

**Workshop: Opportunities for financing energy efficiency projects in Macedonia,
Norsk Energi and Centre for Climate Changes – MK, Skopje, 1 February 2011**

Energy efficiency in industry and services: Its real potential

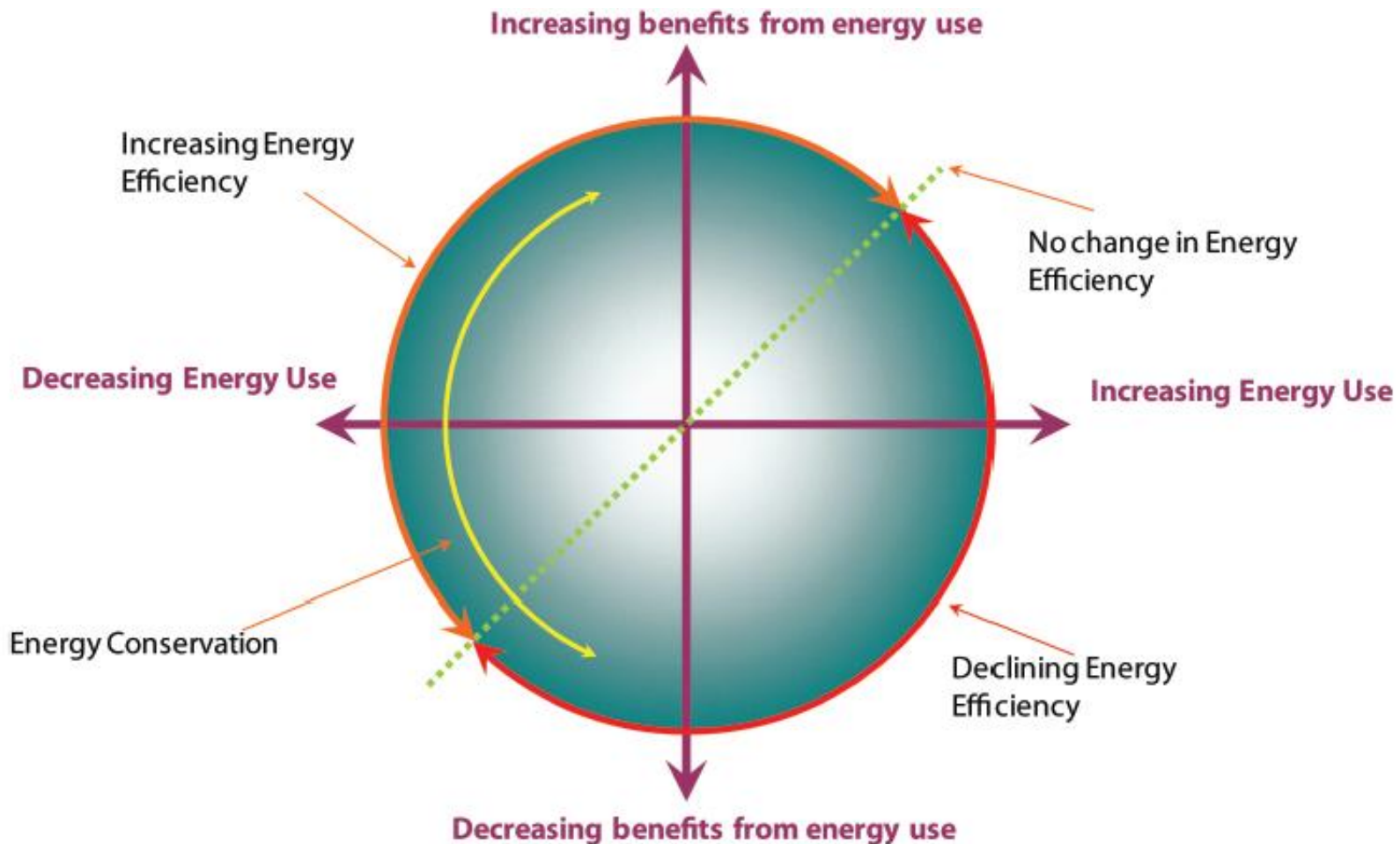
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- 1. Why energy efficiency?**
- 2. Is economic growth directly linked with energy consumption increase?**
- 3. How to improve EE and reduce energy intensity? Different types of energy efficiency policies and measures in industry – EU countries**
- 4. Some energy efficiency issues – Macedonia**
- 5. What to do?**

What is energy efficiency?

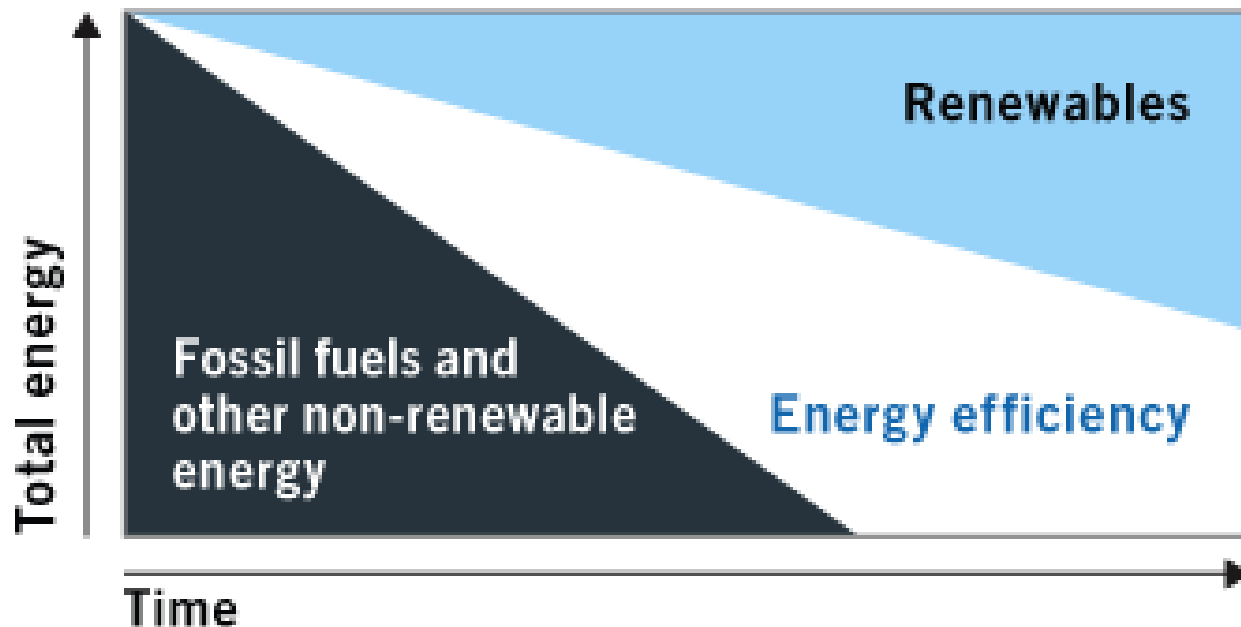
Delivering the same (or more) products/services for less energy



Source: Energy Efficiency and Conservation Authority, New Zealand (2006)³
Macedonia

Why Energy Efficiency?

- **Energy efficiency is one of the largest potential resources** and a cornerstone of a sustainable society!



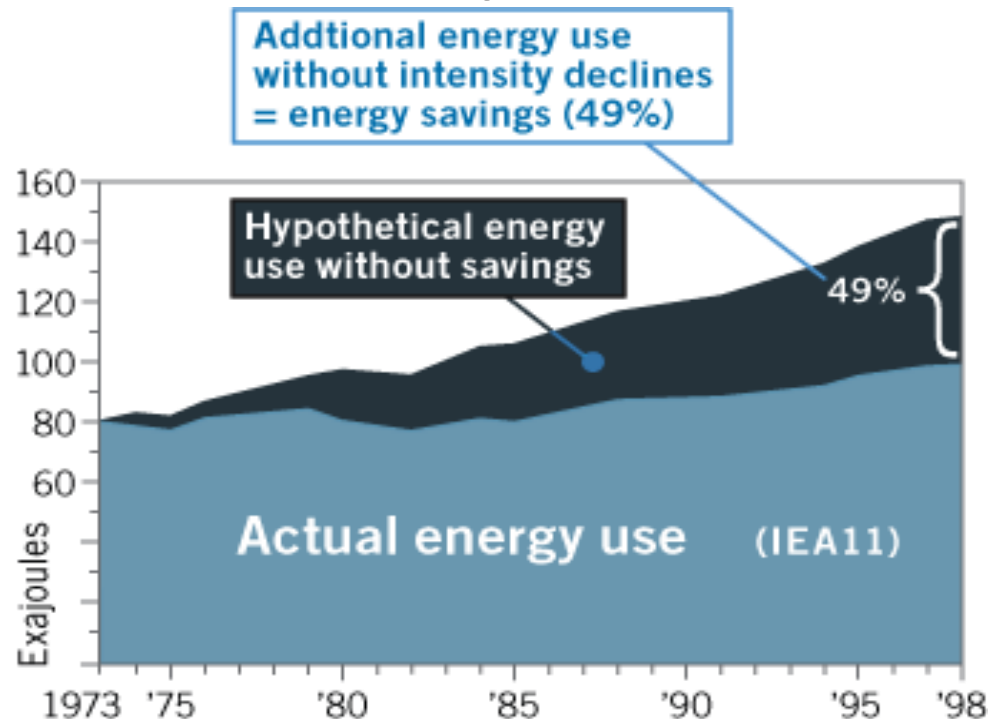
Energy efficiency can provide us with the time needed to replace fossil fuels and other non-sustainable energy sources with renewables in an ecological, economic and socially responsible manner

Why Energy Efficiency?

- Energy efficiency **helps the economy** by saving consumers and businesses mill. of € in energy costs. Energy efficient solutions can reduce the energy bill for many businesses and homeowners by 20 - 30 %
 - The “megawatts” contributed by energy efficiency are as valuable in economic terms as “produced megawatts”!
 - With today’s energy prices, a MW of energy savings costs about half of what it costs to produce the same amount of energy!
 - ***€ 1 invested in EE avoids about € 2.0-2.2 in supply side investments!***
 - Saved energy is the cheapest, most competitive, the cleanest and most secure form of energy for the European countries!

Energy efficiency - A big thing in small packages

Until the 1970s, economic growth seemed to be directly linked to increased energy use. After the oil crises in 1973 and the early 80s, this direct link was broken. Energy efficiency in many countries was applied fast enough to overcome the effect of economic growth.



Since the first oil crisis in 1973, increased energy efficiency has contributed more to the prosperity than any other single source of energy supply.

