

BRIEFING

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Status of policies for clean vehicles and fuels in select G20 countries

EXECUTIVE SUMMARY

The transport sector has significant impacts on climate change and human health. It is responsible for nearly a quarter of anthropogenic carbon dioxide (CO₂) emissions. Within the transport sector, on-road motor vehicles account for more than three quarters of CO₂ emissions. Air pollutants emitted from motor vehicles (e.g., nitrogen oxides and particulate matter) are closely associated with elevated rates of morbidity and mortality. The G20 countries collectively account for 80% of global energy demand and more than 90% of global new vehicle sales; the policies relevant to the transport sector in these countries largely dictate the impacts of the sector globally on air quality, climate change, and energy consumption.

Realizing the immense opportunity to promote energy efficiency in their economies, G20 economies adopted an Energy Efficiency Action Plan¹ that identified six focus areas for collaborative activity, including motor vehicles. More recently, G20 economies adopted the G20 Energy Efficiency Leading Programme,² which established, for the first time, a multilateral definition of “world-class” clean vehicle and fuel standards and encouraged all G20 nations to develop relevant policy goals and milestones. These suggested world-class standards include Euro 6/VI or

1 G20. (2014). G20 energy efficiency action plan: Australia 2014. Retrieved from http://www.ipeec.org/upload/publication_related_language/pdf/11.pdf

2 G20. (2016). G20 energy efficiency leading programme: 2016 China. Retrieved from <https://ec.europa.eu/energy/sites/ener/files/documents/G20%20Energy%20Efficiency%20Leading%20Programme.pdf>

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equivalent tailpipe emission standards for light- and heavy-duty vehicles, fuel quality standards with maximum sulfur limits of 10 ppm to 15 ppm, a 50% reduction of fuel consumption for new light-duty vehicles (LDVs) by 2030 based on a 2005 baseline, and a 30% reduction of fuel consumption for new heavy-duty vehicles (HDVs) by 2030 based on a 2010 baseline. In addition, countries were encouraged to support green freight programs that encourage the adoption of cost-effective energy efficiency improvements for in-use trucks.

This paper provides an update to the 2015 report, *Policies to reduce fuel consumption, air pollution, and carbon emissions from vehicles in G20 nations*, which summarized the status of clean vehicle and fuel standards in G20 economies. For this paper, we surveyed the participating economies of the G20 Transport Task Group to collect information on policies and programs that are under development by various government ministries and agencies. In this report, we define “under development” to mean regulatory actions that have been officially notified or proposed. Table ES-1 summarizes the status of policy developments in four major areas.

The findings reveal that the efforts made by multiple Transport Task Group countries to promote and support policies and programs—including stringent tailpipe emissions standards, fuel economy standards, low sulfur fuels, and green freight programs—are in good alignment with the long-term perspective and pathways of the Transport Task Group defined in the G20 Energy Efficiency Leading Programme. Key findings specific to each area are below. Opportunities for continued collaboration among G20 economies on policies for clean vehicles and fuels are described in the conclusions.

1. Tailpipe emissions: Canada, the European Union, Japan, and the United States are relative leaders in terms of tailpipe emission standards. With world-class emissions standards already implemented, Canada and the United States are in the process of phasing in more stringent Tier 3 emissions standards for light-duty vehicles. Another major focus for reducing tailpipe emissions is to close the gap between real-world and laboratory emissions, particularly for nitrogen oxides from diesel vehicles. The European Union is implementing the first phase of its real-driving emissions (RDE) program in 2017, and China’s newly adopted China 6b standard will require RDE testing for compliance starting in 2023. India has finalized Bharat VI standards, which are equivalent to Euro 6 for LDVs and Euro VI for HDVs, to take effect in 2020. China and Brazil are also developing HDV Euro VI-equivalent standards, and Australia and Mexico are exploring pathways to world-class standards for LDVs and HDVs.

2. Fuel economy: Eleven Transport Task Group economies have implemented LDV efficiency standards, including India’s first LDV fuel economy standard, which took effect in April 2017. Major policy development activities among Transport Task Group economies include the development of post-2020 standards and implementation of World Harmonized Light Vehicle Test Procedures in the European Union, and Mexico’s consideration of next-stage LDV fuel economy standards that are in alignment with the LDV fuel economy standards in the U.S. The adoption of a fuel economy standard in Australia is under public discussion via a Ministerial Forum. Compared with LDVs, HDV fuel economy standards are at a relatively early stage. However, remarkable progress is being made among the Transport Task Group economies, including (1) the U.S., which officially adopted Phase 2 HDV fuel efficiency standards for 2018 through 2027 in August 2016; (2) Canada and China, which are developing next-phase standards; and

(3) the European Union and India, which have both indicated action aimed at bringing the fuel efficiency of HDVs under regulation for the first time.

3. Fuel quality: Because fuel quality is crucial to achieving better control of tailpipe emissions, the advancement of tailpipe emissions standards is typically coupled with the adoption of more stringent fuel quality standards. Gasoline and diesel meeting the quality standard of Euro 6/VI-equivalent or better are available in most Transport Task Group economies. Major development activities include the nationwide availability of gasoline and diesel with 10 ppm sulfur content in India and diesel with below 15 ppm sulfur in Mexico. The Australian Government is also considering updating its fuel quality standards.

4. Green freight programs: Green freight programs take various forms across countries. Most of the Transport Task Group economies have one or more green freight programs in force. The coverage of these programs spans from nationwide to regional and continental. Nationwide programs typically involve multiple government agencies. This study identified Australia and India as two countries seeking to establish their first domestic green freight program. Other Transport Task Group countries have various types of programs that are evolving and expanding. Table ES-1 identifies all of the countries that have existing and active programs.

Table ES-1. Summary of world-class policies that are adopted (●) or under development (○) in Transport Task Group (TTG) countries as of March 2017.*

Country or Region	Tailpipe emissions		Fuel economy		Fuel quality		Green freight program
	LDV	HDV	LDV	HDV	Gasoline	Diesel	
Australia	○	○	○		○	●	○
Brazil	○	○	●			●	●
Canada	●	●	●	●	●	●	●
China	●	○	●	●○	●	●	●
European Union	●	●	●○	○	●	●	●
Germany	[see EU]						●
India	●	●	●	○	●	●	○
Italy	[see EU]						●
Japan	●	●	●	●	●	●	●
Mexico	○	○	●○		○	●	●
Russia					●	●	
United Kingdom	[see EU]						●
United States	●	●	●	●	●	●	●

Number of TTG countries with world-class standards by status. TTG includes a total of 37 countries; 12 participate directly, and 25 participate indirectly through the EU.

