Introduction to indicators and ODYSSEE

EPE-GIZ training on indicators

EPE, Rio de Janeiro , September 13-16 2011

Bruno Lapillonne, Vice President, Enerdata

Paper prepared with the support of GIZ

1. **Introduction to indicators and ODYSSEE**
2. Overview of ODYSSEE Indicators
3. Overview of data and indicators in ODYSSEE

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1. **Energy efficiency policies: a top priority in the EU and at world level**
2. Why energy efficiency indicators?
3. Introduction to ODYSSEE indicators in Europe
4. Other initiatives: ESD, IEA, EEA
5. Conclusions

High priority on energy efficiency in the EU

- Increasing implications of European public authorities at EU level (EU Commission /parliament) and national levels to promote energy efficiency

- As a way to address the main challenges facing the EU:
  - Risk of tensions on supply and thus on the cost and security of supply
  - Climatic risk linked to the increase in Greenhouse Gas emissions

From soft commitments to more constraining and quantitative targets

- Previously very general and qualitative targets set in the framework of the EU energy policy or national policies

- Now quantitative targets are set in the EU:
  - That are more constraining and ambitious
  - That are increasingly integrated within energy law and Directives
  - That are defined both at the level of the total consumption but also by sector or end-use ("sectoral targets"
  - That generally require yearly monitoring, with standardised procedures, and reporting obligations

- More and more countries at world level with quantities targets

Example of official targets in the field of energy efficiency : EU Directives

- 9% energy savings in 2016 compared to 2008 for each EU member country ("Energy Service Directive" (ESD) adopted in May 2006), with reporting obligation imposed to each EU member on actions undertaken and energy savings achieved, with harmonised calculation model using combination of top-down and bottom-up methods

- 20% energy efficiency progress by 2020

- 18% share of cogeneration by 2010

- 130g CO2/km for new cars by 2012 (new Directive)

- Ban of incandescent lamps in 2012

French official targets in the field of energy efficiency, as included in Energy Laws

- Raise the annual energy intensity reduction of the GDP to -2%/year by 2015 and –2.5%/year by 2030

- Obligation of energy savings for suppliers of electricity, gas, heating oil, and district heat to be made in consumer premises. imposed on (54 TWh* for 2006-2008 and 345 TWh* over 2010-2013) (with possibilities of buying energy savings certificates from other actors) ("White certificates");

- Energy uses of new buildings below 15 kWh/m2/year in 2020 (heating, water heating and ventilation)

- Thermal retroffiting of:
  - 400, 000 dwellings per year until 2020 with an objective of 38% total savings in in 2020 for all dwellings built before 2008;
  - 120 Mm2 of public buildings by 2020 with an objective of 40% savings for all public buildings

- 139.5 TWh total energy savings in 2016 with final consumers according to National Energy Efficiency Action Plan as required by EU ESD Directive

- **lifetime discounted energy savings"*

Example of official targets: other EU countries

- Slovakia: decrease relative ratio of intensity compared to the EU average to 1.3 in 2020 and 1.1 in 2030
- Poland: share of electricity purchased from cogeneration sources connected to the grid not lower than 16% in 2010
- Slovenia : National Energy Program of 2004 target of energy efficiency improvement by 2010: 10% in industry, household, services and transport and 15% in public sector ; double share of electricity production in CHP
- Spain: Energy Efficiency Strategy (Action Plan 2005-2007): primary energy saving of around 7,2 Mtoe/year in 2007 (of around 4.7% of consumption)
- UK: Obligation on electricity and gas suppliers to save 62 TWh of energy from households over 2002 – 2005, of which half from low income households and 95 TWh for 2005 – 2008

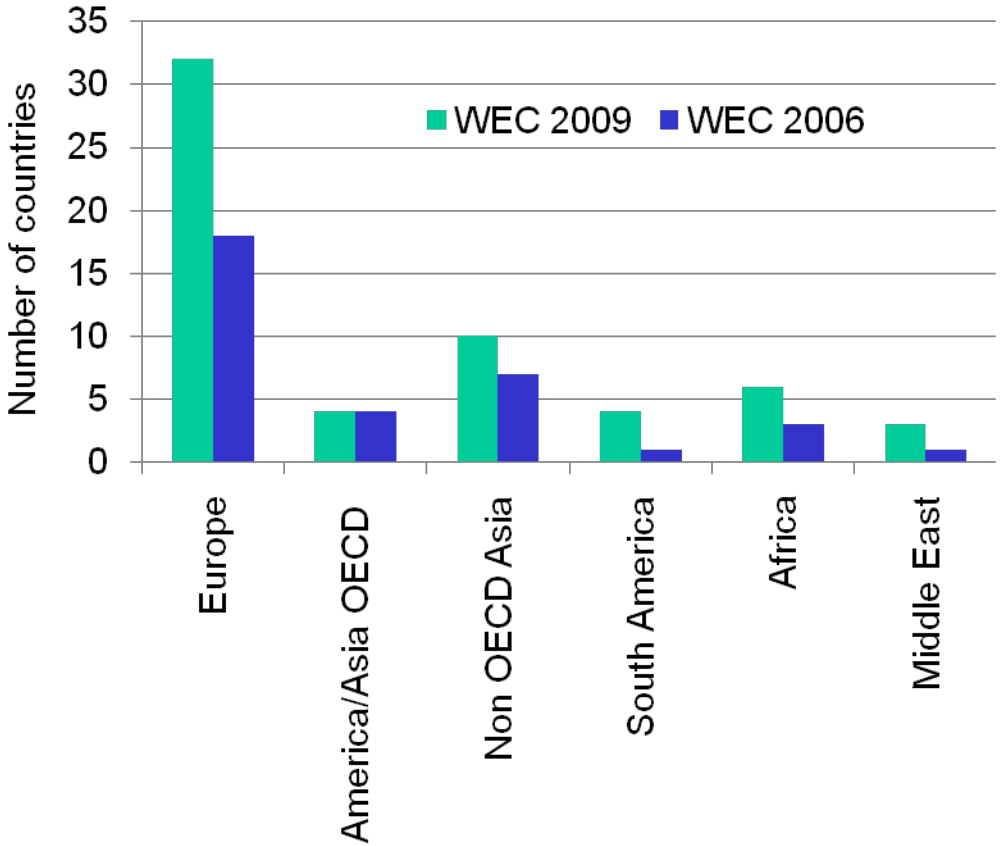
How policy targets are expressed?

Targets are in general expressed in 5 different ways:

- ✓ rate of energy savings or efficiency improvement:
  - ✓ Overall: EU-ESD, Netherlands, Slovenia, Spain,New Zealand, Japan, Vietnam
  - ✓ For specific sectors: Sweden for buildings, UK for households, Mongolia for energy sector)
- ✓ rate of reduction in energy consumption (%) (e.g. Finland, Switzerland, Korea
- ✓ as a rate of energy intensity decrease (%/year or %): e.g. France, Germany, Bulgaria, Czech Rep., Hungary, Russia, China, Taiwan China, Tunisia),
- ✓ in volumes of energy savings (in GWh, Mtoe) for a target year :
  - ✓ To be proved EU-ESD , Spain, France, Italy, UK, Norway, Iran, Sri Lanka, Philippines, Thailand, Algeria, Morocco, Tunisia (Brazil for lighting)
  - ✓ In reference to a baseline projection: most frequent: EU (20% target for 2020), Brazil (106 TWh in 2030 in National Plan for Energy Efficiency)
- ✓ in terms of energy consumption elasticity (e.g. Estonia, Thailand, Indonesia)

At world level also, increasing number of countries with quantitative targets on energy efficiency

Energy efficiency programmes with quantitative targets

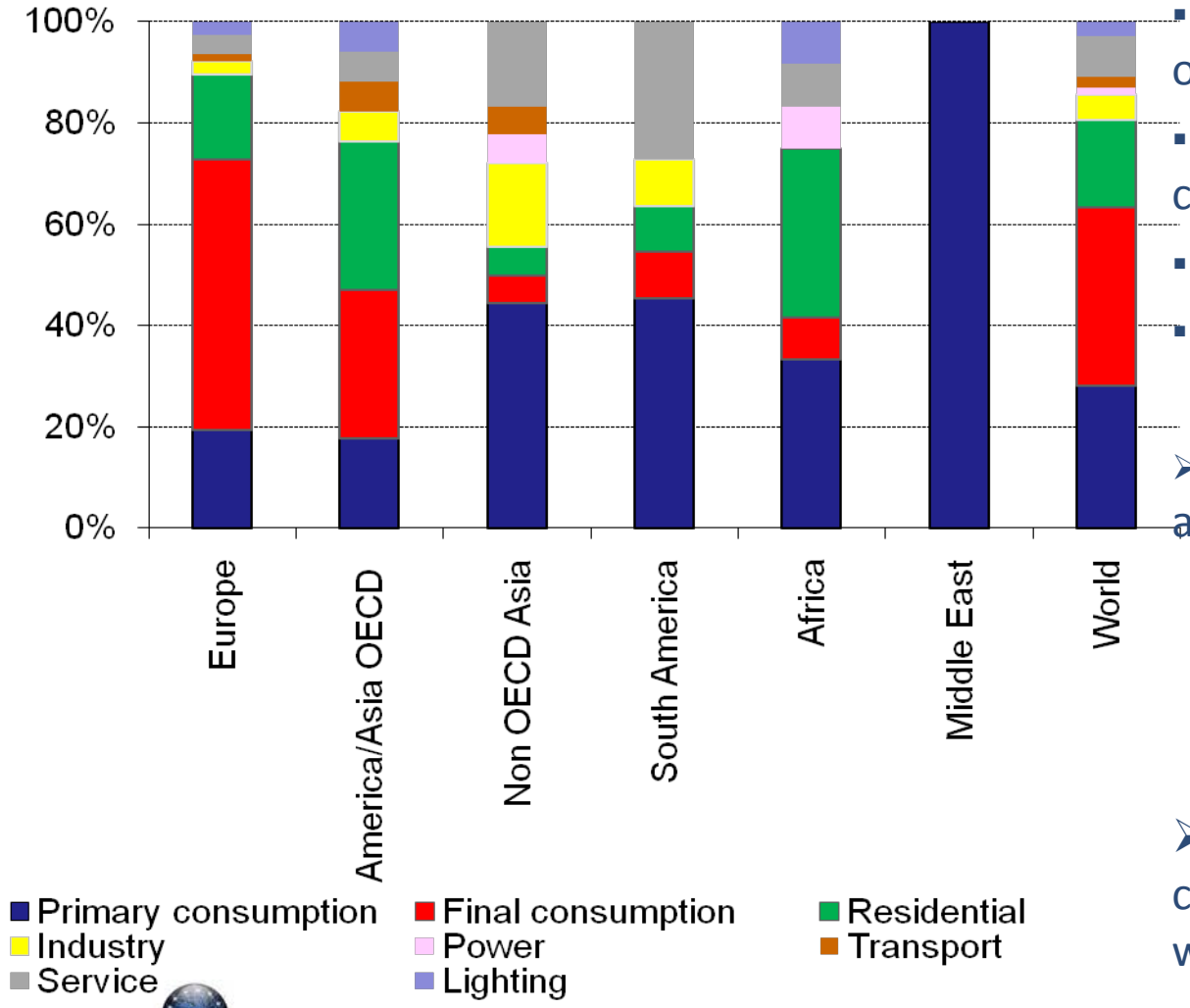


Source: WEC/ADEME surveys

- About 60 countries in 2009 compared to 35 in 2006, with quantitative targets in their national energy efficiency programme according to WEC-ADEME surveys;
- Progression in all regions, and especially in Europe;
- This reflects more ambitious policies

About 2/3 of targets on final or primary energy consumption and 1/3 of sectoral targets.

