

GTI Meeting

Paris, France, 2 May 2011



**International
Energy Agency**

Overview of IEA Transport Data

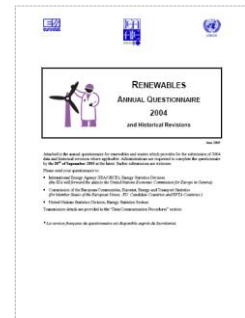
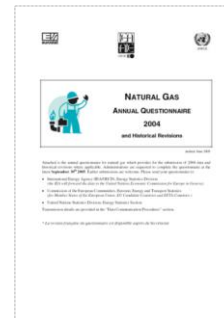
**Lew Fulton, Francois Cuenot, Tali Trigg,
Jean-Yves Garnier
International Energy Agency**

www.iea.org

How the IEA collects its annual consumption data on transport for OECD countries

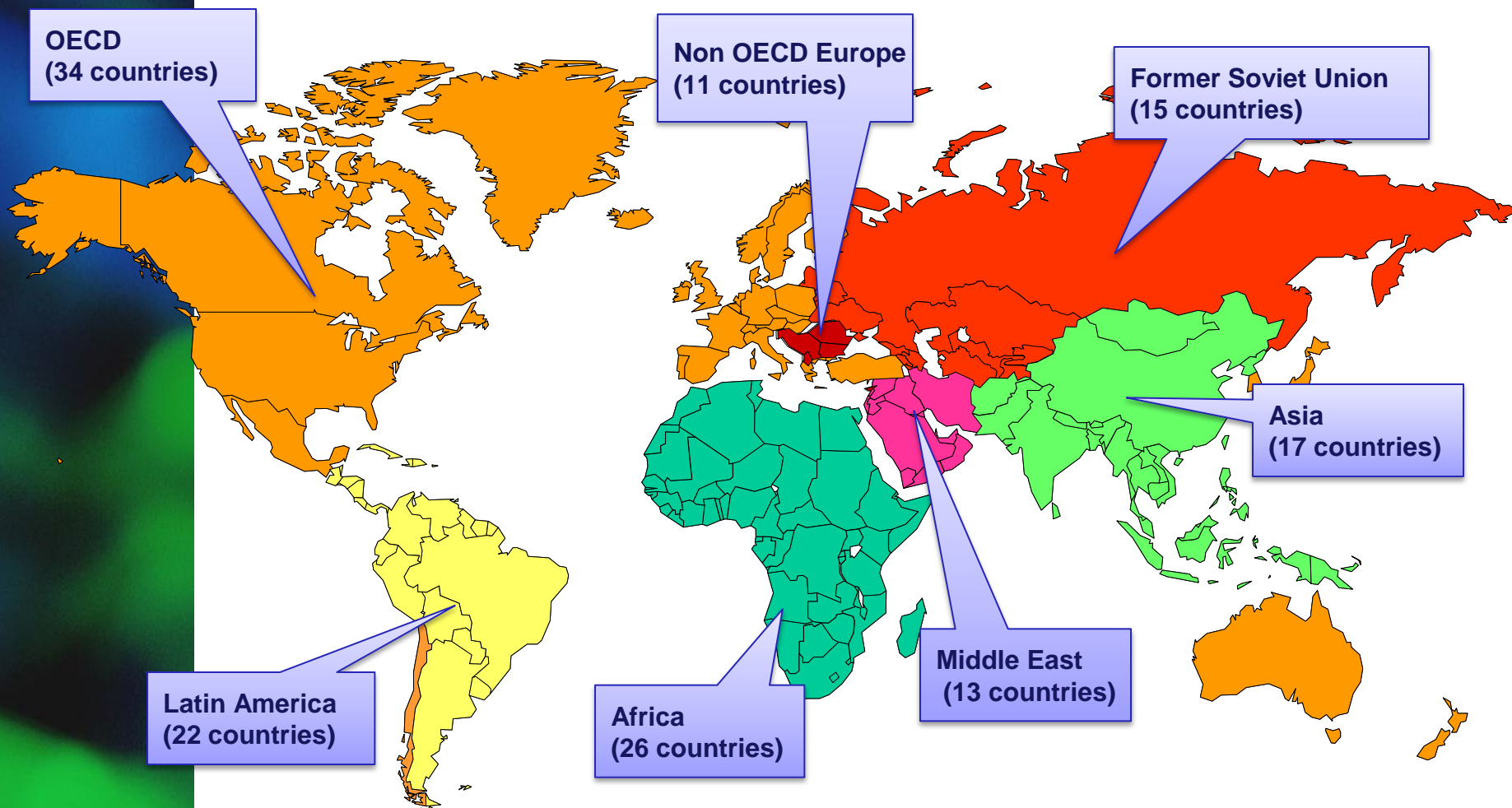


Five Annual Energy Questionnaires



		Motor Gasoline	Of which Biogasoline	Aviation Gasoline	Gasoline Type Jet Fuel	Kerosene Type Jet Fuel	Other Kerosene	Gas-Diesel Oil	Transport Diesel	Of which Biodiesels	Heating and Other Gasoil
		G	H	I	J	K	L	M	N	O	P
Total Final Consumption	25										
Transport Sector	26										
International Aviation	27										
Domestic Aviation	28										
Road	29										
Rail	30										
Domestic Navigation	31										
Pipeline Transport	32										
Non-specified (Transport)	33										

Current Supply/Demand Coverage by the IEA



Energy Balance

Thousand tonnes of oil equivalent / Milliers de tonnes d'équivalent pétrole									
SUPPLY AND CONSUMPTION	Coal	Crude Oil	Petroleum Products	Gas	Nuclear	Hydro	Geotherm. Solar etc.	Combust. Renew. & Waste	Electricity
APPROVISIONNEMENT ET DEMANDE	Charbon	Pétrole brut	Produits pétroliers	Gaz	Nucléaire	Hydro	Géotherm. solaire	Comb. ren. & déchets	Electricité
Production	1145355	181427	-	42621	13835	34143	-	223561	-
