



Informal document No. WP.29-149-28
(149th WP.29, 10-13 November 2009,
agenda item 8.5)

Recent IEA Activities and Findings (finishing with ideas for WP-29 Roundtable)

Lew Fulton, IEA/SPT
WP-29 meeting, 12 Nov 2009

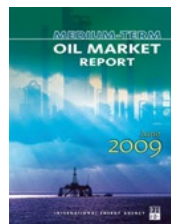


IEA and transport

Relevant publications

TRANSPORT,
ENERGY
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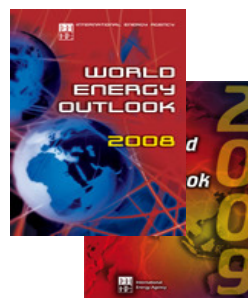
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■ Medium term Oil Market Report

Horizon 2015, focus on oil

Scenarios currently based on two different GDP growth assumptions, includes biofuels projection

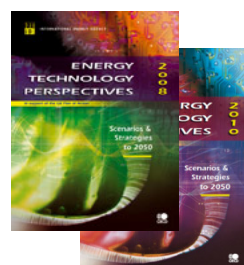


■ World Energy Outlook (WEO)

Horizon 2030, all energy sources

Scenarios depicting different developments on the basis of policy actions

One underlying assumption for GDP and population growth
Includes a thorough analysis on the oil supply availability

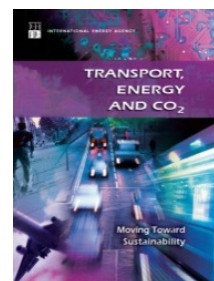


■ Energy Technology Perspectives (ETP)

Horizon 2050, all energy sources

Scenarios that pay particular attention to the role of technology, especially on the demand side

One underlying assumption for GDP and population growth



■ Transport, energy and CO₂ **Just Out!**

Moving towards sustainability

“Transport book”

Horizon 2050, all energy sources

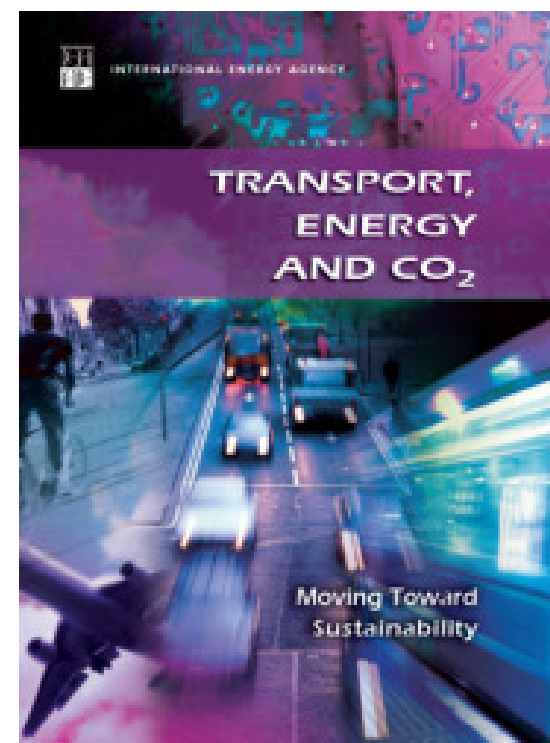
Builds and expands the work done on ETP

35 years
1974-2009

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IEA's New Transport Publication

- Released 27 October, 2009
- Builds on ETP 2008, will feed into ETP 2010
- Transport analysis based on on-going development of IEA Mobility Model, supporting research
- Book features:
 - Indicator update and extension to more countries
 - Technology potential and cost updates
 - Fuel and Modal assessments (LDV, truck, aviation, shipping)
 - Detailed scenario analysis with regional detail – Baseline, High Baseline, Modal Shift, BLUE technology scenarios
 - Role of future technologies, modal shift
 - More regional detail than in ETP
 - Continuing development of CO₂ mitigation cost analysis
 - Policy considerations



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2050

2045

2040

2035

ELECTRIC VEHICLE CHARGING STATION

Technology Roadmap

Electric and plug-in hybrid electric vehicles (EV/PHEV)



