



Open Workshop

Progetto SIMEA

Innovazione ed efficienza nell'uso dell'energia

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Sustainability and technology growth

- R&D and new energy technologies have to give proper answers to 2 main challenges:
 - Environment protection
 - Resources' distribution
- Short term solutions are not good in the long term. We need to find the sustainable solutions to the energy supply conundrum. Most energy companies have very short time horizons due to stock performances
- A regulated approach to energy investments is needed
- Energy efficiency can give answers at lower cost



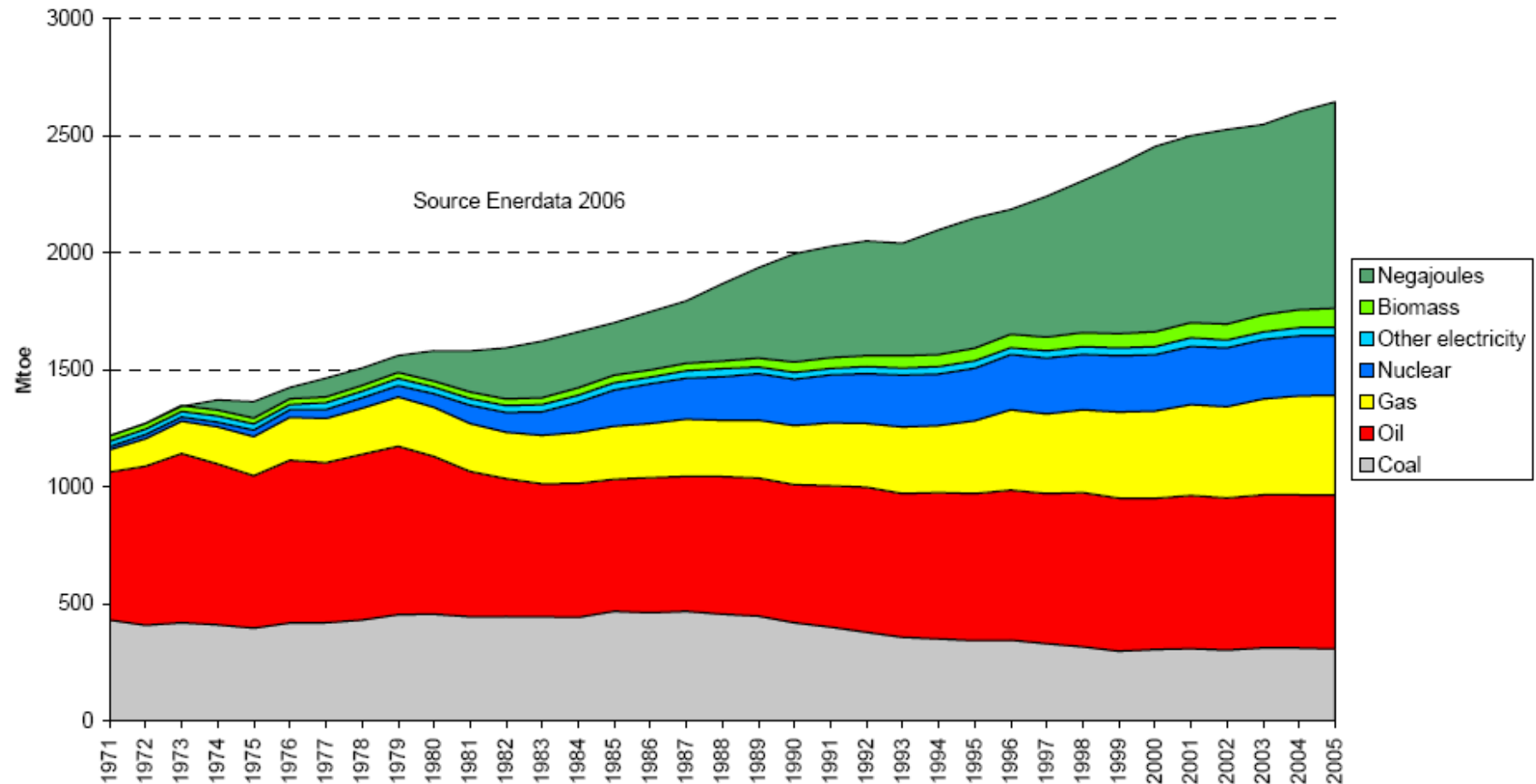
Innovation is needed

- The economy based on fossil fuels allowed to reach a huge development during the 20th century, but it is showing all its limits due to:
 - Scarcity of resources
 - Environmental constraints
 - Geopolitical conflicts
 - Volatility of the markets
- New technological options are available and need to be supported, as far as externalities exist