Main quantitative targets of energy efficiency programmes



Source:WEC ADEME survey 2009

➢At world level:

- 1/3 of programmes have a target on the final consumption
- less than 1/3 on the primary consumption
- 17% for households
- 8% for services.

➢Different focus in these targets according to regions:

- final consumers.
- priority to the primary consumption in other regions

➢ Slightly over 1/3 of the countries with multiple targets (of which 2/3 are in Europe)

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1. Energy efficiency policies: a top priority in the EU and at world level
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Energy efficiency indicators : a necessary tool to assess the progress achieved ?

- Monitoring on a yearly basis the results achieved in terms of energy savings becomes now a necessity for many governments and institutions,
  - To check that the country is on track compared to its targets (“distance to target”)
  - To justify the public budget spent
  - To conform to reporting requirements of the parliament or other institutions (e.g. EU Commission for EU member countries)

Why energy efficiency indicators (cont'd)?

➢These evaluations are generally based on statistical indicators of energy use, as well as data on market penetration of energy efficient technologies, often referred to as "energy efficiency indicators" ;

➢This type of evaluation is usually referred to as "top-down" measurement of energy savings as opposed to bottom-up evaluation in which the evaluation is more based on detailed data collected at a micro level (ex-post, from surveys or ex ante from modelling/estimates)

Multiple use of energy efficiency indicators

- Beyond a monitoring of the energy savings and progress achieved these indicators can be also used :
  - ✓ To understand why the targets are not met so as to identify corrective measures
  - ✓ To compare/benchmark the countries progress and performance with respect to energy efficiency performances and assess potential for improvement
  - ✓ Finally to assess the long term potential for energy efficiency improvement so as to see what new measures could be implemented ➔ in that case technico economic models such as MEDEE or MURE can be used (case of ESD potential study for the EU Commission) (http://www.eepotential.eu)

Why tracking energy efficiency at the macro level is not an easy task?

- Insulating a house makes it more energy efficient but this improvement at the micro-level may be not visible at the macro-level - the whole stock of dwellings - if, at the same time, more houses are built, dwellings are larger, more appliances are used and if the comfort is improved.

- In the same way in industry, each factory individually can decrease its energy consumption per unit of output with more energy efficient technologies, but this may not be seen at the industrial level if there is at the same time an increase in the production or a higher growth in the production of energy intensive industries.

➔ Needs of appropriate methods to sort out the energy efficiency component

➔ Need to have complex indicators, such as ODYSSEE Energy efficiency indicators

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The ODYSSEE-MURE project (1/2)

- Project supported by a special programme of the European Commission called EIE, Energy Intelligent Europe
- Project coordinated by ADEME, the French Energy Environment and Efficiency Agency
- Project started more than 10 years ago
- 33 partners from 28 countries, mainly national energy efficiency agencies (or their representatives)
- Technical coordination:
  - Enerdata, with ECN on indicators
  - Fraunhofer with ISIS and ECN on policies

The ODYSSEE-MURE network

The ODYSSEE-MURE project (2/2)

- Main objectives :
  - Evaluate and compare energy efficiency progress by sector for EU countries and for the EU as a whole, and relate the progress to the observed trend in energy consumption;
  - Evaluate energy efficiency policy measures in the EU countries

- Project relying on two data bases, covering the EU, the individual 27 Member states, Norway and Croatia,
  - ✓ The MURE database on energy efficiency measures
  - ✓ The ODYSSEE data base on energy efficiency indicators

ODYSSEE and MURE Data Bases

- ODYSSEE and MURE are comprehensive data bases, that have been developed progressively over the last 15 years:
  - ✓ ODYSSEE: energy consumption, and their drivers, energy efficiency and CO2 indicators at macro or sectoral levels : www.odyssee-indicators.org
  - ✓ MURE: on all policy measures implemented by sector, and their impact evaluation whenever available (methods, results): www.mure2.com

- Coverage: all EU-27 countries, Norway and Croatia, the EU-27 and EU-15 as a whole.

- These data base are updated by national teams, generally the national energy efficiency agencies (or their representative), with a centralised management ("technical coordinator") (Enerdata for ODYSSEE and ISIS-Fraunhofer-ISIS for MURE), that is in charge of the quality control and assistance to the countries

ODYSSEE data base in brief (1/2)

- Data base covering:
  - ✓ Energy consumption data by sector and end-use and their drivers (about 1000 data series, of which 600 main data series)
    - ➔ Half energy consumption data and half non energy data
    - ➔ Importance given in the consistency between the definition and coverage of the energy consumption categories and drivers
  - ✓ Energy efficiency and CO2 indicators at macro or sectoral levels (about 180 indicators).
  - ✓ EU-27 countries, Norway, Croatia, the EU-15 and the EU-27, as a whole (31 countries/ regions).
  - ✓ Period covered over 1990-2008/09 (from 1980 for most EU-15 countries) (1996 for some new members such as Baltic countries, Malta and Cyprus)

ODYSSEE data base in brief (2/2)

- Available on internet (www.odyssee-indicators.org) with a password
- Data updated by national teams, generally the national energy efficiency agencies (or their representative)
- Data base coordinated and managed by Enerdata, who is in charge of the quality control and assistance to the countries.
- Data base developed, maintained and updated within the ODYSSEE-MURE project:
  - ✓ sponsored by the Energy Intelligence for Europe programme (EIE), through EACI, the European Agency for Competitiveness and Innovation,
  - ✓ coordinated by ADEME

Classification of ODYSSEE indicators: ~180 indicators split in 9 different types

Type	Level
1. Energy intensities	by sector & sub sector
2. Adjusted intensities	final and industry
3. Specific energy consumption	by sub sector & end-use
4. Benchmarked specific energy consumption	steel, cement, paper, heating
5. Energy efficiency indices (ODEX)	final and by sector
6. Energy savings	final, by sector and sub sectors
7. Indicators of diffusion	by sector
8. CO_2 intensities	by sector & sub sector
9. Specific CO2 emissions	by sub sector & end-use

Characteristics and role of National Teams

- National teams are the key actors of the project: they generally belong to national public energy efficiency agencies which ensure expertise, dissemination, legitimacy and motivation
- Their task is:
  - To perform the data collection
  - To report on data gaps improvements
  - To carry out a national report on energy efficiency trends based on comparable indicators and template
  - To disseminate the results in particular to ministries
  - To participate in the workshops for methodological discussion

Characteristics and role of the Technical Coordination

- ADEME is coordinating the overall project, with the asitance of a technical coordination is composed of 4 partners which are private consultants or researchers, coming from 4 different countries (Fr, DE, IT, NL.).
- Their role is:
  - To elaborate the work programme and develop methodologies (ie. new indicators, new surveys etc.)
  - To train and assist N.T. in the data collection and reporting (hot line service)
  - To store and manage the data base including harmonisation, quality control and software development
  - To carry out the cross country comparison
  - (newsletter, websites)
  - To disseminate the results (commission, ministries, ODYSSEE users etc.)

The users of ODYSSEE data and indicators

- DG-ENER:
  - EMOS database (Energy Market Observatory)
  - Explicit reference in the Energy Service Directive to ODEX indicator
  - Basis to measure energy savings with top-down methods for the monitoring of the ESD Directive ;

- IEA: to complete its indicators for European countries.

- EEA (European Environmental Agency):
  - Indicators factsheets
  - Annual TERM report;
  - Annual report “State and Outlook of the Environnement »
  - Fourth pan-European environment assessment report in the 'Environment for Europe' process in the framework of UNECE.

*TERM monitors indicators tracking transport and environment integration in the EU

The users of ODYSSEE data and indicators (cont'd)

- EUROSTAT designed its own indicators taking into account the experience of ODYSSEE indicators .

- CEN-CENELEC: design of a norm on energy savings measurement

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Conclusion: indicators and policies: the European experience (1)

- Policy makers need data and indicators to monitor the impact of their actions, to prepare new policy measures and to assess long– term energy savings potentials

