



IEA workshop on Energy Efficiency indicators

**Recent development of the energy
efficiency indicators in the EU-25
The ODYSSEE project**



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- **Political issues?**
- **Methodology: why type of indicators in Odyssee?**
- **Recent developments and results for EU-15 and NMC's on EE indicators and « CO2 demonstrable progress »**
- **Dissemination and future strategy**



ODYSSEE : a brief reminder

- A comprehensive and detailed technico-economic data base on Energy Efficiency Indicators and CO2 indicators at macro or sectoral levels or end-use levels (cars, cement space heating etc...)
- A network able to review and report on past achievements of energy efficiency trends at EU and national levels.

ADEME



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Fraunhofer Institute Systems and Innovation Research



ECONOTEC CONSULTANTS

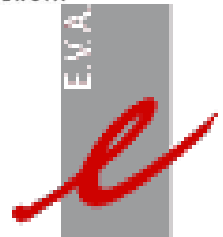


Instituto para la Diversificación y Ahorro de la Energía

Miner



AGÊNCIA PARA A ENERGIA



CRES





The EU NMC's network

- **Coordinator** **ADEME**
- **Technical coordination**
- **ENERDATA (fr); FHG-ISIS (ger); ISIS (ita); DEA (den); ECS (bel)**
- **National teams**
- **CEA (Cz); ENVIROS (Cz); SEA (Slk); SORS (Slk); ENA (Lat); LIDA (lit); TUT (Est); JSI (Slv); ENCEN (Hun); KAPE (Pol), GUS (Pol); MRA (Malta); CIE (Ccyp); EEA (Bul)**



Monitoring the revival of energy efficiency policies

- **At EU level**, important pieces of legislation have been adopted to reach the target of the ECCP, EEAP, Green Paper on EE (directives on ETS, building, cogeneration, labelling) or are in negotiating process (energy service directive, eco design).
- **In the UNFCCC process**, the application of decision 13 CP.7 and art2 (1)b of the KP, on **exchange of information on good practices of P&Ms** and the obligation of **reporting on Demonstrable Progress (Art. 3.2 KP)** certainly rely on the setting up of a monitoring system for P&Ms.
- **At national level**, there is a need for evaluation of the impact of public funding dedicated to EE P&Ms

 An increasing need for monitoring P&Ms implementation



The Energy Services Directive: The 3 pillars of M & V

- Bottom-up calculations of energy efficiency measures to show estimated or metered impact of measures taken.
- Top-down systems of energy efficiency indicators can show past improvements, including effects of horizontal measures and market transformation.
- Benchmarking of selected energy efficiency indicators (including from bottom-up measures and top-down systems). Annex IV a.





The Energy Services Directive Target: Article 4 and Annexes I, II,

- Measured as from 1.1.2008.
- 9-year 9% target (cumulative annual savings).
- Intermediate target for 3rd year.
- Base for calculating target is 5-year average of unadjusted final consumption.
- Conversion table in Annex II (2.5 for electricity).
- Early actions initiated not earlier than 1995 (1991).
- Early actions of a technical nature should be updated or assessed in relation to the benchmark for such measures. (All must be verifiable and measurable or estimable.)





The Energy Services Directive Annex IV: General Framework for M & V

- Harmonised calculation model using combination of top-down and bottom-up methods.
- Committee to use if possible available data.
- Top-down calculations to be adjusted for degree days, structural changes, product mix and other extraneous factors.
- Existing models such as ODEX used to extent possible.
- With top-down and bottom-up together, risk of double-counting to be avoided.



Decision 280/2004/CE (article 1)

- To perform the GHG inventories.
- To carry out a report on demonstrable progress on KP commitment
- Article 7 : Values of the indicators of the priority list , on a yearly basis (table II- 1; II-2 ; II-3 of annexe II)



Why many indicators?

- In the **ODYSSEE** project : **about 200 indicators** and number is increasing
- Each indicator **answer to a specific question** : depending on the question, one or several indicators can be considered
- **Energy efficiency has different meaning and frontiers** (economic efficiency versus technical efficiency)
- Several indicators often necessary to cope with possible **data gaps** (alternative indicators)
- **Interpretation** provided by comparing several indicators



Originality of the ODYSSEE project on indicators

- Unique data bases by its comprehensive content (about 200 indicators) and time coverage (1970 - 2004)
- **Interpretation of indicators** trends : important component of the project ; this justifies the involvement of national agencies → not a project on statistics
- **Large set of indicators** to address the various definition of energy efficiency and CO2 abatements
- **Interpretation is enriched by comparing different indicators for a given sector** (eg energy versus CO2, various indicators for cars or for industry)

