-range Transboundary Air Pollution (CLRTAP), Nov. 13, 1979, 1302 U.N.T.S. 217, <http://www.unece.org/fileadmin/DAM/env/lrtap/full%20text/1979.CLRTAP.e.pdf>, archived at <http://perma.cc/F9ZJ-DU4Y>.

¹⁴ *Convention on Long-range Transboundary Air Pollution, Status as of Apr 5, 2018*, UNITED NATIONS TREATY COLLECTION, https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtidsg_no=XXVII-1&chapter=27&clang=en, archived at <http://perma.cc/G2PX-RU22>.

¹⁵ CLRTAP, arts. 2, 3.

¹⁶ *Protocols*, UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE (UNECE), https://www.unece.org/env/lrtap/status/lrtap_s.html (last visited Apr. 5, 2018), archived at <http://perma.cc/J25P-C7G9>.

¹⁷ United Nations Framework Convention on Climate Change (UNFCCC), May 9, 1992, 1771 U.N.T.S. 107, http://unfccc.int/files/essential_background/background_publications_htmlpdf/application/pdf/conveng.pdf, archived at <http://perma.cc/2XMZ-7GKG>; *Status of Ratification of the Convention*, UNITED NATIONS CLIMATE CHANGE, http://unfccc.int/essential_background/convention/status_of_ratification/items/2631.php (last visited Apr. 5, 2018), archived at <http://perma.cc/SDU8-TRUN>.

¹⁸ Kyoto Protocol to the United Nations Framework Convention on Climate Change (Kyoto Protocol), Dec. 11, 1997, 2303 U.N.T.S. 162, annex B, <http://unfccc.int/resource/docs/convkp/kpeng.pdf>, archived at <http://perma.cc/3HQM-LT8M>; *Status of Ratification of the Kyoto Protocol*, UNITED NATIONS CLIMATE CHANGE, http://unfccc.int/kyoto_protocol/status_of_ratification/items/2613.php (last visited Apr. 5, 2018), archived at <http://perma.cc/9NCN-NJMG>.

¹⁹ Bundesgesetz über die Reduktion der CO₂-Emissionen [CO₂-Gesetz] [Federal Act on the Reduction of CO₂ Emissions] [CO₂ Act], Oct. 8, 1999, SR 641.71, as in force on Apr. 18, 2000, <https://www.admin.ch/opc/de/classified-compilation/19995362/200005010000/641.71.pdf>, archived at <http://perma.cc/7ASY-J4BA>.

The Kyoto Protocol was amended in December 2012 (Doha Amendment to the Kyoto Protocol) and new commitments were agreed upon by some countries.²⁰ During the second commitment period, which runs from 2013 to 2020, Switzerland pledged to reduce its GHG emissions by 20% compared to 1990 levels.²¹

3. *Paris Agreement to the UNFCCC*

In October 2017, Switzerland ratified the Paris Agreement, which entered into force for Switzerland on November 5, 2017.²² The Paris Agreement's goal is to limit the global average temperature increase above preindustrial levels to well below 2°C. In furtherance of that goal, Switzerland submitted its “intended nationally determined contribution” (INDC) in which it set a total GHG emissions reduction target of 50% below 1990 levels by 2030.²³

B. National Law

1. *Air Pollution Control*

Even though the air quality in Switzerland has improved since the 1980s, pollution continues to be higher than the ambient limit values set out in the relevant legislation.²⁴ Air pollution reduction measures are mainly codified in the Environmental Protection Act (EPA).²⁵ The EPA contains general provisions that apply to all aspects of environmental protection and is supplemented by various detailed implementing ordinances. For the area of air pollution control and reduction these are in particular the Ordinance on Air Pollution Control (OAPC),²⁶ the

²⁰ Doha Amendment to the Kyoto Protocol, Dec. 8, 2012, reference no. C.N.718.2012 TREATIES-XXVII.7.c, https://unfccc.int/files/kyoto_protocol/application/pdf/kp_doha_amendment_english.pdf, archived at <http://perma.cc/CVK3-2YFR>.

²¹ *Id.* at 3, n.11.

²² Paris Agreement, Dec. 12, 2015, http://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf, archived at <http://perma.cc/9UKH-4U6T>; *Paris Agreement – Status of Ratification*, UNITED NATIONS CLIMATE CHANGE http://unfccc.int/paris_agreement/items/9444.php (last visited Apr. 5, 2018), archived at <http://perma.cc/T5LP-X53J>.

²³ SWITZERLAND, SWITZERLAND'S INTENDED NATIONALLY DETERMINED CONTRIBUTION (INDC) AND CLARIFYING INFORMATION, [http://www4.unfccc.int/ndcregistry/PublishedDocuments/Switzerland First/15 02 27 INDC Contribution of Switzerland.pdf](http://www4.unfccc.int/ndcregistry/PublishedDocuments/Switzerland%20First/15%2027%20INDC%20Contribution%20of%20Switzerland.pdf), archived at <http://perma.cc/F9MQ-MG88>.

²⁴ *Air Quality in Switzerland*, FOEN, <https://www.bafu.admin.ch/bafu/en/home/topics/air/info-specialists/air-quality-in-switzerland.html> (last updated June 28, 2017), archived at <http://perma.cc/W8E6-4AAX>.

²⁵ Umweltschutzgesetz [USG] [Environmental Protection Act] [EPA], Oct. 7, 1983, SR 814.01, <https://www.admin.ch/opc/de/classified-compilation/19830267/201801010000/814.01.pdf>, archived at <http://perma.cc/46PW-TE5Y>, unofficial English translation available at <https://www.admin.ch/opc/en/classified-compilation/19830267/201801010000/814.01.pdf>, archived at <http://perma.cc/3VP4-DV3J>.

²⁶ Luftreinhalte-Verordnung [LRV] [Ordinance on Air Pollution Control] [OAPC], Dec. 16, 1985, SR 814.318.142.1, <https://www.admin.ch/opc/de/classified-compilation/19850321/201801010000/814.318.142.1.pdf>, archived at <http://perma.cc/LHU3-4A9Z>, unofficial English translation at <https://www.admin.ch/opc/en/classified-compilation/19850321/201801010000/814.318.142.1.pdf>, archived at <http://perma.cc/W748-7Q7R>.

Chemical Risk Reduction Ordinance,²⁷ the Ordinance on Incentive Taxation of Petrol and Diesel with a Sulfur Content of More Than 0.001% (PDSO),²⁸ the Ordinance on the Incentive Tax on Extra-Light Heating Oil with a Sulfur Content of More Than 0.1% (ELHOO),²⁹ and the Ordinance on the Incentive Tax on Volatile Organic Compounds (OVOC).³⁰ The legislation is mainly focused on reducing air pollution from respirable particulate matter (PM₁₀), nitrogen oxides (NO_x), sulfur dioxide (SO₂), and ozone (O₃), among others. The reduction of CO₂ emissions is dealt with in separate legislation.³¹

a. Ordinance on Air Pollution Control

“Air pollution” is defined as a “modification of the natural condition of the air, in particular, through smoke, soot, dust, gases, aerosols, steams, odors or waste heat.”³² The EPA generally requires that the spread of air pollutants and other emissions are kept to a minimum and prevented where they occur.³³ The EPA authorizes the Swiss Federal Council (the Swiss government) to enact legislation to limit emissions, in particular by setting ambient limit values.³⁴ The OAPC therefore includes preventive emission limits for installations³⁵ that pollute the air, provisions on open-air waste incineration, requirements for thermal and motor fuels, maximum permitted ambient air pollution levels (ambient limit values), and procedures in the event of excessive ambient air pollution levels.³⁶ Different rules exist for existing and new

²⁷ Chemikalien-Risikoreduktions-Verordnung [ChemRRV] [Chemical Risk Reduction Ordinance] [ORRChem], May 18, 2005, SR 814.81, <https://www.admin.ch/opc/de/classified-compilation/20021520/201803010000/814.81.pdf>, archived at <http://perma.cc/H2AQ-HPAH>, unofficial English translation available at <https://www.admin.ch/opc/en/classified-compilation/20021520/201803010000/814.81.pdf>, archived at <http://perma.cc/6BVG-6XRL>.

²⁸ Verordnung über die Lenkungsabgabe auf Benzin und Dieselöl mit einem Schwefelgehalt von mehr als 0,001 Prozent [BDSV] [Ordinance on Incentive Taxation of Petrol and Diesel With a Sulfur Content of More than 0.001%] [PDSO], Oct. 15, 2003, SR 814.020, <https://www.admin.ch/opc/de/classified-compilation/20031179/200901010000/814.020.pdf>, archived at <http://perma.cc/N7FY-THTN>; EPA, arts. 35b^{bis}, 35c.

²⁹ Verordnung über die Lenkungsabgabe auf «Heizöl Extraleicht» mit einem Schwefelgehalt von mehr als 0,1 Prozent [HELV] [Ordinance on the Incentive Tax on “Extra-Light Heating Oil” with a Sulfur Content of More Than 0.1%] [ELHOO], Nov. 12, 1997, SR 814.019, <https://www.admin.ch/opc/de/classified-compilation/19970459/200901010000/814.019.pdf>, archived at <http://perma.cc/X3LD-7GC6>; EPA, arts. 35b, 35c.

³⁰ Verordnung über die Lenkungsabgabe auf flüchtigen organischen Verbindungen [VOCV] [Ordinance on the Incentive Tax on Volatile Organic Compounds] [OVOC], Nov. 12, 1997, SR 814.018, <https://www.admin.ch/opc/de/classified-compilation/19970460/201801010000/814.018.pdf>, archived at <http://perma.cc/JNG7-8K9X>, unofficial English translation available at <https://www.admin.ch/opc/en/classified-compilation/19970460/201801010000/814.018.pdf>, archived at <http://perma.cc/HGJ3-BY5J>; EPA, arts. 35a, 35c.

³¹ See *infra* Part II(B)(2).

³² EPA, § 7, para. 3.

³³ *Id.* art. 1, para. 2.

³⁴ *Id.* arts. 12, 13, 39.

³⁵ “Installations” are defined as buildings, traffic routes, other fixed facilities, modifications of the terrain, appliances, machines, vehicles, ships, and aircraft. See EPA, § 7, para. 7.

³⁶ OAPC, art. 1, para. 2.

stationary installations (industrial pollution), vehicles, and transport infrastructure.³⁷ The main reduction measures are limits to the release of certain organic and inorganic substances from existing and new stationary installations;³⁸ additional limits to the release of substances for certain installations, in particular chemical plants, the mineral oil industry, metal productions plants, agricultural and foodstuffs installations, coating and printing factories, and waste incinerators;³⁹ additional or different emission limits for combustion installations;⁴⁰ licensing of combustion installations, construction machines and particle filter systems, and machinery;⁴¹ sulfur content and combustion limits for thermal and motor fuels;⁴² restrictions on the height of industrial chimneys;⁴³ and average ambient limit values for air pollutants like SO₂, nitrogen dioxide (NO₂), carbon monoxide (CO), O₃, and PM₁₀, calculated on an annual or hourly basis.⁴⁴

The cantons are obligated to monitor ambient air pollution levels in their territory, establish and regularly review action plans to control excessive ambient air pollution levels, and enforce the OAPC in general.⁴⁵

b. Chemical Risk Reduction Ordinance

The Chemical Risk Reduction Ordinance (ORRChem) includes measures to deal with the damage of the ozone layer. Substances that deplete the ozone layer like fully halogenated chlorofluorocarbons (CFCs) generally cannot be manufactured, imported, exported, or used.⁴⁶ Exceptions may be granted upon special request and in limited circumstances.

c. Incentive Taxation of Petrol and Diesel, Extra-light Fuel Oil, and VOCs

The ordinances on incentive taxation of petrol and diesel, extra-light fuel oil, and volatile organic compounds (VOCs) create economic incentives to reduce the use of sulfur and VOCs⁴⁷ like acetone and benzene by making them more expensive. Exemptions from the taxes are possible if measures to reduce emissions are taken in return. In the case of the VOC incentive tax, for example, persons liable for the tax must prove that they have an operational air purification plant in place that is in good technical condition and that the measures taken have resulted in the

³⁷ *Id.* art. 2.

