

Energy efficiency: a worldwide review

Indicators, policies and evaluation

François MOISAN
Director of Strategy and Research
ADEME
With ENERDATA

Energy efficiency option : present concerns

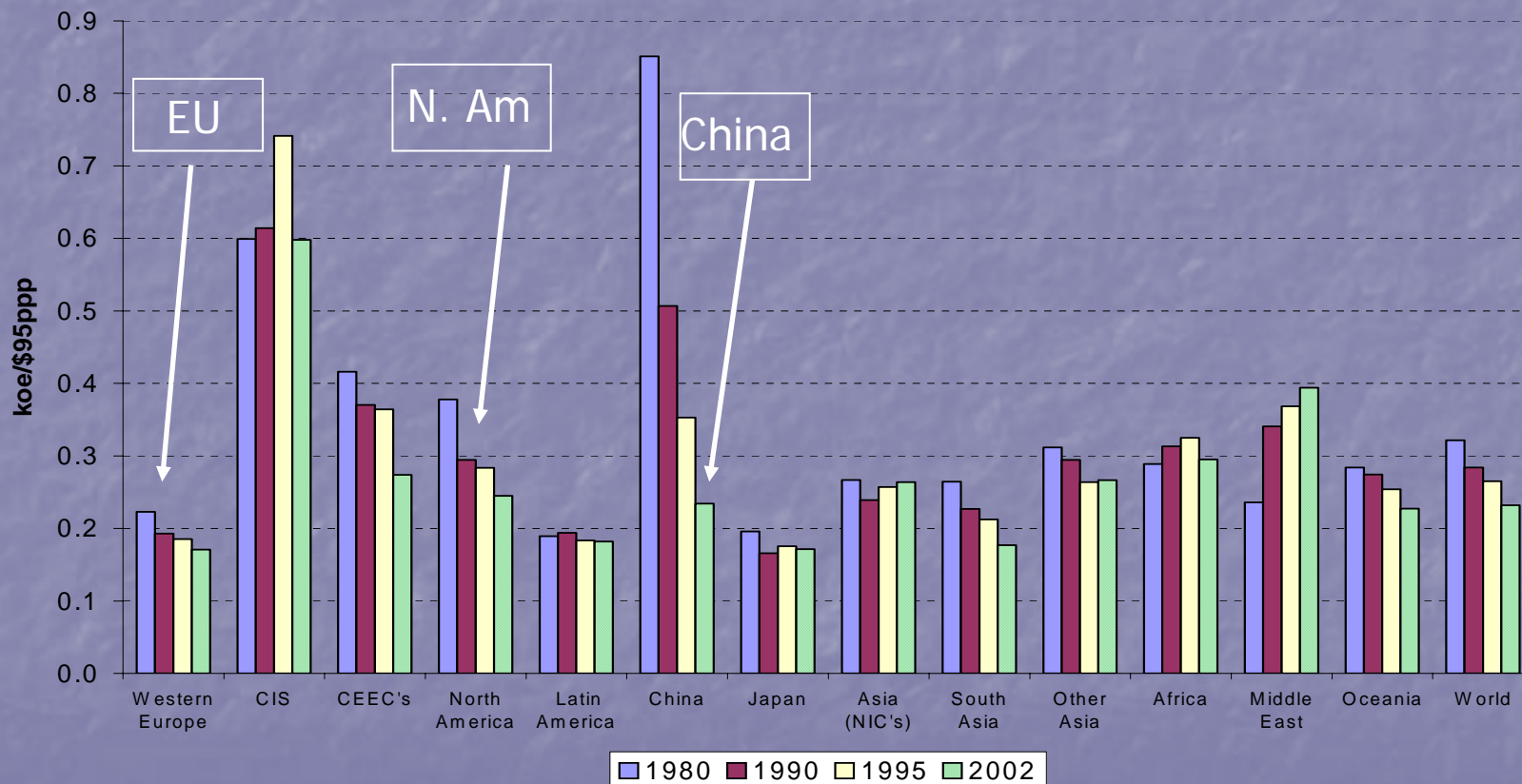
- High oil prices because of market instability ...but more structural issues (depletion of conventional oil resources with peak oil around 2030 or before)
- Global warming and post-Kyoto issues
- Scarcity of funding for energy supply expansion in developing countries

The WEC ADEME report aims at describing and evaluating energy efficiency trends and policies at world level

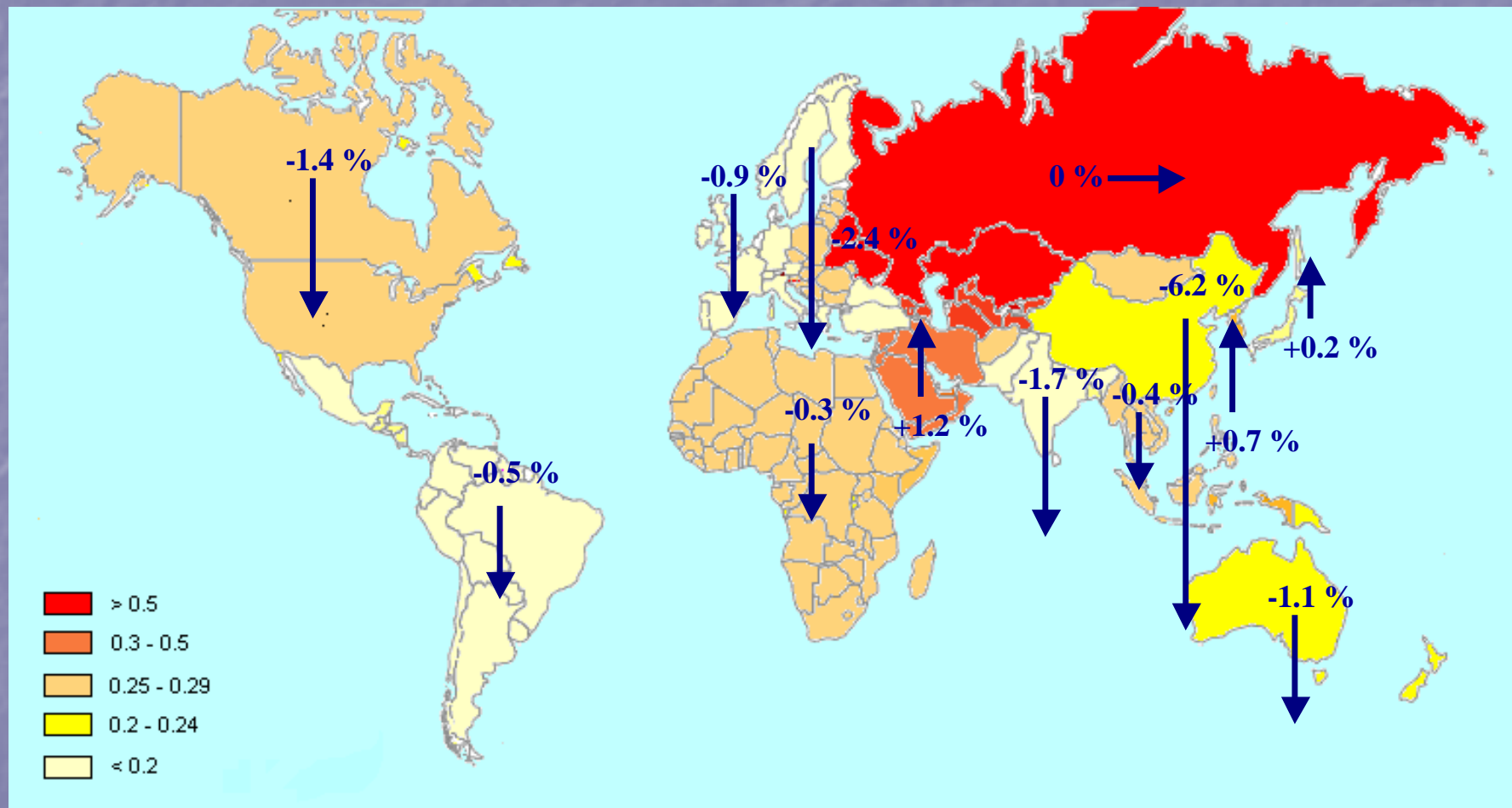
WEC Study on energy efficiency policies and indicators

