



The Kyoto Protocol: The Role and Potential of End-use Energy and the Recommended Actions

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**Implementation of the Kyoto Protocol, Energy Efficiency and Climate Change
Mitigation**

Geneva, 29 June 2005



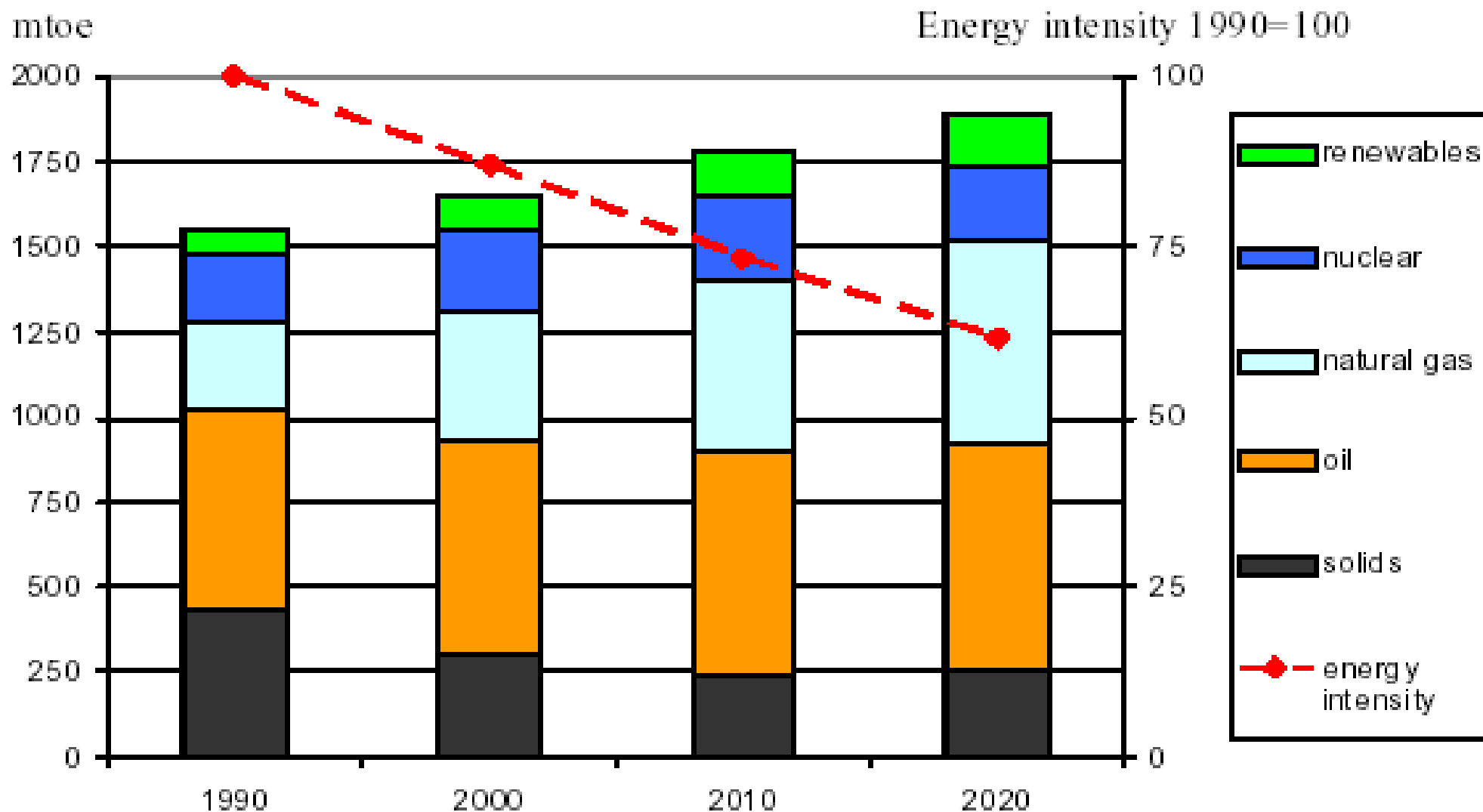
Importance of Energy Efficiency

- **Competitiveness and the Lisbon agenda.**
 - An effective energy efficiency policy can make a major contribution to EU competitiveness and employment, which are central objectives of the Lisbon agenda.
- **Environmental protection and the EU's Kyoto obligations.**
 - Energy saving is without doubt the quickest, most effective and most cost-effective manner for reducing greenhouse gas emissions, as well as improving air quality, in particular in densely populated areas. It will therefore help Member States in meeting their Kyoto commitments.
- **Security of supply.**
 - Today the European Union imports about 50% of its energy. If nothing is done, 70% of the EU energy would be covered by imports by 2030. By 2030, on the basis of present trends, the EU will be 90% dependent on imports for its requirements of oil and 80% dependent regarding gas.



