

G20 Country Update from ICCT

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2019 G20 Transport Task Group Meeting

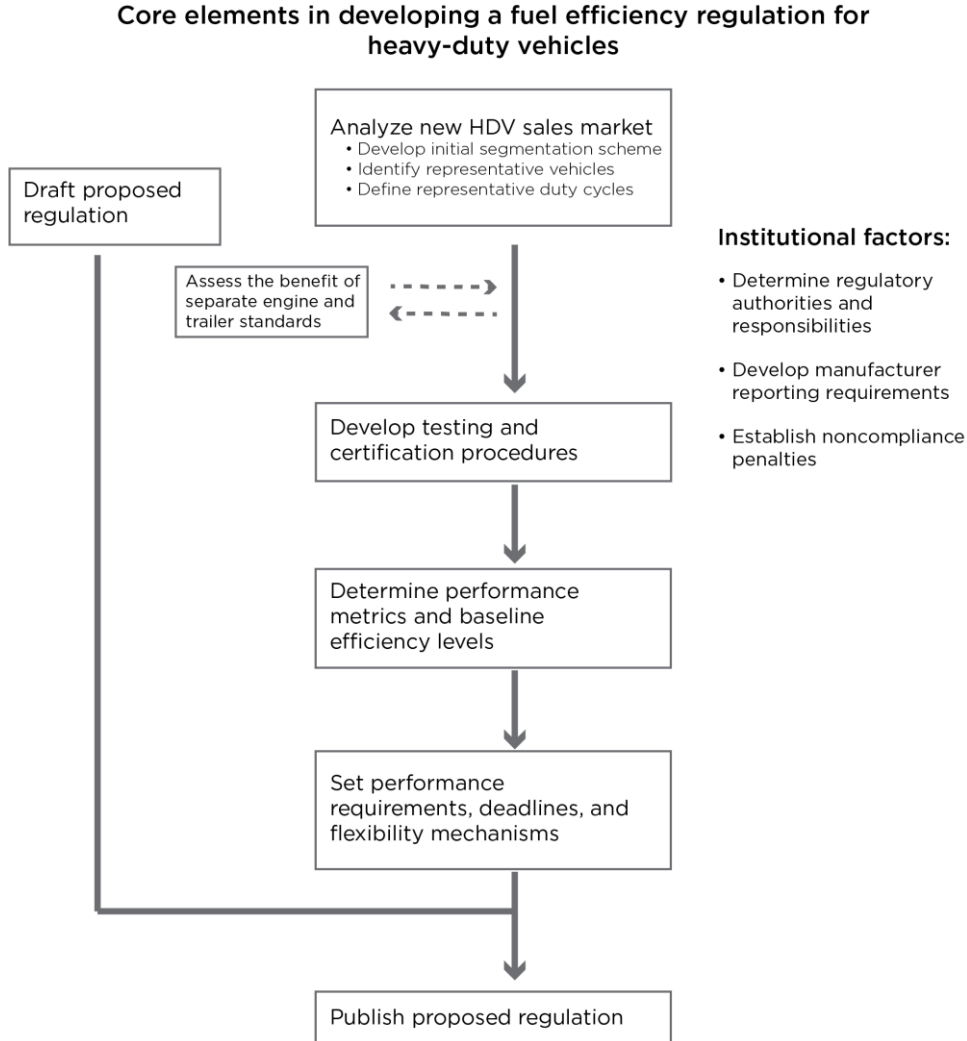
28 October 2019, Tokyo, Japan






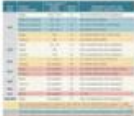


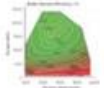

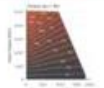

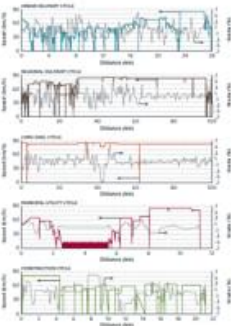
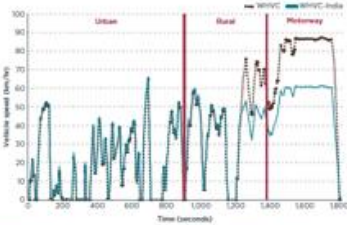
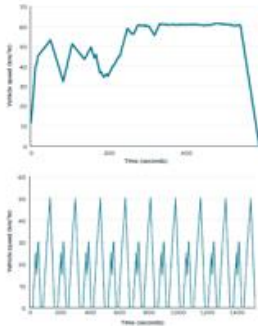