- ↪ Collaboration ADEME, APERC with support from OLADE and technical coordination by ENERDATA
- ↪ Participation of 63 corresponding members of WEC Committees to a policy survey
- ↪ In depth evaluation of 5 selected policy measures by experts
- ↪ Calculation of indicators by country and world regions

Since 1980 energy intensity at world level decreased by 1.5 % /year in average



Since 1990 energy efficiency improvements reduces energy demand in 2002 by 20% : 2 Gtoe



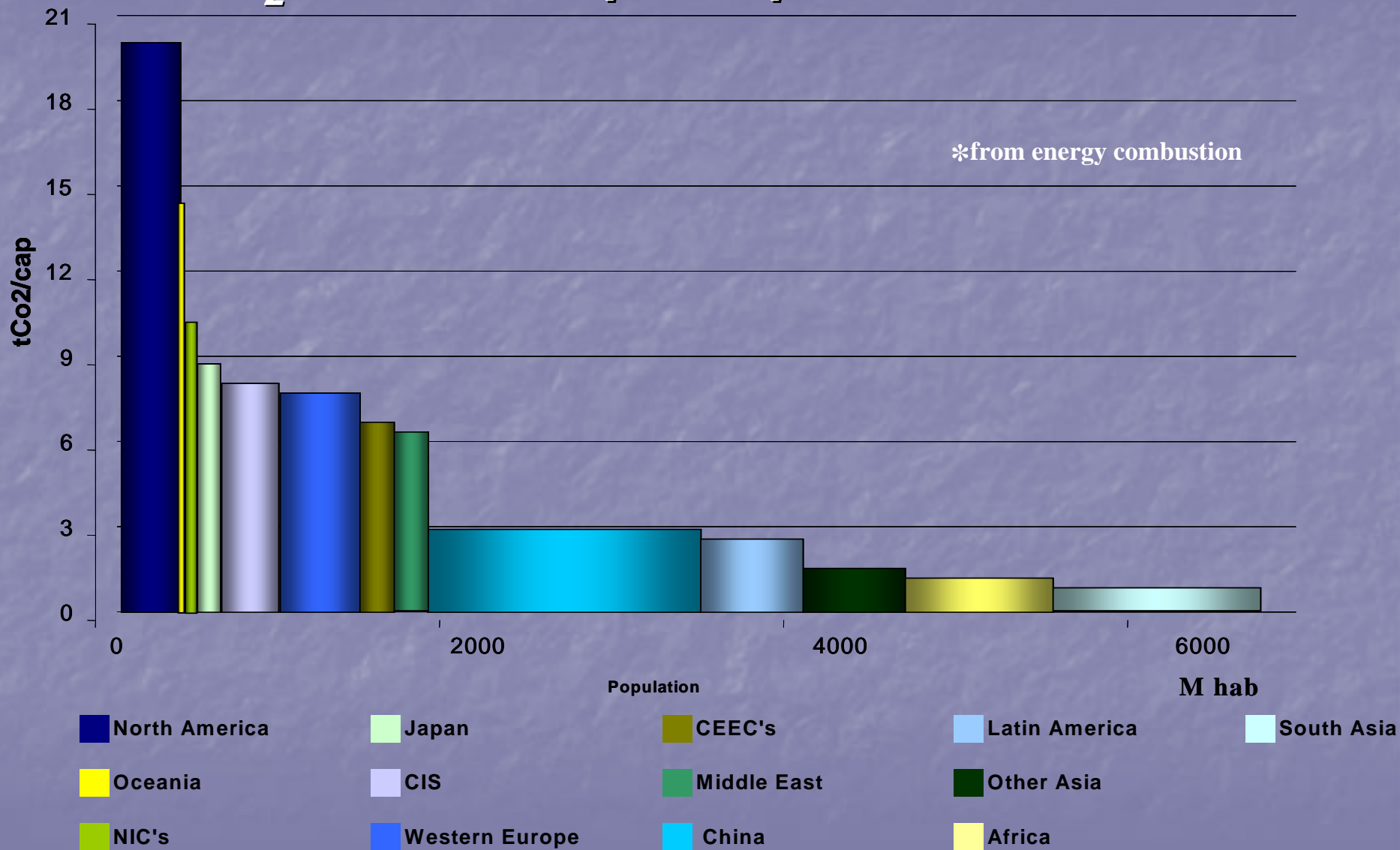
Primary intensity in koe/\$95ppp

Source: Enerdata

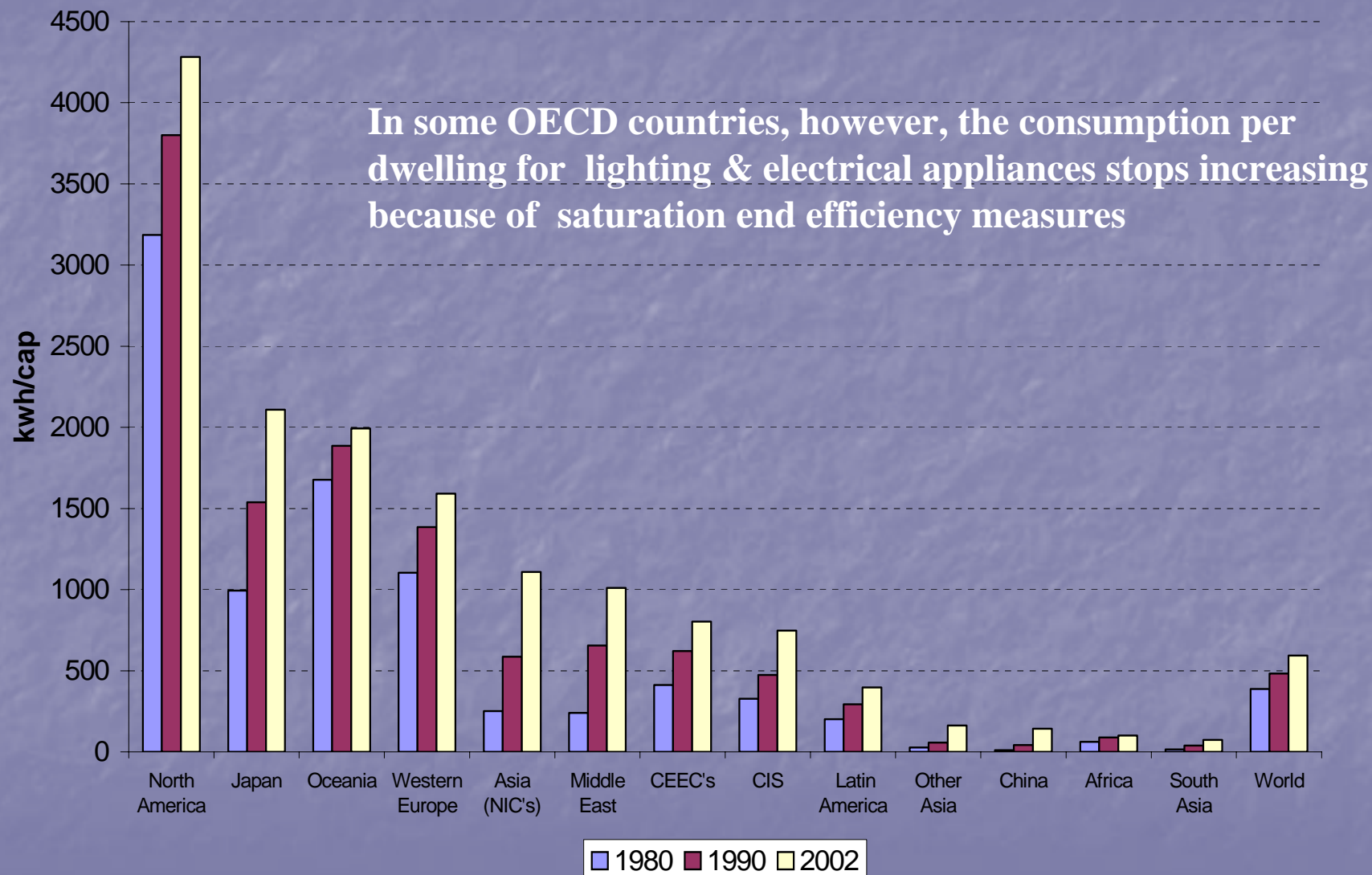
6 December 2005

WEC COP 11

Large variations across world regions in CO₂ emissions* per capita : a factor 1 to 7

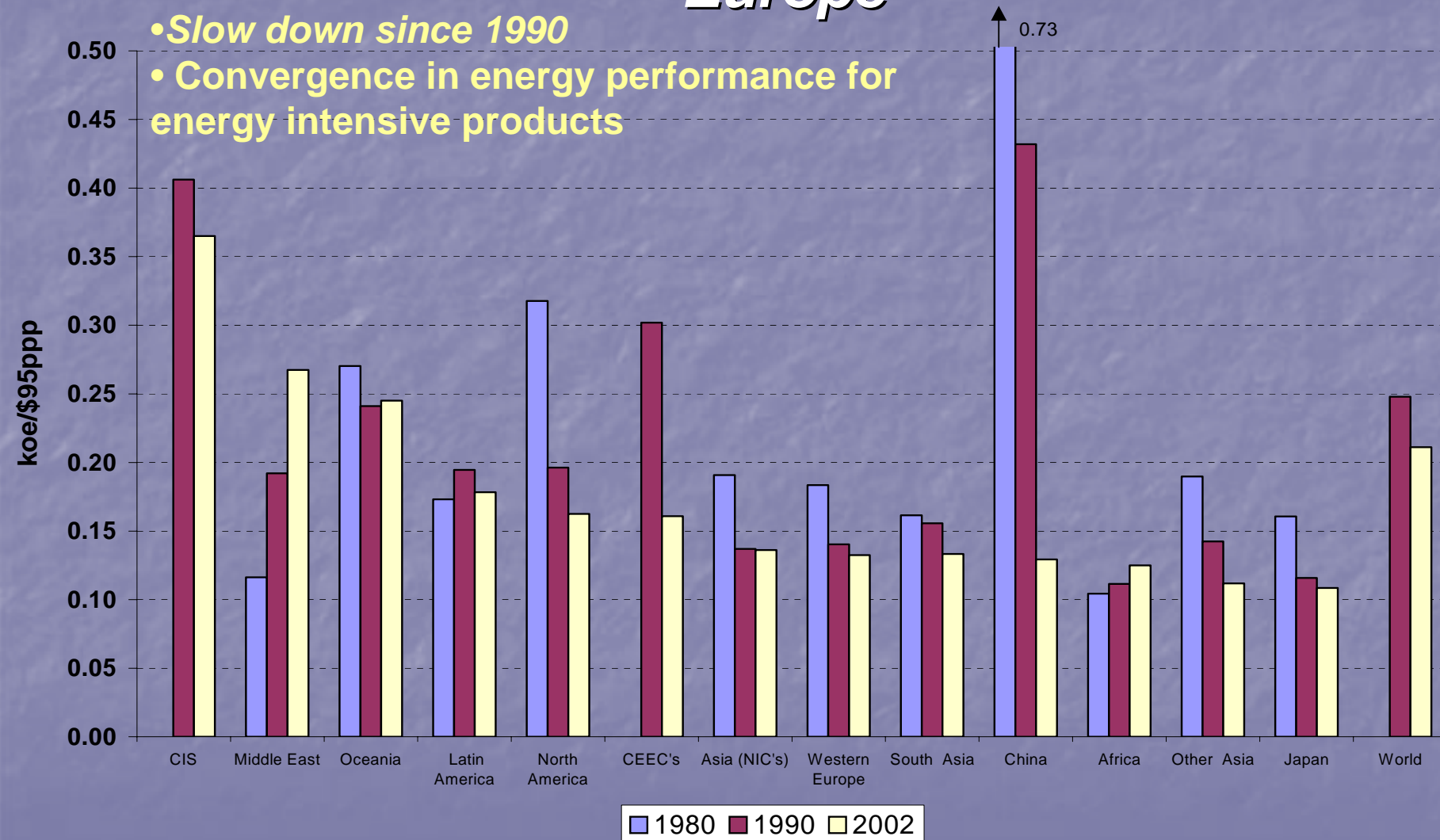


Household electricity consumption per capita is rising



The energy intensity of industry decreased significantly in OECD, China, and Central Europe