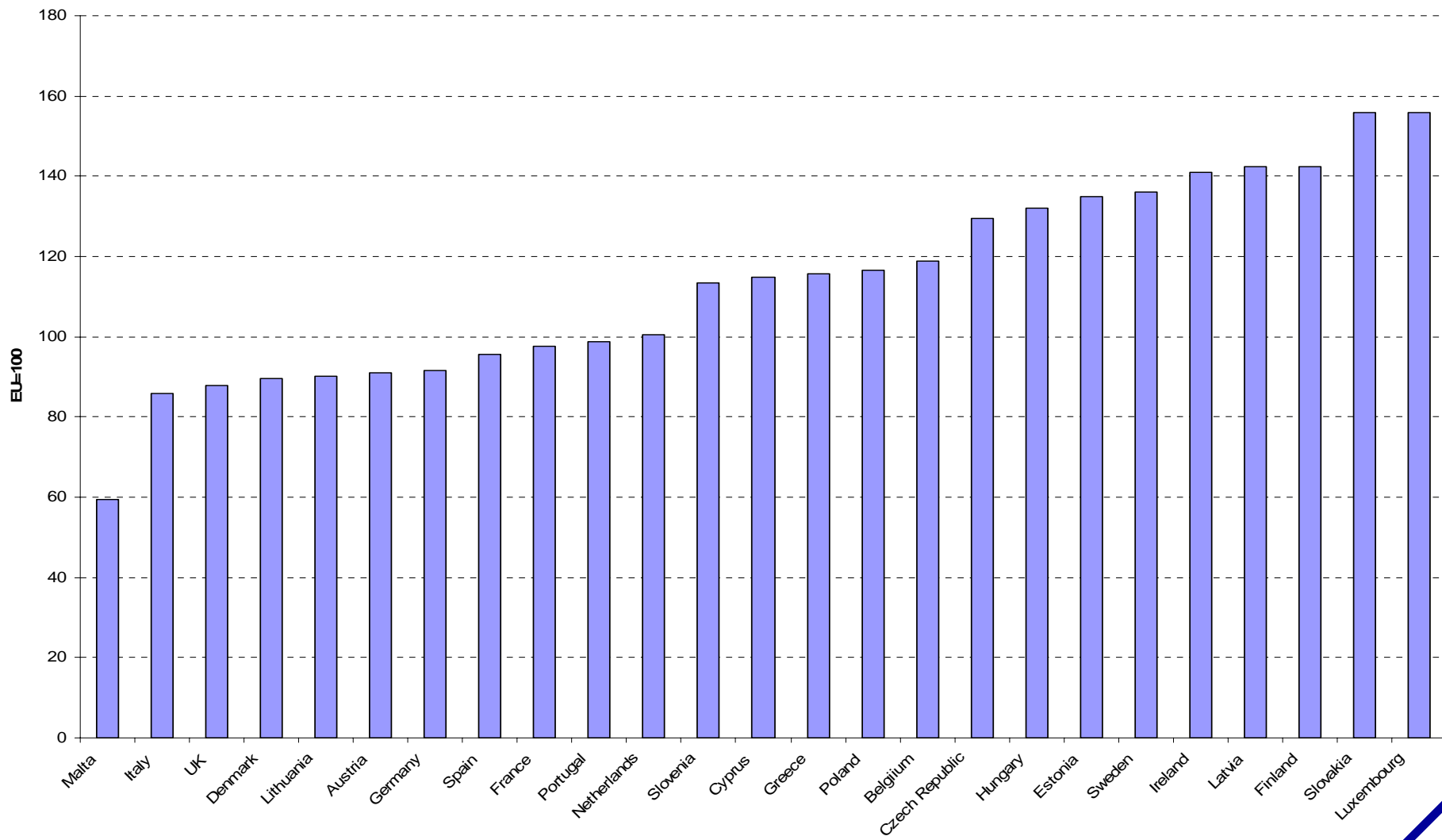


Energy efficiency and CO2 indicators

- **Macro-economic indicators**, such as energy intensities
- More detailed **technical and economic indicators**, at the level of sub-sectors (industry, services), end-uses (heating, major household electrical appliances), modes of transport (cars, trucks...), so as to improve the interpretation of the factors behind the trends observed (technical, behavioural, economic...).
- The **newly developed energy efficiency indices** (“aggregate bottom–up indicators”) that provide a synthetic overview of sectoral trends in energy efficiency. **ODEX**
- Understanding the differences between countries in their relative performance and comparing them with **benchmark values** (the EU average, the three best EU countries) will be also part of the study (“**adjusted**” and “**target indicators**”).



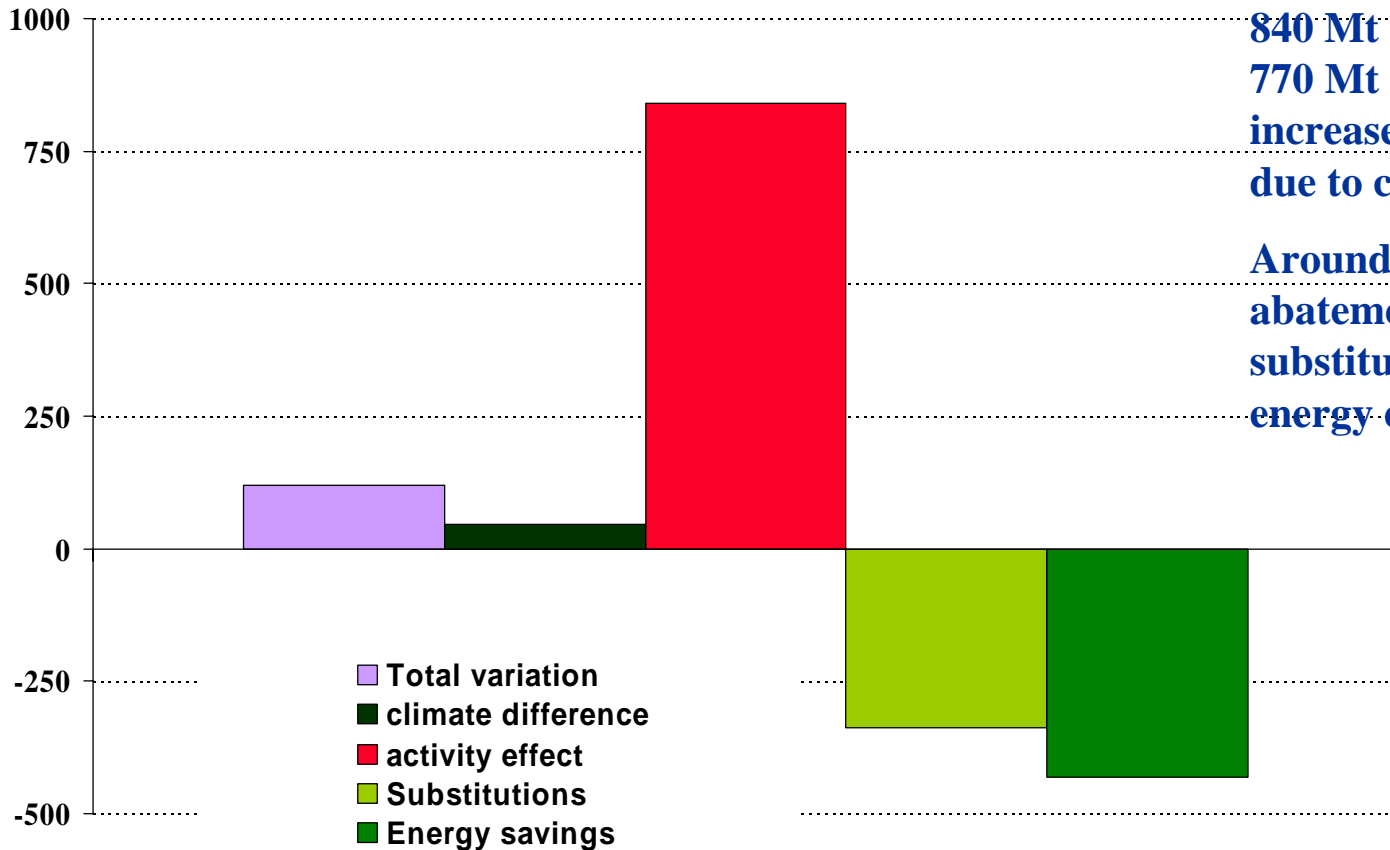
Final energy intensity adjusted to same climate, industry & economic structure at current purchasing power parities (reference of climate and structure: EU15 average)





Due to substantial savings, total CO₂ energy-related emissions are in 2003 only 4% above of 1990 level in the UE-15

Factors of variation of total CO₂ emissions in the UE-15 (Mt CO₂) (1990-2003)



Impact of economic growth (+840 Mt CO₂) largely balanced by 770 Mt of savings → emissions increase of 120 Mt (gap of 70 Mt due to climate differences)

Around 45% of emissions abatements are due to fuels substitution and 55% related to energy efficiency improvements.