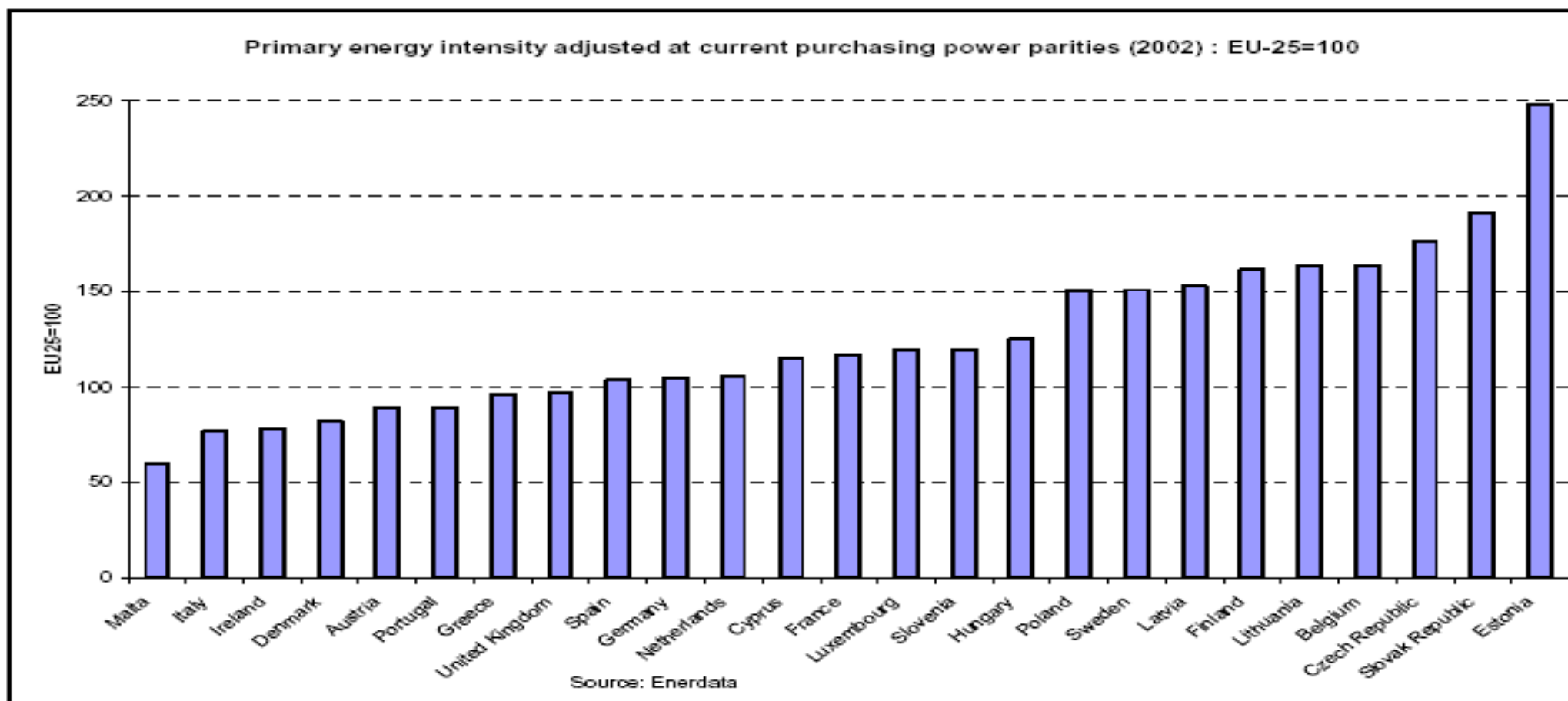
Energy Continues to Grow

Total energy consumption by fuel and energy intensity



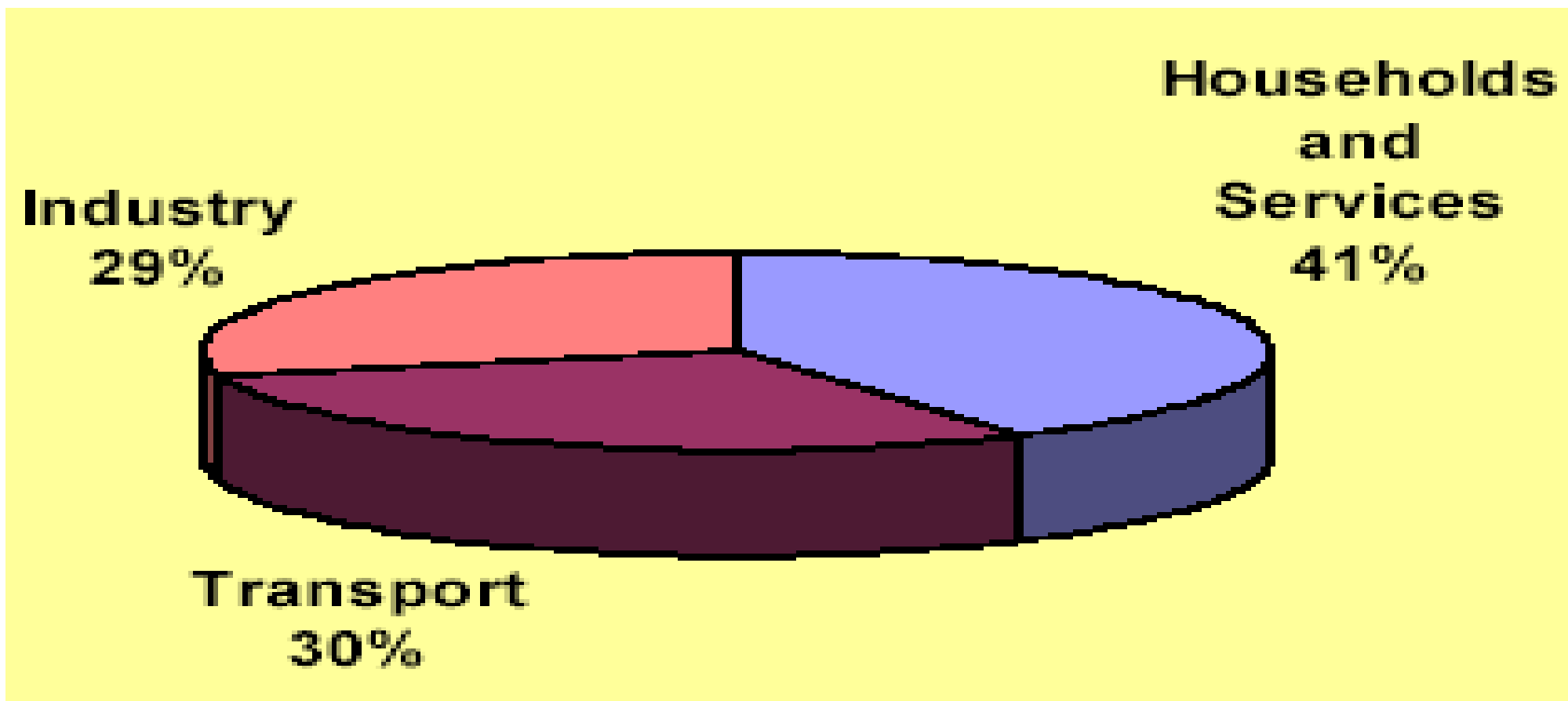


Differences exist among Member States





