Multi-year Expert Meeting on Transport, Trade Logistics and Trade Facilitation

Sustainable Freight Transport Systems: Opportunities for Developing Countries

14-16 October 2015

ELEMENTS OF A SUSTAINABLE FREIGHT STRATEGY

by

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Geneva, October 14, 2015

icct
THE INTERNATIONAL COUNCIL ON CLEAN TRANSPORTATION

the ICCT: mission and activities

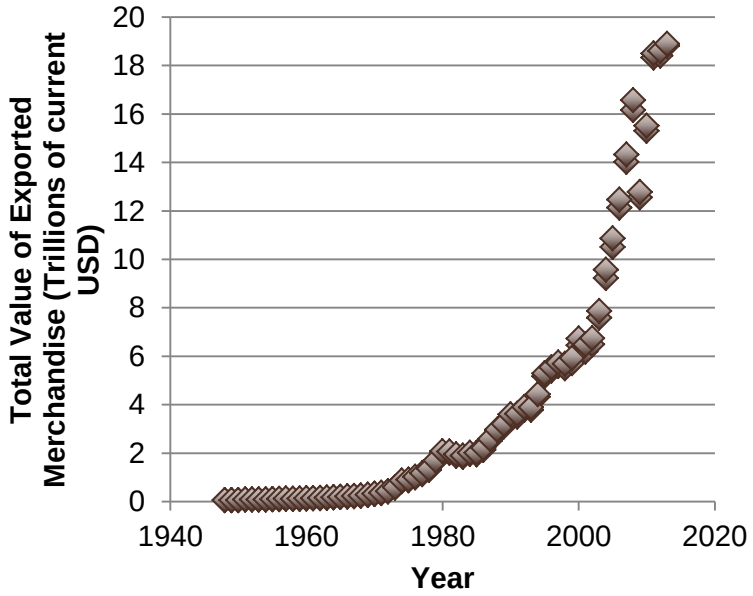
The mission of ICCT is to dramatically improve the environmental performance and efficiency of cars, trucks, buses and transportation systems in order to protect and improve public health, the environment, and quality of life.

- Non-profit research organization
- Air pollution and climate impacts
- Focus on regulatory policies and fiscal incentives
- Activity across modes including aviation and marine
- Global outreach, with special focus on largest markets

Growing Importance of Freight Transport

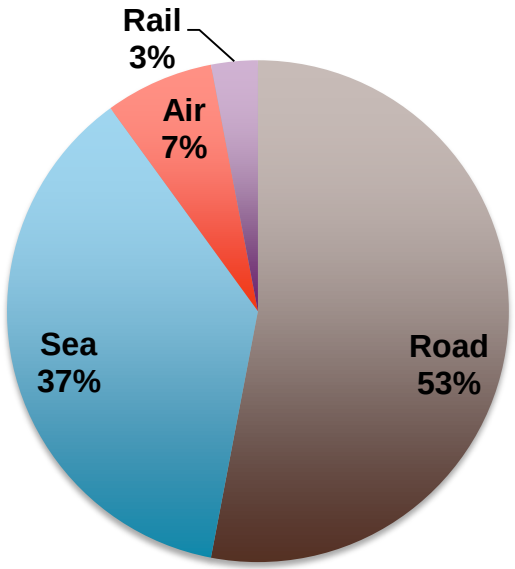
- Global Freight transport consumes almost 45% of total transport energy (IPCC)
- The value of freight exports has grown significantly over the past 20 years
- CO2 emissions from international freight transport projected to grow by a **factor of 4** from 2010 to 2050 (ITF).
- Freight movement is a **global and multimodal** issue