³⁸ *Id.* annex 1.

³⁹ *Id.* annex 2.

⁴⁰ *Id.* annex 3.

⁴¹ *Id.* annex 4.

⁴² *Id.* annex 5.

⁴³ *Id.* annex 6.

⁴⁴ *Id.* annex 7.

⁴⁵ *Id.* arts. 27, 31, 33, para. 3, art. 35.

⁴⁶ ORRChem, art. 3 *in conjunction with* annex 1.4.

⁴⁷ VOCs are defined as “organic compounds with a vapour pressure of at least 0.1 mbar at 20°C or a boiling point of maximum 240°C at 1013.25 mbar.” *See* OVOC, art. 1. VOCs subject to the tax are found in annex 1 of the OVOC.

annual quantity of VOC emissions from their installations being reduced by at least 50%.⁴⁸ The proceeds from the taxes are redistributed to the general public.⁴⁹

2. Greenhouse Gas Emissions Reduction

The core domestic legal instrument to combat GHG emissions and climate change in Switzerland is the CO₂ Act⁵⁰ and its corresponding ordinance.⁵¹ The CO₂ Act implements, *inter alia*, the goals agreed upon under the UNFCCC and the Kyoto Protocol, Doha Amendment, and Paris Agreement. The current second revision of the CO₂ Act sets targets for buildings, transport, and industry for GHG emission reduction until 2020. Furthermore, it obligates the Swiss Federal Council to submit proposals to the Swiss Parliament on how to reduce GHG emissions beyond 2021.⁵² In order to meet the GHG emission reduction target under the Paris Agreement of 50% by 2030 compared to 1990 levels, a third revision of the CO₂ Act is currently in progress.⁵³ Measures to reduce CO₂ emissions set out in the CO₂ Act and its implementing ordinances include a CO₂ levy, emissions trading, building standards, vehicle emissions standards, compensation for CO₂ emissions for fuel importers and operators of fossil-thermal power plants, voluntary agreements with industry sectors, climate program training and communication, and a technology fund to guarantee loans for companies that are developing and marketing new products and methodologies for reducing GHG emissions.⁵⁴

a. CO₂ Levy

Since 2008, Switzerland has levied an incentive tax on the production, extraction, and import of thermal fuels, such as heating oil and natural gas and coal, when they are used to produce heat, to generate light, in thermal installations for the production of electricity, or for the operation of heat-power cogeneration plants.⁵⁵ The goal is to encourage people to use them more

⁴⁸ OVOC, art. 9.

⁴⁹ EPA, art. 35a, para. 9, art. 35b, para. 5; art. 35b^{bis}, para. 6.

⁵⁰ Bundesgesetz über die Reduktion der CO₂-Emissionen [CO₂-Gesetz] [Federal Act on the Reduction of CO₂ Emissions] [CO₂ Act], Dec. 23, 2011, SR 641.71, <https://www.admin.ch/opc/de/classified-compilation/20091310/201801010000/641.71.pdf>, archived at <http://perma.cc/9VE5-ZEX9>, unofficial English translation at <https://www.admin.ch/opc/en/classified-compilation/20091310/201801010000/641.71.pdf> (English version updated through Jan. 1, 2013), archived at <http://perma.cc/LZ88-PNPE>.

⁵¹ Verordnung über die Reduktion der CO₂-Emissionen [CO₂-Verordnung] [Ordinance on the Reduction of CO₂ Emissions] [CO₂ Ordinance], Nov. 30, 2012, SR 641.711, <https://www.admin.ch/opc/de/classified-compilation/20120090/201801010000/641.711.pdf>, archived at <http://perma.cc/6QE6-SRPQ>, unofficial English translation available at <https://www.admin.ch/opc/en/classified-compilation/20120090/201801010000/641.711.pdf> (English version updated through June 15, 2017), archived at <http://perma.cc/LGE3-5M7T>.

⁵² Botschaft zur Totalrevision des CO₂-Gesetzes nach 2020 [Message Regarding the Complete Revision of the CO₂ Act After 2020], Dec. 1, 2017, BUNDESBLETT [BBL.] [FEDERAL GAZETTE] I 247, 248 (2018), <https://www.admin.ch/opc/de/federal-gazette/2018/247.pdf>, archived at <http://perma.cc/YS3D-TCJH>.

⁵³ *Id.*

⁵⁴ *Swiss Climate Policy*, FOEN, <https://www.bafu.admin.ch/bafu/en/home/topics/climate/info-specialists/climate-policy.html> (last updated Aug. 30, 2016), archived at <http://perma.cc/K9LR-AY5G>.

⁵⁵ CO₂ Act, arts. 29–33; CO₂ Ordinance, arts. 93–95, annex 11.

economically and choose more carbon-neutral or low-carbon energy sources.⁵⁶ The current rate as of January 1, 2018, is CHF 96 (about US\$100) per metric ton of CO₂.⁵⁷ One-third of the revenue from the CO₂ levy is invested into energy-efficient renovations of buildings and transferred to the technology fund, and two-thirds is redistributed to the public and the business community.⁵⁸

Certain companies and persons may be exempted from the CO₂ levy and can request a refund from the Swiss Federal Customs Administration.⁵⁹ Greenhouse gas-intensive companies that commit to a reduction in their GHG emissions or participate in the Emissions Trading Scheme as well as power plants are exempt.⁶⁰ Furthermore, persons that prove that they did not use the thermal fuels to generate energy may request an exemption.⁶¹ Lastly, since January 1, 2018, operators of fossil fuel-based combined heat and power plants (CHP plants) have been able to request a (partial) refund for fossil combustible fuels that they use for electricity production if the plants have a rated thermal input of 0.5 to 20 MW.⁶²

b. Emissions Trading Scheme

The Swiss Emissions Trading Scheme (ETS) adheres to the “cap-and-trade” principle, meaning that the availability of tradable rights to emit greenhouse gases (emission allowances) is limited. The Swiss ETS requires certain large, greenhouse gas-intensive companies to participate, whereas other small and medium-sized companies can choose to do so.⁶³ As mentioned, participation in the ETS qualifies the companies for an exemption from the CO₂ levy.⁶⁴ Participating companies must submit annual greenhouse gas emission reports.⁶⁵ If emissions of ETS companies are neither covered by emission allowances nor by emission reduction

⁵⁶ CO₂ Levy, FOEN, <https://www.bafu.admin.ch/bafu/en/home/topics/climate/info-specialists/climate-policy/co2-levy.html> (last updated May 11, 2016), archived at <http://perma.cc/G8BA-8CE3>.

⁵⁷ Imposition of the CO₂ Levy on Heating and Process Fuels, FOEN, <https://www.bafu.admin.ch/bafu/en/home/topics/climate/info-specialists/climate-policy/co2-levy/imposition-of-the-co2-levy-on-thermal-fuels.html> (last updated Jan. 8, 2016), archived at <http://perma.cc/HA4U-S9HC>.

⁵⁸ CO₂ Act, arts. 34, 35, 36; *Redistribution of the CO₂ Levy*, FOEN, <https://www.bafu.admin.ch/bafu/en/home/topics/climate/info-specialists/climate-policy/co2-levy/redistribution-of-the-co2-levy.html> (last updated Aug. 8, 2016), archived at <http://perma.cc/J5HV-99NF>.

⁵⁹ CO₂ Act, arts. 17, 25, 31, 31a, 32a, 32c; CO₂ Ordinance, arts. 96, 96a, 97. The newly codified articles 31a, 32a, and 32c of the CO₂ Act and article 96a of the CO₂ Ordinance are not yet reflected in the English translation of the CO₂ Ordinance.

⁶⁰ CO₂ Act, arts. 17, 25.

⁶¹ CO₂ Act, art. 32c; CO₂ Ordinance, art. 96, para. 1c. These newly codified articles are not yet reflected in the English translation of the CO₂ Act and the CO₂ Ordinance.

⁶² CO₂ Act, arts. 32a, 32b; CO₂ Ordinance, art. 96a. These newly codified articles are not yet reflected in the English translation of the CO₂ Act and the CO₂ Ordinance.

⁶³ CO₂ Act, arts. 15, 16; CO₂ Ordinance, art. 40 *in conjunction with* annex 6, art. 42 *in conjunction with* annex 7.

⁶⁴ CO₂ Act, art. 17.

⁶⁵ *Id.* art. 20.

certificates, companies will have to pay a fine of CHF125 (about US\$130) per metric ton of CO₂ eq.⁶⁶

On November 23, 2017, the EU and Switzerland signed an agreement to link their GHG emissions trading systems and create a joint CO₂ market.⁶⁷ In a next step, the Swiss Parliament and the competent EU institutions need to approve the ratification for the agreement to enter into force.⁶⁸ In preparation for the agreement entering into force, Switzerland updated the Ordinance on the Acquisition and Reporting of Tonne-Kilometre Data Relating to Distances Covered by Aircraft,⁶⁹ because emissions generated from aviation were excluded from the Swiss ETS, unlike in the EU. The Ordinance only includes emissions from domestic flights and flights from Switzerland to member states of the European Economic Area.⁷⁰

c. Building Standards

Buildings account for one-quarter of the Swiss CO₂ emissions and 40% of energy consumption.⁷¹ The goal is to reduce these emissions by 40% compared to the 1990 levels, with an interim target of a 22% reduction by 2015.⁷² The abovementioned CO₂ levy and the proceeds from it that are invested in the federal and cantonal building programs are two of the measures available to reduce building emissions. The buildings programs invest in energy-efficient renovation of buildings, renewable energies, waste heat recovery, and the optimization of building services technology.⁷³ In addition, the cantons are required to define standards for the continuous reduction of CO₂ emissions in new and older buildings that are heated with fossil fuels based on

⁶⁶ *Id.* art. 21.

⁶⁷ Agreement between the European Union and the Swiss Confederation on the Linking of Their Greenhouse Gas Emissions Trading Systems, 2017 O.J. (L 322) 3, [https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:22017A1207\(01\)&from=EN](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:22017A1207(01)&from=EN), archived at <http://perma.cc/LN2S-SQ32>; Press Release, FOEN, Signature of the Agreement Between Switzerland and the EU on the Linking of Their Emissions Trading Schemes (Nov. 23, 2017), <https://www.bafu.admin.ch/bafu/en/home/topics/climate/info-specialists/climate-policy/emissions-trading/linking-the-swiss-and-eu-emissions-trading-schemes/unterzeichnung-des-abkommens-zur-verknuepfung-der-emissionshande.html>, archived at <http://perma.cc/Z64K-KT4C>.

⁶⁸ Press Release, *supra* note 67.

⁶⁹ Verordnung über die Erhebung von Tonnenkilometerdaten aus Flugstrecken und die Berichterstattung darüber [Ordinance on the Acquisition and Reporting of Tonne-Kilometre Data Relating to Distances Covered by Aircraft], June 2, 2017, SR 641.714.11, <https://www.admin.ch/opc/de/classified-compilation/20170489/201707010000/641.714.11.pdf>, archived at <http://perma.cc/37HU-CPWJ>, unofficial English translation available at <https://www.admin.ch/opc/en/classified-compilation/20170489/201707010000/641.714.11.pdf>, archived at <http://perma.cc/A2ZA-SU4N>.

⁷⁰ *Id.* art. 3, para. 1; Press Release, *supra* note 67.

⁷¹ *The Federal and Cantonal Buildings Programme*, FOEN, <https://www.bafu.admin.ch/bafu/en/home/topics/climate/info-specialists/climate-policy/buildings/buildings-programme.html> (last modified Feb. 15, 2018), archived at <http://perma.cc/Z79V-EVEA>.