Adopted (●)	33	32	35	4	34	37	34
Development (○)	3	4	30	30	2	-	2

*The count of TTG-participating countries includes individual countries that are members of the European Union. Tailpipe emissions and fuel quality standards are indicated only if world class. Fuel economy standards and green freight programs are not differentiated according to stringency.

INTRODUCTION

Today the transport sector consumes more than half of global oil demand and is responsible for about a quarter of anthropogenic CO₂ emissions. Motor vehicles account for approximately three quarters of direct CO₂ emissions from the transport sector.³ Motor vehicles also contribute to outdoor air pollution and a range of associated adverse health impacts. The economies of the G20 collectively account for two thirds of the world population, more than 80% of global energy demand, and more than 90% of new vehicle sales worldwide. Therefore, the transport sector policies of G20 economies largely dictate the impacts of the global transport sector on air quality, climate change, and energy consumption.

While there is strong motivation among G20 economies to mitigate the climate and health impacts of the transport sector, the level of environmental standards for transport varies across these markets. Considering the significant potential for energy efficiency, climate, and health benefits achievable with stronger transport sector policies and improved enforcement, the G20 established the Transport Task Group (TTG) with the purpose of supporting domestic action and promoting cooperation among G20 countries to develop and implement clean vehicle and fuels policies. The TTG is jointly led by the European Union and the United States. As of March 2017, the list of TTG participants covers 37 countries, including 12 that participate directly (Australia, Brazil, Canada, China, Germany, India, Italy, Japan, Mexico, Russia, the United Kingdom, and the United States), plus 25 members of the European Union (that are not direct participants in TTG activities). Following the entry into force of the Paris Agreement in November 2016, there is now added motivation for TTG economies to cooperate on the development of best practice energy efficiency policies. These policies can help countries fulfill their Nationally Determined Contributions (NDCs) and contribute to meeting the objective of the Paris Agreement to limit the global temperature increase to well below 2°, and to pursue efforts to limit the temperature increase to 1.5°.

This paper updates a previous review of energy and environmental policies for light-duty vehicles (LDVs) and heavy-duty vehicles (HDVs) in G20 countries.⁴ To support the review, we conducted a survey among the TTG economies to validate and update this information on policies for clean vehicles and fuels, with a focus on the four policy objectives of the TTG: (1) tailpipe emission standards, (2) fuel economy and greenhouse gas standards, (3) low-sulfur fuels, and (4) green freight programs. The survey also included questions about policies for alternative fuels, interest in financing fuel quality upgrades, and the distribution of authority for policy development and compliance and enforcement activities. The survey, which was conducted as an official TTG activity with the full support of the TTG, was designed to capture policies that have been implemented, adopted but not implemented, and policies under development. The survey results reflect the progress that TTG economies have made over the past 2 years and establish a reference point for evaluating the potential to further improve the efficiency and environmental performance of motor vehicles.

3 Josh Miller, Cristiano Façanha, *The state of clean transport policy: A 2014 synthesis of vehicle and fuel policy developments* (ICCT: Washington DC, 2014). <http://www.theicct.org/state-of-clean-transport-policy-2014>

4 Drew Kodjak, *Policies to reduce fuel consumption, air pollution, and carbon emissions from vehicles in G20 nations* (ICCT: Washington DC, 2015). <http://www.theicct.org/policies-reduce-fuel-consumption-air-pollution-and-carbon-emissions-vehicles-g20-nations>

SURVEY OF CLEAN VEHICLE AND FUEL POLICIES

In February 2016, we conducted a survey of G20 TTG participants to review the clean vehicle and fuel policies that define the present and future state of emissions in each region. The survey focused on policies relating to tailpipe emissions for LDVs and HDVs, fuel economy for LDVs and HDVs, fuel sulfur content for gasoline and diesel, green freight programs, alternative fuels, and compliance and enforcement. The survey also aimed to capture the implementation status of these policies. Participants were asked to provide information on policies that are implemented, adopted but not yet implemented, and under development. This information on policy status provides a more complete picture of the current and forthcoming clean vehicle and fuel policies than if the survey had focused only on those adopted into law. Nevertheless, it is important to recognize that those policies that are under development are subject to change (either through adoption or revision). The survey also collected information on the distribution of policy-making authority among the various government agencies in each region. The list of survey questions is included in Appendix A, and the distribution of authority within each region is summarized in Appendix B. Appendixes C and D summarize the responses to questions about financing fuel quality upgrades and alternative fuels, respectively. The survey was distributed to representatives of 12 TTG economies⁵ in February 2016. Responses were received from eight economies: Australia, Brazil, Canada, the European Union (EU), Germany, Japan, Mexico, and the United States. We then reviewed and validated the results. Where necessary, we conducted additional validation and follow-up with TTG representatives to ensure the survey results herein are accurate and current. For the following sections, updated information on adopted policies is available at TransportPolicy.net. Additional resources for green freight programs are available at globalgreenfreight.org.

STATUS OF CLEAN VEHICLE AND FUEL POLICIES

This section summarizes the status of policies for clean vehicles and fuels that are currently in force, adopted but not yet implemented, or under development in TTG economies. Policies designated as under development include those actions that have been either officially notified or proposed, or that have been reported in survey responses. There are likely additional actions at earlier stages of policy development that (unless reported by the survey participants) are not captured in this survey. For the sake of completeness, gaps in survey responses were identified and filled according to available regulatory documents and official publications. EU member states that participate individually in the TTG were also surveyed; notations are made to the following tables where these responses overlap with EU-wide policies.

TAILPIPE EMISSION STANDARDS

Table 1 covers emission standards for LDVs and HDVs. “Current” policies indicate the most recent policy that is in effect: for example, Bharat Stage IV emission standards apply to all new vehicles sold in India as of April 2017. Similarly, “Adopted but not yet implemented” indicates those policies that have been finalized but have not yet taken effect. For example, China 6 emission standards will apply to new LDVs sold nationwide starting in 2020; likewise, India’s BS VI standards for LDVs and HDVs will

⁵ The survey was distributed to TTG participants in February 2016. India joined the TTG in March 2016 and did not participate in the survey.

apply nationwide starting in 2020. Finally, “Under development” applies to policies that have been officially notified or announced by regulatory agencies, or communicated in responses to the survey: for example, as of April 2017, Mexico has proposed Euro VI/US 2010-equivalent emission standards for HDVs, but these have not been finalized. Current world-class standards (Euro 6/VI or US Tier 2)⁶ are color-coded green, and more stringent standards (e.g. US Tier 3) are color-coded blue.