Value of Exported Merchandise



Source: World Trade Organization

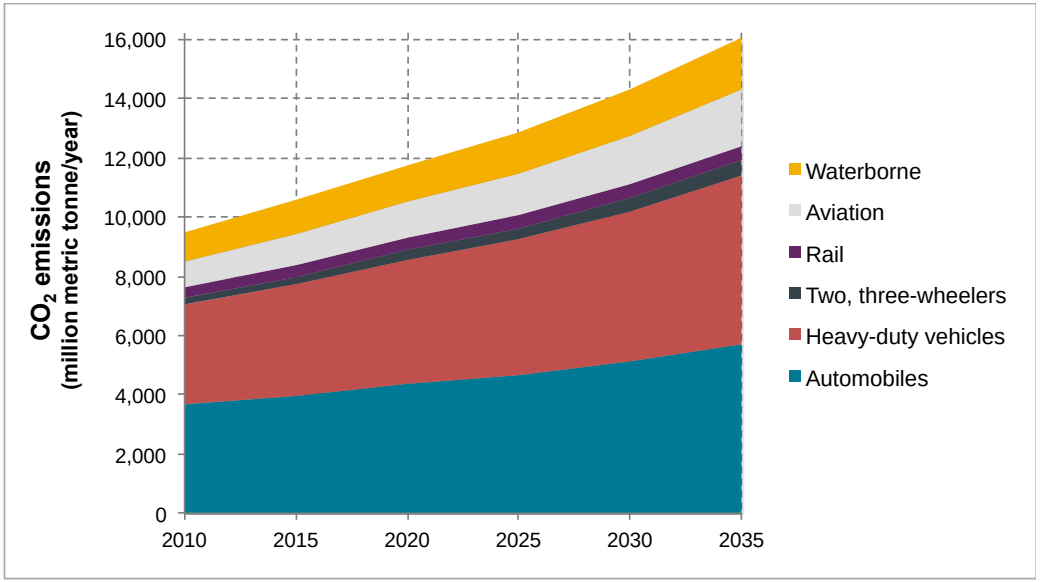
International Trade related CO2 emissions by mode



Source: ITF

Growing Importance of HDVs

- Transportation sector impacts are increasing
  - About 50 million barrels oil per day, a third of global climate emissions
- Heavy-duty vehicles are major, growing energy demand, CO2 source
  - Typically the highest transport energy, CO2 source outside US, EU
- Growth in HDV energy consumption (and CO_2 emissions) predicted to outpace growth in other modes. Forecasted 72% increase from 2010-2030



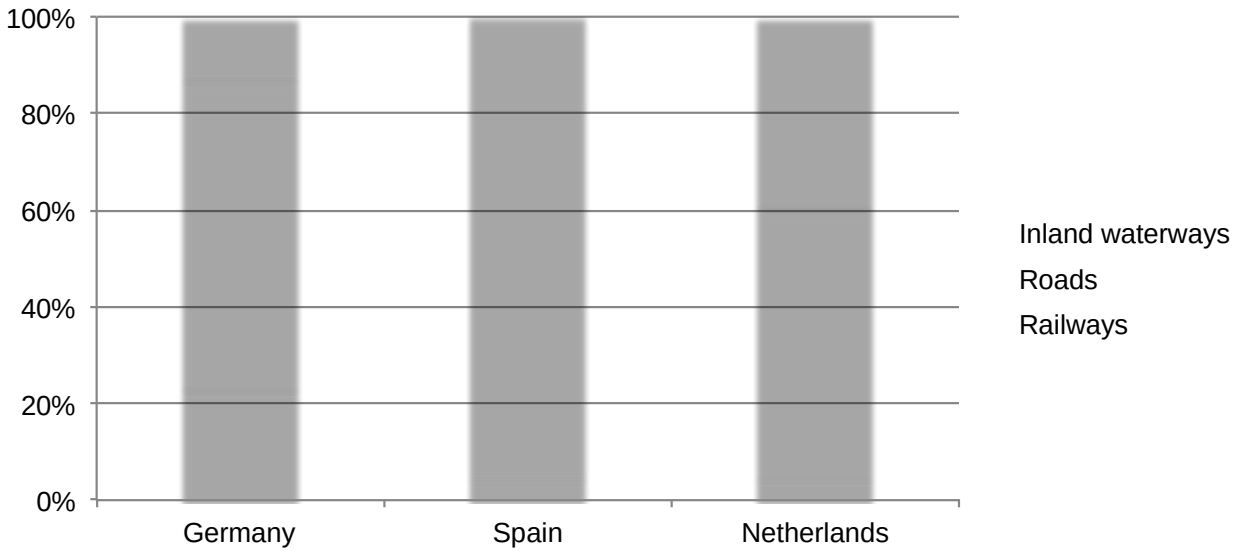
Source: ICCT Roadmap (2014)

Country/Region Specific Challenges

- Unique challenges for every country
- Country specific freight assessments are needed

- Availability of modal options
- Duty Cycles
- Technology availability
- Market structure
- Logistics
- Infrastructure
- Regulatory compliance
- Additional regulations (e.g. weights and measures)