⁷² CO₂ Ordinance, art. 3, para. 1a.

⁷³ *The Federal and Cantonal Buildings Programme*, *supra* note 71.

the current state of the art.⁷⁴ They submit regular reports to the Confederation on the measures taken.⁷⁵

d. Vehicle Emission Standards

More than a third of the total energy consumption and CO₂ emissions in Switzerland can be attributed to traffic.⁷⁶ Rules on vehicle emission standards are codified in the CO₂ Act, the CO₂ Ordinance, the Ordinance on Technical Requirements for Road Vehicles,⁷⁷ and the Ordinance on the Homologation of Road Vehicles.⁷⁸ CO₂ emission regulations for new passenger cars in Switzerland are similar to those found in the EU. The CO₂ Act explicitly states that regulations of the EU on vehicle emission standards must be considered when reduction goals are set.⁷⁹ Currently, passenger cars that are registered for the first time may not emit more than 130 grams of CO₂ per kilometer on average by the end of 2015.⁸⁰ Importers or manufacturers of cars that violate the individual targets are subject to a fine of between CHF5 and CHF8 (about US\$5.20 to US\$8.31) for the first gram of CO₂ per kilometer over the individual target up to between CHF95 and CHF152 (about US\$99 to US\$158) for the fourth and every additional gram of CO₂/km over the individual target for the period from 2017 to 2018.⁸¹ Beginning January 1, 2019, the fine will be raised to CHF95 to CHF152 for each gram of CO₂/km over the individual target.⁸² The fines are recalculated every year.⁸³

A continuous tightening of the emission rules for passenger cars and new rules for light commercial vehicles was proposed by the Swiss Federal Council as part of the Energy Strategy 2050 and enacted into law.⁸⁴ From 2020 onwards, new passenger cars will not be allowed to emit

⁷⁴ CO₂ Act, art. 9, para. 1.

⁷⁵ *Id.* art. 9, para. 2.

⁷⁶ *Measures for Increasing Energy Efficiency*, SWISS FEDERAL OFFICE OF ENERGY [SFOE], <http://www.bfe.admin.ch/energiestrategie2050/06447/06457/index.html?lang=en#> (last updated Jan. 18, 2018), archived at <http://perma.cc/HB2L-APDD>.

⁷⁷ Verordnung über die technischen Anforderungen an Strassenfahrzeuge [VTS] [Ordinance on Technical Requirements on Road Vehicles], June 19, 1995, SR 741.41, <https://www.admin.ch/opc/de/classified-compilation/19950165/201707010000/741.41.pdf>, archived at <http://perma.cc/5VVC-RG8W>.

⁷⁸ Verordnung über die Typengenehmigung von Strassenfahrzeugen [TGV] [Ordinance on the Homologation of Road Vehicles], June 19, 1995, SR 741.511, <https://www.admin.ch/opc/de/classified-compilation/19950161/201701150000/741.511.pdf>, archived at <http://perma.cc/UYE6-67WZ>.

⁷⁹ CO₂ Act, art. 10, para. 3, art. 11, para. 2.

⁸⁰ *Id.* art. 10, para. 1.

⁸¹ *Id.* art. 13, para. 1. Please note that the higher fines are not yet reflected in the English translation of the CO₂ Act.

⁸² *Id.*

⁸³ *Id.* art. 13, para. 2.

⁸⁴ *What is the Energy Strategy 2050?*, SFOE, <http://www.bfe.admin.ch/energiestrategie2050/06445/index.html?lang=en> (last updated Jan. 18, 2018), archived at <http://perma.cc/TGD8-P373>; *CO₂ Emissions Regulations for Passenger Cars*, FOEN, <https://www.bafu.admin.ch/bafu/en/home/topics/climate/info-specialists/climate-policy/co2-emissions-regulations-for-passenger-cars.html> (last updated Apr. 24, 2015), archived at <http://perma.cc/J92X-YJFX>.

more than 95 grams of CO₂/km, whereas light commercial vehicles and light articulated vehicles may not emit more than 147 grams of CO₂/km.⁸⁵

e. Compensation for CO₂ Emissions

Importers of fossil fuels and operators of fossil fuel thermal power plants are required to compensate for CO₂ emissions. Importers of fossil fuels must compensate for 10% of the CO₂ emissions caused by traffic, whereas fossil fuel thermal power plant operators must compensate for all their CO₂ emissions.⁸⁶ Importers of fossil fuels can only use domestic measures, whereas fossil fuel thermal power plant operators have several compensation options as long as half of the compensation measures take place domestically.⁸⁷ As an example, investments in renewable energies may count as a compensation measure.⁸⁸

f. Industry Sector Agreements

The Swiss Confederation is authorized to conclude agreements with individual sectors of the economy to generally enforce the objectives of the EPA, to set quantitative targets and deadlines for meeting them, and to set GHG reduction targets.⁸⁹ Two such agreements have been concluded; one is a voluntary industry solution with the goal of limiting consumption and emissions of SF₆, a potent greenhouse gas, and the other is between the Federal Department of the Environment, Transport, Energy, and Communications (DETEC) and waste recycling plants to reduce emissions from the incineration of waste and provide incentives for improving energy efficiency.⁹⁰

⁸⁵ CO₂ Act, art. 10, paras. 1, 2. Please note that the new vehicle emission standards are not yet reflected in the English translation of the CO₂ Act. For an English description of the new rules see *CO₂ Emission Regulations for New Cars and Light Commercial Vehicles*, SFOE, <http://www.bfe.admin.ch/themen/00507/05318/index.html?lang=en> (last updated Apr. 4, 2018), archived at <http://perma.cc/27WF-F6PZ>.

⁸⁶ CO₂ Act, art. 22, para. 1a; CO₂ Ordinance, arts. 89, para. 1d.

⁸⁷ CO₂ Act, arts. 22, 26, 27; CO₂ Ordinance, arts. 83, 90.

⁸⁸ CO₂ Act, art. 22, para. 3.

⁸⁹ EPA, art. 41a; CO₂ Act, art. 3, para. 4.

⁹⁰ Swiss Voluntary Agreement for the Use of SF₆ in Electrical Switching Devices and Switchgear, Dec. 19, 2013, https://www.bafu.admin.ch/dam/bafu/en/dokumente/klima/fachinfo-daten/selbstverpflichtungserklaerungzusf6inelektrischenschaltgeraetenu.pdf.download.pdf/swiss_voluntary_agreementfortheuseofsf6inelectricalswitchingdevice.pdf, archived at <http://perma.cc/KM2K-UC9R>; Swiss Voluntary Agreement for the Use of SF₆ in Particle Beam Accelerators (Electron and Proton Beam Accelerators), Dec. 19, 2013, https://www.bafu.admin.ch/dam/bafu/en/dokumente/klima/fachinfo-daten/selbstverpflichtungserklaerungzusf6inteilchenbeschleunigernelekt.pdf.download.pdf/swiss_voluntary_agreementfortheuseofsf6inparticlebeamaccelerator.pdf, archived at <http://perma.cc/64SV-74J4>; Vertrag zwischen der Schweizerischen Eidgenossenschaft vertreten durch das Eidg. Departement für Umwelt, Verkehr, Energie und Kommunikation (UVEK) und den in Anhang 1 aufgeführten Kehrrechtverbrennungsanlagen vertreten durch den Verband der Betreiber Schweizerischer Abfallverwertungsanlagen (VBSA) betreffend Reduktion der fossilen CO₂-Emissionen aus der Abfallverbrennung [Agreement between the Swiss Confederation Represented by the Federal Department of the Environment, Transport, Energy, and Communications (DETEC) and the Municipal Waste Incineration Plants Listed in Annex 1 Represented by the Association of Plant Managers of Swiss Waste Treatment Installations (VBSA) on the Reduction of Fossil CO₂ Emissions from the Incineration of Waste], Aug. 2014, <https://www.bafu.admin.ch/dam/bafu/en/dokumente/klima/fachinfo-daten/zielvereinbarung.pdf.download.pdf/zielvereinbarung.pdf>, archived at <http://perma.cc/YL5D-LF86>. For a description of the

g. Other Measures

In addition, Switzerland uses money from the technology fund to guarantee loans for companies that are developing and marketing new products and methodologies for reducing GHG emissions, for the use of renewable energies, and for the economical use of natural resources; invests in training programs to qualify skilled workers in climate-relevant occupations; and provides cities and municipalities with advice and information services with respect to climate issues.⁹¹

3. Renewable Fuels

In order to promote the use of biofuels like biogas, bioethanol, biodiesel, and vegetable or animal oils, Switzerland exempts domestic manufacturers and importers from the mineral oil tax that is generally levied on fuels.⁹² A proportional tax relief may be granted for mixtures of fossil fuels and biofuels. The manufacturers or importers have to apply to the Directorate General of Customs (DGC) for such an exemption and submit evidence to show that the fuels comply with the ecological and social requirements set out in the relevant legislation.⁹³ Tax exemptions are generally valid for four years.⁹⁴

agreements see *Voluntary Industry Solution for SF₆*, FOEN, <https://www.bafu.admin.ch/bafu/en/home/topics/climate/info-specialists/climate-policy/sector-agreements/freiwillige-branchenloesung-fuer-sf6.html> (last updated Apr. 24, 2015), archived at <http://perma.cc/WQP5-ZCWF>; *Target Agreement DETEC Waste-Recycling Plants CH*, FOEN, <https://www.bafu.admin.ch/bafu/en/home/topics/climate/info-specialists/climate-policy/sector-agreements/target-agreement-detec-waste-recycling-plants-ch.html> (last updated Apr. 24, 2015), archived at <http://perma.cc/WJ7K-DSQU>.

⁹¹ CO₂ Act, art. 35; FOEN, KLIMAPROGRAMM. BILDUNG UND KOMMUNIKATION [CLIMATE PROGRAM. EDUCATION AND COMMUNICATION] (Jan. 2017), https://www.bafu.admin.ch/dam/bafu/de/dokumente/klima/ud-umwelt-diverses/Klimaprogramm.pdf.download.pdf/BAFU_Publikation_A5_DE_def_low.pdf, archived at <http://perma.cc/BMJ7-UWFX>.

⁹² Mineralölsteuergesetz [MinöStG] [Mineral Oil Tax Law], June 21, 1996, SR 641.61, art. 2, para. 3, let. d, art. 12b, <https://www.admin.ch/opc/de/classified-compilation/19960320/201701010000/641.61.pdf>, archived at <http://perma.cc/2D3H-QVXN>; Mineralölsteuerverordnung [MinöStV] [Mineral Oil Tax Ordinance], Nov. 20, 1996, SR 641.611, arts. 19a, 19b *in conjunction with* annex 2, <https://www.admin.ch/opc/de/classified-compilation/19960585/201701010000/641.611.pdf>, archived at <http://perma.cc/U4GT-RHRH>; Verordnung des UVEK über den Nachweis der Erfüllung der ökologischen Anforderungen an biogene Treibstoffe [BTrV] [DETEC Ordinance on Demonstrating Compliance with the Ecological Requirements for Biofuels] [Biofuel Ordinance], June 15, 2016, SR 641.611.21, <https://www.admin.ch/opc/de/classified-compilation/20152686/201608010000/641.611.21.pdf>, archived at <http://perma.cc/BUY2-X7RS>.

⁹³ Mineral Oil Tax Law, arts. 12b, 12c, 12d; Mineral Oil Tax Ordinance, arts. 19b–19g.

⁹⁴ Mineral Oil Tax Ordinance, art. 19h, para. 1.