Nearly all TTG economies have implemented, adopted, or are developing world-class tailpipe emissions standards for LDVs and HDVs. In the United States and Canada, Tier 3 standards phase in starting in 2017 and will apply to all sales and registrations by 2025. In the EU, the first-phase real-driving emissions (RDE) program will apply to new Euro 6 type approvals in September 2017 and to all sales and registrations in September 2019. The EU has also played an important role in developing the Worldwide Harmonized Light Vehicles Test Procedure (WLTP),⁷ which is scheduled to take effect in September 2017. Phase 2 of the WLTP is under active development and is expected to be completed in 2018 or 2019. In September 2016, the EU also adopted an implementing package for HDVs that aims to improve portable emissions measurement systems (PEMS) testing and other procedures, such as the replacement of emission control devices.

Among those countries that have not yet adopted world-class tailpipe emission standards, Australia and Brazil have implemented emission standards that are generally equivalent to Euro 5/V. The Australian government has been exploring pathways to Euro 6/VI-equivalent standards and released a discussion paper on the impact of such standards for public consultation in late 2015. Considering the feedback from the public consultation period that closed in April 2016, the Australian government subsequently released three consultation papers in December 2016 that discussed the respective impacts of tailpipe emissions standards for LDVs and HDVs, fuel efficiency standards for LDVs, and fuel quality standards. A second round of public consultations closed in March 2017, and further steps are expected based on the outcome of the public comments. Euro 6/VI-equivalent emissions standards are also under development in Brazil. Sao Paulo’s environment agency, CETESB, has proposed next-stage tailpipe emission standards to be implemented for HDVs in 2019, motorcycles in 2020, and LDVs in 2025, although additional technical details have not yet been released. Mexico, which has in force a mix of US Tier 1/NLEV and Euro 4 standards for LDVs and US 2004/Euro IV standards for HDVs, has proposed US 2010/Euro VI standards for HDVs.

6 World-class tailpipe emissions standards are defined in the G20 Energy Efficiency Leading Programme as Euro 6, U.S. Tier 2/3, or equivalent standards for LDV and Euro VI, U.S. HD2010 or equivalent standards for HDV.

7 Peter Mock, Jörg Kühlwein, Uwe Tietge, Vicente Franco, Anup Bandivadekar, John German, *The WLTP: How a new test procedure for cars will affect fuel consumption values in the EU*. International Council on Clean Transportation (ICCT: Washington DC, 2014). http://www.theicct.org/sites/default/files/publications/ICCT_WLTP_EffectEU_20141029.pdf

Table 1. Policy status of light- and heavy-duty tailpipe emissions standards among G20 TTG economies.^a

Region	Light-duty			Heavy-duty		
	Current	Adopted but not yet implemented	Under development	Current	Adopted but not yet implemented	Under development
Australia	ADR 79/04		Euro 6	ADR 80/03		Euro VI
Brazil	L-6 ^b		L-7 ^c	P-7		P-8 ^c
Canada	Tier 3			US 2010		
China*	China 5 ^d	China 6 [2020.07]		China V ^d		China VI
EU (Germany, Italy, UK)	Euro 6b WLTP ^e	Euro 6c [2017.09] RDE	WLTP ^e RDE Phase 3 and Phase 4	Euro VI	Implementing package [2018-2019] ^f	
India*	Bharat IV ^g	Bharat VI		Bharat IV ^g	Bharat VI	
Japan	PNLTES			PNLTES	PNLTES [2016-2018]	
Mexico*	NOM-042-SEMARNAT-2003		US Tier 3	US 2004/Euro IV		Euro VI/US 2010
Russia*	Euro 5			Euro V		
US	Tier 3			US 2010		
Euro-equivalent	None reported	Euro 4/IV	Euro 5/V	Euro 6/VI	Post Euro 6/VI	

a. Regions marked with an asterisk indicate survey results were supplemented with external sources. Square brackets denote future implementation year.

b. Although some of the emission limits are consistent with Euro 5, L-6 standards do not include particulate filter-forcing limits for PM mass or particle number.

c. Sao Paulo's environment agency (CETESB) has proposed that next-stage tailpipe emission standards are implemented for HDVs in 2019, motorcycles in 2020, and LDVs in 2025. Technical details have not yet been released.

d. Nationwide implementation of China 5/V started on January 1, 2017; some regions implemented the standard on April 1, 2016. Diesel LDVs need to meet China 5 starting on January 1, 2018.

e. WLTP Phase 1 has been implemented. WLTP Phase 2 is expected to finish in 2018 or 2019.

f. The implementing package [Commission Regulation (EU) 2016/1718] was adopted in September 2016; implementation dates for specific issues are in 2018 and 2019.

g. Bharat IV was implemented nationwide in April 2017.

Sources: TransportPolicy.net (Brazil); ICCT (China, India, Mexico)

FUEL ECONOMY STANDARDS

Table 2 summarizes the status of fuel economy standards that have been adopted or are under development by TTG participants. Fuel economy standards are defined here to include targets for fuel consumption; fuel economy; CO₂; and greenhouse gases (GHG), including refrigerants. In Table 2, adopted policies are grouped together (including current and future targets) because these targets often include credit provisions that encourage early compliance by manufacturers. All but two TTG economies (Australia and Russia) have adopted policies to promote the fuel economy of LDVs. Australia has conducted public consultations to consider developing light-duty fuel economy standards. The European Union is in the process of developing post-2020 standards for cars and vans (also referred to as light commercial vehicles [LCVs]). In comparison to LDVs, heavy-duty fuel economy is relatively less regulated. Only four TTG economies—Canada, China, Japan, and the United States—have implemented fuel economy standards for HDVs. The current Japanese standard covers 2015 and subsequent years. In the United States, Phase 1 HDV standards extend through 2018, and Phase 2 HDV fuel economy standards (adopted in August 2016) will

be applied from 2018–2027. Canada has historically aligned with the U.S. fuel economy standards for both LDVs and HDVs. In March 2017, Canada issued a proposal to align with post-2018 U.S. HDV fuel economy standards.

The EU and India are each working toward first-phase HDV fuel economy standards. India began the development of such standards in 2014 and established a steering committee to guide the process. The EU launched a public consultation through October 2016 to collect input on the preparation of legislation to monitor and report of HDV fuel consumption and CO₂ emissions.

