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Data and Modelling for Transport, and Thoughts on Data Collection Needs

Presentation

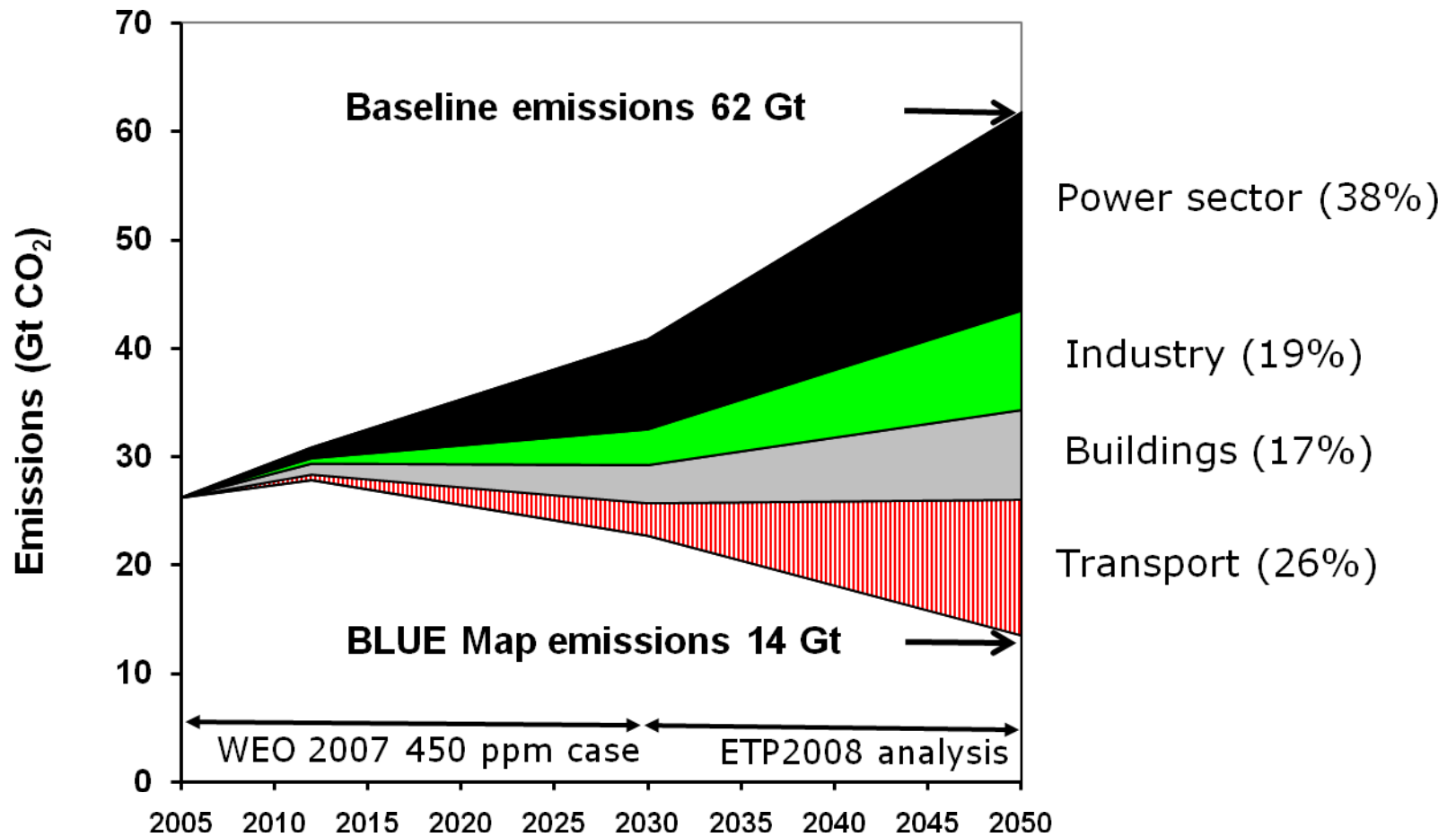
MEET Follow up Meeting
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IEA ETP 2008 50% Global CO₂ reduction by 2050





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Initial Considerations

- We will need to ***avoid/shift/improve***
 - ◆ A top priority is to design and build low-carbon cities
 - ◆ Vehicle efficiency has great low-cost potential
 - IEA made 4 transport efficiency recommendations to the Hokkaido G8
 - ◆ Should encourage people to travel on most efficient modes
 - ◆ Transition to some combination of electricity, biofuels, H2 will probably be needed – but many pitfalls
- Moving toward encouraging effective policy packages, e.g. via NAMAs
- We will need to track progress and measure the effectiveness of policies

FOR ALL THIS WE NEED GOOD DATA!



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Transport data: a multi-dimensional issue

- Urban / inter-urban / rural
- Passenger / freight
- Specific modes
- Local/regional/national/international
- Different aspects
 - ◆ ASIF and GHG-related data
 - ◆ Co-benefit data
 - ◆ Cost / finance data
 - ◆ Demographic aspects
 - ◆ Policy impacts



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What is the Mobility Model?