Imports	14893	126817	41493	-	-	-	-	-	431
Exports	-55279	-8067	-16722	-2484	-	-	-	-	-963
Intl. Marine Bunkers	-	-	-7642	-	-	-	-	-	-
Stock Changes	-17345	788	288	-	-	-	-	-	-
TPES	1087624	300965	17417	40137	13835	34143	-	223561	-532
Transfers	-	-74	88	-	-	-	-	-	-
Unallocated Differences	7118	-1328	917	-1137	-	-	-	-	-
Plants	-527596	-213	-15059	-2637	-13835	-34143	-	-861	214780
Refineries	-71089	-3	-2672	-1938	-	-	-	-503	-
Information	-6640	-	-144	4841	-	-	-	-	-
Plants	-69485	-290405	283439	-	-	-	-	-	-
Information	-46624	-	-	-	-	-	-	-	-
Losses	-	-	-	-	-	-	-	-	-28398
TPES	373308	-	-	-	-	-	-	-14494	171355
SECTOR	279763	-	-	-	-	-	-	222197	116217
Petrochemical	102809	-	-	-	-	-	-	-	21882
Metals	28095	-	-	-	-	-	-	-	21588
Minerals	8147	-	-	-	-	-	-	-	12639
Equipment	85282	-	-	-	-	-	-	-	12179
Quarrying	3225	-	-	-	-	-	-	-	2580
Quarrying	9117	-	-	-	-	-	-	-	13801
Quarrying	3628	-	-	-	-	-	-	-	978
Quarrying	11818	-	-	-	-	-	-	-	303
Quarrying	854	-	-	-	-	-	-	-	4337
Paper Pulp and Printing	-	-	761	65	-	-	-	-	4123
Wood and Wood Products	1870	-	268	14	-	-	-	-	1977
Construction	3200	-	4161	125	-	-	-	-	2373
Textile and Leather	9378	-	1572	64	-	-	-	-	15768
Heat Generated - TJ	2091954	-	94145	90203	-	-	-	-	12045
CHP Plants	-	-	-	-	-	-	-	-	-
Heat Plants	2091954	-	94145	90203	-	-	-	-	12645

No breakdown by transport mode:

- motorcycle
- light com. vehicle
- rigid truck
- articulated truck
- bus...