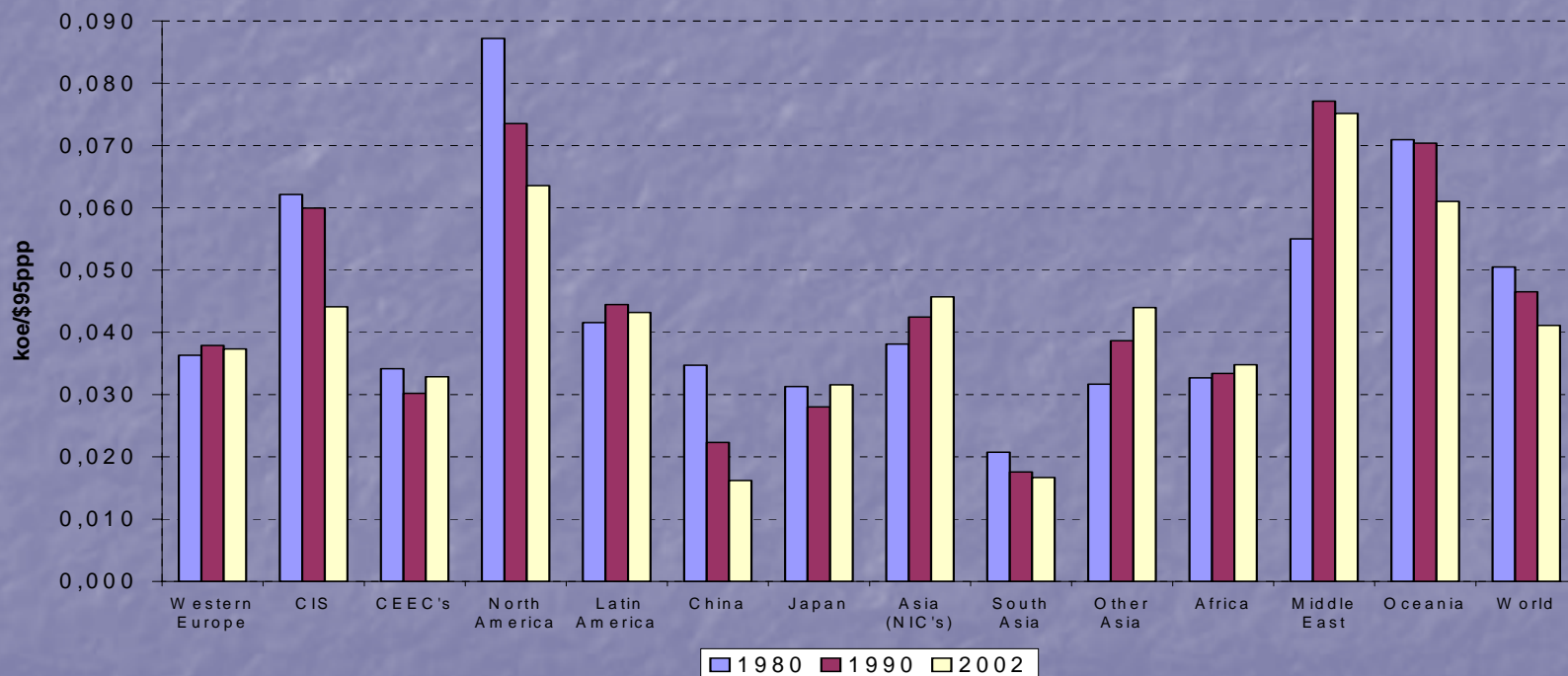
- *Slow down since 1990*
- *Convergence in energy performance for energy intensive products*



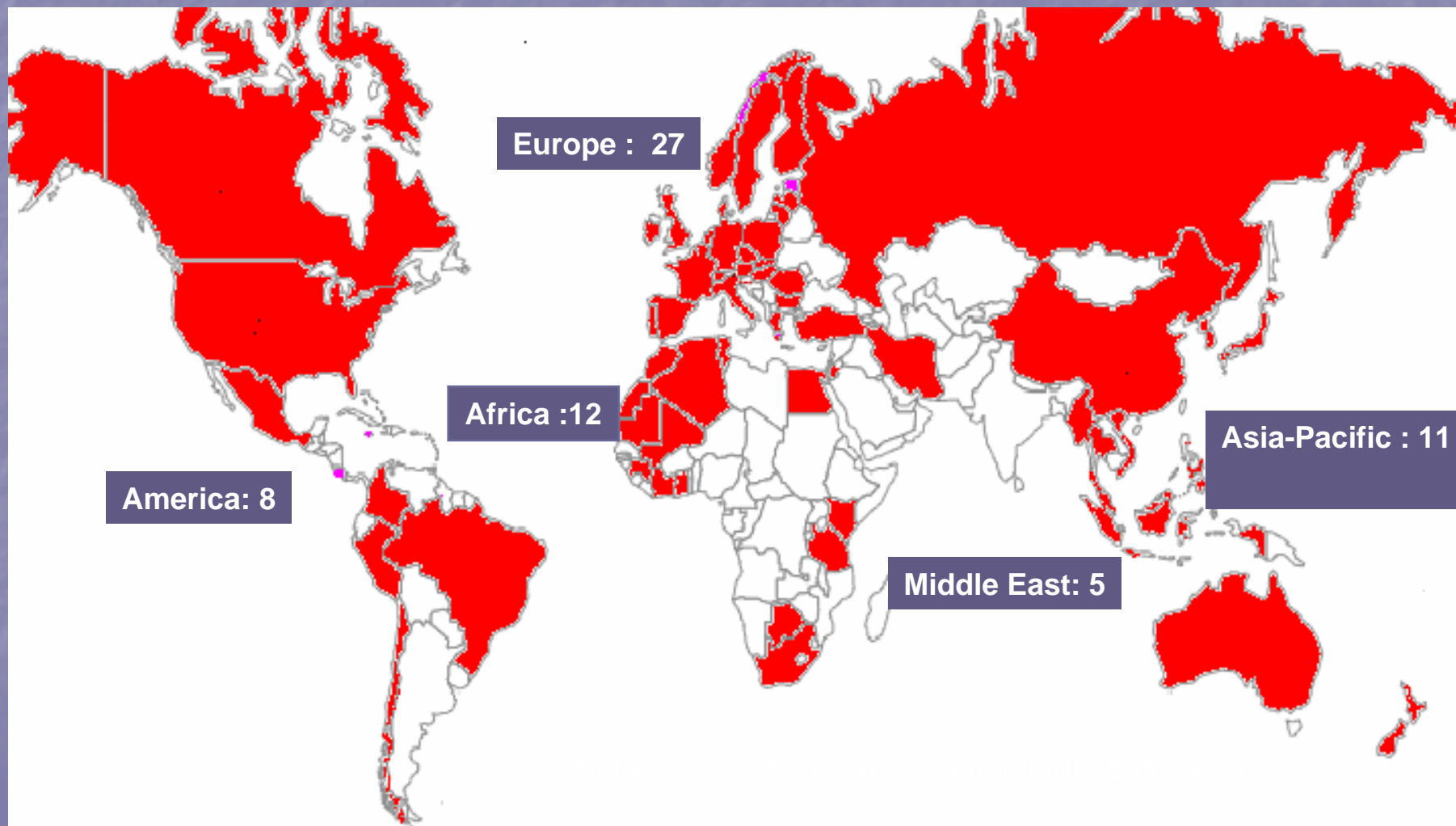
Source: Enerdata

Energy intensity of transport sector : different trends in each region

Transport consumption / GDP (in toe/\$ 1995 ppp)