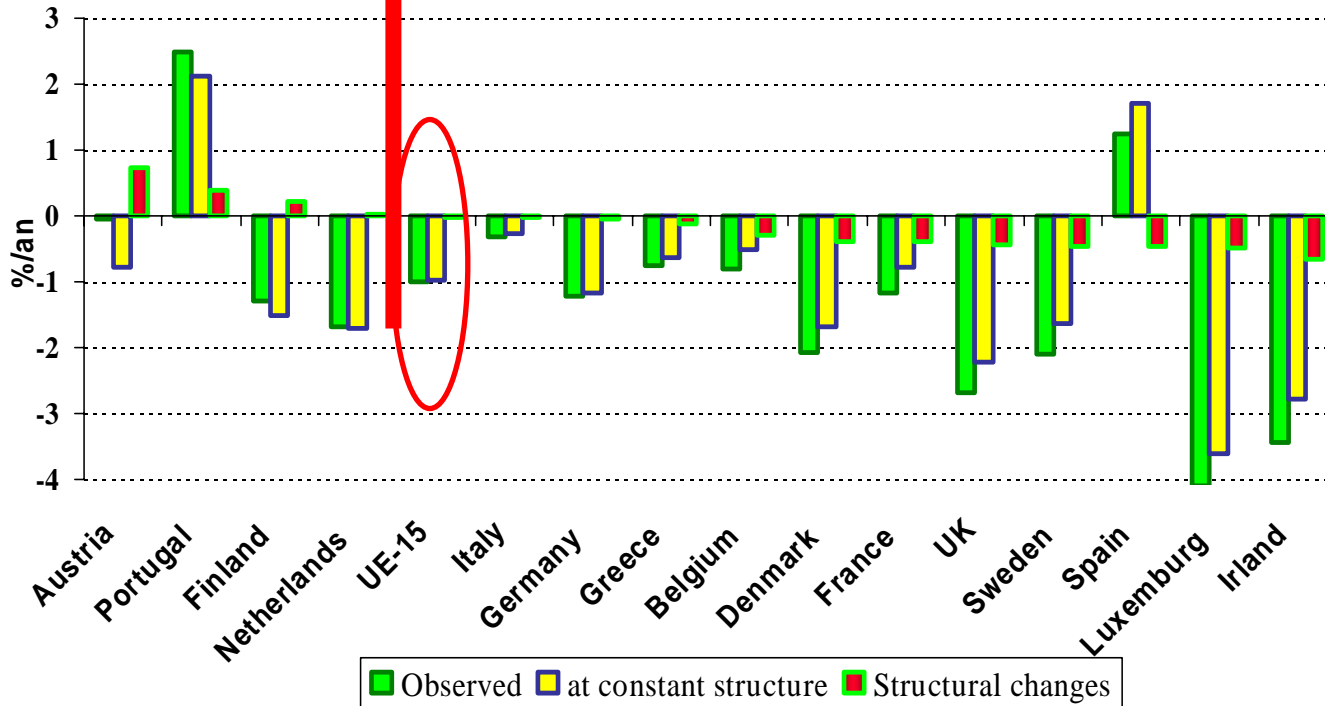


Structural changes in the economy have had a marginal influence at the UE-15 level but very variable according to the countries

Structures **more** energy intensive

Structures **less** energy intensives

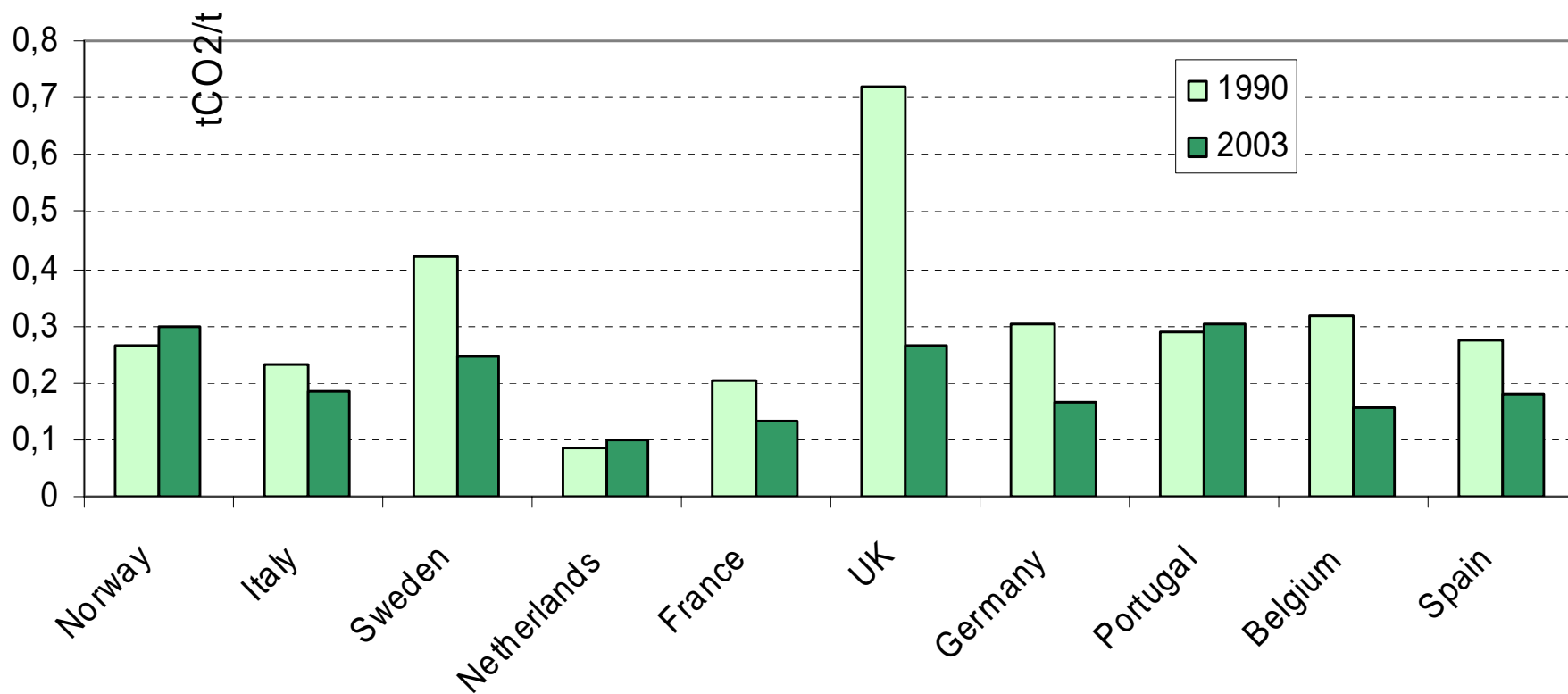
Structural changes of the economy only explain 10 % of the final energy intensity in the UE-15.