Table 2. Status of LDV and HDV efficiency programs in TTG economies.^a

Region	Light-duty		Heavy-duty	
	Adopted	Under development	Adopted	Under development
Australia		Standards under discussion ^b		
Brazil	Inovar-Auto; PBEV ^c ; PSTM ^d	Rota 2030 ^e		
Canada	2025		2018	Post-2018 program proposed
China*	2020		2019	Post-2019 program
EU* (Germany, Italy, UK)	2020/2021	Post-2020 standards for cars and vans		Preparation of legislation to monitor and report HDV fuel economy
		WLTP ^f		
India*	2017–2022			First HDV fuel economy standard
Japan ^g	2020		2015	
Mexico*	2016	Next-phase LDV GHG		
Russia*				
United States	2017–2025		2018–2027	

a. Regions marked with an asterisk indicate survey results were supplemented with external sources.

b. The Ministerial Forum is considering the adoption of fuel economy standards for light vehicles following the public consultation period, which closed in March 2017.

c. The Brazilian government launched in April 2017 the ninth phase of the Brazilian Motor Vehicle Labelling Programme (PBEV), which will require all light-duty motor vehicles sold domestically to include information on fuel consumption efficiency (ranging from an “A” rating for the most efficient vehicles to an “E” rating for the least efficient) as well as emissions of carbon dioxide and polluting gases (i.e., hydrocarbons, carbon monoxide, and nitrogen oxide).

d. Long-term fuel economy standards are not defined in law in Brazil. However, various ministries have developed short-term programs or programs with no specific implementation timeframe.

e. ROTA 2030 is being discussed by a working group with government and private representation. From the end of 2017 on, the new industry automotive regime will replace the Inovar-Auto program. Stated goals include: (i) continue to improve energy efficiency; (ii) make Brazil a global hub for vehicle development and production; (iii) arrive in 2030 with technology equivalent to advanced markets, capacity to develop global projects, active integration in the global supply chain, and competitiveness in the main automotive systems. Possible changes in the vehicular IPI tax should benefit electric vehicles and may include a shift from an IPI based on engine size to one based on the efficiency of the vehicle.

f. WLTP Phase 1 has been implemented. WLTP Phase 2 is expected to finish in 2018 or 2019.

g. Japan’s Top Runner Program sets fuel economy targets for fiscal years 2015–2020; new targets are set periodically for subsequent years. The HDV efficiency target for 2015 remains in effect.

Sources: TransportPolicy.net ([China](#)); ICCT ([Global](#), [India](#));

EU: “Consultation on the preparation of legislation on monitoring/reporting of heavy-duty vehicle fuel consumption and CO₂ emissions,” The European Commission, accessed August 15, 2016, http://ec.europa.eu/clima/consultations/articles/0031_en.htm

FUEL QUALITY STANDARDS

Table 3 shows the status of standards for fuel sulfur content among TTG economies. Nearly all have adopted or are developing standards to limit the sulfur content of gasoline to 10 parts per million (ppm), and all have adopted standards limiting diesel content to 10 ppm–15 ppm. India requires low-sulfur gasoline (i.e., a maximum of 50 ppm sulfur) nationwide as of April 2017 and ultralow-sulfur gasoline (i.e., a maximum of 10 ppm sulfur) nationwide by 2020. The Australian Government released a discussion paper in December 2016 that considers limiting gasoline to 10 ppm sulfur to enable the introduction of advanced emission control technologies. Mexico is also considering standards for ultralow-sulfur gasoline. Ultralow-sulfur diesel is already available in Mexico's major cities and in the region bordering the United States, and it must be sold exclusively nationwide by the end of 2018.

Table 3. Status of standards for fuel sulfur content, in parts per million.^a

Region	Gasoline			Diesel	
	Current	Adopted but not yet implemented	Under development	Current	Adopted but not yet implemented
Australia	50/150 ^b		10	10	
Brazil	50			10/500 ^c	
Canada	10			15	
China*	10			10	
EU (Germany, Italy, UK)	10			10	
India*	50	10 [2020]		50	10 [2020]
Japan	10			10	
Mexico*	30 (80) ^d		10	15/500	15 [2018]
Russia*	10			10	
US	10			15	
<i>Euro-equivalent</i>	Euro 4/IV	Euro 5/V & 6/VI ^e			

a. Regions marked with an asterisk indicate survey results were supplemented with external sources. Square brackets denote future implementation year.

b. Unleaded petrol is limited to 150 ppm sulfur; premium unleaded petrol is limited to 50 ppm sulfur.

c. Forward slash '/' indicates Euro 6/VI fuel is available, but higher sulfur fuel is still sold in some parts of the country.

d. Fuel standards typically limit maximum sulfur content. Some regions (e.g., Mexico) set a limit for average sulfur content and maximum sulfur content; in these cases, the lower limit applies to the average and the higher limit in parentheses indicates the maximum.

e. No change in fuel sulfur content required from Euro 5/V to Euro 6/VI standards.

Sources: TransportPolicy.net ([China](#), [India](#));

Australia: Australian Government, "Better fuel for cleaner air," Discussion paper of Ministerial Forum on Vehicle Emissions (2016).

<http://www.environment.gov.au/system/files/consultations/f3f4acc3-f9e6-4cc3-8a1e-a59a6490cfd/files/better-fuel-cleaner-air.pdf>;

Mexico: Mexico has adopted the fuel quality standard NOM-061-CRE-2016 that requires nationwide availability of ultra-low sulfur diesel by December 31, 2018. http://www.dof.gob.mx/nota_detalle.php?codigo=5450011&fecha=29/08/2016

GREEN FREIGHT PROGRAMS

Unlike standards for vehicles and fuels, participation in green freight programs is typically voluntary. These programs encourage the deployment of advanced technologies to improve the efficiency and emissions performance of in-use freight vehicles. To achieve this, they employ a combination of technology verification, information sharing, and financial incentives. Table 4 lists green freight programs that are existing or under development in TTG economies based on the survey responses, supplemented with publicly available information. The EU has proposed a certification of green freight services based on a standardized measure of carbon footprint. Meanwhile, Germany intends to provide fiscal incentives for HDVs with hybrid engines, extend road charges to all federal roads by 2018, and index road charges based on vehicle fuel economy. In contrast, Japan's program aims to improve logistics, shift freight activity from trucks to rail or shipping, and reduce the incidence of empty containers.

