

Rationale for controlling energy consumption: External impact on cost effectiveness of production

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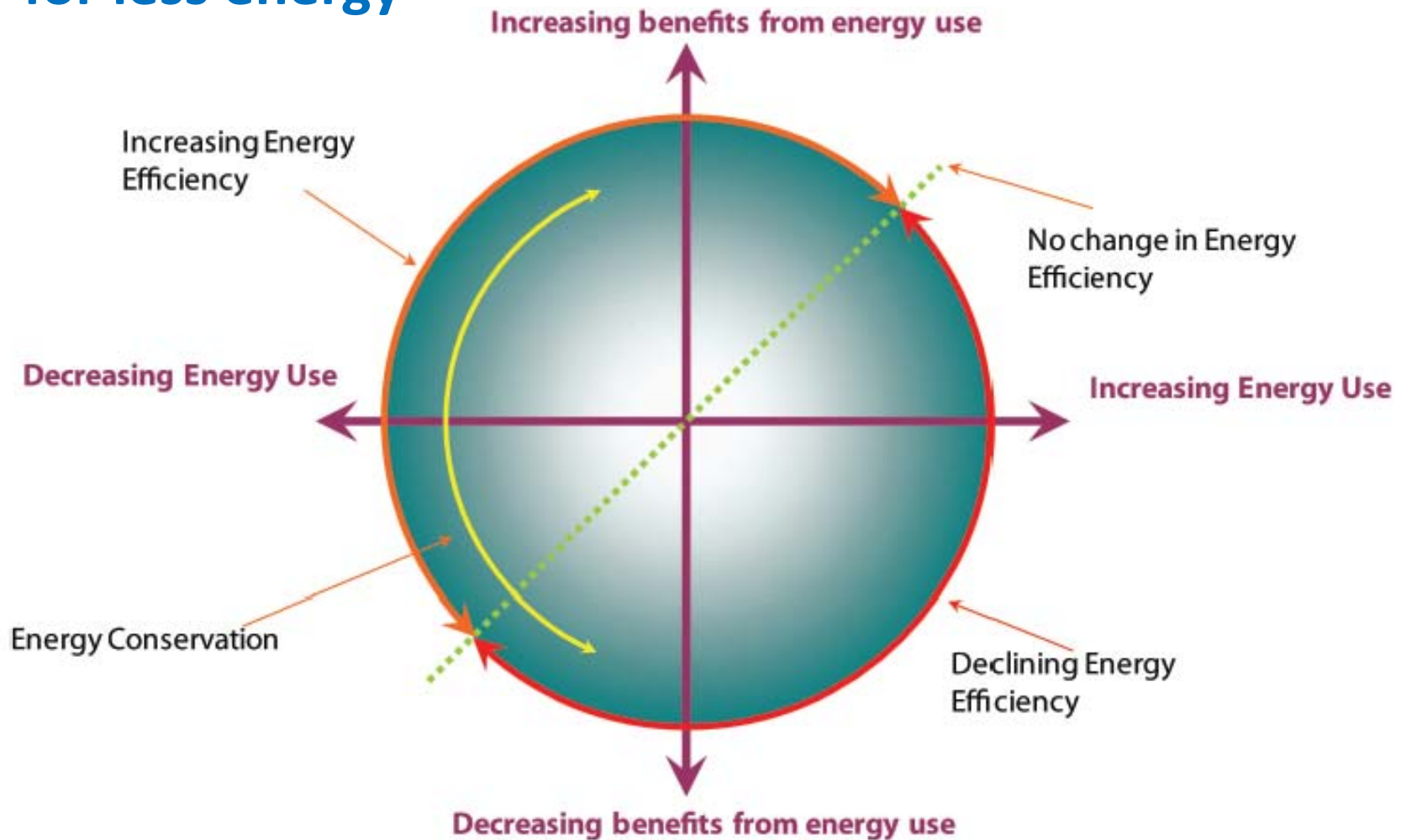
Skopje, Republic of Macedonia

Presentation topics

- 1. Energy use, energy efficiency and environment**
- 2. Energy costs and the competitiveness of the industry**
- 3. Regulations, policies and energy efficiency**
 - International trends, EU regulations, energy efficiency policies and measures and targets
 - MK initiatives in EE strategy
 - How to improve EE and reduce energy intensity in the industry and services? What could industry expect?
 - Energy management – a way to multiple benefits

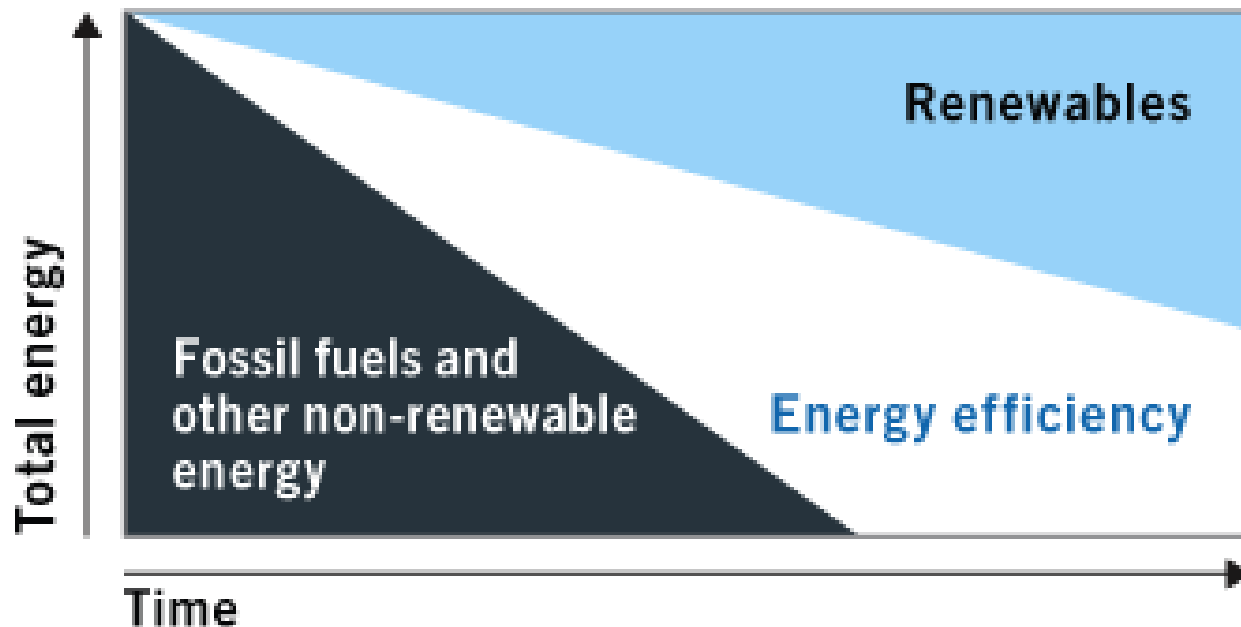
What is energy efficiency?

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



Why energy efficiency improvement is important?