Cleaner and more cost effective industry in
Macedonia

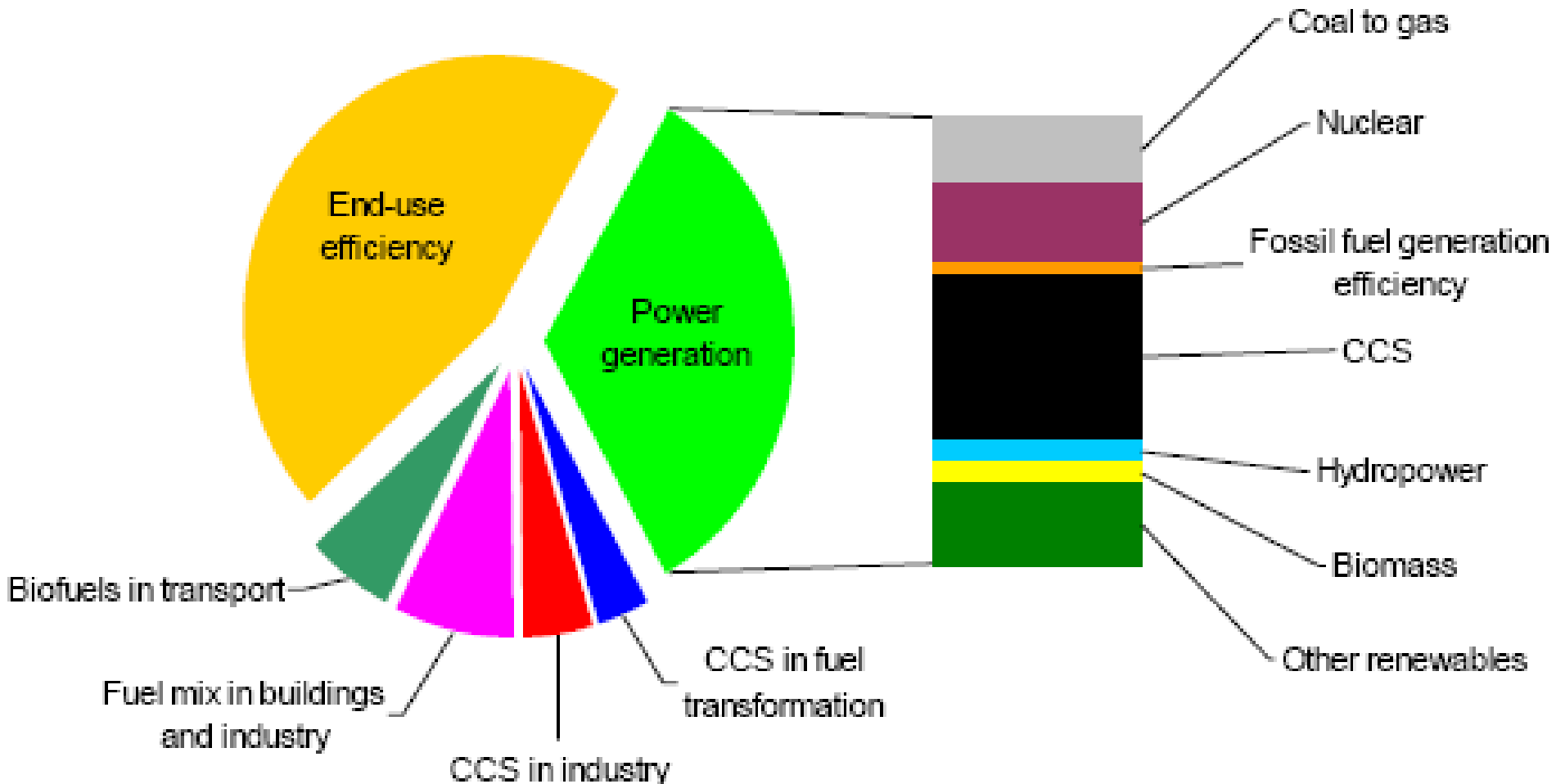
Why Energy Efficiency?

- Delivering the same (or more) services or products for less energy helps protects the environment!
- When less energy is used, less energy is need to generate at power plants, which reduces GHG emissions and improves the quality of our air.

The benefits of energy efficiency extend far beyond achieving reductions in greenhouse gas emissions.

- **Locally:** EE ↗ → Reduction of emissions of: SO₂, NO_x, CO, PM, ...
- **Globally:** EE ↗ → Reduction of emissions of: CO₂, CH₄, N₂O, NMVOC, ...

Energy efficiency and some environmental issues

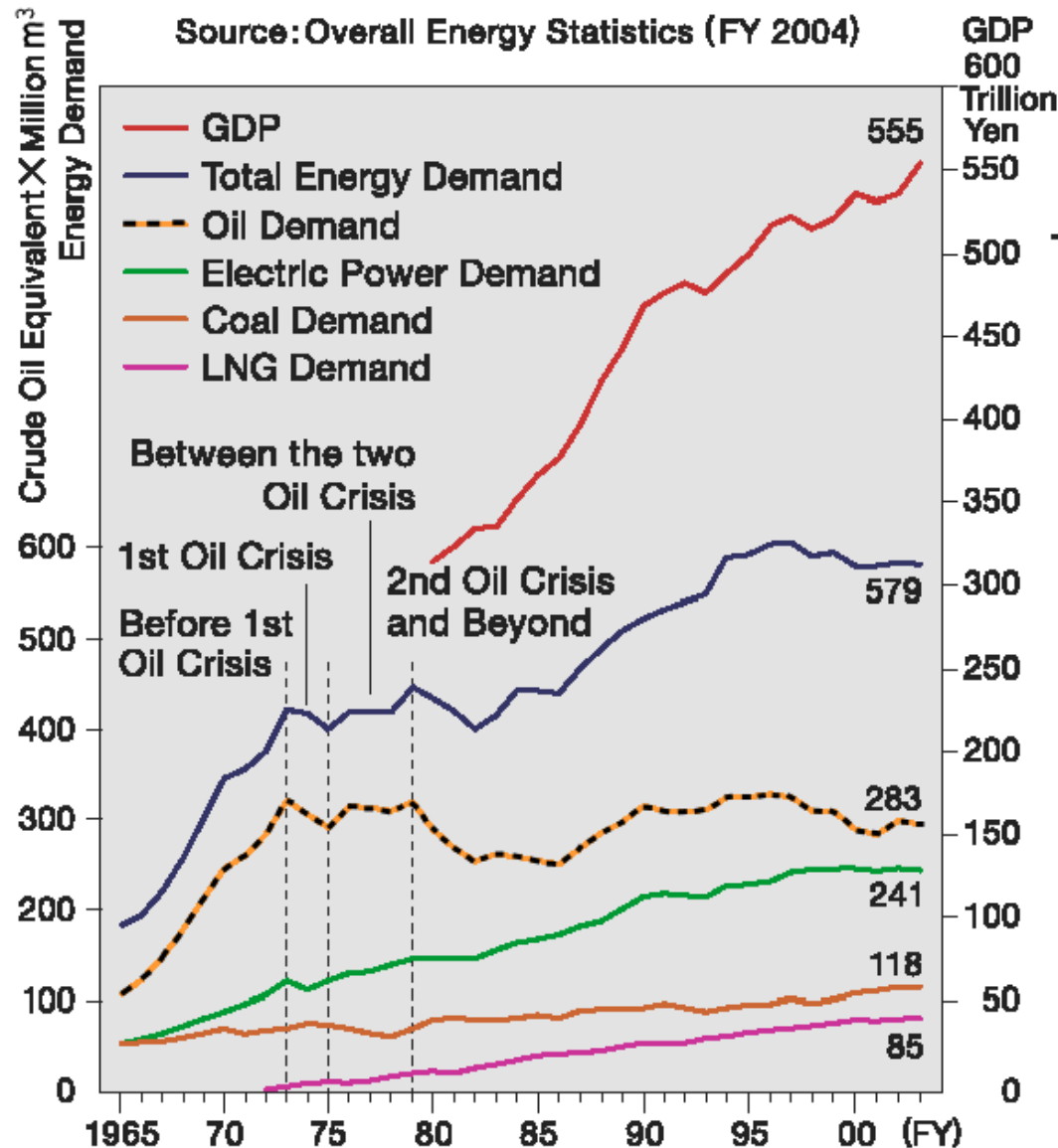


IEA 2050 - assessment of the role of different opportunities for GHG emission reduction up to 2050

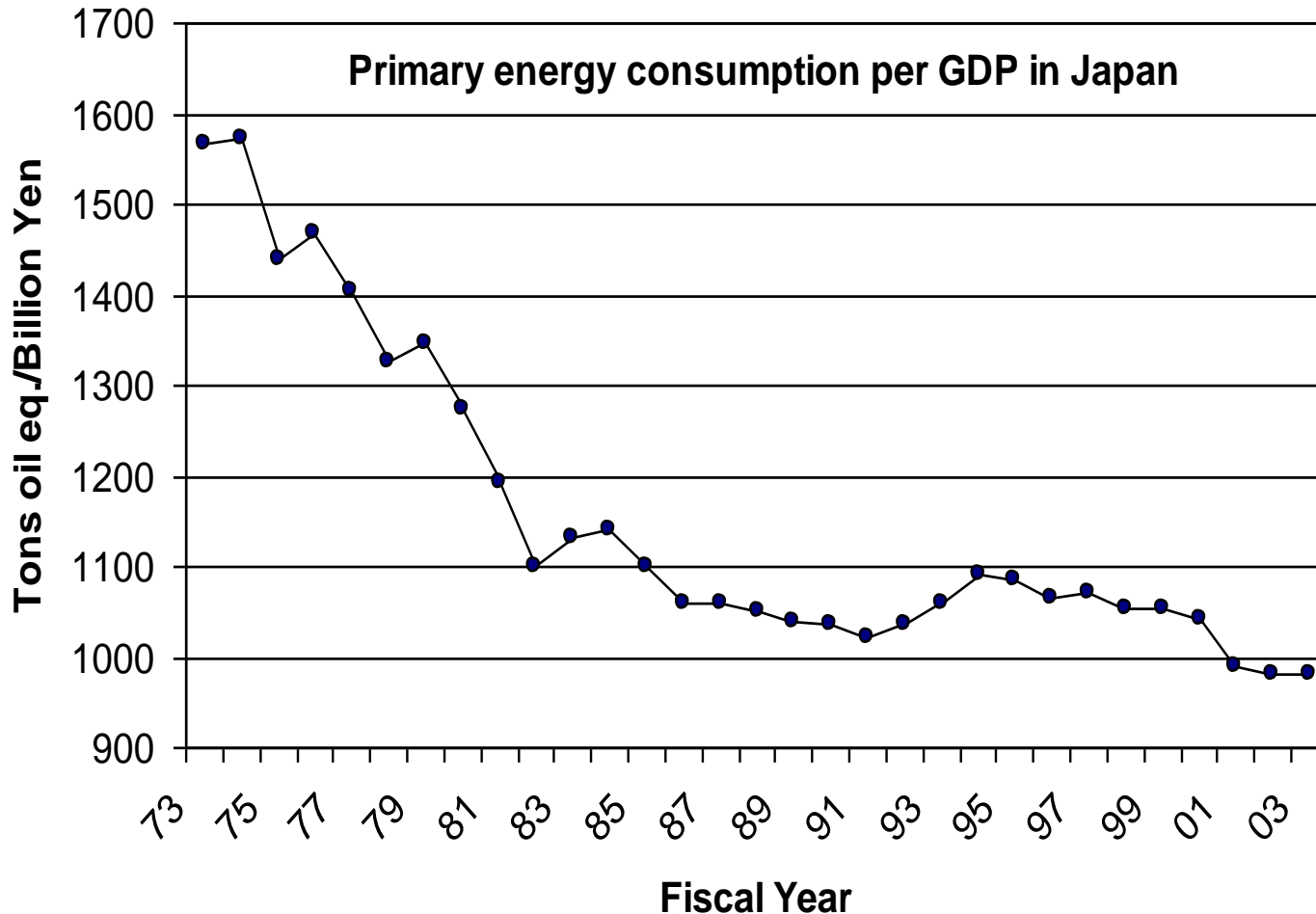
❑ The cases of Japan - example of the power of the energy efficiency policy that works!