No activity data on passenger-km or on tonne-km, no data on vintage, ownership, ...

What most countries collect on a regular basis is limited to aggregated levels

TRANSPORT SECTOR	4080	-	108334	79	-	-	-	-	1737	-	114230
International Aviation	-	-	2095	-	-	-	-	-	-	-	2095
Domestic Aviation	-	-	7566	-	-	-	-	-	-	-	7566
Road	-	-	75670	70	-	-	-	-	-	-	75740
Rail	4079	-	9129	-	-	-	-	-	1737	-	14944
Pipeline Transport	-	-	4627	9	-	-	-	-	-	-	4636
Domestic Navigation	1	-	9247	-	-	-	-	-	-	-	9248
Non-specified	1	-	-	-	-	-	-	-	-	-	1

A NEW QUESTIONNAIRE ON ENERGY EFFICIENCY WAS THEN DESIGNED AND APPROVED BY ENERGY MINISTERS



Draft Energy Efficiency Indicators Template country name

COUNTRY DATA SECTION (to be reviewed and updated)

MACRO ECONOMIC DATA	Macro economic and activity data
COMMODITIES	Production outputs from selected energy-consuming industries
INDUSTRY	Energy consumption by ISIC categories
SERVICES	Energy consumption by end-uses in the services sector
RESIDENTIAL	Household energy consumption by end-uses and selected appliances data
TRANSPORT	Energy and activity data for passenger and freight transport

IEA DATA and AGGREGATE INDICATORS

ELECTRICITY GENERATION	Electricity generation from combustible fuels and efficiencies
BASIC INDICATORS	Predetermined set of aggregate energy and activity indicators

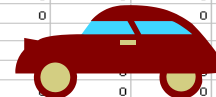
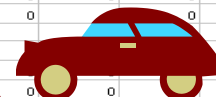
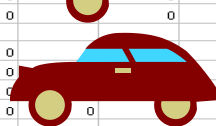
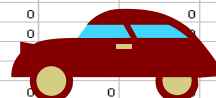
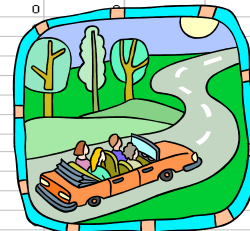
SUPPORT TOOLS

USER REMARKS	To incorporate comments associated to the data from the individual sheets
DATA COVERAGE	Generates a graphical summary of data coverage (completed vs. expected)
SINGLE INDICATOR GRAPHS	To generate a graph for one energy indicator
MULTIPLE INDICATORS GRAPHS	To generate a graph comparing trends from multiple indicators
CONSISTENCY CHECKS	To run the integrated consistency checks