- **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 RES in an ecological, economic and socially responsible manner

Energy efficiency improvement protects the environment

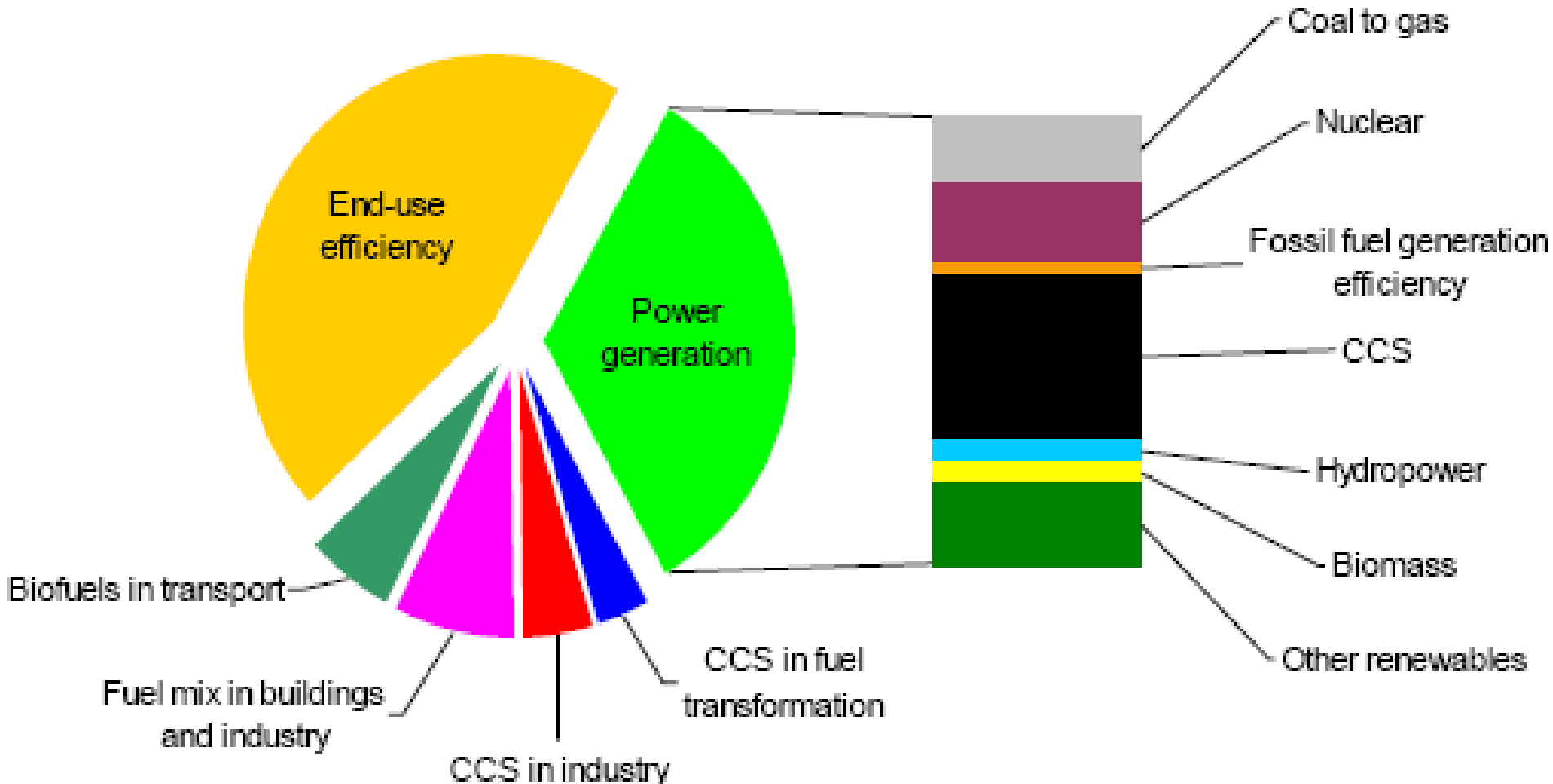
- Delivering the same (or more) services or products for less energy helps protects the environment locally and globally!

- Global impact: EE ↗ → Reduction of emissions of GHG: CO₂, CH₄, N₂O, NMVOC, ...

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

- Local impact: EE ↗ → Reduction of emissions of: SO₂, NO_x, CO, particulate matter, ...

Energy efficiency and some environmental issues

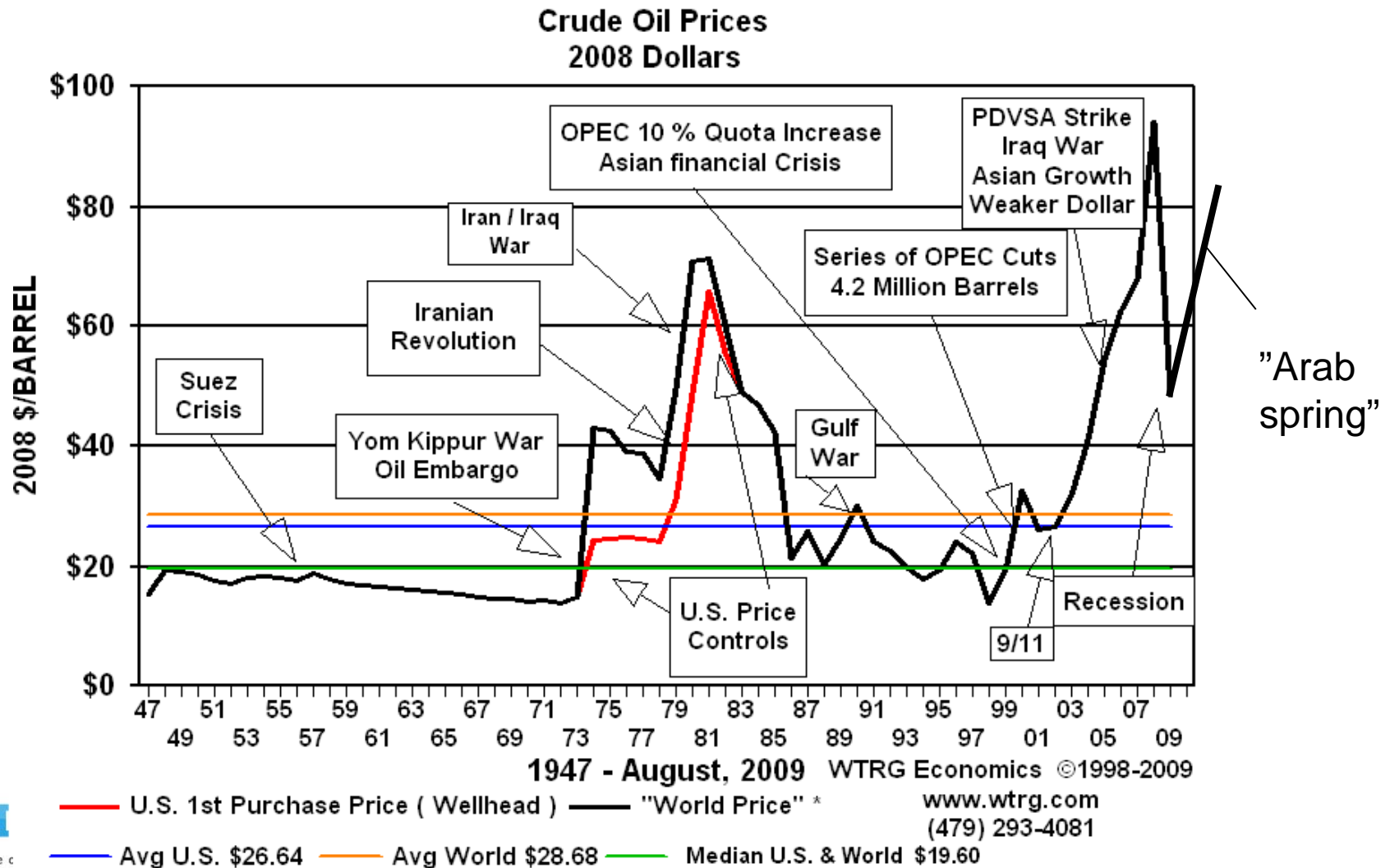


IEA 2050 - assessment of the role of different opportunities for GHG emission reduction up to 2050