Selected examples of G20-related work during this year

- India and other countries
 - A stepwise guide to heavy-duty vehicle efficiency standards
 - Adapting VECTO for use in India and other countries
- Argentina
 - HDV aerodynamic drag determination tests
 - HDV on-road fuel consumption measurement during typical operation
 - Freight assessment and HDV Euro VI cost-benefit studies
- South Africa
 - Refining sector analysis and potential pathways to cleaner fuels and vehicles
 - Southern Africa workshop on regional harmonization of fuel and vehicle standards

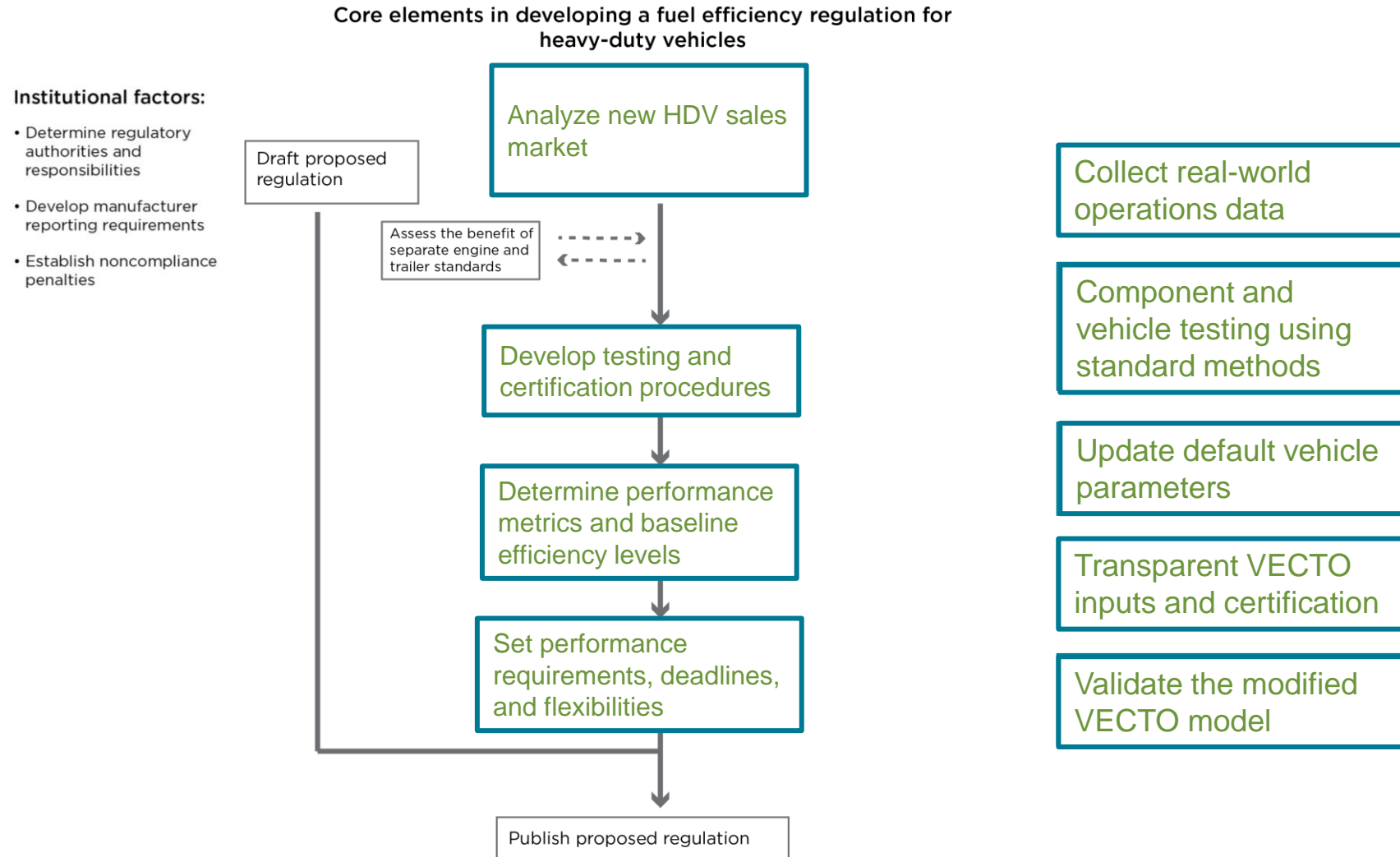
A stepwise guide to heavy-duty vehicle efficiency standards