1993-2002



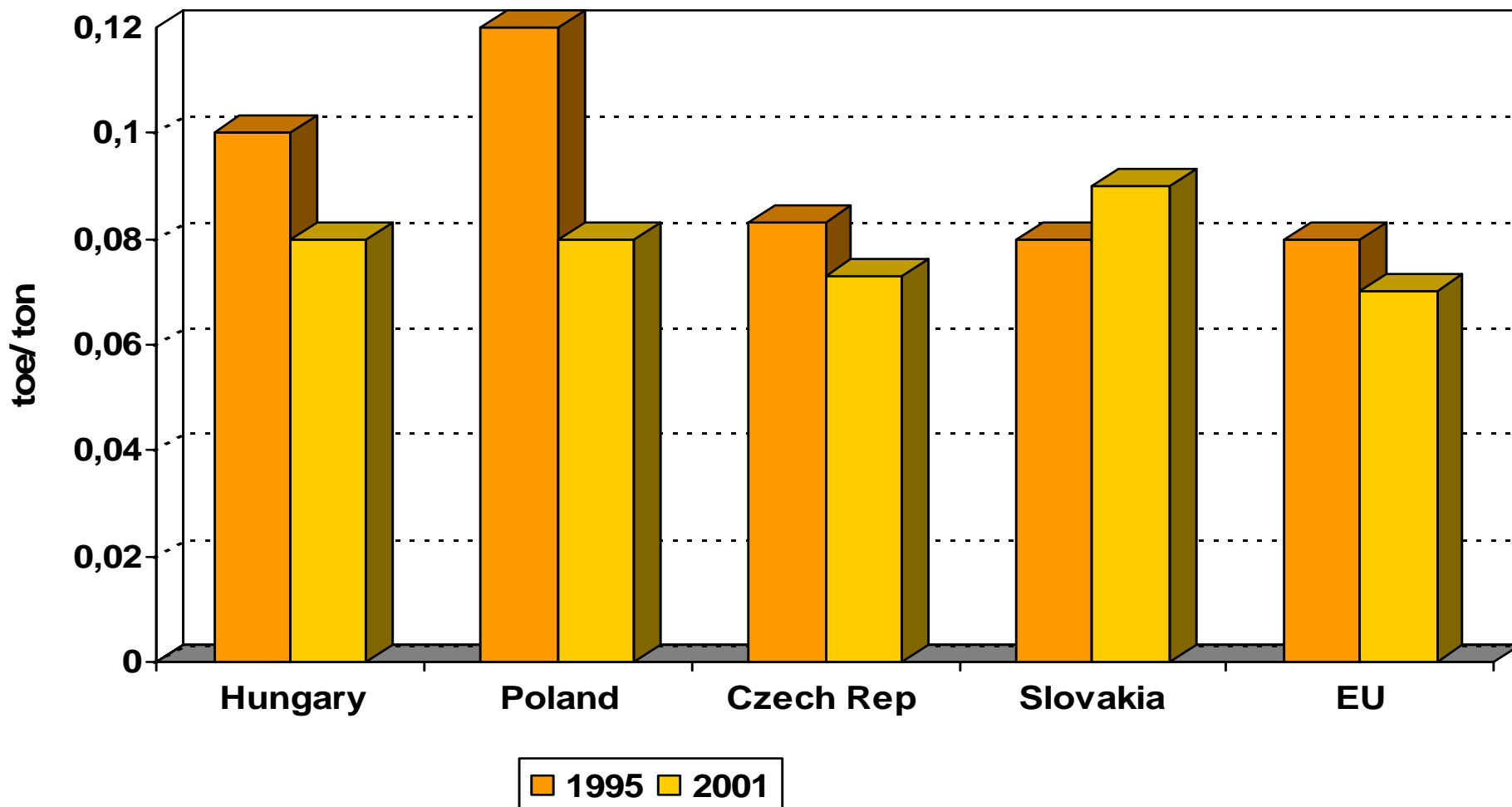
Co2 emissions per ton (Cement)





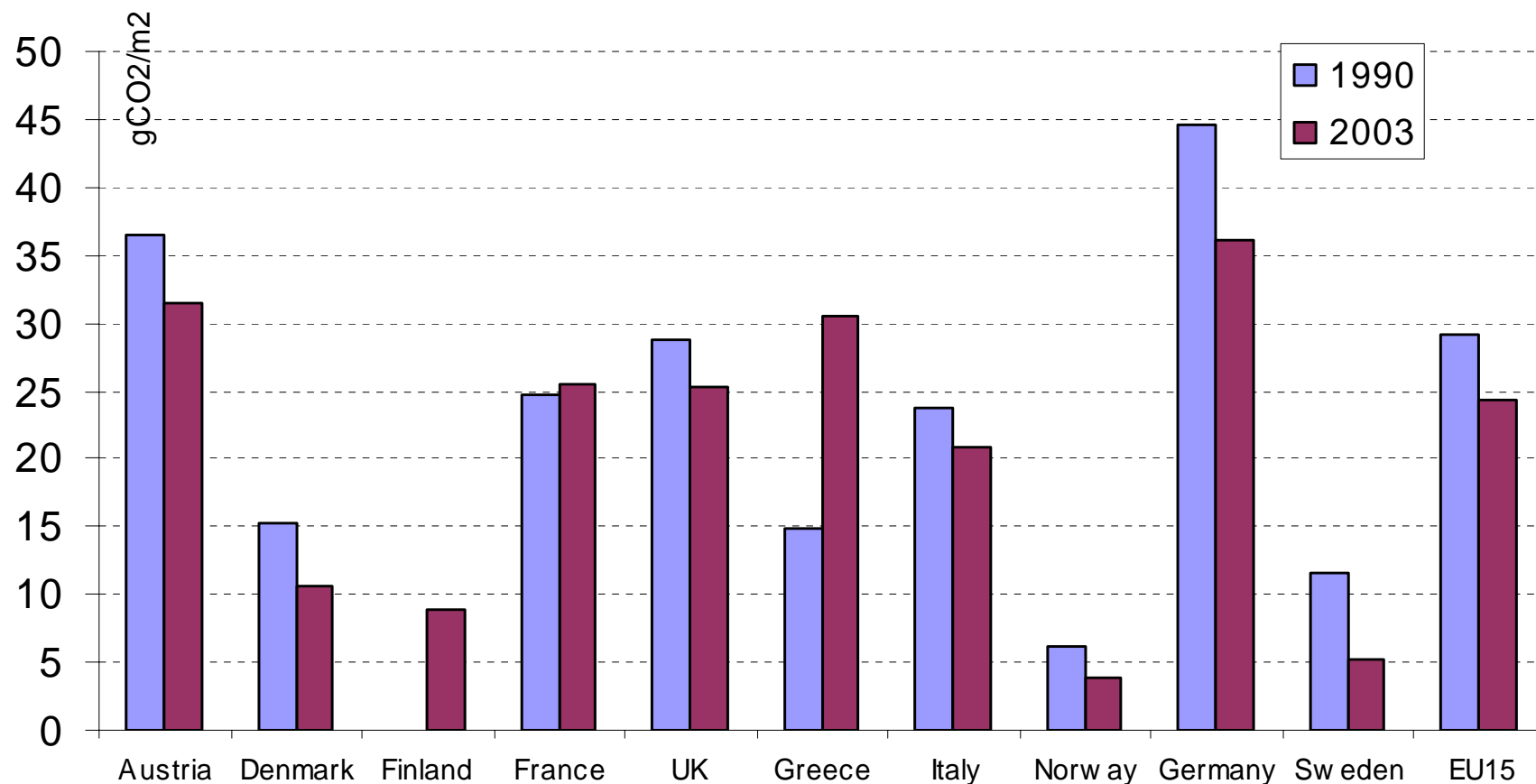
Unit consumption of cement

Same situation for cement as for steel , convergence of performance across countries