Energy costs and the competitiveness of the industry

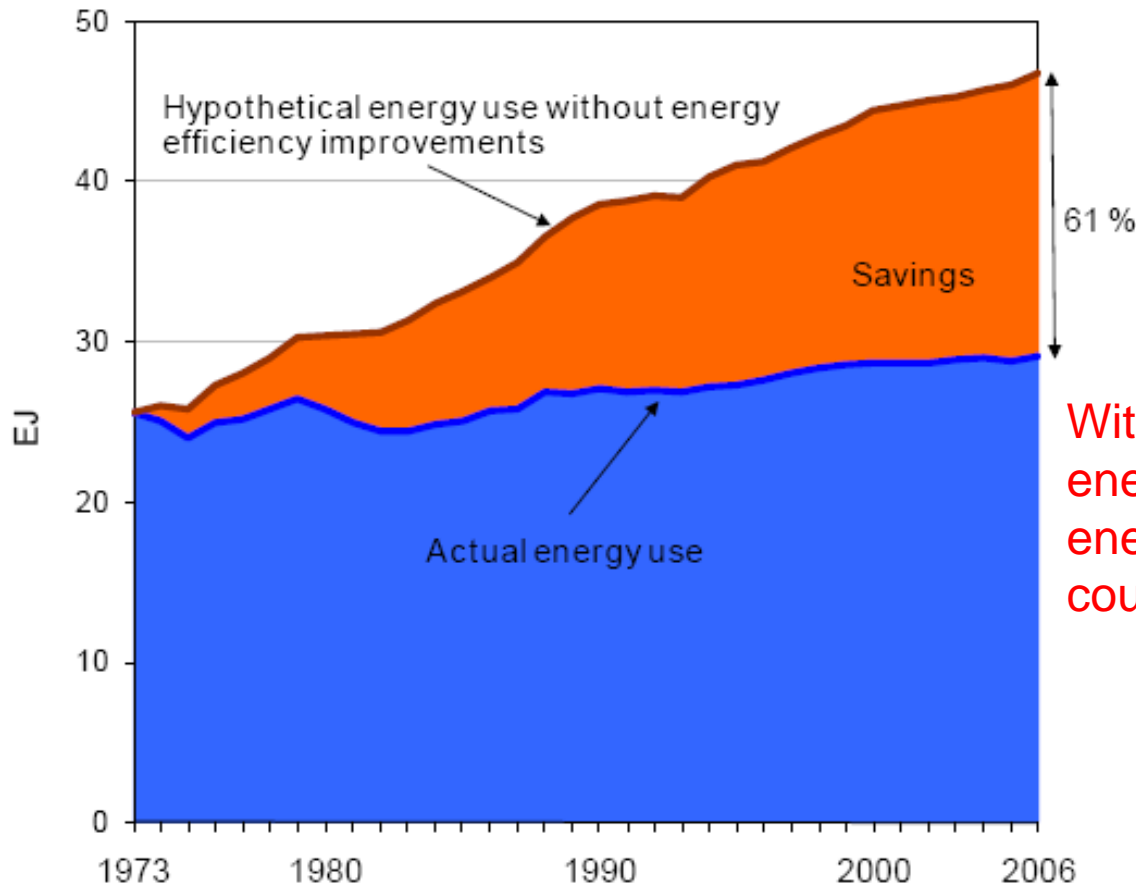
- Energy efficiency helps the economy by saving consumers and businesses in energy costs.
 - The “megawatts” contributed by energy efficiency are as valuable in economic terms as “produced megawatts”!
 - With today’s energy prices, 1 MW of energy savings costs about half of what it costs to produce the same amount of energy!
 - In other words, **€ 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!

One obvious reason to improve energy use – historic change of oil prices



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. Improved energy efficiency in many countries has contributed more to the prosperity than any other single source of energy supply!.

