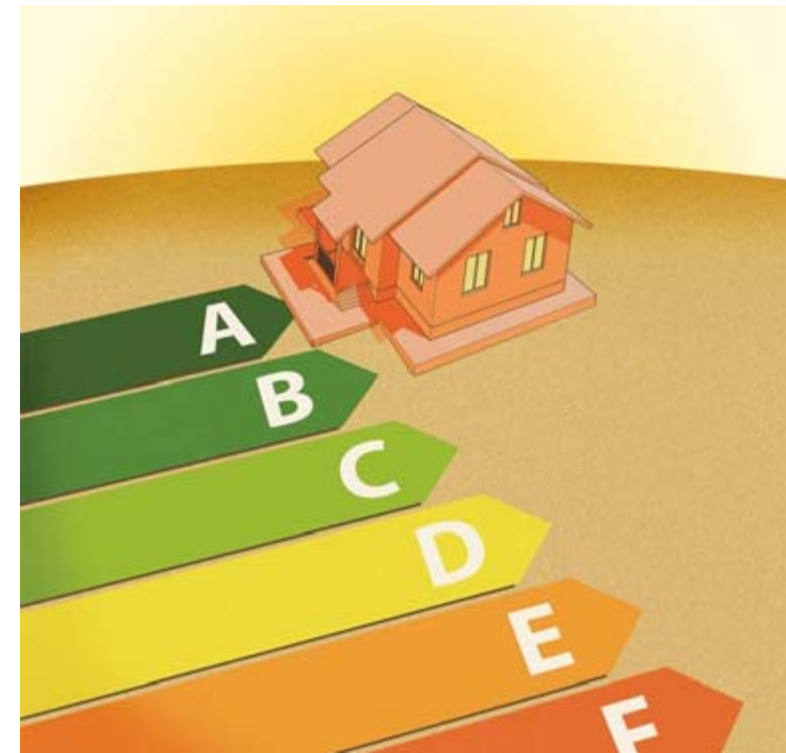


JRC R&D Activities in support of EU Energy Efficiency Policies



Paolo Bertoldi
European Commission
Joint Research Centre (JRC)
IE - Institute for Energy
<http://re.jrc.ec.europa.eu/energyefficiency>



JRC – *Robust science for policy making*

As a Directorate-General of the European Commission, the JRC provides customer-driven scientific and technical support to Community policy making



Supporting citizen's security, research on energy, environment, transport, climate change, safety of food and consumer products, security, crisis management, nuclear safety and security

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The Mission

... is to provide customer-driven scientific and technical support for the conception, development, implementation and monitoring of EU policies. As a service of the European Commission, the JRC functions as a reference centre of science and technology for the Union.

Close to the policy-making process, it serves the common interest of the Member States, while being independent of special interests, whether private or national.

The Vision

...is to be a trusted provider of science-based policy options to EU policy makers to address key challenges facing our society, underpinned by internationally recognised research.

Our Structure: 7 Institutes in 5 Member States

IRMM – *Geel, Belgium*

Institute for Reference Materials and Measurements

ITU – *Karlsruhe, Germany*

Institute for Transuranium Elements

IE – *Petten, The Netherlands and Ispra, Italy*

Institute for Energy

IPSC – *Ispra, Italy*

Institute for the Protection and Security of the Citizen

IES – *Ispra, Italy*

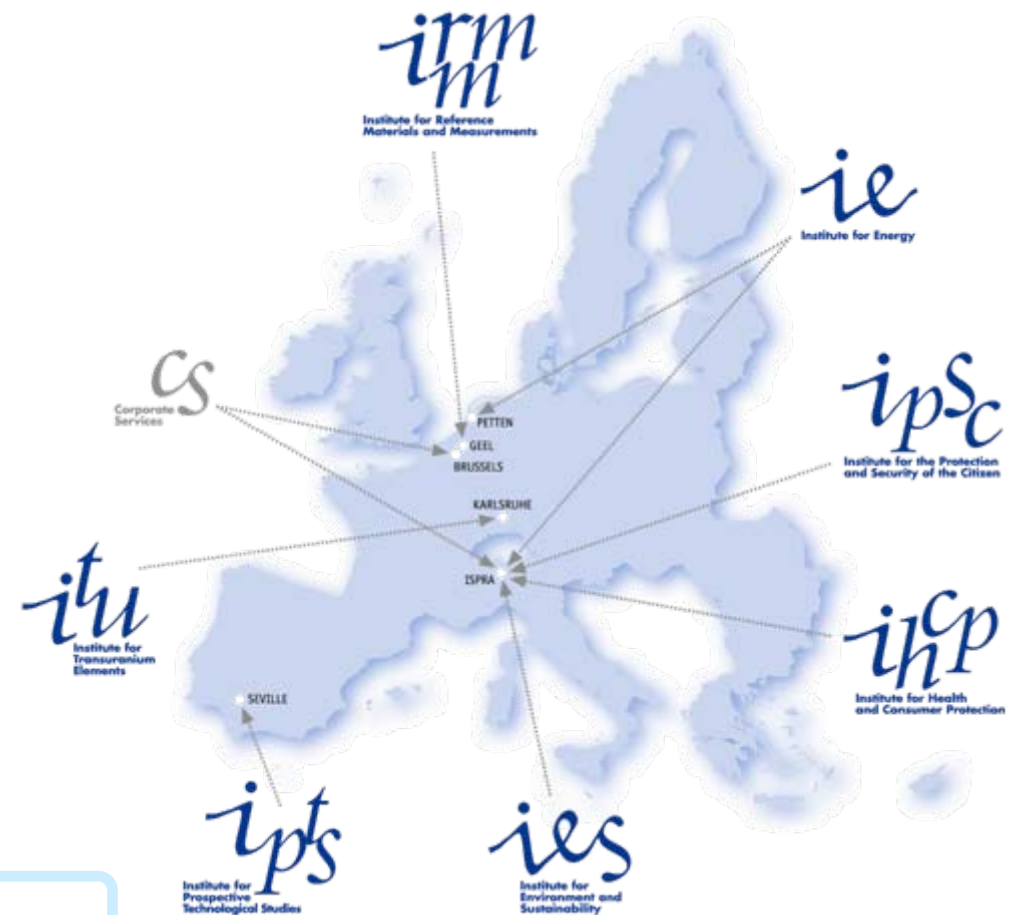
Institute for Environment and Sustainability