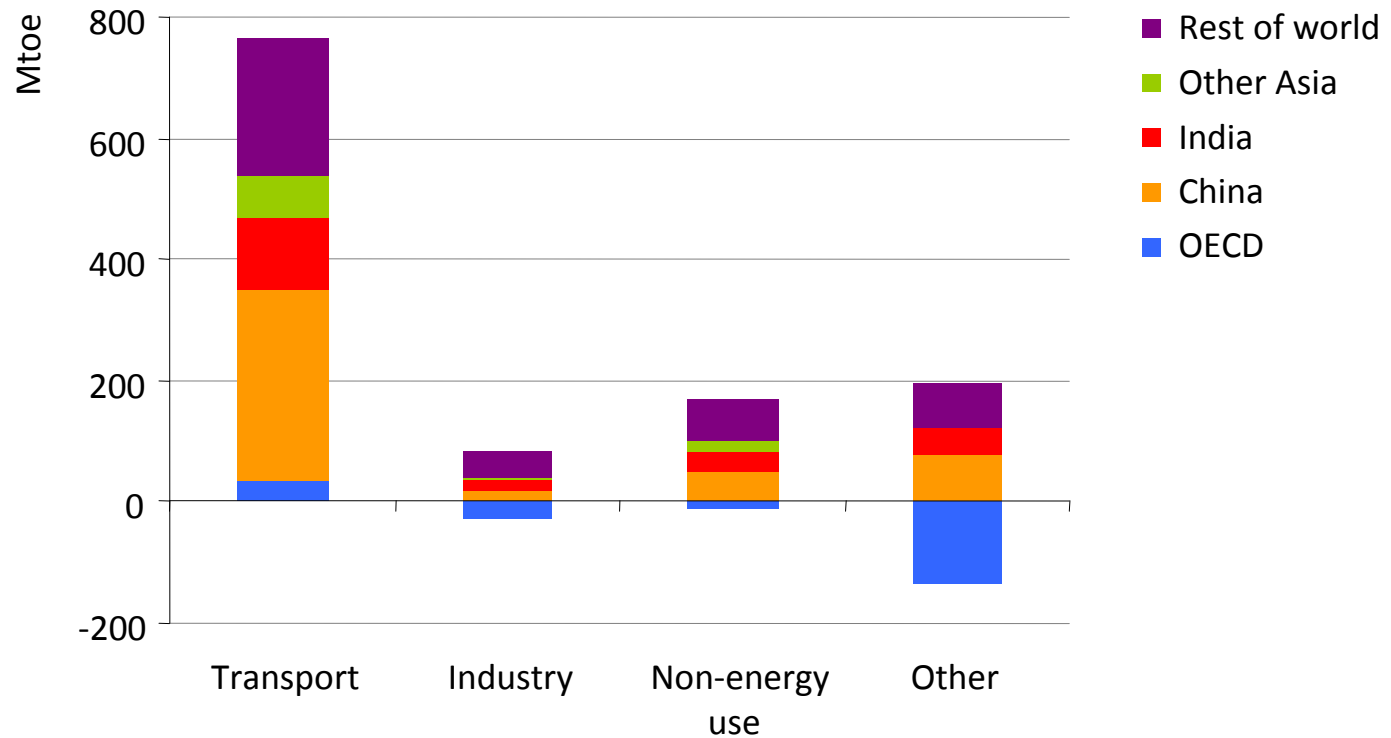
International Energy Agency

IEA *Electric and Plug-in Hybrid Vehicle Roadmap* published October 2009



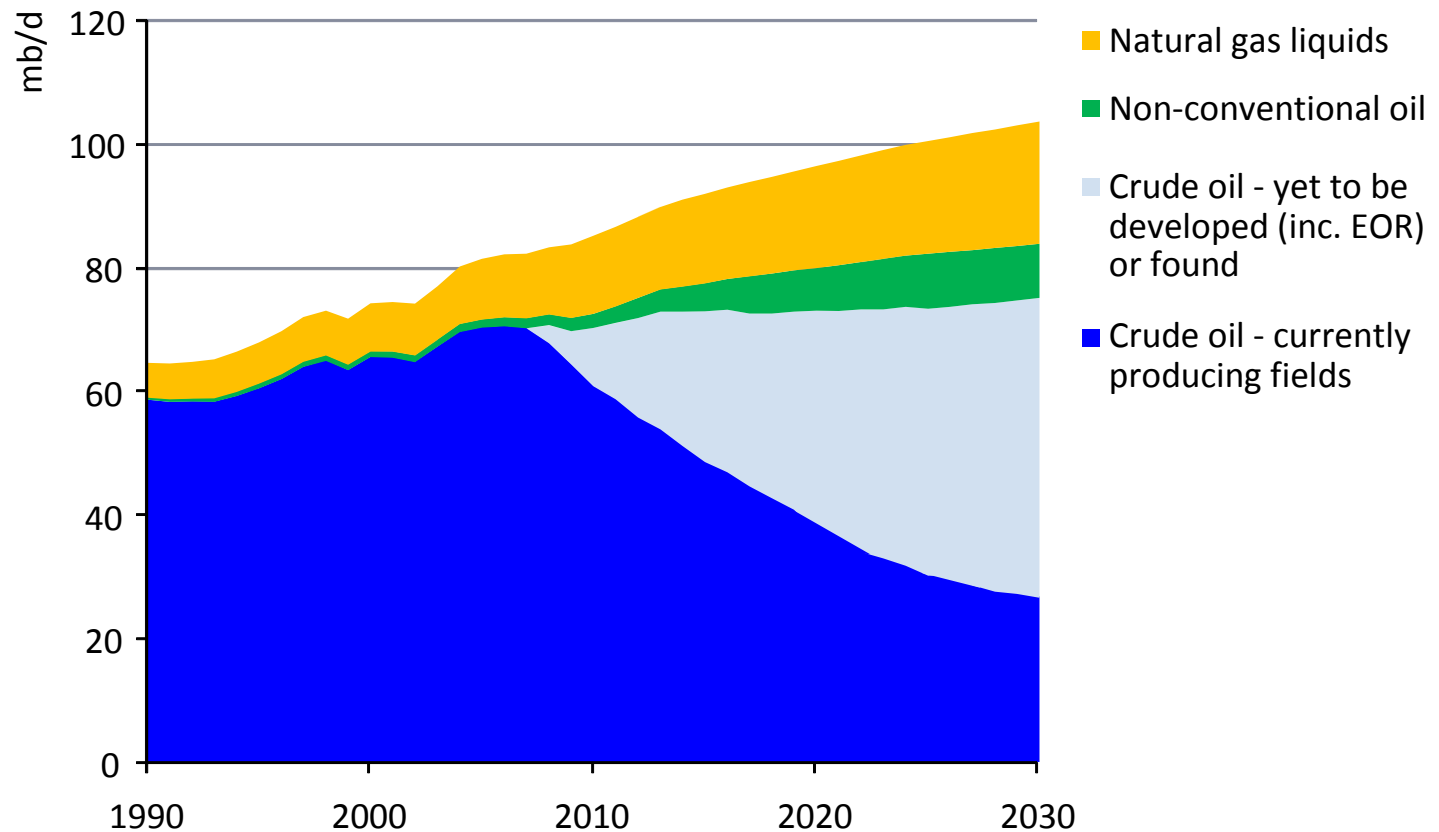


WEO 2008 Reference Scenario: Incremental oil demand, 2006-2030



***Around three-quarters of the projected increase in
oil demand comes from transportation***

World oil production by source in the Reference Scenario



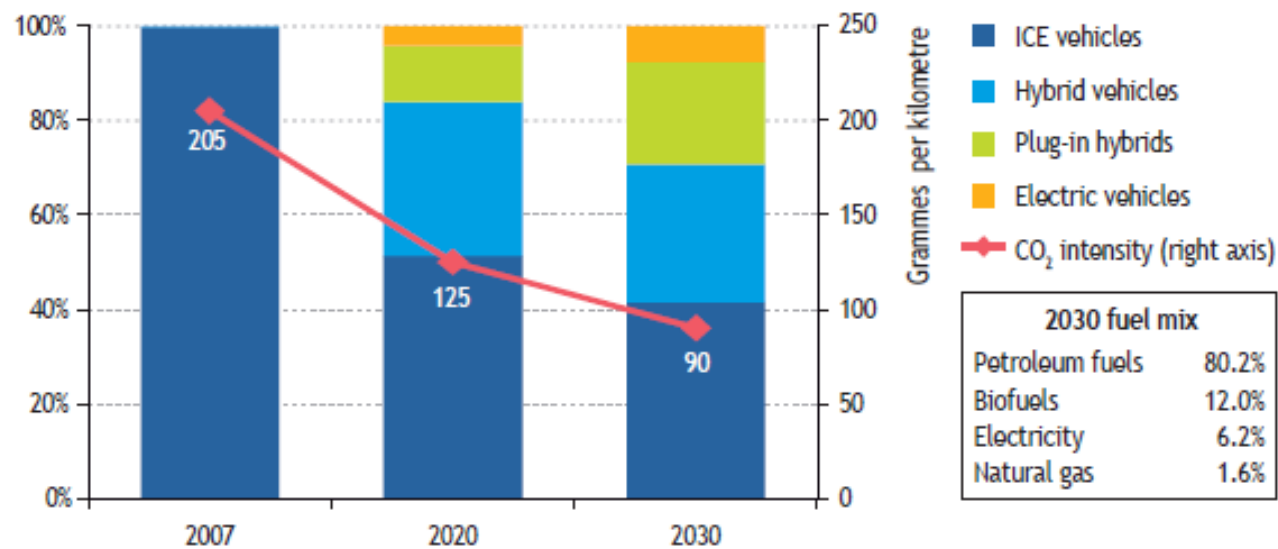