Australia, India, and Russia do not yet have well-defined green freight programs in place. The Australian Government is considering a green freight initiative similar to those implemented in the European Union and the United States. India has been exploring actions to improve the efficiency of specific components of the freight supply chain, and a unified program appears to be a major next step.

There is also precedent and opportunity for transnational cooperation in green freight programs. The SmartWay Transport Partnership in Canada and the United States has the largest membership, with more than 3,000 partners, and Mexico is considering harmonizing its own national program, Transporte Limpo, with Smartway. Other transnational programs such as Green Freight Europe, EcoStars Fleet Recognition, and Lean and Green have participation across multiple EU member states. The U.S. is considering improvements to the current program as well as harmonization with a global green freight program.

Table 4. Status of green freight programs in TTG economies.^a

Region	Current	New/emerging
Australia		Potential green freight initiative under discussion ^b
Brazil	Despoluir; PLVB, CONPET ^c	
Canada	SmartWay; FleetSmart	
China*	China Green Freight Initiative; Guangdong Green Freight Pilot Program; Great Freight Asia	
EU*	Green Freight Europe; Global Logistics Emissions Council (GLEC); diverse programs among countries with no common rules	Proposed certification based on carbon footprint
Germany*	Lean and Green	Fiscal incentives for hybrids, road charges on all federal roads indexed to vehicle efficiency
India*		Green Freight India
Italy*	Lean and Green	
Japan*	Tokyo Freight Carrier Assessment System; Green Logistics Partnership	Improved logistics, trucks to rail or shipping, and reduced incidence of empty containers
Mexico*	Transporte Limpo	
Russia*		
UK*	EcoStars Fleet Recognition	
US	SmartWay	Expanded scope; improved data quality and usability; harmonization of green freight programs

a. Regions marked with an asterisk indicate survey results were supplemented with external sources.

b. The Ministerial Forum on vehicle emissions released a discussion paper that explores options to improve HDV efficiency, including green freight programs.

c. The CONPET Energy Efficiency label aims to highlight for the consumer those models that reach the maximum degrees of energy efficiency in the National Energy Conservation Label of the INMETRO's Brazilian Labeling Program. Awarded annually by Petrobras, the label is a stimulus to the manufacture of increasingly efficient models. The program applies to LDVs, including LCVs.

Sources:

Australia: Australian Government, "Vehicle Emissions Discussion Paper," (2016). https://infrastructure.gov.au/roads/environment/forum/files/Vehicle_Emissions_Discussion_Paper.pdf;

Brazil: DESPOLUIR – PROGRAMA AMBIENTAL DO TRANSPORTE, accessed May 23, 2017, <http://www.cntdespoluir.org.br/Paginas/Inicio.aspx#>; Smart Freight Centre, "Smart Freight Leadership: Green Freight Programs Worldwide 2017," (2017). http://www.nucms.nl/tpl/smart-freight-centre/upload/Green%20Freight%20Programs%20Worldwide%20-%20SFC%20May2017_FINAL.pdf; CONPET – Programa nacional da racionalização do uso dos derivados de petróleo e do gás natural, accessed July 25, 2017, http://www.conpet.gov.br/portal/conpet/pt_br/pagina-inicial.shtml;

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G20: G20. (2016). G20 energy efficiency leading programme: 2016 China. Retrieved from <https://ec.europa.eu/energy/sites/ener/files/documents/G20%20Energy%20Efficiency%20Leading%20Programme.pdf>

CONCLUSION

This paper updates our 2015 report, *Policies to reduce fuel consumption, air pollution, and carbon emissions from vehicles in G20 nations*, which summarized the status of clean vehicle and fuel standards in G20 economies. Our findings reveal the efforts made by multiple TTG countries over the past 2 years to promote and support policies and programs, including stringent tailpipe emissions standards, fuel economy standards, low sulfur fuels, and green freight programs. The adoption of the G20 Energy Efficiency Leading Programme in 2016 highlights the common interest of G20 economies (including those in the TTG and those that do not yet participate) to sustain and accelerate progress in these four key policy areas to improve the energy efficiency and environmental performance of their vehicle fleets.

Table 5 summarizes the status of these policies that are adopted or under development among TTG economies. These findings provide several insights on the accomplishments of TTG economies as well as the challenges and opportunities associated with further progress. These insights are discussed below.

Continue to support world-class standards for cleaner vehicles and fuels.

All 37 TTG economies have adopted standards requiring the nationwide availability of ultralow-sulfur diesel. These standards are critically important in that they pave the way for world-class HDV emissions standards (most of which are powered by diesel), which have been adopted in 32 TTG economies and are under development in four (Australia, Brazil, China, and Mexico). Considering the high contribution of HDVs to transport-related air pollution and health impacts as well as the effectiveness of world-class standards at reducing these impacts,⁸ there is a strong rationale for the TTG to continue to support the development and implementation of these policies across the G20. There is a similar story for LDVs, which are predominantly powered by gasoline, diesel, or equivalent biofuel blends. All but three TTG economies have adopted standards for ultralow-sulfur gasoline, and such standards are under consideration in Australia and Mexico. Combined with the availability of ultralow-sulfur diesel in countries with a substantial market share of diesel LDVs, these developments in fuel quality allow for the introduction of advanced emission control technologies needed to meet world-class LDV emissions standards. Here, too, there is an opportunity to share knowledge among TTG economies, especially in relation to effective compliance and enforcement practices (e.g., reducing real-world nitrogen oxide emissions from diesel LDVs).

Promote cooperation on energy efficiency standards and compliance tools.

In contrast to light-duty efficiency standards—which have been adopted in all but two TTG economies and for which future stages are under development in several—only four have adopted such standards for HDVs. A key challenge for HDV efficiency standards has been the development of tools to certify and monitor compliance for HDVs and engines over a wide range of vehicle types and duty cycles. Thus, as several major TTG economies pursue the development of first-ever (EU and India) or next-stage (China) HDV efficiency standards, there is an opportunity to support international collaborative action on both the standards and associated compliance tools.

8 Josh Miller, Li Du, Drew Kodjak, *Impacts of world class vehicle efficiency and emissions standards in select G20 countries* (ICCT: Washington DC, 2017). <http://www.theicct.org/impacts-of-world-class-vehicle-efficiency-and-emissions-standards-in-G20-countries>

Refine and enhance transnational participation in green freight programs.

