THE POWER OF ENERGY EFFICIENCY AND ENERGY SAVING

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Cleaner and More Cost Effective Industry in Macedonia

Graduate Student Conference: Implementing Energy Efficiency through Renewable Energy Solutions - are Southeast European Countries on track? 14th of June, Faculty of Electrical Engineering-Skopje

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- Some cases on Energy Efficiency (Japan and Denmark)
- Energy Efficiency and Environmental Issues
- Cleaner and More Cost Effective Industry in Macedonia
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GENERAL NOTES

Energy policy as a dominate political discourse around the world.....

Energy is a prerequisite for industrial and overall social development.....

Different issues arisen when considering energy use.....

Adoption of energy efficient technologies in developed vs. developing countries .....

❑ The cases of Japan and Denmark - examples of the power of the energy efficiency policies that work!

- 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.

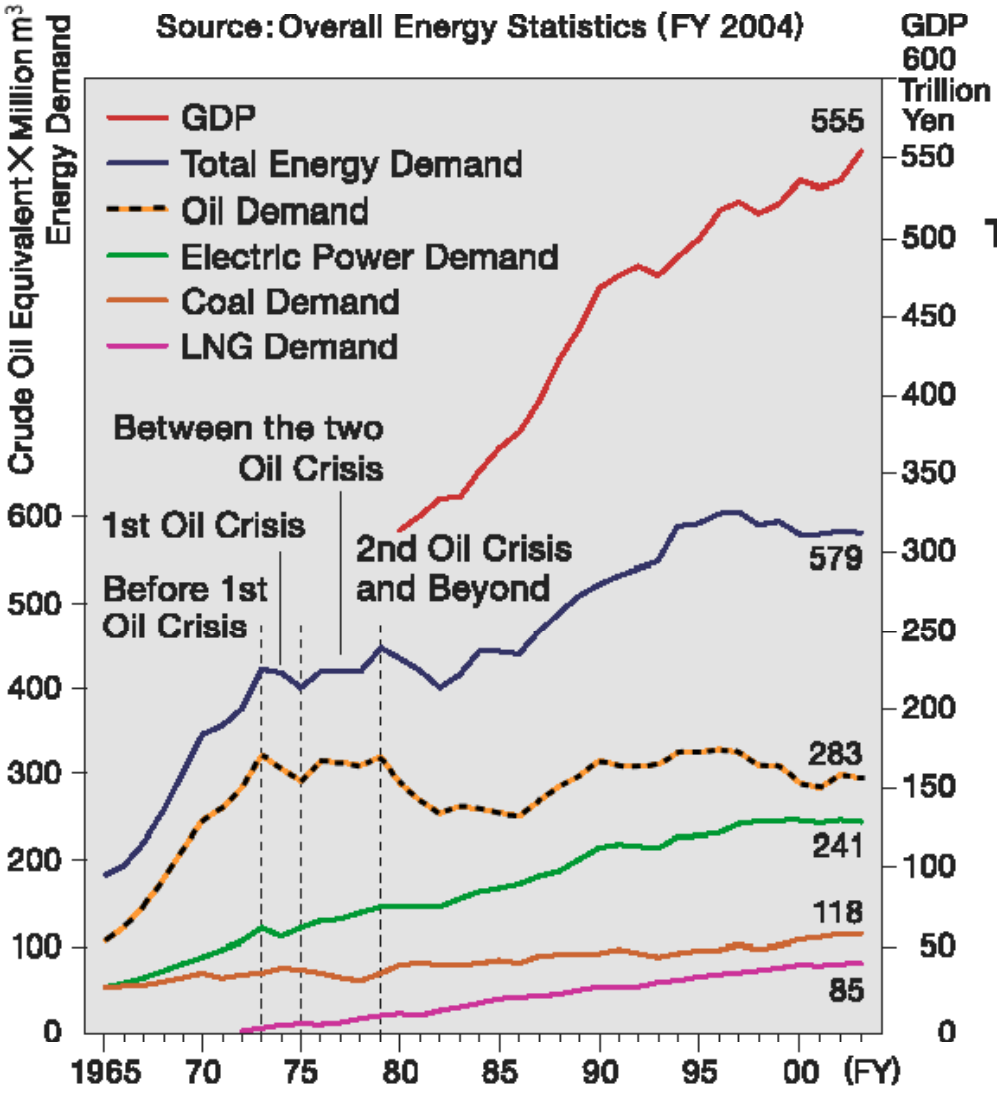


Fig. The Japan case: (a) The change of GDP and energy demand

EE - The case of Japan

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

If the final energy consumption per real GDP in US$ in Japan is sat at 1.0, the relative energy consumption in France would be 1.07, in Germany 1.14, in UK 1.22 and in the USA 1.82.