- The energy intensity in Japan has decreased significantly from the first oil crisis in 1973 until now.
- The total energy consumption in the industrial sector has been generally steady since that time, but the energy intensity for the manufacturing industry fell sharply through the 1980s.

The change of GDP and energy demand



Energy efficiency - The case of Japan



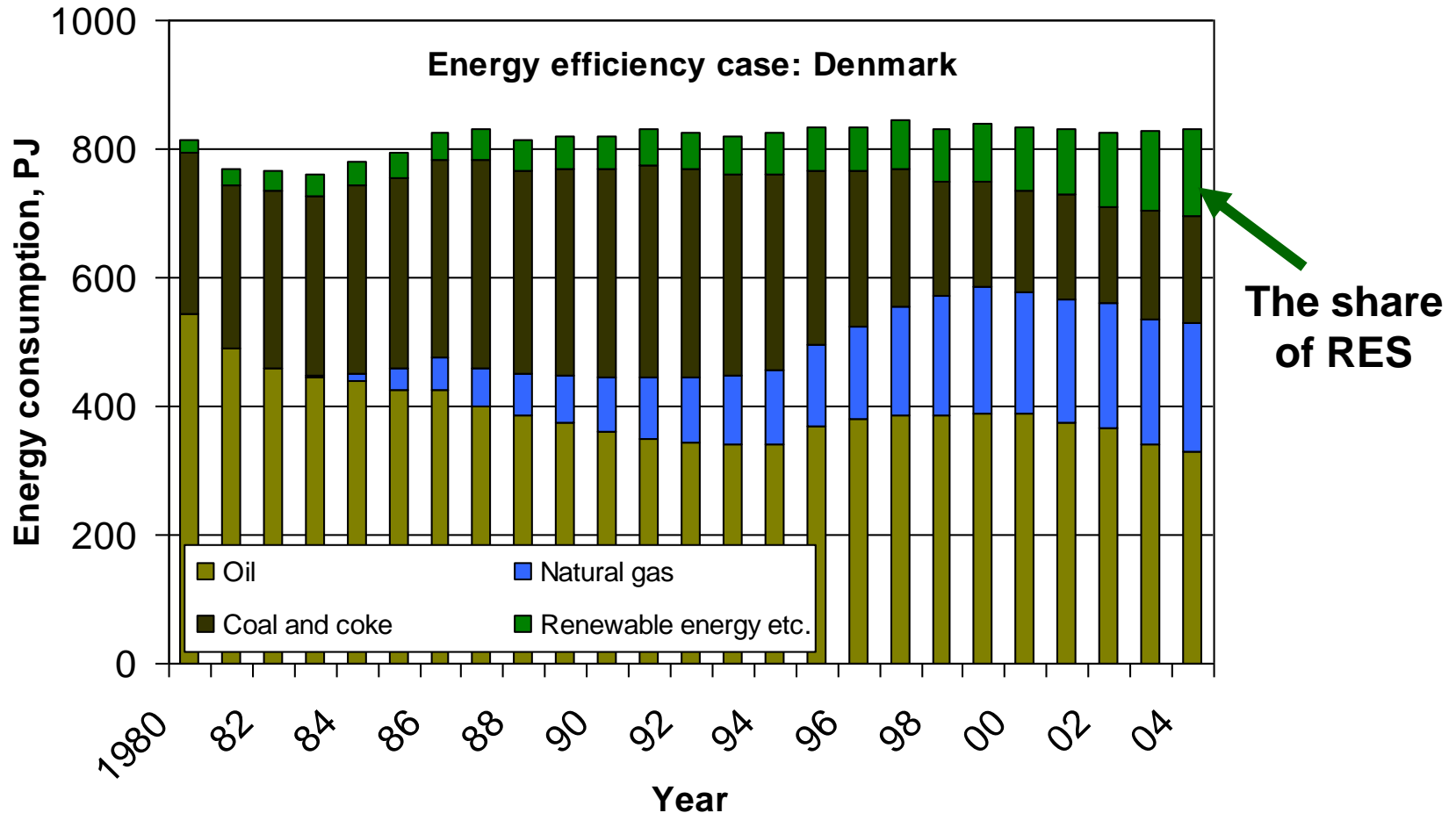
**Example:
Unit final energy
consumption per
GDP in the industry
sector (Fiscal 2002):**

- Japan 1.0
- France 1.07
- Germany 1.14
- UK 1.22
- USA 1.82

The Japan case: Energy intensity related to GDP

Energy efficiency - The case of Denmark

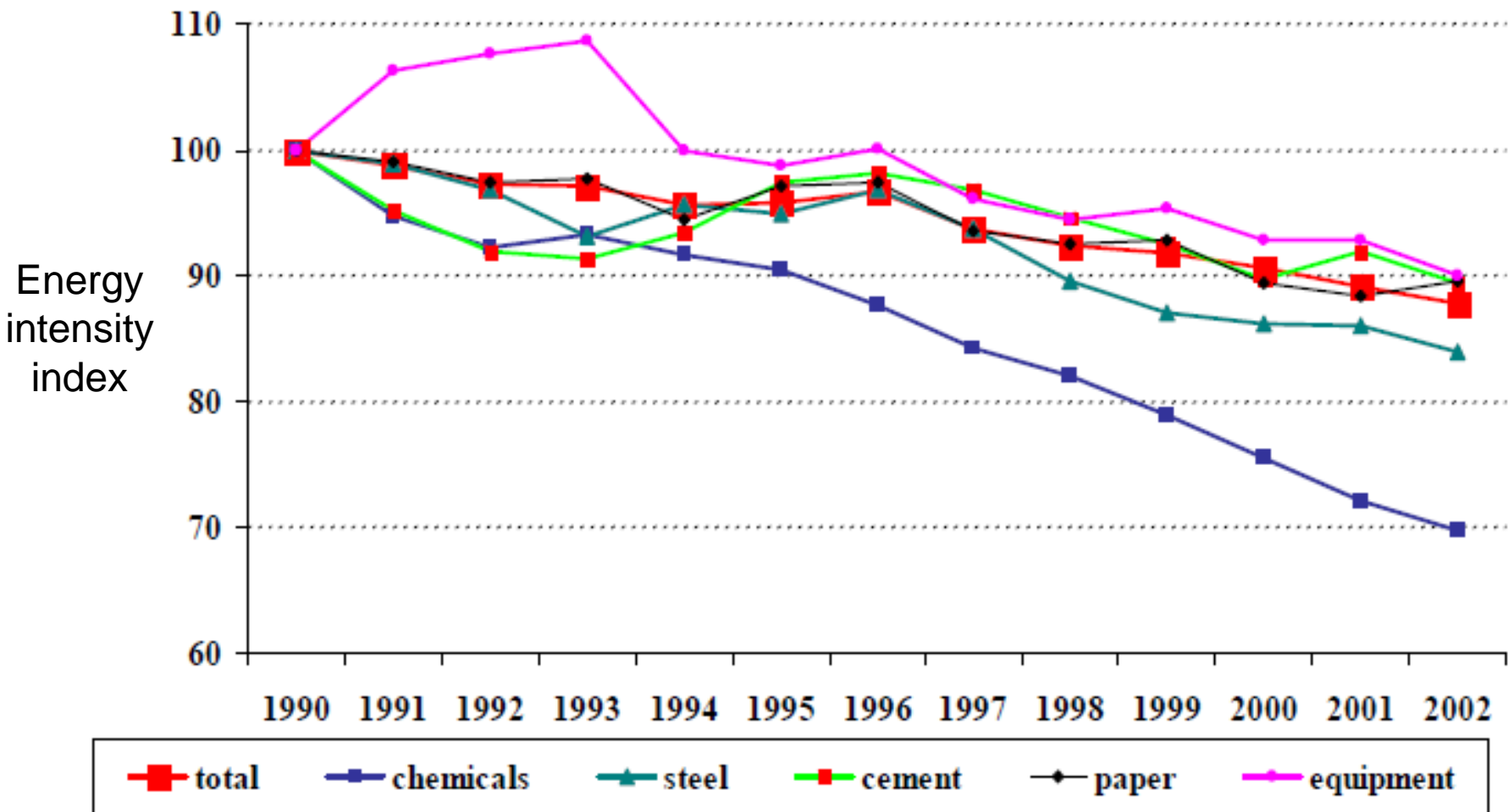
- Energy efficiency policy at work in the case of Denmark: During the period 1980-2005, thanks to the energy efficiency and energy saving, the country has succeeded to maintain steady energy consumption.
- **At the same time, 32% growth of the GDP!**