Share of Energy Consumption Between Sectors





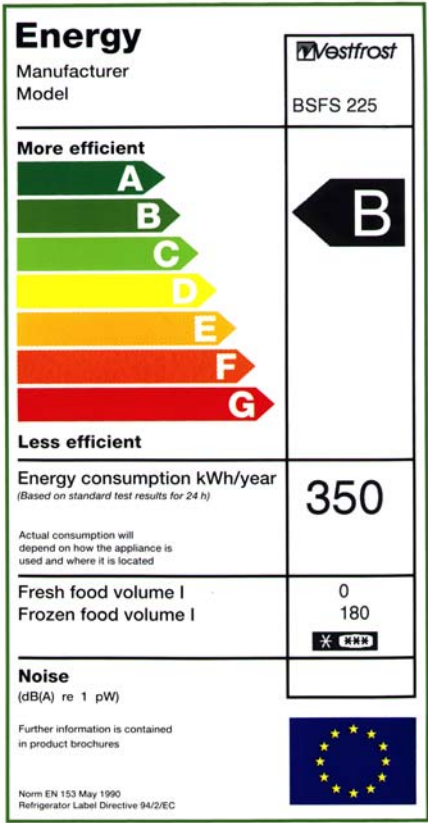
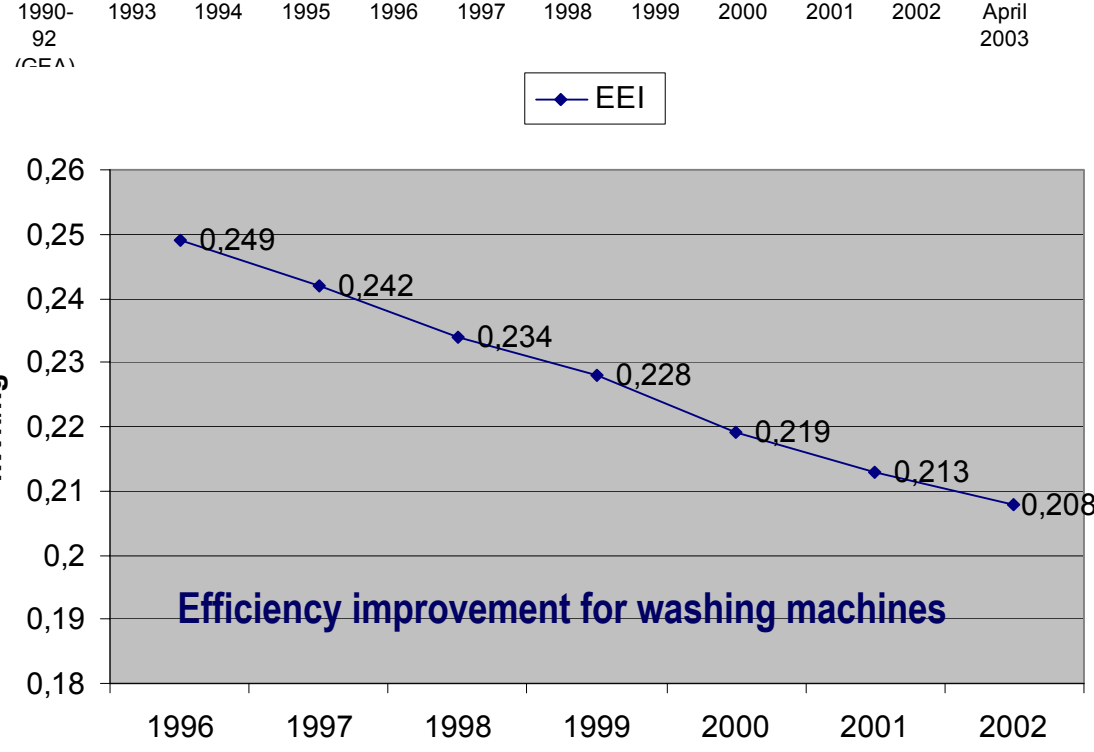
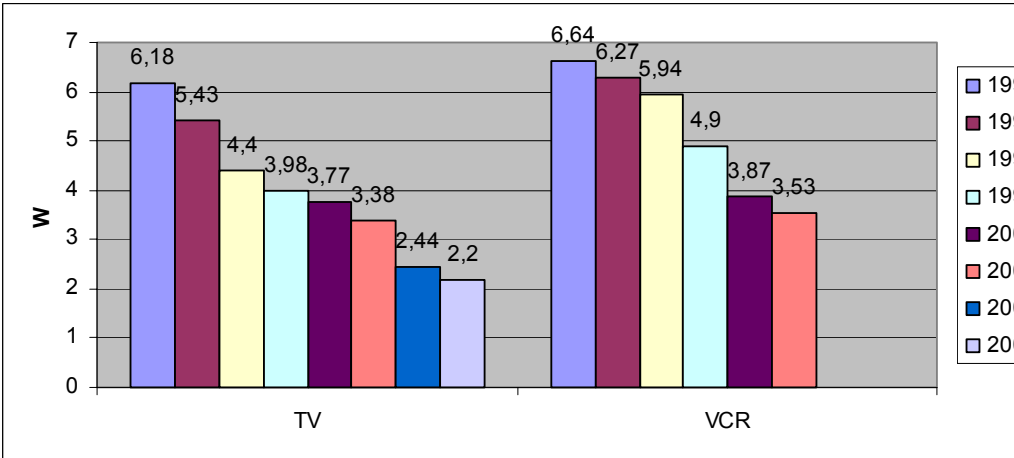
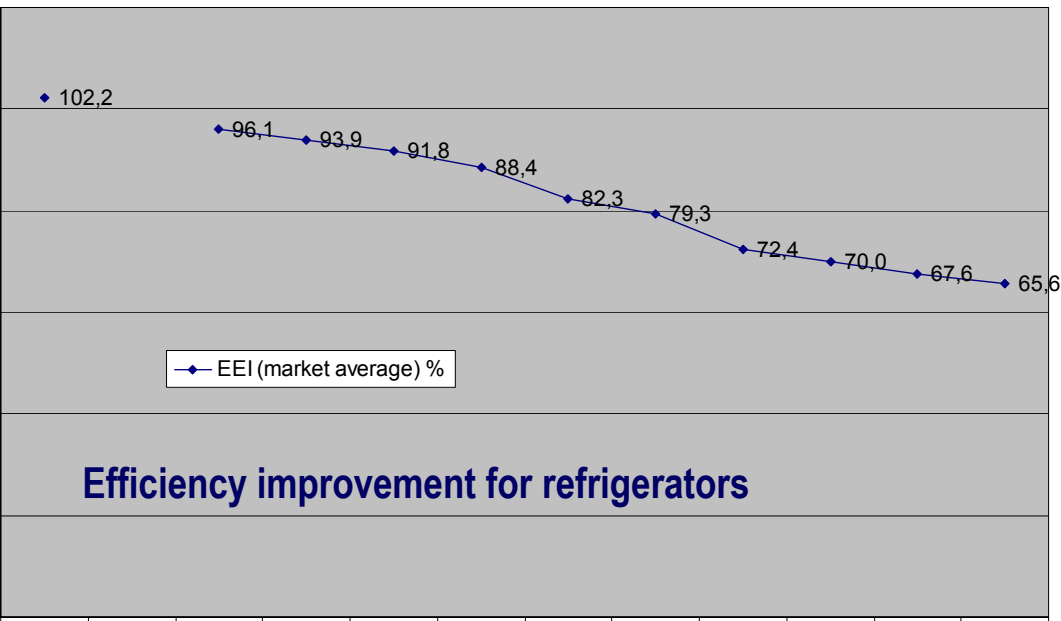
The Green Paper