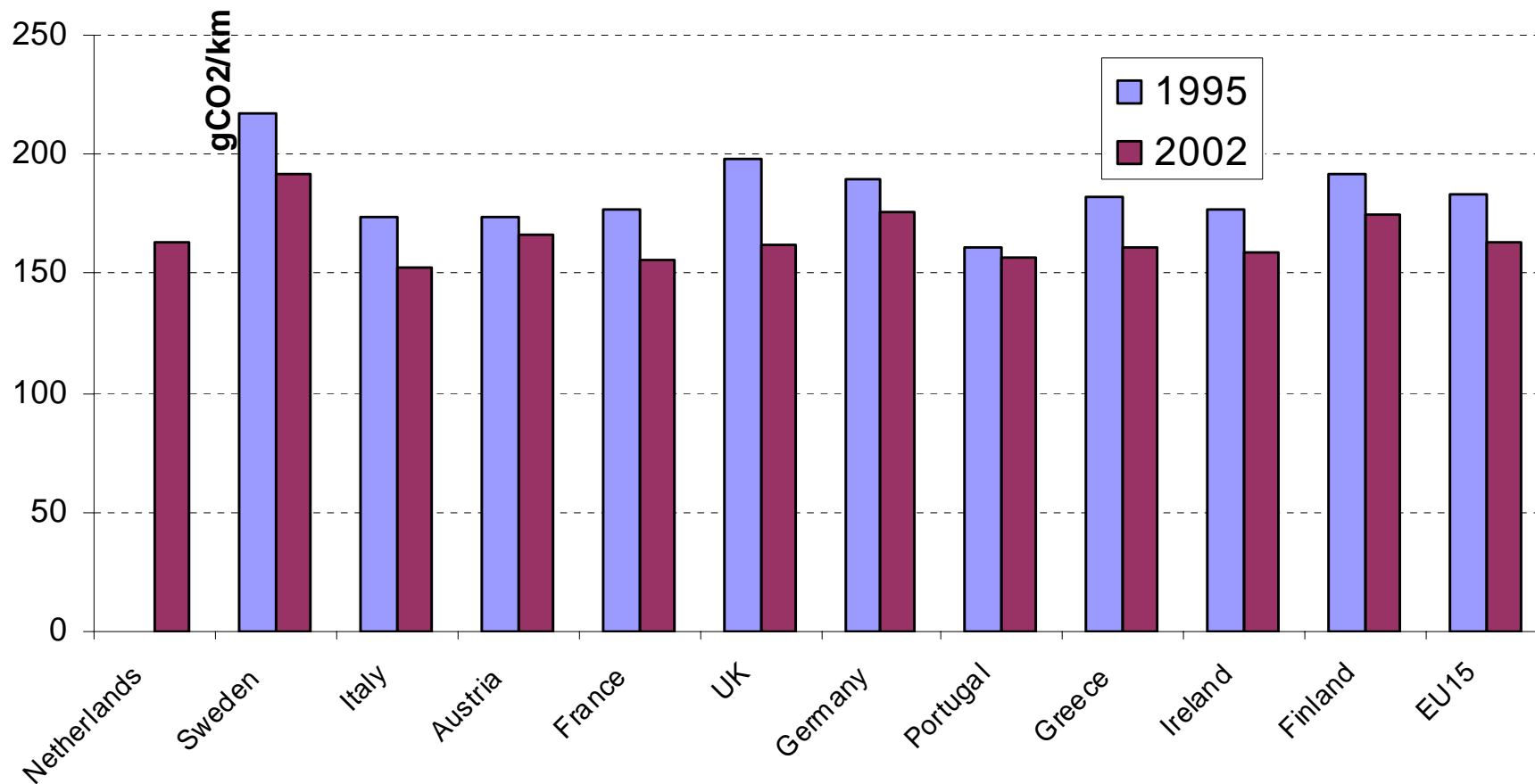


Co2 emissions per m2 Space heating for household



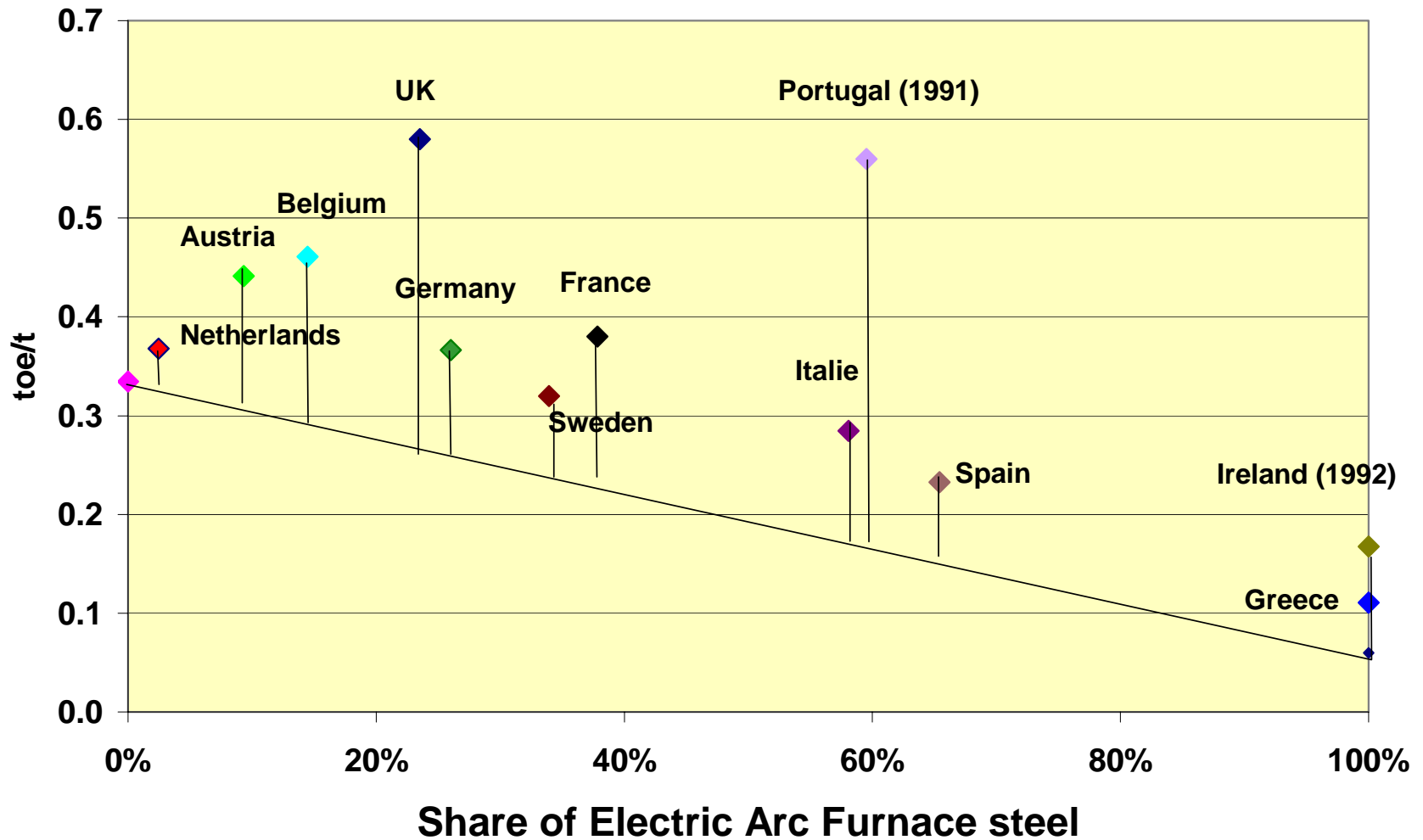


CO₂ emissions per km for new of cars





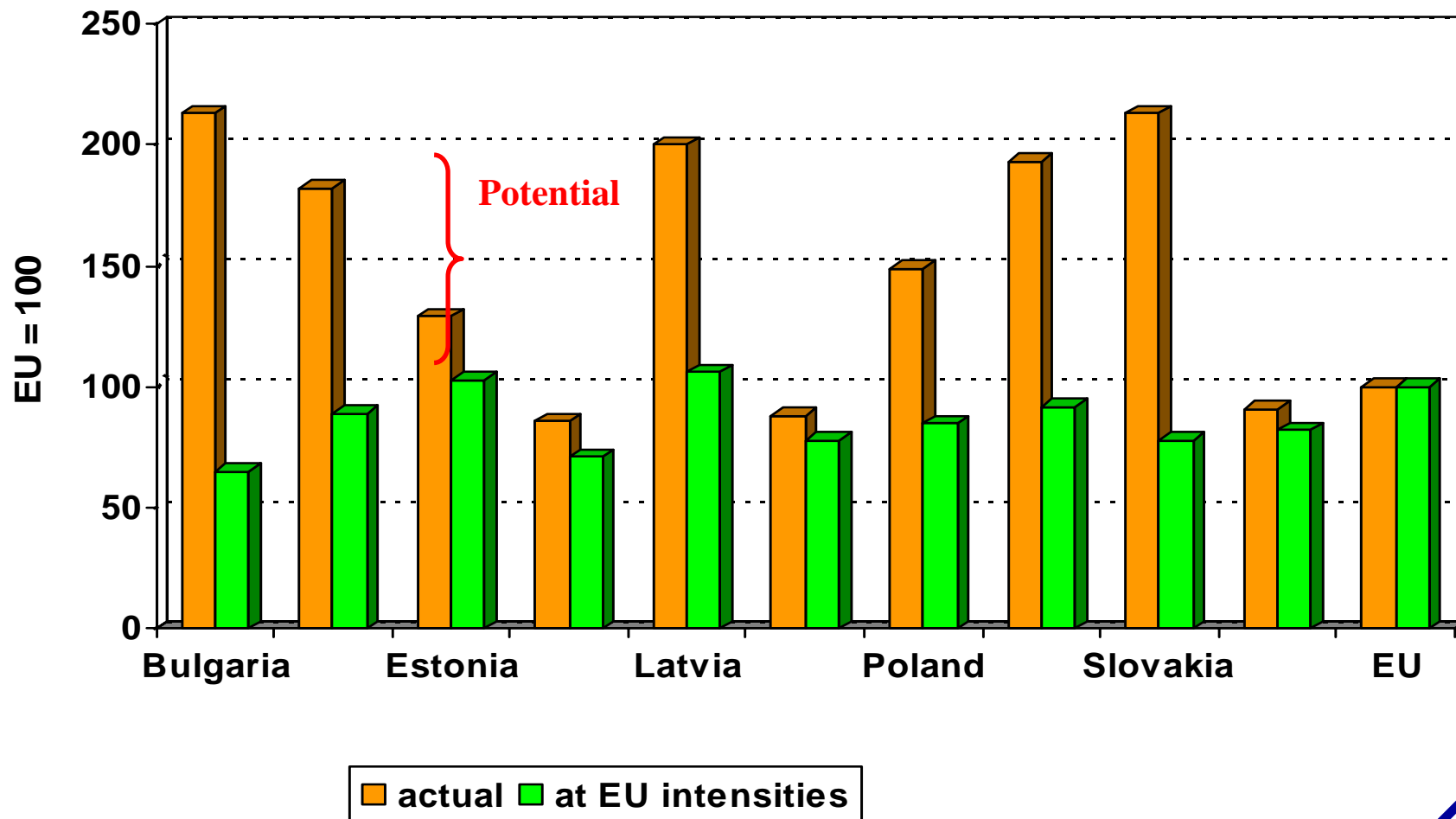