Energy efficiency policy: case of Denmark

Energy efficiency progress through EI index

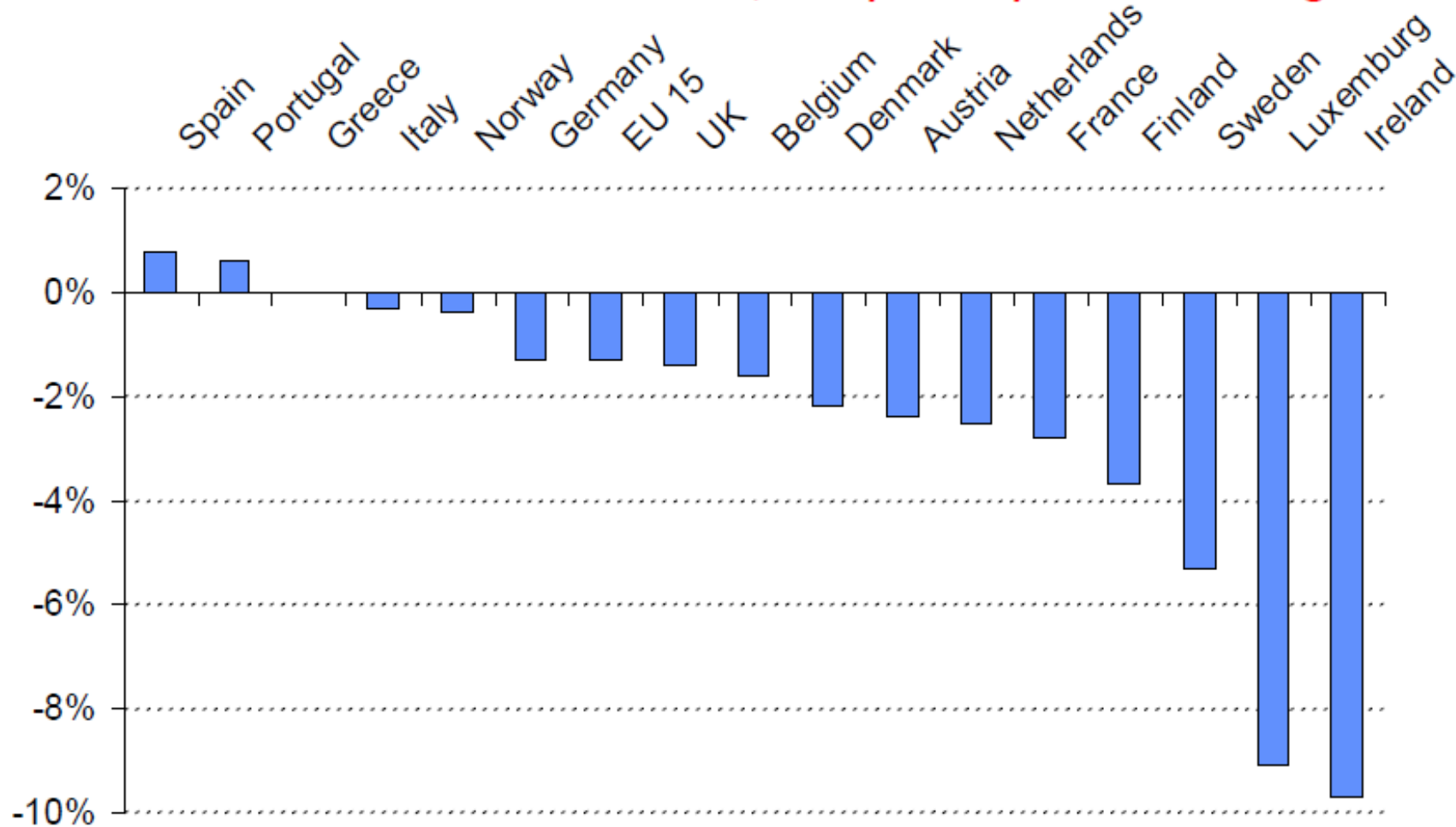
EU 15: 12 % reduction in energy intensity



Cleaner and more cost effective industry in
Macedonia

Trends in the industrial energy intensity in EU-15 countries

decrease in all countries, except for Spain and Portugal



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Slovenia case

Table – Growth of GDP, private consumption and value added (VA) of industry in Slovenia for the period 1997-2007

	2000/1997	2001/2003	2004/2007	1997/2007
GDP	4,4%	3,4%	5,7%	4,4%
Private consumption	3,2%	2,6%	4,9%	3,5%
VA of Industry	4,4%	4,9%	6,9%	5,1%

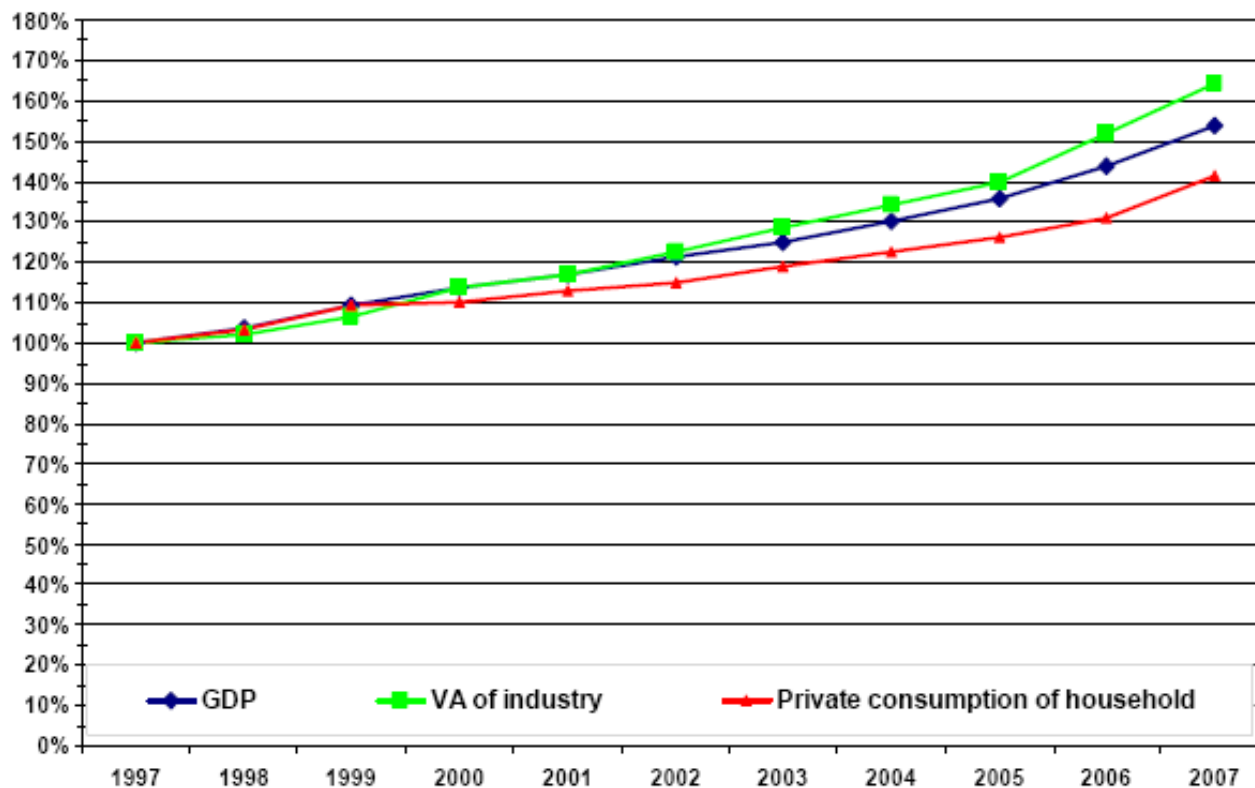
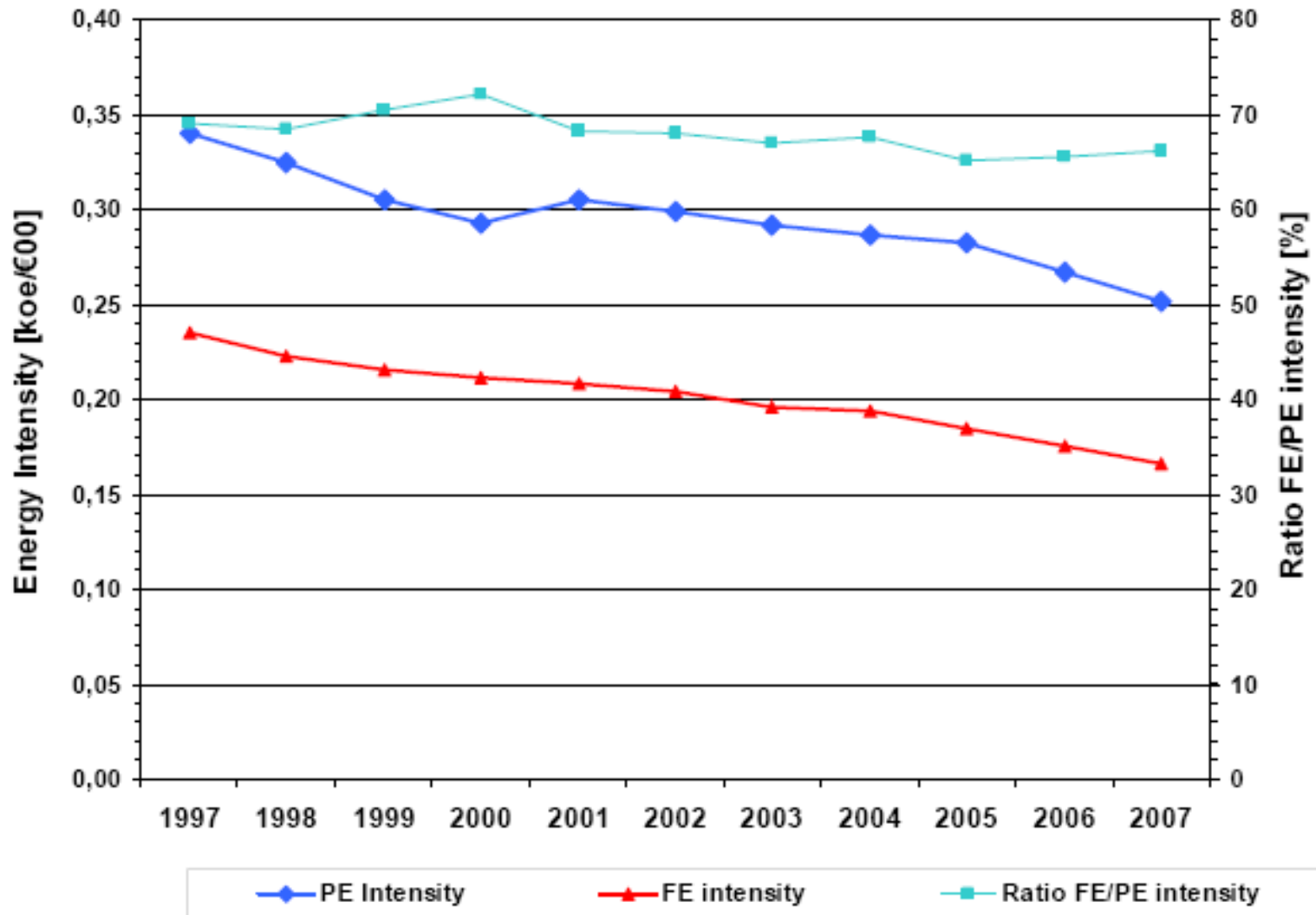


Figure 1: Trends of macro-economic developments in Slovenia: 1997-2007

Energy intensity - Slovenia



Final and primary energy intensity in Slovenia

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Macedonia

How to improve EE and reduce energy intensity?