Nearly all TTG economies have adopted or are developing green freight programs; however, there is substantial variation in the focus and definition of these programs across countries. The precedent for transnational cooperation and participation in green freight programs (e.g., SmartWay Transport Partnership in North America, Green Freight Europe across EU member states) strengthens the rationale for improving the design and expanding participation in such programs both within and beyond the G20 framework. Such collaborations could include technology verification, refinement of fiscal incentives, and harmonization of certification guidelines across programs.

Table 5. Summary of world-class policies that are adopted (●) or under development (○) in Transport Task Group (TTG) countries as of March 2017.*

Country or Region	Tailpipe emissions		Fuel economy		Fuel quality		Green freight program
	LDV	HDV	LDV	HDV	Gasoline	Diesel	
Australia	○	○	○		○	●	○
Brazil	○	○	●			●	●
Canada	●	●	●	●	●	●	●
China	●	○	●	●○	●	●	●
European Union	●	●	●○	○	●	●	●
Germany	[see EU]						●
India	●	●	●	○	●	●	○
Italy	[see EU]						●
Japan	●	●	●	●	●	●	●
Mexico	○	○	●○		○	●	●
Russia					●	●	
United Kingdom	[see EU]						●
United States	●	●	●	●	●	●	●

Number of TTG countries with world-class standards by status. TTG includes a total of 37 countries; 12 participate directly, and 25 participate indirectly through the EU.

Adopted (●)	33	32	35	4	34	37	34
Development (○)	3	4	30	30	2	-	2

*The count of TTG-participating countries includes individual countries that are members of the European Union. Tailpipe emissions and fuel quality standards are indicated only if world class. Fuel economy standards and green freight programs are not differentiated according to stringency.

APPENDIX A. SURVEY QUESTIONS

Q1. Please provide the following information for the individual primarily responsible for filling out the survey. (Your e-mail address will only be used by the TTG to ask to follow up questions, and will not be shared or used to send unsolicited e-mail).

(a) Name

(b) Country

(c) Agency

(d) E-mail address

(e) Phone number

Q2. Please describe the existing emission standards applicable to vehicles sold today.

Q3. If standards have been adopted, but not yet implemented, please identify those standards and indicate when they will be implemented (month and year).

Q4. If there are any emission standards under active development, or if there is an intention to develop new emission standards in the future, please describe the current situation in as much detail as possible (status of the regulatory proposal, description of regulatory process, public workshops, stakeholder group engagement, length of expected process to finalize policy action).

Q5. What agency(ies) is/are responsible for the development of light-duty vehicle emission standards?

Q6. Please provide the name and contact information of the person(s) who is/are primarily responsible for light-duty vehicle emission standards.

Q7. Please describe the existing emission standards applicable to heavy-duty vehicles sold today.

Q8. If standards have been adopted, but not yet implemented, please identify those standards and indicate when they will be implemented (month and year).

Q9. If there are any emission standards under active development, or if there is an intention to develop new emission standards in the future, please describe the current situation in as much detail as possible (status of the regulatory proposal, description of regulatory process, public workshops, stakeholder group engagement, length of expected process to finalize policy action).

Q10. What agency(ies) is/are responsible for the development of heavy-duty vehicle emission standards?

Q11. Please provide the name and contact information of the person(s) who is/are primarily responsible for heavy-duty vehicle emission standards.

Q12. Please describe the existing gasoline / petrol sulfur standards, and similarly diesel fuel sulfur standards, applicable to vehicles sold today.

Q13. If fuel sulfur standards have been adopted, but not yet implemented, please identify those standards separately for gasoline / petrol and diesel fuel and indicate when they will be implemented in the future (month and year).

Q14. If there are any gasoline / petrol or diesel fuel sulfur standards under active development, or if there is an intention to develop new emission standards in the future, please describe the current situation in as much detail as possible (status of the regulatory proposal, description of regulatory process, public workshops, stakeholder group engagement, length of expected process to finalize policy action).

Q15. What agency(ies) is/are responsible for the development of fuel sulfur standards?

Q16. Please provide the name and contact information of the person(s) who is/are primarily responsible for fuel sulfur standards.

Q17. Are you interested in seeking assistance on how to finance any domestic oil refinery upgrades to produce low-sulfur fuels? If so, please describe.

Q18. Please describe the existing fuel economy standards applicable to light and heavy-duty vehicles sold today. List the standards by light-duty and heavy-duty separately.

Q19. If fuel economy standards have been adopted, but not yet implemented, please identify those standards and indicate when they will be implemented (month and year). List the standards by light-duty and heavy-duty separately.

Q20. If there are any fuel economy standards under active development, or if there is an intention to develop new fuel economy standards in the future, please describe the current situation in as much detail as possible (status of the regulatory proposal, description of regulatory process, public workshops, stakeholder group engagement, length of expected process to finalize policy action). List the standards by light-duty and heavy-duty separately.

Q21. What agency(ies) is/are responsible for the development of light-duty vehicle and heavy-duty fuel economy standards? If they are different, please list each agency.

Q22. Please provide the name and contact information of the person(s) who is/are primarily responsible for light-duty vehicle fuel economy standards, and separately for heavy-duty vehicle fuel economy standards.

Q23. Please describe any existing Green Freight program including its individual elements, programs, incentives, etc.

Q24. Please describe, in as much detail as possible, any new elements of an existing or emerging Green Freight program. Details could include a description, status of new elements, public workshops, stakeholder engagement, length of expected process to full implementation.

Q25. What agency(ies) is/are responsible for the development of the Green Freight program?

Q26. Please provide the name and contact information of the person(s) who is/are primarily responsible for light duty vehicle fuel economy standards, and separately for heavy-duty vehicle fuel economy standards.

Q27. Please describe the existing alternative fuel policies including those for biofuels, natural gas, and electricity.

Q28. If alternative fuel policies have been adopted, but not yet implemented, please identify those policies and indicate when they will be implemented in the future (month and year).

Q29. If there are any alternative fuel standards under active development, or if there is an intention to develop new alternative fuel standards in the future, please describe the status in as much detail as possible (status of the regulatory proposal, description of regulatory process, public workshops, stakeholder group engagement, length of expected process to finalize policy action).

Q30. What agency or agencies are responsible for the development of alternative fuel standards?

Q31. Please provide the name and contact information of the person(s) who is/are primarily responsible for alternative fuel standards.

Q32. Please describe the process by which your country seeks to ensure that motor vehicle emissions comply with legal emission standards at point of sale and throughout useful life.

Q33. What legal authority is related to compliance and enforcement, including recall and penalty authority?