- If the current trend continues, gross energy demand could increase by 10% by 2020. Growth in electricity demand could also reach 1.5% per year. Today's consumption in the EU could reach 1900 Mtoe within 15 years (2020), compared with 1725 Mtoe in 2005.
- Estimates indicate that we could reduce consumption by 20% by 2020 that is a saving of 60 billion euros a year.
- By saving 20% of energy consumption by 2020, it would be possible to secure 50% of the necessary reductions of CO₂ emissions.
- Saving 20% of energy consumption would also strengthen the competitiveness of our economy and facilitate the creation of one million jobs in Europe.



The Green Paper

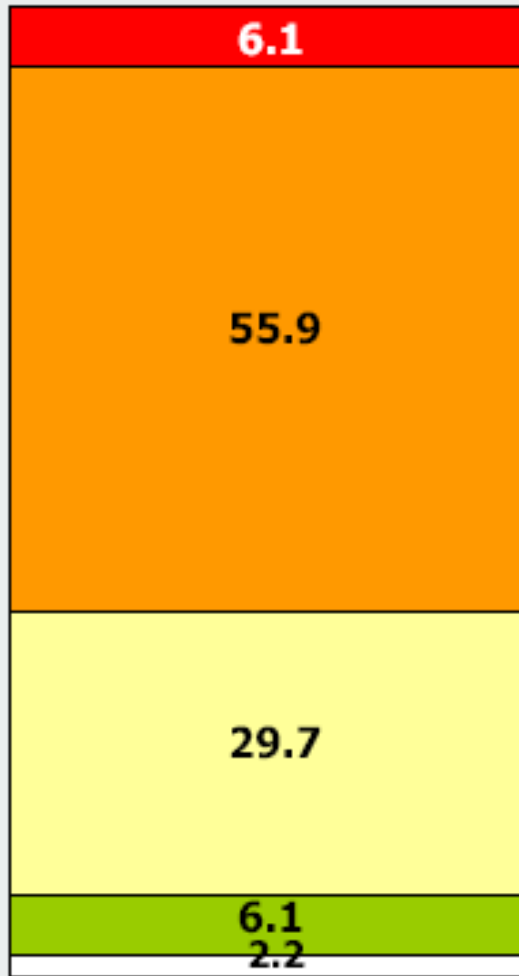
- 10% savings could be carried out by fully implementing the measures already
- **Existing European legislation on energy efficiency**
 - Directive on energy performance of buildings
 - Directive on the promotion of cogeneration
 - Directive on energy efficiency requirements for ballasts for fluorescent lighting
 - Directive on energy efficiency requirements for refrigerators and freezers
 - Directive on energy efficiency requirements for hot water boilers
 - Directives on labelling of electric ovens, of air-conditioners, refrigerators/freezers, washing machines, dishwashers, driers
 - Regulation on Energy Star labelling for office equipment
- **Proposals to be adopted**
 - Directive on Eco design requirements for energy using products
 - Directive on energy efficiency and energy services





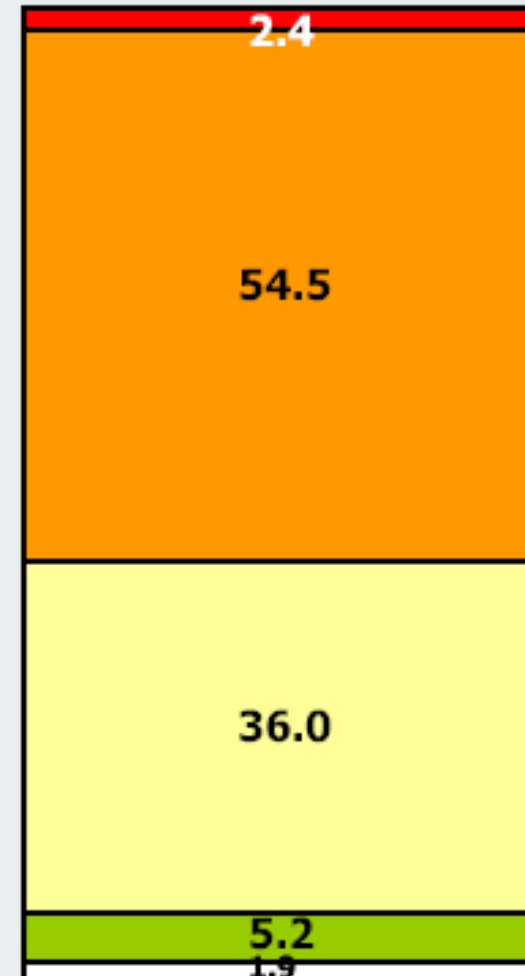
Sales of Refrigerators by Efficiency Class