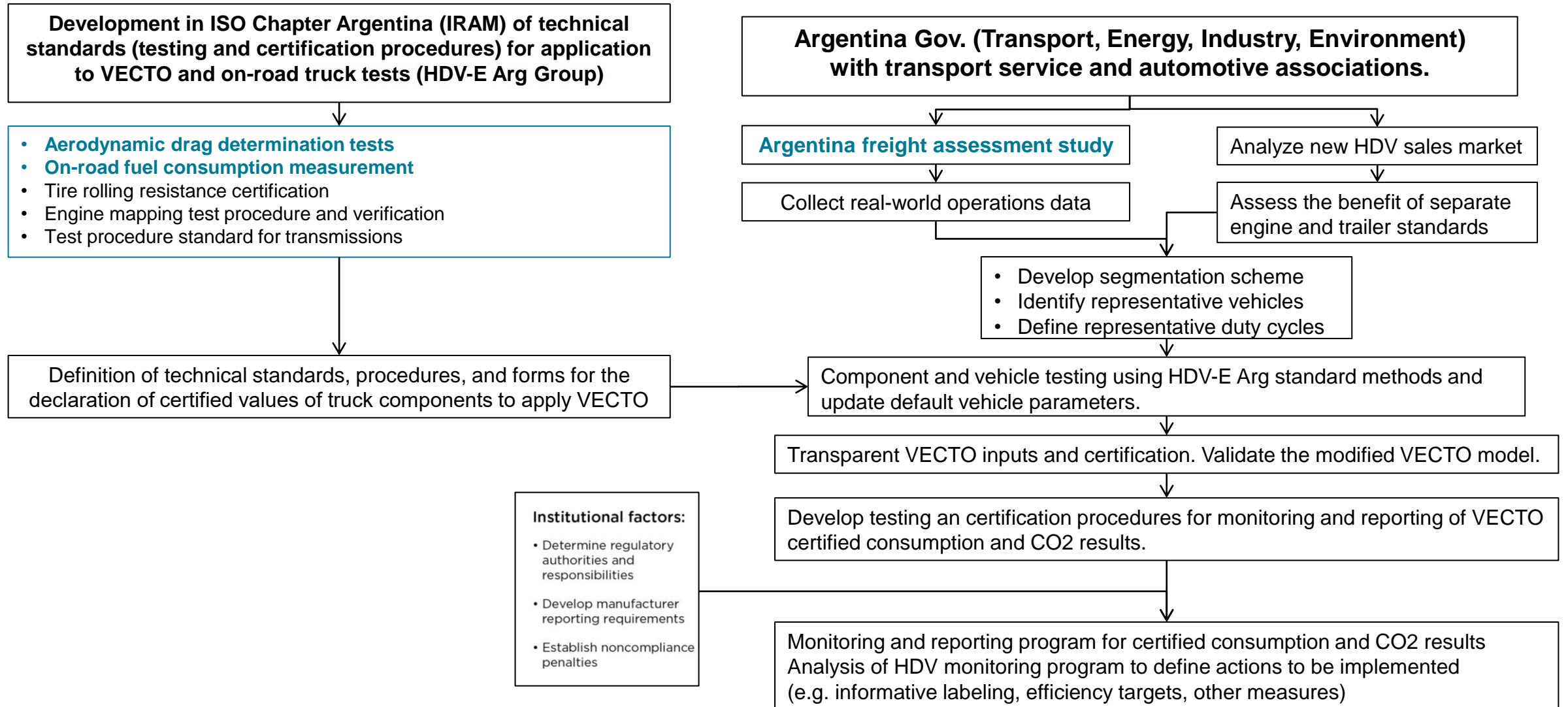
Adapting VECTO for use in India and other countries

