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Energy Efficiency Around the World

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Promoting the sustainable supply and use of energy for the greatest benefit of all

WEC/ADEME Energy Efficiency Policies and Indicators

ADEME = Agency for Environment and Energy Efficiency, France

Reports 1992, 1995, 1998, 2001, 2004, 2007, 2010, 2013

Interactive **databases** on WEC website

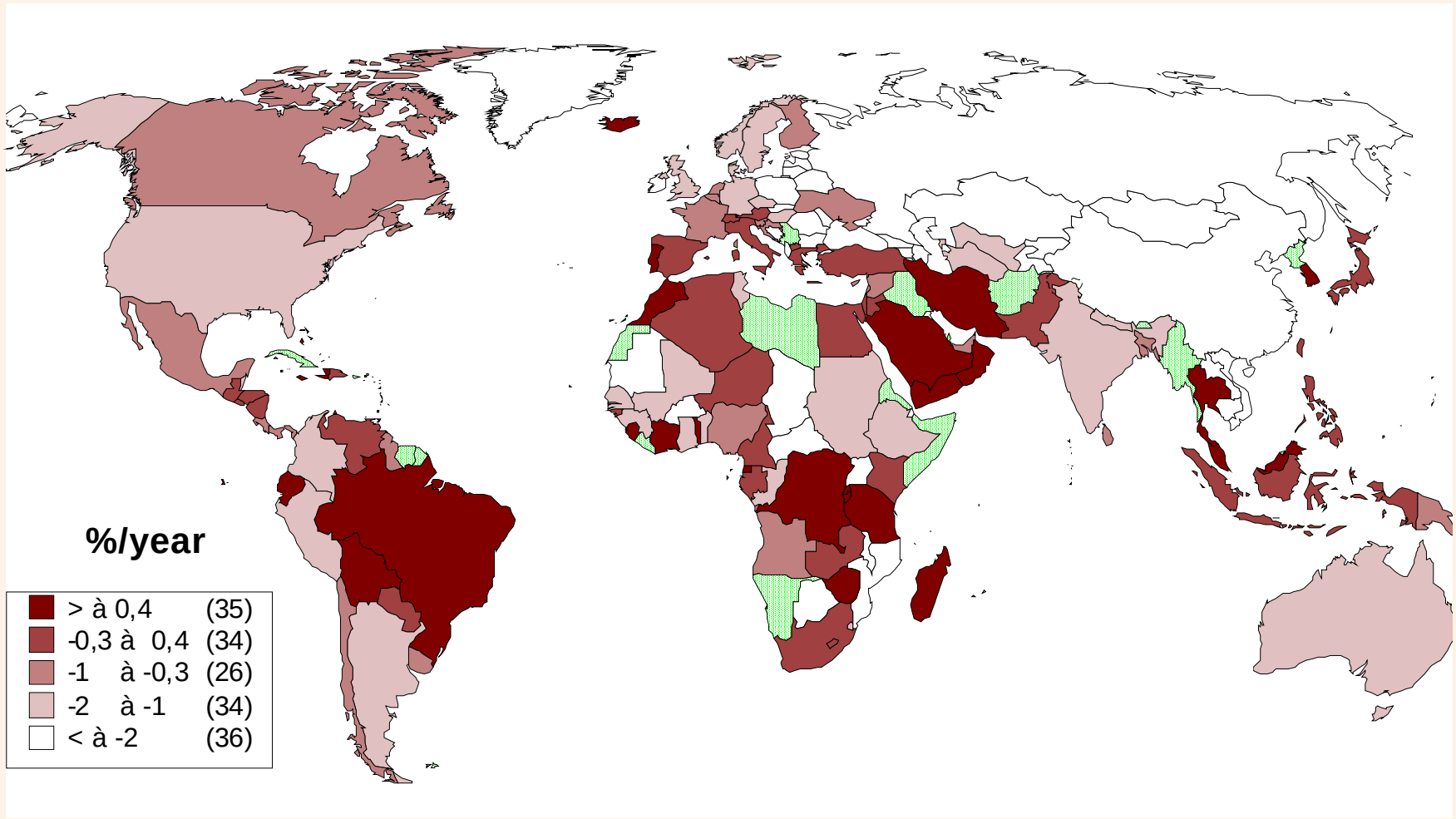
What is Energy Efficiency?