West Europe



Sales Unit (Th.) **12,628.5**

East Europe

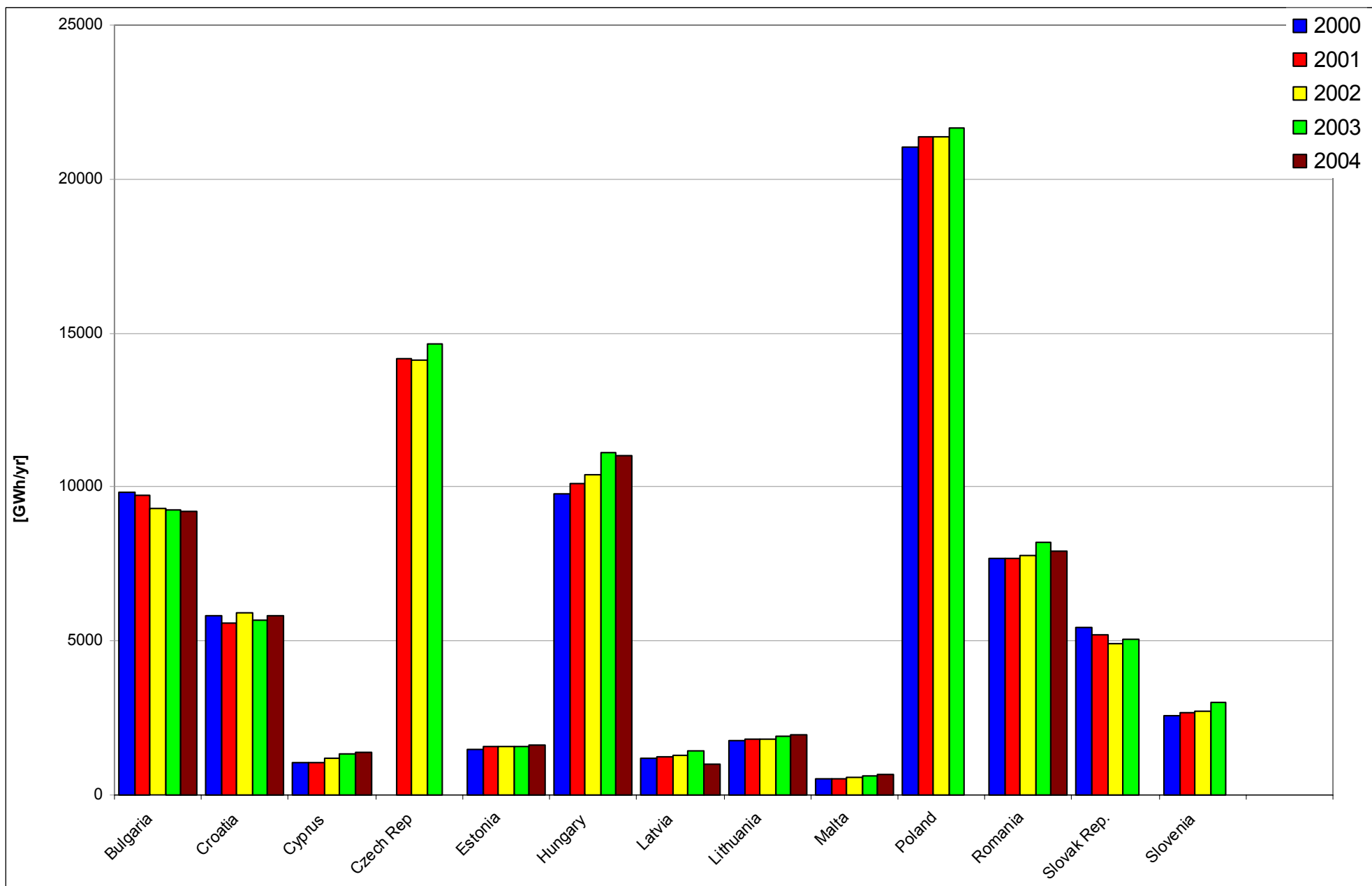


2,337.6





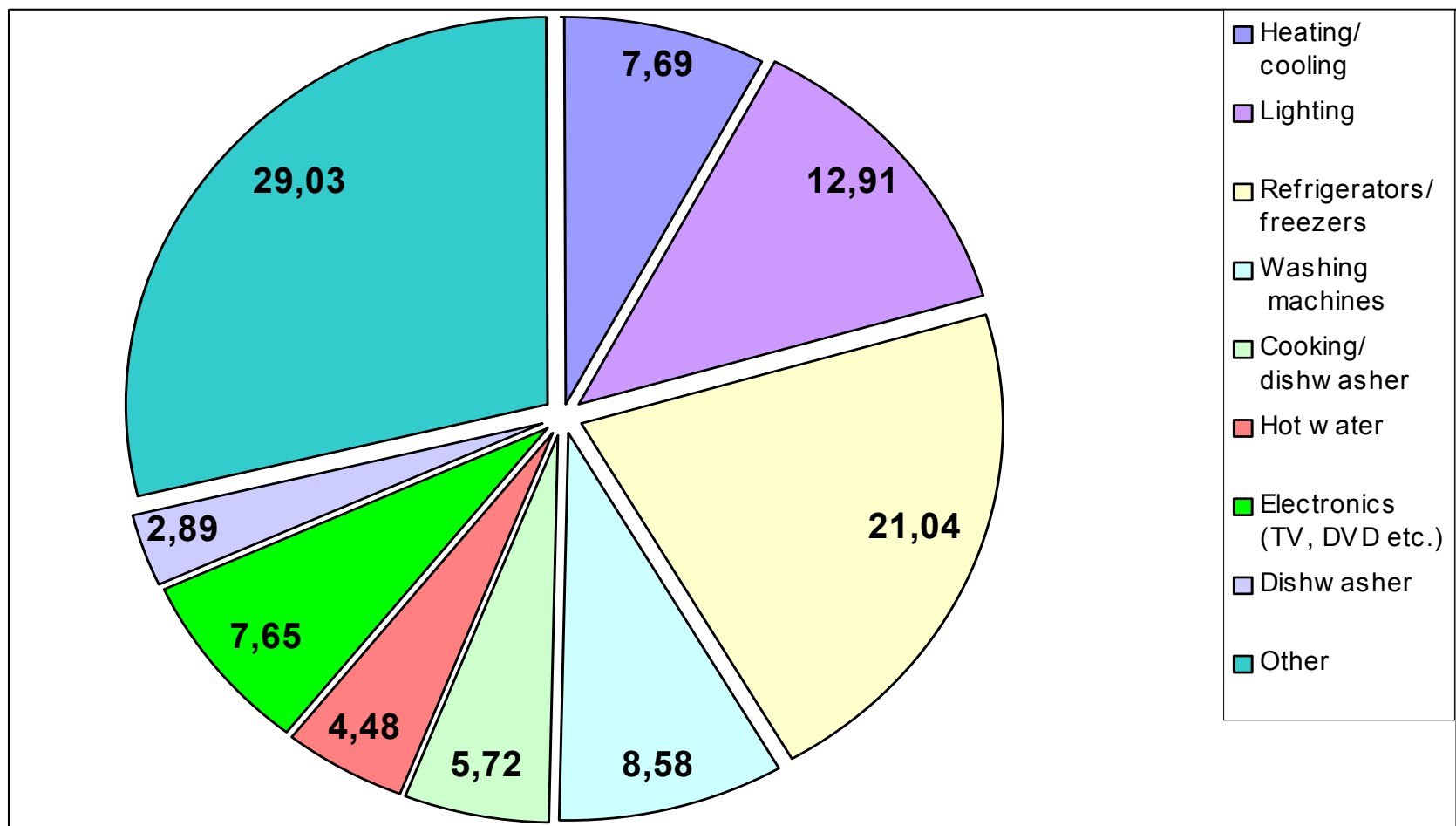
Residential Electricity Consumption in New Member States and Candidate Countries





RESIDENTIAL – CONSUMPTION (3)

Appliances and lighting take the main share of electricity consumption in households and all the electricity end-use efficiency actions in residential sector have to be oriented on these.