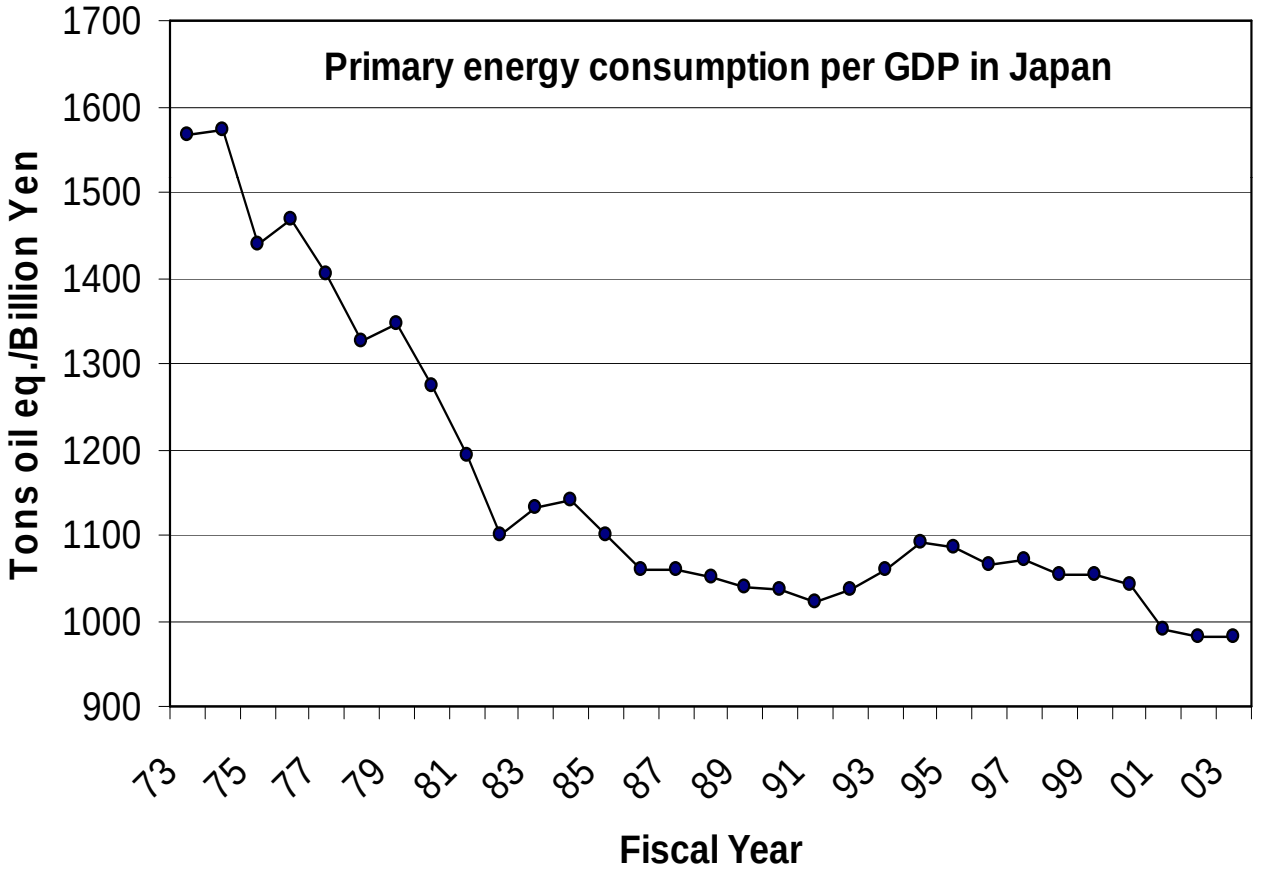


Fig. The Japan case: (b) Energy intensity [7,8]