The IEA Indicators Questionnaire

TRANSPORT

units		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Passenger transport [passenger-kilometres]																		
Cars, SUV and personal light trucks	10 ⁹ pass-km	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- gasoline (spark ignition) engine	10 ⁹ pass-km	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- diesel (compression ignition) engine	10 ⁹ pass-km	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Motorcycles (2 wheelers) & 3 wheelers	10 ⁹ pass-km	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buses	10 ⁹ pass-km	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Passenger Trains	10 ⁹ pass-km	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Domestic passenger airplanes	10 ⁹ pass-km	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Domestic passenger ships	10 ⁹ pass-km	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freight transport [tonne-kilometres]																		
Freight & Commercial road transport	10 ⁹ tonnes-km	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- gasoline (spark ignition) engine	10 ⁹ tonnes-km	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- diesel (compression ignition) engine	10 ⁹ tonnes-km	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freight trains	10 ⁹ tonnes-km	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Domestic freight airplanes	10 ⁹ tonnes-km	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Domestic freight ships	10 ⁹ tonnes-km	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freight transport [tonnes]																		
Freight & Commercial road transport	10 tonnes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- gasoline (spark ignition) engine	10 tonnes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- diesel (compression ignition) engine	10 tonnes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freight trains	10 tonnes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Domestic freight airplanes	10 tonnes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Domestic freight ships	10 tonnes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vehicle kilometres																		
Cars, SUV and personal light trucks	1 m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- gasoline (spark ignition) engine	10 ⁹ vkm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- diesel (compression ignition) engine	10 ⁹ vkm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Motorcycles (2 wheelers) & 3 wheelers	1 m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buses	1 m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Passenger Trains	1 m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Domestic passenger airplanes	1 m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Domestic passenger ships	1 m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freight & Commercial road transport	1 m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- gasoline (spark ignition) engine	1 m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- diesel (compression ignition) engine	1 m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freight trains	10 ⁹ vkm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Domestic freight airplanes	10 ⁹ vkm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Domestic freight ships	10 ⁹ vkm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vehicle stocks (number of vehicles in use)																		
Cars, SUV and personal light trucks	10 ⁶	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- gasoline (spark ignition) engine	10 ⁶	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- diesel (compression ignition) engine	10 ⁶	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Motorcycles (2 wheelers) & 3 wheelers	10 ⁶	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buses	10 ⁶	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Passenger Trains	10 ⁶	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Domestic passenger airplanes	10 ⁶	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Domestic passenger ships	10 ⁶	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freight & Commercial road transport	10 ⁶	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- gasoline (spark ignition) engine	10 ⁶	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- diesel (compression ignition) engine	10 ⁶	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freight trains	10 ⁶	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Domestic freight airplanes	10 ⁶	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Domestic freight ships	10 ⁶	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Coverage for IEA countries

Data need to develop indicators	Number of IEA member countries reporting the data
Energy consumption by:	
Total Passenger Consumption	26
By Transportation Mode	
<i>Cars, SUV and personal light trucks</i>	23
<i>Motorcycles and three-wheelers</i>	18
<i>Buses</i>	22
<i>Passenger train</i>	26
<i>Domestic passenger airplane</i>	24
<i>Domestic passenger ships</i>	5
Passenger-kilometres by:	
Cars, SUV and personal light trucks	26
Motorcycles and three-wheelers	6
Buses	26
Passenger train	26
Domestic passenger airplane	23
Domestic passenger ships	4
Vehicle Kilometres by:	
Cars, SUV and personal light trucks	25
Motorcycles and three-wheelers	15
Buses	20
Passenger train	3
Domestic passenger airplane	2
Domestic passenger ships	1
Vehicle stocks by:	
Cars, SUV and personal light trucks	27
Motorcycles and three-wheelers	25
Buses	26
Passenger train	0
Domestic passenger airplane	2
Domestic passenger ships	1

Note: 30 IEA countries coverage indicates the number of IEA member countries for which data are available for the 1990 to 2006 in the energy indicators database.

Data need to develop indicators	Number of IEA member countries reporting the data
Energy consumption by:	
Energy source	
Total Freight Transportation mode	26
<i>Freight and commercial road transport</i>	22
<i>Freight trains</i>	26
<i>Domestic freight airplanes</i>	5
<i>Domestic freight ships</i>	25
Freight tonne-kilometres by:	26
Freight and commercial road transport	25
Freight trains	26
Domestic freight airplanes	6
Domestic freight ships	24
Freight tonnes transport by:	
Freight and commercial road transport	6
Freight trains	5
Domestic freight airplanes	3
Domestic freight ships	3
Vehicle kilometres by:	
Freight and commercial road transport	21
Freight trains	3
Domestic freight airplanes	0
Domestic freight ships	0
Vehicle stocks by:	
Freight and commercial road transport	27
Freight trains	0
Domestic freight airplanes	0
Domestic freight ships	1

Checks and Quality Control

Annual Questionnaires

A thorough check procedure applies to all data received:

- Internal consistency checks
- Checks against sources
- Any major issue is queried with official contacts in countries

Energy Efficiency Template

Check procedures also apply to all data received:

- Internal consistency checks
- Checks against energy balance for consumption
- Any major issue is queried with official contacts in countries or ODYSSEE for EU countries

Access to Data

Annual Questionnaires: Available in several publications and databases



Energy Efficiency Template: Only available through indicators.