IHCP – *Ispra, Italy*

Institute for Health and Consumer Protection

IPTS – *Seville, Spain*

Institute for Prospective Technological Studies



~ 2750 staff

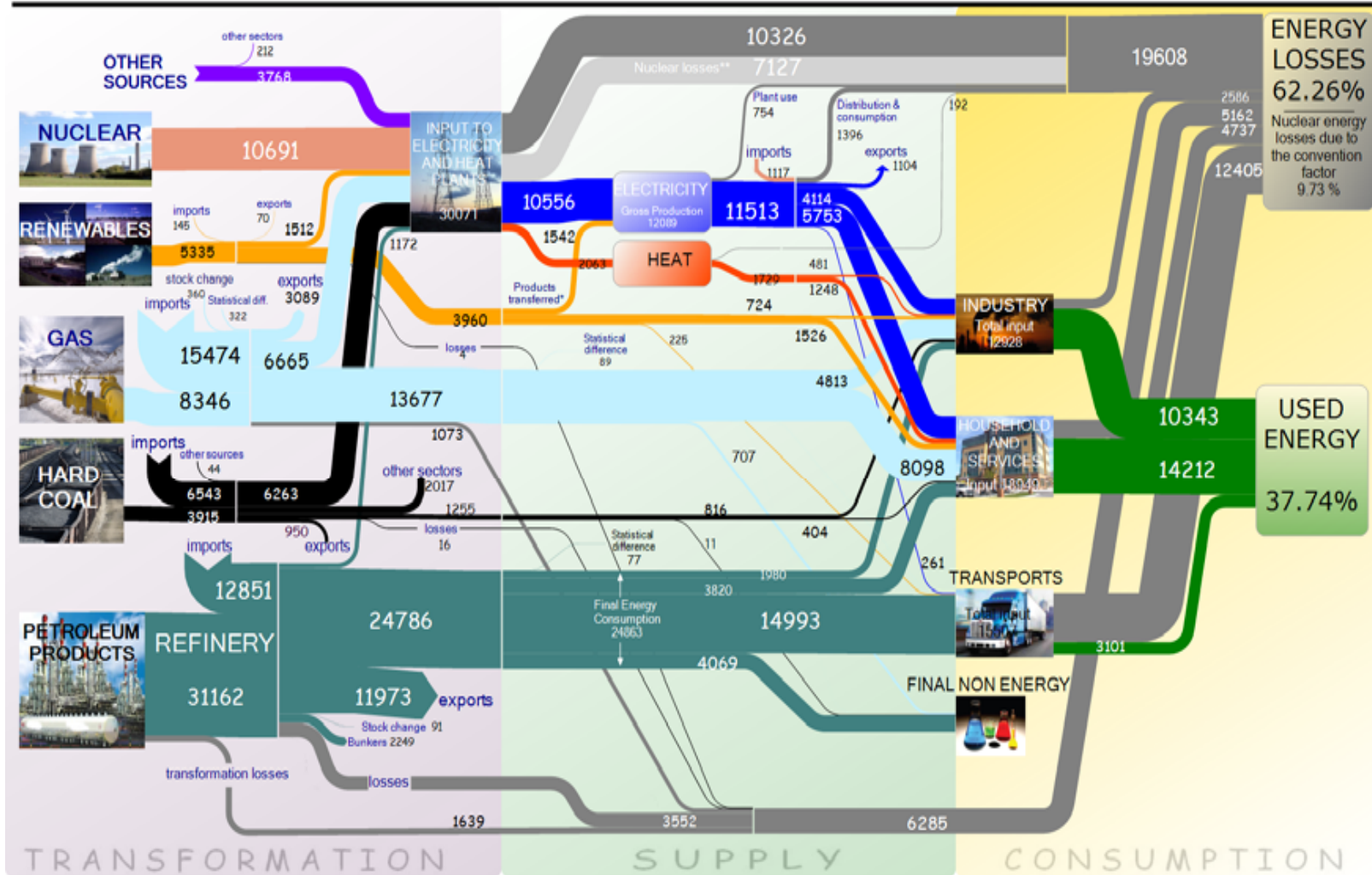
~ 345 M€y institutional budget (+ 60 M€y earned income)

- The Institute for Energy (IE) is one of the 7 scientific Institutes of the JRC Typical Activities of the Institute include:
 - Renewable energies including solar, photovoltaics and biomass,
 - Sustainable & safe nuclear energy for current & future reactor systems
 - Energy techno/economic assessment
 - Bioenergy including biofuels,
 - Hydrogen and fuel cells,
 - Clean fossil fuel
 - **Energy efficiency in: buildings, industry and transport**

- **The mission of the IE is to provide support to Community policies related to both nuclear and non nuclear energy in order to ensure sustainable, safe, secure and efficient energy production, distribution and use"**

Washington D.C. 18 February 2011 – AAAS Annual meeting 2011

EU-27 streamlined energy flow trends - 2006 Supply, transformation, consumption (PJ)



* It refers to electricity produced from Hydro, Wind and Photovoltaic Power which is directly counted as gross electricity production. It has been added also the gross electricity generation from pumped storage plants.

** Losses occurred due to the convention factor for nuclear power. These are not properly losses.

LEGEND

- Petroleum products
- Hard coal
- Natural Gas and Derivates (GAS)
- Renewable energies (hydro, biomass, wind, PV, wood, wastes)
- Nuclear
- Electricity
- Heat
- Lignite & peat
- Useful Energy
- Losses

EU Key Climate and Energy Objectives for 2020

By 2020 -20% **EU GHG**

By 2020 +20% **ENERGY
SAVING**

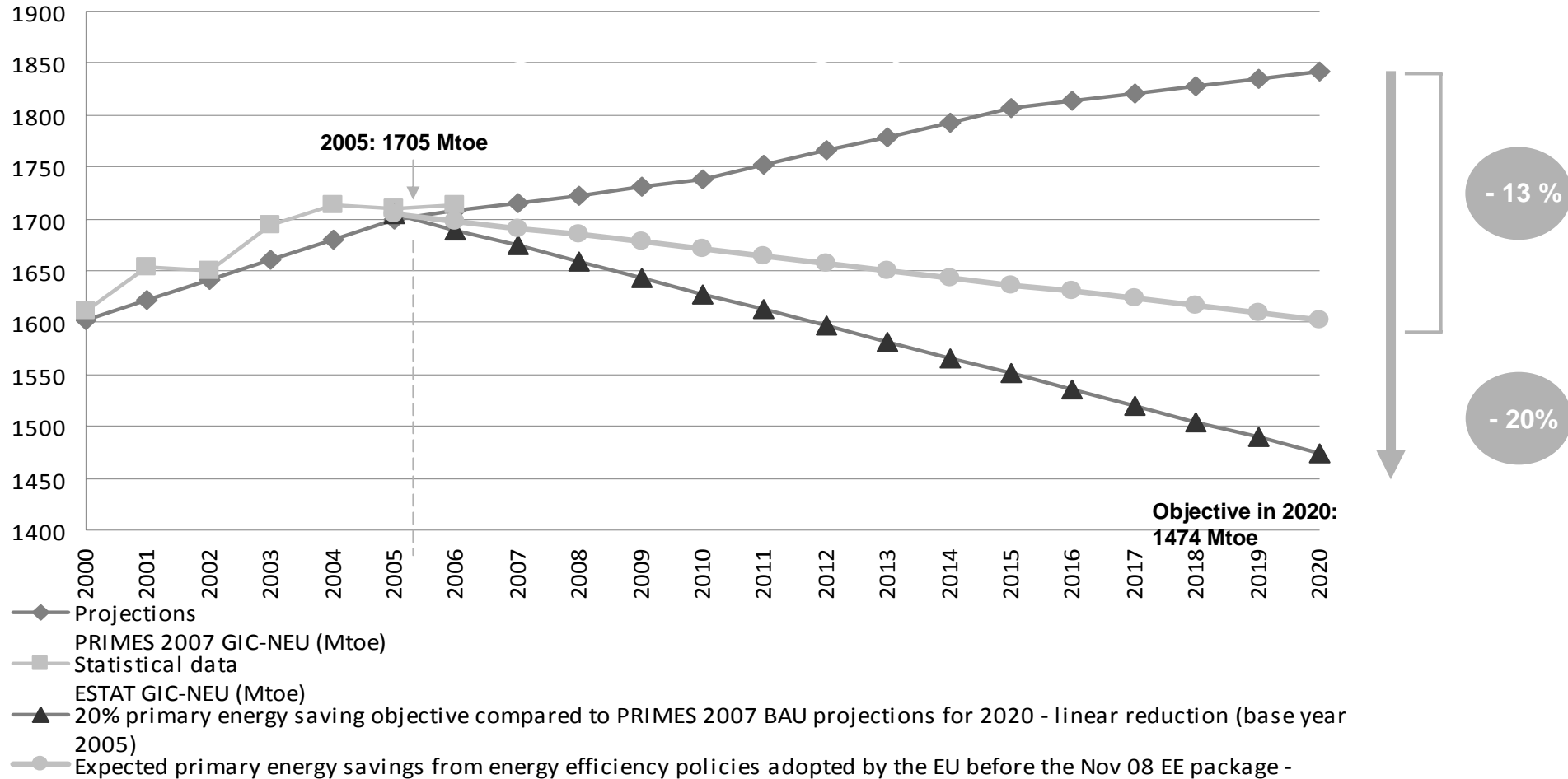
By 2020 binding 20% **RENEWABLES** in final
energy consumption at EU level