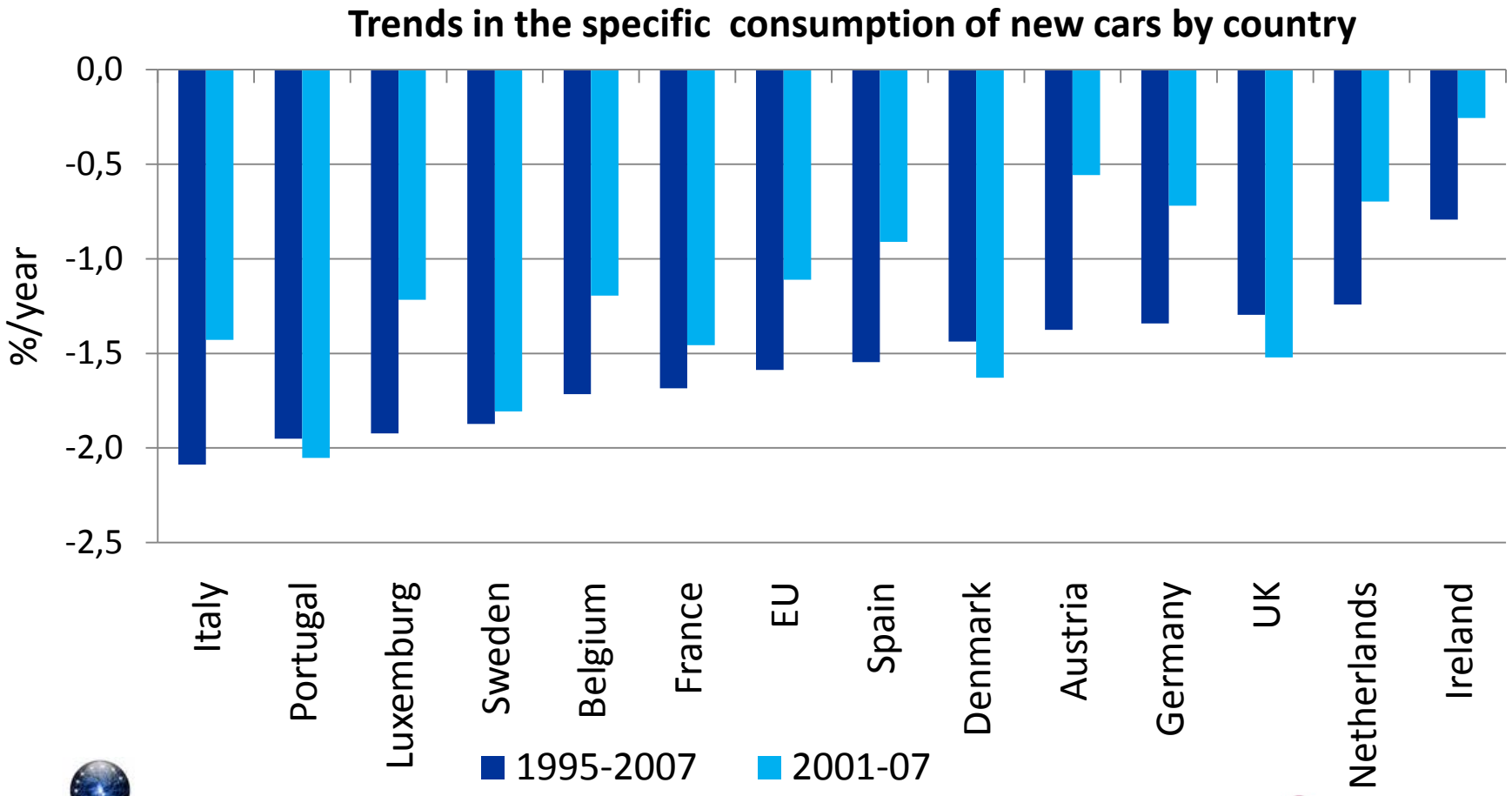
- Data needed are not just merely the usual energy statistics from the energy balance but more detailed data by end-use

- Strategies have to be defined to collect such data ... In a permanent way:
  - by combining detailed surveys every 2 to 3 years with modelling or lighter surveys in between the survey years
  - by imposing reporting requirements to utilities, equipment manufacturers , utilities➔ exchange of international experience is very useful in that matter

- Although such indicators can be used to assess the impact of policies, it is seldom that they can measure the impact of a single measure➔ they measure the impact of packages of measures acting on a given end-use (e.g. new cars, lighting, solar heaters...)

Conclusion: indicators and policies : case of new cars

Trends in the specific consumption of new cars is clearly the result of several policy measures, at EU level (agreement with car manufacturers association in 1995, mandatory car labelling), but also at national level (fiscal measures, subsidies)➔ it is impossible to dissociate their relative effect



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Conclusion: indicators and policies: the European experience (2)

- The « success story » of the ODYSSEE project is due to the decentralised project implementation which ensures the legitimacy of the results.

- The ODYSSEE methodologies is spread over 30 european countries as well as in emerging or developing countries (Tunisia, India, Algeria, Turkey) and applied to several international organisms (IEA, EU) or network (ex Medener).

- Thank you

- bruno.lapillonne@enerdata.net

- http://www.odyssee-indicators.org
http://www.MURE2.com

Overview of ODYSSEE Indicators

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ODYSSEE energy efficiency indicators: ~180 indicators split in 9 different types, of which 5 quite specific to ODYSSEE

Type	Level
1. Energy intensities	by sector & sub sector
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7. Indicators of diffusion	by sector
8. CO_2 intensities	by sector & sub sector
9. Specific CO2 emissions	by sub sector & end-use

Energy intensities

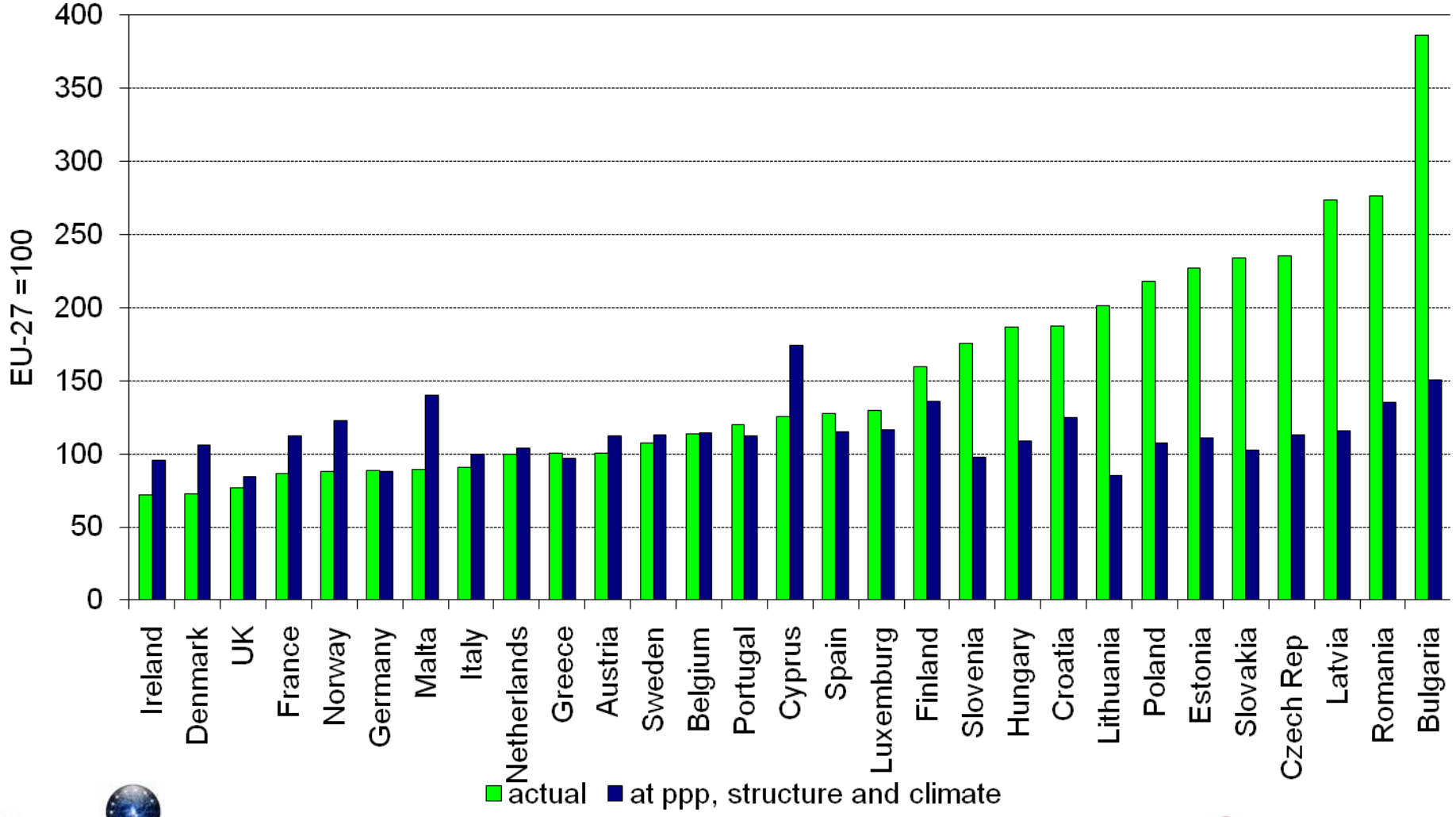
Objective	Measure the link between energy consumption and economic activity
Principle of calculation	Relates the energy consumption (E) in energy units (eg TJ, ktoe or GWh) to the GDP (Gross Domestic Product) or Value Added (VA) measured at constant price (e.g. €2000)➔ toe/€2000 or kWh/€2000
Interpretation	Measure how much energy is required to generate one unit of GDP or VA (i.e. one euro) Reverse of the energy intensity (GDP/E) measures the **energy productivity** of the country (similar to the labour productivity) Assess the overall energy efficiency from an economic viewpoint ➔ broader than pure energy efficiency from a policy or engineering viewpoint A decrease in the energy intensity means that the country requires less and less energy to fuel its economic growth ➔ the country increases its energy productivity

Adjusted energy intensities (to GDP or value added)

Objective	Compare overall energy productivity performance among countries
Principle of calculation	Calculation of fictive energy intensities in toe/€ with several adjustments (price level, climate , economic structure) to a reference country (EU-27 average)
Interpretation	Comparison more relevant than with actual energy intensities ➔ necessary for comparison Cannot correct for all structural differences Somehow a proxy, in the absence of a better indicator, of overall energy efficiency performance (from an economic viewpoint)
Examples	Final energy intensity at EU economic and industry structure and climate and measured at purchasing power parities Energy intensity of industry at EU structure

Adjusted energy intensities: examples

Final energy intensities adjusted for differences in prices (ppp),climate and industry & economic structures narrow difference between countries



