ICCT Global Transportation Roadmap

Overview

April/2012

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Overview and Scope of Work

- The Roadmap is a tool to help policymakers worldwide identify and understand trends in the transportation sector, assess emission impacts of different policy options, and frame plans to effectively reduce emissions of both greenhouse gases (GHGs) and local air pollutants.
- The core of the Roadmap is a spreadsheet-based model developed in Microsoft Excel that calculates historical and future well-to-wheel (WTW) emissions from the transportation sector for different policy scenarios.
- The Roadmap compares the effects of policies that have been adopted and those that are under active discussion with the policy potential for the largest vehicle markets.

Pollutants
- Local air pollutants (NO_x, SO_x, CO, PM)
- GHGs (CO_2, CH_4, N_2O)

Modes
- On-road (LDVs, buses, 2 and 3 wheelers, HDTs)
- Rail
- Marine (domestic/international)
- Aviation (domestic/international)

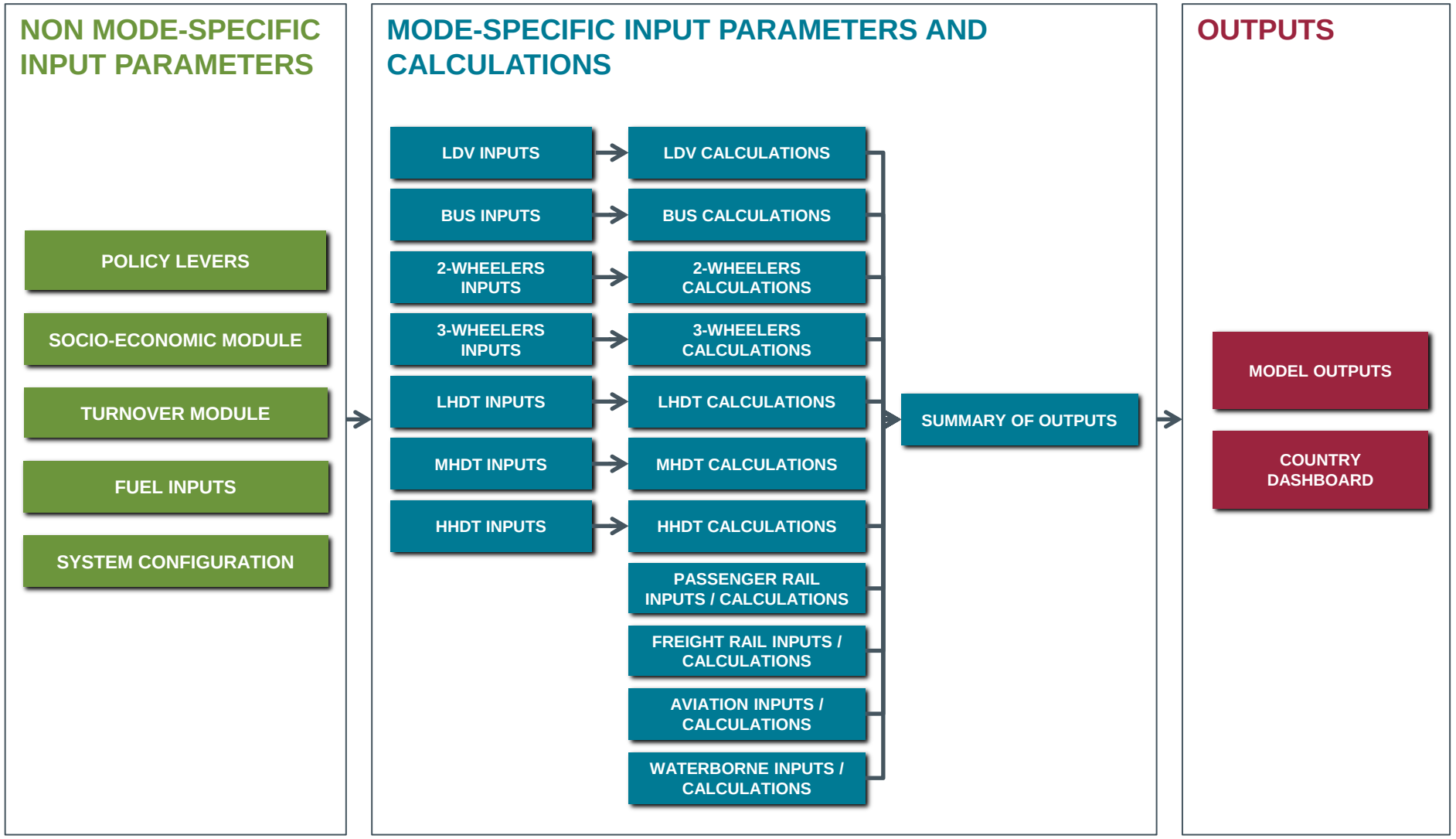
Regions
- United States, EU-27, China, India, Japan, Brazil, South Korea, Canada, Australia, Mexico, Russia, Rest of Latin America, Rest of Europe, Rest of Asia-Pacific, Middle-East, and Africa.