**RES in
transport**
Min 10%
binding

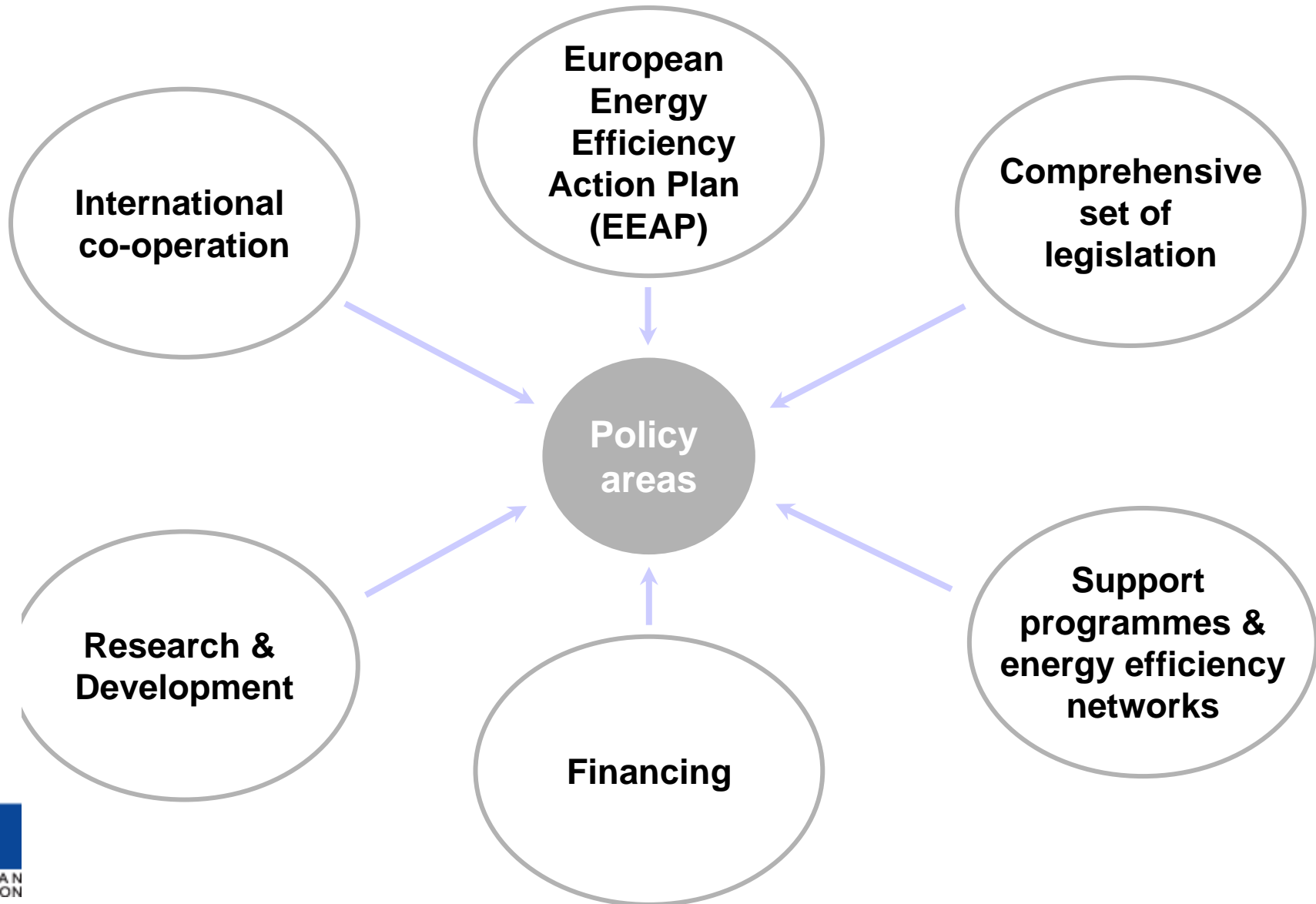
ELECTRICITY
MS binding
choice

**HEATING &
COOLING**
MS binding
choice

NATIONAL TARGETS & ACTION PLANS

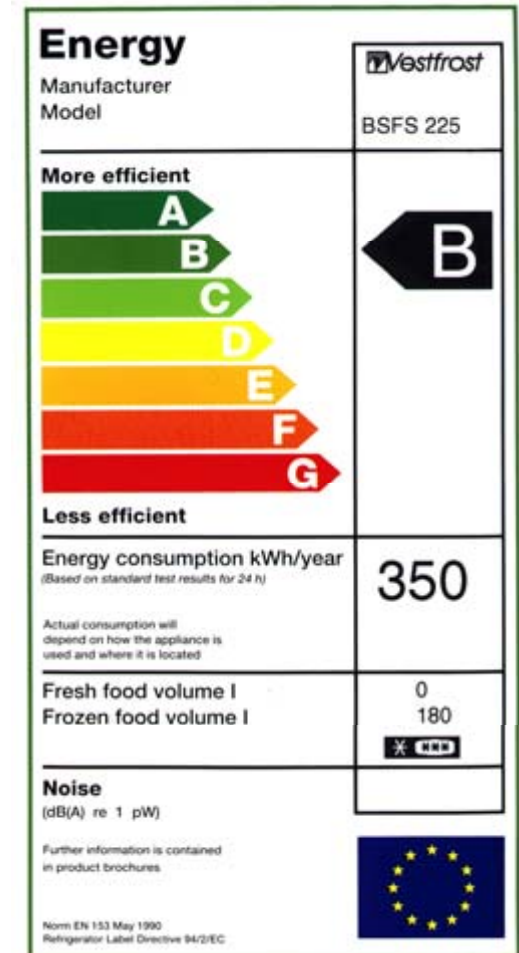


Source: European Commission

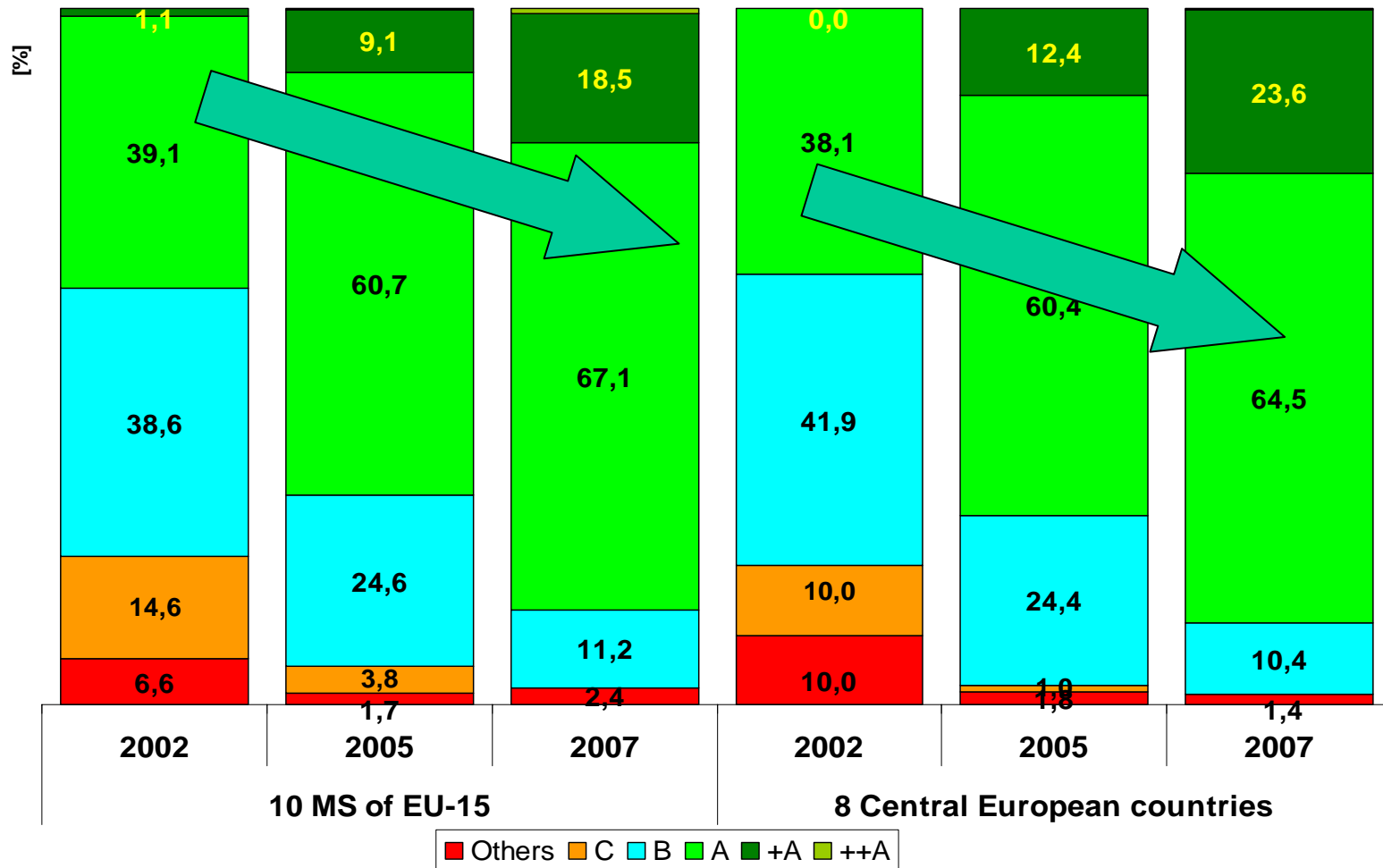


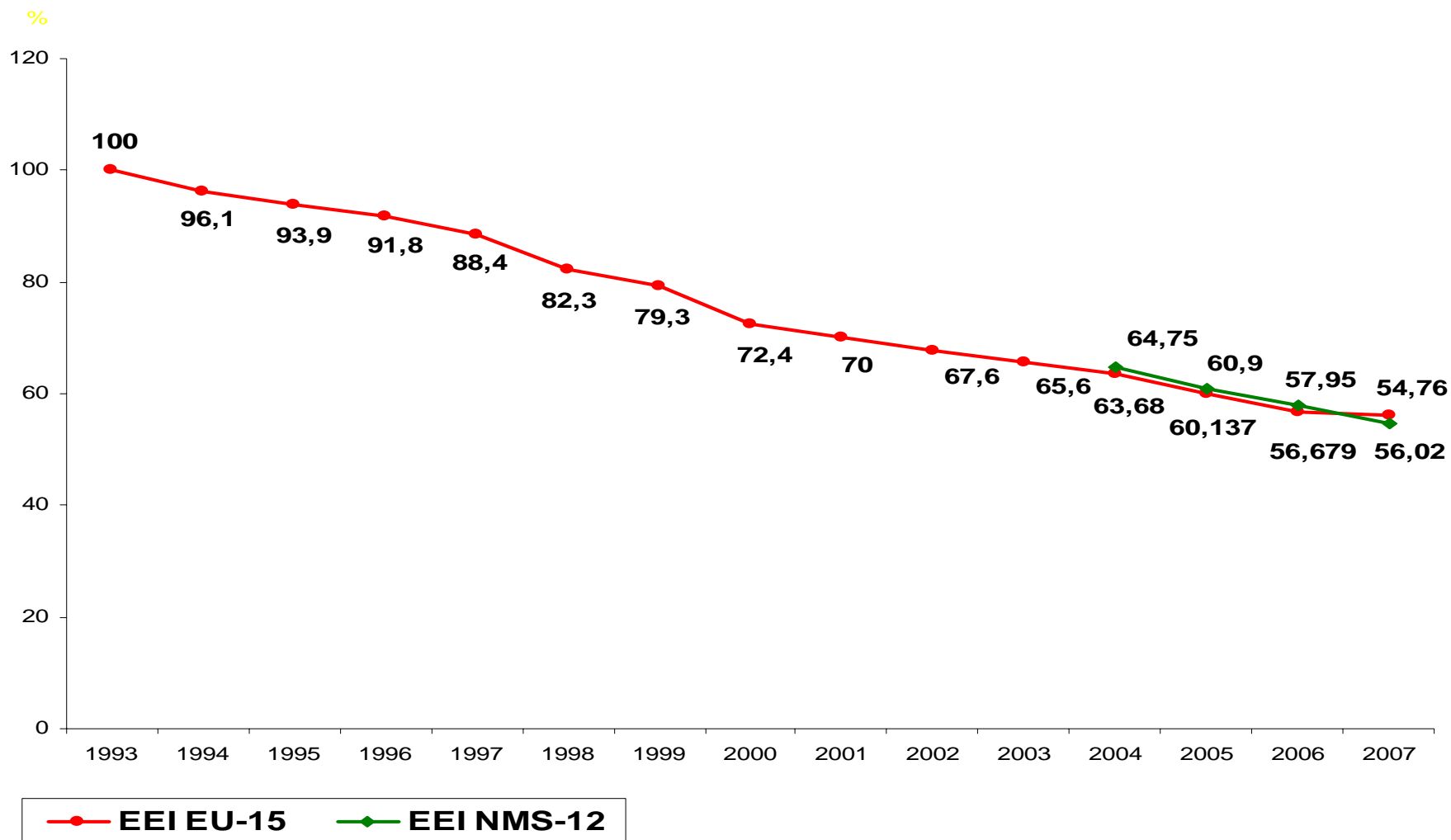
- Energy tax (at EU and national level)
- Incentives and financing for investments in energy efficiency (national)
- Information campaigns (mainly national)
- Promotion of energy services (ESCOs) (national action, but not enough!)
- Minimum Efficiency Requirements (MEPS) for end-use equipment (at EU level)
- Equipment Labelling (at EU level)
- Buildings Codes (standards) (at national level under the frame of the EPBD)
- Energy Audits (at national level)
- Voluntary programmes (mainly in the industrial sector at national level, but also for equipment, these are at EU level)
- Energy Audits
- Use of taxation (reduced VAT, accelerated depreciation, tax deductions);
- Public procurement;
- White certificates, a new market-based instrument;