**64 mb/d of gross capacity needs to be installed between 2007 & 2030
– six times the current capacity of Saudi Arabia – to meet demand
growth & offset decline**

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WEO 2009 Excerpt – Passenger vehicles and fuels in 450 ppm scenario

Figure 5: World share of passenger vehicle sales by technology and average new vehicle on-road CO₂ intensity in the 450 Scenario



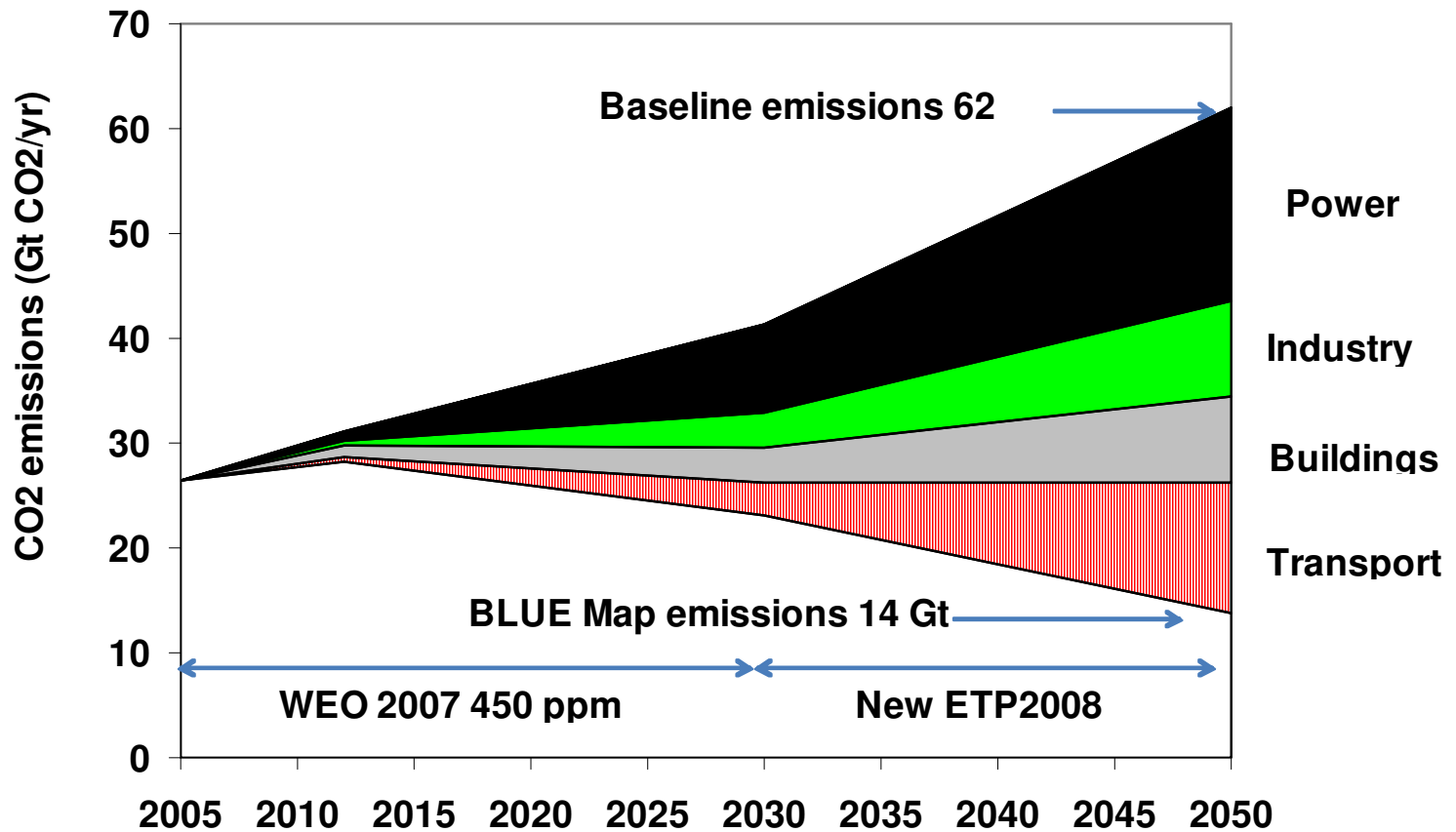
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We need a global 50% CO₂ cut by 2050