In order to benefit from the tax exemption, biofuels must fulfill three ecological and two social requirements. To meet the ecological requirements, biofuels must

- generate at least 40% less GHG emissions from the cultivation of raw materials until their end use compared to fossil fuels;
- be no more than 25% more harmful to the environment from the cultivation of raw materials until their end use than fossil fuels; and
- use raw materials that are not obtained from land converted after January 1, 2008, or represented land with high carbon stock or high biodiversity value prior to its conversion.⁹⁵

To meet the social requirements,

- the land for the cultivation of raw materials must have been legally acquired; and
- the raw materials and fuel must have been cultivated and produced under socially acceptable conditions that respected the social regulations applicable in the producing country. The fundamental conventions of the International Labor Organization (ILO) must be respected in every case.⁹⁶

⁹⁵ Mineral Oil Tax Law, arts. 12b, let. a-c; Mineral Oil Tax Ordinance, art. 19c.

⁹⁶ Mineral Oil Tax Law, arts. 12b, let. d, e; Mineral Oil Tax Ordinance, art. 19d.

United Kingdom

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SUMMARY The United Kingdom has extensive and robust legislation to help provide for clean air. It has legislated independently, as well as implemented a number of EU Directives concerning clean air into its national law. The government has opted to require local authorities to monitor and ensure that air in these areas do not have pollutants that exceed limits set by the EU. It is also working to reduce the amount of pollutants in car emissions. The UK is a party to the EU's Emissions Trading Scheme, which has established a cap on the amount of carbon emissions specified installations are permitted to produce each year, allowing them to either take measures to reduce the amount of emissions or purchase allowances through auctions to cover the emissions they produce. The government has also undertaken a number of other measures with the aim of reducing carbon emissions, such as restricting the amount of packaging used for products and tying the annual car tax rate to the amount of carbon emissions each vehicle produces.

I. Introduction

The UK has a wide range of environmental laws, with many that govern clean air stemming from the European Union (EU). The government has also issued a number of policies relating to climate change.

The government considers that air pollution is a national health emergency,¹ inasmuch as it contributes to the deaths of approximately 40,000 people in the UK each year, making it the “second largest cause of mortality [in the UK] after smoking.”² The cost of air pollution amounts to £20 billion (approximately US\$29 billion) annually in the UK.³ The government is currently investing £3.5 billion (approximately US\$4.8 million) “to improve air quality and reduce harmful emissions.”⁴ Despite this investment, and extensive legislation, a government report notes that “[t]he current legislative framework for air quality is not doing enough to protect public and environmental health,”⁵ and the government is currently considering how to improve the existing air quality legislation.⁶

¹ House of Commons Environment, Food and Rural Affairs, Environmental Audit, Health and Social Care, and Transport Committees, Fourth Report: Improving Air Quality, 2017-18, HC 433, ¶ 11, <https://publications.parliament.uk/pa/cm201719/cmselect/cmenvfru/433/433.pdf>, archived at <https://perma.cc/N4PC-FM2V>.

² *Id.* ¶ 5.

³ *Id.* ¶ 9.

⁴ Feb. 22, 2018, PARL. DEB., H.C. (5th Ser.) (2018) WS477, <https://www.parliament.uk/business/publications/written-questions-answers-statements/written-statement/Commons/2018-02-22/HCWS477/>, archived at <https://perma.cc/MM7G-NR22>.

⁵ House of Commons Environment, Food and Rural Affairs, Environmental Audit, Health and Social Care, and Transport Committees, *supra* note 1, ¶ 34.

⁶ *Id.*

Given the comprehensive and extensive environmental legislation,⁷ this report will provide a high level overview of these laws as they apply in England⁸ to achieving a target of reducing air pollution.

While responsibility for implementing and enforcing environmental policy falls across many government departments and bodies, the Department for Environment, Food and Rural Affairs is the lead department that has authority for ensuring the implementation of the majority of clean air legislation in England.

II. Clean Air Regulations

England has a number of laws that aim to reduce pollutants in the air, and these laws have led to a long-term decrease in the emissions of a several air pollutants.⁹ Standards on air quality are driven at the EU level, notably by the Directive on Ambient Air Quality, which provides limits on the levels of major pollutants in outdoor air.¹⁰ The UK is also a party to a number of international agreements on the environment, including the Kyoto Protocol,¹¹ the United Nations Framework Convention on Climate Change,¹² and the Paris Agreement,¹³ and is actively working to meet targets set by these instruments.

A. National Legislation

England's domestic laws serve to prohibit industries from emitting some of the most serious pollutants in the air. Notably, the Clean Air Act 1995 provides that it is an offense, punishable

⁷ *UK and EU Air Quality Policy Context*, DEPARTMENT FOR ENVIRONMENT FOOD & RURAL AFFAIRS, <https://uk-air.defra.gov.uk/air-pollution/uk-eu-policy-context> (last visited May 8, 2018), archived at <https://perma.cc/3DZS-WZDJ>.

⁸ Environmental legislation is a devolved area, meaning that the Scottish Parliament, Northern Ireland Assembly, and National Assembly for Wales may legislate on this issue.

⁹ Department for Environment Food & Rural Affairs, *Statistical Release: 15 Feb. 2018, Emissions of Air Pollutants in the UK, 1970 to 2016*, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/681445/Emissions_of_air_pollutants_statistical_release_FINALv4.pdf, archived at <https://perma.cc/K67U-Q883>.

¹⁰ *Air Quality – Existing Legislation*, EUROPEAN COMMISSION, http://ec.europa.eu/environment/air/quality/existing_leg.htm (last visited May 7, 2018), archived at <https://perma.cc/ANP3-H74S>.

¹¹ Kyoto Protocol to the United Nations Framework Convention on Climate Change (Kyoto Protocol), Dec. 11, 1997, 2303 U.N.T.S. 162, annex B, <http://unfccc.int/resource/docs/convkp/kpeng.pdf>, archived at <http://perma.cc/3HQM-LT8M>.

¹² United Nations Framework Convention on Climate Change (UNFCCC), May 9, 1992, 1771 U.N.T.S. 107, http://unfccc.int/files/essential_background/background_publications_htmlpdf/application/pdf/conveng.pdf, archived at <http://perma.cc/2XMZ-7GKG>.

¹³ Paris Agreement, Dec. 12, 2015, http://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf, archived at <http://perma.cc/9UKH-4U6T>.

upon conviction with an unlimited fine, for industries or trades to emit dark smoke from their premises.¹⁴

The Climate Change Act was enacted in 2008, setting a target for England to reduce its greenhouse gas emissions to levels that are 34% lower than 1990 levels by 2020, and 80% lower than 1990 levels by 2050.¹⁵

B. National Air Quality Standards

Part IV of the Environmental Act 1995 requires the UK government and devolved administrations (Scotland, Northern Ireland, and Wales) to produce a National Air Quality Strategy.¹⁶ As part of this strategy, the government established Local Air Quality Management Areas, which imposed obligations on local authorities to monitor, assess, and, where appropriate, take action, to ensure the air quality in their area meets government targets.¹⁷ Three pollutants are at the core of this program: nitrogen dioxide (NO₂), particulate matter (PM), and sulfur dioxide (SO₂).¹⁸ The government has established a £255 million (approximately US\$345 million) Implementation Fund to help local authorities develop clean air plans, and an additional Clean Air Fund of £220 million (approximately US\$300 million) was announced in 2017 to further help support the implementation of such plans.¹⁹

The Local Air Quality Management Areas require local authorities to monitor air quality. If the local authority is not satisfied that an objective under the plan will be met, an Air Quality Management Area must be declared and an Action Plan must be implemented that details the measures that will be established to reduce pollution.²⁰ Such measures could include “changing road layouts; reducing congestion; encouraging active travel and public transport use; encouraging Ultra Low Emission Vehicle (ULEV) uptake; and retrofitting existing vehicles.”²¹

If these initial measures prove to be insufficient to bring levels of pollutants down to acceptable levels, local authorities may use the powers granted to them under the Transport Act

¹⁴ Clean Air Act 1995, c. 11, § 2, <http://www.legislation.gov.uk/ukpga/1993/11>, archived at <https://perma.cc/VT6P-3BZ4>.

¹⁵ Climate Change Act 2008, c. 27, § 1, <http://www.legislation.gov.uk/ukpga/2008/27/contents>, archived at <https://perma.cc/MY27-P45G>.

¹⁶ Environment Act 1995, c. 25, § 80, <https://www.legislation.gov.uk/ukpga/1995/25>, archived at <https://perma.cc/VLQ4-YFNL>.

¹⁷ Department for Environment Food & Rural Affairs, Part IV of the Environment Act 1995 Local Air Quality Management Technical Guidance (TG16), Feb. 2018, ¶ 1.01, available at <https://laqm.defra.gov.uk/documents/LAQM-TG16-February-18-v1.pdf>, archived at <https://perma.cc/A5KR-YMV2>.

¹⁸ *Id.* ¶ 1.08.

¹⁹ House of Commons Environment, Food and Rural Affairs, Environmental Audit, Health and Social Care, and Transport Committees, *supra* note 1, ¶ 72.

²⁰ *Air Quality Management Areas*, DEPARTMENT FOR ENVIRONMENT FOOD & RURAL AFFAIRS, <https://uk-air.defra.gov.uk/aqma/> (last visited Apr. 24, 2018), archived at <https://perma.cc/2QBK-DNFX>.

²¹ House of Commons Environment, Food and Rural Affairs, Environmental Audit, Health and Social Care, and Transport Committees, *supra* note 1, ¶ 37.

2000²² to establish Clean Air Zones. These zones would require owners of vehicles that do not meet a specified emissions standard to pay to enter or move around a designated area.²³ The government has stated that Clean Air Zones are the fastest way to decrease NO₂ emissions, and that the measures should be temporary and “lifted once legal compliance is achieved and there is no risk of legal limits being breached again.”²⁴

The proposals have not gone without criticism, with some groups saying that current actions to reduce pollutants have largely been ineffective and that Clean Air Zones should be initiated immediately, while others note that introducing such zones would be “politically contentious for many councils, particularly if they opted for Band D Zones, which would charge private vehicles . . . [and] would be ‘difficult to implement locally without leadership from national government and a persuasive, evidence based, compelling argument’.”²⁵

C. Breach of EU Directive on Ambient Air Quality

The UK is currently in breach of the 2008 EU Directive on Ambient Air Quality, which required member states to comply with limits for certain air pollutants by 2010.²⁶ In cases where these limits are exceeded, the Member State is required to implement an air quality plan to help reduce these pollutants, which would include measures used in an Air Quality Management Area (discussed above) and may also include reducing traffic volume, the type of fuels used in vehicles, or encouraging people to adjust their driving behavior.²⁷

The European Commission started an infringement case²⁸ against the UK for failing to meet the obligations contained in this Directive in sixteen air-quality zones, and in February 2017, it issued a Reasoned Opinion, a final written warning, for the UK to comply with the obligations imposed by the Directive. If the UK does not meet these obligations, the European Commission has stated that it will refer the case to the Court of Justice of the European Union,²⁹ which could order the

²² Transport Act 2000, c. 38, https://www.legislation.gov.uk/ukpga/2000/38/pdfs/ukpga_20000038_en.pdf.

²³ DEPARTMENT FOR ENVIRONMENT FOOD & RURAL AFFAIRS AND DEPARTMENT FOR TRANSPORT, CLEAN AIR ZONE FRAMEWORK, May 2017, ¶ 126, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/612592/clean-air-zone-framework.pdf, archived at <https://perma.cc/CG38-W4YQ>.

²⁴ House of Commons Environment, Food and Rural Affairs, Environmental Audit, Health and Social Care, and Transport Committees, *supra* note 1, ¶ 18.

²⁵ *Id.* ¶ 52.

²⁶ Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on Ambient Air Quality and Cleaner Air for Europe (Ambient Air Quality Directive), 2008 O.J. (L 152) 1, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32008L0050&from=EN>, archived at <http://perma.cc/6XF2-QWC4>. This Directive was implemented into the national law of the UK by the Air Quality Standards Regulations 2010, SI 2010/1001, http://www.legislation.gov.uk/uksi/2010/1001/pdfs/uksi_20101001_en.pdf, archived at <https://perma.cc/3WWZ-GUF6>.