Saving Potential in Appliances

	Electricity Savings Achieved in the Period 1992-2003 [TWh/year]	Consumption in 2003 [TWh/year]	Consumption in 2010 (with current policies) [TWh/year]	Consumption in 2010 Available potential to 2010 (with additional policies) [TWh/year]
Washing Machines	10-11	26	23	14
Refrigerators and Freezers	12-13	103	96	80
Electric ovens	-	17	17	15.5
Standby	1-2	44	66	46
Lighting	1-5	85	94	79
Dryers	-	13.8	15	12
DESWH ⁴⁰	-	67	66	64
Air-conditioners		5.8	8.4	6.9
Dishwashers	0.5	16.2	16.5	15.7
Total	24.5-31.5	377.8	401.9	333.1



Saving Potential

Potential savings in Mtoe	2020 Rigorous implementation of adopted measures	2020+ Implementation of additional measures
Buildings: Heating/cooling	41	70
Electric appliances	15	35
Industry	16	30
Transport	45	90
CHP	40	60
Other energy transformation, etc	33	75
Total energy savings	190	360



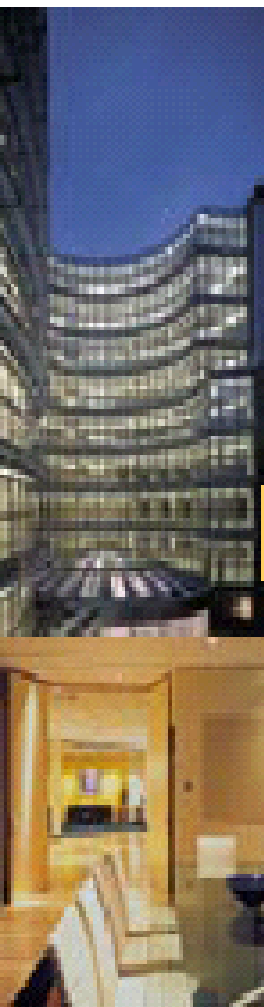
The Energy Performance of Building Directive

Objectives

- Promoting the improvement of energy performance of buildings within the EU through cost-effective measures
- Convergence of building standards towards those of Member States which already have ambitious levels

Proposed measures

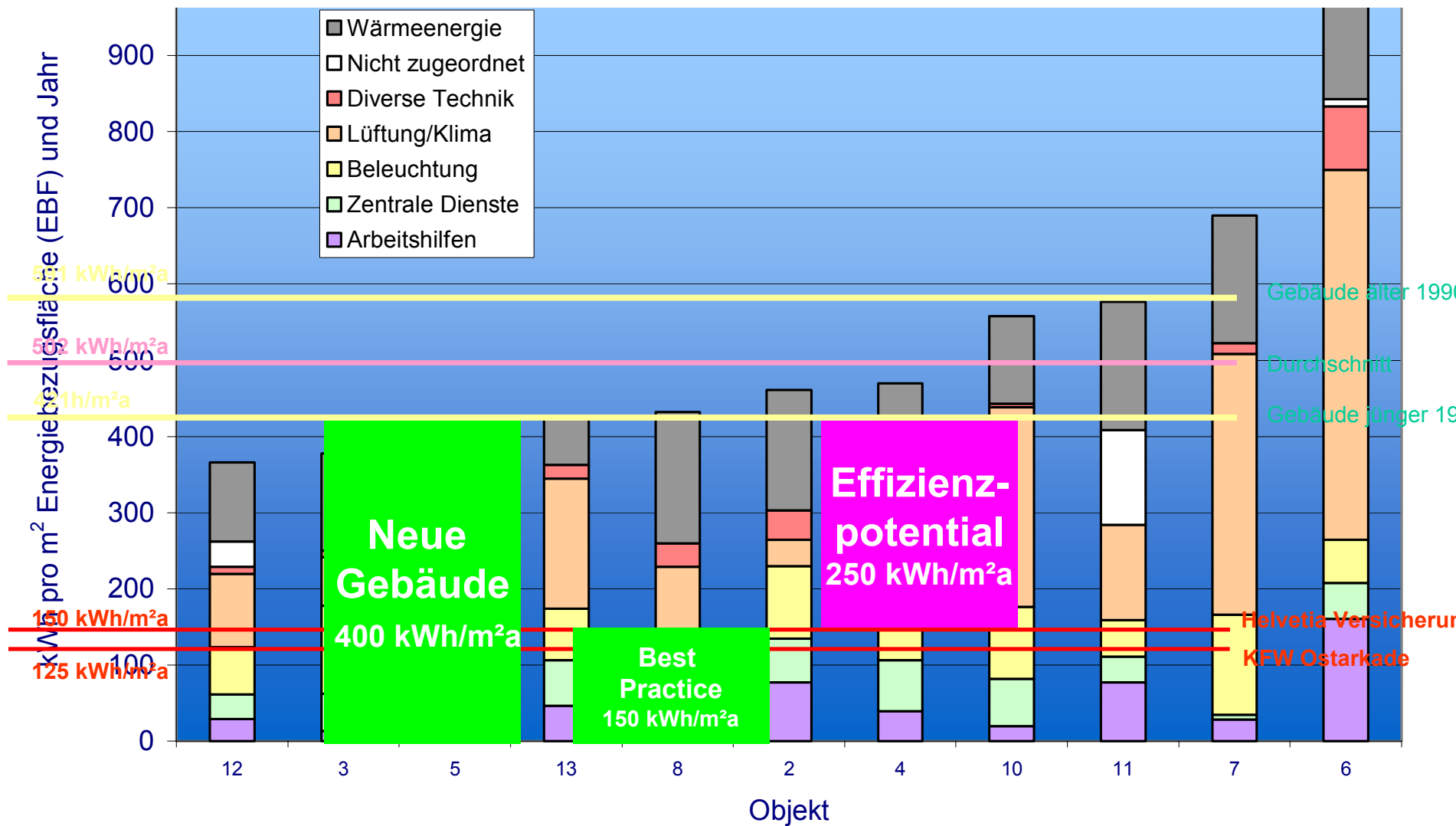
- Methodology for integrated buildings energy performance standards
- Application of these standards on new and existing buildings
- Certification schemes for all buildings
- Inspection & assessment of boilers/heating and cooling installations