IEA ETP 2008: Where reductions come from

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How do we get there? The IEA ETP BLUE Map approach

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- 1. Achieve 50% reduction in new car fuel intensity by 2030**
 - Similar reductions in other modes
- 2. Widespread introduction of advanced technology vehicles by 2030, dominance by 2050**
 - Low GHG electricity/hydrogen must be widely available by 2030
- 3. Use of advanced biofuels to the extent possible given sustainability constraints**
 - Land use change, food security key issues
- 4. Modal shift to more efficient modes**
 - 25% reduction in growth of cars/air travel by 2050



Book: Key Findings

- **Baseline (WEO Reference Case) transport fuel use 80% higher by 2050; a new High Baseline reaches 25% higher energy use in 2050**
 - **Mainly dependent on car sales projections and freight sensitivity to economic growth**
- **Fuel economy improvement remains among most cost-effective measures**
 - **Can reach 50% improvement for LDVs and 30-50% for other modes by 2050 or before**
- **Alt fuels still critical, though biofuels concerns growing; electrification may be key**
 - **Biofuels still important but concerns about sustainability are growing; a roadmap for achieving 2050 levels in BLUE is needed**
 - **Costs for batteries and fuel cells are dropping; EVs may reach commercial production very soon**
 - **PHEVs appear to be a promising transition strategy**

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Key Findings (cont.)

- **Additional reductions can come from changes in the nature of travel**
 - **Modal shift analysis suggests that a 25% reduction from 2050 Baseline is feasible (almost 50% compared to High Baseline), though more work is needed on the costs and policies to get there**
 - **Technologies such as Bus Rapid Transit will be important, but ultimately its about land use planning and a comprehensive approach to travel policies.**
- **Together modal shift, efficiency improvements and alt fuels could cut transport CO2 by 70% compared to baseline in 2050 (30% below 2005)**
 - **More technology cost work is needed for aviation and shipping, but initial assessment suggests that many relatively low cost opportunities may be available.**
 - **For LDVs, 80% reduction in CO2 by 2050 at under 200 USD/tonne in that year**

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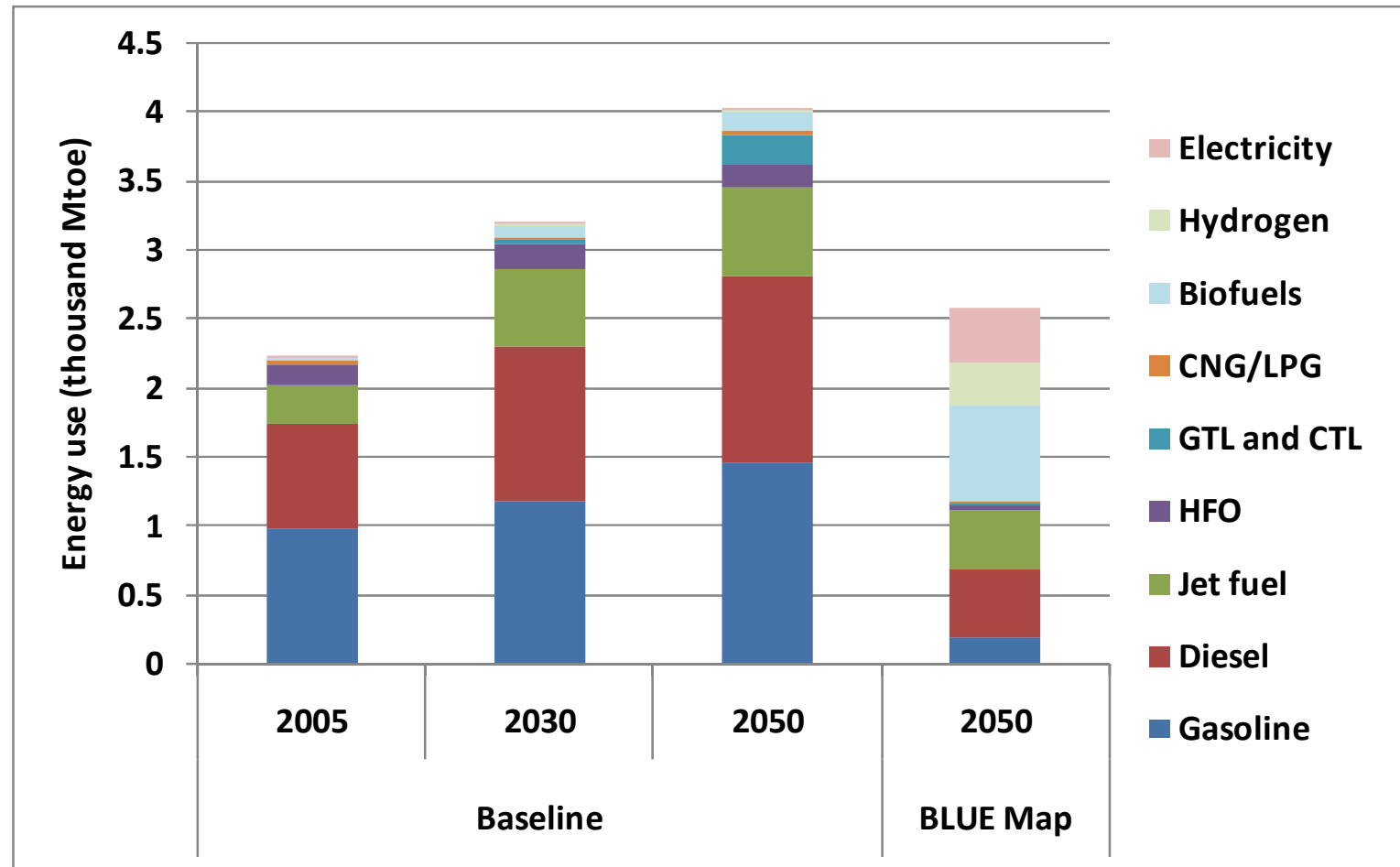
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ETP Transport Energy use by scenario