MoMo team data work

- Bottom-up approach, using the ASIF / PUCE methodology

Activity (passenger travel) * **S**tructure (travel by mode, load factors) * Energy **I**ntensity = **F**uel use

- Database contains, for road vehicles

- Stock number
- Sales number
- Used imports number
- Annual travel
- Average fuel economy
- Average Load factors

- Historical data goes down to the national level, annually collected

- Other data gathered

MoMo team data work

■ Road vehicles are divided into

● Vehicle Type

Passenger Vehicles					
	2&3 / 4 Wheelers				
		2 Wheelers			
		3 / 4 Wheelers			
	PLDVs				
		Passenger Cars			
		Passenger Light Trucks			
	Mass Transport				
		Minibuses			
		Buses			
		BRT			
Commercial Vehicles					
	3 / 4 Wheelers				
	LCVs				
	Medium trucks				
	Heavy trucks				

● Powertrain Type

ICEs
Hybrids
Plug-ins
Electric

MoMo team data work

- Road vehicles are divided into
 - Energy source

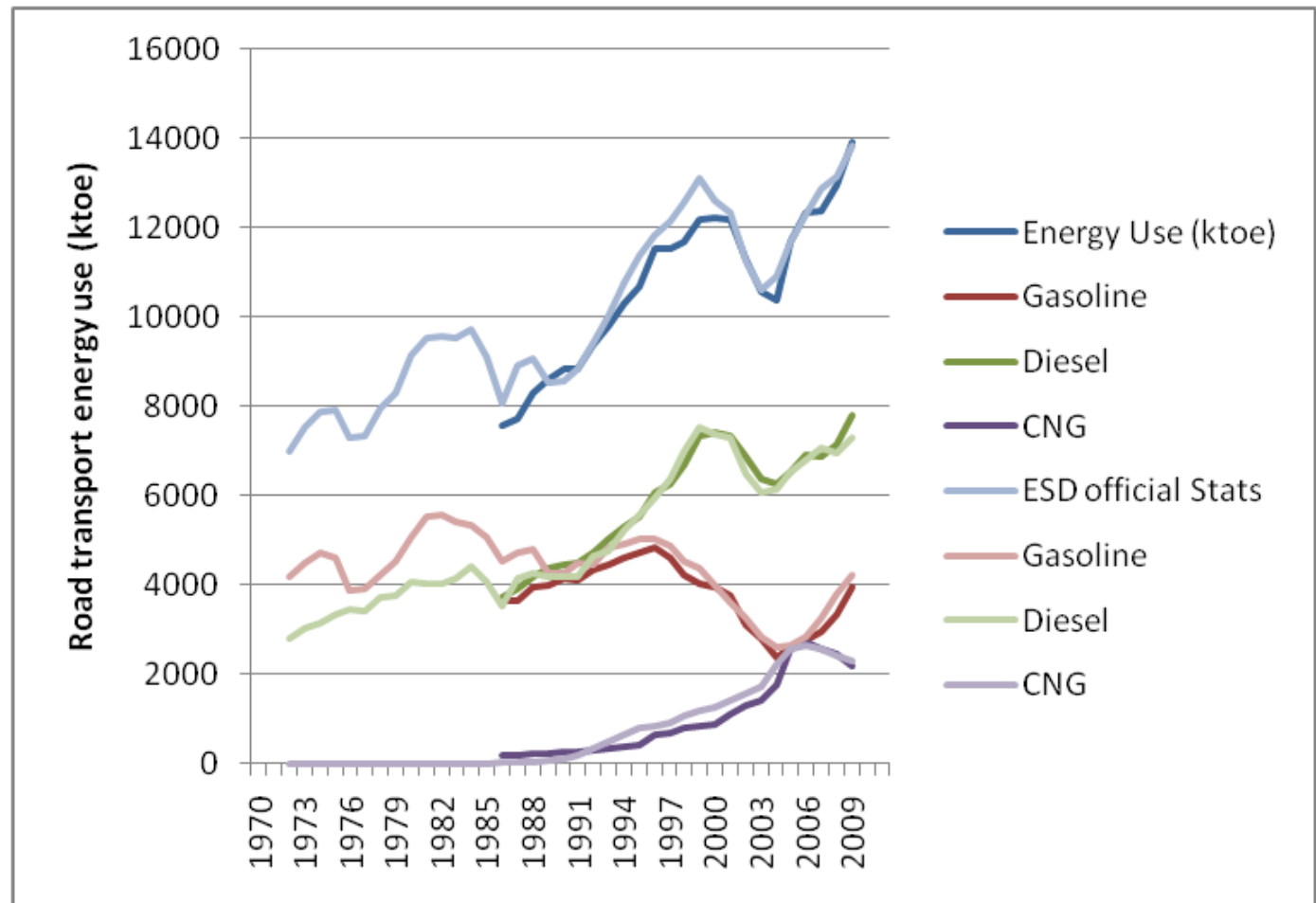
Gasoline	
Diesel	
Alternative powertrains	
	Pure CNG
	CNG / Gasoline
	CNG / Diesel
	LPG / Gasoline
	FlexFuel
	Hydrogen Fuel Cell