Primärenergieverbrauch

There is still a high potential for efficient new and existing office buildings





Overview of European industrial EE policy instruments

- Energy management (EMAS)
- Agreements (Negotiated, Voluntary, Unilateral, Long Term)
- Energy Audits
- IPPC Directive
 - Energy Efficiency BREF under development.
 - Article 3 says: “Member States shall take the necessary measures to provide that the competent authorities ensure that installations are operated in such a way that energy is used efficiently;”
- Best practice (and specific programmes)
- Emission Trading



New Instruments

- Better use of taxation;
- Opening up public purchasing;
- Measures in the transport sector (tyres, Developing a market for clean vehicles);
- *White certificates, a market-based instrument;*
- *Develop Energy Services and ESCOs;*
- Develop Financial Sources;



EU Emission Trading System

- Started in 2005 with the first 3-year (2005-2007) period covering CO₂ only (about 46 % of total CO₂ emissions in 'old' EU MS);
- About 12,000 installations covered, direct emissions only;
- For the first period installations are free of charge and allocated on the basis of grandfathering, for the second phase (2008-2012) up to 10% can be auctioned;
- Emissions allocated via national allocation plan (NAP) and according to defined criteria;
- Penalty of 40 Euro per ton CO₂ for the period 2005-2007, for the next periods it will be 100 Euro per ton CO₂ ;
- From 2005 firms will have direct access through CDM to credits from countries without targets (CERs); from 2008 JI credits (ERUs) will be available for countries with targets.



EU Emission Trading System: significance

- Long-term decarbonisation required
- The EU ETS sends a price signal for investment into cleaner processes and plants
 - New investment in power generation: approx. 1/3 of capacity to be replaced by 2020, lifetime of several decades
 - What technology will be deployed? Low carbon price signal risks locking Europe into high-emission infrastructure



Design of EU ETS and early assessment

Positive	Negative
Absolute targets, mandatory participation	Targets and rules left vague, little use of auctioning
Compliance and monitoring system	No restriction on JI/CDM credit use (this is up to MS, but use of PBM must be supplementary to domestic action)
NAPs require strategies for all sectors	In some cases little more than BAU, reductions only vis-à-vis BAU projections for the future (not current levels), increases over recent years
Potential to change mindsets	A worrying trend to rely on JI/CDM for Kyoto compliance

MS had to develop NAPs in short time-frame with no precedence and little guidance



Caveats of emissions trading (1)

- ET will stimulate RES and EUEE **only after all cheaper options are taken up by the market.** Such direct ‘competition’ will result in the additional deployment of a limited number of EUEE and RES projects.
- For RES this is because of possibly higher marginal abatement costs than other carbon mitigation options; anticipated low and fluctuating allowance prices in the EU ETS and markets being indifferent towards the direction of technological change
- EUEE is a low-cost carbon mitigation option but is ‘invisible’ and power generators obliged under the EU ETS are more likely to take measures at the supply side where their area of expertise is



Caveats of emissions trading (2)

As EU ETS covers **direct emissions only**

- it does not account for reduced industrial electricity consumption;
- negative incentive for electricity end-use options (motors/drives, lighting);
- there may be a shift from thermal to electricity;
- wrong signals may go to industrial CHP (higher absolute emissions for installation as allocation of allowances is not based on useful heat and/or power output).



Caveats of emissions trading (3)

- For RES: price increases are expected to be insufficient to stimulate RES deployment;
- For EUEE: already current evidence shows that under the CDM, supply side projects and methane emission reductions are the preferred option for investors;
- Over-allocation of permits to large industry players, which is highly possible, will make direct policies in downstream sectors even more critical.



Systems with savings obligations and tradable certificates for energy savings (TCES, or white certificates)

Four key elements

- the creation and framing of the demand,
- the tradable property right and the rules for trading,
- the cost recovery mechanism and
- Institutional infrastructure and processes (such as measurement and verification) to support the scheme.



Systems with savings obligations and tradable certificates for energy savings: implementation to date

- **Italy:** savings targets for electricity and gas distributors (primary energy consumption) and tradable energy saving certificates issued to distributors and ESCOs, as well as with elements of tariff regulation (cost recovery mechanism via electricity and gas tariffs and multiple driver tariff schemes to avoid profit losses) or dedicated funds. 50 % constraint for action in own energy vector.
- In the **UK**, the EEC 2 program requires that all electricity and gas suppliers with 50,000 or more domestic customers must encourage or assist those customers to take energy-efficiency measures in their homes; at least half of their energy savings in households on income-related benefits and tax credits.



Integrating green and white certificates in emissions trading. Theoretical premises 1

- Establish one homogenous good, increase compliance options, boost liquidity of the carbon market and bring market stability;
- The ability to do domestic projects that generate allowances will act as a “safety valve” for buyers in an ETS scheme;



Integrating green and white certificates in emission trading. Practical issues

- EUEE and RES result in CO2 emission reductions, the carbon value could be calculated and included in the certificate.
- The total value of certificates may be viewed as constituted of two items: an energy benefit (domestic) and a carbon benefit (international);
- EU ETS covers direct emissions only;
- Improved flexibility of compliance;

Integration requires robust tracking and data management across markets and will increase the administrative complexity.



Conclusions about MBIs

- Emissions trading alone will not stimulate significant investment in RES, nor in EUEE and therefore implementation of strategic deployment policy for RES and EUEE is needed to stimulate investments along with the implementation of an emissions trading scheme.
- There is a limited track record with white and green certificate schemes and the EU ETS has only started: it still remains to be seen whether MBIs will perform as expected, at what cost this will be achieved and whether they can co-exist, and complement each other to pave the road to a sustainable energy future.
- Integration of white and green certificates in the EU ETS is needed for enhanced static and dynamic efficiency of the EU ETS, improved liquidity and stability of the ET, environmental soundness and equity;
- There are clear benefits for EUEE and RES on the carbon market; take into account impacts across markets, robust tracking and data management, other practical implementation concerns



ESCOs in Europe: general characteristics

- Most ESCOs have been founded either by large companies or as subsidiaries of large companies, coming from the heat supply sector or building control
- Under EPC arrangements ESCOs have so far provided financing themselves (mainly in France, Italy and Germany). Only recently have more ESCOs started implementing EPC using TPF: no matter that almost all ESCO projects in Europe have been based on the shared savings concept. Chauffage contracts are also commonly used. The guaranteed savings concept has been used rarely;
- The market is segmented in 'functionally specialised' companies: e.g. companies specialising in supply contracting for industry rarely compete directly with those specialising in performance contracting in buildings;