2013 Modal Split based on ton-kilometers of freight for 3 EU member states

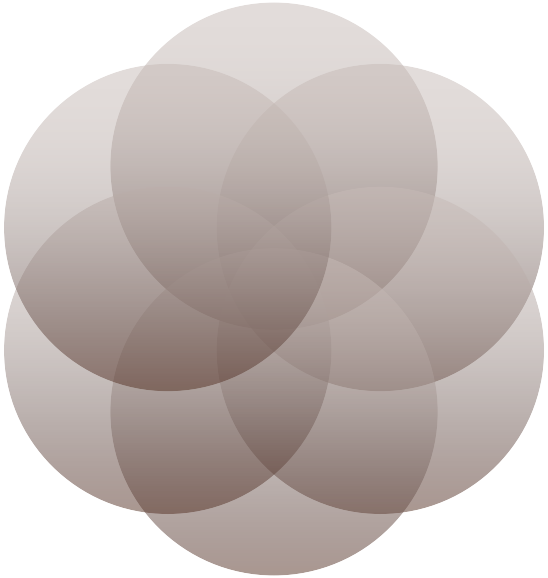


Source: EuroStat.
http://ec.europa.eu/eurostat/data/database

Portfolio of Sustainable Freight Strategies

Fuel consumption and fuel/emission standards

Green Freight and other in-use programs/policies



Improved infrastructure and transportation systems

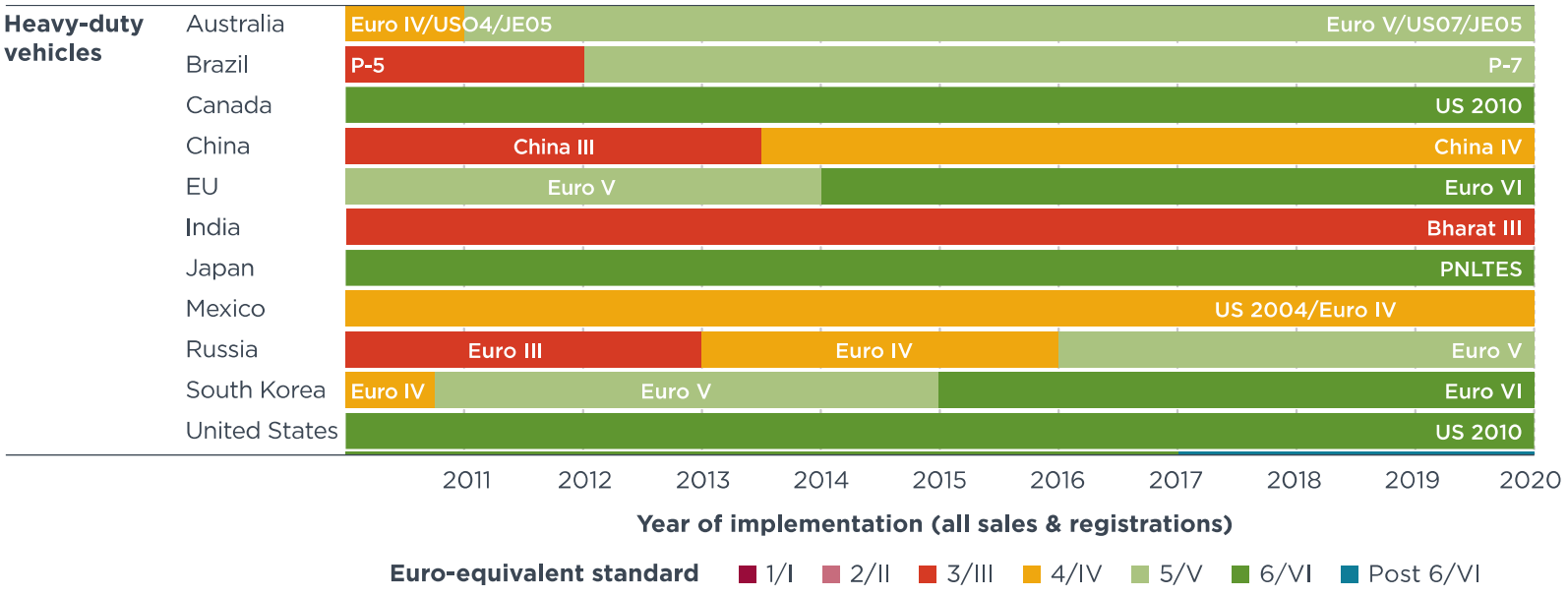
Advanced technology development and deployment