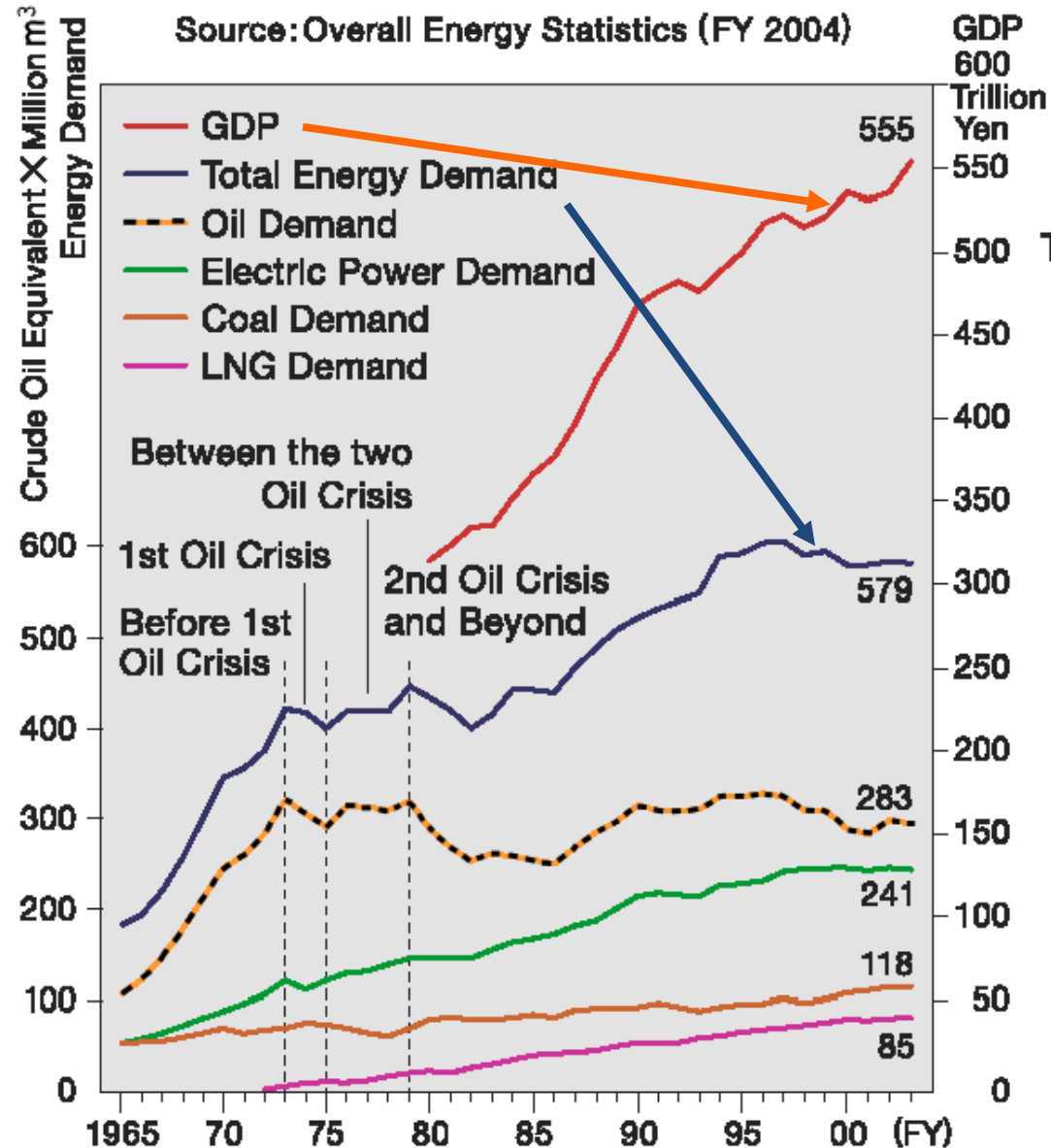


Without the savings from improved energy efficiency since 1973, energy use in OECD Europe countries would now be 61% higher

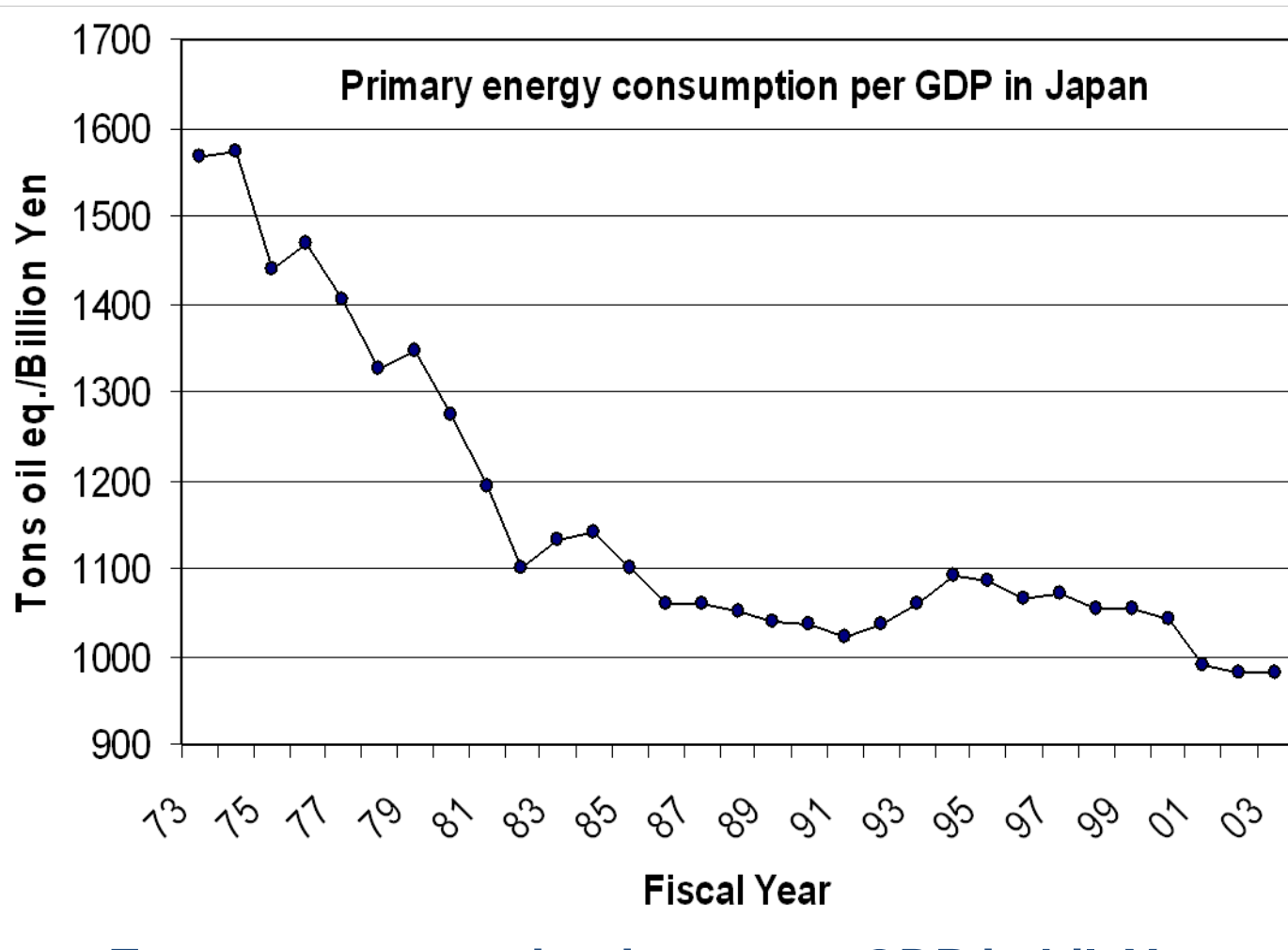
The case of Japan - example of the energy efficiency policy that works!

- 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.

Figure - The change of GDP and energy demand



Energy intensity - the case of Japan



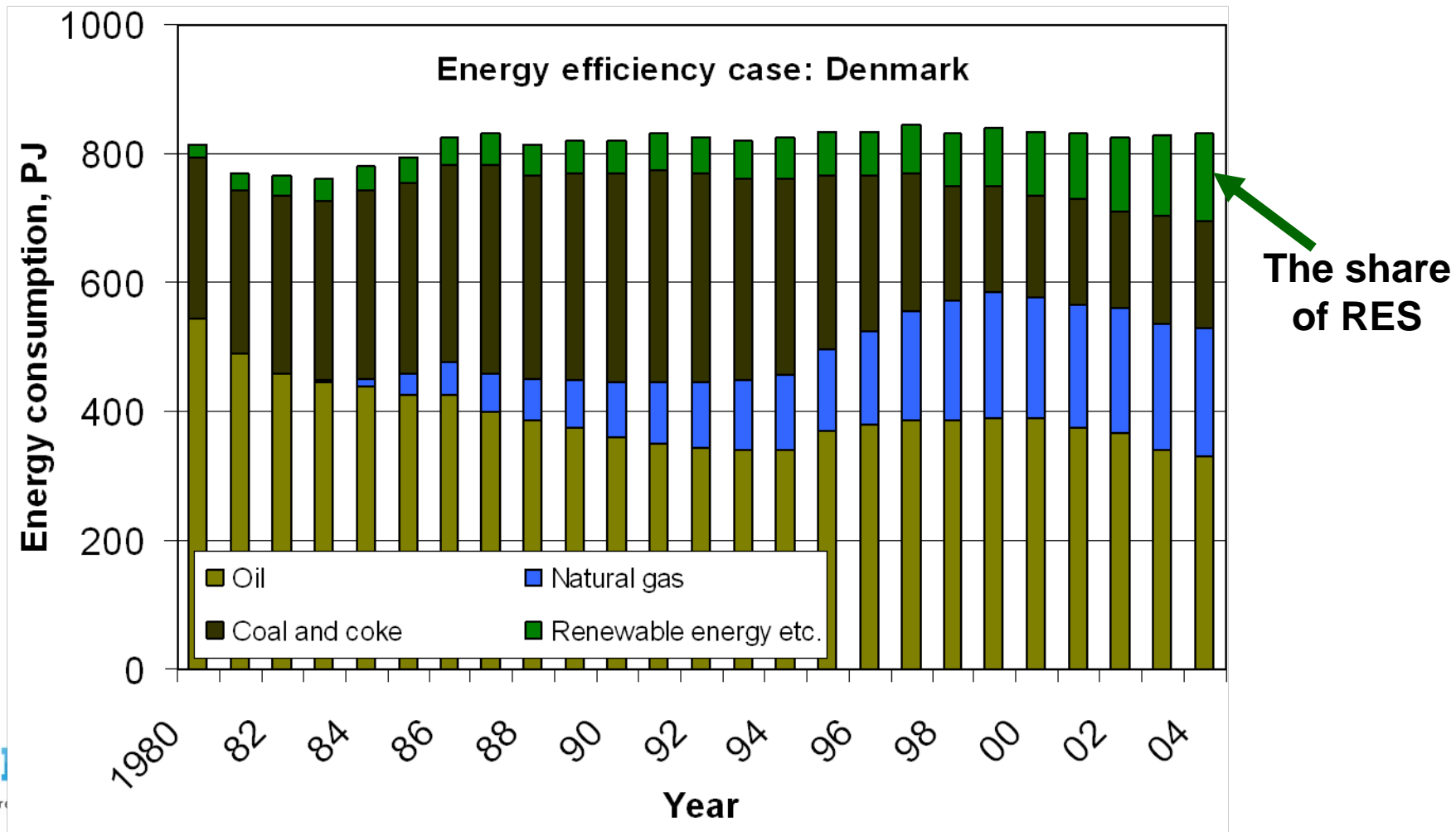
Unit final energy consumption per GDP in the industry sector (Fiscal 2002):