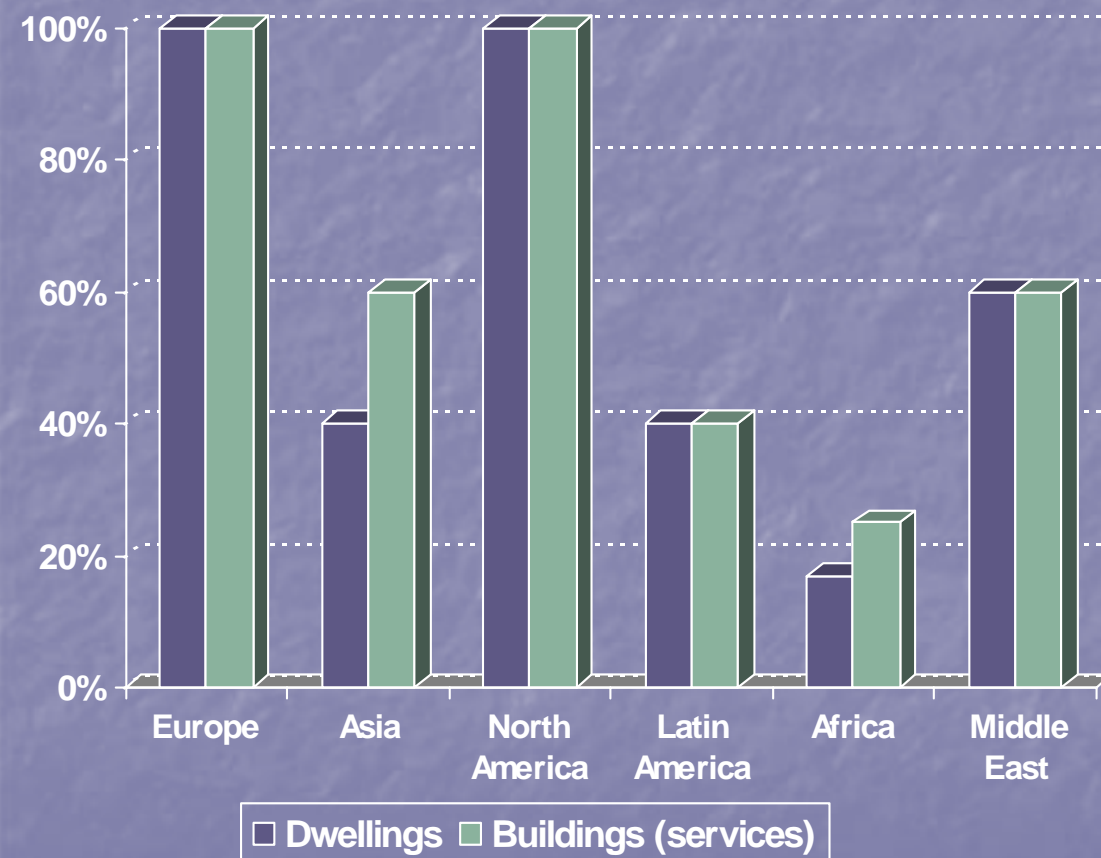
WEC survey on energy efficiency policies: 63 countries respond the survey through *OLADE, APERC, ADEME*



Evaluation of energy efficiency policies through selected measures

- Labelling and efficiency standards for household electrical appliances
- Innovative financing schemes for energy efficiency : **a mix of public and private funds**
- Voluntary/ negotiated agreements with large energy consumers or equipment manufacturers: **more appropriate as complementary instruments, rather than a prime policy measure; mainly used in OECD countries** (eg The Netherlands, Germany, Finland, EU, Japan, Australia)
- Local energy information centres : to **offer impartial information to consumers**
- Package of measures

Thermal building regulations



•Europe

- ✓ **mandatory** efficiency standards for new dwellings or buildings) in **all** countries
- ✓ regular and recent revisions in more than half of the countries

•Other regions

- ✓ few countries with standards for new dwellings; slightly more frequent in services
- ✓ Often voluntary standards (60% of countries with mandatory or voluntary standards in service sector)

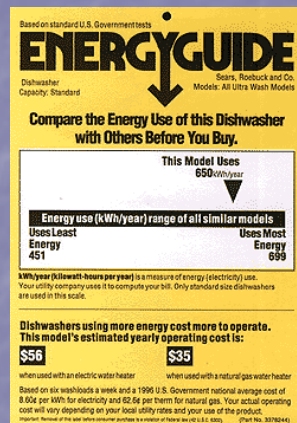
Labelling and minimum energy performance standards (MEPS) for households electrical appliances

- An increasing number of countries has introduced labelling and MEPS, generally for refrigerators, lamps, washing machines and dryers, water heaters and room air conditioning units
- In developing countries, labelling less common and seldom mandatory, as second hand appliances account for a large market share
- Labelling programmes and efficiency standards are effective and complementary measures to transform the market.
- To remain effective, they must be regularly revised and updated to stimulate technical progress

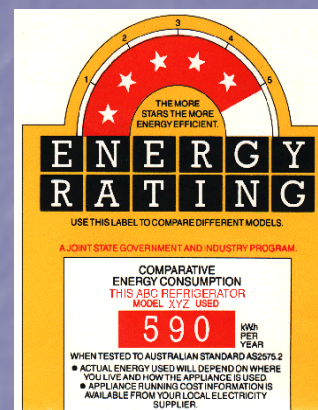
Labelling of households electrical appliances



Energy Star (USA)



USA



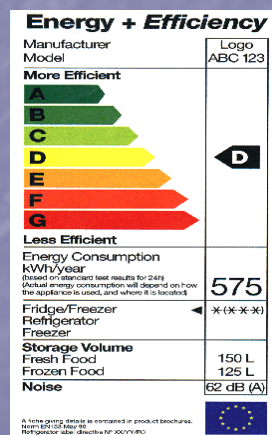
Australia



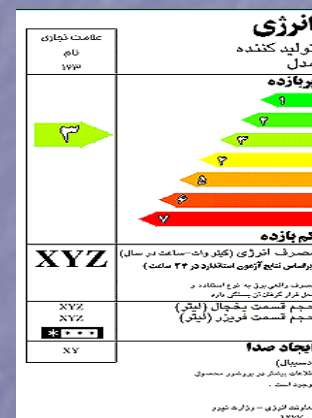
Thailand



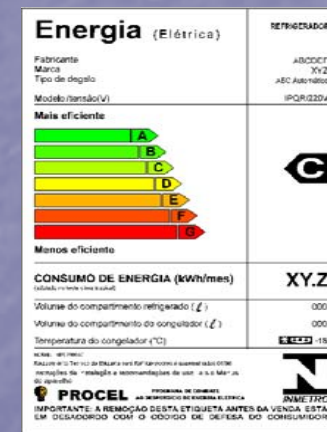
E 2000 (CH)