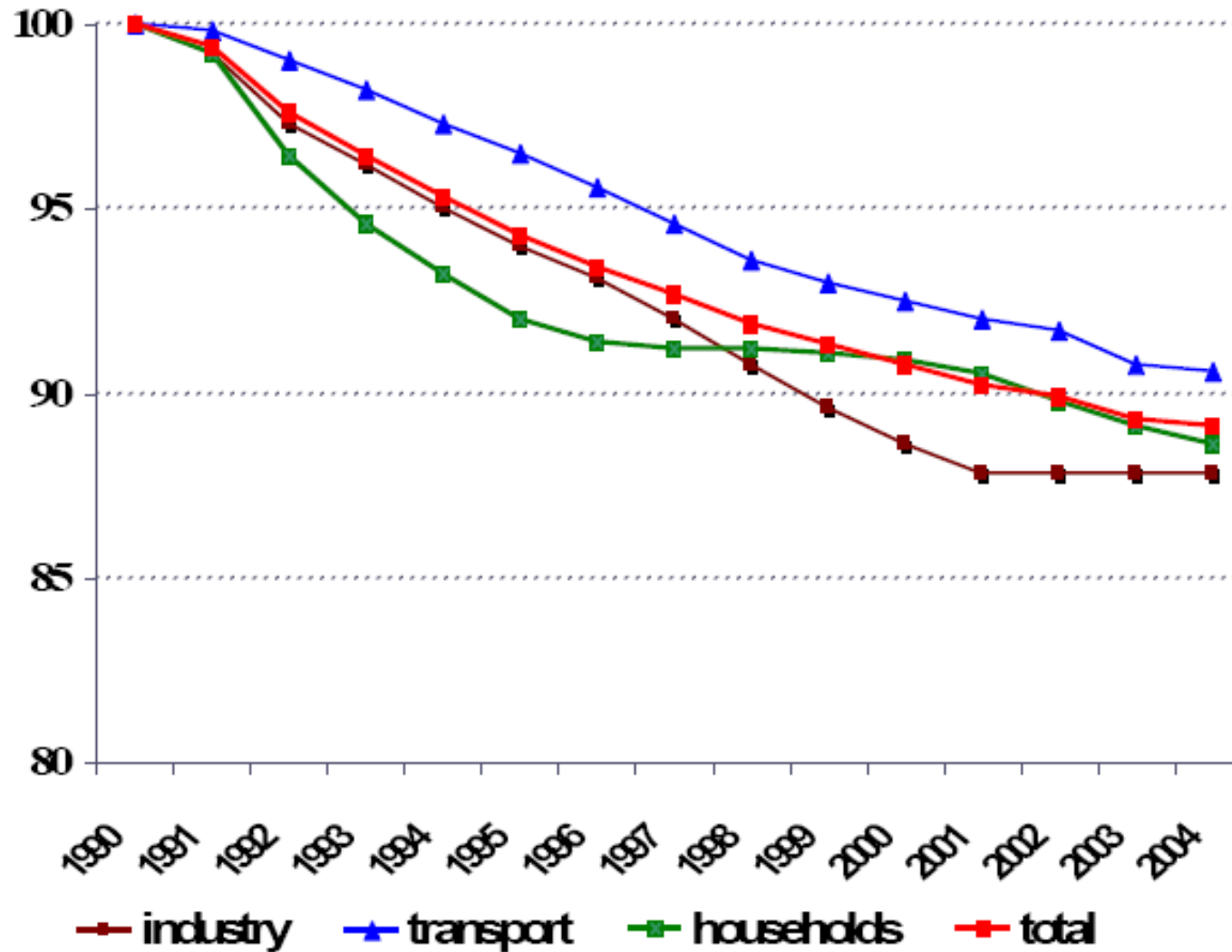
Nothing new: the growth of efficiency in EU

Development of the primary energy demand and of "negajoules"
("negajoules" : energy savings calculated on the basis of 1971 energy intensity)