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

Energy consumption in toe per GDP in bil. Yen

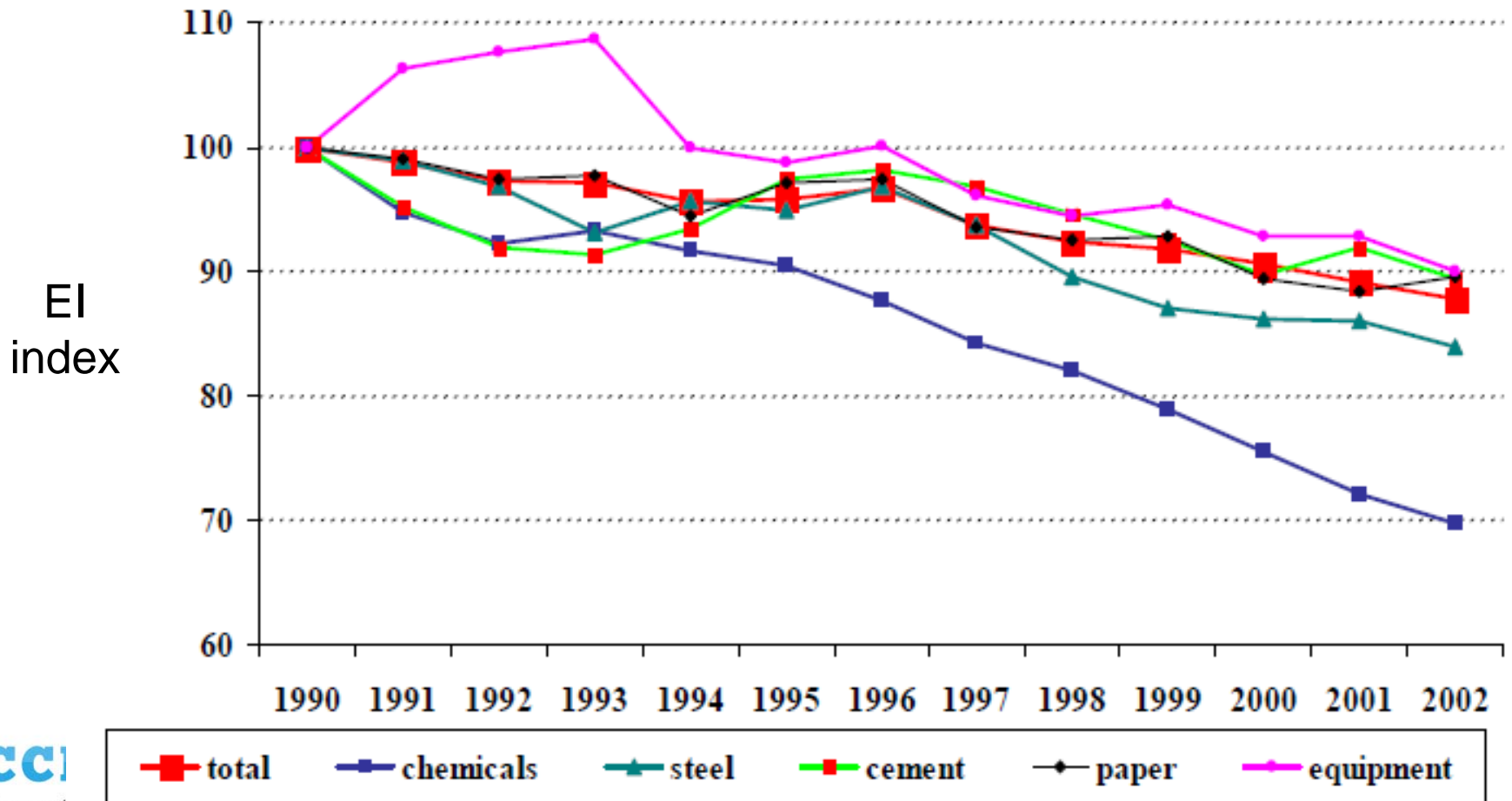
The power of the energy efficiency - Denmark

- During the period 1980-2005, thanks to the energy efficiency and energy saving, the country has succeeded to maintain steady energy consumption.
- In the same period, 32% growth of the GDP!