- Reduction in the energy used for a given service
- Technological changes and non-technical factors
- Energy used to produce one unit of GDP
- Reductions in energy use are not energy efficiency

A Wide Range of Opportunities

- Behavior, individual choices
- Efficient and cost-effective technologies
- Many opportunities in the residential sector
- 70% in developing countries
- Technology transfer, capacity building

Energy Efficiency Trends



Energy Efficiency Trends

- Improvements industry-driven in OECD
- Converging industry trends due to globalisation
- Trade-offs in transport
- Continued rapid growth of electricity use in households
- Electricity intensity of the service sector is increasing

Energy Efficiency Trends

- Tripling the energy intensity levels among world regions
- Higher GDP for less energy resulting in large energy savings at the world level
- In less developed regions, the energy intensity is decreasing slower if biomass is excluded
- About 20% of end-use efficiency improvements are offset by higher conversion losses
- Energy efficiency of thermal power generation is improving slowly at world level
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Energy Efficiency Trends

- Final intensities are generally decreasing with economic development and converging
- Changes in economic structure also influence final energy intensities: services require six times less energy inputs per unit of value added than industry
- In transport great disparities exist among regions in the energy intensity trends; certain interesting signals in some OECD countries with a stabilisation of transport energy use

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Energy Efficiency Trends

- The household electricity consumption per capita is rising and showing diverse trends
- One fifth of the world's population accounts for about 60% of world CO_2 emissions
- CO_2 emissions from energy combustion doubled since 1990 in non-OECD Asia
- CO_2 emissions generally increase less rapidly than output

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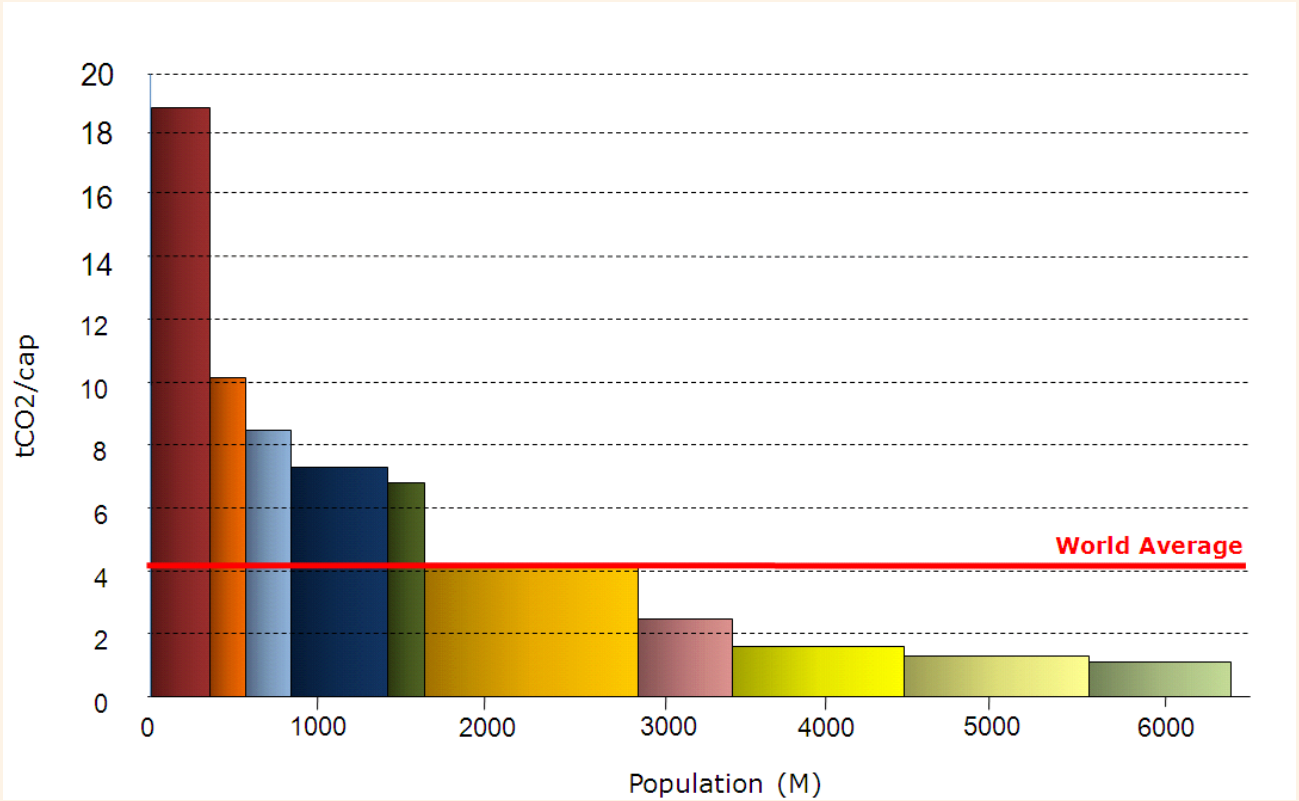
Energy Efficiency Trends