Years
- 2000 to 2050 in 5-year increments

Outputs
- WTW/WTT/TTW emissions
- Energy consumption
- Vehicle stock and sales

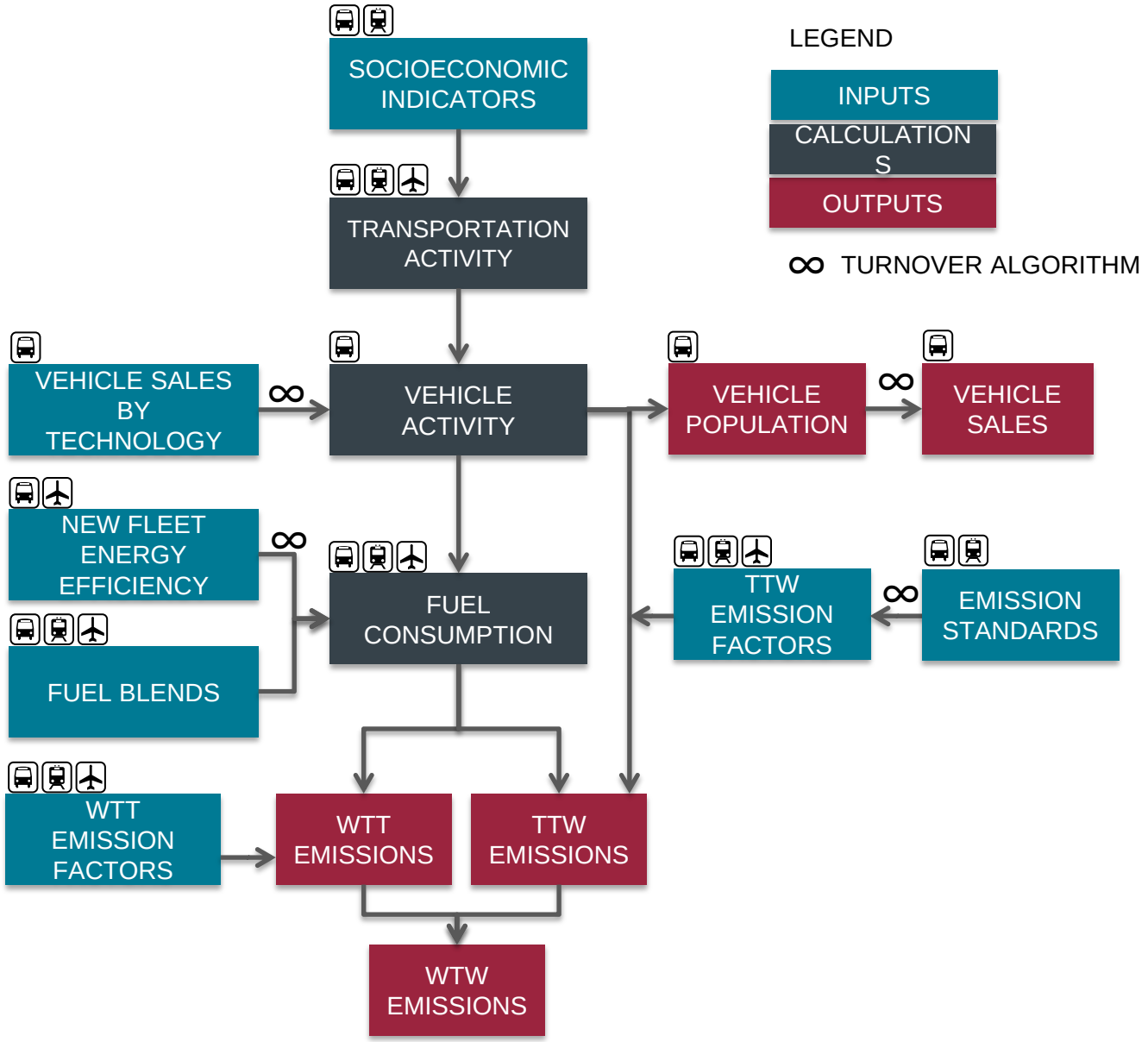
Roadmap Model

Spreadsheet Structure



Roadmap Model

Simplified Emission Calculation Methodology



Emission Reduction Strategies

IMPROVE

- Vehicle efficiency improvements
- Faster introduction of emission standards
- “Decarbonization” of fuels and electricity