Very important: Set targets!

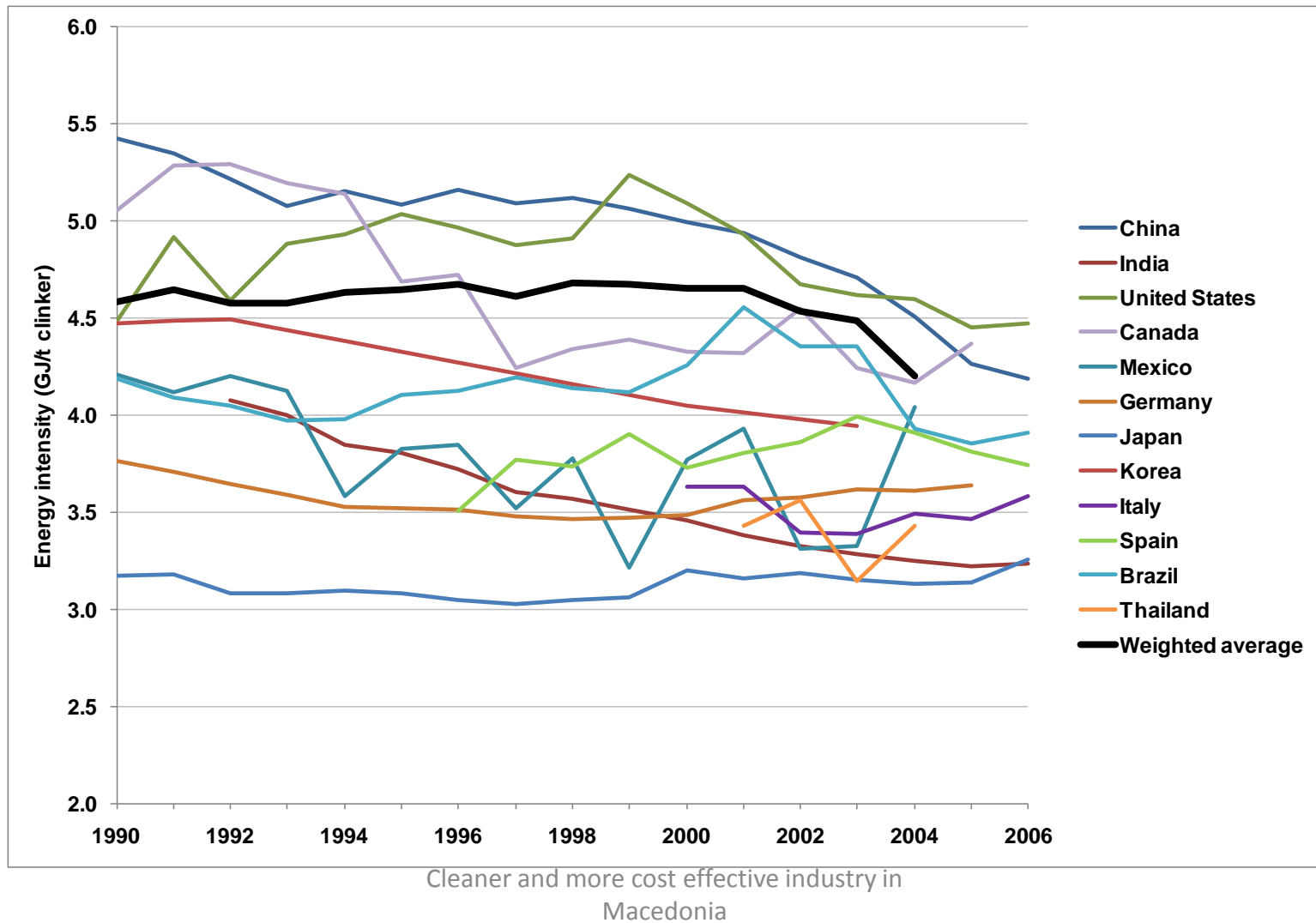
EU 20/20/20 until 2020 (EE↑, RES↑, Emission. red.↓)

Energy efficiency targets - Slovenia

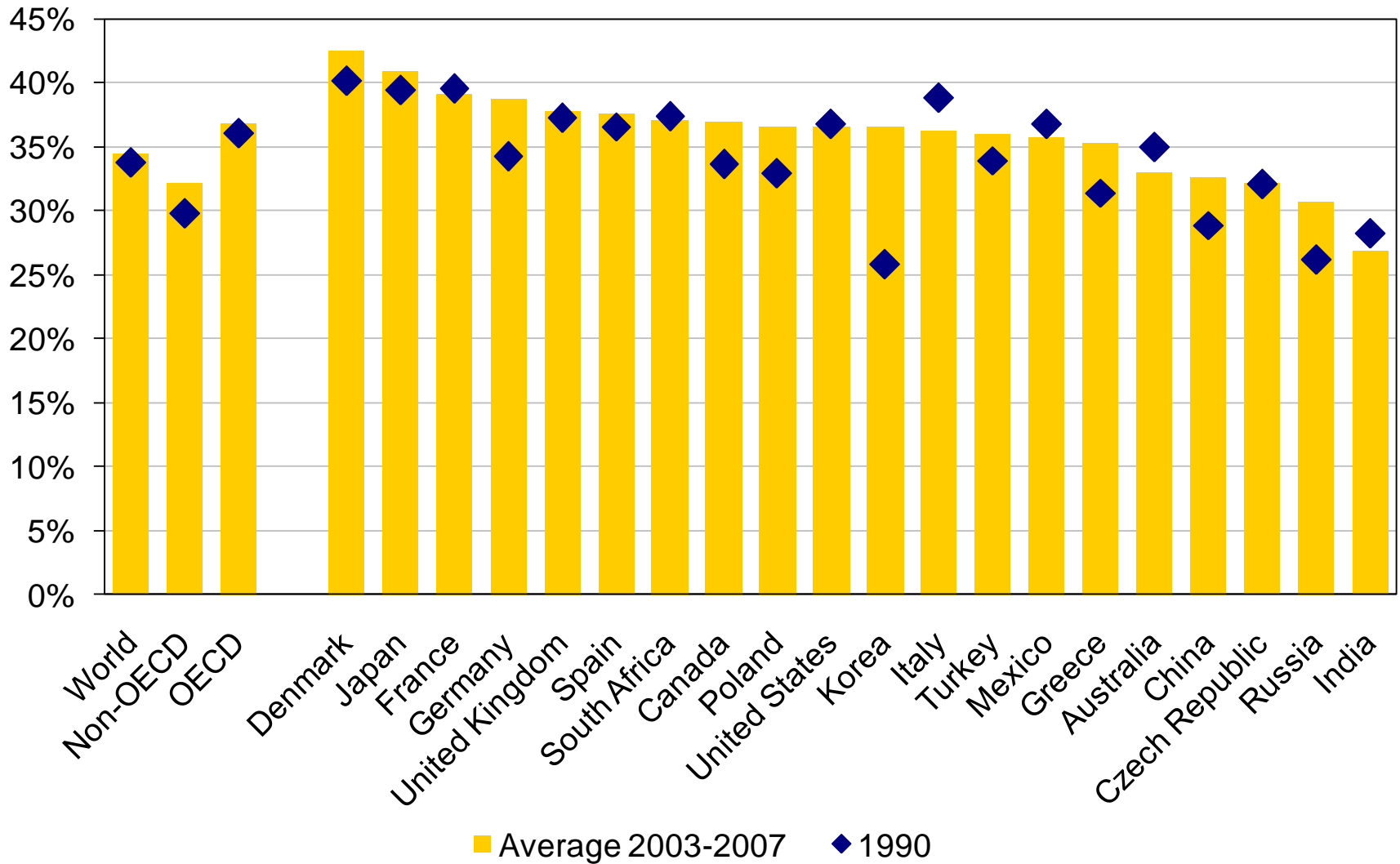
The targets of Slovenian policy defined in the Resolution on National Energy Programme (ReNEP) are to:

- improve the energy efficiency by 2010 as for 2004:
- in industry and service sectors for 10%,
- in buildings for 10%,
- in public sector for 15% and
- in transport for 10%.
- double share of electricity production in CHP,
- increase the share of RES in primary energy balance to 12% in 2010:
- increasing heat supply from RES from 22% in 2002 to 25% in 2010,
- increasing electricity from RES from 32% in 2002 to 33,6% in 2010,
- achieving 2% share of biofuels for transport at the end of 2005.

Example on sub-sectoral level - cement industry: Cement indicator – Thermal energy use per tonne clinker



Efficiency of Coal-fired Power Generation



Cleaner and more cost effective industry in Macedonia

Different types of energy efficiency policies and measures in industry – EU countries

Regulations

- Obligation of making energy audits
- Efficiency standards on equipment (boilers, fans, motors, ...)
- Obligation of reporting energy consumption
- Obligation of energy savings plans
- Obligation to nominate an energy manager in the company
- Limits on GHG emissions (ETS Directive)

Taxes

- Ecotaxes (e.g. carbon tax); Reduction on the tax if commitment on energy savings engagement ...

Fiscal and economic incentives

Information of consumers (audits, ...)