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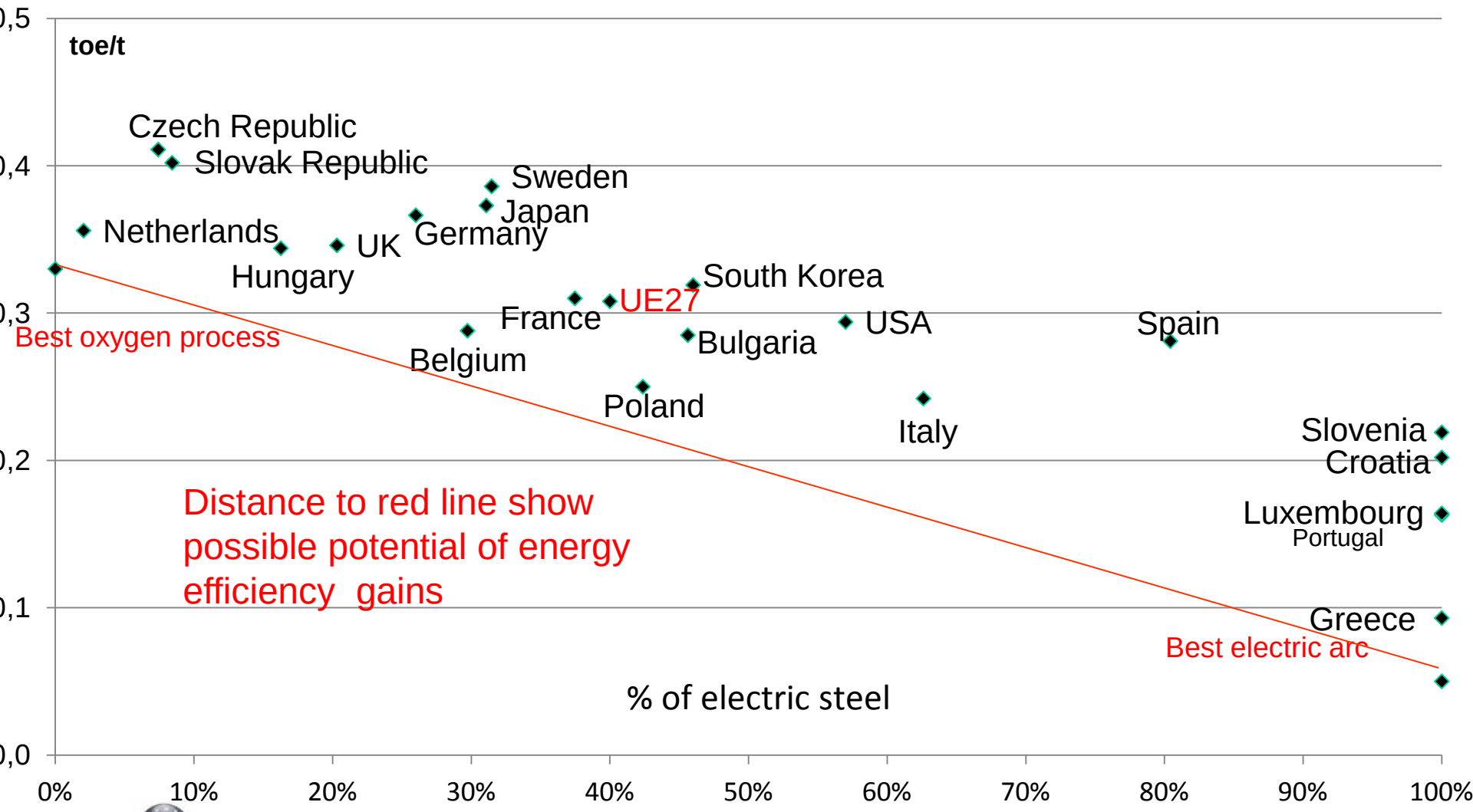
Specific energy consumption

Objective	Characterise the energy efficiency performance at the level of an end-use or sub –sector
Principle of calculation	Energy consumption per unit of physical indicators
Interpretation	Specific energy consumption enable a more detailed analysis of technical changes than energy intensities
Examples	toe or GJ per ton of steel, toe per car , litre/100 km, toe or kWh per dwelling

Benchmarked specific energy consumption

Objective	Compare sectoral energy efficiency performance among countries and with benchmark values (e.g. the 3 best EU countries, the best world practice Evaluate energy savings potential
Principle of calculation	Calculation of specific consumption with the maximum adjustment permitted from data available (e.g. process mix, rate of appliance ownership, climate) and use of graphics to add non quantifiable adjustments
Interpretation	
Examples	Consumption per ton of steel as a function of process mix (share of electric steel) Consumption for heating in useful (or final energy) per degree day as a function of central heating penetration

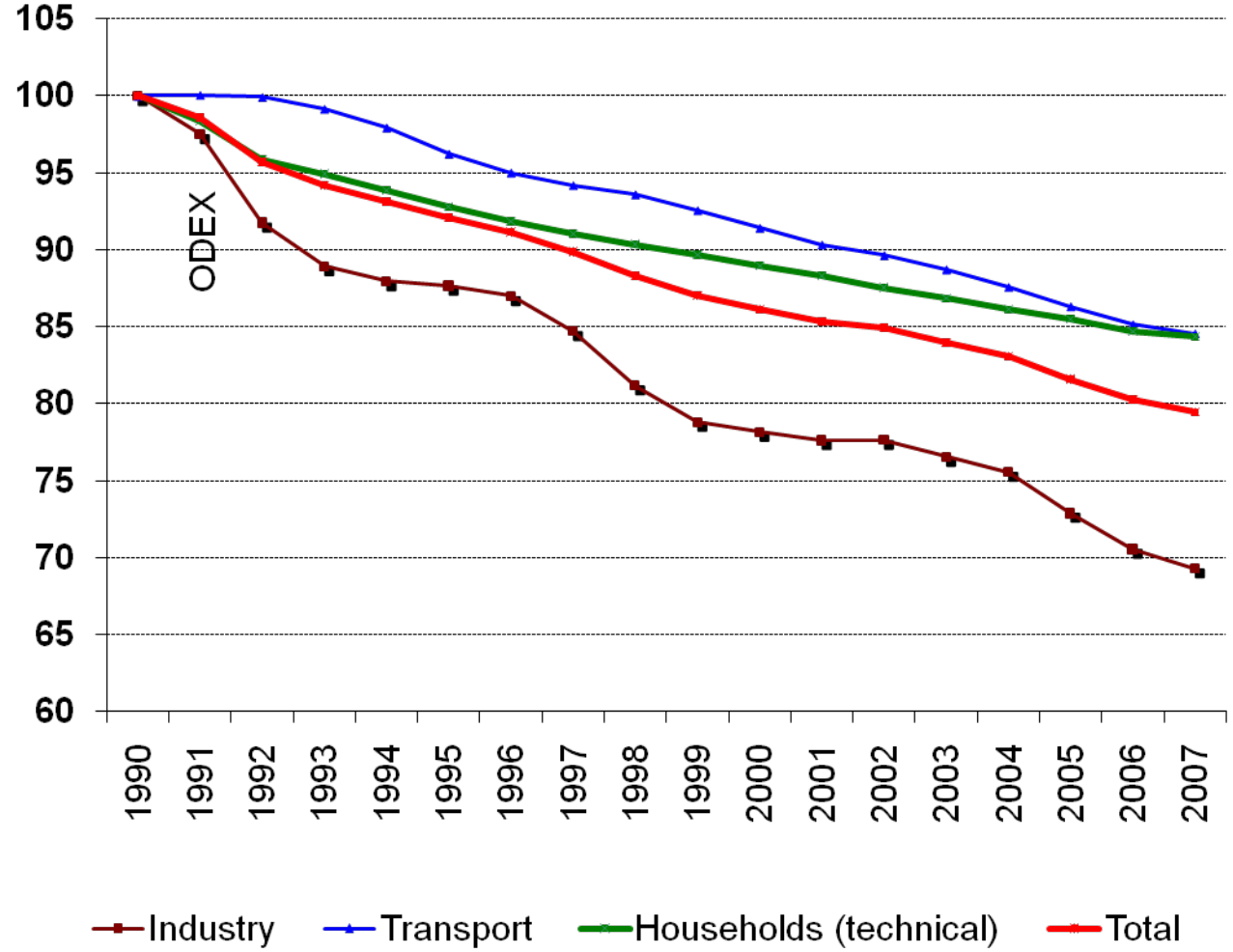
Benchmarking of the specific consumption: case of crude steel



Energy efficiency index (ODEX)

Objective	Measure energy efficiency progress at the level of the main end-use sectors (industry, transport, households) and at the level of all final consumers
Principle of calculation	ODEX by sector combines unit consumption indices by sub–sector into one index for the sector by weighting each sub-sector index by its share in the energy consumption
Interpretation	ODEX=79 in 2007 with 100 in 1990 ➔ 21% energy efficiency improvements between 1990 and 2007 Much better indicator than energy intensities as cleaned from structural changes or other factors that have nothing to do with energy efficiency (e.g. increase in comfort or in equipment ownership, structural changes in industry)

Example of energy efficiency index (ODEX): final consumers (EU-27)



ODEX= 79 in 2007
➔ 21% energy efficiency improvement between 1990 and 2007

ODEX is calculated as a 3 years moving average to avoid short term fluctuations (imperfect climatic corrections, behavioural factors, business cycles)….

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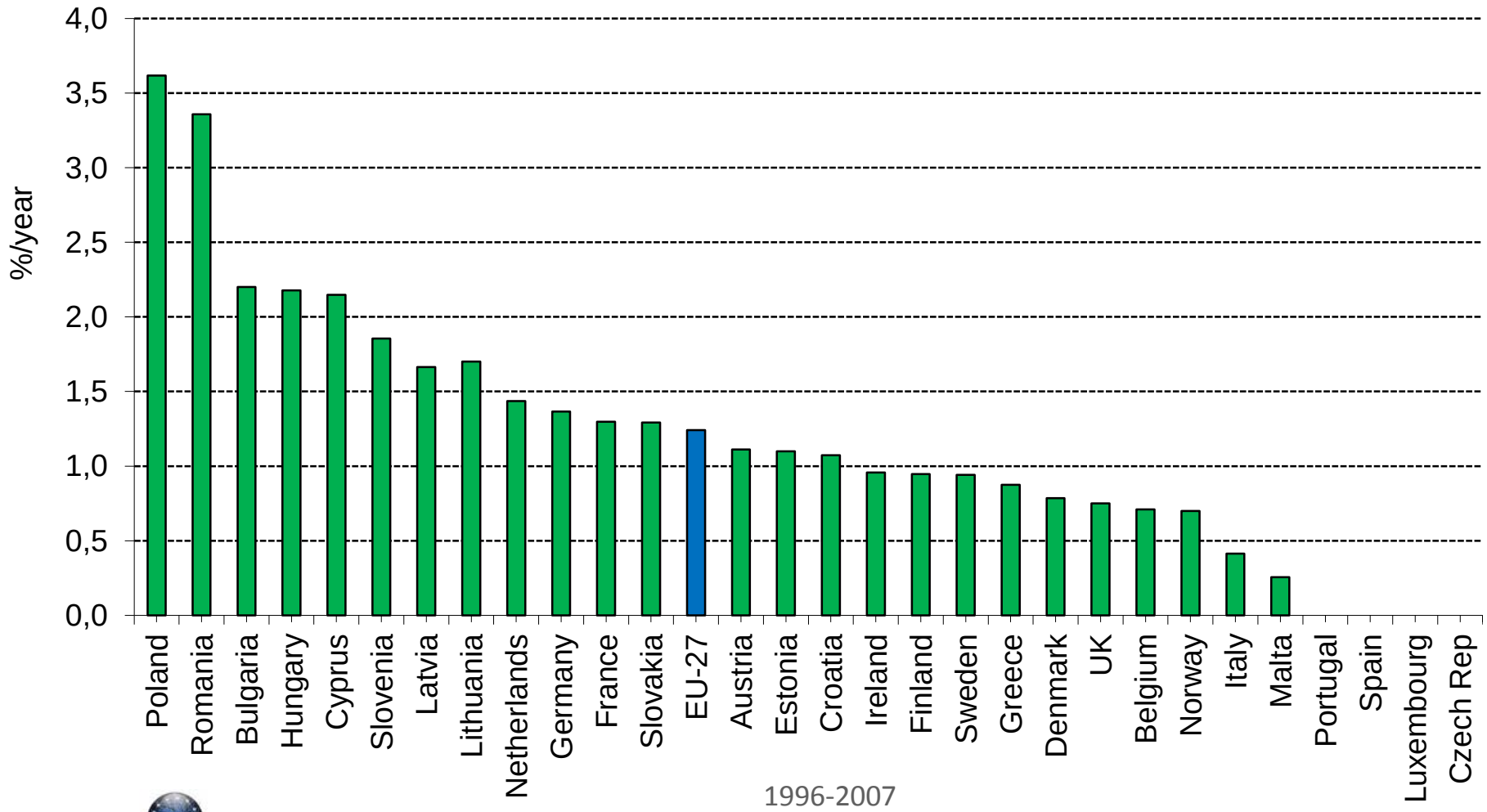
Energy efficiency improvement from ODEX in %/year