	 European version	 Proof-of-concept India version	 Proposed India regulatory version
Vehicle types	 <p>17 truck segments are included in VECTO. Segmentation is based on vehicle type (rigid truck, tractor truck, or bus), gross vehicle weight, and axle configuration.</p>	<p>Users can select from these 3 truck types</p>  <p>6x4 25-tonne rigid truck 8x2 31-tonne rigid truck 4x2 40-tonne tractor truck</p>	 <p>India creates 11 truck and 3 bus categories to match the segmentation approach in the existing fuel consumption regulations. See Sathiamoorthy and Sharpe (2019) for further discussion.</p>
Input data	<p>Physical testing-based data</p>  <p>Dynamometer-based engine fuel consumption maps</p>	<p>Combination of user inputs and default values</p> <p>User has the ability to input an engine fuel consumption map</p>	<p>Physical testing-based data</p>  <p>We propose that VECTO-India be identical to VECTO in terms of component testing and input data requirements. India should aim to require physical testing for all component inputs for which a certified test procedure already exists in the CO₂ certification process in the European Union. If this arrangement proves too burdensome, then certain technology modules in VECTO can be modified to be based on default values.</p>
	 <p>Testing-based torque loss maps for transmissions, axles, and auxiliaries</p>	<p>Default values auto-populate for transmission, axle, and auxiliary data. Users can modify the number of gear and/or the gear ratio values.</p>	
	 <p>Aerodynamic drag area ($C_D A$) → track testing Coeff. of rolling resistance (C_{RR}) → lab testing</p>	<p>Aerodynamic drag area (C_D) → default value Vehicle frontal area → modifiable input C_{RR} → modifiable input</p>	
Drive cycles	 <p>Unique drive cycles are assigned based on vehicle group</p>	 <p>WHVC-India cycle is used for all 3 vehicle types. Weighting factors are used for each of the 3 'mini cycles' in the WHVC to account for different mission profiles of the 3 vehicles.</p>	 <p>India creates an appropriate number of new truck and bus driving cycles that is based on real-world operations data.</p> 

Lessons for VECTO adaptation in India and other countries



Supporting development of the HDV efficiency regulatory framework in Argentina



Argentina's aerodynamic drag testing: Coastdown



- **Participants:** Secretary of Environment and Sustainable Development, Energy Secretary, Transport Ministry, ICCT, US EPA, Argentinian Federation of Freight Transport Companies (FADEEAC), Argentina Automotive Factory Association (ADEFA), Scania, Mercedes Benz, Andreani, Michelin, YPF (Oil National Company), Drive Up, ITBA.
- **Objective:**
 - Build technical capacity, get familiar with this type of test, and select which standards to apply.
 - Air drag testing is important for HDV simulation-based CO₂ certification (VECTO) and technology verification of aerodynamic devices.
 - Collect air drag data for VECTO simulations.
- **Outcomes:**
 - Procedure to create an air drag standard with Argentina's ISO Chapter (IRAM) has begun.
 - Air drag was measured at 6.1 m² (prelim.)

Argentina's fuel consumption test: Flowmeter evaluation



- **Participants:** Secretary of Environment and Sustainable Development, Energy Secretary, Transport Ministry, ICCT, Argentinian Federation of Freight Transport Companies (FADEEAC), Argentina Automotive Factory Association (ADEFA), Scania, Horiba, Andreani, YPF (Oil National Company), Michelin, Drive Up, ITBA.
- **Objective:**
 - Build technical capacity and get familiar with fuel consumption measurement with fuel flow meters to develop relative consumption standards to support Argentina's Intelligent Transport Program.
 - Collect FC data for comparing VECTO simulations against real-world measurement.
- **Outcomes:**
 - Data processing and analysis ongoing.

Potential next steps in Argentina

- Continue technical work program (Technical Group HDV-E Arg)
 - Technical standards and VECTO adaptation
 - HDV efficiency certification and monitoring program
 - Analyzing results of HDV monitoring program to define actions to be implemented (e.g. informative labeling, efficiency targets, other measures)
 - Regional harmonization
- Joint regional workplan to reduce motor vehicle air pollution*
 - Adoption of world-class emissions standards (forthcoming cost-benefit study)
 - Improvements on fuel quality
 - Developing and implementing compliance and enforcement programs
 - Starting national transitions at the city level
 - Addressing high emissions from legacy fleets