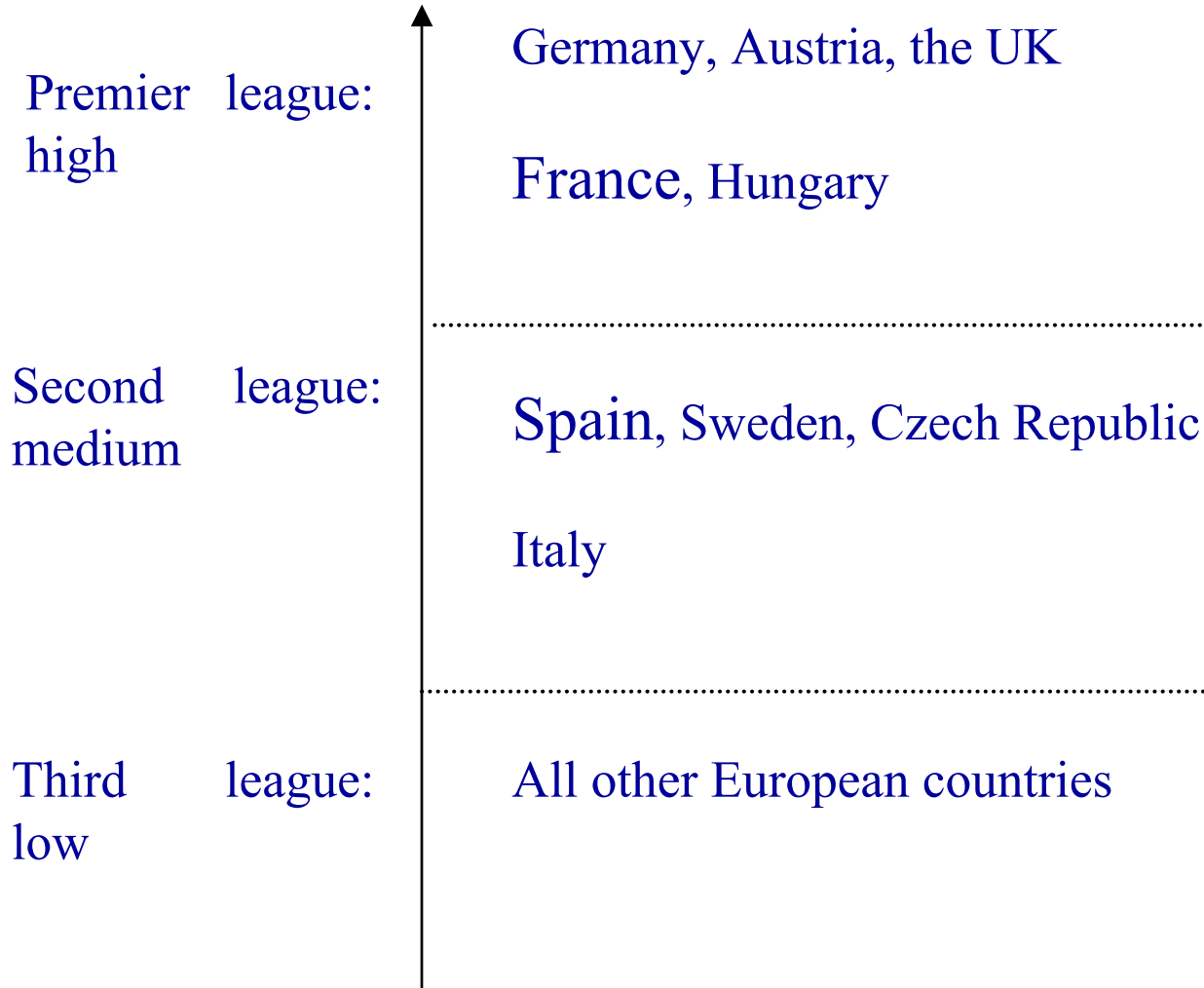


ESCO projects

- The majority of ESCOs' projects in EU MS have focused on:
 - co-generation;
 - public lighting;
 - heating, ventilation, and air-conditioning (HVAC);
 - energy management systems.
- The majority of ESCO projects in Europe have been undertaken in the public sector, primarily because the public sector is perceived as having 'safer' clients, moreover in some MS (e.g. Germany and Austria) also as a result of national or local energy agencies taking the lead with public sector buildings.
- The recent energy industry restructuring has stimulated projects in CHP for large commercial centers, hospitals, and industrial facilities (BOOT contracts); it has also triggered public lighting projects, where municipalities tendered lighting operation, including the supply of electricity.
- In many cases ESCOs are more interested in the business of selling energy or equipment than in exploiting the financial opportunities of energy savings.



Country Development: preliminary ranking





Strategy to Foster the Development of the ESCO Industry:

- **Increase Dissemination of ESCO Services and Projects;**
- **Launch an Accreditation System for ESCOs**
- **Develop Funding Sources**
- **Standardise Contracts and M&V**
- **Promote EPC in Government Buildings**
- **Develop a European TPF Network**



Conclusions about ESCO

- The current status of the ESCO industry shows significant differences from country to country ranging from the top countries (Germany, Austria, the UK, and Spain and Hungary and to a certain extent France), to the middle range countries (the Czech Republic, Sweden, Italy), to the other European countries, whose ESCO industry has been lagging behind.
- Recent policy developments, such as schemes with tradable certificates for energy savings as introduced in some European countries, may result in a strong development of the ESCO industry. In the long term, a combination of legislative measures, such as the proposed “Energy Services” Directive, coupled with the strategic actions proposed in the paper, could trigger a wide expansion of the ESCO business in all European countries
- The Kyoto Protocol and its flexible mechanisms (ET, CDM, and JI), and the related legislation for responding to these mechanisms, will create a new opportunity for developing the ESCO industry. Energy-efficiency projects offer a very cost-effective approach to reducing greenhouse gas emissions.



Thank you for your attention!

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*For more information about the Green Paper:
http://europa.eu.int/comm/energy/efficiency/index_en.htm*

*For more information about ESCOs
<http://energyefficiency.jrc.cec.eu.int/ESCO/esco.htm>*

*For more information about MBIs
www.eurowhitecert.org*