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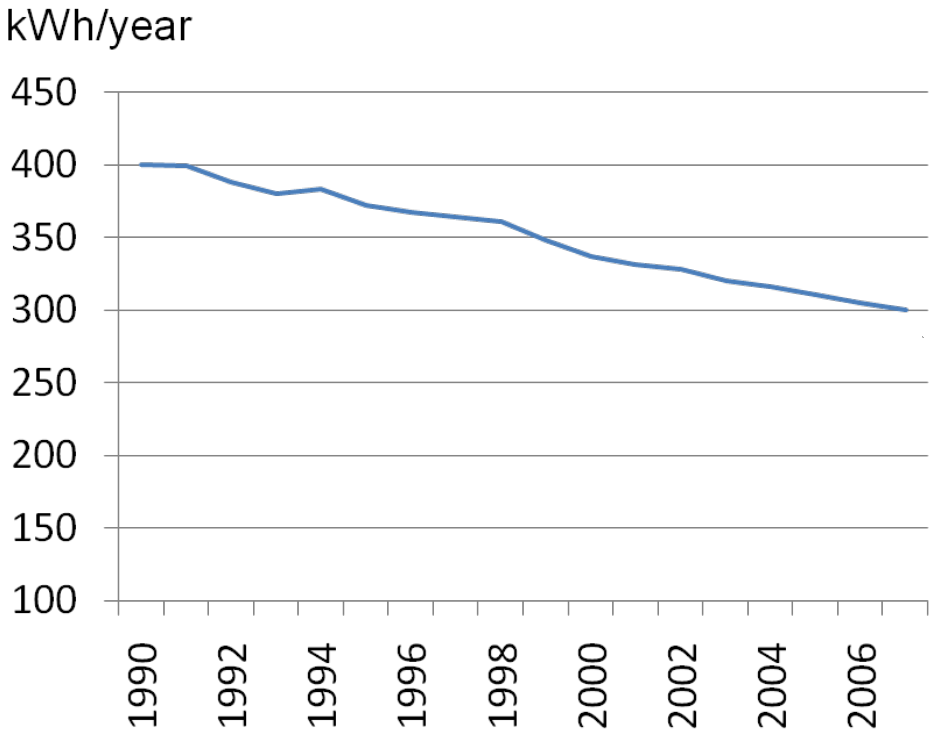
Energy savings by sub-sector or end-use

Objective	Measure the amount of energy saved through energy efficiency progress by end-use or sub -sector
Principle of calculation	Derived from the multiplication of the variation of an energy efficiency indicator (I) by an indicator of activity (A) over a reference period: $ES = \Delta I_{(t,0)} * A_t$ For instance, the energy savings of a given appliance (e.g. refrigerators) are derived from the variation in the average specific energy consumption per appliance (in kWh/year) multiplied by the stock of refrigerators;
Interpretation	The indicator assesses total energy savings whatever their drivers (market price, autonomous or policy measures for instance

Energy savings: example of the refrigerator stock

- A reduction of the average specific consumption of the refrigerator 'stock from 400 to 300 kWh in a country with 2 million of refrigerators will result in total electricity savings equal to 100 GWh.

- Methodology officially proposed by the European Commission for the monitoring of the 9% savings required by the Energy Service Directive (ESD) with top-down indicators



•Energy savings in 2007 (compared to 1990) = 100 GWh ((400-300)*1)

assuming a stock of 1 M refrigerators in 2007

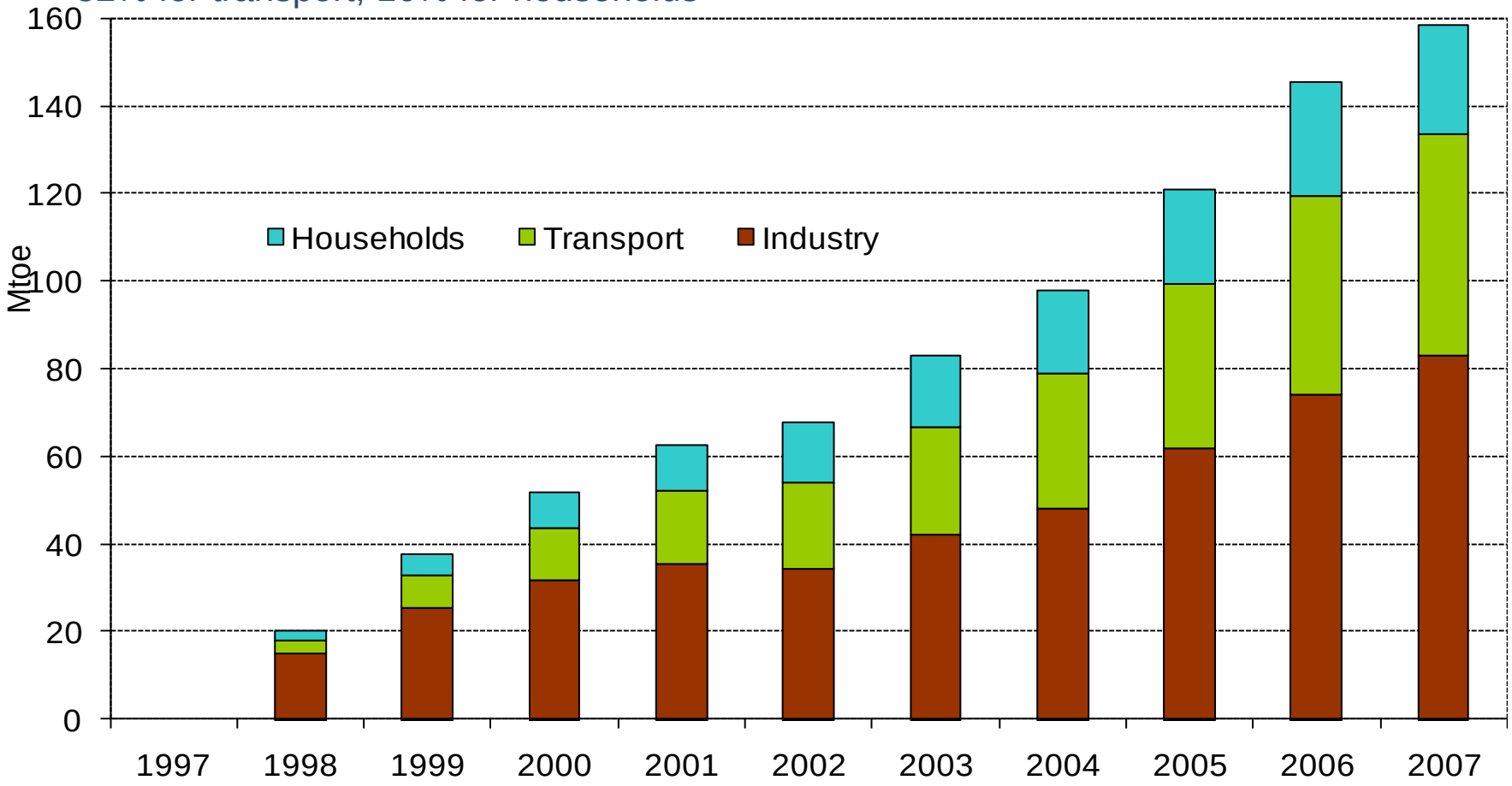
•Rate of energy savings: 25% (=100/400)

Energy savings by sector

Objective	Measure the amount of energy saved through energy efficiency progress by main end-use sectors (industry, transport, households) and at the level of all final consumerssector
Principle of calculation	•Calculated either as the sum of savings by sub-sector or end-use, or •Derived from ODEX, as ODEX represents the ratio between the energy consumption and a fictive consumption that would have happened without the savings. If in 2008, energy consumption = 50 Mtoe and ODEX =80 ➔Energy savings =50* ((100/80)-1)=12.5 Mtoe
Interpretation	Savings =12.5 Mtoe compared to 1990 means that without a reduction in specific consumption since 1990, the final energy consumption would have been 12.5 Mtoe higher in 2008 than the observed value

Energy savings for final consumers(EU-27)

About 158 Mtoe energy savings in 2007 compared to 1997: without energy savings the final energy consumption would have been in 2007 158 Mtoe higher. Calculated by summing savings by end-use or sub-sector. More than half of savings in industry 52%; 32% for transport, 16% for households