Financial incentives

Carbon taxation

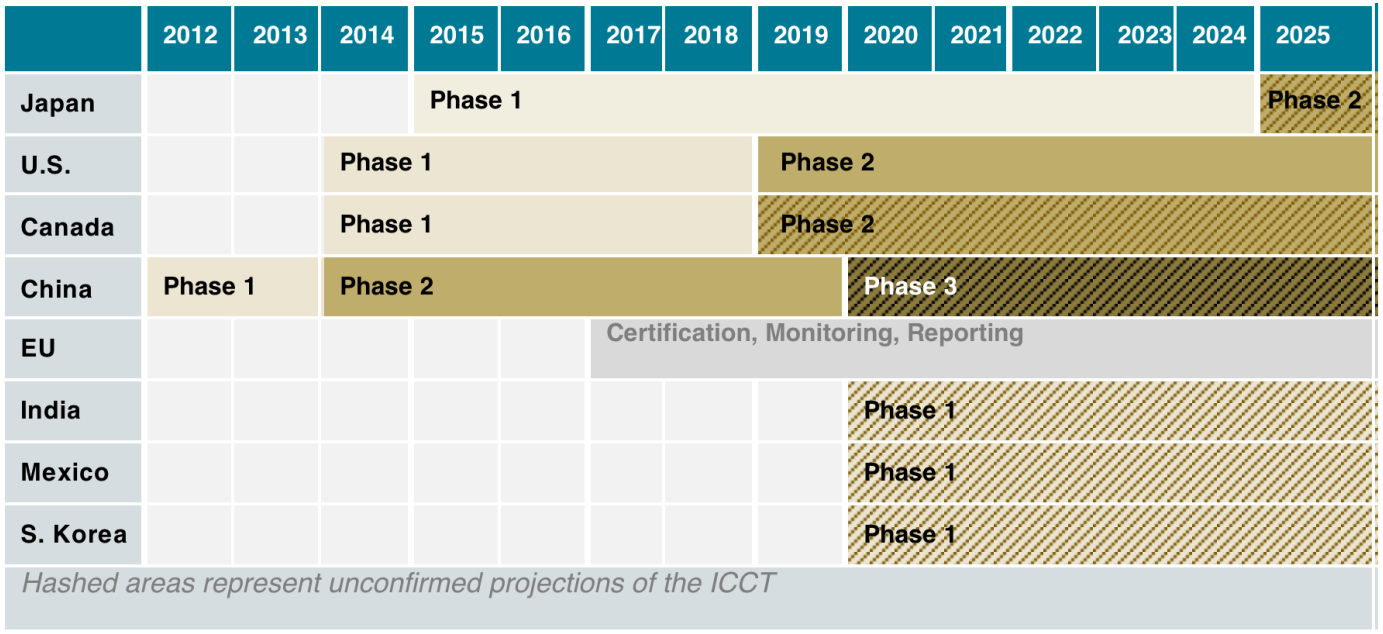
New Vehicle Emissions Standards

- Emissions standards (and complimentary fuel sulfur standards) for heavy-duty diesel engines have been progressively driving down criteria pollutant emissions
- US 2010 and Euro VI Emissions standards require the lowest emissions of PM and NOx and require the use of Ultra Low Sulfur Diesel Fuel
  - These standards covered 27% of HDVs sold in 2014