- The EU adopted a Framework Appliance Energy Labelling Directive in 1992 (92/75/EEC) followed by implementing Directives for the following appliances:
- Cold appliances (Directive 94/2/EC of 21.1.94)
- Clothes washers (Directive 95/12/EC of 23.5.95)
- Clothes dryers (Directive 95/13/EC of 23.5.95)
- Washer-dryers (Directive 96/60/EC of 23.5.95)
- Dishwashers (Directive 97/17/EC of 7.5.97)
- Household lamps (Directive 98/11/EC of 27.1.98)
- Air-conditioners (Directive 2002/31/EC of 22.3.2002)
- Electric ovens (Directive 2002/40/EC of 8.5.2002).
- Directive 2003/66/EC on refrigerators and freezers (A+/A++)



- Mandatory minimum efficiency requirements have been introduced in the 1990s the EU for:
 - Cold appliances
 - Heating Boilers
 - Ballast for fluorescent lighting
- The new Eco-Design of Energy Related Products Directive allows a faster adoption of Mandatory minimum efficiency requirements. The Eco-Design Directive does not create immediate obligations for manufacturers but allows the Commission to do so through implementing Regulations;

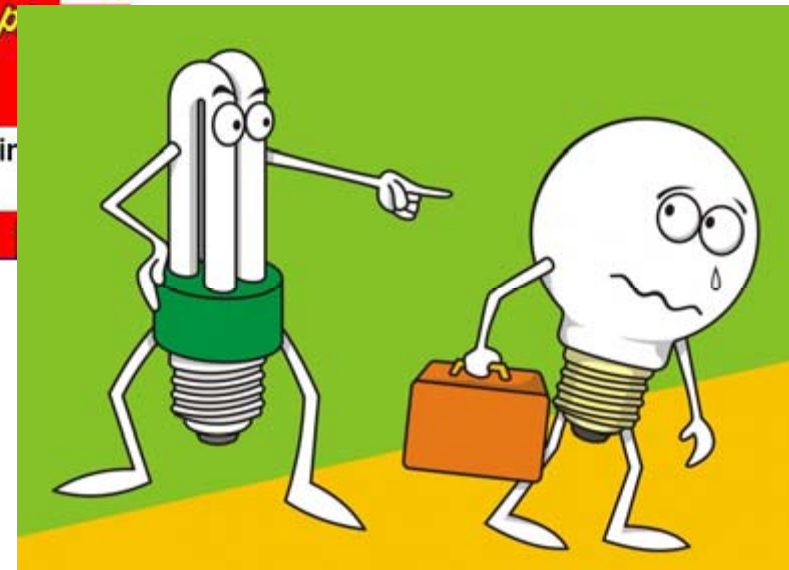




In March 2009 the European Commission adopted the Eco-design Regulation to improve the energy efficiency of household lamps, which envisages the progressive phase-out of incandescent bulbs starting in 2009 and finishing at the end of 2012.

Date	Non-clear lamps				Clear lamps						
	Requirement energy class	Incandescent	All halogen	CFLs	Requirement energy class	Conventional halogen				Halogen C	Halogen B
						≥100 W	≥75 W	≥60 W	<60 W		
Today	None				None						
Sep-09	A	phased-out			C for ≥100W, E for the rest ¹						
Sep-10	A				C for ≥75W						
Sep-11	A				C for ≥60W						
Sep-12	A				C for all						
Sep-13					Second level of functionality requirement						
Review 2014					Review						
Sep-16	A	phased-out			B / C ²						

Now our R&D activity focus on Solid State Lighting





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

- a) All new build “nearly zero energy buildings” as of end of 2020 (public sector: end of 2018). Remaining energy need mainly covered by RES
- b) Directive covers now all existing buildings irrespective of their size both residential and non residential sector (previously only >1000 m²)
- c) Requirement for Member States to lay down min. energy performance levels for technical building systems and building elements when installed, replaced or upgraded
- d) Level of minimum energy performance requirements
Benchmarking to achieve cost-optimal levels

- e) Display of Energy Performance Certificates in public buildings
(decrease of threshold to 500 m² and 250 m² after 5 years)**
- e) Strengthening the role and the quality of energy performance certificates – i.a. by quality checks and obligatory use of the performance indicator in all advertisements for sale or rent**
- f) Strengthening the role and the quality of HVAC inspections**
- g) Stimulating financing mechanisms for energy efficiency investments in the building sector**
- h) Exemplary role of public authorities**

- **Analysis of market mechanisms and tradable white certificate schemes in place in Europe and elsewhere: results, lessons learned;**
- **Comparison of white certificate schemes with other policy tools to promote energy efficiency;**
- **Integrating white certificates (project credits) into carbon markets.**

**TRADABLE CERTIFICATES FOR
ENERGY SAVINGS
(WHITE CERTIFICATES)**

- THEORY AND PRACTICE -

PAOLO BERTOLDI
*European Commission, DG JRC,
Institute for Environment and Sustainability, Renewable Energies Unit*

SILVIA REZESSY
*Central European University, Environmental Sciences and Policy
Department*