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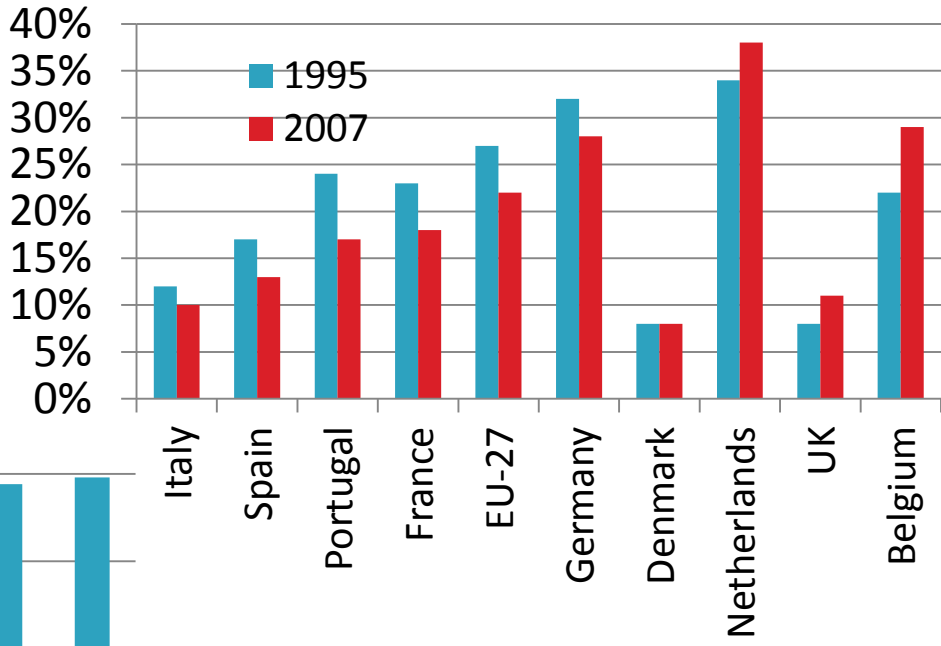
Indicators of diffusion

Objective	Complement the existing energy efficiency indicators with indicators that are easier to monitor and are more rapidly updated than energy efficiency indicators that depend on the availability of data on end-use consumption. Capture the penetration of energy efficiency technologies and practices and of end-use renewables Can be used to calculate the energy savings linked to the penetration of these efficiency technologies and practices using standardized deemed savings by technology or equipment
Principle of calculation	Ratio between the share of the stock (or sales) of efficient technologies fro a given end-use and the total stock (or sales)
Interpretation	Measure the status and impact of the penetration of energy efficiency technologies and practices
Examples	Number or % of solar water heaters % of label A in new sales of electrical appliance, …) % of passenger transport by public modes, % of transport of goods by rail and water

Examples of indicators of diffusion

Case of transport: share of rail and water in freight transport



Case of washing machines: share of efficiency label case of A & A+

Source: GfK

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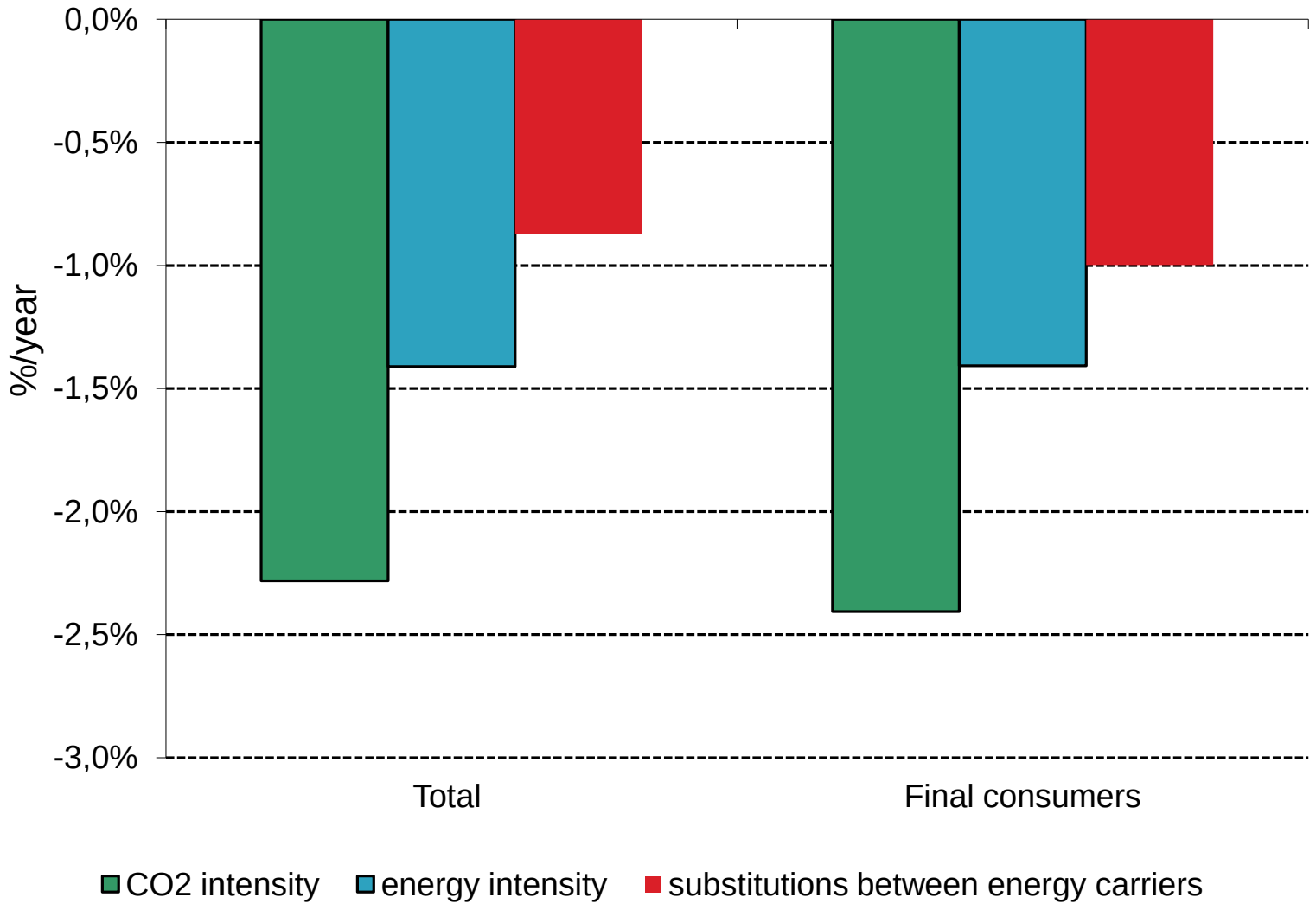
CO2 intensities

Objective	Measure the link between CO2 emissions and economic activity
Principle of calculation	Relates CO2 emissions (eg ktCO2) to the GDP ➔ tCO2/€2000 or kWh/€2000
Interpretation	Measure how much CO2 is emitted to generate one unit of GDP or VA (i.e. one euro) A decrease in the CO2 intensity means that the country reduces its emissions to fuel its economic growth Comparison between energy intensity and CO2 intensity can give a proxy of the role of changes in the average emission factor (tCO2/toe)

Variation of CO2 intensity in the EU-27



Specific CO2 emissions

Objective	Measure average CO2 emissions per unit of activity for a given end-use or sub-sector
Principle of calculation	Calculation of fictive intensities with several adjustments
Interpretation	Comparison more relevant than with actual energy intensities ➔ necessary for comparison Cannot correct for all structural differences Somehow a proxy, in the absence of a better indicator, of overall energy efficiency performance (from an economic viewpoint)
Examples	gCO2/km, tCO2/dwelling, kgCO2/m2

Direct versus indirect emissions

- CO_2 emissions correspond to on site inventories on site

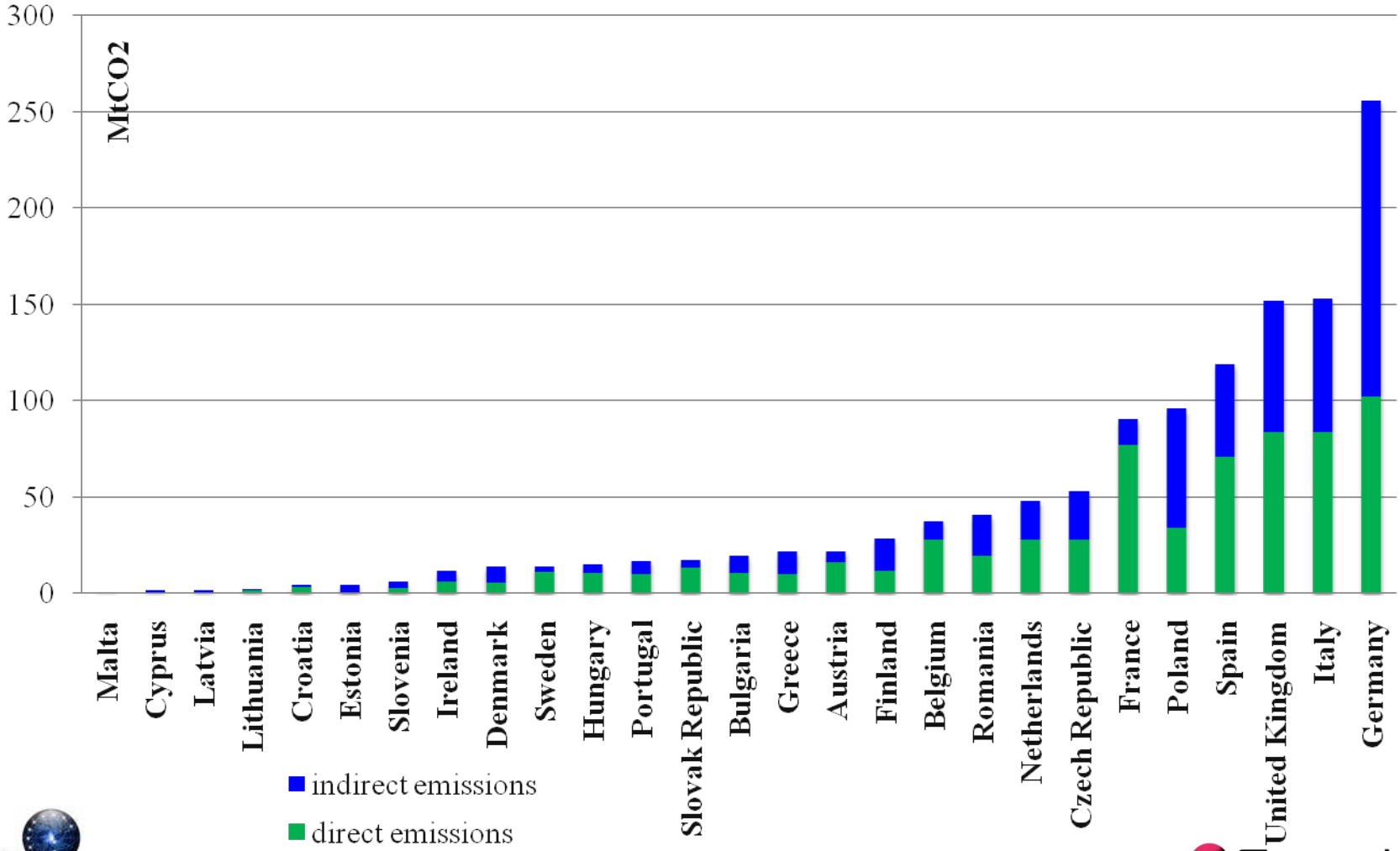
- If a consumer replace fossil fuels with electricity, it will reduce its emissions even if this will increase emissions at power production level