Voluntary / negotiated agreements

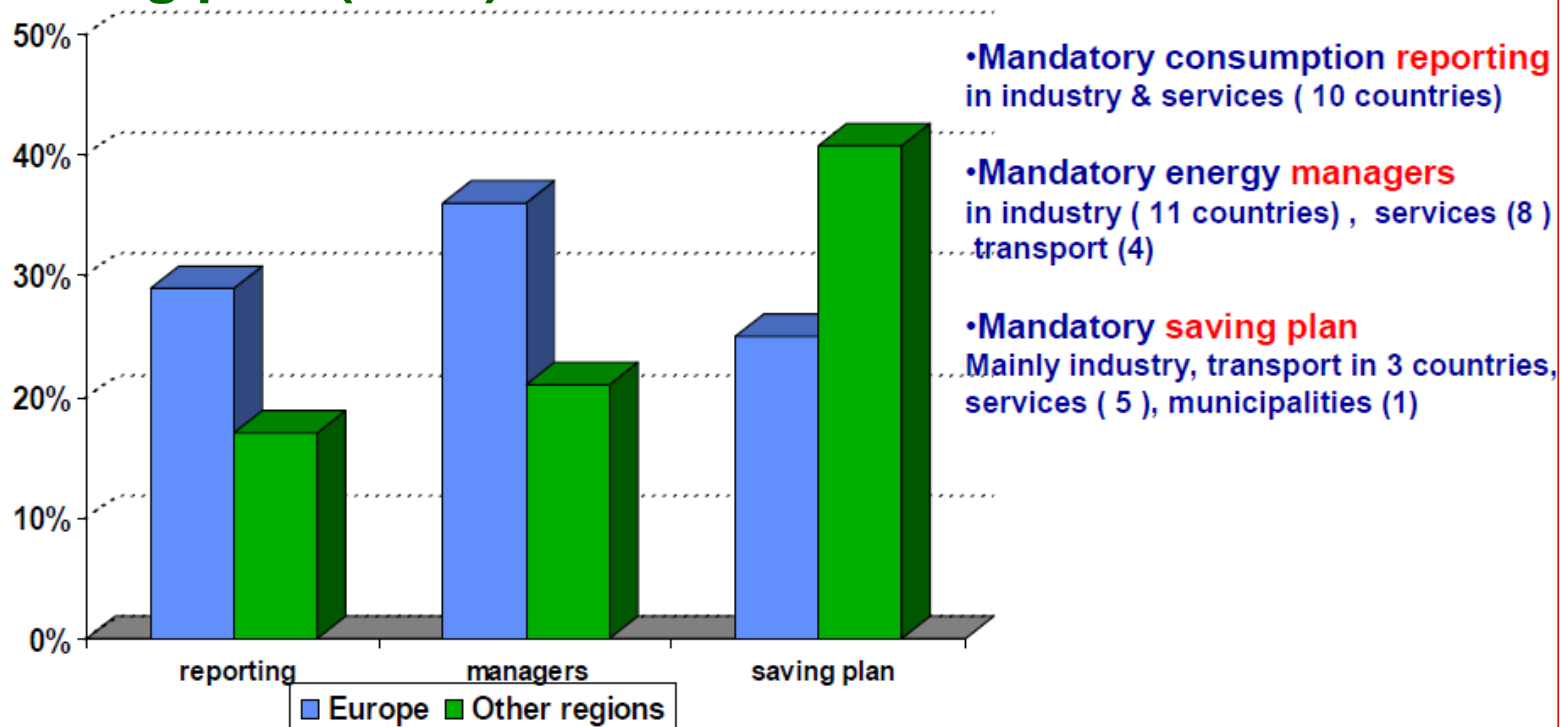
Package of measures

Different types of energy efficiency policies and measures in industry – EU countries

Energy auditing programmes in industry and services

- Over 60 % of countries with audits programmes
- Mandatory audits in about 40 % of the schemes in Europe

Mandatory consumption reporting, energy managers and saving plan (2003)



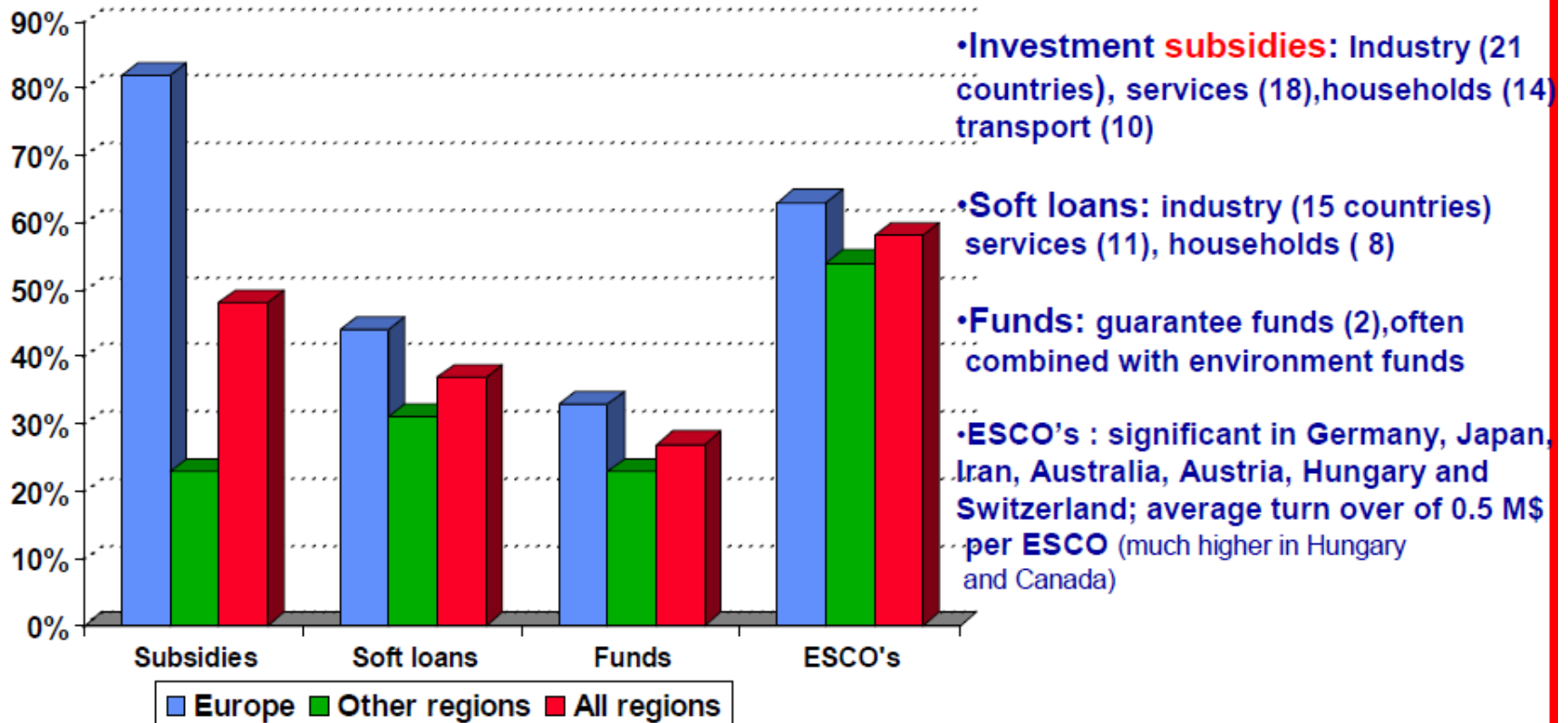
Economic and fiscal incentives for energy efficient equipment and measures– EU countries

Economic incentives

- Subsidies for energy audits
- Subsidies for investments
- “Soft” loans
- Guarantee funds of investments

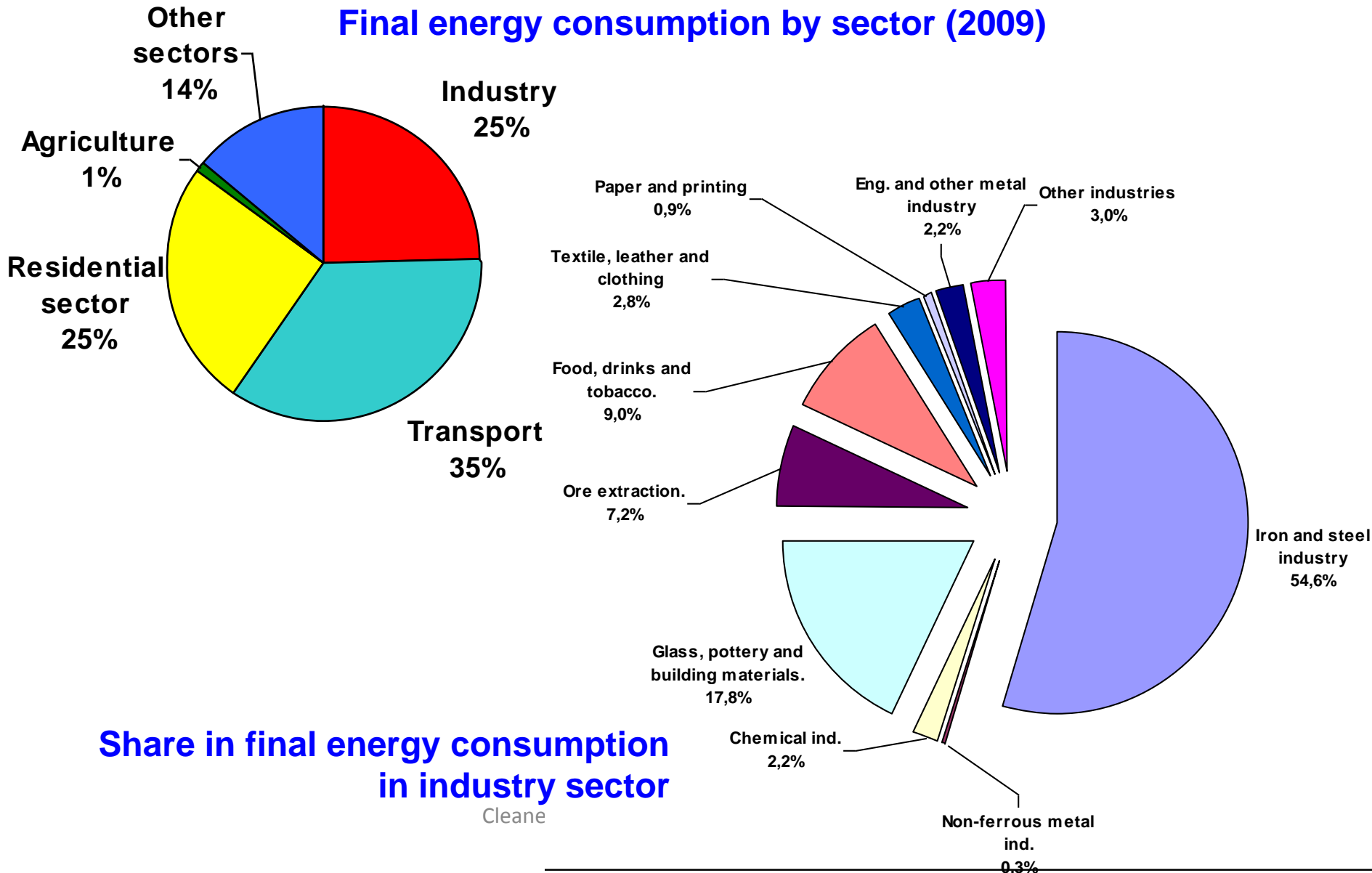
Fiscal incentives

- Accelerated depreciation
- Reduction of taxes (VAT, import taxes)