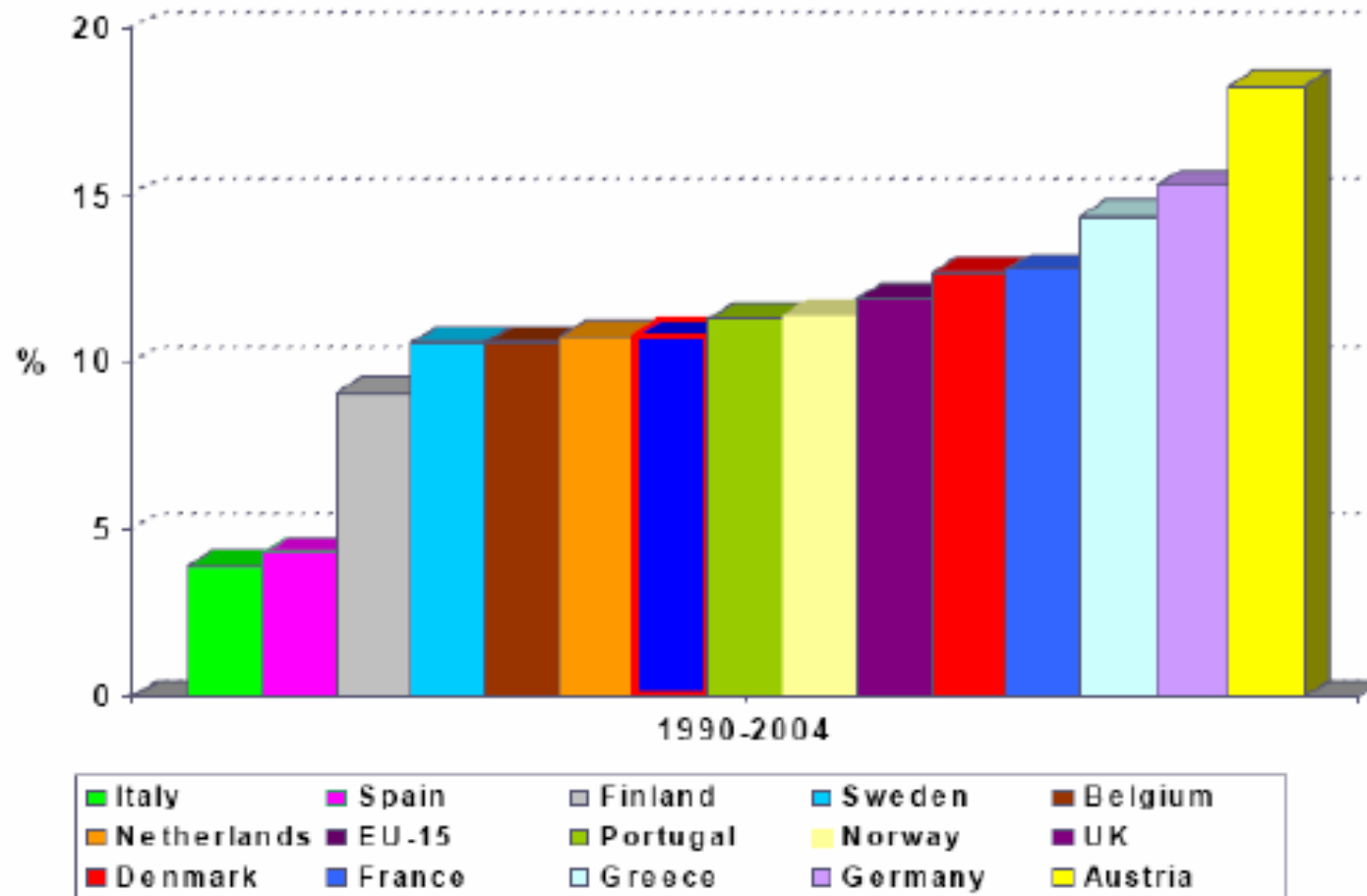
Energy intensity reduction





15 years of improvement

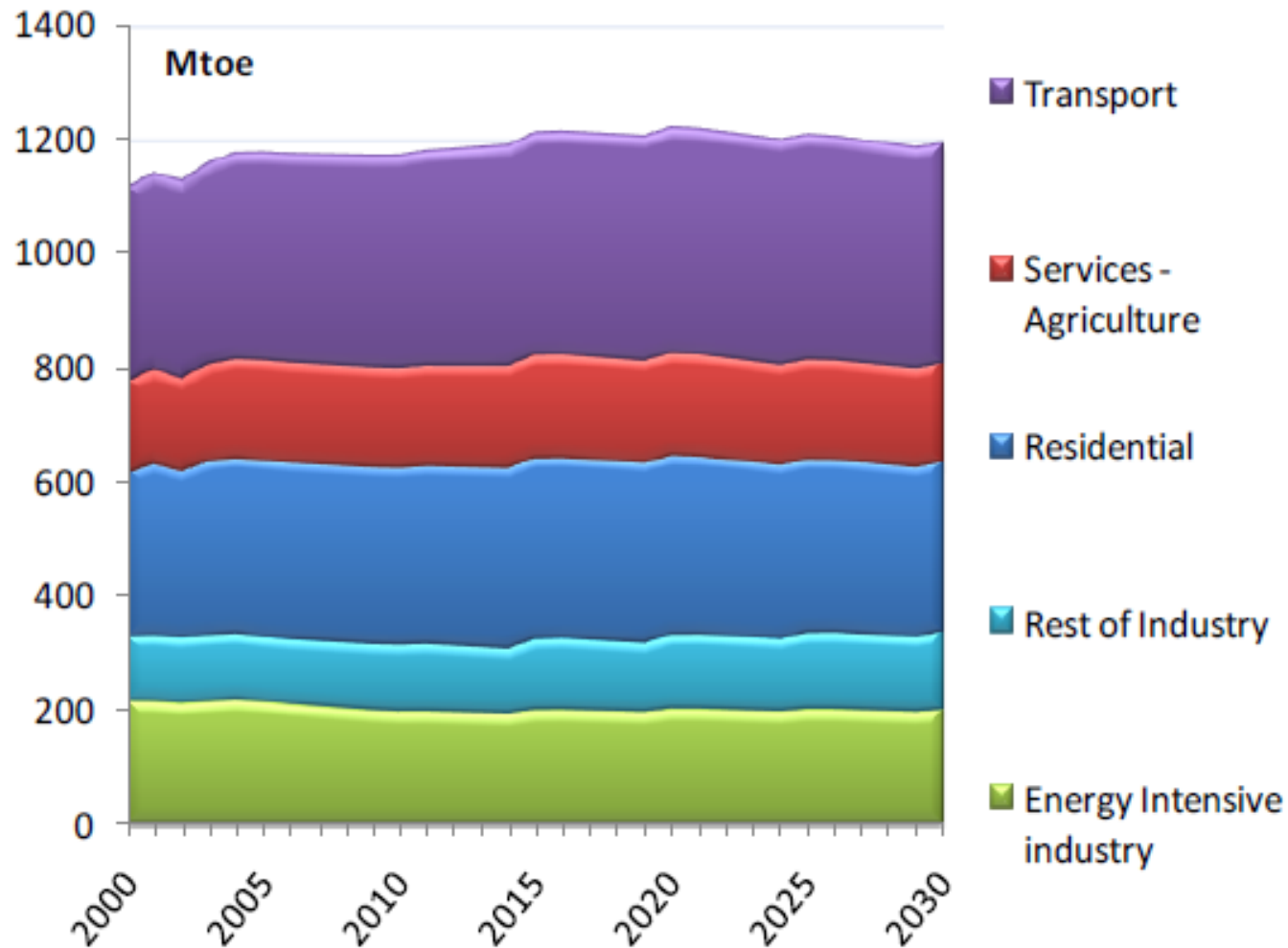
Energy efficiency progress in EU-15 countries and Norway¹



Source: Evaluation of Energy Efficiency in the EU-15: Indicators and Measures , ADEME 2007