- To measure the impact of consumers actions on total CO_2 emissions, calculation of total emissions = direct +indirect (i.e. at the level of power plants)

- For this calculation, use the average emission factor of electricity production in the country : average 60 to 70 g CO_2 per kWh in France and 350 g CO_2 per kWh for the EU-15

Direct and indirect CO2 emissions in industry

Indirect CO2 emissions represents 46% of total emissions in EU on average in 2006; Large discrepancies between countries (14% in France, 60% in Germany)



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1. Overview of indicators from ODYSSEE
2. Conclusions

Originality of ODYSSEE data base on indicators: a wide range of Odyssee indicators

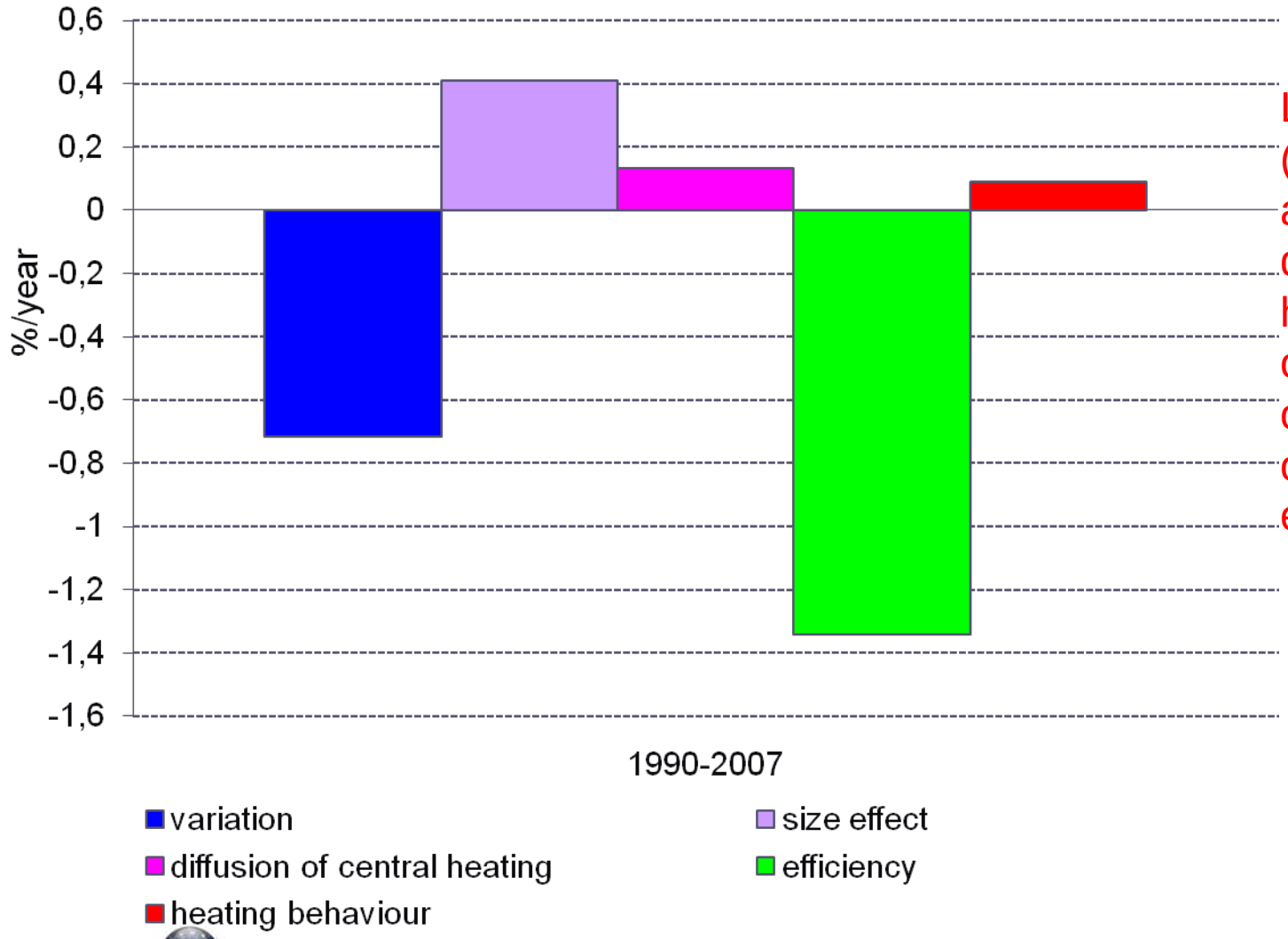
In ODYSSEE : a wide range of indicators and number is increasing: why?

- Energy efficiency has different meaning and frontiers (economic versus technical efficiency).
- Policy measures aims at different target (e.g. cars, mobility behavior):
  ➔depending on the definition used and the target, different indicators may be considered; (e.g. for cars toe/passenger-km, toe/car; l/100 km, l/kg);

- Interpretation is enriched by comparing several indicators to show for instance the impact on energy consumption of factors not linked to energy efficiency (e.g. lifestyles, behaviors , structural changes in industry, modal shift);

- Alternative indicators are often necessary to cope with possible data gaps (alternative indicators);

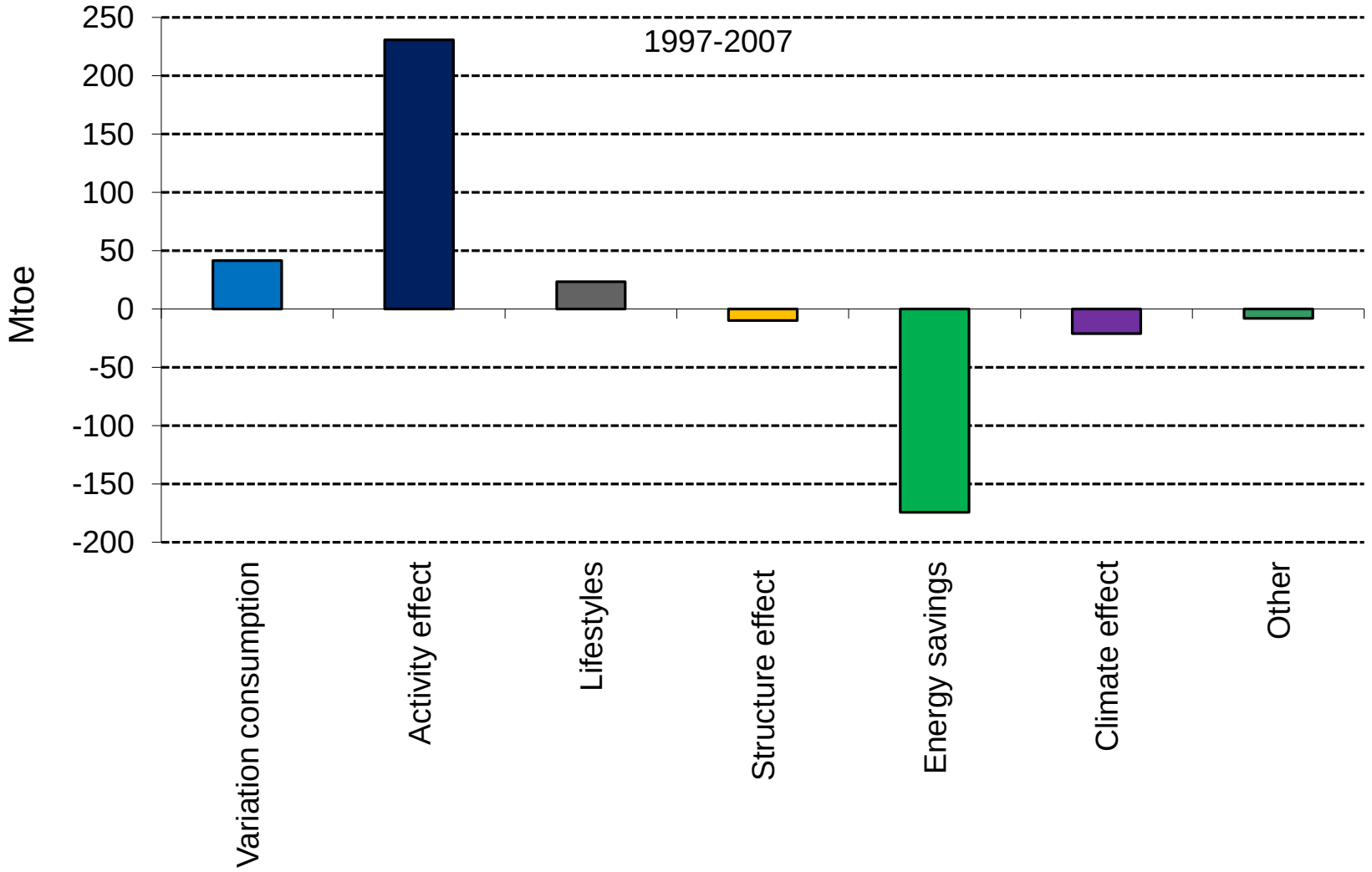
Drivers of the variation in heating consumption per dwelling in the EU27



Larger dwellings (+0.4 m2/year on average) and diffusion of central heating in the south of Europe, have offset the equivalent of 80% of the energy efficiency gains

All indicators at normal climate

Drivers of the variation of the final energy consumption in the EU



Selection criteria of indicators by sector or end-use

Selection of indicator dependent :

- On the definition of energy efficiency (economic efficiency versus technical efficiency) ;
- On the policies to evaluate (e.g. in transport modal shift or improvement with vehicles);

➔Depending on the definition used and the targeted policies, a different indicator may be considered to measure energy savings; (e.g. for cars toe/passenger-km, toe/car; l/100 km, l/kg);

- On the availability of data: alternative indicators to the “best” indicators are often necessary to cope with possible data gaps;

Selection criteria of indicators: data issues

- In the data needed for calculating the indicators, two types of data:
  - Data currently available in official statistics:
    - ✓ Easy part;
    - ✓ No special problem;
  - Data by end-use in households and services or by type of vehicle for road transport, which generally require some estimates and modelling:
    - ✓ Such data are needed even if they are less reliable and less official if one want to better evaluate energy savings and understand energy consumption trends;
    - ✓ Such data are stamped by official bodies in many countries because of their importance for policy evaluation
- The quality of the evaluation of top-down savings decreases with the level of aggregation (calculation of savings at aggregate level leads to bad estimate of savings and often to an underestimation of real savings) ➔ trade –off between the quality of data and quality of savings

- Thank you

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Overview of data and indicators in ODYSSEE