²⁷ Press Release, European Commission, Commission Warns Germany, France, Spain, Italy and the United Kingdom of Continued Air Pollution Breaches (Feb. 15, 2017), http://europa.eu/rapid/press-release_IP-17-238_en.htm, archived at <https://perma.cc/CK2C-CEBB>.

²⁸ *Id.*

²⁹ *Id.*

UK to pay a financial penalty. The government has stated that it is not aware of the amount this penalty could be, or whether the penalties would be imposed before or after the UK exits the EU.³⁰

England's plans to enable it to comply with the Directive have also been subject to domestic legal action, brought by ClientEarth, which claimed that the government's plan to reduce NO₂ emissions to comply with its obligations under the Directive were insufficient. The High Court sided with ClientEarth and ruled that the government "must aim to achieve compliance by the soonest date possible, that [the Secretary of State] must choose a route to that objective which reduces exposure as quickly as possible, and that [the Secretary of State] must take steps which mean meeting the value limits is not just possible, but likely."³¹

In 2017, the government published a new plan to tackle NO₂ pollution,³² and ClientEarth brought further legal proceedings, claiming that the new plan "failed to adequately address the magnitude of the problem."³³ While the court dismissed two complaints, finding the government's approach to combat NO₂ pollution in areas with the worst air quality to be "sensible, rational and lawful,"³⁴ it did rule in favor of Client Earth, opining that the measures across England were not sufficient to "ensure substantive compliance with the 2008 Directive and the English Regulations."³⁵ The government responded to the judgment by issuing legally binding directions to all local authorities instructing them to consider any further actions that could be made to accelerate compliance with the Directive.³⁶ It also aims to publish a supplement to the 2017 plan in the fall of 2018 and will release a comprehensive Clean Air Strategy in 2018 to detail further steps that it plans to take to combat air pollution.

³⁰ House of Commons Environment, Food and Rural Affairs, Environmental Audit, Health and Social Care, and Transport Committees, *supra* note 1, ¶ 21.

³¹ ClientEarth v. Secretary of State for the Environment, Food & Rural Affairs et al., [2016] EWHC 2740 (Admin), ¶ 22, <https://www.judiciary.gov.uk/wp-content/uploads/2016/11/clientearth-v-ssenviron-food-rural-affairs-judgment-021116.pdf>, archived at <https://perma.cc/328R-TLYV>.

³² Department for Environment Food & Rural Affairs and the Department for Transport, UK Plan for Tackling Roadside Nitrogen Dioxide Concentrations, July 2017, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/633270/air-quality-plan-detail.pdf, archived at <https://perma.cc/32Y7-V6SF>. All documents relating to this paper are available at *Policy Paper Air Quality Plan for Nitrogen Dioxide (NO₂) in UK (2017)*, Department for Environment, Food & Rural Affairs and Department for Transport (last updated Mar. 23, 2018), <https://www.gov.uk/government/publications/air-quality-plan-for-nitrogen-dioxide-no2-in-uk-2017>, archived at <https://perma.cc/HQ5L-E6WH>.

³³ ClientEarth v. Secretary of State for the Environment, Food & Rural Affairs et al., [2016] EWHC 2740 (Admin), ¶ 95, <https://www.judiciary.gov.uk/wp-content/uploads/2016/11/clientearth-v-ssenviron-food-rural-affairs-judgment-021116.pdf>, archived at <https://perma.cc/328R-TLYV>.

³⁴ R (on the application of ClientEarth) No. 3 v. Secretary of State for Environment, Food and Rural Affairs et al., [2018] EWHC 315 (Admin), ¶ 101, <https://www.judiciary.gov.uk/wp-content/uploads/2018/02/clientearth-no3-final-judgmentdocx.pdf>, archived at <https://perma.cc/YL9S-NHPN>.

³⁵ *Id.* ¶ 104.

³⁶ Feb. 22, 2018, PARL. DEB., H.C. (5th Ser.) (2018) WS477, <https://www.parliament.uk/business/publications/written-questions-answers-statements/written-statement/Commons/2018-02-22/HCWS477/>, archived at <https://perma.cc/MM7G-NR22>.

D. Reducing Industrial Emissions

The EU's National Emission Ceiling Directive³⁷ sets limits on the total emissions of certain pollutants from land sources in Member States that are not covered under the EU's Emissions Trading System (EU ETS, discussed below), which establishes a limit on greenhouse gas emissions by Member States.

In early 2018, the government passed regulations to implement a further EU Directive³⁸ that established limits for air pollution from medium-sized combustion plants and generators, filling the gap between large industries covered by the Industrial Emissions Directive that have a thermal input of more than 50 megawatts³⁹ and small appliances, such as boilers and heaters with a thermal input of 1 megawatt or less that are covered by the Ecodesign Directive.⁴⁰ The regulations require existing medium-combustion plants to reduce emissions by 2025 to 2030, depending upon the size of the plant. New medium-combustion plants must comply with the reduced emissions requirements starting December 20, 2018.⁴¹

III. Greenhouse Gas Tail Pipe Emission Reduction Measures

Vehicle exhaust emissions are regulated at the EU level, meaning that before vehicles are approved for sale they must meet certain standards set out in EC Regulation 715/2007.⁴² This Regulation

³⁷ Directive 2016/2284/EU of the European Parliament and of the Council of 14 December 2016 on the Reduction of National Emissions of Certain Atmospheric Pollutants, Amending Directive 2003/35/EC and Repealing Directive 2001/81/EC (National Emissions Ceilings (NEC) Directive), art. 2, 2016 O.J. (L 344) 1, <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016L2284&from=EN>, archived at <http://perma.cc/6FNN-F4PP>. This Directive was implemented into England's national legislation by the National Emission Ceilings Regulations 2018, SI 2018/129, <http://www.legislation.gov.uk/cy/uksi/2018/129/made?view=plain>, archived at <https://perma.cc/964J-U962>.

³⁸ Directive 2015/2193/EU of the European Parliament and of the Council of 25 November 2015 on the Limitation of Emissions of Certain Pollutants Into the Air from Medium Combustion Plants (Medium Combustion Plant (MCP) Directive), 2015 O.J. (L 313) 1, <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32015L2193&from=EN>, archived at <http://perma.cc/2QOQ-VZLV>. This Directive was implemented into England and Wales' national legislation by the Environmental Permitting (England and Wales) (Amendment) Regulations 2018, SI 2018/110, <https://www.legislation.gov.uk/uksi/2018/110/made>, archived at <https://perma.cc/78XT-W8CE>.

³⁹ Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on Industrial Emissions (Integrated Pollution Prevention and Control), ch. III & annex V, 2010 O.J. (L 334) 17, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32010L0075&from=EN>, archived at <http://perma.cc/6GA5-KUXU>.

⁴⁰ Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 on Establishing a Framework for the Setting of Eco-design Requirements for Energy-related Products (Recast), 2009 O.J. (L 285) 10, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32009L0125&from=EN>, archived at <https://perma.cc/M37W-TANE>.

⁴¹ Department for Environment, Food & Rural Affairs & Thérèse Coffey MP, *New Emission Controls Will Help Improve Air Quality* (Jan. 24, 2018), <https://www.gov.uk/government/news/new-emission-controls-will-help-improve-air-quality>, archived at <https://perma.cc/UT59-4OUG>.

⁴² Regulation 715/2007/EC of June 26, 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

requires new cars on sale after September 1, 2015, to meet the requirements set out in the Euro 6 standard before they will be approved for sale in the EU. This standard requires cars fueled with petrol that weigh up to 2.5 metric tons laden to not exceed emissions of more than 1,000mg of carbon dioxide (CO₂), 100mg of total hydrocarbon (THC), 68mg of non-methane hydrocarbons (NMHC), 60mg of NO_x, and 5.0/4.5mg of PM per kilometer.⁴³ For diesel vehicles, the standard requires those that weigh up to 2.5 metric tons laden to not exceed emissions of more than 500mg of CO₂, 180mg of NO_x, 230mg of THC+NO_x, 5.0/4.5mg of PM, and 6.0 x 10 particles per kilometer.⁴⁴ Electric vehicles do not produce pollutant exhaust emissions and are not subject to these regulations.

In England, cars older than three years must also pass emissions tests as part of the annual roadworthiness test, known as the MOT.⁴⁵ The level of acceptable emissions varies according to the year that the vehicle was first registered.⁴⁶

The UK was part of a wide-scale emissions fraud by a car manufacturer, in which 1.2 million vehicles imported into the UK were fitted with “defeat devices” that enabled these vehicles to pass emissions testing, but only during the test.⁴⁷ In the wake of this incident, the government announced its intention to introduce legislation that, if enacted, will enable it to bring criminal charges and impose financial penalties against vehicle manufacturers that install such devices.⁴⁸

The government has further stated that it will end the sale of conventional gas and diesel fueled cars by 2040,⁴⁹ and included this statement as one of its priorities in its recently-issued twenty-five-year environmental plan.⁵⁰

Information, 2007 O.J. (L 171) at 1–16, <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ:L:2007:171:TOC>, archived at <https://perma.cc/5XWC-QKPT>.

⁴³ *Exhaust Air Quality Pollutant Emissions Testing*, VEHICLE CERTIFICATION AGENCY, <http://www.dft.gov.uk/vca/fcb/exhaust-emissions-testing.asp> (last visited Apr. 11, 2018), archived at <https://perma.cc/7RU5-ENMH>.

⁴⁴ *Id.*

⁴⁵ Road Traffic Act 1988, c. 52, § 45, <http://www.legislation.gov.uk/ukpga/1988/52>, archived at <https://perma.cc/TQY9-DDFF>.

⁴⁶ Driver & Vehicle Standards Agency, *In Service Exhaust Emission Standards for Road Vehicles* (19th ed. 2017), https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/676700/in-service-exhaust-emission-standards-for-road-vehicles-19th-edition.pdf, archived at <https://perma.cc/7J9Q-3BZB>.

⁴⁷ Joe Watts, *Carmakers That Cheat on Emissions Tests Could Be Given Unlimited Fines Under a Strict New Regime*, TELEGRAPH (London) (Feb. 1, 2018), <https://www.independent.co.uk/news/uk/politics/emissions-scandal-volkswagen-unlimited-fine-diesel-cars-uk-a8188851.html>, archived at <https://perma.cc/9WTW-MYLH>.

⁴⁸ DEPARTMENT FOR TRANSPORT, ROAD VEHICLES IMPROVING AIR QUALITY AND SAFETY (Feb. 2018), https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/678209/road-vehicles-improving-air-quality-and-safety.pdf, archived at <https://perma.cc/WGC8-F2BN>.

⁴⁹ Feb. 22, 2018, PARL. DEB., H.C. (5th Ser.) (2018) WS477, <https://www.parliament.uk/business/publications/written-questions-answers-statements/written-statement/Commons/2018-02-22/HCWS477/>, archived at <https://perma.cc/MM7G-NR22>.

⁵⁰ *Policy Paper At a Glance: Summary of Targets in Our 25 Year Environment Plan*, DEPARTMENT FOR ENVIRONMENT FOOD & RURAL AFFAIRS, <https://www.gov.uk/government/publications/25-year-environment>

IV. Pollution Control : Reducing Greenhouse Gases

A. Cap and Trade Scheme

The establishment of the EU Emissions Trading Scheme in 2005 was considered a major milestone to collectively tackle climate change across the EU. It is one of the EU's key policies to help meet a target of reducing greenhouse gas emissions to 8% below the levels produced in 1990, as per the Kyoto Protocol.⁵¹ The rationale behind emissions trading is that it enables emission reductions to take place where the cost of the reduction is lowest, lessening the overall cost of tackling climate change.⁵²

The UK is under an obligation to meet the emissions trading standards set by the EU ETS and must reduce emissions to at least 15% below 1990 levels by 2020, and to at least 80% of those levels by 2050.⁵³ The UK has transposed the EU Directives that regulate this scheme into its national law. The most current version of the regulations is the Greenhouse Gas Emissions Trading Scheme Regulations 2012, which came into force on January 1, 2013.⁵⁴

B. UK's Regulatory Authority for the EU ETS

The Department for Business, Energy & Industrial Strategy is the regulator of the EU ETS in the UK, with the financial aspect of bidding on emissions regulated by the Financial Services Authority. The Environmental Agency regulates England's opt-out scheme for small emitters and hospitals. The regulators ensure compliance with the EU ETS and, among other things, grants and maintains permits, aviation emission plans, and the monitoring and reporting of planes.⁵⁵

[plan/25-year-environment-plan-our-targets-at-a-glance#clean-air](https://perma.cc/32TC-3H68) (last updated Feb. 1, 2018), archived at <https://perma.cc/32TC-3H68>.