- Low sulfur fuels

AVOID

- Transportation activity reduction through travel demand management, land-use policies, and improvements in efficiency of passenger and freight transportation systems.

SHIFT

- Mode shift to less energy-intensive modes (passenger and freight).

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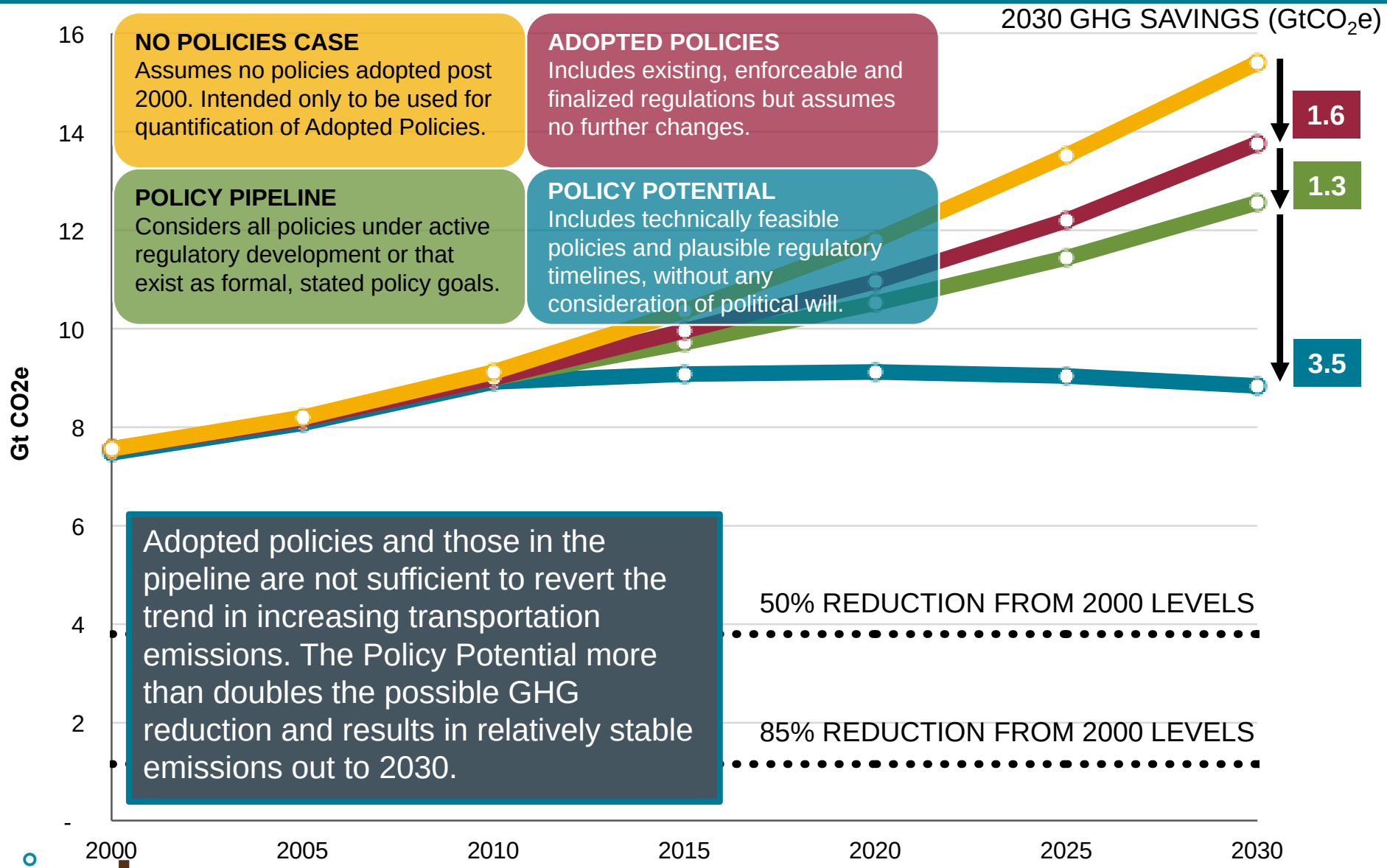
Policy Trajectories