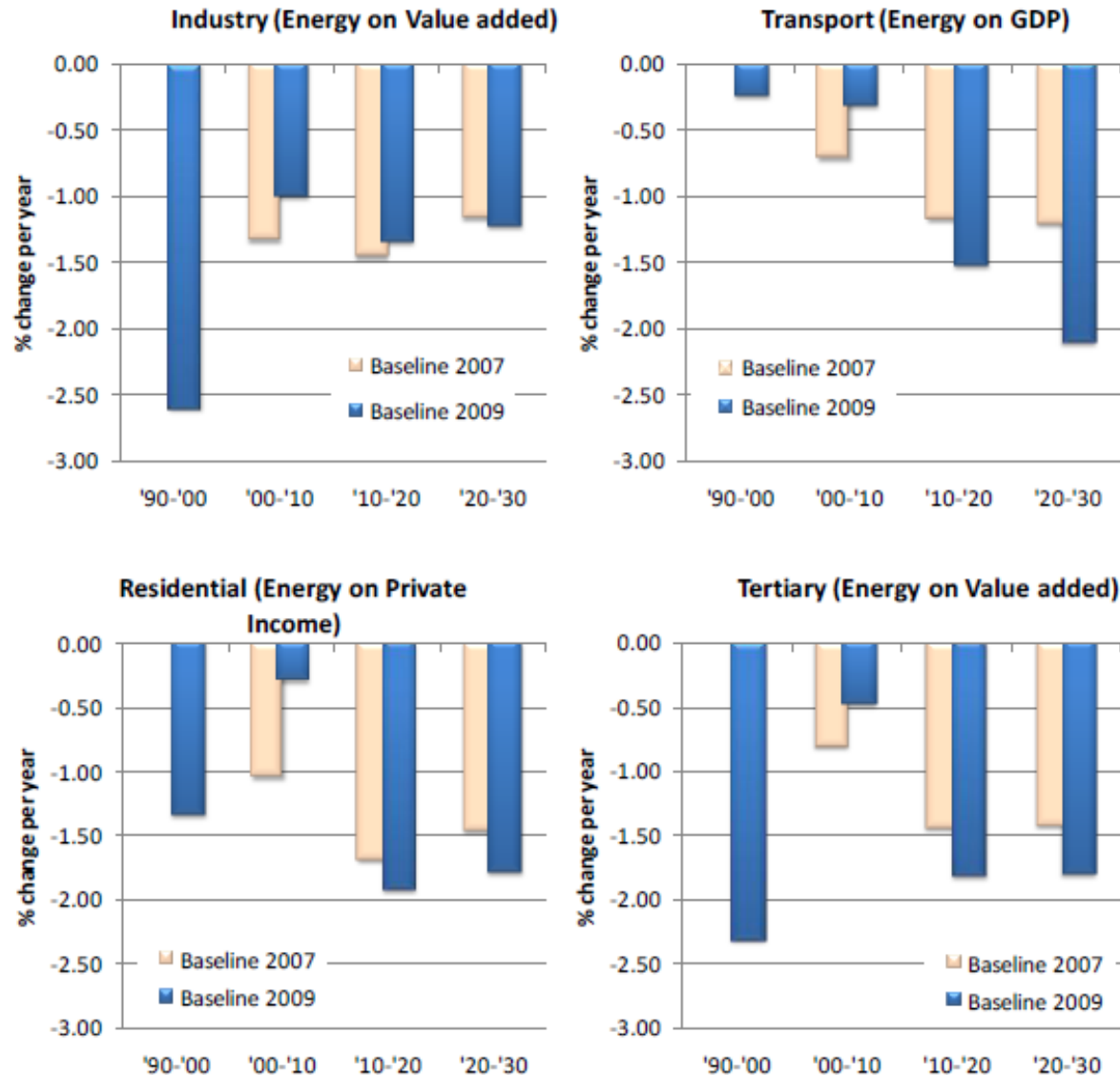
Expected energy demand in Europe



Source: EC, EU Energy trends to 2030, updated version Sept. 2010



Energy intensity indicators for Europe



Source: EC, EU Energy trends to 2030, updated version Sept. 2010



Sustainability and competitiveness

- The search for sustainability is helping companies to be more innovative
- The environment has solid industrial motivations
- An innovation without sustainability seems impossible
- Low cost economies are catching up and are becoming exporters of technologies
- Raising the standards can help



The multiple dividend of energy efficiency

- Value in terms of technological leadership and commercial strategies for domestic companies
- Incentive to innovation and development of new products and services
- Positive effects on the environment
- Reduction of operational costs in many sectors
- Increase of security and diversification of energy sources
- Creation of new professional profiles
- “no regret” measures: there are no bills to pay for these benefits!