EU



Iran



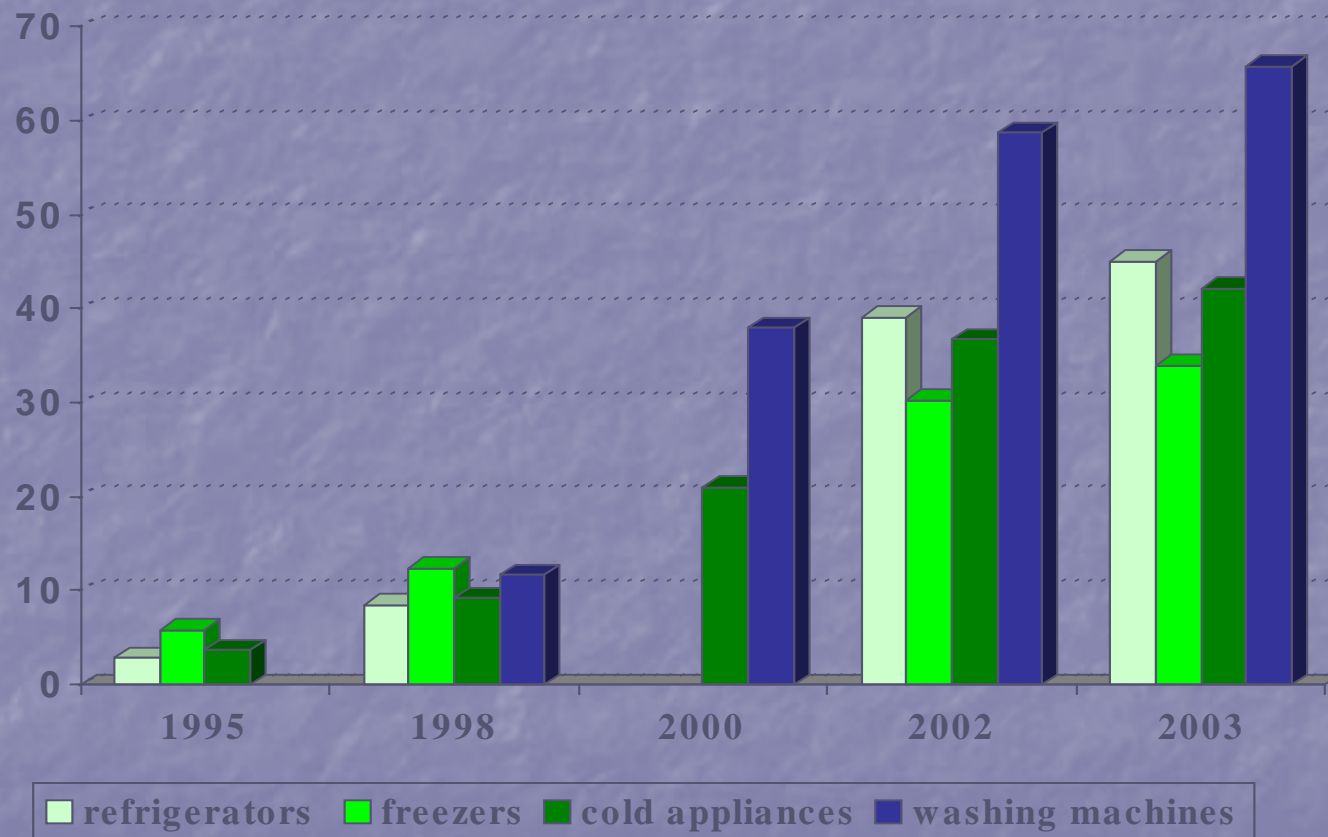
Brazil

Endorsements labels

Comparison labels

Impacts of labels and standards on household appliances

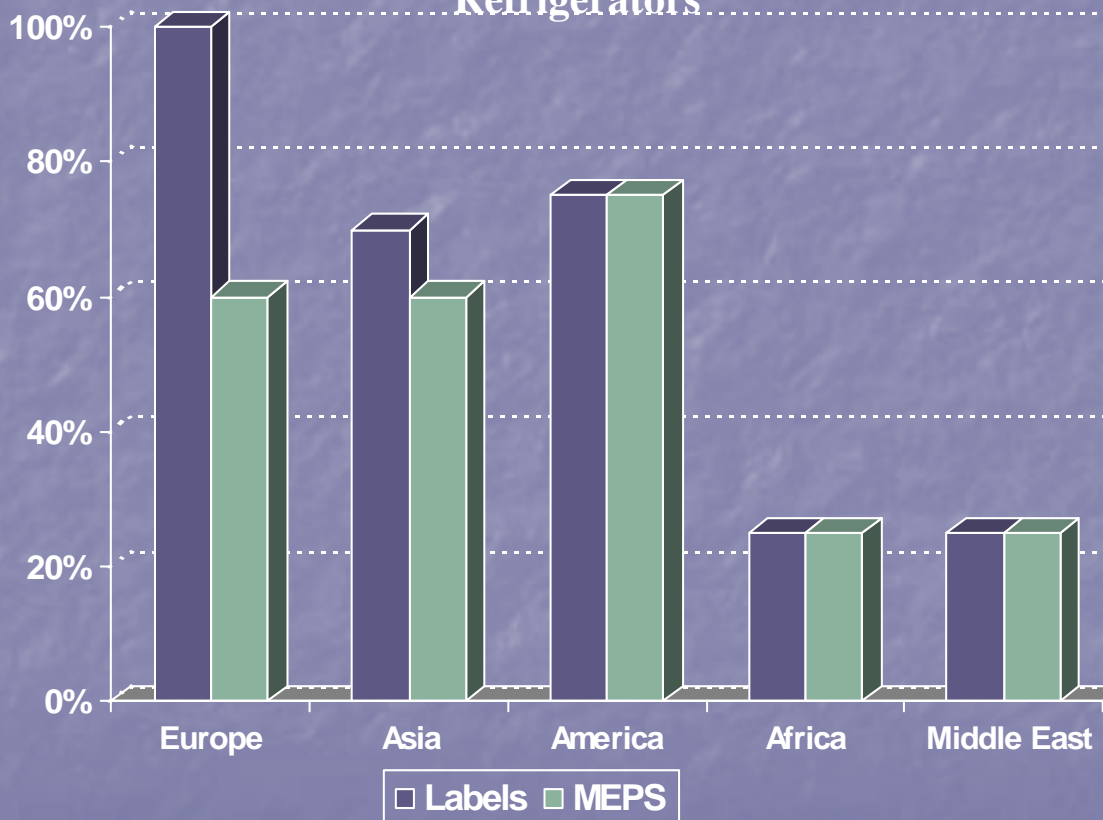
Share of labels
A&B in
refrigerators
and washing
machine sales
(EU-15)



Source: Odyssee data base

WEC survey : Regulations Electrical appliances

Refrigerators



•Europe

- ✓ **Mandatory labelling** of main appliances in all countries
- ✓ **Mandatory efficiency standards** for new refrigerators in **all EU** countries; under implementation in Accession countries