Specific energy consumption of steel: role of different process mix





Target intensity of manufacturing : potential of energy intensity improvement in manufacturing

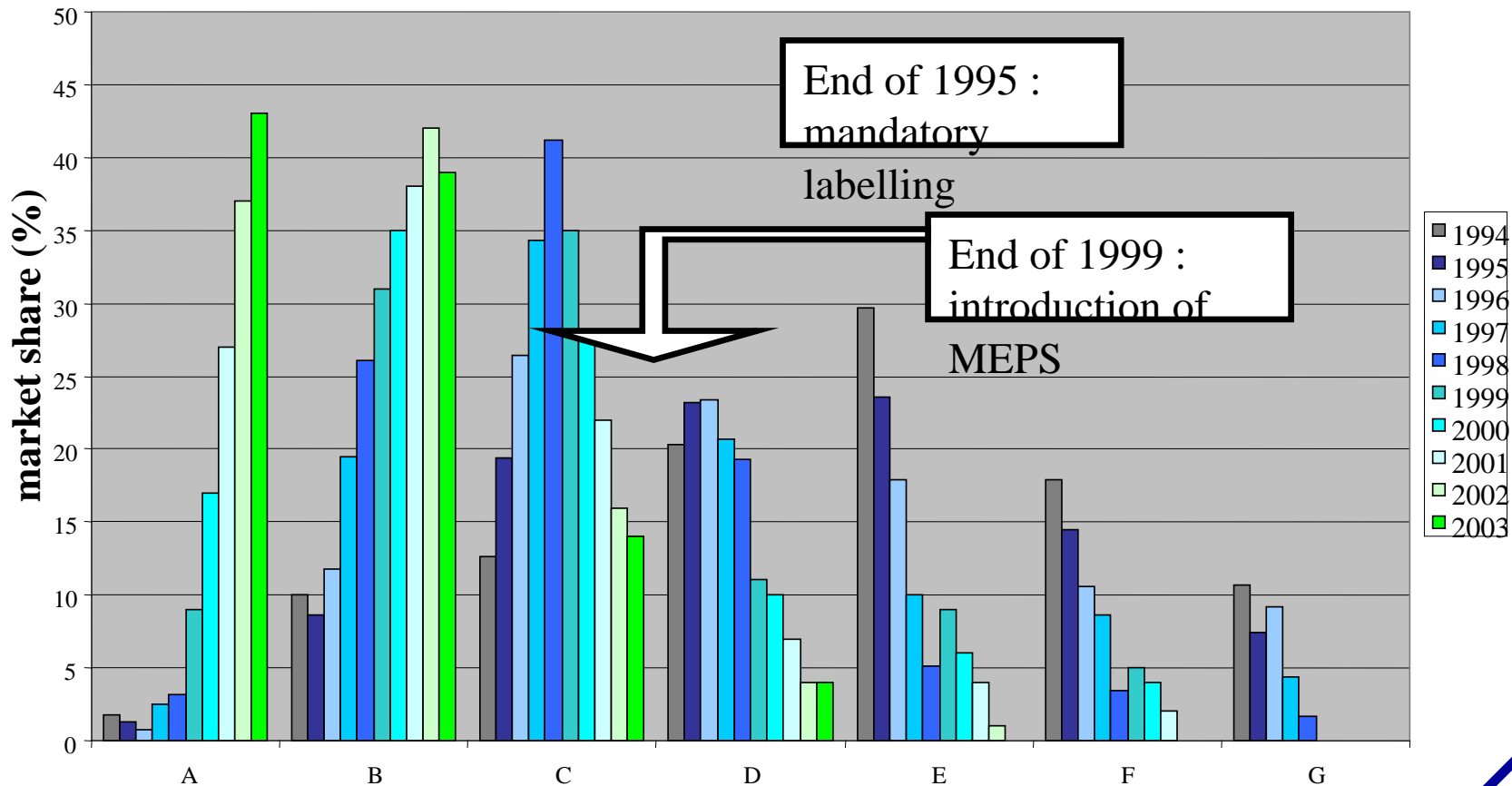
Difference between these two intensities give the magnitude of the potential