- MoMo is an IEA spreadsheet model of global transport, energy use, emissions, safety, and materials use
 - ◆ analysis of a multiple set of scenarios, projections to 2050
 - ◆ Based on hypotheses on GDP and population growth, fuel economies, costs, travel demand, vehicle and fuel market shares
- World divided in 11 regions, plus a good number of specific countries (for LDVs only, being extended to other modes)
 - ◆ USA, Canada, Mexico, Brazil, France, Germany, Italy, UK, Japan, Korea, China, India
 - ◆ The model is suitable for handling regional and global issues
- It contains a large amount of information (data) on technologies and fuel pathways
 - ◆ full evaluation of the life cycle GHG emissions
 - ◆ cost estimates for new light duty vehicles
 - ◆ estimates for fuels costs and taxes
 - ◆ section on material requirements for LDV manufacturing
- It is based on the "ASIF" framework:
$$\text{Activity (passenger travel)} * \text{Structure (travel by mode, load factors)} * \text{Energy Intensity} = \text{Fuel use}$$



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IEA Mobility Model Follows the ASIF structure

A Average travel = Activity [km]

I Specific consumption = Intensity $\left[\frac{\text{Joules}}{\text{km}}\right]$

S Vehicle stock = Structure [1]

F Energy use = Fuel [Joules]

$$(\text{Energy use})_m = \sum_{\substack{k=\text{vehicle type} \\ j=\text{immatriculation year}}} (\text{Specific consumption})_{k,j} (\text{Vehicle})_{k,j} (\text{Average travel})_{k,j}$$

- Following the ASIF requirements, we focused on **sales, stocks, fuel economies and travel**, aiming to explain the total **energy use** and **GHG emissions**
- This determines our primary data requirements
- Most of the data we have looked for to date concern **road vehicles (cars and trucks)**



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IEA data

- The IEA has a mandate to collect energy statistics in OECD countries
- The IEA collects additional information on energy supply and demand in the non-OECD
- The IEA also collects sectoral data
 - ◆ Led by IEA Statistics office, but other offices help
- In the case of transport, the IEA Mobility Model and its related databases contain most of the transport-relevant information collected by the Agency



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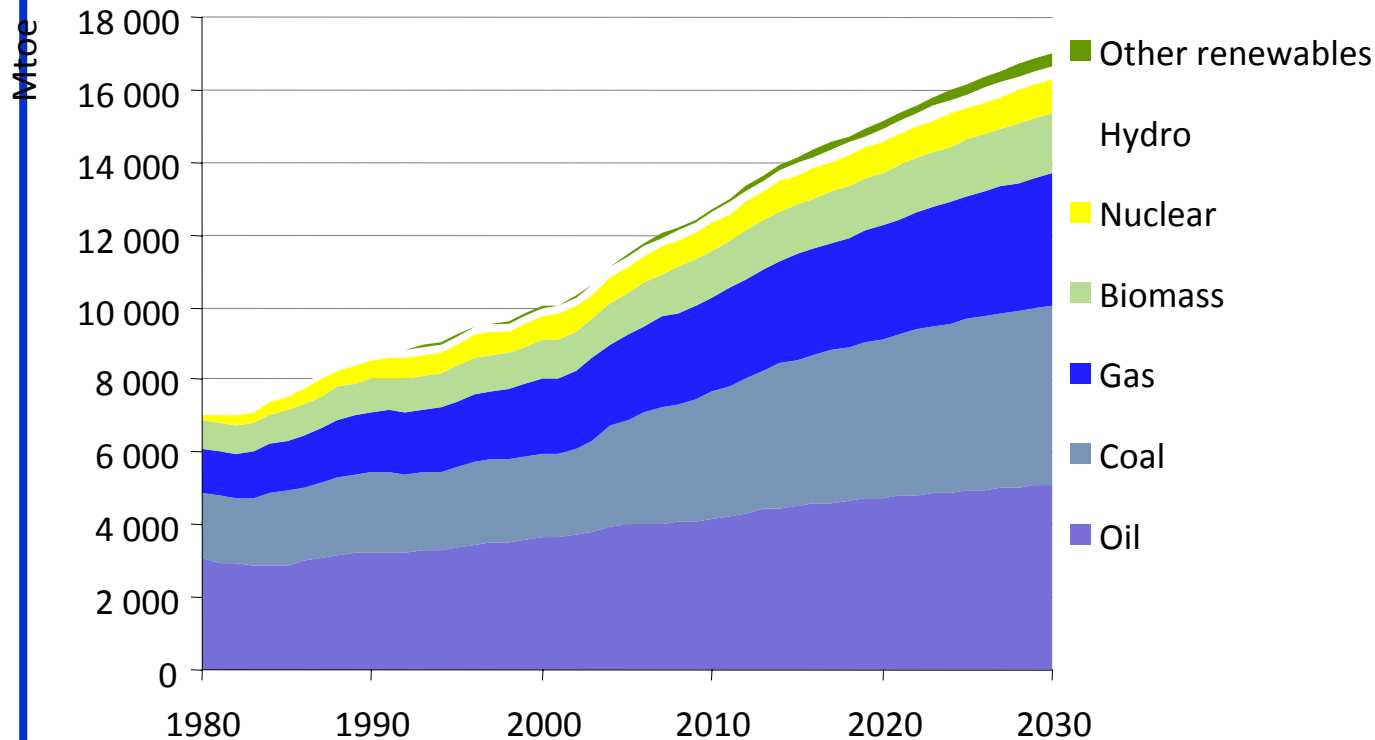
IEA: secondary data collector