Q34. Which agency(ies) is/are responsible for compliance and enforcement of motor vehicle emission standards?

Q35. Please list the contact information of the individual(s) at the relevant agencies.

APPENDIX B. DISTRIBUTION OF REGULATORY AUTHORITY

The following tables detail the responses of survey participants relating to the distribution of regulatory authority. Regions and agencies are listed in alphabetical order.

AUSTRALIA

Agencies/Organizations	Tailpipe emissions	Fuel sulfur	Fuel economy	Green freight	Alt. Fuel	Regulatory compliance*	Legal enforcement*
Australian Government Department of Infrastructure and Regional Development	√		√			√	√
Australian Government Department of the Environment		√			√		
Respective states and territory government agencies						√	√

* The Australian Government Department of Infrastructure and Regional Development is responsible for compliance and enforcement of vehicles upon entering the Australian market, whereas government agencies at the state level are responsible for the compliance and enforcement of vehicles in circulation.

BRAZIL

Agencies/Organizations	Tailpipe emissions	Fuel sulfur	Fuel economy	Green freight	Alt. fuel	Regulatory compliance	Legal enforcement
Brazilian Agency for Industrial Development (ABDI)			√				
Brazilian Environment Institute (IBAMA)						√	√
Traffic Departments at state level (DETRANs)^a						√	√
Environmental agencies at state level^b	√		√			√	√
Ministry of Development, Industry and Trade (MDIC)							
Ministry of Mines and Energy (MME)					√		
Ministry of the Environment (MMA)	√					√	
National Agency of Petroleum, Natural Gas and Biofuels (ANP)		√			√	√	√
National Institute of Metrology, Quality and Technology (INMETRO)			√	√			

a. DETRANs are responsible to verify the emission standards at the moment of vehicle-licensing.

b. For example, in February 2017, the Environmental Agency of the State of São Paulo (CETESB) announced new phases of emissions standards for heavy-duty vehicles, light-duty vehicles, and motorcycles; if approved by Conama (the National Environment Council), these phases would take effect in 2019, 2026, and 2020, respectively. Motor vehicle emissions standards are federally coordinated by IBAMA and have the participation of CETESB.

CANADA

Agencies/Organizations	Tailpipe emissions	Fuel sulfur	Fuel economy	Green freight	Alt. fuel	Regulatory compliance	Legal enforcement
Environmental and Climate Change Canada*	√		√			√	√
Environment and Climate Change Canada - Oil and Alternative Energy Division		√			√		
Natural Resources Canada				√			

* The transportation division of Environmental and Climate Change Canada is specifically responsible for the regulation of tailpipe emissions and fuel economy.

EU

Agencies/Organizations	Tailpipe emissions	Fuel sulfur	Fuel economy	Green freight	Alt. fuel	Regulatory compliance	Legal enforcement
DG CLIMA		√					
DG ENV		√				√	√
DG GROW	√						
DG MOVE				√			
The European Commission		√	√	√	√ ^a		
Type approval authorities of EU member states ^b						√	√

a. Multiple internal departments in the European Commission are involved in the regulation of alternative fuels.

b. In the European Union, compliance and enforcement remains primarily a responsibility of member states, and the European Commission has very limited powers regarding compliance and enforcement.

GERMANY

Agencies/Organizations	Tailpipe emissions	Fuel sulfur	Fuel economy	Green freight	Alt. fuel	Regulatory compliance	Legal enforcement
Federal Ministry for Economic Affairs and Energy (BMWI)					√		
Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUM)	√	√	√	[a]	√		
Federal Ministry of Transport and Digital Infrastructure (BMVI) ^b						√	√

a. The establishment, operation and finance of green freight programs are based on collaborative actions from multiple departments.

b. The Federal Ministry of Transport and Digital Infrastructure (BMVI) is responsible for compliance and enforcement of standards with the support of the Federal Motor Transport Authority, Kraftfahrt-Bundesamt (KBA).

JAPAN

Agencies/Organizations	Tailpipe emissions ^a	Fuel sulfur	Fuel economy	Green freight	Alt. fuel ^b	Regulatory compliance	Legal enforcement
Ministry of Economy, Trade and Industry		√	√	√	√	√	
Ministry of Land, Infrastructure, Transport and Tourism	√		√	√	√	√	√
Ministry of the Environment	√					√	

a. The Ministry of the Environment is responsible for the development of the specific permissible limits included in the emission standards, and the Ministry of Land, Infrastructure, Transport and Tourism is responsible for the development and implementation of the standards.

b. The Ministry of Economy, Trade and Industry took on jurisdiction over biofuels and other fuels through the Act on the Quality Control of Gasoline.

MEXICO

Agencies/Organizations	Tailpipe emissions	Fuel sulfur	Fuel economy	Green freight	Alt. fuel	Regulatory compliance	Legal enforcement
Energy Regulatory Commission (CRE)		√	√				
Ministry of Environmental and Natural Resources (SEMARNAT)	√			√			
Secretariat of Communication and Transportation				√			
Secretariat of Energy (SENER)				√			
The Federal Attorney for Environmental Protection (PROFEPA)						√	√
The National Commission of the Efficient Use of Energy (CONUEE)*				√			

* CONUEE is a subsidiary agency under SENER.

UNITED STATES (ADDITIONAL INFORMATION ADDED)

Agencies/Organizations	Tailpipe emissions	Fuel sulfur	Fuel economy	Green freight	Alt. fuel	Regulatory compliance	Legal enforcement
Department of Justice (DOJ)						√	√
National Highway Traffic Safety Administration (NHTSA)			√			√	√
US Environmental Protection Agency (EPA)	√	√	√	√ ^a	√ ^b	√	√

a. U.S. EPA is responsible for the SmartWay program. U.S. EPA works with the U.S. State Department to implement related green freight programs under multinational efforts. The degree of involvement by specific agencies and federal or regional governments varies by country.

b. The Federal Aviation Administration (FAA) has the authority to regulate aviation.

APPENDIX C. FINANCING DOMESTIC OIL REFINERY UPGRADES

Both Mexico and Australia expressed interest in assistance regarding the finance pathways to upgrade domestic oil refineries. Australia highlighted the concern of domestic oil refiners that producing ultralow-sulfur fuels (i.e., maximum 10 ppm to 15 ppm sulfur content) for compliance with Euro 6 emission standards would require substantial equipment upgrades. Australia welcomed additional information on the options to upgrade refineries as well as the associated cost and benefits. The other TTG countries which provided responses to the survey (Brazil, Canada, the European Union, Germany, Japan, and the United States) did not indicate an interest in this sort of information. This is not surprising considering that all those countries (except for Brazil) have already adopted nationwide standards for ultralow-sulfur gasoline and diesel.