Impacts of labels and standards

Refrigerators / Freezers (France)





Energy efficiency :bottom up index

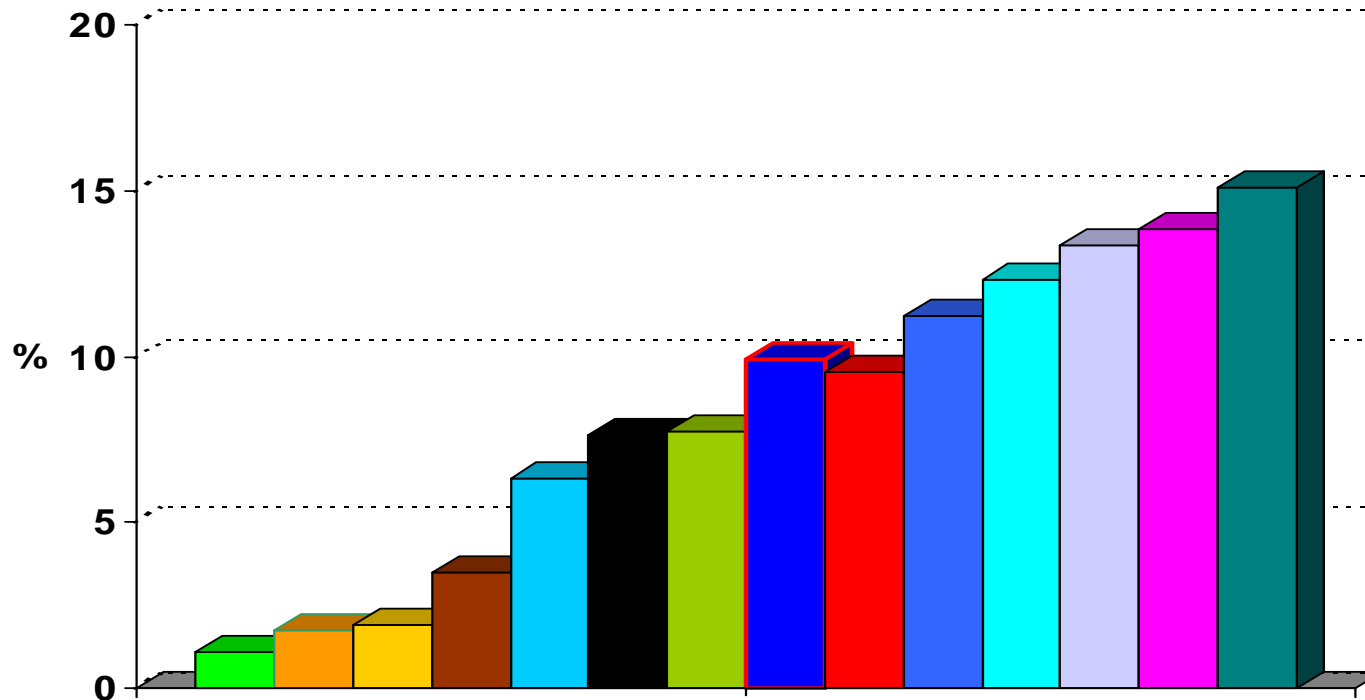
The top down indicator of the ESD?

- **Aggregate** trends in indicators by end-use , equipment, transport mode... **in a single indicator** for the whole sector and the country
- 26 indicators used (7 in transport, 9 for households and 9 in industry, 1 in services)→ **“ODEX”**
- **Provide substitute indicators** to energy intensities (industry and transport) or unit consumption (per dwelling for households) to describe trends by sector and help in the evaluation of policies and measures



Energy efficiency at final consumers level has improved of 10 % in the UE-15 since 1990

Energy efficiency gains at final consumers level between 1990 et 2002



- | | | | | |
|---|---|--|--|--|
| ■ Italy | ■ Netherlands | ■ Spain | ■ Belgium | ■ Greece |
| ■ Sweden | ■ Portugal | ■ UE-15 | ■ U-K | ■ France |
| ■ Germany | ■ Finland | ■ Denmark | ■ Austria | |

All countries improve their efficiency ; great discrepancies across countries.

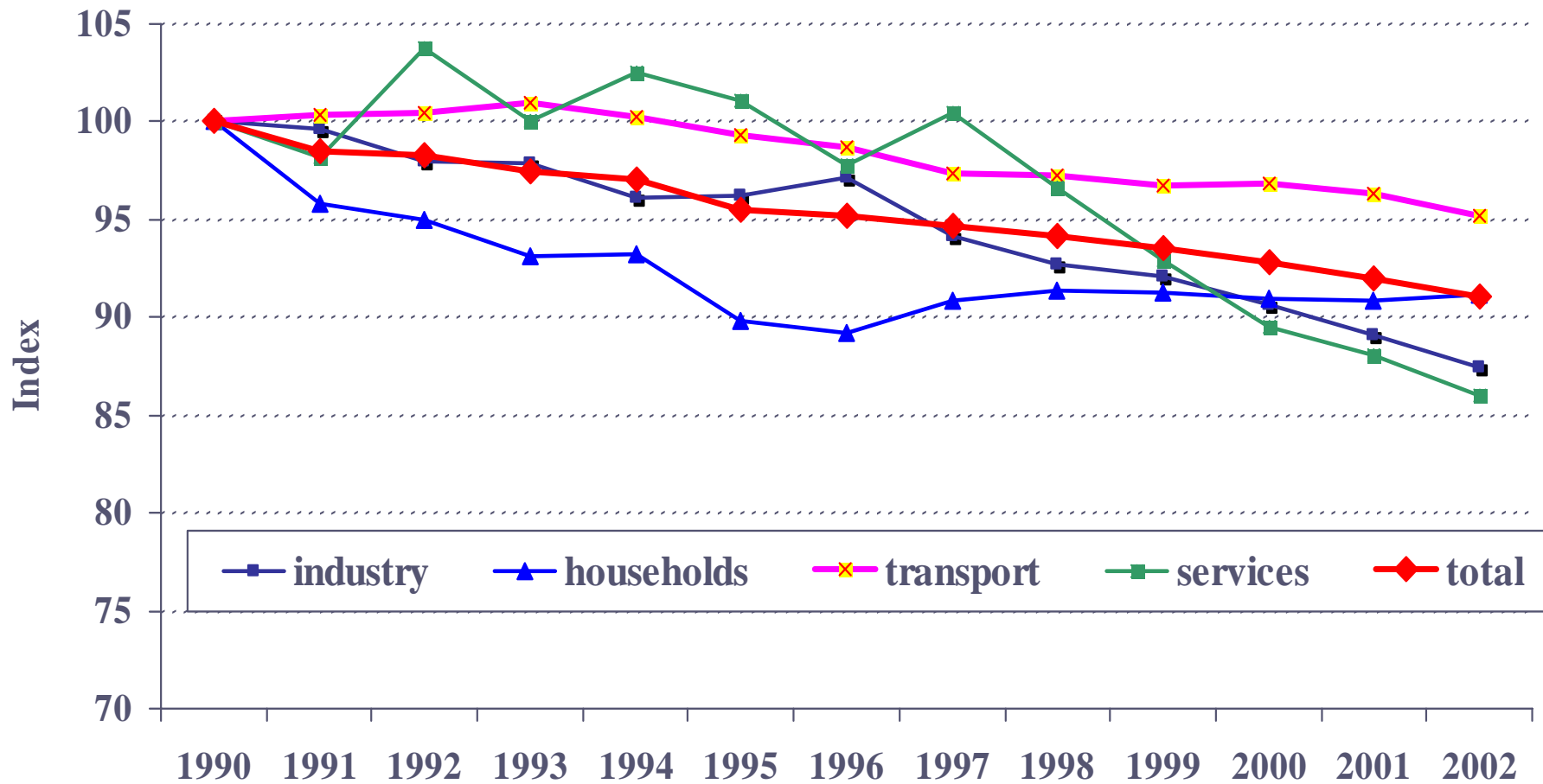
These efficiency gains are calculated with an index so-called ODEX , which weights gains observed in 30 end-uses