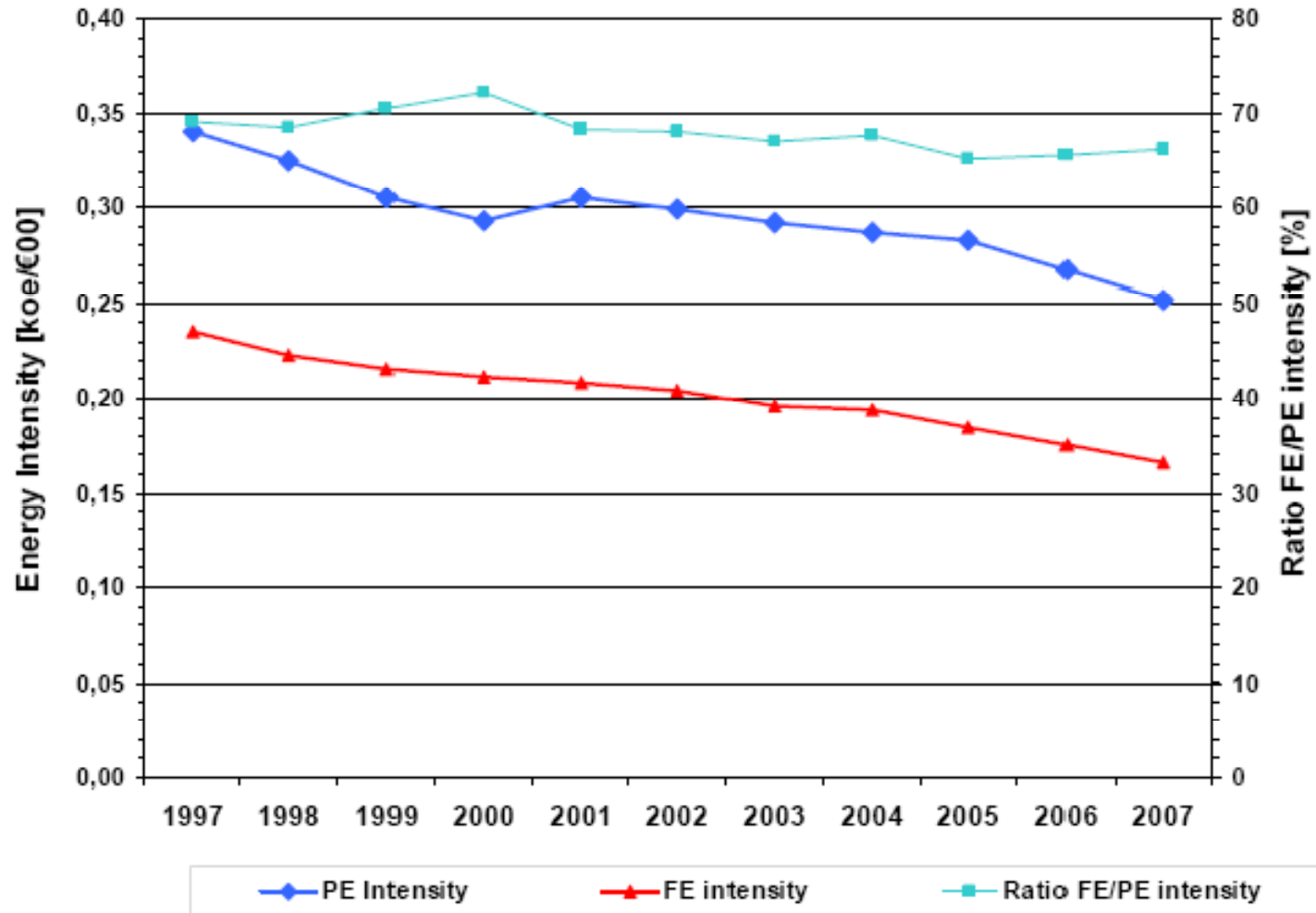


Energy efficiency progress through energy intensity (EI) index in EU 15

About 12 % total reduction in energy intensity (2002 vs 1990)



Energy intensity - Slovenia



Final and primary energy intensity in Slovenia

So, what to do to improve EE and reduce energy intensity?

First of all – commitment and a good plan!

“Those who fail to plan, plan to fail.”

Very important: Set targets!

EU 20/20/20 target until 2020

(20 % EE↑, 20 % RES↑, 20 % Emission. red.↓)

The 20 % target sought by the European Commission (EC) relates to the saving of primary energy in relation to a defined reference scenario. It is intended that, by 2020, primary energy consumption will have been reduced in relation to this base line.

Energy efficiency targets – Slovenia example

The 2004-2010 EE targets, Resolution on National Energy Programme:

- Improve the energy efficiency by 2010 as for 2004:
 - Industry and services sector 10 %
 - Buildings 10 %
 - Public sector 15 %
 - Transport 10 %
- Double share of electricity generation in CHP
- Increase the share of RES in primary energy balance to 12%
- Increase heat supply from RES from 22% in 2002 to 25% in 2010
- Increase electricity gen. from RES from 32% in 2002 to 33.6% in 2010
- Achieve 2% share of biofuels for transport at the end of 2005

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

Regulations

- Mandatory energy audits
- Efficiency standards on equipment (boilers, fans, motors, lighting, ...)
- Obligation of reporting energy consumption
- Obligation to prepare 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

Energy efficiency policies and measures in industry and services – EU countries

Energy auditing programmes in industry and services

- Over 70 % of countries with audits programmes; Mandatory audits in about 50 % of the schemes in Europe

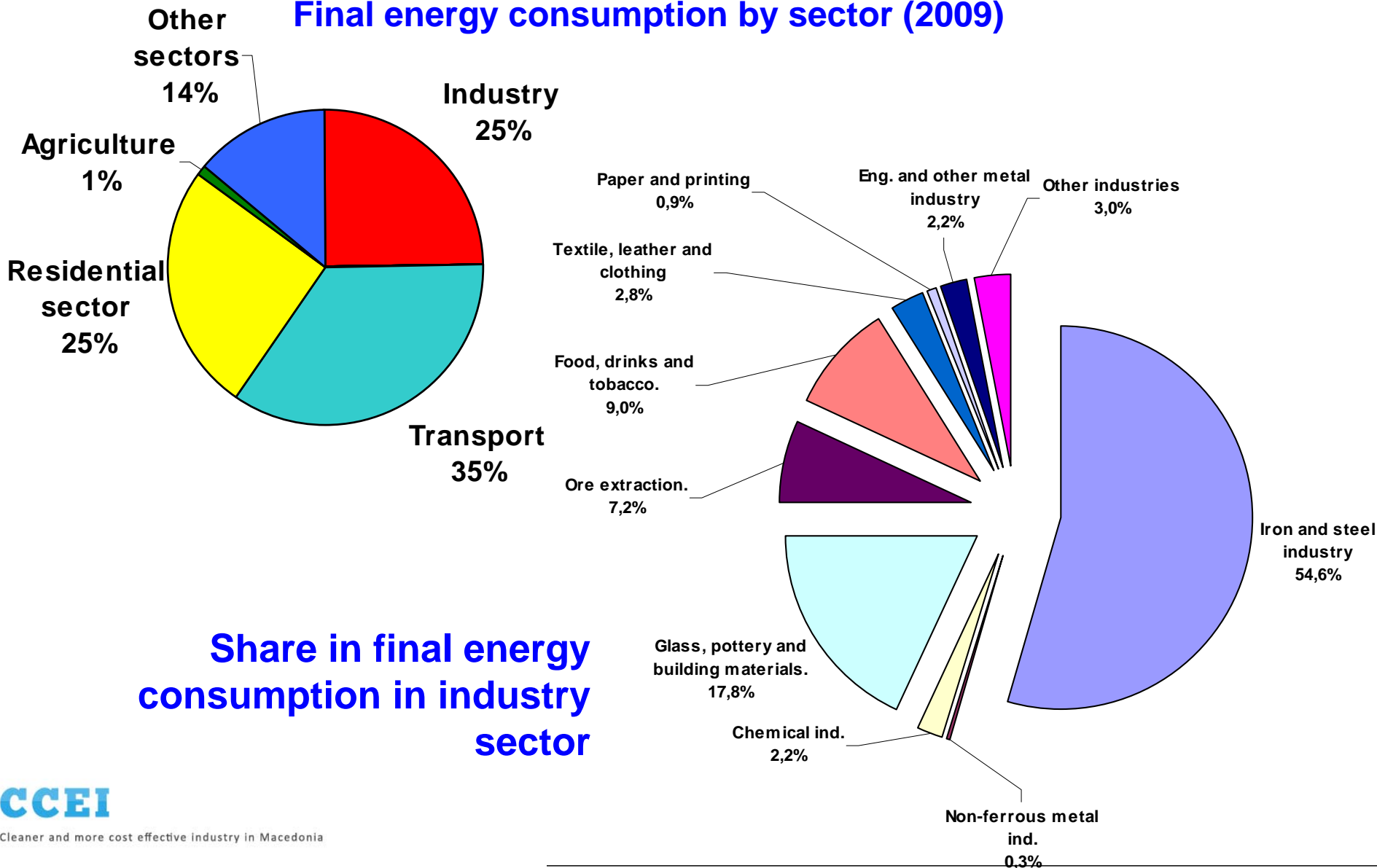
Mandatory consumption reporting, energy managers and saving plan in most of the countries