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Policy Trajectories

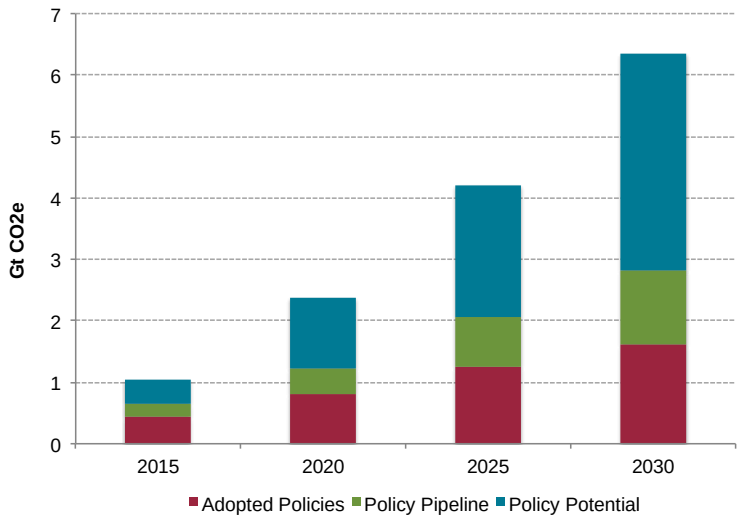
Policies by Region and Mode

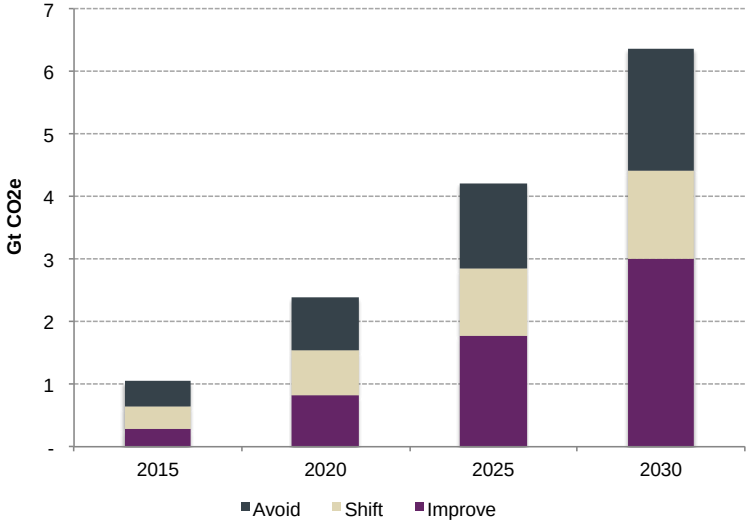
Mode	Adopted Policies	Policy Pipeline	Potential Policies
LDV *Includes Pre-2012 Standards	US – MY 2000-2011 NHTSA US - 2012-2016 EPA/NHTSA US - ZEV mandate in California to 2016 Canada - CAFC LDV Standards Canada – GHG MY 2011-2016 EU-27 – 130g/km* China – LDV Phases I,II,III China – Phase I for motorcycles Japan - Top Runner Approach MY 2010, 2012-2015, and 2020 South Korea - Average Fuel Economy (AFE) Program	U.S. – 2017-2025 EPA/NHTSA US - ZEV mandate in California to 2025 Canada – eq. US Mexico – eq. US 2016 EU-27 – Parliamentary target for 2020 (95gCO2/km) China – Phase IV India – 20km/L	Main vehicle markets – 4% annual improv. after policy timeline (1.1% for motorcycles)
HDV	U.S. - 2014-2018 EPA/NHTSA Canada - Equiv US 2014-2018 HDV EU-27 – LCV 147g/km Japan - Top Runner Approach MY 2015 China – LCV Phases I, II	Mexico – eq. US 2014-2018 China – Phase I	Main vehicle markets – 40% reduction in fuel consumption by 2030 from 2010 levels.
EVs	N/A	N/A	2-9% sales by 2030
Fuels	Assumed no GHG benefits from biofuels with exception of Brazilian sugarcane	Assumed no GHG benefits from biofuels with exception of Brazilian sugarcane	Assumed no GHG potential
Aviation	EU ETS BAU improv. – 21% by 2030 over 2010.	ICAO's standard – 27% improv. by 2030	29% improv. by 2030
Marine	EEDI	Market-based measures	10% reduction by 2030 from 2007 levels.
Mode Shift	Based on completed transit and freight rail projects.	Based on funded transit and freight rail projects.	Based on potential transit and freight rail projects.
Activity Reduction	-	-	Based on potential logistics improvements and reduction of urban trip lengths.