APPENDIX D. POLICIES FOR ALTERNATIVE FUELS

In addition to fuel economy standards and green freight programs, most TTG economies have also adopted policies to promote the use of alternative fuels, including biofuels, natural gas, and electricity. The objectives and design elements of these policies vary substantially across countries. This section summarizes the policies for alternative fuels, including those that are under development. Because alternative fuels are not an identified focus area of the TTG, only those countries for which survey responses were received are included in this summary.

AUSTRALIA

Australia has adopted a fuel- and technology-neutral policy approach that aims to increase the range of fuel and technology options available in the market. Australia has implemented fuel quality standards for biodiesel, LPG, ethanol in petrol (E10), and ethanol blends (E85), as well as a fuel quality information labeling program for ethanol and E85. Targets for the sale of ethanol-blended petrol (E10) and biodiesel are specified at the state and territory level. The Fuel Quality Standards Act 2000, which provides a legislative framework for setting fuel quality standards, is under review; the outcome of this review could impact future standards for alternative fuels, particularly biofuels. In addition to policies focused on the supply alternative fuels, Australia provides financial incentives for low emission vehicles (Emission Reduction Fund,⁹ Clean Energy Finance Corporation¹⁰).

BRAZIL

As one of the largest biofuel markets in the world, Brazil has two major nationwide programs governing biofuels. The National Biodiesel Production Program (PNPB) establishes the guidelines for laws, executive orders and other legal measures to regulate the production, distribution, and use of biodiesel in Brazil.¹¹ Similarly, the

9 More information available at <http://www.environment.gov.au/climate-change/emissions-reduction-fund>

10 More information available at <http://www.cleanenergyfinancecorp.com.au/low-emissions.aspx>

11 Law 11.097 regulates activities related to the production, quality control, distribution and sales of biodiesel and diesel-biodiesel blends.

Renovabio programme, launched by the Ministry of Mines and Energy of Brazil in December 2016, aims at reaching competitiveness in production, marketing, and use of biofuels, and encouraging competition among biofuels and in relation to fossil fuels. Emphasis is given to security of supply, combating anti-competitive practices and protecting consumers' interests vis-à-vis price, quality, and supply. The RenovaBio programme will also help in reaching Brazil's greenhouse gas reduction target of 43% by 2030 under the Paris Climate Agreement.

Brazil's mandated biodiesel blend is slated to increase from 8% in 2017, to 9% in 2018, to 10% by 2019.¹² In addition, regulators have the authority to increase the mandated biodiesel blend to up to 15% if the technical feasibility of this is confirmed by testing. The National Energy Policy Committee and the Brazilian National Agency of Petroleum, Natural Gas, and Biofuels would likely be extensively involved in such a decision. For bioethanol, Brazil's mandatory blend ratio in regular gasoline was raised to 27% (E27) starting on March 16, 2015.¹³

CANADA

Canada's federal Renewable Fuels Regulation (RFR) requires fuel producers and importers to have an average renewable content of at least 5% for gasoline and 2% for diesel fuel and heating distillate oil. Multiple renewable fuels standards are also in place at the provincial level.

EUROPEAN UNION

The European Commission has implemented two directives at the EU level. The Renewable Energy Directive (2009/28/EC) requires member states to achieve 10% renewable energy in transport by 2020. The Fuel Quality Directive (2009/30/EC)—amended by the “ILUC Directive”—requires member states to reduce the GHG intensity of fuel by 6%. Through its focus on GHG intensity and inclusion of indirect land use change (ILUC) impacts, the FQD is a key measure for promoting the use of second-generation biofuels and electricity in transport.

GERMANY

At the national level in Germany, the Tenth Order implementing the Federal Pollution Control Act regulates the properties and labeling of the quality of fuels (German designation: 10. BImSchV), including biodiesel, ethanol, LPG, natural gas/biomethane, and vegetable oil. Germany has also set nationwide GHG reduction targets for fuel suppliers that consider the lifecycle GHG balance of biofuels. In addition, Germany has also established a voluntary industry target to achieve a 4% share of methane (fossil or renewable) in road transport in 2020.

Considering the high life-cycle emissions of conventional (first generation) biofuels, Germany is expected to introduce a nationwide cap for conventional biofuels. Germany is also seeking to foster the uptake of other fuels and new-energy transportation (electric-drive vehicles). Measures have been explored with the intent to speed up the

¹² Law N° 13.263, Presidência da República Casa Civil Subchefia para Assuntos Jurídicos, March 23, 2016, http://www.planalto.gov.br/ccivil_03/_Ato2015-2018/2016/Lei/L13263.htm

¹³ Law N° 8.723, http://www.planalto.gov.br/ccivil_03/LEIS/L8723.htm

market penetration of electric vehicles (EVs) to achieve a goal of 1 million cumulative electric vehicle sales by 2020 and 6 million by 2030.¹⁴ Germany is also considering additional options to fulfill the national GHG reduction targets. These options include the use of electricity in EVs, renewable hydrogen or methane of non-biological origin, and credits for upstream emission reductions. In addition, a national subtarget for advanced fuels is under development.

JAPAN

Japan has applied fiscal measures (including budgetary provisions and taxes) to accelerate the deployment of next-generation vehicles, including electric vehicles, plug-in hybrids, fuel-cell vehicles, and associated fueling and charging infrastructure. Japan has also applied fiscal measures that encourage refiners to increase biofuel volumes from 2011 to 2017. According to the survey results, these actions are required by “new criteria for oil manufacturers on use of non-fossil energy sources” based on “act on the promotion of use of non-fossil energy sources and effective use of fossil energy materials by energy suppliers.”

UNITED STATES

The Renewable Fuels Standard (RFS) is an ongoing program that sets annual volumetric requirements for renewable fuels to displace petroleum consumption. In addition to the RFS program, U.S. EPA is considering rules for higher ethanol blends in gasoline.

14 Tietge, Uwe, Peter Mock, Nic Lutsey, and Alex Campestrini. “Comparison of Leading Electric Vehicle Policy and Deployment in Europe.” ICCT, GIZ, and BMU, May 2016. http://www.theicct.org/sites/default/files/publications/ICCT_EVpolicies-Europe-201605.pdf