- Data collected by MoMo team based on official sources tracked into the data files
- National governmental sources usually preferred

MoMo team data work

■ Quality control

- Using PUCE, the fuel use is then compared with IEA/ESD national annual numbers



MoMo team : other data work

■ Cost of transport systems and technologies

- Powertrain technology cost
 - ◆ Short-term long term with learning effect as penetration grows
- Other vehicle technologies costs
 - ◆ Short-term long term with learning effect as penetration grows
- Infrastructure costs
 - ◆ Capital costs
 - ◆ Upgrade costs
 - ◆ Operation and maintenance
- Transport fuels / fuel infrastructure costs
 - ◆ Extraction / production
 - ◆ Transport / distribution
 - ◆ Storage / recharging

■ Vehicle infrastructure

- Road, rail and airports extent

MoMo team : Mode Share database

- **City level : more than 700 city-year points**
- **Country level: more than 80 country year data points**

- **Mode divided into:**

Car
Motorcycle
Taxi
PT
Bike
Walk
Others

MoMo team : other data work

■ GFEI database

- Fuel Economy of new vehicle registration at the vehicle level

■ EVI database : Deployment strategies of EVI member countries

- EV/PHEV target numbers
- Recharging infrastructure by type
- Public spendings



Transport data at the IEA

Thank You!

	1990	1995	2000	2005	2010	Total
OECD North America	31	23	70	165	62	351
Canada		12	7	7		26
Mexico		1		3		4
USA	31	10	63	155	62	321
OECD Europe		45	50	104		199
France		5	6	4		15
Germany		7	4	31		42
Italy		3	3	20		26
UK		9	9	10		28
Other OECD Europe		21	28	39		88
OECD Pacific	2	10	12	32		56
Australia and NZ		6	11	31		48
Japan	2	3	1	1		7
Korea		1				1
FSU		1	1			2
Russia		1	1			2
Asian TE						0
Eastern Europe		1	1	1		3
China		4	10	20		34
Other Asia		7	1			8
India		3			12	15
Middle East		3	1			4
Latin America		5	1	12		18
Brazil		3	1	5		9
Other LA		2		7		9
Africa		9	1	2		12
South Africa		4	1	1		6
Other Africa		5		1		6
World	33	111	148	336	74	702