• Asia and America

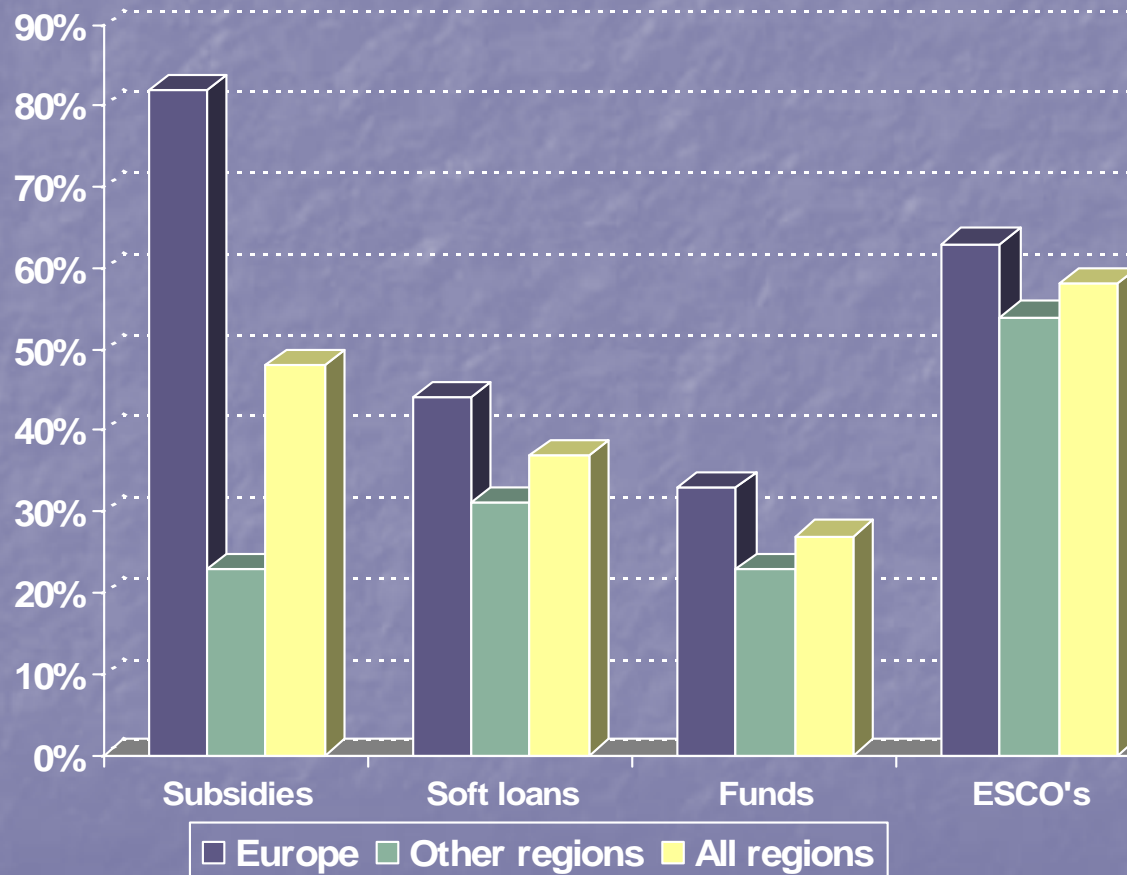
- ✓ **Mandatory labelling and standards** well developed for refrigerators
- ✓ Existing for **AC** in 2/3 of countries

• Africa & Middle East

- ✓ Not well spread
- ✓ Existing for AC in 30% of countries

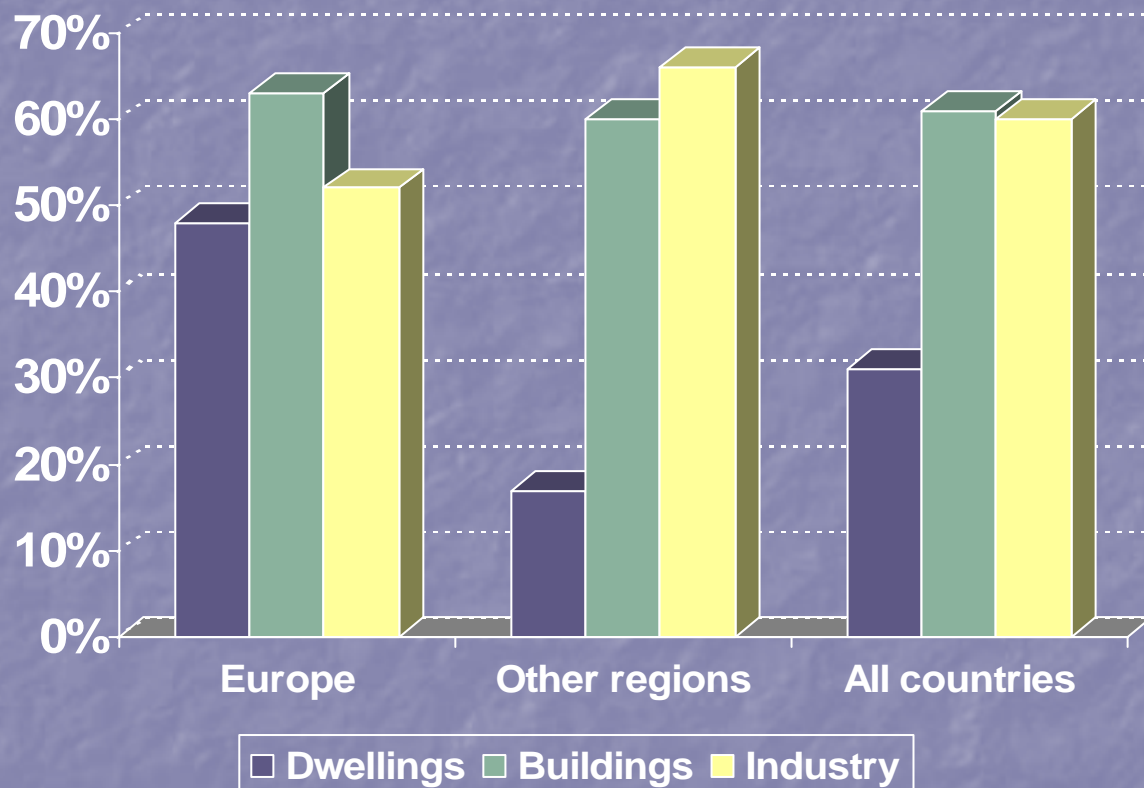
MEPS: Minimum Energy Performance Standard; AC: Air Conditioning

WEC survey : Economic & fiscal incentives



- **Investment subsidies:** Industry (21 countries), services (18), households (14), transport (10)
- **Soft loans:** industry (15 countries), services (11), households (8)
- **Funds:** guarantee funds (2), often combined with environment funds
- **ESCO's :** significant in Germany, Japan, Iran, Australia, Austria, Hungary and Switzerland; average turn over of 0.5 M\$ per ESCO (much higher in Hungary and Canada)