⁵¹ Greenhouse Gas Emissions Trading Scheme (Amendment) Regulations 2012, SI 2012/3038, Explanatory Memorandum, ¶ 7.1, http://www.legislation.gov.uk/ukxi/2012/3038/pdfs/ukxiem_20123038_en.pdf, archived at <https://perma.cc/DWY3-PLS5>.

⁵² *Id.*

⁵³ Climate Change Act 2008, c. 27, § 1.

⁵⁴ Greenhouse Gas Emissions Trading Scheme Regulations 2012, SI 2012/3038, <http://www.legislation.gov.uk/ukxi/2012/3038/made>, archived at <https://perma.cc/6OAL-QLZW>. This Regulation served to implement Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 Establishing a Scheme for Greenhouse Gas Emission Allowance Trading Within the Community and Amending Council Directive 96/61/EC, 2003 O.J. (L 275) 32 (as amended), <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:2003L0087:20090625:EN:HTML>, archived at <https://perma.cc/EWB3-3M9H>.

⁵⁵ *Participating in the EU ETS*, DEPARTMENT FOR BUSINESS, ENERGY & INDUSTRIAL STRATEGY, <https://www.gov.uk/participating-in-the-eu-ets> (last updated Apr. 27, 2018), archived at <https://perma.cc/7GL6-SGSG>.

C. Installations Covered by the EU ETS

1. Permit Requirement

The Greenhouse Gas Emissions Trading System Regulations 2012 provide that any operator conducting an activity that is covered by the EU ETS must hold a greenhouse gas emissions permit.⁵⁶ The government describes this permit as effectively being a “license to operate and emit greenhouse gases covered by the EU ETS.”⁵⁷ When applying for a permit, the operator must propose a monitoring plan that provides information on how the emissions will be measured and reported on an annual basis, in accordance with the European Commission’s Monitoring and Reporting Regulation.⁵⁸ Applications for permits are made to the relevant regulator, who may grant the permit if the applicant is capable of monitoring and reporting emissions from the installation in accordance with the requirements of the regulation.⁵⁹

In accordance with the EU Directive, the UK has set out the list of participants in Phase III.⁶⁰ The aviation industry has been included in the EU ETS⁶¹ since January 1, 2012, with the system covering flights that land and depart from any EU or European Economic Area Agreement Member State.⁶² Each aircraft operator is to be administered by a single Member State, as set out by the European Commission.⁶³ While there are four regulators in the UK, only the Environment Agency for England and Wales and the Scottish Environment Protection Agency regulate aircraft operators.⁶⁴

2. Opt-out Scheme for Small Emitters and Hospitals

The UK has a Small Emitter and Hospital Opt-out Scheme, which allows eligible installations to be excluded from Phase III, which runs from 2013 to 2020.⁶⁵ This is in accordance with article 27 of the EU ETS Directive, which allows the exclusion of such emitters. The opt-out requires that

⁵⁶ Greenhouse Gas Emissions Trading Scheme Regulations 2012, ¶ 9.

⁵⁷ Activities covered by the EU ETS are listed in Annex I of Directive 2003/87/EC, *supra* note 54.

⁵⁸ DEPARTMENT FOR BUSINESS, ENERGY & INDUSTRIAL STRATEGY, *supra* note 55.

⁵⁹ Greenhouse Gas Emissions Trading Scheme Regulations 2012, ¶ 10(4).

⁶⁰ Department of Energy and Climate Change, The UK’s National Implementation Measures for Phase III of the EU Emissions Trading System as Submitted to the European Commission (Dec. 13, 2011), https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/48248/3846-uk-nat-imp-measures-phase3-euets.pdf, archived at <https://perma.cc/3U9D-VPAM>.

⁶¹ DEPARTMENT FOR BUSINESS, ENERGY & INDUSTRIAL STRATEGY, *supra* note 55.

⁶² Greenhouse Gas Emissions Trading Scheme Regulations 2012, ¶ 10(4).

⁶³ *Aircraft Operators and Their Administering Member States*, EUROPEAN COMMISSION, https://ec.europa.eu/clima/policies/ets/monitoring/operators_en (last updated Feb. 2017), archived at <https://perma.cc/SG9C-GPWV>.

⁶⁴ DEPARTMENT FOR BUSINESS, ENERGY & INDUSTRIAL STRATEGY, *supra* note 55.

⁶⁵ DEPARTMENT OF ENERGY & CLIMATE CHANGE, THE UK’S SMALL EMITTER AND HOSPITAL OPT-OUT SCHEME ¶ 3.2 (Dec. 2015), https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/481396/Annex_D_small_emitter_SI_updated_guidance_-_final_policy_clearance_3_.pdf, archived at <https://perma.cc/KYT6-2WSK>.

such installations be subject to a domestic scheme that provides for an equivalent contribution to the reduction of emissions as the EU ETS.⁶⁶

A “small emitter” is an installation with reported annual emissions of less than 25,000 tons of carbon since 2008 and, if certain combustion activity is undertaken, a net-rated thermal input of below 35 megawatts between the years 2008–2010. To be eligible for the scheme, a hospital participant must not export more than 15% of the heat it produces to another non-hospital establishment or, if the installation is not operated by a hospital, it must supply at least 85% of the heat it produces to a hospital.⁶⁷ Two hundred and forty-seven installations have been approved to participate in this scheme during Phase III of the EU ETS.⁶⁸ The aim of excluding these installations is to reduce the administrative burden, as these costs are “disproportionately higher per tonne [metric ton] of CO₂, in comparison to the costs for large emitting installations.”⁶⁹

D. The Scheme in Practice

The EU ETS cap-and-trade system works by placing a cap (limit) on the total greenhouse gas emissions permitted by participants. The cap is converted into tradable emission allowances, so those who are likely to produce more emissions than they have been allocated may either take measures to reduce their emissions or purchase surplus allocations.⁷⁰ This is done through either the secondary market or from auctions held by the EU or its individual Member States.⁷¹

The EU ETS is occurring in phases, three of which have already been delivered or agreed to.⁷² The current phase, Phase III (2013–2020) places an EU-wide cap on the number of available allowances.

⁶⁶ The Small Emitter and Hospital Opt-out Scheme allows eligible installations to be excluded from Phase III, which runs from 2013 to 2020. This is in accordance with article 27 of the EU ETS Directive, which allows the exclusion of such emitters. DEPARTMENT FOR BUSINESS, ENERGY & INDUSTRIAL STRATEGY, *supra* note 55.

⁶⁷ DEPARTMENT OF ENERGY & CLIMATE CHANGE, THE UK’S SMALL EMITTER AND HOSPITAL OPT-OUT SCHEME, *supra* note 65, ¶ 3.3.

⁶⁸ *Id.* See also Department for Business, Energy & Industrial Strategy, List of the UK Installations to Be Excluded from Phase III of EU Emissions Trading System (EU ETS) Under Article 27 of the Revised ETS Directive, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/65660/7178-list-of-the-uk-installations-to-be-excluded-from-p.pdf (last visited May 9, 2018) (providing list of installations approved to participate in the small operators scheme), archived at <https://perma.cc/9M4P-3VMB>.

⁶⁹ This allows eligible installations to be excluded from Phase III, which runs from 2013 to 2020 in accordance with article 27 of the EU ETS Directive. DEPARTMENT FOR BUSINESS, ENERGY & INDUSTRIAL STRATEGY, *supra* note 555.

⁷⁰ *Id.*

⁷¹ *Id.*

⁷² Phase I occurred between January 2005 and December 2007; Phase II occurred between January 2008 and December 2012. Phase III is currently in operation and is intended to run from January 2013 to December 2020. *Id.*

E. Allocating Allowances

Under the EU ETS, one ton of carbon dioxide is equivalent to one EU allowance.⁷³ Participants in the EU ETS are required to monitor and report their emissions at the end of each calendar year, with reports and monitoring verified by an independent verifier, in accordance with the EU's Accreditation and Verification Regulation.⁷⁴ The Secretary of State set the carbon price at £4.86 (approximately US\$6.59) per metric ton of carbon for 2018.⁷⁵

All sectors covered by the EU ETS, with the exception of most of the EU power sector, are currently provided with free allowances in order to assist the transition to lowering carbon emissions. Additional allowances are provided to sectors where competition from countries with no emission reduction schemes is high,⁷⁶ and in cases where the scheme could cause “carbon leakage,” such as where the company may be inclined to shift production or investment overseas to a country with no emission reduction scheme to avoid the increased costs associated with complying with the EU ETS. These free allowances are determined in accordance with the methodology in Commission Decision 2011/278/EU.⁷⁷ The UK government has expressed concern that the current additional allowances will not adequately compensate these sectors in the future if the EU ETS is not reformed for Phase IV.⁷⁸ Electricity intensive companies that are deemed at high risk for carbon leakage are also eligible for compensation from the UK government

⁷³ Greenhouse Gas Emissions Trading Scheme (Amendment) Regulations 2012, Explanatory Memorandum, *supra* note 51, ¶ 7.3.

⁷⁴ The UK's National Implementation Measures for Phase III of the EU Emissions Trading System, *supra* note 60, ¶ 6; DEPARTMENT FOR BUSINESS, ENERGY & INDUSTRIAL STRATEGY, *supra* note 555. In the UK, the verifier is currently the UK Accreditation Service (UKAS), <http://www.ukas.com/about-accreditation>, archived at <https://perma.cc/DLN6-NHH6>.

⁷⁵ Determination by the Secretary of State for Business, Energy and Industrial Strategy of the EU Emissions Trading System (EU ETS) Carbon Price Under the Greenhouse Gas Emissions Trading Scheme Regulations 2012 (Nov. 20, 2017), https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/664472/Carbon_Penalty_Price_Determination_for_2018.pdf, archived at <https://perma.cc/F3XW-KA5T>.

⁷⁶ Sectors deemed at high risk from competition were assessed against criteria in the EU ETS Directive and agreed to through the EU comitology procedure in December 2009. The Directive provides that reviews of high-risk sectors may occur every five years. Commission Decision of 24 December 2009 Determining, Pursuant to Directive 2003/87/EC of the European Parliament and of the Council, a List of Sectors and Subsectors Which Are Deemed to Be Exposed to a Significant Risk of Carbon Leakage, 2010 O.J. (L 1) 10–18, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32010D0002:EN:NOT>, archived at <https://perma.cc/3TTM-NVQ3>.

⁷⁷ Commission Decision of 27 April 2011 Determining Transitional Union-wide Rules for Harmonised Free Allocation of Emission Allowances Pursuant to Article 10a of Directive 2003/87/EC of the European Parliament and of the Council, 2011 O.J. (L 130) 1, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:130:0001:0045:EN:PDF>, archived at <https://perma.cc/CJE6-PEVF>. The UK's allowances for Phase III were approved in December 2013. See Press Release, European Commission, Commission Gives Green Light for a First Set of Member States to Allocate Allowances for Calendar Year 2013 (Dec. 18, 2013), http://ec.europa.eu/clima/news/articles/news_2013121801_en.htm, archived at <https://perma.cc/H8S2-24CR>; The UK's National Implementation Measures for Phase III of the EU Emissions Trading System as Submitted to the European Commission, *supra* note 60.