Progress toward cleaner fuels and vehicles in G20 economies

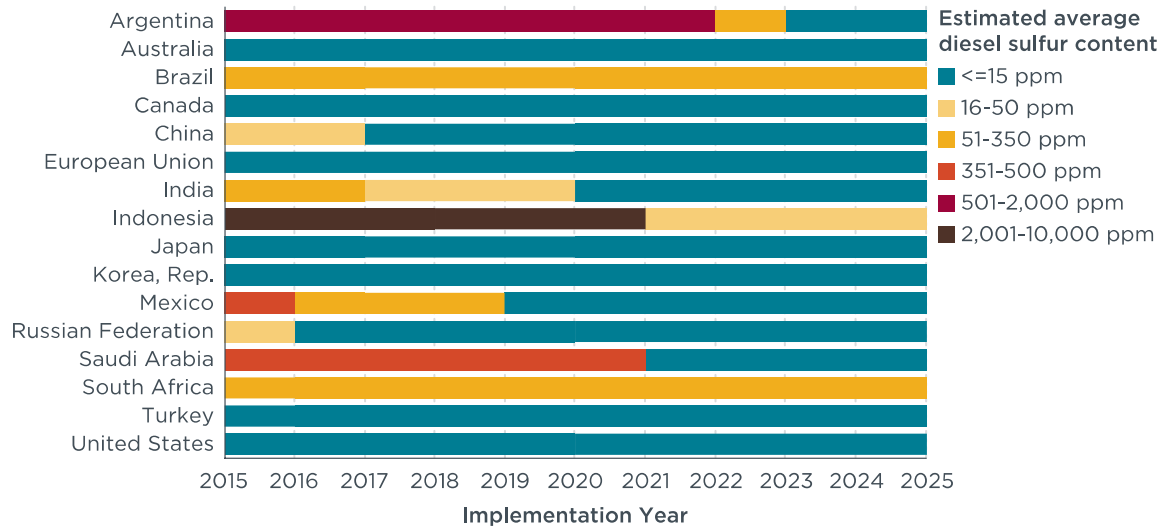


Figure 3. Timeline of average on-road diesel sulfur content in G20 economies

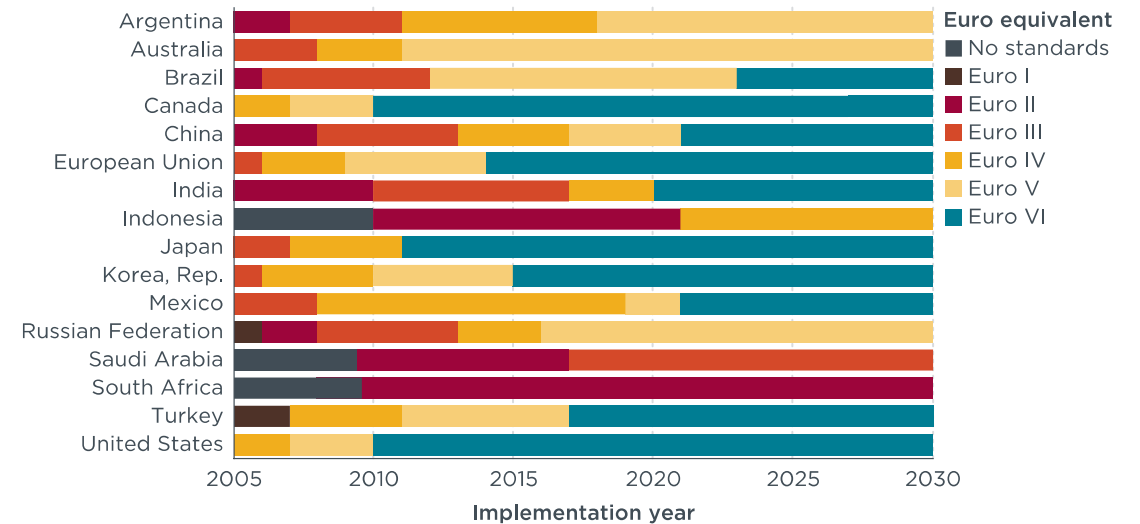


Figure 6. Implementation of heavy-duty diesel engine emission standards in G20 economies

Policy options for cleaner fuels and vehicles in South Africa

Current situation

- Diesel imports satisfy 35% of demand
- 50-ppm sulfur diesel is 80% of supply
- 10-ppm sulfur diesel is a niche grade
- The rest is capped at 500-ppm sulfur
- Euro 2/II standards since 2008
- Cleaner fuels delayed since 2017
- Refiners cite cost recovery concerns
- Fuel levies add ~3% to price annually

Policy options

- Differential environment levy
 - ~1–3% of price should be sufficient
 - Equivalent to 1 year of levy increases
- Regulatory action
 - Phase out 500-ppm sulfur fuels
 - Require fuel imports to be 10-ppm sulfur
 - Set a timeline for refinery upgrades
 - Euro 4/IV emission standards without delay
 - Leapfrog to Euro 6/VI with fuel availability
 - Regional harmonization