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

- Subsidies for energy audits
- Subsidies for investments
- "Soft" loans
- Guarantee funds of investments
- Accelerated depreciation
- Reduction of taxes (VAT, import taxes)

Some energy issues - Macedonia

Final energy consumption by sector (2009)

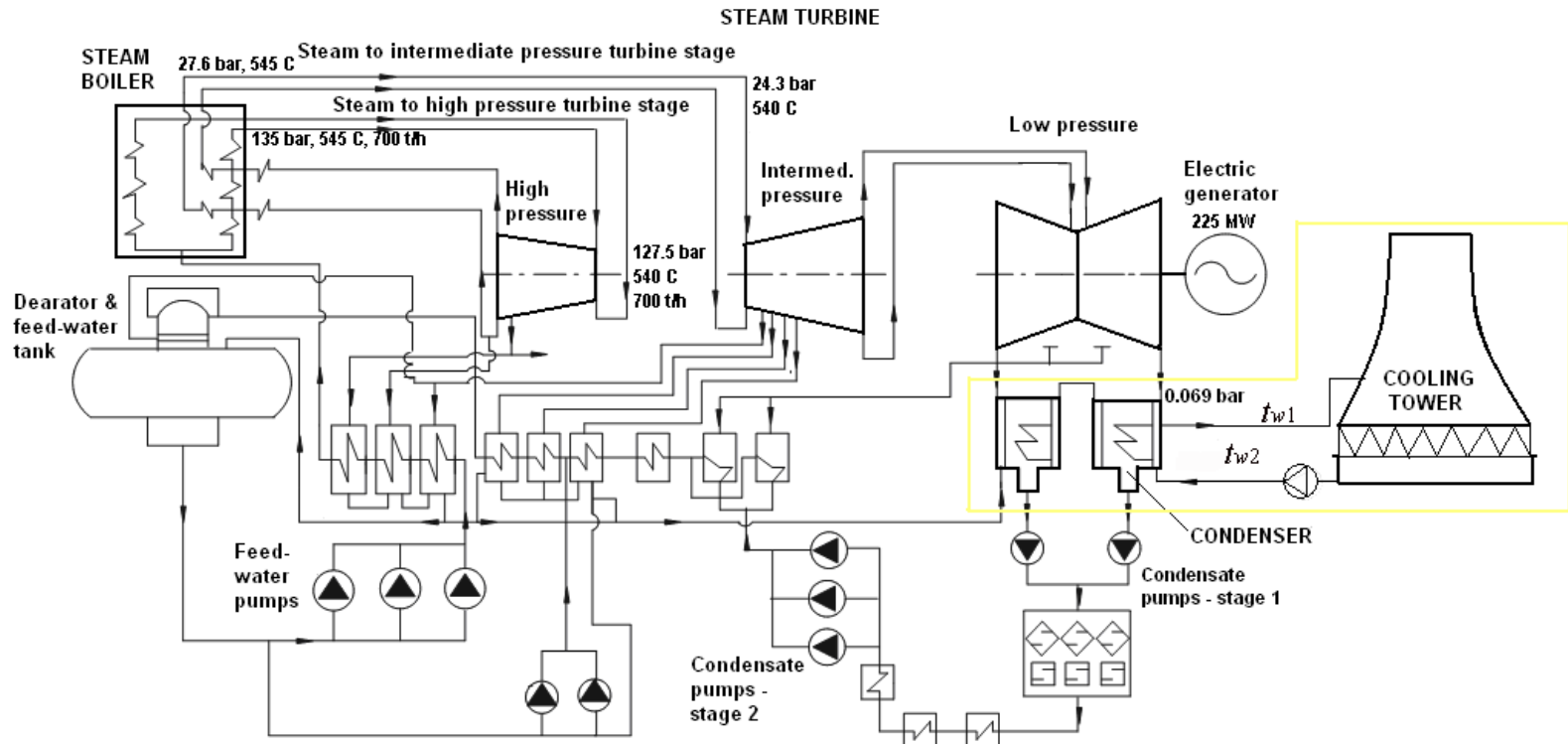


Some energy issues - Macedonia

LAST FEW YEARS: SIGNIFICANT PORTION (~20 %) 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!

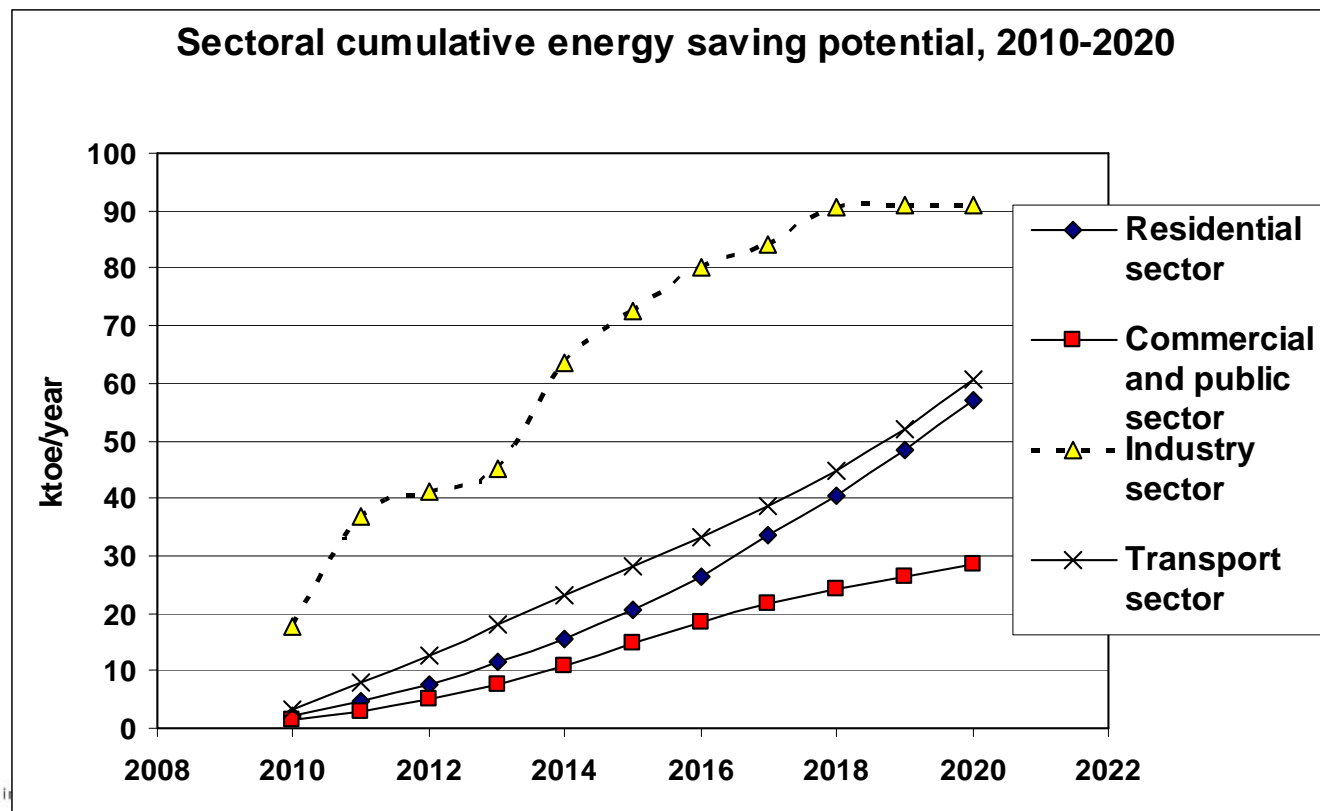
15-20 % ENERGY SAVING IN MACEDONIA MEANS ONE UNIT OF TPP BITOLA!