New Vehicle Fuel Efficiency Standards

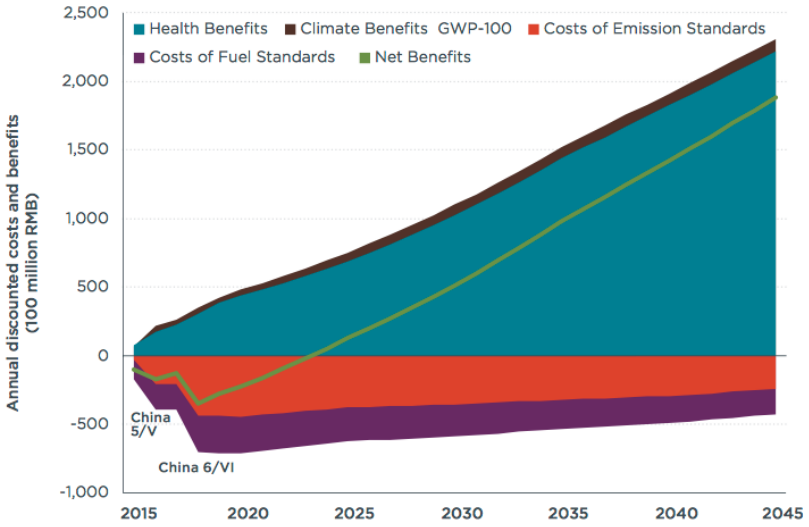
- HDV efficiency standards are used to overcome existing market barriers to efficiency technology
  - To drive fleet-wide CO2 reductions year to year
- HDV standards are relatively new compared with LDV standards
- Currently 4 countries have HDV standards – some others are working towards standards



Costs and Benefits of New Vehicle Policies

- Emissions standards: benefits of typically outweigh costs significantly
  - For China VI, benefit:cost ratio of nearly 6:1
- Efficiency standards: payback times for technologies are considered
  - Payback time for US efficiency standards is less than two years for long haul trucks in Phase 2

Cost-Benefit of China VI



Source: Costs and benefits of motor vehicle emission control programs in China. http://www.theicct.org/costs-and-benefits-motor-vehicle-emission-control-programs-china

Costs and Benefits of US Phase 1 and 2		Phase 1	Proposed Phase 2
Proposal		2010	2015
Final rule (expected)		2011	(2016)
Model years		2014–2018	2018–2027
Percent CO_2 reduction	Combination tractors (Class 7 and 8)	9%–23%	11%–24%
	Trailers	-	3%–9%
	Vocational vehicles (Class 2b-8)	5%–9%	10%–15%
	Heavy-duty pickups and vans (Class 2b and 3)	10%–15%	16%
	Engine	5%–6%	0%–4%
Vehicle technology cost	Combination tractors (Class 7 and 8)	$6,215	$11,680
	Trailers	-	$1,170
	Vocational vehicles	$378	$3,380
	Heavy-duty pickups and vans (Class 2b and 3)	$1,048	$1,340
Average payback period[a]	Combination tractors (Class 7 and 8)	1	2
	Vocational vehicles	1	5
	Heavy-duty pickups and vans (Class 2b and 3)	2	3
Energy and climate impact	Greenhouse gas emission reduction by calendar year (million metric ton CO_2)	76 (2030) 108 (2050)	127 (2035) 183 (2050)
	Fuel reduction by calendar year (million gallons per year)	6.0 (2030) 8.7 (2050)	9.3 (2035) 13.4 (2050)
	Greenhouse gas reduction over regulated vehicle lifetimes (million metric ton CO_2 equivalent)	273	961
	Fuel reduction over regulated vehicle lifetimes (billion gallons)	22	75
Monetary impact[b]	Fuel savings (billion)	$50	$170
	Other benefits (billion)	$7	$99
	Total costs (billion)	$8	$25
	Overall benefit-to-cost ratio	7:1	10:1

[a] Years after technology purchase in which cumulative fuel savings are greater than the additional initial technology cost.
[b] Based on 3% discount rate; "Other benefits" include value of health and monetized CO_2 benefit.