⁷⁸ DEPARTMENT FOR BUSINESS, ENERGY & INDUSTRIAL STRATEGY, *supra* note 555.

to help offset the increased costs associated with compliance with the EU ETS and the carbon price floor.⁷⁹

F. Auctioning Allowances

The European Commission's Auctioning Regulation governs the auctioning of European Union allocation allowances and establishes a common EU auction platform.⁸⁰ The regulations provide that Member States may opt out of using the common EU auction platform and set up their own national platform, which the UK has done. Auctions are overseen by the Department of Energy and Climate Control and administered by ICE Futures Europe.⁸¹ During the Phase II auctions between 2008–2012, the UK auctioned 10% of allowances (more than triple the EU's average of 3%), held thirty auctions, and sold almost 123 EU allowances, raising £1.3 billion (approximately US\$2.2 billion) for the Exchequer.⁸²

EU Regulations require certain persons wishing to bid in the EU ETS auctions across Europe to be regulated by the competent national authority. Bidding for emissions under the EU ETS in the UK by certain bodies, such as investment firms, is regulated by the Financial Services Authority (FSA).⁸³

G. Penalties for Noncompliance

The penalties for noncompliance with the EU ETS are left to each Member State's discretion, but must be "effective, proportionate and dissuasive."⁸⁴ In the UK, civil penalties for noncompliance are provided for in the Greenhouse Gas Emissions Trading System Regulations 2012.⁸⁵ These regulations provide that the regulator may issue a penalty notice to operators stating the regulation under which the liability arises; the amount of civil penalty due; how the penalty is calculated; whether the operator is liable for an additional daily penalty; and the date the penalty must be paid.⁸⁶ The current civil penalty for failing to surrender enough allowances is €100 (approximately US\$160) per metric ton of carbon not covered by an

⁷⁹ Policy Paper, *Energy-intensive Industries: Compensation for Indirect Costs of Energy and Climate Change Policies*, DEPARTMENT FOR BUSINESS, INNOVATION & SKILLS (Dec. 12, 2012), <https://www.gov.uk/government/publications/energy-intensive-industries-support-for-indirect-costs-of-energy-and-climate-change-policies/energy-intensive-industries-support-for-indirect-costs-of-energy-and-climate-change-policies>, archived at <https://perma.cc/H64Z-AFYV>.

⁸⁰ Commission Regulation (EU) No. 1031/2010, 2010 O.J. (L 302) 1, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:302:0001:0041:EN:PDF>, archived at <https://perma.cc/A8AB-65KW>.

⁸¹ This role was initially conducted by the UK Debt Management Office. *Guidance – EU ETS: Carbon Markets*, DEPARTMENT FOR BUSINESS, ENERGY & INDUSTRIAL STRATEGY (Jan. 22, 2013), <https://www.gov.uk/guidance/eu-ets-carbon-markets>, archived at <http://perma.cc/3S8P-SXY6>.

⁸² *Id.*

⁸³ *Regulating Certain Bidders in Auctions of EU Emissions Allowances*, HM TREASURY (Feb. 14, 2012), https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/81557/condoc_regulating_certain_bidders_auctions_euemissions_allowances.pdf, archived at <https://perma.cc/8V5K-97H7>.

⁸⁴ DEPARTMENT FOR BUSINESS, ENERGY & INDUSTRIAL STRATEGY, *supra* note 555.

⁸⁵ Greenhouse Gas Emissions Trading Scheme Regulations 2012, ¶ 7.1.

⁸⁶ *Id.* ¶ 50.

allowance.⁸⁷ The regulator does have some discretion to either decrease or increase the penalty to an amount that exceeds any economic benefit the operator obtains by failing to provide the appropriate allowances.⁸⁸ In the 2012 Regulations a discretionary €20 (approximately US\$32) per metric ton of carbon emissions penalty was introduced for installations that fail to surrender allowances “in cases where emissions are under-reported and the error is self-rectified.”⁸⁹

H. Methods of Recourse Against Administrative Decisions

A right of appeal against a decision from the regulatory body is available to the First Tier Tribunal in England and Wales, the Planning and Appeals Commission in Northern Ireland, and the Directorate for Planning and Environmental Appeals in Scotland determines appeals on behalf of the Scottish Minister.⁹⁰ The appeal body has recourse to four actions under the Regulations and may

- (a) affirm the decision;
- (b) quash the decision or vary any of its terms;
- (c) substitute a deemed refusal with a decision of the appeal body; or
- (d) give directions to the regulator as to the exercise of the regulator’s functions under these Regulations.⁹¹

V. Corporate Average Fuel Economy

As noted above, the UK’s Climate Change Act set a target to reduce greenhouse gas emissions to 80% lower than 1990 levels by 2050.⁹² The government set out a plan to reduce greenhouse gases in 2011 in the Carbon Plan,⁹³ and identified vehicle emissions as making up nearly 25% of UK emissions and reducing them as playing a “critical role in meeting the Climate Change Act (2008) obligations.”⁹⁴ It acknowledged that the use of vehicles are important for economic growth, and

⁸⁷ Greenhouse Gas Emissions Trading Scheme (Amendment) Regulations 2012, SI 2012/3038, Explanatory Memorandum, *supra* note 511, ¶ 7.1.

⁸⁸ Greenhouse Gas Emissions Trading Scheme Regulations 2012, ¶ 52(3).

⁸⁹ Department of Energy & Climate Change et al., Amendments to UK Greenhouse Gas Emissions Trading Scheme and National Emissions Inventory Regulations: A Public Consultation 4 (Dec. 2013), http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/267670/Summ_response_and_Gov_resp_to_consult_on_a_mend_to_ghg_and_invent_regs_new_format_FINAL.pdf, archived at <https://perma.cc/7P6S-V7LW>.

⁹⁰ *Id.*; DEPARTMENT FOR BUSINESS, ENERGY & INDUSTRIAL STRATEGY, *supra* note 555.

⁹¹ Greenhouse Gas Emissions Trading Scheme Regulations 2012, ¶ 77.

⁹² Climate Change Act 2008, c. 27, § 1.

⁹³ HM GOVERNMENT, CARBON PLAN: DELIVERING OUR LOW CARBON FUTURE, 2011, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47613/3702-the-carbon-plan-delivering-our-low-carbon-future.pdf, archived at <https://perma.cc/E7KJ-XFXX>.

⁹⁴ *Cars and Carbon Dioxide*, VEHICLE CERTIFICATION AGENCY, <http://www.dft.gov.uk/vca/fcb/cars-and-carbon-dioxide.asp> (last visited Apr. 11, 2018), archived at <https://perma.cc/P5VW-A9XF>.

that over the short term, improving fuel efficiency standards would provide the most significant greenhouse gas savings.⁹⁵

The UK must also comply with EU Regulations, which set targets for manufacturers to produce new vehicles registered in the EU to have an average emission of 130g CO₂ per kilometer, dropping to 95g of CO₂ per kilometer to be phased in beginning in 2020.⁹⁶ As this number is based on an average, it does not require each vehicle to produce CO₂ levels lower than the required amount, but rather that the average emission of new vehicles registered in the EU meet this requirement. It does not require older vehicles to meet this standard.⁹⁷

The UK has taken additional steps to encourage vehicle owners to purchase more fuel efficient vehicles through tax incentives⁹⁸ and grants of up to £5,000 (approximately US\$7,100) for electric or hybrid ultra-low emission vehicles that produce less than 75g of CO₂ per kilometer.⁹⁹ Tax incentives are provided based on the first year of tax of the vehicle, with the rate being tied to the level of CO₂ emissions. The rates are organized in thirteen bands based on CO₂ emissions and range from charges of £0 for vehicles that emit less than 100g of CO₂ per kilometer up to £2,070 (approximately US\$3,000) for vehicles that emit over 255g of CO₂ per kilometer.¹⁰⁰ After the first year, there is an annual tax that varies according to whether the vehicle uses petrol, diesel, electric, or alternative fuel and ranges from £0 for electric vehicles to £140 (approximately US\$200) for petrol and diesel vehicles.

VI. Renewable Fuel Standards

In 2008, the UK introduced the Renewable Transport Fuel Obligation Order (RTFO),¹⁰¹ which serves as “one of the Government’s main policies for reducing greenhouse gas (GHG) emissions from road transport in the UK.”¹⁰² At the time of the RTFO’s introduction, the UK’s road

⁹⁵ *Id.*

⁹⁶ *Id.*

⁹⁷ *Id.*

⁹⁸ Vehicle Excise and Registration Act 1994, c.22, § 1, <http://www.legislation.gov.uk/ukpga/1994/22/contents>, archived at <https://perma.cc/7HP8-T8GC>.

⁹⁹ *Cars and Carbon Dioxide*, *supra* note 94.

¹⁰⁰ *Vehicle Tax Rates*, GOV.UK, <https://www.gov.uk/vehicle-tax-rate-tables>, archived at <https://perma.cc/6UCW-PDLF>.

¹⁰¹ The RTFO was made under the Energy Act 2004, c. 20, <https://www.legislation.gov.uk/ukpga/2004/20>, archived at <https://perma.cc/R7RY-3TMJ>, and serves to implement Council Directive 2009/28, 2009 O.J. (L 140) 16 (EC), <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32009L0028&from=EN>, archived at <https://perma.cc/PZ7P-MEYG>.

¹⁰² DEPARTMENT FOR TRANSPORT, RENEWABLE TRANSPORT FUEL OBLIGATION ANNUAL REPORT 2015–16, 2017, Cm. 9436, ¶ 1.3, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/602389/rtfo-annual-report-2015-2016-web-version.pdf, archived at <https://perma.cc/9WNT-4SM3>.

transportation accounted for approximately 25% of the UK's greenhouse gas emissions, amounting to 112.5 million metric tons of carbon dioxide annually.¹⁰³

The RTFO aims to reduce the UK's greenhouse gas emissions by imposing an obligation on suppliers of fuel in the UK¹⁰⁴ to demonstrate that a specified percentage of fuel they supply originates from renewable sources and, as the result of a 2011 amendment to prevent environmental damage due to the production of biofuels, is produced from sustainable sources.¹⁰⁵ This percentage is increased each year and the criteria of sustainable sources may also be varied.¹⁰⁶ For the period April 15, 2015, to April 14, 2016 ("the reporting year"), fuel suppliers were required to provide biofuel that was 4.7501% of their overall fuel supply,¹⁰⁷ and meet the following sustainability criteria:

- The biofuel meets a minimum GHG saving of 35%;
- Growing crops for biofuels does not lead to a loss of biodiversity; and
- Growing crops for biofuels does not lead to a loss of high-carbon stock land such as forest or peatland.¹⁰⁸

The cost of compliance with the RTFO is estimated to be £177 million (approximately US\$247 million) for the years 2019 and 2020, with the amount passed along to the consumer at the gas pump estimated to be 0.44 pence (p) per liter (approximately US\$0.61 per liter, or approximately US\$2.49 per US gallon). This is in addition to the excise duty charged to petrol and diesel at 57.95 p per liter (approximately US\$0.95 per liter, working out to approximately US\$3.59 per gallon). With value added tax, a charge on almost every good sold in the country, included, taxes make up around 60% of the price paid for gas and diesel in England and raised £28.1 billion (approximately US\$38 billion) in revenue in 2017/18.¹⁰⁹

¹⁰³ Explanatory Memorandum to the Renewable Transport Fuel Obligation Order 2007, 2007 No. 3072, ¶ 7.1, http://www.legislation.gov.uk/ukxi/2007/3072/pdfs/ukxiem_20073072_en.pdf, archived at <https://perma.cc/NR7J-PH79>.