EE - 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!**

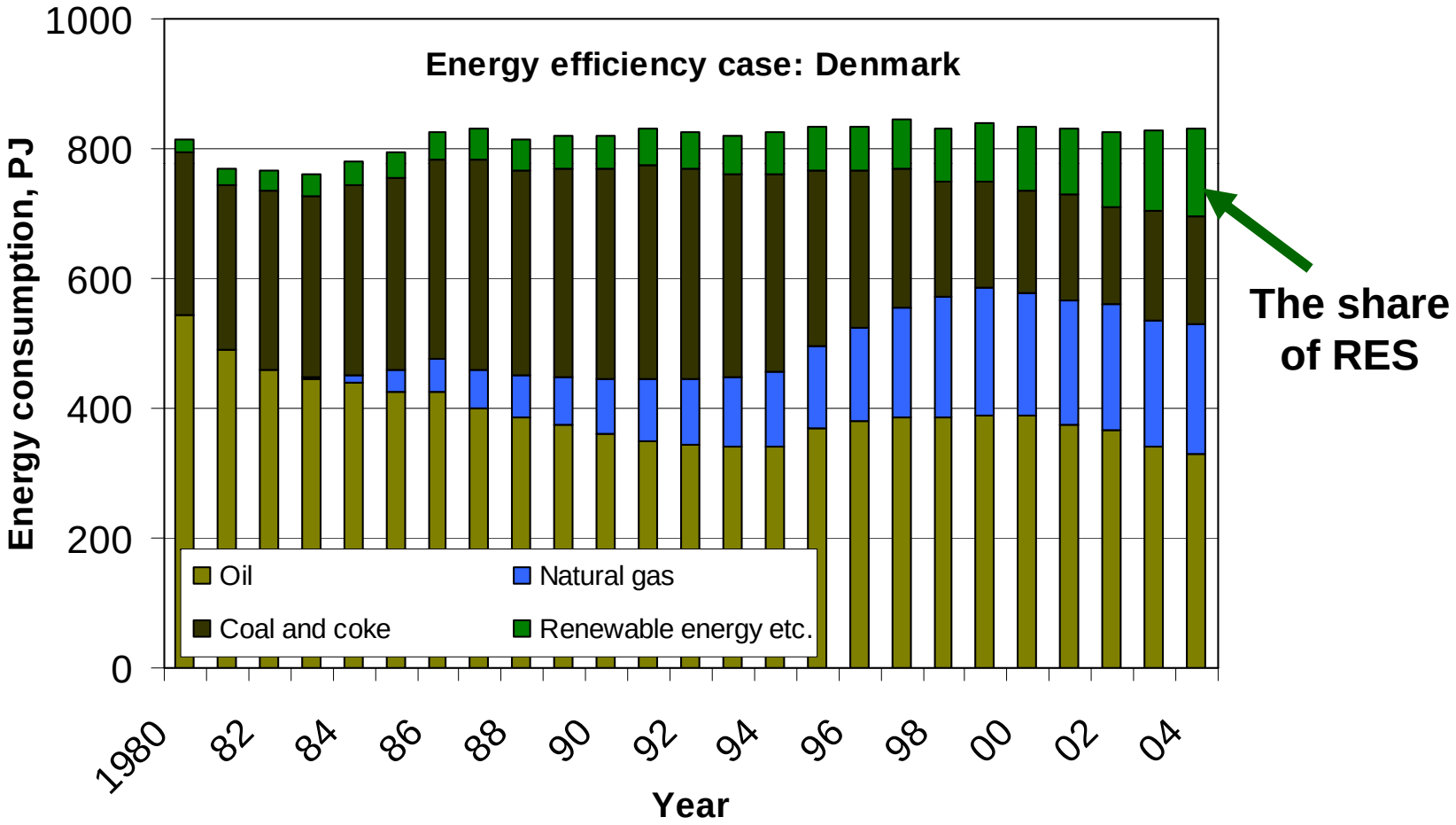


Fig. 4. Energy efficiency policy: case of Denmark [4,9]