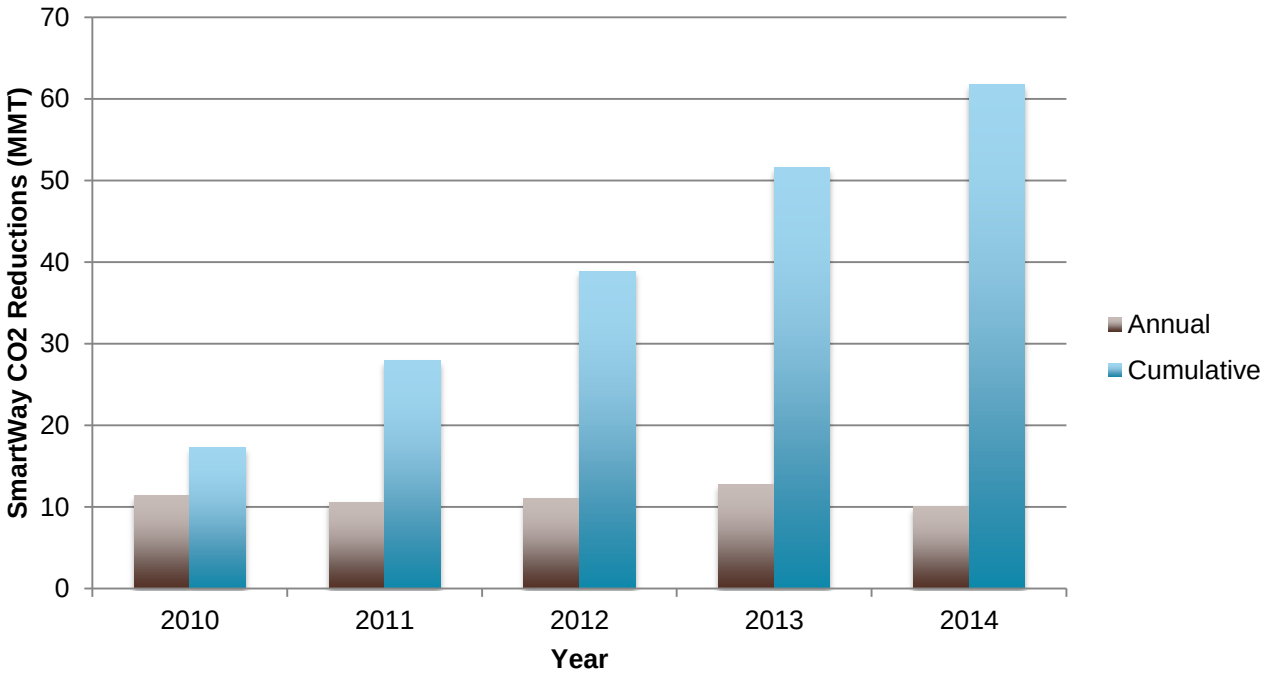
Source: U.S. efficiency and greenhouse gas emission regulations for MY 2018–2027 heavy-duty vehicles, engines, and trailers. http://www.theicct.org/us-phase2-hdv-efficiency-ghg-regulations-policy-update

Improving the Legacy Fleet

- Green freight programs
  - Voluntary partnerships with shippers/carriers/logistics companies
- Vehicle replacement programs
  - Accelerate fleet turnover
- Retrofit/repower programs
  - Cost effective way to clean existing, older vehicles
- Inspection and maintenance
  - Ensure proper operation of in-use vehicles' emissions control
- Spotter and remote sensing
  - Identify and repair high emitters
- Low emissions zones
  - Restrict travel zones for high emitting, older vehicles

Green Freight Programs

- CO2 reductions from SmartWay programs (determined based on reporting from members)
- Reductions due to – efficiency technologies, improved strategies, driver training, accelerated fleet turnover
- Nominally, this represents 5-10% annual improvement from 25% of the in-use fleet
- Using similar assumptions – potential for 90 MMT annual reductions from G20 countries



Source: US EPA

Vehicle Replacement Programs

Best Practices

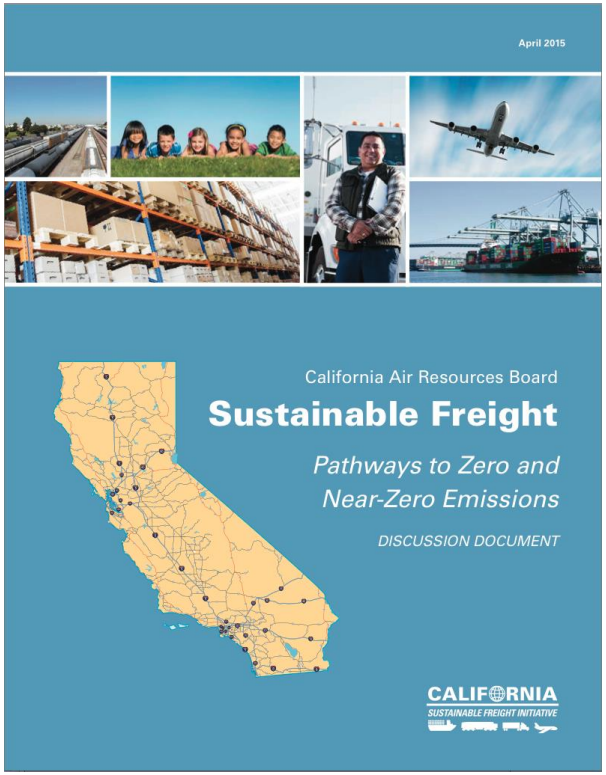
1. Clean replacement vehicles
2. Strong implementation, management, enforcement
3. Optimize the subsidy offered
4. Define policymaker roles at national, regional, and local level
5. Compliment with other incentives