CO_2 emissions per capita



Europe

Europe’s TPES	81.1 Exajoules
Total end-use	50.2 Exajoules

Early rewards have been exhausted

20% potential reduction in energy demand by 2020

A good example to the world with 25% savings potential

How does Europe do it?

District Heating and Cooling

- Waste heat recovery
- Public-private partnerships
- A 6% increase in use of DH = - 9.3% in CO_2

Combined Heat and Power (CHP)

- Co-generation plant in Belgium supplies 200,000 households
- 60 CHP plants for Spanish pulp and paper sector

How does Europe do it?

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Municipal Waste to Produce Energy

- Unicem's Cement kiln in Italy
- 20% of energy from local municipal waste
- 70,000 tonne CO_2 per year

Low Rolling Resistance Tyres

- Tyres consume 20%
- Introduction of silica in 1993
- 50% of car tyres on the replacement market in Europe

How does Europe do it?

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Eco-Driving

- Reduction of 25% for individual drivers after training
- 10% in the long term
- Reduction potential of 50Mt CO_2 by 2010

Advanced insulating glass units

- One m^2 double glazing = +25 kg of CO_2
- Replacing one m^2 of single glazing by double = -91kg of CO_2 per year
- CO_2 recovery in less than four months

How does Europe do it?

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Efficient motors

- 65% of electricity in the EU industrial sector
- 90% can be saved by adjusting motor speed
- 10% equipped with variable speed drives

Lighting

- 14% of electricity in the EU
- 2/3 old low-efficiency technology

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Policy Instruments for Cars Energy Efficiency

- Road pricing
- Car labels for fuel consumption and CO_2 emissions
- Car scrapping
- Biofuels
- Fiscal Measures on Cars
  - Car Purchase Tax
  - Car registration tax
  - Taxation of Motor Fuels