Potential energy savings in MK

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

- 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



What to do? – On national level

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

- Energy Law (February 2011)
- Law on Environment; IPPC permission; Sub-legislative acts
- Strategy documents:
 - Strategy for energy development in the Republic of Macedonia until 2030
 - Strategy for improvement of the energy efficiency in the R. of Macedonia until 2020
 - Base study for RES ...
- Action plans: National EE action plan, ...

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

WHAT TO DO? → IMPLEMENT!

Energy efficiency strategy - some initiatives

STRATEGY ELEMENTS

- ❑ LEGAL AND REGULATORY
- ❑ INSTITUTIONAL AND CAPACITY BUILDING
- ❑ SOCIAL MEASURES
- ❑ FINANCIAL (Energy efficiency fund)
- ❑ TECHNICAL INITIATIVES
 - RESIDENTIAL SECTOR
 - COMMERCIAL AND PUBLIC SERVICES SECTORS
 - INDUSTRY
 - Improvement of process performances (incl. IPPC permitting)
 - Energy auditing schemes
 - Energy performance of non-residential buildings
 - Fuel type change
 - Improved heating, improved lighting
 - Waste heat recovery, etc.
 - TRANSPORT

Law on energy - some initiatives

- **Chapter XI – Energy efficiency**

- Energy efficiency policy, measures and activities
- Energy efficiency action plan on national level – 3 years period
- Energy efficiency action plan on local (municipality) level – 3 years period
- Specific obligations for public sector: energy efficiency of buildings, facilities and devices
- Mandatory energy audits - assessment and evaluation of possibilities for reduction of energy consumption in buildings, facilities and devices, as well as in industrial processes
- Energy certificate of buildings, Regulation on energy audits, Regulation on energy consumption labeling

Mandatory: the only guarantee that economic and environmental benefits will be maximised within a reasonable timeframe!

Law on construction

Official Gazette of the R. Makedonija No. 51/05, 30.06.2005

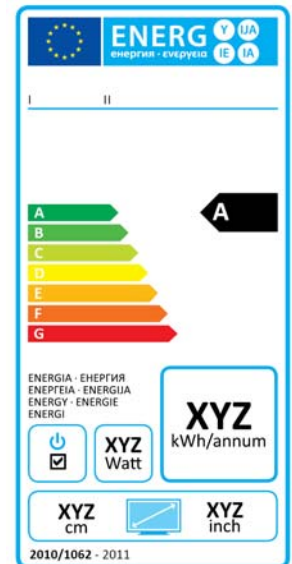
Chapter II Basic requirements for buildings

Ar. 6. Efficient utilisation of energy and thermal insulation

“Gradbata i nejinite uredi za greenje, ladenje i provetruvanje mora da bidat izvedeni na takov nacin sto vo zavisnost od klimatskite uslovi na lokacijata kje obezbedat potrosuvackata na energijata vo tekot na nejinoto upotrebuvanje da bide ednakva ili poniska od propisanoto nivo, obezbeduvajkji im na lugjeto koi prestojuvaat vo gradbata soodvetni uslovi na toplinska zastita.”

Eco-design and eco labeling

Example – positive consequences of similar regulation in Croatia



On a company level – energy management is a way to achieve multiple benefits: energy saving, environmental, financial ...

- Energy consumption in industry represents large share of both global primary energy and energy related GHG emissions
- For developing countries, this is often in excess of 30% of the total and can produce supply problems. Developing economies lead growth in both industrial energy use and carbon-related emissions
- Energy cost in some industries (refractory materials, cement, metallurgy, etc.) contribute with 20-50% in the product price
- It is much more cost-effective to build in energy efficiency the first time than retrofit it later. A missed opportunity for energy efficiency may not reoccur - for decades or at all until the original installation fails or becomes obsolete

What are industry companies' priorities?

Current

1. Stay profitable
2. Operate a safe workplace
3. Be compliant with environmental regulations
4. Meet fiduciary and social responsibilities
5. Monitor supply chain for potential liability

Emerging

6. Manage GHG emissions, carbon footprint



Sustainable energy efficiency in industry through an energy management system

Implementation of industrial standards framework for energy efficiency would:

- **Provide achievable energy efficiency targets**
- **Provide an organizational process for managing energy to reach these targets and sustain efficiency**
- **Increase demand for systems optimization services**
- **Offer technical guidance to factory personnel**
- **Require written procedures and documentation to ensure that energy savings will be sustained**
- **Reward energy efficiency**

Why an Energy Management Standard?

- **Most energy efficiency improvements in industry are achieved through changes in how energy is managed in an industrial facility, rather than through installation of new technologies;**
- **An energy management standard provides a method for integrating energy efficiency into existing industrial management systems for continuous improvement;**
- **All existing and planned energy management standards are compatible with ISO 9000/14000;**
- **Companies who have adopted an energy management plan usually have achieved major energy intensity improvements and consequent environmental and financial benefits**

Business Benefits

Implementation of an energy management plan assists a company to:

- Develop a baseline of energy use
- Actively managing energy use and costs
- Reduce emissions without negative effect on operations
- Continue to improve energy use/product output over time
- Document savings for internal and external use (e.g. emission credits)

One can not manage what can not measure!

Components of an EM Standard

1. **A strategic plan** that requires measurement, management, and documentation for continuous improvement for energy efficiency;
2. **A cross-divisional management team** led by an energy coordinator
3. **Policies and procedures** to address all aspects of energy purchase, use, and disposal
4. **Projects** to demonstrate continuous improvement in energy efficiency
5. **Creation of an Energy Manual**
6. Identification of **key performance indicators**
7. **Periodic reporting**



Concluding Remarks

- **Energy is a modern necessity. It is not cheap and it will not be so, at least in the foreseeable future**
- **Energy efficiency and energy saving are very important “energy resource” in European countries and also in Macedonia**
- **There are huge opportunities for energy efficiency improvement and energy saving measures in all sectors: public, industry, services, households**
- **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!