- Usually we gather and “assemble” data and information already collected by others (primary or secondary data providers):
- We do not carry out surveys ourselves (except surveying governments on energy use statistics)
- We do our best to ensure data quality and consistency
 - ◆ Our final check is the need to be able to explain the total fuel consumption in a given country/region



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World primary energy demand in the Reference Scenario: this is unsustainable!



World energy demand expands by 45% between now and 2030 – an average rate of increase of 1.6% per year – with coal accounting for more than a third of the overall rise



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Global Fuel Economy Initiative IEA, ITF, UNEP, FIA Foundation

- IEA and its partners are soon launching a “Global Fuel Economy Initiative: Making cars 50% more fuel efficient by 2050 worldwide”
- This initiative features four key elements:
 - ◆ Data development and analysis of fuel economy potentials by country, region
 - ◆ Support for national and regional policy-making efforts
 - ◆ Outreach to stakeholders (e.g. vehicle manufacturers)
 - ◆ Information campaigns around the world to educate consumers, stakeholders



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GFEI “50-by-50” Targets

- Main target is for 2050, interim targets as well, including a 30% improvement by 2020 compared to 2005
- Most OECD countries on track to meet this initial target
- A priority is to improve data and better track fuel economy in non-OECD countries

Fuel economy improvement targets (in L/100 km)

	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		Main goal of the initiative



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What do we need, how do we get it?

- Want to completely fill the ASIF equation
- From passenger perspective:
 - ◆ Info on availability of travel options
 - ◆ Modal split of travel by demographic group
 - ◆ Vehicle ownership by vehicle type and demographic
- From a vehicle perspective:
 - ◆ Vehicle sales and stocks (all vehicle types)
 - ◆ Average travel and load factors per vehicle
 - ◆ Scrappage distribution
 - ◆ Fuel type/energy intensity of sales and stock
 - ◆ Pollutant emissions (CO, VOCs, PM, lead and NOx) per km
 - ◆ Fuel and vehicle costs
 - ◆ Infrastructure data (roadway extent, facilities for walking/cycling etc.)

Most of this data is difficult to get for most non-OECD countries



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What we can get (sometimes)

- National Statistics can be reliable for:
 - ◆ Population, Incomes, fuel prices
 - ◆ Fuel use in broad categories
 - ◆ Vehicle registrations
 - Typical problem is that old vehicles are over-represented
- Municipalities often have data on:
 - ◆ Travel mode shares for trips and/or travel
 - ◆ Availability and extent of transit systems, etc.
 - ◆ Efficiency data for public modes (e.g. buses)

Data tends to be spotty, non-comparable



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What else we could get, and how

- Travel patterns and choices by location/demographic (household characteristics)
 - ◆ Annual travel by purpose/mode covering all types of travel
 - ◆ Explanatory data on location, income, car ownership, travel choices available, etc.
 - ◆ Stated preference on how travel choices might change if new alternatives were available
- For this type of data a **national household travel** survey would be very useful
 - ◆ Perhaps every 3 years would be sufficient
 - ◆ Could be patterned after US, European surveys
 - ◆ Cost?



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What else (cont.)

- Details on national vehicle stock and characteristics
 - ◆ Distribution by vehicle size, type
 - ◆ Age distribution of the fleet
 - ◆ Average travel by vehicle type and age
 - ◆ Tested and actual in-use fuel economy
- **Traffic observation survey work**
 - ◆ Collect sample data on all types of vehicles in use around a country (need scientifically designed, sufficiently large sample)
 - ◆ Can collect vehicle location, type, name plate, age, odometer readings, driver-stated fuel efficiency (or travel diary approach, or mobile equipment monitoring approach)
 - ◆ If enough details available about model (e.g. engine size, trim level), can cross check with other sources to derive tested fuel economy, technologies on vehicle, etc.

Cost? Very dependent on specific approach



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How to approach this?

- Come up with a “grand plan” that is affordable and can be carried out by countries in a reasonable time frame, with reasonable intermittency
- Common methodology that countries can use around the world
- Consistency in timing and publication of data and analysis
- International coordination and systematic, long-term funding support

Something to discuss!