Global GHG Emission Reduction from Transportation Policies

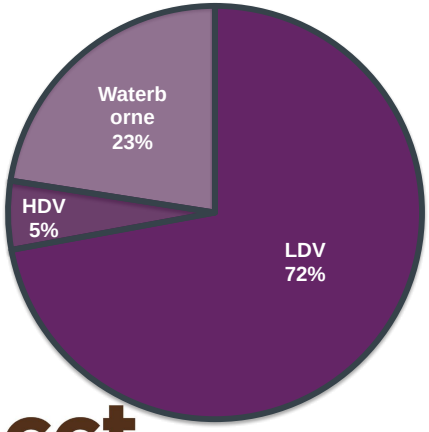
Breakdown by Policy Trajectory and Strategy Type

Transportation policies have the potential to reduce GHG emissions by 40% in 2030 (from a 2030 baseline assuming no policies), equivalent to a total reduction of 6.4 $GtCO_2e$.

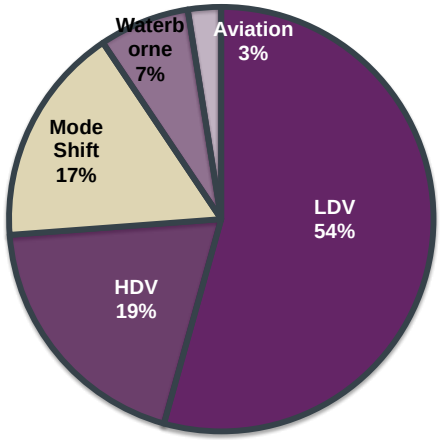




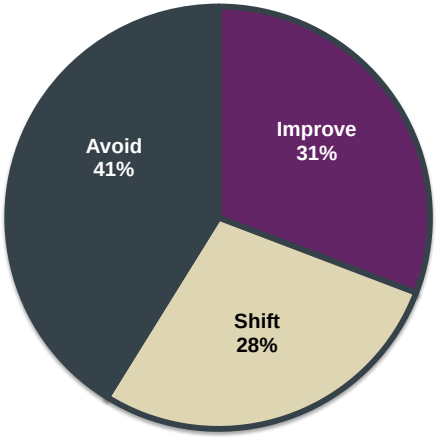
ADOPTED POLICIES



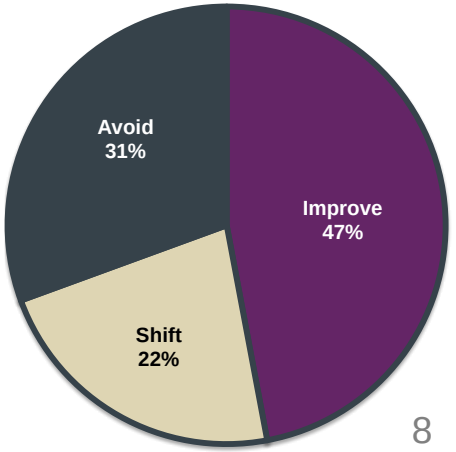