Some energy issues - Macedonia

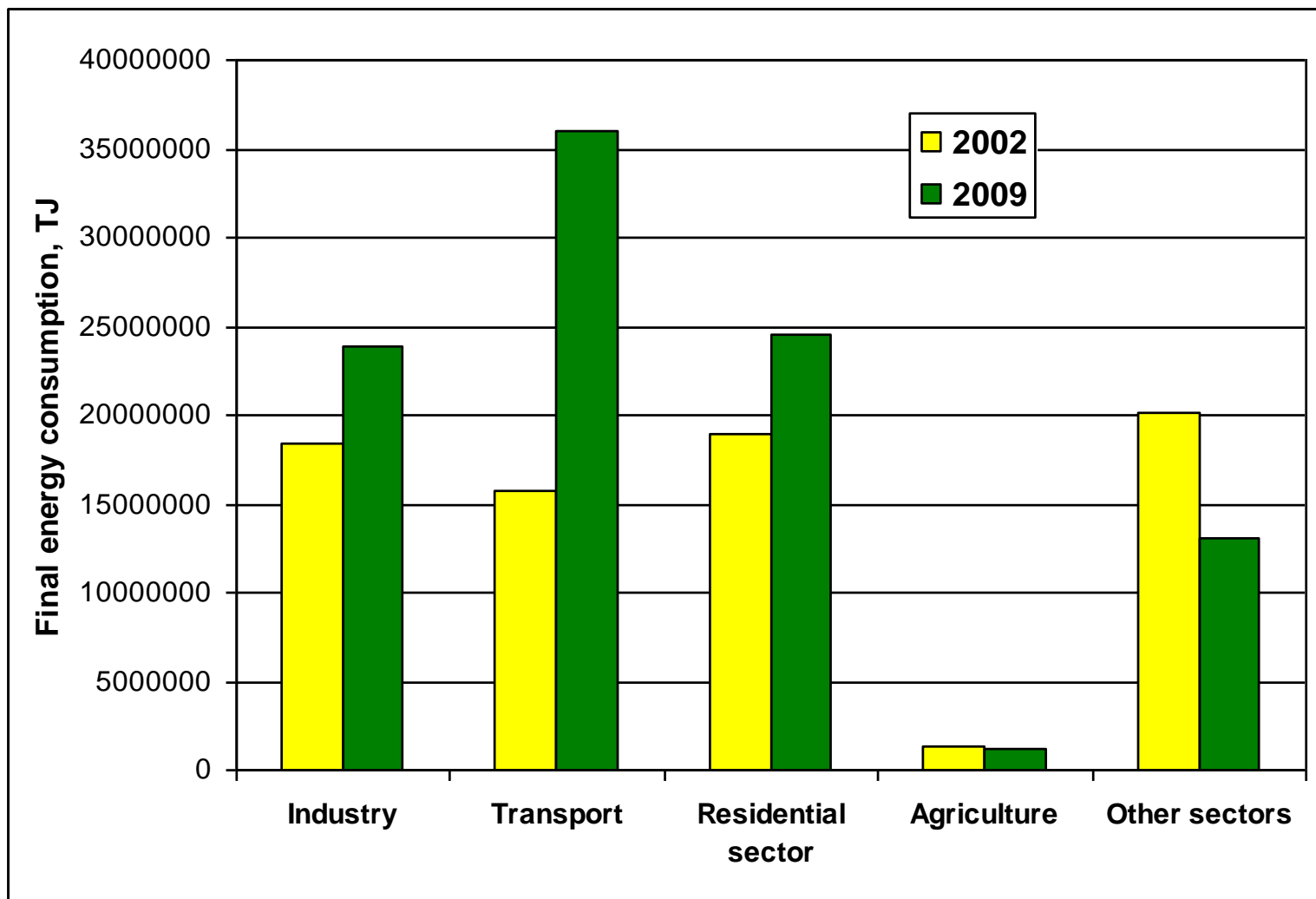
Final energy consumption by sector (2009)



Share in final energy consumption
in industry sector

Cleane

Final energy consumption in Macedonia: 2002-2009 (in TJ)



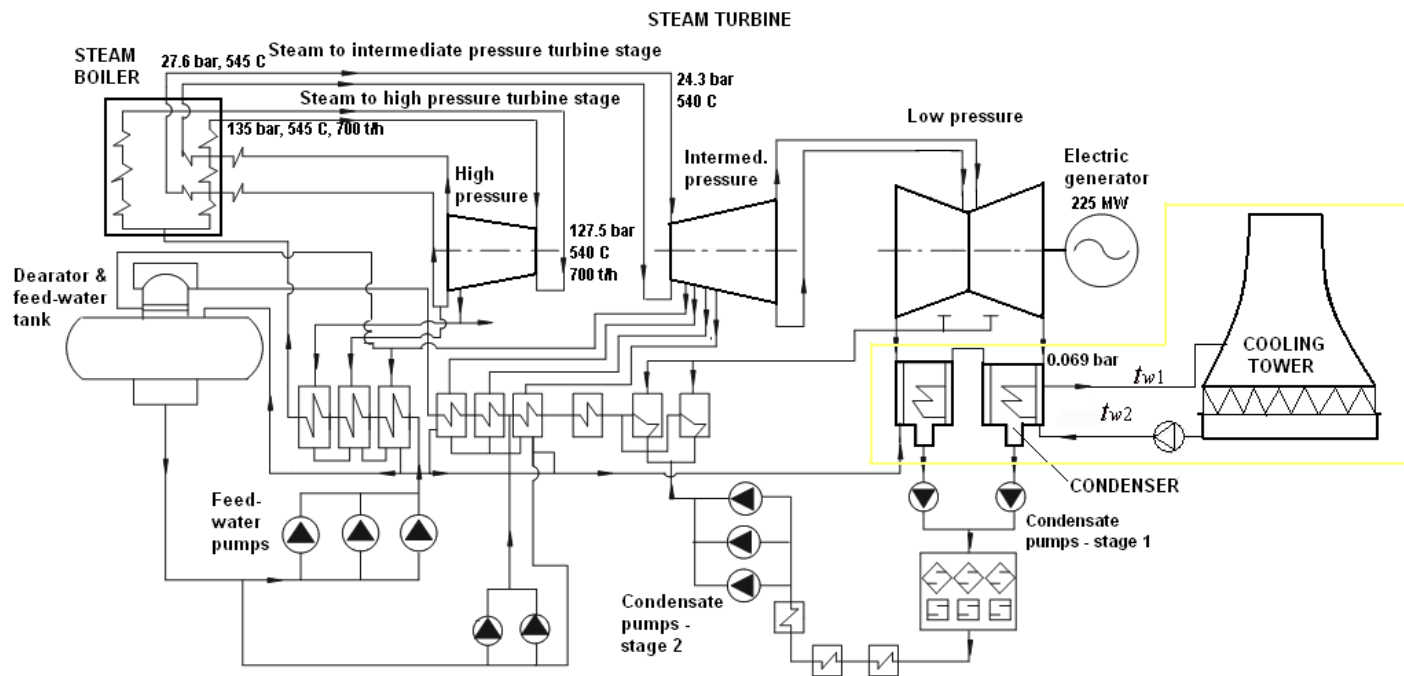
Cleaner and more cost effective industry in
Macedonia

Some energy issues - Macedonia

LAST FEW YEARS: SIGNIFICANT PORTION OF ENERGY DEMAND IS COVERED BY IMPORT

ASSESSMENTS FOR POTENTIAL SAVINGS WITH PROPER ENERGY EFFICIENCY POLICY AND MEASURES IMPLEMENTATION: UP TO 15-20 % OF THE PRESENT ENERGY CONSUMPTION!

15-20 % ENERGY EFFICIENCY IMPROVEMENT MEANS ONE UNIT OF TPP BITOLA!



What to do? – On national level

Legislation and other documents related to energy efficiency and energy management in MK

- Energy Law
- Law on Environment; IPPC permission; Sub-legislative acts
- Strategy documents: Energy development, Energy efficiency strategy, Base study for RES, ...
- Action plans: National EE action plan, EE implementation plan, ...

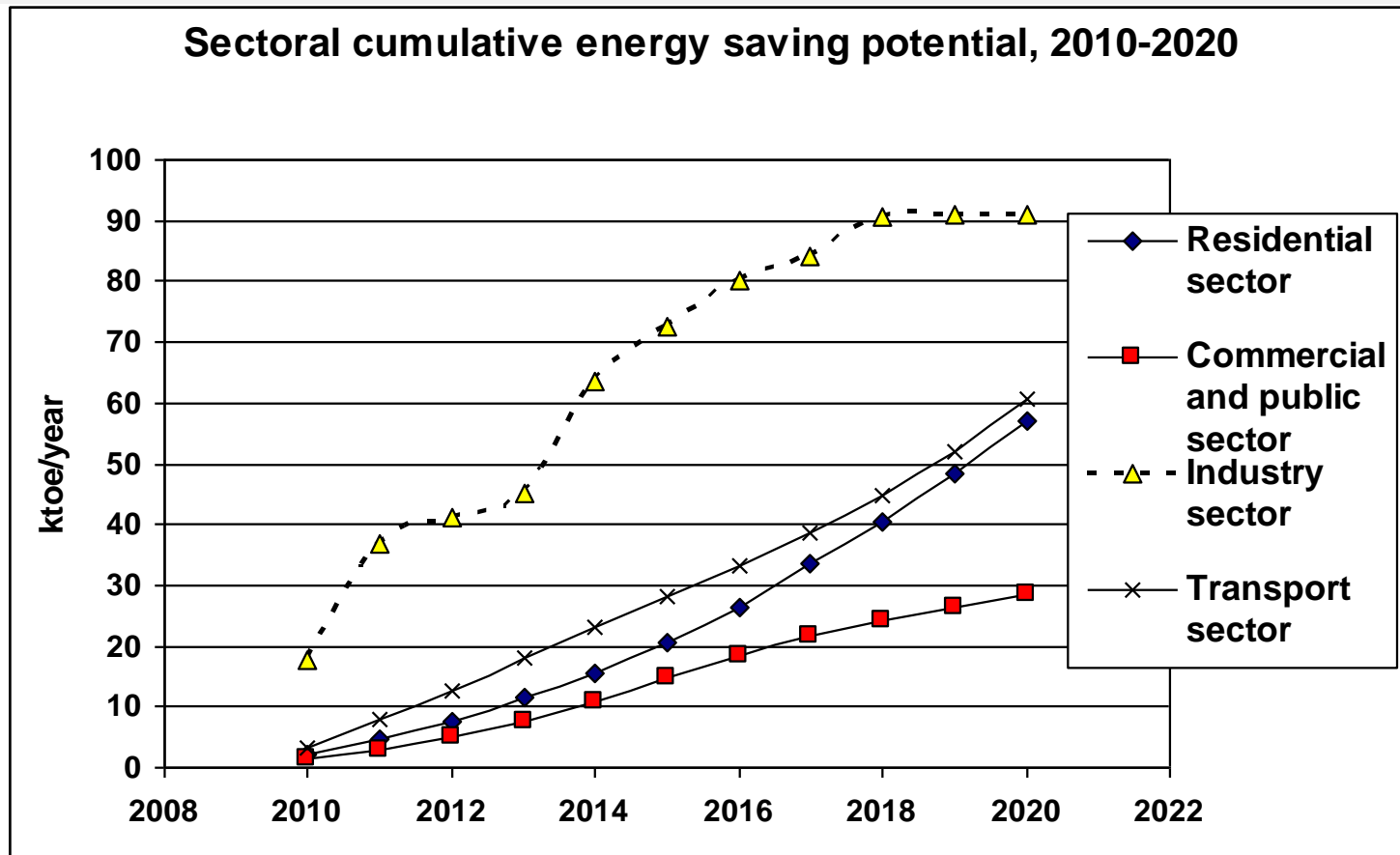
Support: incentives, EE fund etc. → To be set!