In BLUE Map, transport energy use returns nearly to 2005 level, with more than 50% very low CO₂ fuels

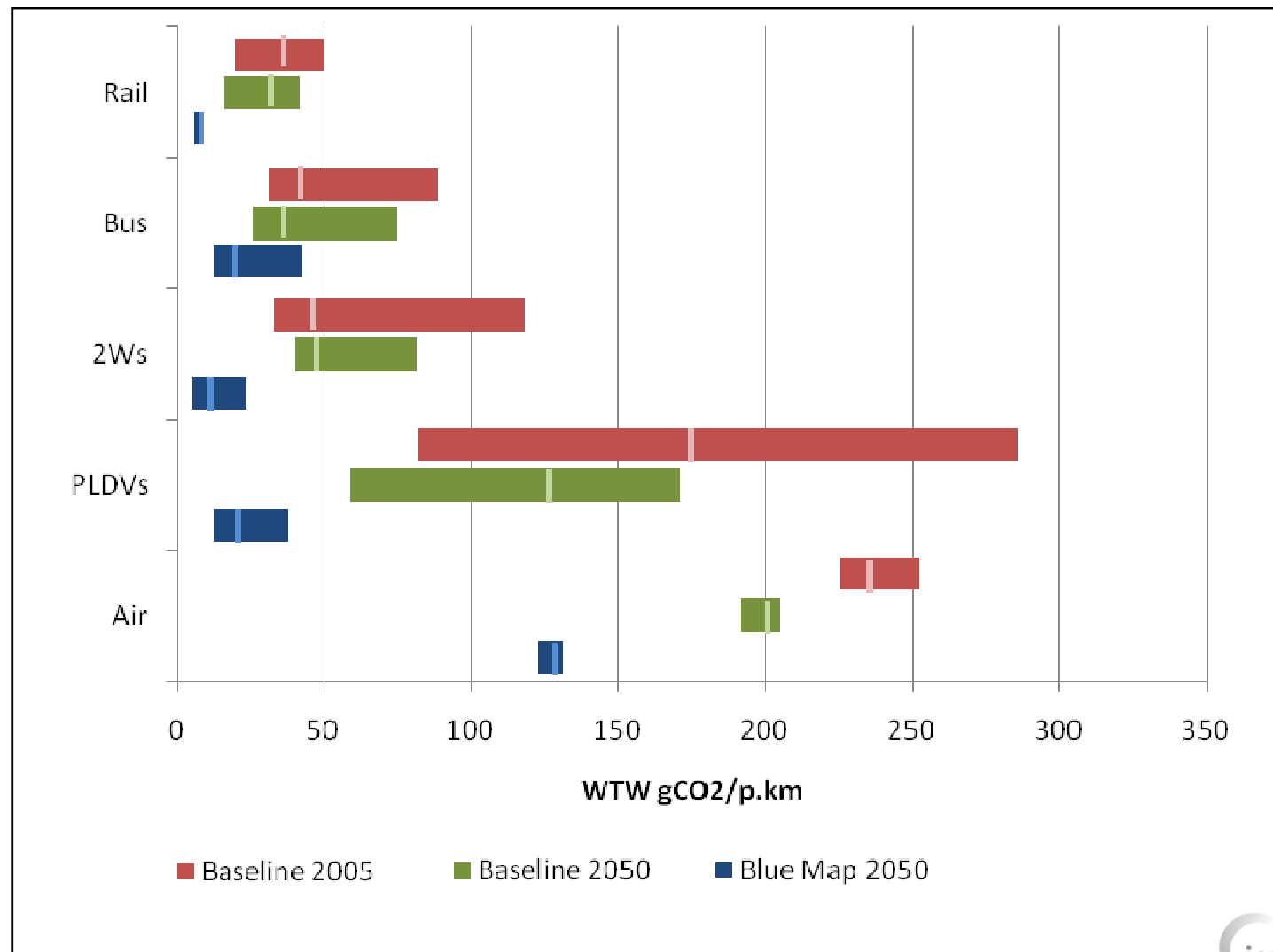


BLUE Map – Strong Technology Penetration GHG intensity by mode and scenario

Through a combination of efficiency and fuel switching, surface modes become extremely low CO₂ by 2050 in BLUE

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Transport Sector Emissions Reductions in BLUE Map