POLICY PIPELINE



POLICY POTENTIAL



ALL POLICIES



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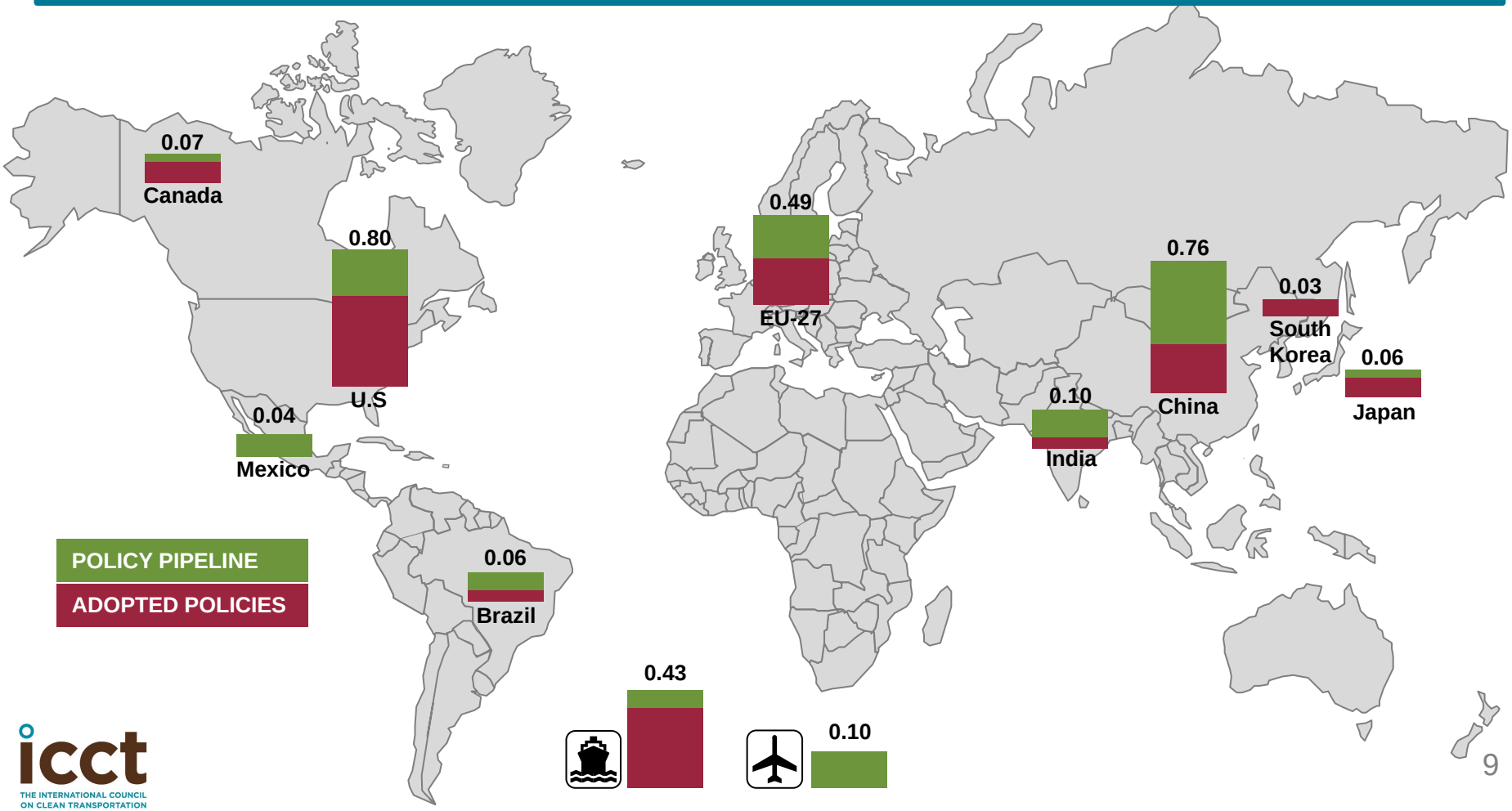
GHG Emission Reduction from Transportation Policies

Breakdown by Country

- The US, China, and Europe are responsible for the large majority of expected emission reductions from adopted and prospective policies.
- Reductions from marine and aviation sectors are substantial and thus should be monitored, enforced, and encouraged.