WHAT TO DO? → IMPLEMENT!

Potential energy savings in MK

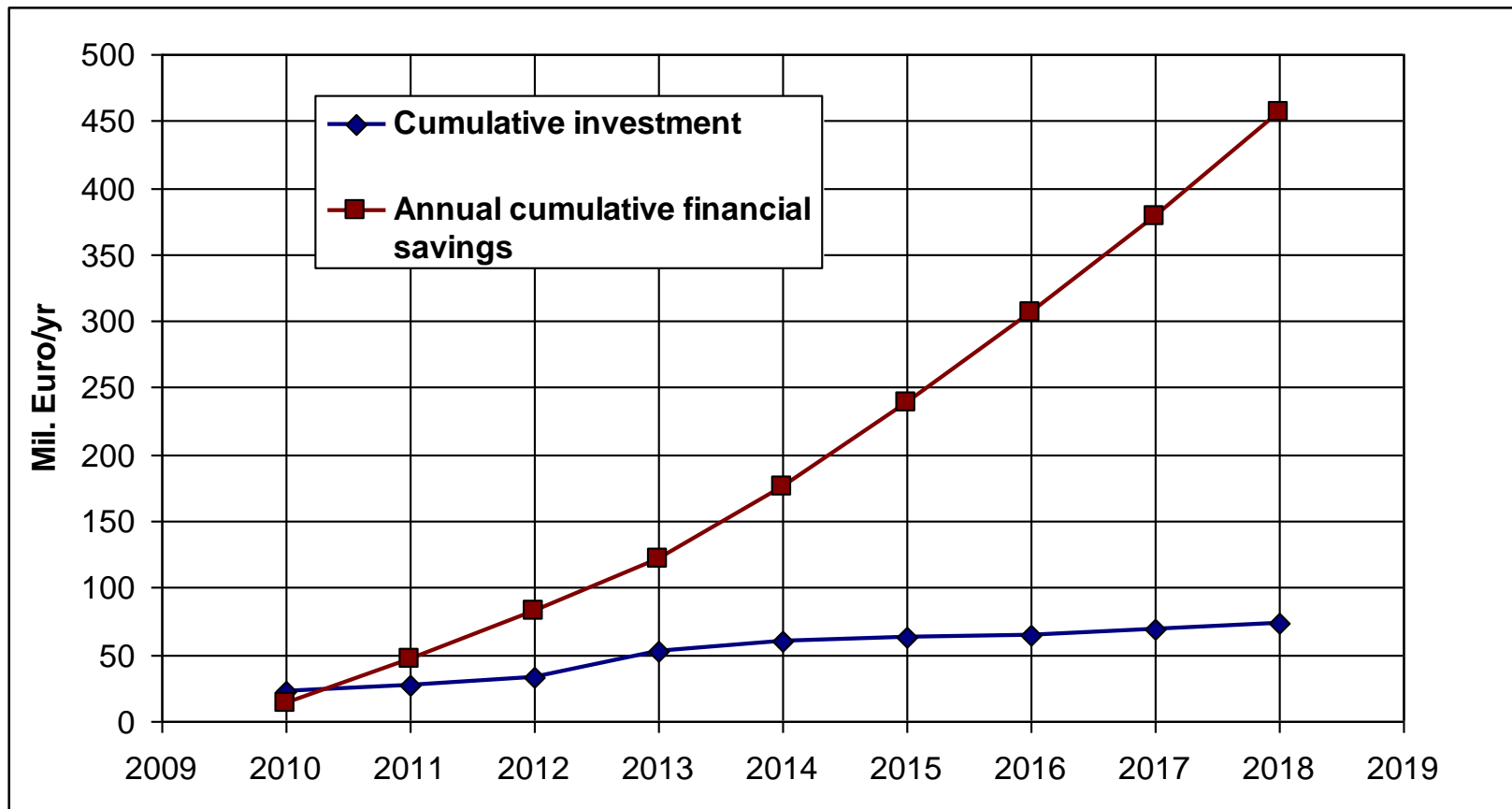
Energy saving potential for 2010-2020 by sectors (according to MEEES):

- Residential	57,14 ktoe
- Commercial and public building sector	28,60 ktoe
- Industry sector	91.09 ktoe
- Transport sector	60.48 ktoe
- Cumulative energy saving potential	237.31 ktoe



Possible financial effects with EE measures in the industry sector in MK

Financial investment of 73,9 M € till 2018 would enable 457 M € financial savings, at current energy prices.



Break-down of possible financial results in the industry sector

Cleaner and more cost-effective industry in Macedonia

What to do?

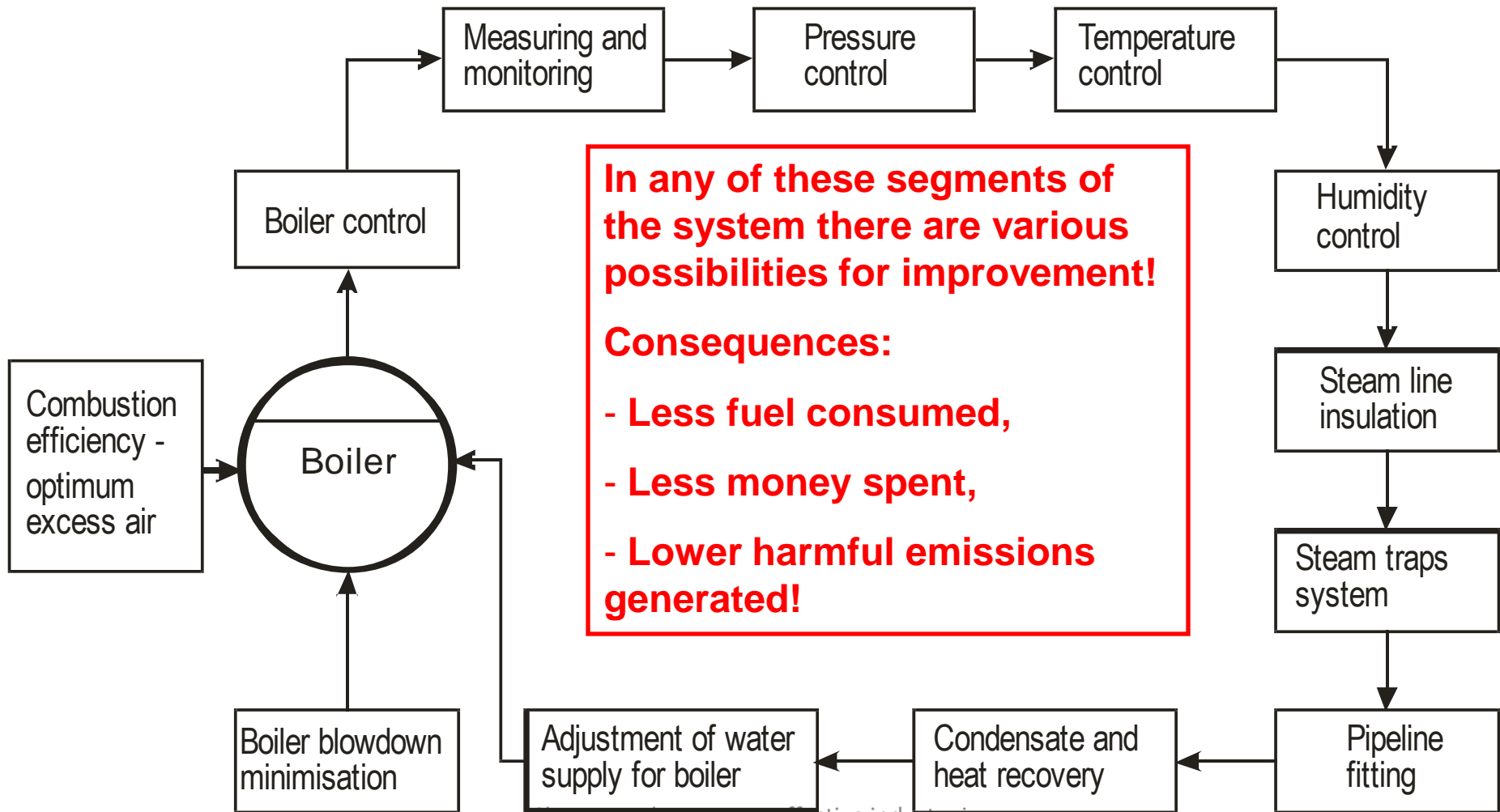
“Those who fail to plan, plan to fail.” The energy savings are out there. Go for it!

On plant level: Ten steps to complete energy efficiency programme

- **Step 1. Secure the commitment of senior management**
- **Step 2. Appoint a person who will champion the process – “Energy Hunters”**
- **Step 3. Where appropriate, appoint a steering committee**
- **Step 4. Set realistic targets and EE indicators for the programme**
- **Step 5. Provide an energy audit of the facility with recommendations for improvements**
- **Step 6. Secure financing for the capital costs**
- **Step 7. Get the audit recommendations implemented**
- **Step 8. Provide staff training**
- **Step 9. Monitor the energy savings**
- **Step 10. Provide feedback to management and rewards to staff**

Energy efficiency is not an unknown task: Possibilities for improvements of energy use are everywhere!

Example: ordinary steam-condensate system



Concluding Remarks

- **Energy is not cheap and it will not, at least in the foreseeable future**
- **Energy efficiency and energy saving is very important “energy resource”**
- **There are huge opportunities for energy efficiency improvement and energy saving measures in the industry and services**
- **Well-designed and effective policies, implementation of comprehensive energy management standards, as well as regulatory frameworks, can have a significant impact on efficient energy use.**
- **Macedonian industry will have to become more energy efficient to be competitive**



Thank You for Your attention!