Institute for Environment and Sustainability

2006

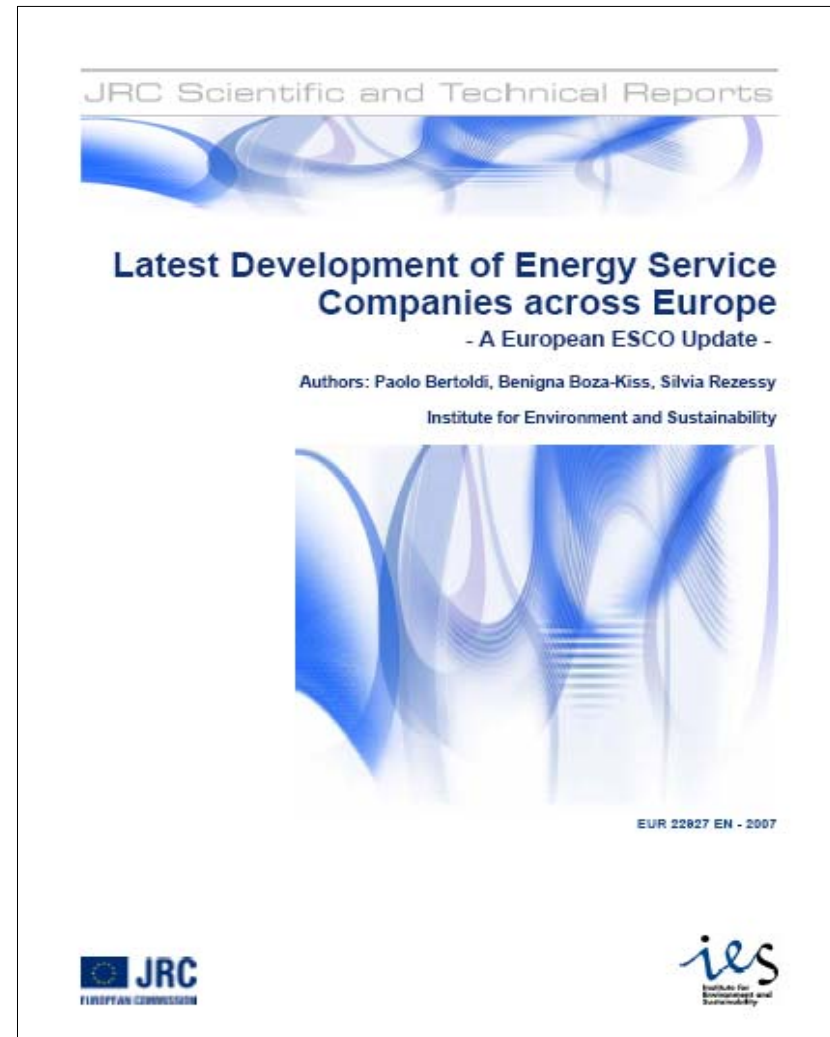
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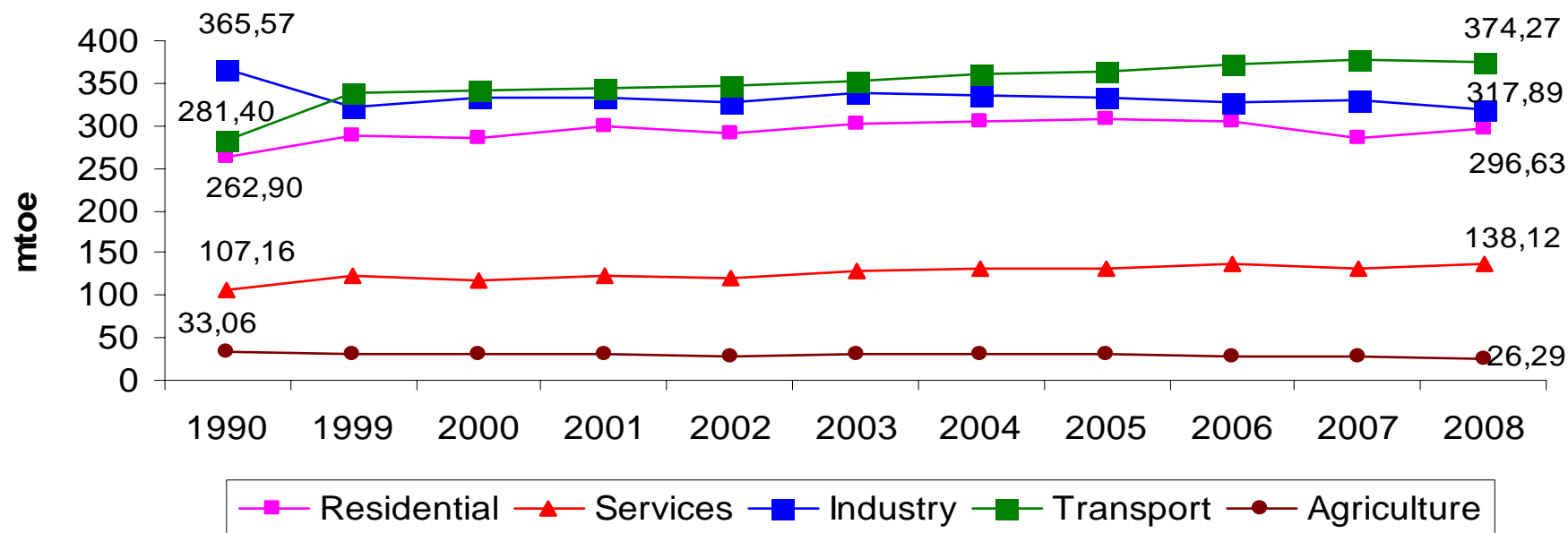