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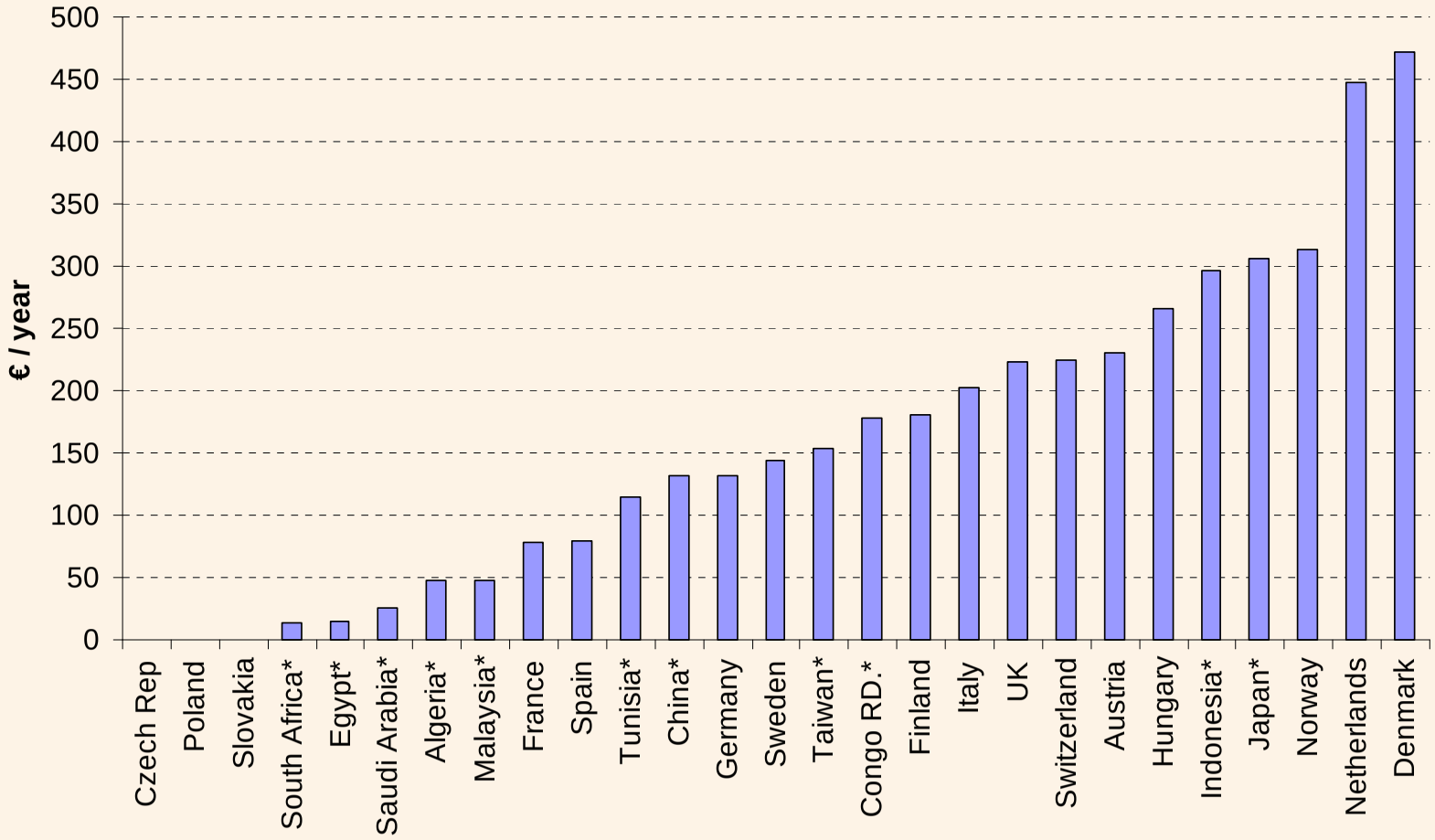
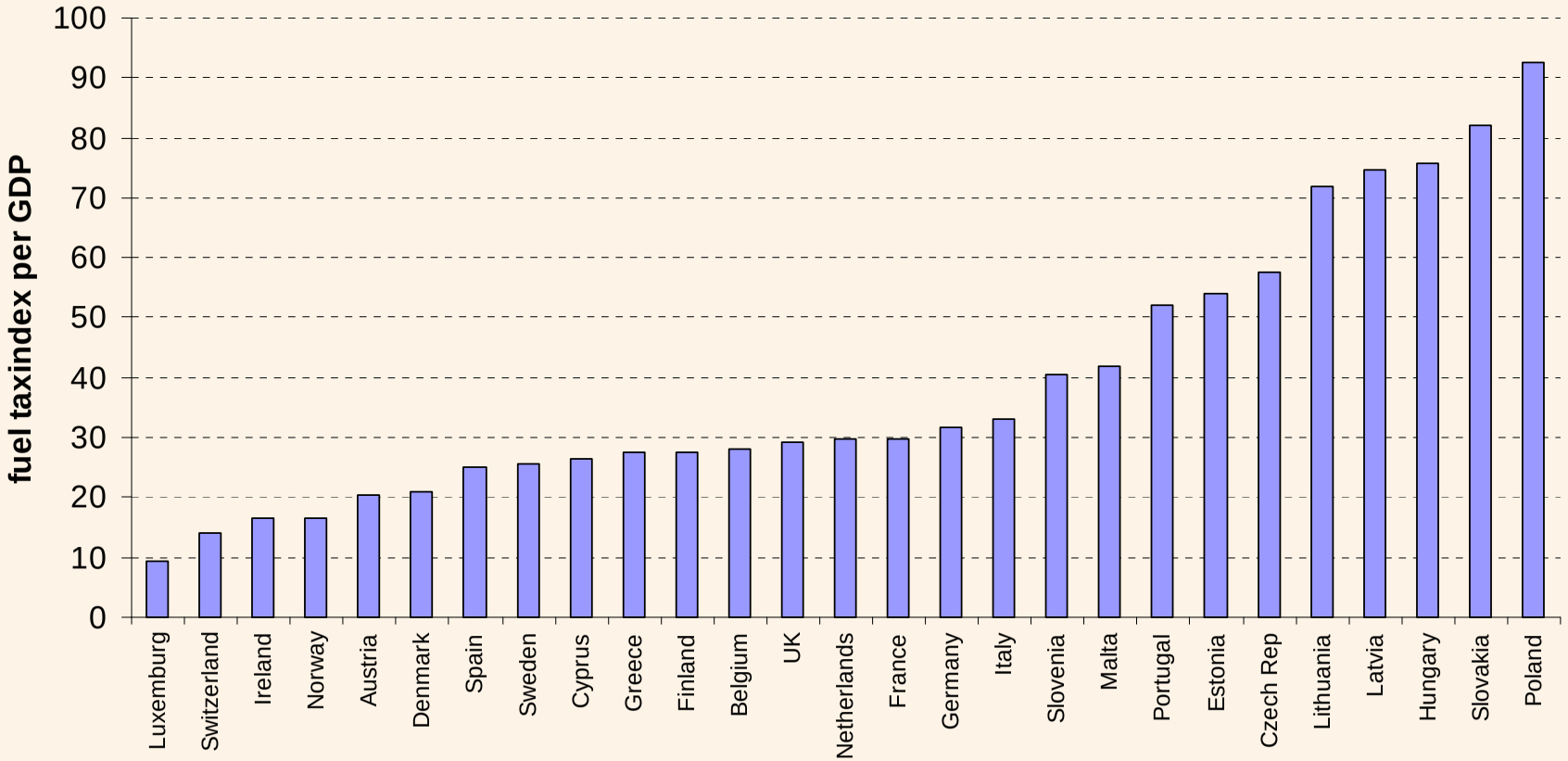
Annual taxes on cars