EPE-GIZ training on indicators

EPE, Rio de Janeiro , September 13-16 2011

Bruno Lapillonne, Vice President, Enerdata

Prepared with the support of GIZ

1. **Overview of data necessary for the ODYSSEE indicators**
2. Qualification of data in ODYSSEE data base

Data required for ODYSSEE indicators: macro & industry

Overall data

- Gross domestic consumption by energy
- Final energy consumption by sector (industry, transport, households, tertiary, agriculture, and others)
- Population, number of households
- GDP, value added by sector

Industry

- Energy consumption
- Production index
- Value added
- CO_2 emissions by branch

15 main branches plus 5 energy intensive production (cement, glass, ferroalloys, aluminium, pulp & paper)

Data required for ODYSSEE indicators: transport & household

Transport

- Energy consumption by fuel
- Stock of vehicles
- Traffic in passenger-km and tonne-km
- Kilometers/vehicle
- CO2 emissions by vehicle

→

- By mode (road, rail, air, water)
- By type of vehicles (car, bus, motorcycle, bus, trucks, light vehicles) *(cross-border trade/fuel tourism)*

Households

- Energy consumption by fuel
- Stock of dwellings by type
- Construction of dwelling by type
- Floor area (existing/new dwellings)
- Stock/ ownership of appliances
- Specific consumption of appliances
- CO2 emissions by end-use

→ By main end-use: space heating, water heating, cooking, electrical appliances

→ By type: refrigerators, freezers, washing machine, dishwashers, dryers, TV, micro wave, air conditioning, IT's (set top box, computers (desktop/laptop, DSL)

Data required for ODYSSEE indicators : services & agriculture

Service

- Energy consumption
- Value added
- Employment
- Building floor area
- Sectoral indicators of activity

- By end- use (space heating, cooking, water heating, AC, IT's)
- By branch (6) (public office, private office, health, retail trade, hotels & restaurant, education)

Agriculture

- Energy consumption
- Value added

1. Overview of data necessary for the ODYSSEE indicators
2. Qualification of data in ODYSSEE data base

Enerdata

Qualification of ODYSSEE data and indicators

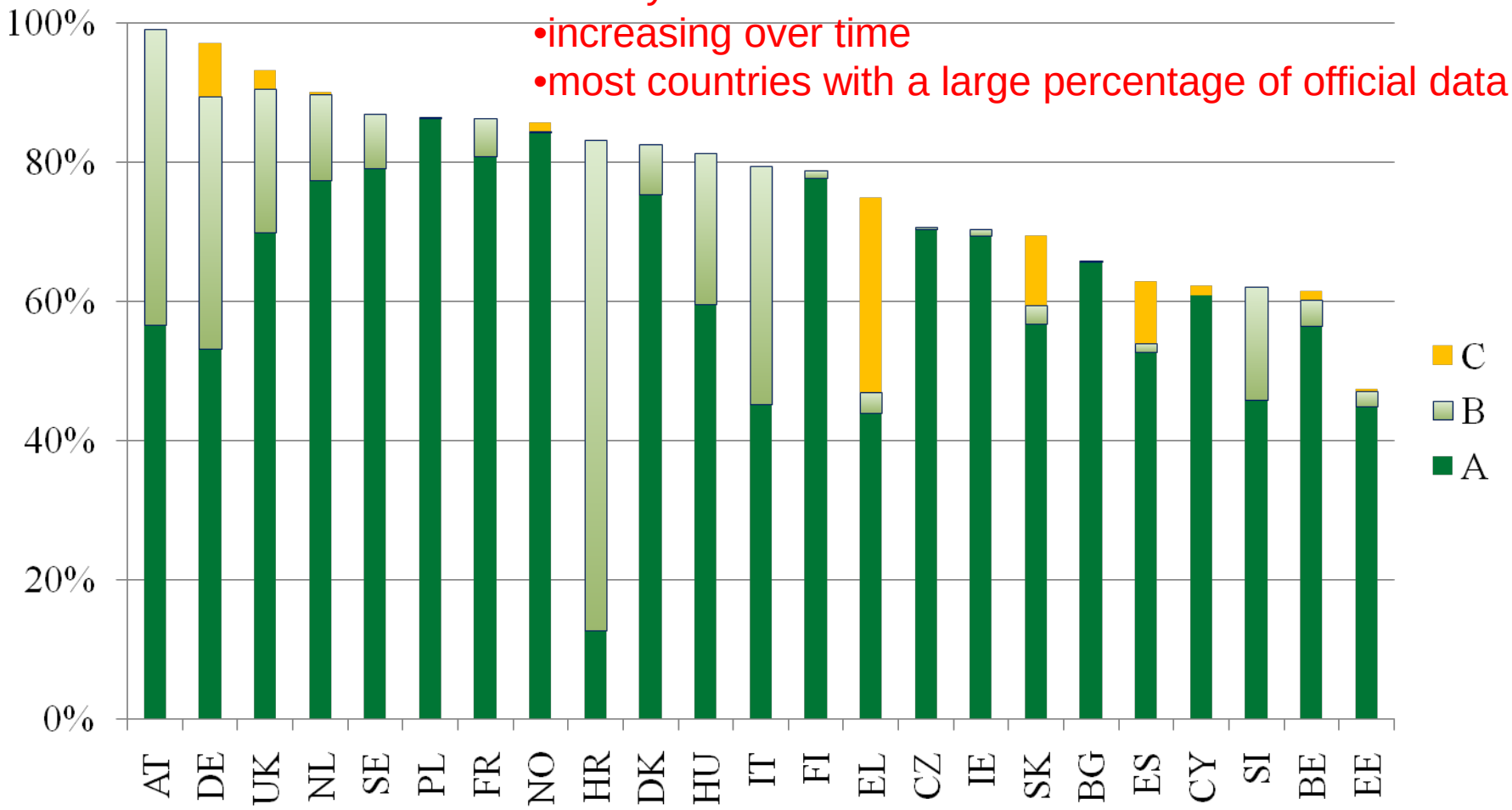
- National teams have been asked to qualify the sources of all Odyssee data, and the uncertainty of the data used to calculate ODEX (i.e. key data)

- Qualification of sources:
  - A: Official sources statistics: national statistical office, Eurostat/AIE, Ministries statistics ; model estimations used as official statistics ; all data "stamped" by Ministries
  - B: Surveys/ modelling estimates : consulting, research centres, universities, industrial associations
  - C: Estimations made by national teams (for the project)

- Data uncertainty:
  - 1 Good: low uncertainty
  - 2 Medium: medium uncertainty
  - 3 Poor: large uncertainty

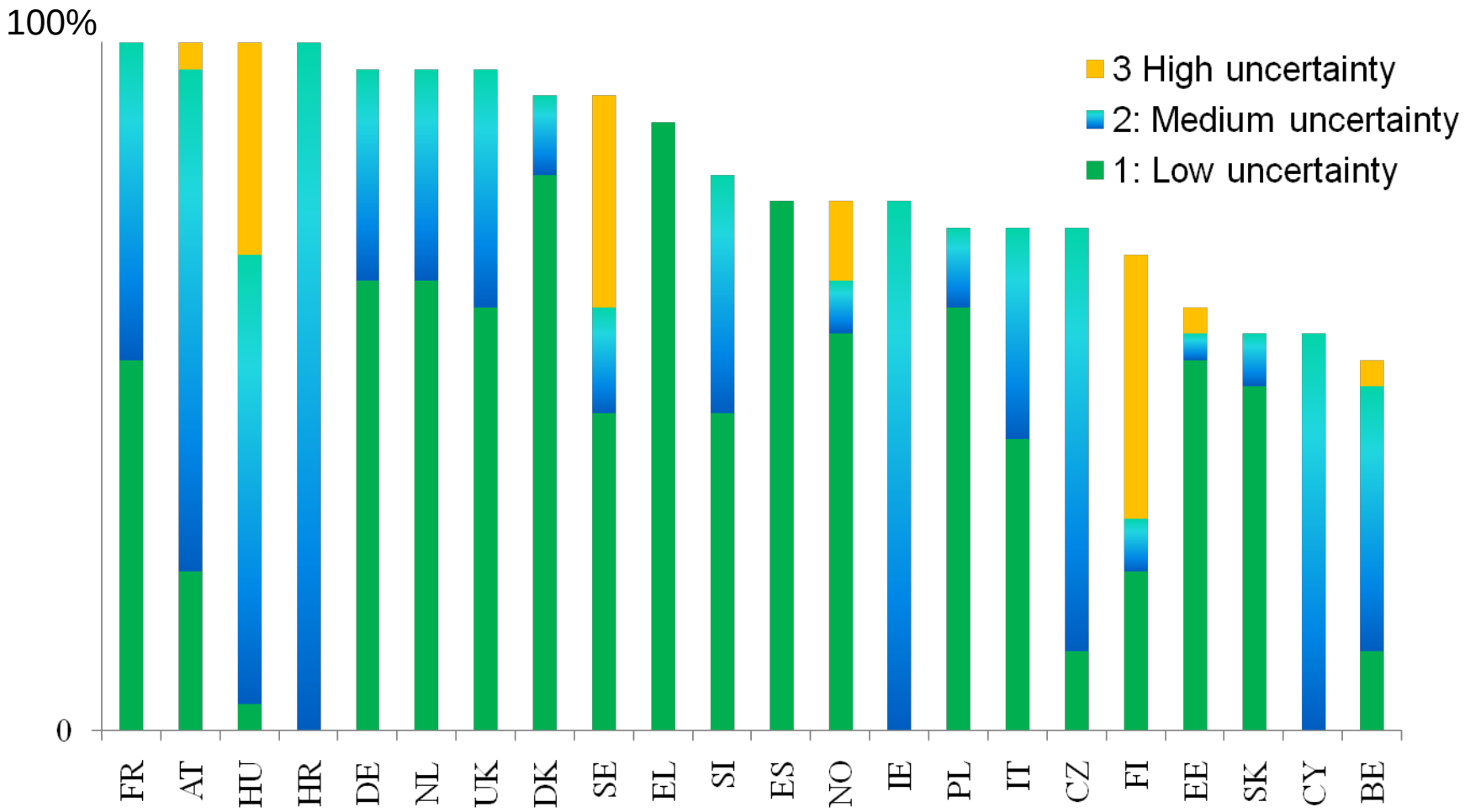
Quality of data sources for all ODYSSEE data

- between 60 and 100% of data available according to country
- increasing over time
- most countries with a large percentage of official data



A: Official statistics B: Surveys/ modelling C: Estimations

Uncertainty of key data*



*data used to calculate energy savings and energy efficiency gains by sector