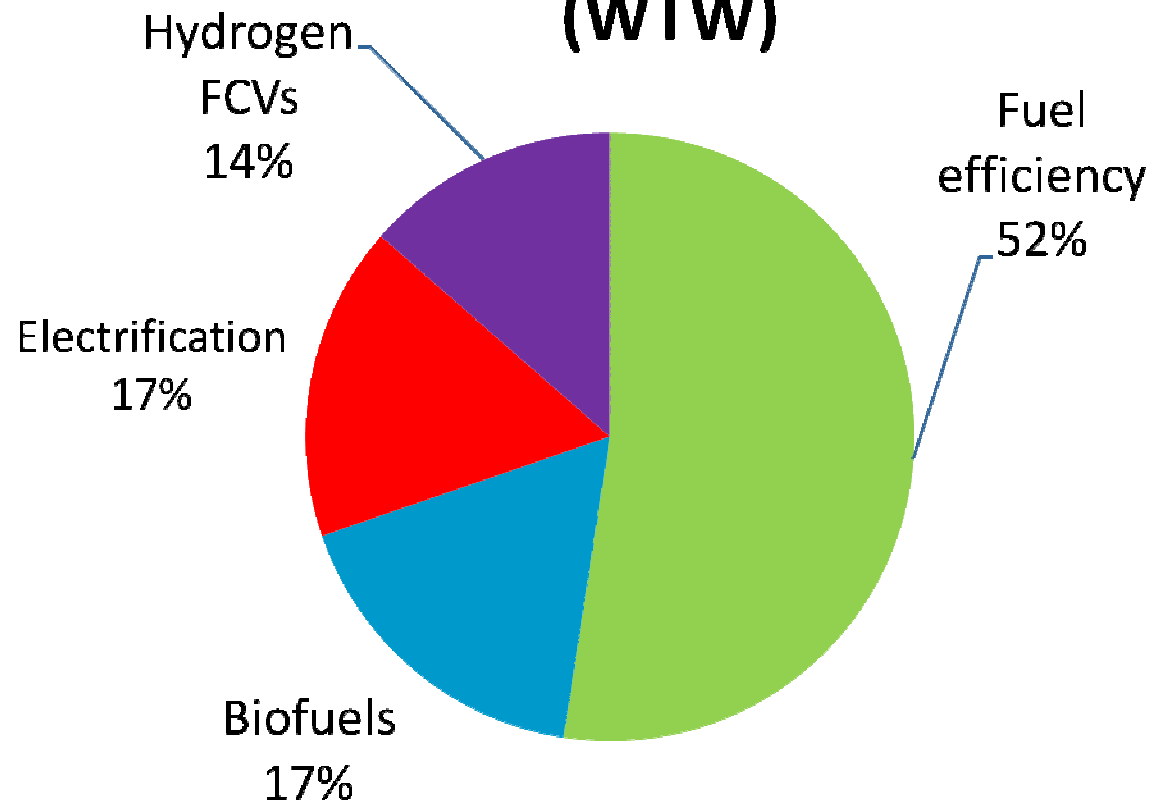
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BLUE Map 12.5 Gt CO₂ reduction (WTW)



BLUE Map transport CO₂
-30% in 2050, compared to 2005

IEA work on vehicle efficiency

Linked to the Global Fuel Economy Initiative (GFEI)

- Launched on 4 March 2009 in Geneva by IEA, ITF, UNEP, and the FIA Foundation



- GOAL: reduction in fuel consumption per km of 50% by 2050 (for the vehicle stock) compared to 2005
- Roughly equivalent to an implementation of a 50% improvement by 2030 for new sales, worldwide
- Four main activity areas:
 - Analysis of global fuel economy trends and potential
 - Outreach to governments, assistance in policy development
 - Outreach to stakeholders, dialogue to improve coordination
 - Information campaigns



GFEI “50-by-50” Targets

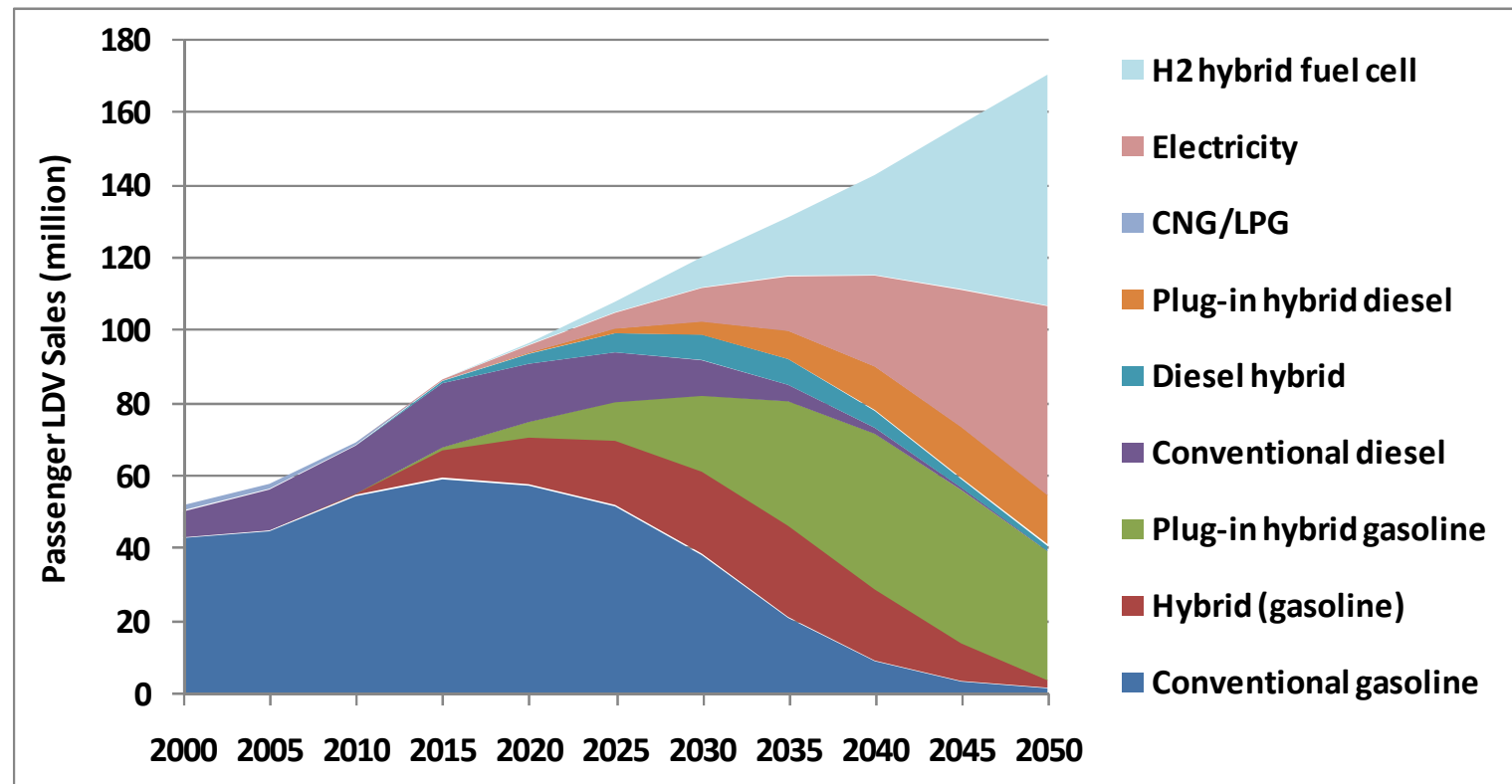
- IEA is a partner in the Global Fuel Economy Initiative
- This targets a 50% improvement worldwide in new car fuel economy by 2030, and in the stock of all cars by 2050 (50-by-50).
- Most countries (especially non-OECD) need to step up efforts to get on track to meet these critical targets for cutting CO2 and saving oil
- An IEA priority is to improve data and better track fuel economy in non-OECD countries