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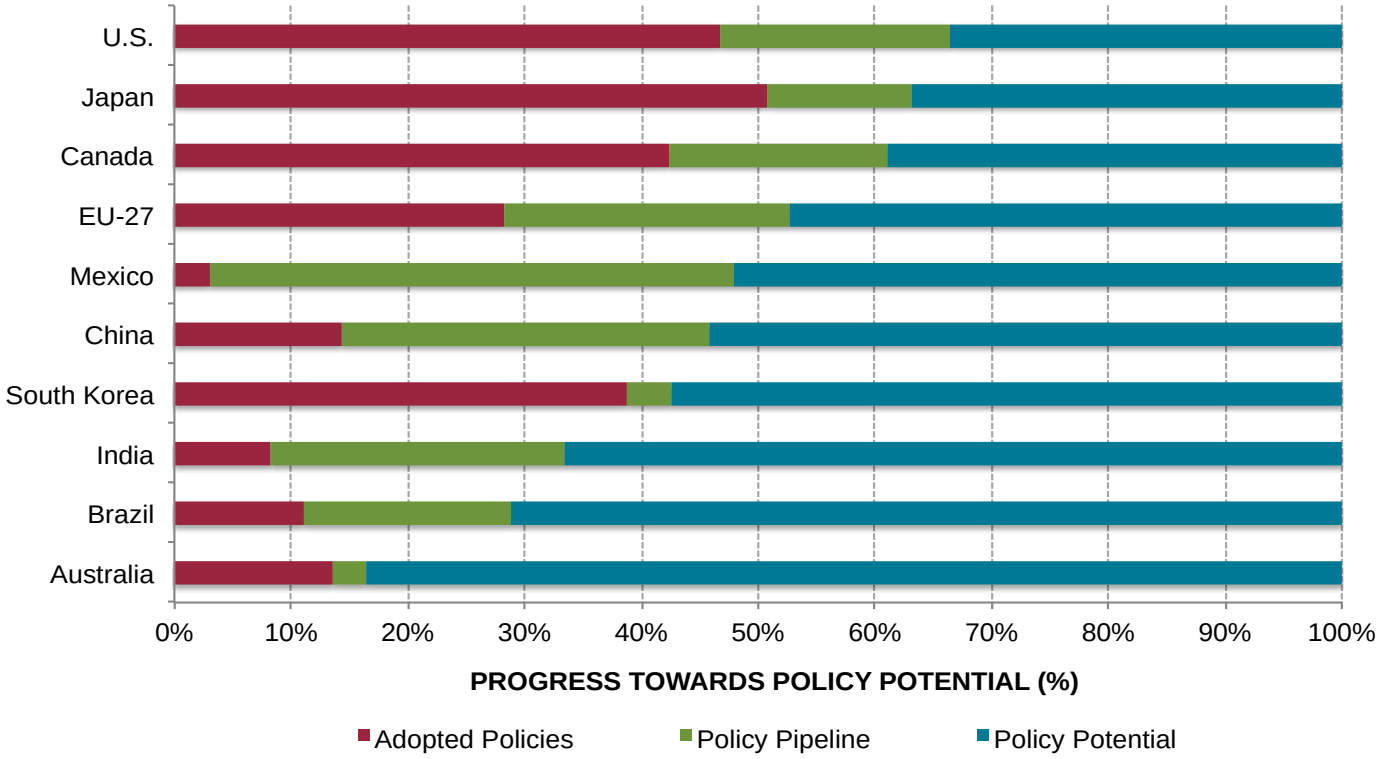
Policy Progress

How far are countries from their policy potential?