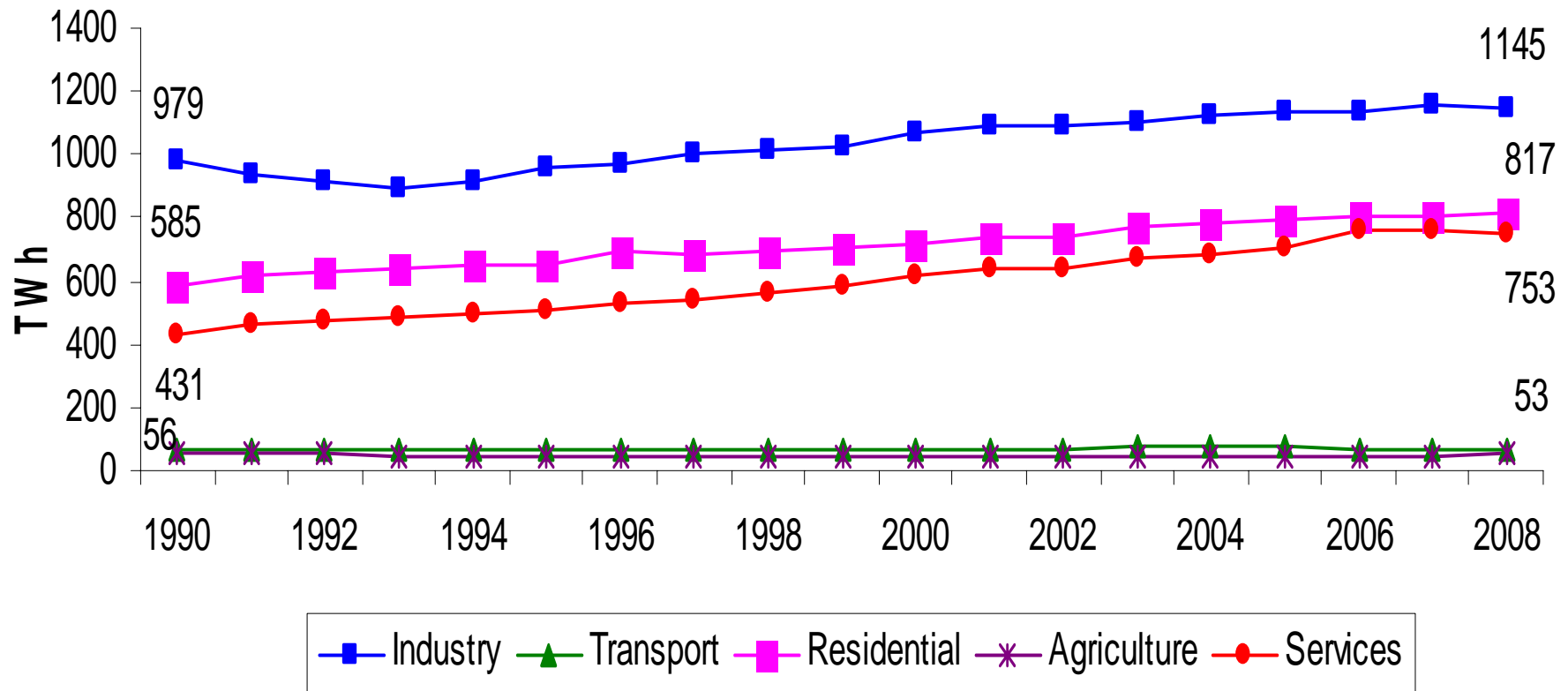
Energy Service Companies

- **Monitoring of market development since 2002;**
- **Review of state of the art, update reports;**
- **Workshops – initiating exchange of experience;**
- **ESCO databases (companies and projects).**