Energy saving potential in EU

Sector	Energy consumption (Mtoe) 2005	Energy Consumption (Mtoe) 2020 (Business as usual)	Energy Saving Potential 2020 (Mtoe)	Full Energy Saving Potential 2020 (%)
Households (residential)	280	338	91	27%
Commercial buildings (Tertiary)	157	211	63	30%
Transport	332	405	105	26%
Manufacturing Industry	297	382	95	25%



The instruments of the Action Plan (Oct. 2006)

- Action 1: Appliance and equipment labelling and minimum energy performance standards
- Action 2: **Building performance requirements and very low energy buildings ("passive houses")**
- Action 3: Making power generation and distribution more efficient
- Action 4: Achieving fuel efficiency of cars
- Action 5: Facilitating appropriate financing of energy efficiency investments for small and medium enterprises and Energy Service Companies
- Action 6: Spurring energy efficiency in the new Member States
- Action 7: A coherent use of taxation
- Action 8: Raising energy efficiency awareness
- Action 9: **Energy efficiency in built-up areas**
- Action 10: Foster energy efficiency worldwide



The Directive 2006/32 on energy end-use efficiency and energy services

Purpose of the Directive:

- providing the necessary indicative targets as well as mechanisms, incentives and institutional, financial and legal frameworks to remove existing market barriers and imperfections that impede the efficient end use of energy;
 - creating the conditions for the development and promotion of a market for energy services and for the delivery of other energy efficiency improvement measures to final consumers.
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- The public sector in each Member State should thus set a good example regarding investments, maintenance and other expenditure on energy-using equipment, energy services and other energy efficiency improvement measures. The public sector should endeavour to use energy efficiency criteria in tendering procedures for public procurement,
 - Member States should therefore adopt national indicative targets to promote energy end-use efficiency
 - Member States should commit themselves to making efforts to achieve the target figure of 9 % savings at 2015



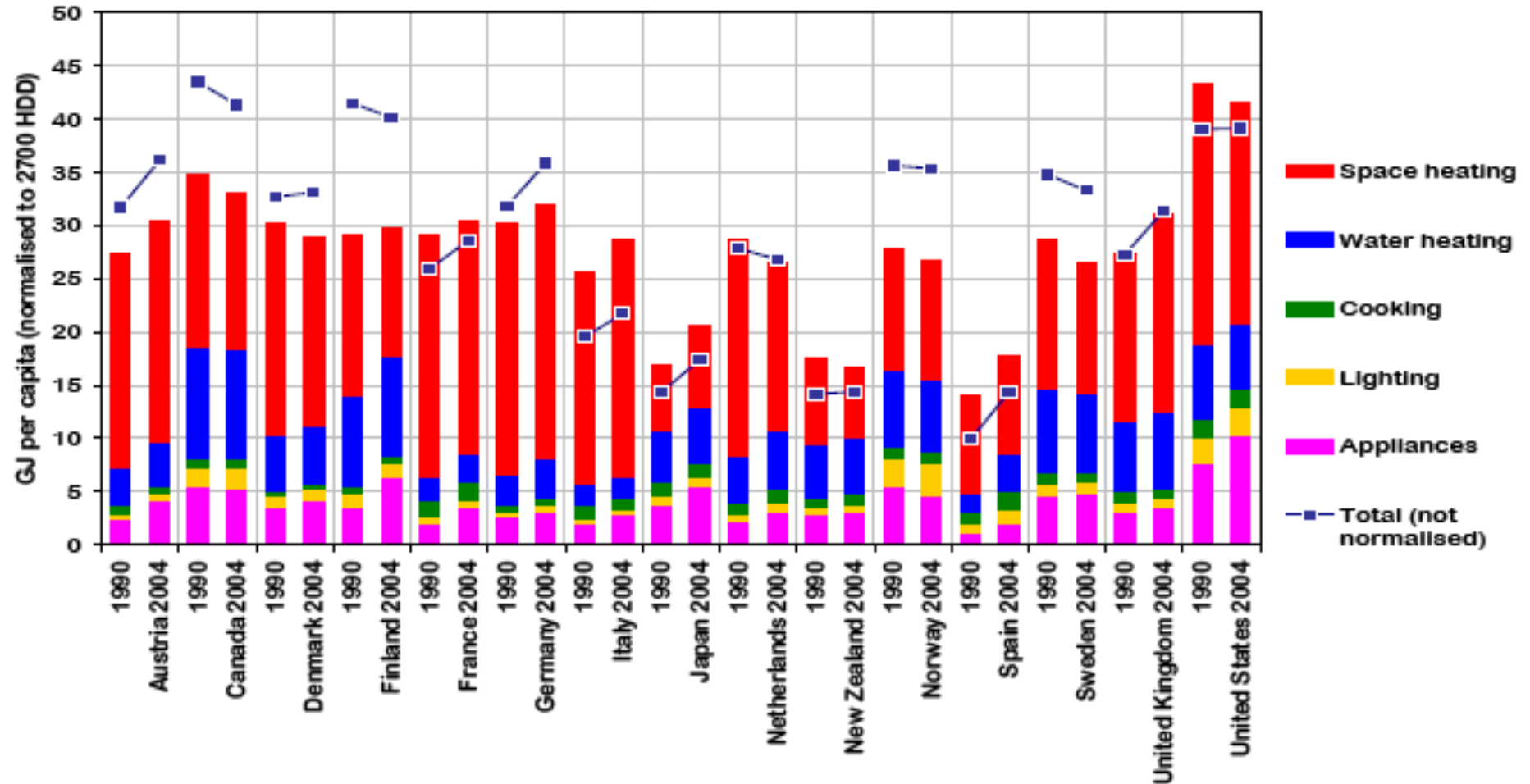
List of energy efficient public procurement measures