Fuel economy improvement targets (in L/100 km), worldwide

	2020	2030	2050
New cars	30%	50%	50% +
	Existing technologies including hybridization; Electric vehicles and plug-in hybrids can help, but not required to meet targets		Additional improvements (e.g. from EVs) increasingly necessary
Stock of all cars	20%	35%	50%
	Some lag time for stock-turnover, partly balanced (in early years) by measures like eco-driving, improved tyres and vehicle maintenance		Goal of the initiative

IEA ETP BLUE Map: advanced technologies must play a major role

Unprecedented rates of change in market penetration of advanced technologies



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IEA Electric and Plug-in Hybrid Vehicle Roadmap

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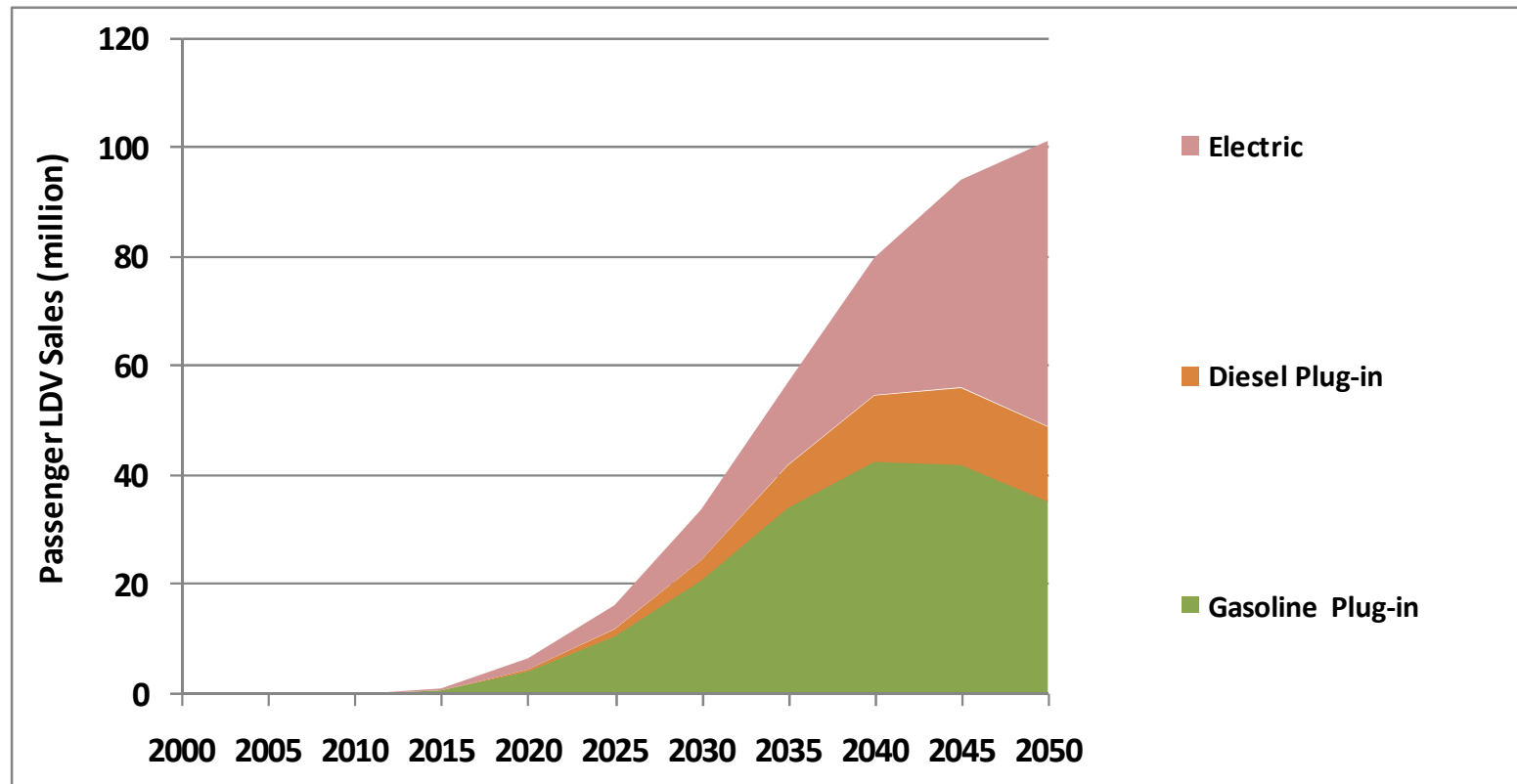
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- **In response to Hokkaido G8 request, IEA/SPT is developing roadmaps for 20+ major technologies**
 - **Gather stakeholders in workshops to develop a common view on how an EV/PHEV “roll-out” could occur over next 10-20 years**
 - **Identify key targets, pathways, near-term actions for governments, stakeholders**
 - **Understand where international collaboration/coordination is needed**

- **Roadmap published October 2009, free download at www.iea.org**

BLUE Map EV/PHEV sales trajectory to 2050

How can we achieve this?