- **New Report on the market in published in September 2010**

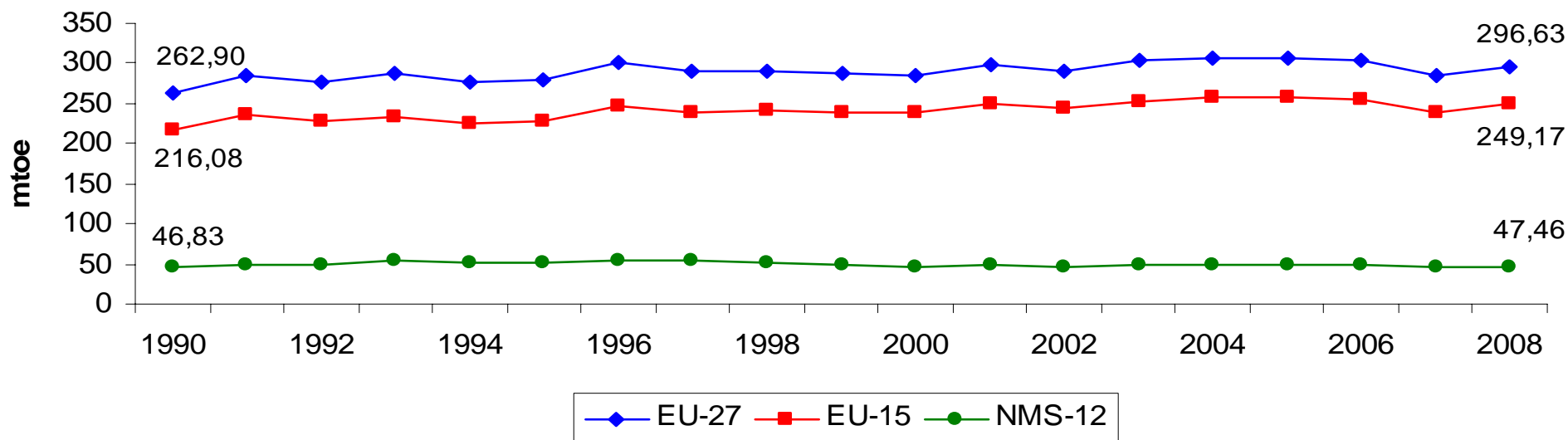




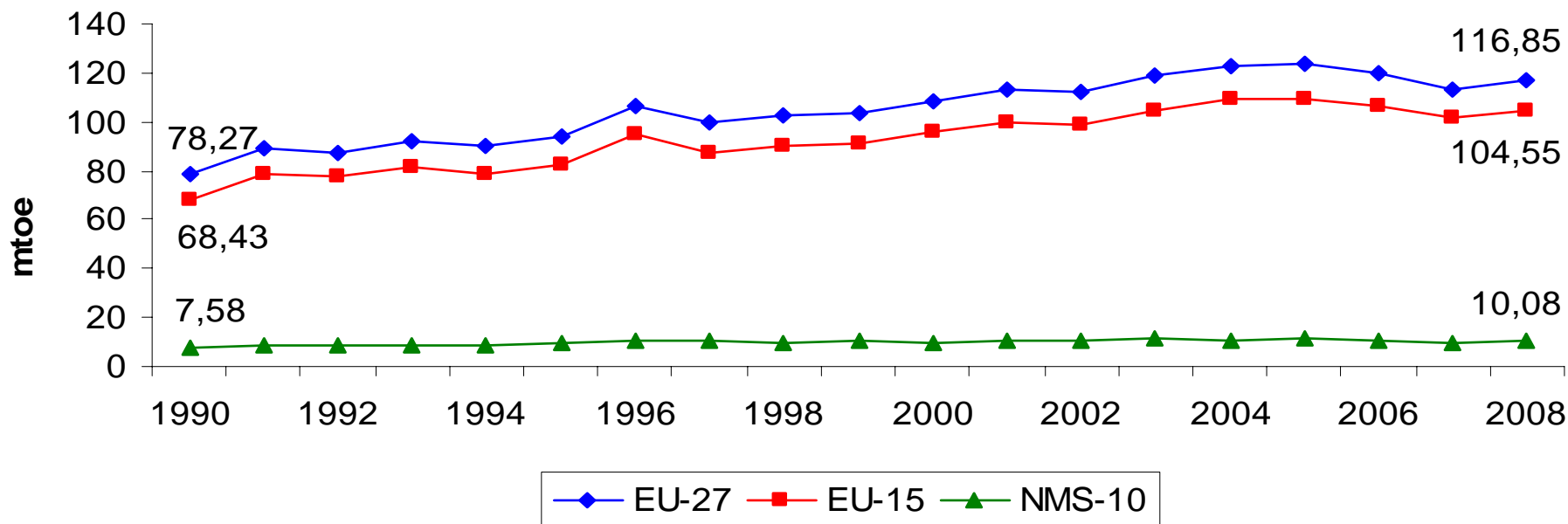


RESIDENTIAL SECTOR

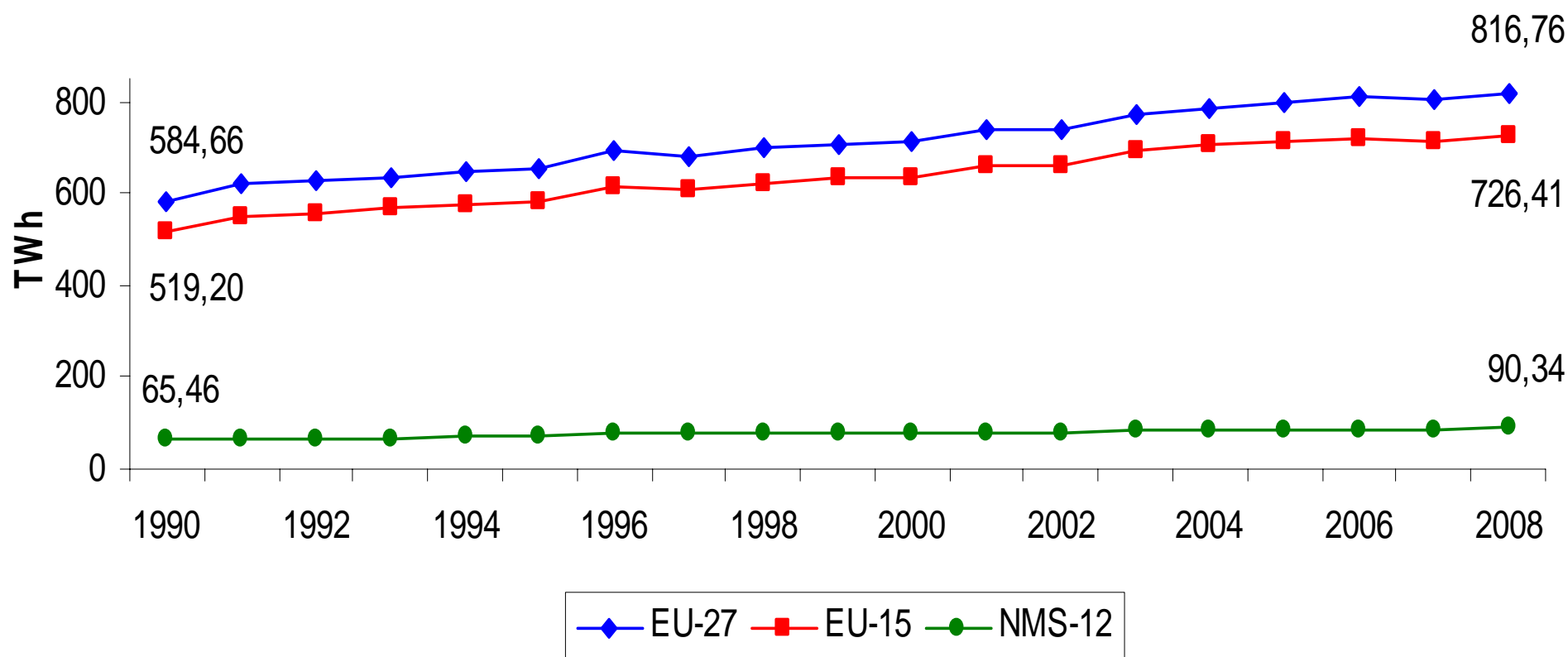
- In the last 4 years (2004-2008) final residential energy consumption decreased by 2.88%. In the period between 1990 and 2008 final residential energy consumption grew by 12.83%. There was a drop in consumption in 2007 (-6.3%) and an increase in 2008 (4.26%)

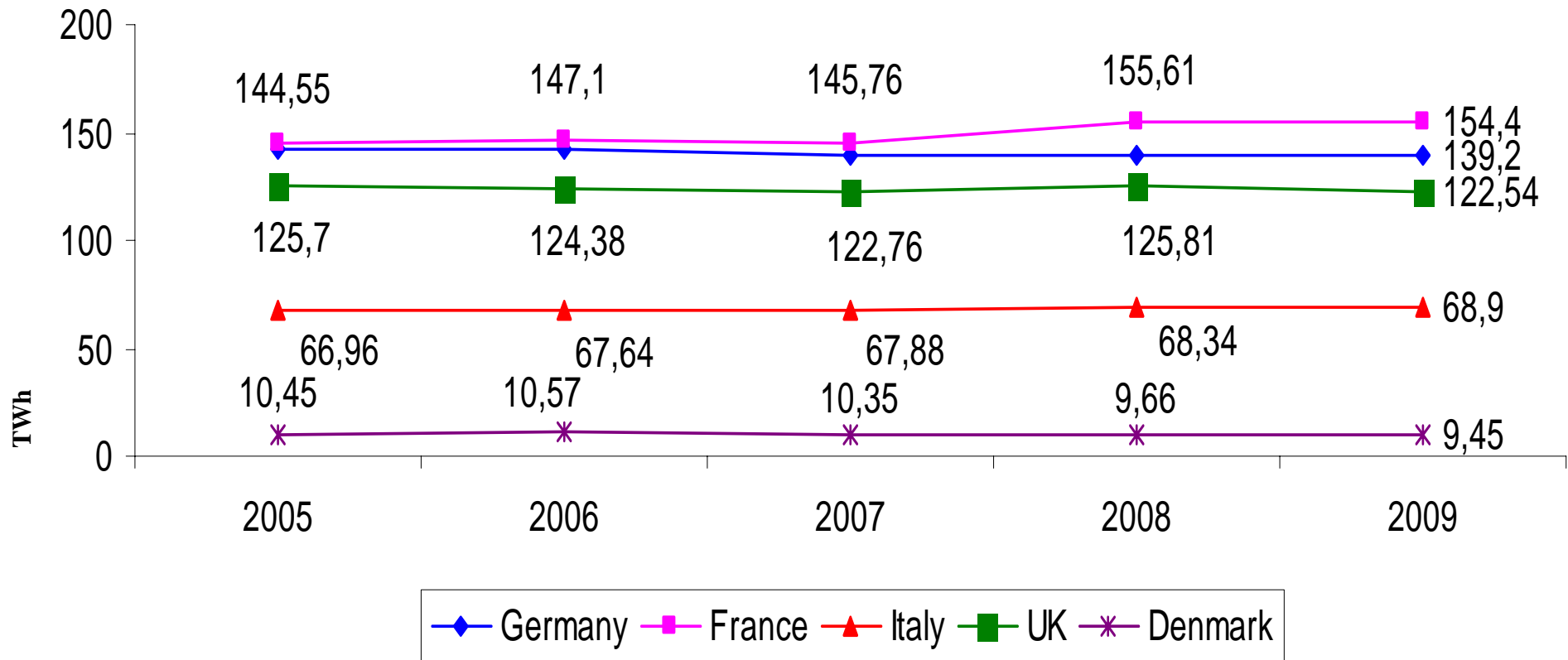


- The gas consumption of the residential sector has continued to grow in the period 1999 to 2008 in the EU-27 from 103.82 Mtoe to 116.85 Mtoe (12.6% growth), but the trend changed from 0,24% increase over the period 2004-2005 to -5,73% decrease over the period 2006-2007. Between 2007 and 2008 gas consumption grew again by 3.18%.



- EU-27: Residential electricity consumption rose by 16.99% on the period 1999-2008 and by 33.4% on 1990-2008, arriving to 816.76 TWh/yr.





..but improvements in efficiency are offset by additional consumption



Including standby consumption



- There is a **large potential** to further improve energy efficiency in buildings (about **25%**) in Europe and elsewhere.
- It requires efficient solutions and **new technologies** both for **buildings** and for the **equipment**, including **renewable energy sources**.
- Attention must be paid to **existing** buildings, and incentives and solutions for the building refurbishment needs to be introduced.
- **Policies and programmes** are needed: information (labelling and smart metering), minimum efficiency standards, and incentives.
- Finally it is required a **change in behaviour and life style** (smaller homes, less equipment, less cooling, walking, etc.).

Thank you!

For more information!

Paolo.Bertoldi@ec.europa.eu

<http://re.jrc.ec.europa.eu/energyefficiency>