Without prejudice to national and Community public procurement legislation, Member States shall ensure that the public sector applies at least two requirements from the following list in the context of the exemplary role of the public sector as referred to in Article 5:

- (a) requirements concerning the use of **financial instruments for energy savings**, including energy performance contracting, that stipulate the delivery of measurable and pre-determined energy savings (including whenever public administrations have outsourced responsibilities);
- (b) requirements **to purchase equipment and vehicles based on lists of energy-efficient product** specifications of different categories of equipment and vehicles to be drawn up by the authorities or agencies referred to in Article 4(4), using, where applicable, minimised life-cycle cost analysis or comparable methods to ensure cost effectiveness;
- (c) requirements to purchase **equipment that has efficient energy consumption in all modes**, including in standby mode, using, where applicable, minimised life-cycle cost analysis or comparable methods to ensure cost effectiveness;
- (d) requirements to **replace or retrofit existing equipment and vehicles** with the equipment listed in points (b) and (c);
- (e) requirements to **use energy audits and implement the resulting cost-effective recommendations**;
- (f) requirements **to purchase or rent energy-efficient buildings** or parts thereof, or requirements to replace or retrofit purchased or rented buildings or parts thereof in order to render them more energy-efficient.



Energy use in IEA houses

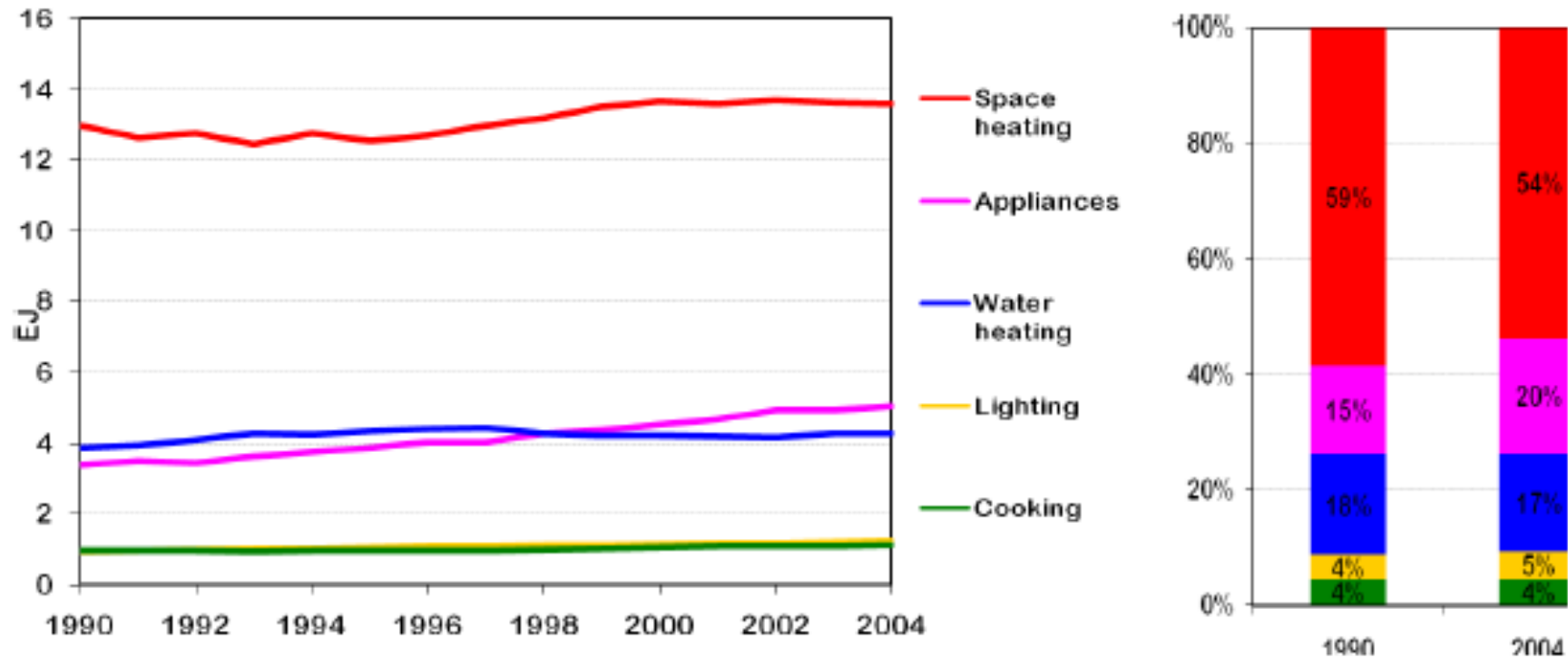


Source: IEA, ENERGY EFFICIENCY REQUIREMENTS IN BUILDING CODES, ENERGY EFFICIENCY POLICIES FOR NEW BUILDINGS, March 2008



Energy use in IEA's houses

Figure 2. Energy use in residential buildings.



Source: IEA, ENERGY EFFICIENCY REQUIREMENTS IN BUILDING CODES, ENERGY EFFICIENCY POLICIES FOR NEW BUILDINGS, March 2008



Energy use in kWh/m² for heating

- Passive house: 15 only heating, 120 total energy demand, appliances included
- Netherlands: 85 in 2006, 60 in 2011, 40 in 2015 (recalculated from energy performance factor and inclusive hot water, ventilation and cooling)
- France: 50 in 2012 only heating
- Existing buildings built before 2000: estimate between 100 and 300 (source IEA)



Passive house concept

- Compact form and good insulation
- Southern orientation and shade considerations