Annual sales targets:

2020: 7 million: e.g. 70 models selling 100,000 each

2030: 30 million: e.g. 150 models selling 200,000 each

2050: 100 million: e.g. 400 models selling 250,000 each

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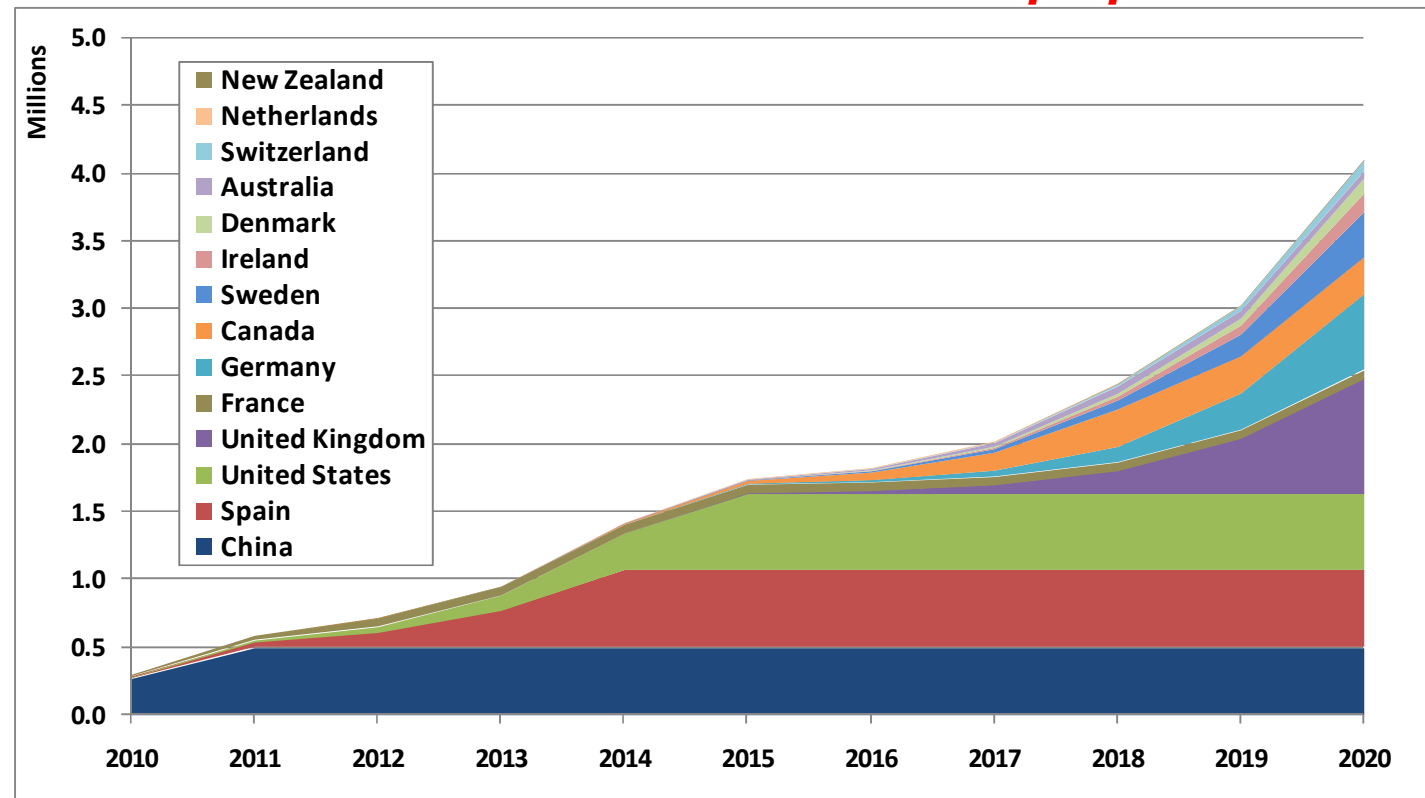
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Announced national targets for EV/PHEV sales – not far behind

As of September 2009. Combined, the total reaches 4 million by 2020;

*However if EV/PHEV sales in each country continue to grow beyond when each target is met, and other countries also set and achieve targets, global sales levels could be far higher in 2020 than shown here. **Are manufacturers prepared for this?***



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Roadmap key findings

- **EVs and PHEVs are expected to provide large private and social benefits, in particular in reducing oil use, GHG emissions and pollutant emissions**
- **The worldwide target for combined EV and PHEV sales share of LDVs should be at least 7% in 2020 (about 5 million) and 50% by 2050 (80 million).**
- **Near term time-line:**
 - **Testing, small scale production, optimisation of vehicle designs should occur during 2010-2012**
 - **Model deployment and moderate levels of production, 2012-2015**
 - **Rapid introduction of models and scale up of production (toward 100,000 per model) will be needed from 2015, in order to hit 2020 targets.**
- **Very important to get battery costs down to USD 300/kWh for EVs by 2015**
 - **Battery durability and life-spans must be adequate**
- **From 2012 (or earlier), coordinated development of infrastructure, perhaps focusing on a number of large metropolitan areas to begin with**

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Roadmap key findings (cont).

- **Strong support needed from national and local governments:**
 - Ensure necessary standards are in place
 - Coordinate vehicle sales, recharging infrastructure investments
 - Use a comprehensive mix of policies that leverage stakeholder interests; probably will need to include EV/PHEV purchase incentives for some years
 - Take measures to reduce risks to manufacturers and battery suppliers
 - Foster research, development and demonstration (RD&D) to reduce costs and resource-related issues, especially on energy storage and smart grid technology.
- **Automakers must develop viable business models – need good understanding of consumer preferences**
- **Role for international collaboration**
 - Coordinating and sharing research
 - Setting standards, targets
 - Help coordinate national roll-out efforts and avoid bottlenecks
 - Monitor and periodically report on progress
- **This Roadmap strongly encourages stakeholders to continue to work with the IEA in an on-going fashion to implement the roadmap and monitor progress.**

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What could a WP-29 Roundtable Cover?

- **Optimal time-phased approach to introducing technology**
- **What fuel economy improvements after 50% is reached?**
- **Future FE testing systems/testing in non-car-producing countries/alignment of fuel economy standards**
- **Intermodal: how much modal shift is realistic (truck/rail, air/rail, etc.)**
- **Analysis of infrastructure requirements/costs**

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