WEC survey : Information and VA Energy audits



→ Industry and services

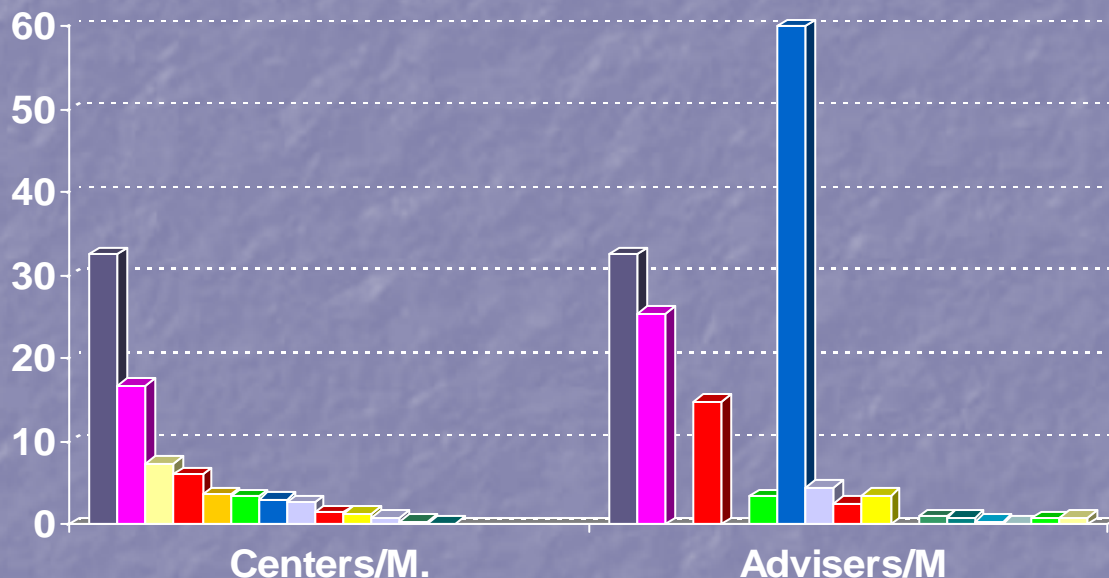
- About 60% of countries with audits programmes
- Mandatory audits in 1/3 of the schemes in Europe (15% for other regions)

→ Households

- Audits schemes mainly in Europe

WEC survey : Local energy information centres

Number of centres and advisers per Million inhabitant

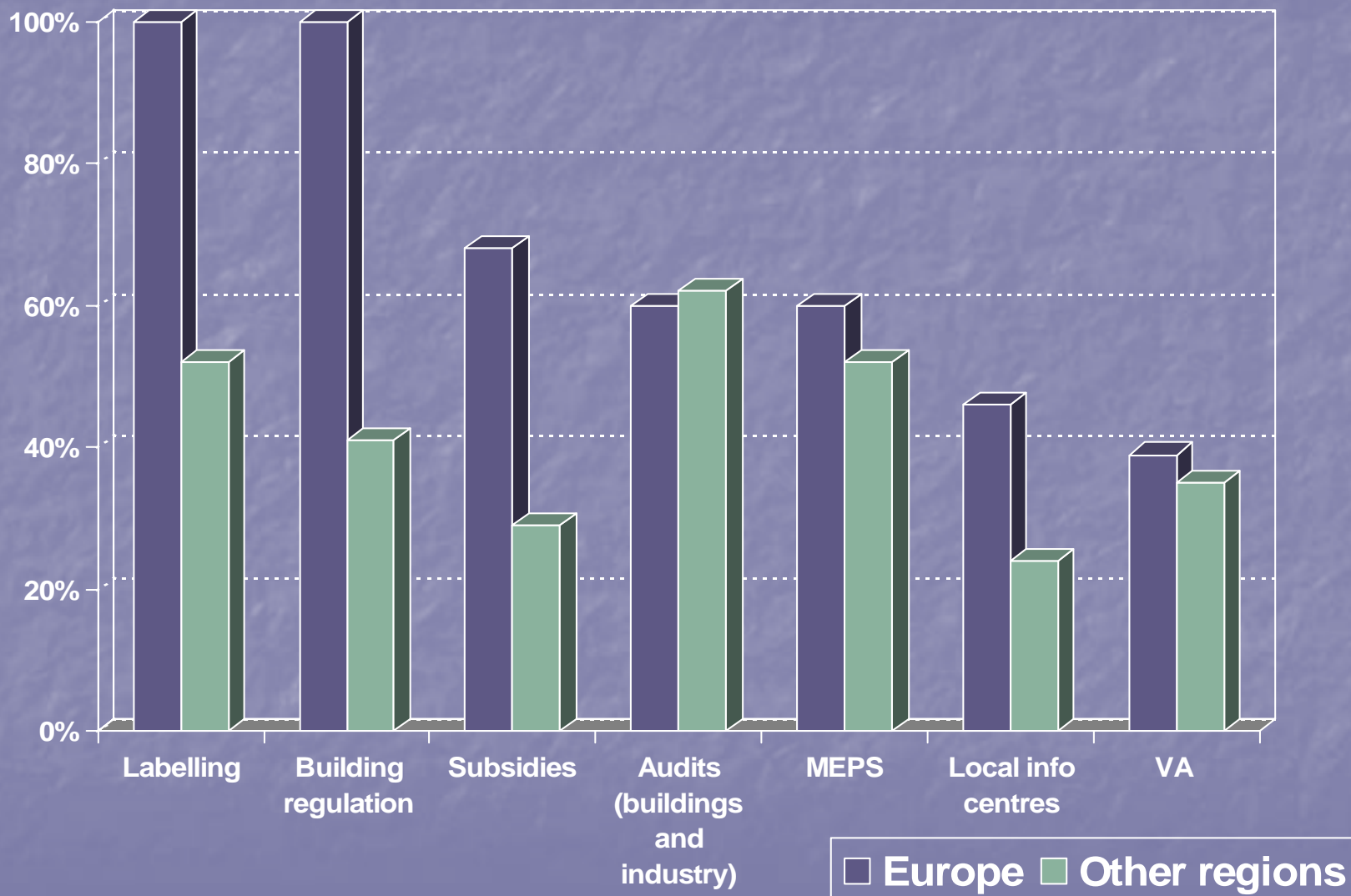


→ Number of centers or advisers per capita high in 5 countries : Hungary , Sweden Slovenia, Denmark, Czech Rep Morocco, France and Austria

→ Around 1 to 3 advisers per centre

| | | | | | |
|---------|----------|---------|-----------|---------|-----------|
| Sweden | Slovenia | Denmark | Czech rep | Austria | Morocco |
| Hungary | France | Belgium | Finland | UK | Australia |
| Romania | Vietnam | Kenya | Mali | Iran | |

WEC survey on energy efficiency policies : most frequent measures



Conclusions and recommendations

- Global warming and the looming depletion of conventional oil and gas resources will increase the cost of energy on the long term; energy efficiency policies are the first non regret response.
- In non-OECD countries, energy efficiency is also a way to alleviate the macro economic tensions and investment constraints on the supply side.
- At the domestic level, governments should incorporate energy efficiency into all main public sector policies (land planning, transport infrastructure, social housing policy, urban planning ...)

Conclusions and recommendations

- Co-ordination of policies and measures at the international level would help to overcome the obstacles to the implementation of both regulations and price signals
- The exchange of information and share of experiences on energy efficiency measures among different countries around the world can be useful to benefit from the good experiences...
- **The World Energy Council is a unique forum for such a task.**