Gasoline tax index in relation to income tax for 1,000 litres to the GDP per head



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EU Countries with active energy efficiency obligations

Country	Obligated Company	Eligible Customers	Target set by	Administrator
Belgium- Flanders	Electricity distributors	Residential and non energy intensive industry and service	Flemish Government	Flemish Government
France	All suppliers of energy	All except EU ETS	Government	Government
Italy	Electricity & gas distributors	All including transport	Government	Regulator (AEEG)
UK	Electricity & gas suppliers	Residential only	Government	Regulator (Ofgem)
Ireland	Electricity (ESB)	All except transport	Regulator	Regulator (CER)
Denmark	Electricity, gas & heat distributors	All except transport	Government	Danish Energy Authority

Details of current EU Energy Efficiency Obligations

Country	Savings target	Size of target	Discount rate	Cost (€M/yr)	Penalty	Trading
Belgium-Flanders	Annual primary energy	0.58TWh per annum	n/a	25.8	10€/MWh missed + fine not eligible for tariff	No
France	Lifetime delivered energy	54TWh over 3 years	4%	200	20€/MWh missed	Yes
Italy	Cumulative primary energy	33.7TWh in 5th year	0%	90	Related to non-compliance	Yes
UK	Lifetime delivered energy	Carbon weighted	3.5%	570	Related to size of missed quantity	Only between suppliers
Ireland	Lifetime delivered energy	0.24TWh annual	0%	3	Potential reduction in subsequent regulated allowance	n/a
Denmark	Lifetime delivered energy	0.12TWh per annum	6%	20	n/a	n/a

Conclusions & Recommendations

- Incentive pricing
- Stable institutional framework
- Packages of measures
- Public/private partnerships
- Properly applied regulations
- Public sector to lead
- Certification and testing

Conclusions & Recommendations

- Developing countries involvement
- Cover all areas with potential for energy savings
- Tailor to individual countries' needs
- International coordination
- Integrate energy efficiency in all policies
- Evaluation using indicators

World Energy Council

The World Energy Council provides a unique forum for the discussion and sharing of experiences among different countries and stakeholders thus facilitating the introduction and deployment of energy efficiency policies and measures