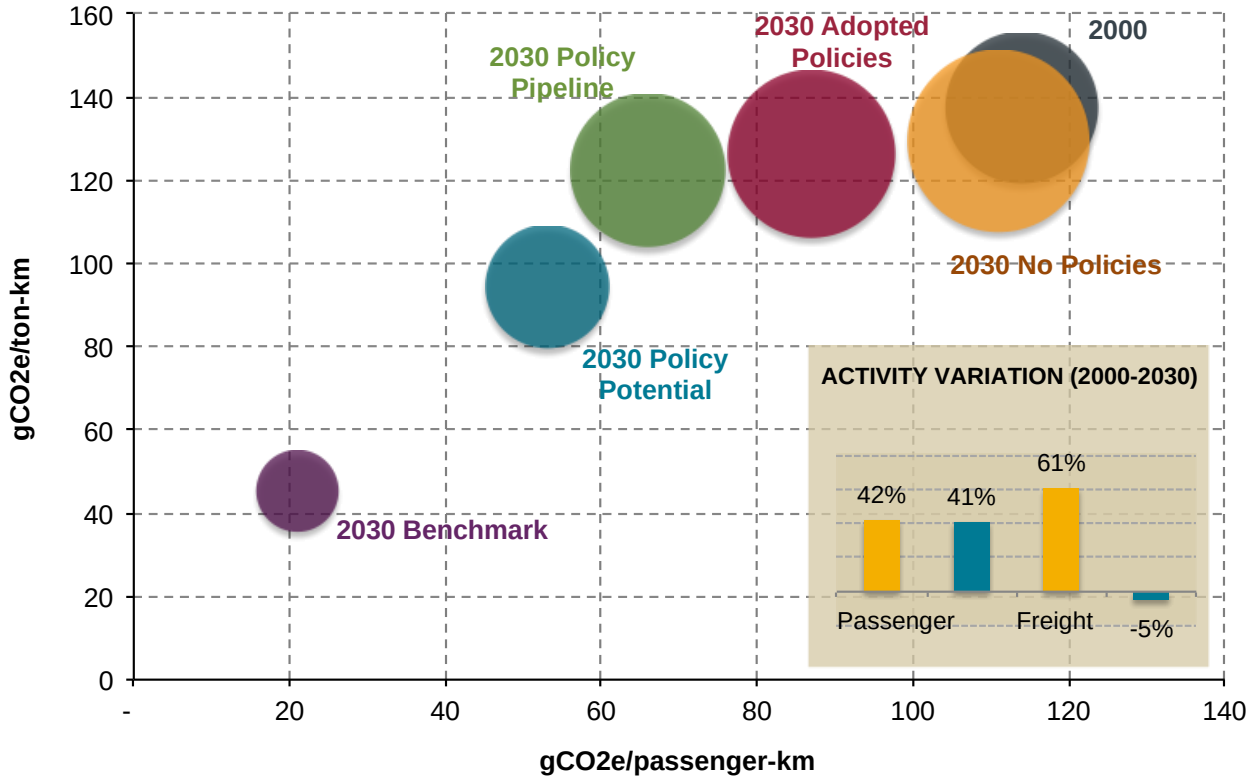
- All regions evaluated fall short of their policy potential in 2030
- Some regions are much further ahead than others. For example, while U.S., Japan, and Canada are expected to achieve 60–70 percent of their policy potential in 2030, Australia is set to achieve less than 20 percent of its policy potential.



Impact of Policies on Transportation Carbon Intensity

EU-27 Example

- Carbon intensity of a transportation system defined by gCO_2e/passenger-km and ton-km. Bubble size is proportional to country CO_2e emissions.
- Economic and demographic trends have some effect – either positive or negative depending on the region – on the carbon intensity of transportation system systems.
- However, most of the impact on transportation carbon intensity is due to policies. An example below is provided for the EU-27, showing how transportation policies have the potential to substantially improve how regions move people and freight.



Planned Deliverables

- Roadmap Model
  - Excel spreadsheet that calculates historical and future transportation emissions by mode and region based on different policy scenarios.
- Global Climate Report
  - Evaluation of impact from adopted, prospective, and potential policies on GHG emissions from transportation in key regions.
- Global Health Report
  - Evaluation of health impacts from adopted, prospective, and potential transportation policies in key regions.
- Policy Dashboard
  - Frequently updated summary of current adopted and planned policies in key regions.