- Energy-efficient window glazing and frames
- Air tight building envelope
- Passive preheating of fresh air
- Balanced ventilation and efficient heat recovery
- Required flow of ventilation air is sufficient to transport the heat for space heating
- Hot water supply with solar or heat pumps
- Energy-saving household appliances



Examples of passive houses





Directive 2010/31/EC

on the energy performance of buildings

Art. 3: Member States shall apply a methodology for calculating the energy performance of buildings

Art. 4: Member States shall take the necessary measures to ensure that minimum energy performance requirements for buildings or building units are set with a view to achieving cost-optimal levels

Art. 9: Member States shall ensure that:

- (a) by 31 December 2020, all new buildings are nearly zero- energy buildings; and
- (b) after 31 December 2018, new buildings occupied and owned by public authorities are nearly zero-energy buildings.

Art. 18: Member States shall ensure that independent control systems for energy performance certificates and reports on the inspection of heating and air-conditioning systems are established

Art. 27: Member States shall lay down the rules on penalties applicable to infringements of the national provisions adopted pursuant to this Directive



An estimate of the saving potential

A very detailed study has been made.

Estimated saving potential in Italy (Mtoe):

Mtoe	lower	higher
transport	2,0	6,4
motor drives	1,9	3,4
lighting	2,4	3,2
heating/cooling	5,6	8,0
other civil uses	1,4	4,2
thermal uses in industry	0,8	4,0
other electric uses in industry	0,2	0,7
TOTAL	14,3	30,0



Other civil electric and thermal uses (8% of TPES 2005)

- Electrical appliances, ICT systems, food refrigeration and cooking
- Stand-by consumption

Achievable savings: 7.5 – 22 TWh (9 – 25% of consumption 2005 for these uses)



Ricerca \leftrightarrow Imprese

- Il settore dell'energia è un'area di elezione della collaborazione tra mondo della ricerca e mondo delle imprese: dobbiamo investire in questi settori, ma servono ricerca e innovazione continue per la competitività
- Oggi le imprese non "usano" l'Università per crescere ... e l'Università tiene le distanze!
- Superare questa distanza è un passaggio determinante perché le politiche per l'energia abbiano successo sul piano industriale
- Superare le barriere culturali che vedono questi mondi disgiunti è difficile!



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