Program	Vehicles targeted	Approximate average subsidy offered	Complimentary policies used
US: California: Carl Moyer Program	Multiple types, including on-road and off-road	~$28,000 per vehicle	Mandatory upgrades of high polluting vehicles (regulatory backstops)
US: Consumer Assistance to Recycle and Save (CARS)	Light-duty vehicles	$3,500-$4,500	None
US: National Clean Diesel Campaign (NCDC)	Heavy-duty vehicles	~$9,400 per vehicle spent for the program	None
Germany: Scrappage Bonus	Light-duty vehicles	$3,500	Low emission zones
China: National Vehicle Scrappage Program	Light- and heavy-duty vehicles	Varies by vehicle type; between $980 and $2,940	Mandatory vehicle age limits
China: Local Vehicle Scrappage Program	Light- and heavy-duty vehicles	Varies by vehicle type; LDVs: $410-2410 HDVs: $1,330-$2,100	Mandatory vehicle age limits and low emission zones
Mexico: Program to Modernize Federal Road Transportation	Heavy-duty vehicles on federal highways	Up to 15% of the cost of the replacement vehicle	None
Mexico: Mexico City: Program to Replace Microbuses with New Autobuses	City buses	Up to $7,700	None
Chile: Swap your Truck	Heavy-duty trucks	From $8,000 to $24,000 depending on vehicle category	Partial: there is a ministerial decree to implement a low emission zone, but it has not been executed.

Source: Survey of best practices in reducing emissions through vehicle replacement programs. http://www.theicct.org/vehicle-replacement-program-best-practices-mar2015

Developing a Sustainable Freight Strategy

1. Freight assessment – all modes
2. Emissions inventory
3. Set targets
4. Stakeholder involvement
5. Funding
6. Develop short, mid, long term strategy



Source: http://www.arb.ca.gov/gmp/sfti/sfti.htm

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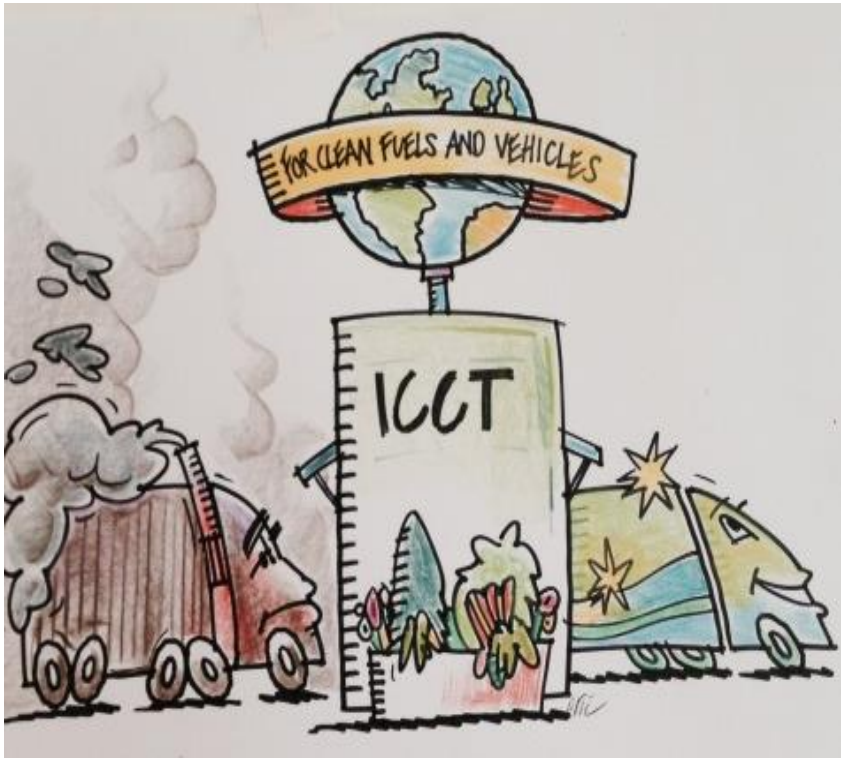

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