ODEX allows the monitoring of the ESD



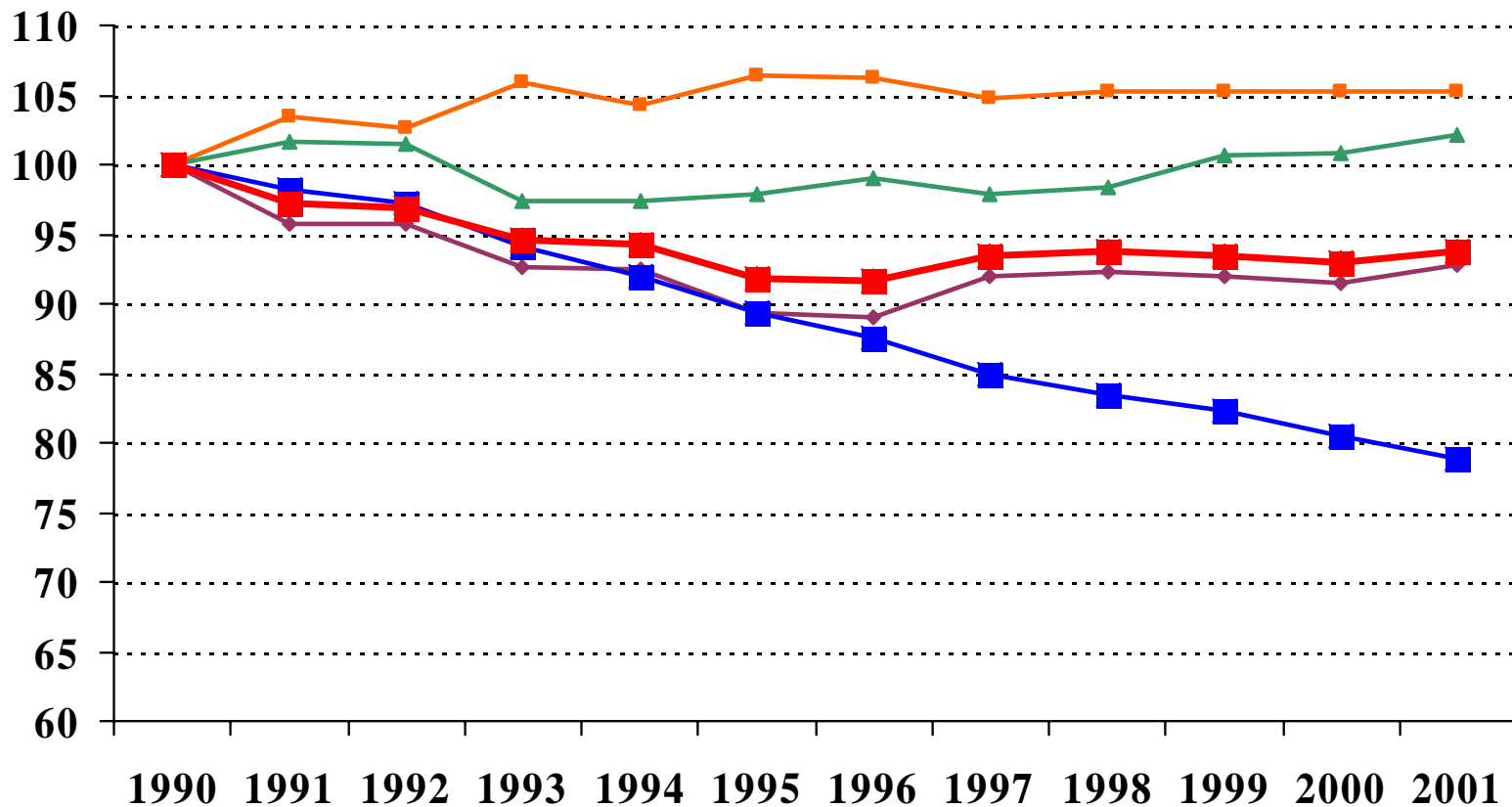
Energy efficiency is improving in the EU-15

Almost 10% since 1990: main improvement in services (15%) and industry with 13% against, 5% in transport and 8% in households





Energy efficiency index for the household sector : **about 6 % efficiency progress since 1990; no progress since 1995**





ODEX current development

- **Extension of ODEX (transformation, primary energy)**
- **Sliding reference year (n-1)**
- **3 years moving average**
- **Cleaning of behavioural changes in household**
- **Short term odex**
- **CO2 odex**



Dissemination/ deliverables (2005-7)

- 7 yearly workshops (France, Spain, Italy, budapest, EC)
- Final report including 25 national reports on recent energy efficiency and CO2 trends
- 4 books including in 2005 « **Monitoring energy efficiency in the EU-15** »(200 pages), evaluation of energy efficiency policies in europe, a popularisation book en « energy and society)
- Internet dissemination: 2 dedicated websites: odyssee-indicators.com; Mure2.com



Dissemination (2005-7) (cont)

- Others activities
 - ↳ 5 newsletters
 - ↳ 2 ODYSSEE CD ROM, 1 MURE CD ROM
 - ↳ 2 reviewed journal articles
 - ↳ Promotion of projects results in others international organisations (DG TREN, DG Env, Eurostat, UNFCCC, **IEA**, EEA, WEC, DGrec-JRC, ECEEE, ECS, EnR club etc)



Short term future of the ODYSSEE project

- **IEE 2005-6: ODYSSEE-MURE for EU-15 (1,2 Meuros of which 0,6 from IEE), 2 years, starting 1/1/05, including more emphasis on P&M 's evaluation**
- **IEE 2006-7 : extension to NMCs and first results for EU-25**
- **Use of selected odyssee indicators for the monitoring of the ESD**



Conclusion

- **ODYSSEE-MURE : the current best practice in Europe for monitoring energy efficiency and CO2 abatement in the E.U.**
- **Will provide valuable input for the monitoring of the energy service directive**
- **Extension to EU-25**
- **Transfer to Tunisia and Turkey and possibly to Croatia and Romania**
- **ODYSSEE-indicators.org; MURE2.com**



Conclusion (2)

- **Need of basic harmonised end-use survey ;**
- **Need to improve the « communication » on indicators;**
- **Officialisation of indicators requires a lot of dissemination efforts;**
- **Data collection through official channel will limit the number of E.E. indicators.**
- **Complementary data collection using « good estimates » and expert networking allow us for better detailed analysis of energy efficiency situation**