¹⁰⁴ Fuel suppliers are defined in the Order as those that provide at least 450,000 liters of fuel each fiscal year, for both transport and non-road mobile machinery. Renewable Transport Fuel Obligation Order 2007, SI 2007/3072, ¶ 4, <http://www.legislation.gov.uk/ukxi/2007/3072/made>, archived at <https://perma.cc/33EW-TVLX>.

¹⁰⁵ *Id.* The number of certificates awarded per liter varies according to the type of fuel.

¹⁰⁶ The Renewable Transport Fuels and Greenhouse Gas Emissions Regulations 2018, SI 2018/374, <http://www.legislation.gov.uk/ukxi/2018/374/memorandum/contents>, archived at <https://perma.cc/DKU6-4KUC>. This order transposed Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources, commonly known as the Renewable Energy Directive, into the national law of the United Kingdom. It requires Member States ensure that 10% of energy used for transport is from renewable sources by the year 2020.

¹⁰⁷ DEPARTMENT FOR TRANSPORT, *supra* note 1022, ¶ 1.6.

¹⁰⁸ *Id.* ¶ 6.9.

¹⁰⁹ Antony Seely, *Taxation of Road Fuels*, House of Commons Library Standard Note, SN824, April 2018, available at: <http://www.parliament.uk/briefing-papers/SN00824.pdf>, archived at <https://perma-archives.org/warc/L9F8-VWUR/http://researchbriefings.files.parliament.uk/documents/SN00824/SN00824.pdf>.

To enable monitoring and enforcement of the provisions of the RTFO, the Office of the Renewable Fuels Agency was established,¹¹⁰ which issues “tradeable certificates in return for the supply of renewable road fuel. The certificates can be used as evidence of meeting the obligation.”¹¹¹ In order to obtain a certificate, the supplier must demonstrate that the fuel provided meets sustainability requirements, and this information must be independently verified.¹¹² The number of certificates awarded per liter varies according to the type of fuel. Specifically, from the reporting year 2015–16,

[o]ne RTFC [Renewable Transport Fuel Certificate] is issued per litre of liquid biofuel derived from crop based feedstocks. The number of RTFCs issued to biomethane (1.9), biobutane (1.75) and biopropane (1.75) is greater, to reflect their higher energy content relative to liquid biofuels. Biofuels produced from waste material and certain other sources have an increased incentive of twice the number of RTFCs per litre. This reflects the lower risk that these materials will cause undesirable impacts such as indirect land use change.¹¹³

If the fuel supplier does not have enough certificates to show that renewable fuels make up the correct percentage of its road fuel sales in the reporting year, it may still fulfill the obligation under the RTFO by buying a certificate from another supplier of biofuel, or paying 0.30 per liter of biofuel that the supplier was short from meeting the obligation imposed by the order. This amount is set to “protect[] consumers from excessive increases in fuel prices by setting a maximum value for RTFCs.”¹¹⁴

The RTFO was “designed and managed to ensure a high level of compliance with its requirements,”¹¹⁵ and this ease of compliance has been evidenced in the results. The Department for Transport has stated that “[t]he RTFO is meeting its objective of reducing GHG emissions from road transport.”¹¹⁶ The initial target was that renewable fuels would comprise 5% of UK road fuel sales by 2010.¹¹⁷

In its first year of operation, no fuel suppliers needed to buy credits, and the total renewable fuel sold was 2.7%, slightly over the 2.5% target, and double the amount sold in the previous year.¹¹⁸

¹¹⁰ Renewable Transport Fuel Obligation Order 2007, SI 2007/3072, ¶ 6, <http://www.legislation.gov.uk/ukksi/2007/3072/made>, archived at <https://perma.cc/33EW-TVLX>. This Order was introduced Energy Act 2004⁴

¹¹¹ DEPARTMENT FOR TRANSPORT, *supra* note 1022, ¶ 2.1.

¹¹² *Id.* ¶ 1.4.

¹¹³ *Id.* ¶ 1.5.

¹¹⁴ *Id.* ¶ 1.8.

¹¹⁵ *Id.* ¶ 6.

¹¹⁶ *Id.*

¹¹⁷ Explanatory Memorandum to the Renewable Transport Fuel Obligation Order 2007 2007 No. 3072, http://www.legislation.gov.uk/ukksi/2007/3072/pdfs/uksem_20073072_en.pdf, archived at <https://perma.cc/NR7J-PH79>.

¹¹⁸ RENEWABLE FUELS AGENCY, RENEWABLE FUELS AGENCY 2008/09 ANNUAL REPORT TO PARLIAMENT ON THE RENEWABLE TRANSPORT FUEL OBLIGATION, 2008/9, at 4, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/243584/9780108508868.pdf, archived at <https://perma.cc/9NGB-6CY7>.

By reporting year 2015–16, all road fuel suppliers met the 2015–16 obligations by providing biofuel as 4.7501% of their overall fuel supply.¹¹⁹ The government has announced that it intends to increase this obligation to 9.75% in 2020 and up to 12.4% by 2032.¹²⁰

The difference in cost between renewable fuels supplied and the fossil fuels it replaced was £451.7 million (approximately US\$630 million), with this number predicted to rise in fiscal year 2016–17 by a further £75.3 million (approximately US\$105 million) to £527 million (approximately US\$735 million).¹²¹ The most common type of renewable fuels used are “bioethanol (50%), which is blended into fossil petrol and biodiesel (47%), which is blended into fossil diesel.”¹²² This program is estimated to have saved 2.67 million metric tons of CO₂, which is equivalent to removing 1.3 million cars off the roads annually.¹²³ While this program has helped remove some greenhouse gas emissions due to transportation, a 2017 report from the Department for Transport has stated that domestic transport continues to be the “UK’s largest emitting sector of damaging greenhouse gas emissions, accounting for nearly a quarter of emissions,” with transport emissions increasing in 2014 and 2015.¹²⁴

VII. Other Energy Efficiency Measures

There are a number of laws in place to help reduce the UK’s carbon footprint. As referenced above, the UK has its own Climate Change Act, with a carbon price floor applicable to UK base electricity generators that aims to reduce the UK’s carbon emissions faster than the EU ETS can alone.¹²⁵ The UK has restrictions on excessive packaging of products, stemming from an EU directive. The Regulations require companies to reduce excessive packaging unless it is essential for safety, the protection of the health and hygiene of the packed products, or transport requirements.¹²⁶

¹¹⁹ DEPARTMENT FOR TRANSPORT, *supra* note 102, ¶ 6.14.

¹²⁰ DEPARTMENT FOR TRANSPORT, THE RENEWABLE TRANSPORT FUEL OBLIGATIONS ORDER: GOVERNMENT RESPONSE TO THE CONSULTATION ON AMENDMENTS, 2017, Cm. 9494, ¶ 13, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/644843/renewable-transport-fuel-obligations-order-government-response-to-consultations-on-amendments.pdf, archived at <https://perma.cc/X5KV-LDLB>.

¹²¹ DEPARTMENT FOR TRANSPORT, *supra* note 102, ¶¶ 3–4.

¹²² *Id.* ¶ 4.1.

¹²³ *Id.* ¶ 6.3.

¹²⁴ DEPARTMENT FOR TRANSPORT, THE RENEWABLE TRANSPORT FUEL OBLIGATIONS ORDER, *supra* note 1200, ¶ 1.

¹²⁵ HM TREASURY, HM REVENUE & CUSTOMS, CARBON PRICE FLOOR CONSULTATION: THE GOVERNMENT RESPONSE ¶ 1.14 (Mar. 2011), http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/190279/carbon_price_floor_consultation_govt_response.pdf, archived at <https://perma.cc/5GH2-FLJT>. See also HM Revenue & Customs, *Carbon Price Floor*, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/179259/carbon_price_floor.pdf (last visited May 9, 2018), archived at <https://perma.cc/CRN9-ZPJK>.

¹²⁶ Packaging (Essential Requirements) Regulations 2015, SI 2015/1640, http://www.legislation.gov.uk/uksi/2015/1640/pdfs/uksi_20151640_en.pdf, archived at <https://perma.cc/Y7Q7-HPFP>.

VIII. Impact of the UK's Exit from the EU on Environmental Laws

As noted above, a large amount of the UK's legislative regime regulating air quality has been established at the EU level and therefore reflects the "polluter pays" approach and the "precautionary principle" of EU law.¹²⁷ Concerns have been raised as to how the government will legislate to ensure environmental protection after the UK leaves the EU.¹²⁸ The House of Commons Environment, Food and Rural Affairs, Environmental Audit, Health and Social Care, and Transport Committees have stated that the current legislative framework for air quality is insufficient to protect the public and environment and that it should update and improve it during the UK's departure from the EU.¹²⁹

With thirty successful cases out of thirty-four brought by the Environment Directorate-General against the UK for not meeting its environmental obligations, concerns have been raised that the UK's approach to environmental protection and its enforcement mechanisms will not be as robust upon its exit.¹³⁰ Lord Rooker stated before the Select Committee on the European Union that

[t]he Government by definition opposed what it was doing; in other words, we had to be forced to operate environmental policies under threat of legal action. That will be removed following Brexit. Leaving the ECJ and the Commission leaves a gaping hole in the Government's arrangements.¹³¹

ClientEarth, who has also undertaken successful legal action against the UK over its failure to meet its environmental obligations, has also expressed concern over what body will replace the European Commission and European Court of Justice.¹³²

The Secretary of State for Environment, Food and Rural Affairs acknowledged that the concerns raised are legitimate, and that, without action, exit from the EU would leave a governance gap,¹³³ but that the government has a responsibility to address this and create an enforcement body, and this will be done during the "course of the progress of the Withdrawal Bill."¹³⁴ The Secretary of

¹²⁷ HOUSE OF COMMONS, *supra* note 1, ¶ 29.

¹²⁸ House of Commons Library, *Brexit and the Environment*, Briefing Paper No. CBP8132, Jan. 2018, <http://researchbriefings.files.parliament.uk/documents/CBP-8132/CBP-8132.pdf>, archived at <https://perma.cc/FVN9-RTG5>.

¹²⁹ HOUSE OF COMMONS, *supra* note 1, ¶ 34.

¹³⁰ *Id.* ¶ 23.

¹³¹ Select Committee on the European Union Energy and Environment Sub-Committee, *Corrected Oral Evidence: Secretary of State for Environment, Food and Rural Affairs*, 2017–18, at 17, <http://data.parliament.uk/written-evidence/committeeevidence.svc/evidencedocument/eu-energy-and-environment-subcommittee/secretary-of-state/oral/73100.pdf>, archived at <https://perma.cc/FD3R-F5JY>.

¹³² *Id.*

¹³³ Department for Environment, Food & Rural Affairs & The Rt. Hon. Michael Gove, *Environment Secretary Sets Out Plans to Enhance Environmental Standards*, GOV.UK (Nov. 13, 2017), <https://www.gov.uk/government/speeches/environment-secretary-sets-out-plans-to-enhance-environmental-standards>, archived at <https://perma.cc/4RQJ-NR9T>.

¹³⁴ Select Committee on the European Union Energy and Environment Sub-Committee, *supra* note 1311, at 17.

State has proposed “establishing a body that is independent of Government . . . [and] placed on a statutory footing, ensuring it has clear authority. Its ambition will be to champion and uphold environmental standards.”¹³⁵ While there were differing opinions within the government whether such a body, or Parliament, is the best body to enforce environmental laws and hold the government to account,¹³⁶ in spring 2018, the government announced that it would work to establish an “independent statutory body to hold Government to account for upholding environmental standards.”¹³⁷

¹³⁵ Department for Environment, Food & Rural Affairs & The Rt. Hon. Michael Gove, *supra* note 1333.

¹³⁶ Select Committee on the European Union Energy and Environment Sub-Committee, *supra* note 1331, ¶ 25.

¹³⁷ HM GOVERNMENT, A GREEN FUTURE: OUR 25 YEAR PLAN TO IMPROVE THE ENVIRONMENT, 2018, at 7, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf, archived at <https://perma.cc/C2CC-G5RZ>.