ENERGY EFFICIENCY AND ENVIRONMENTAL ISSUES

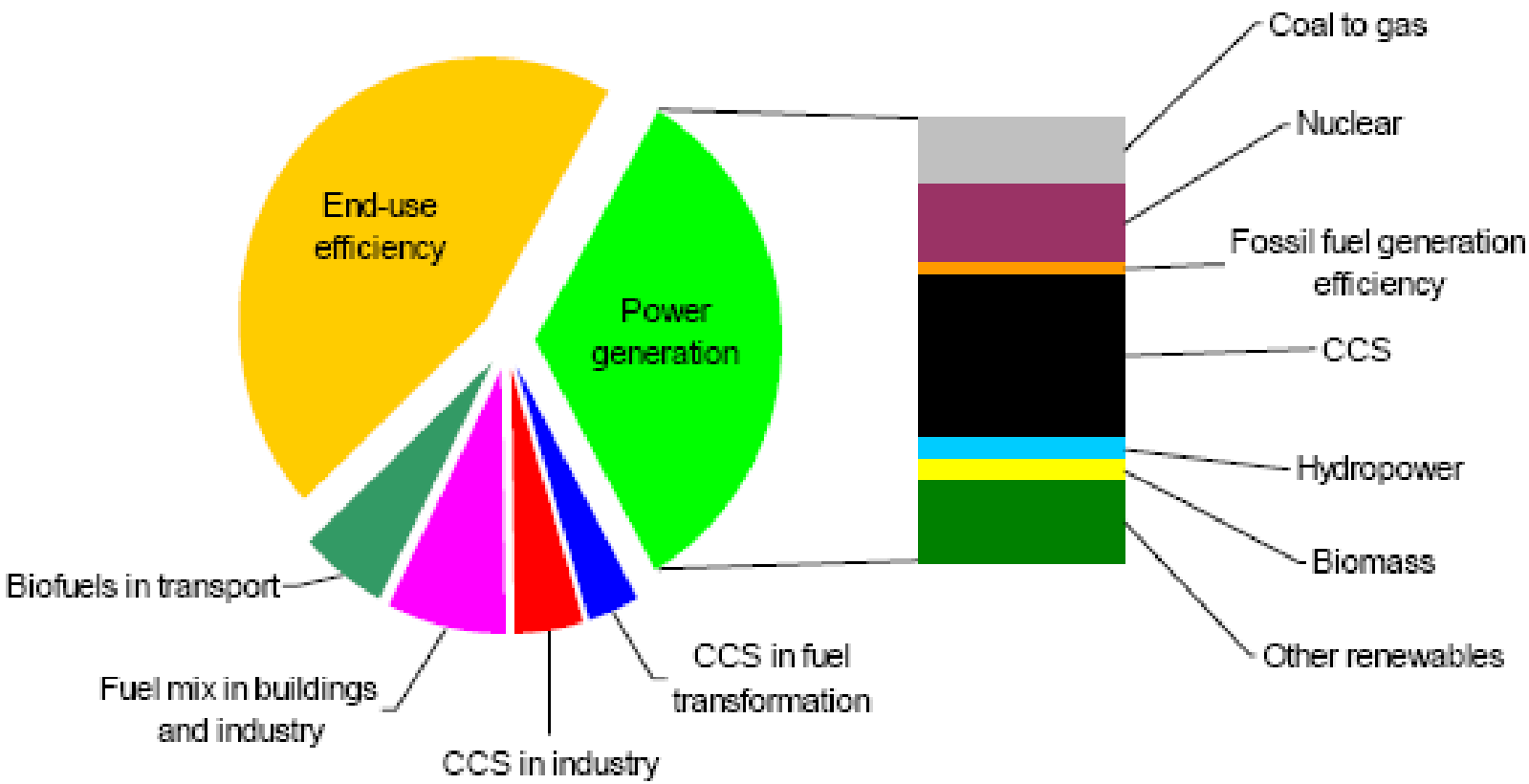


Fig. 5. IEA 2050 assessment for the role of different climate change mitigation opportunities [4,10]

- **Energy efficiency is the lowest hanging option for reduction of the GHG emission.**
- According to the IPCC 2030 scenario, the potential for GHG reduction in the energy supply at <US$ 100/t CO2-eq is 2.4-4.7 Gt CO2-eq/year [11]. Additionally, the potential for GHG reduction in the industry at <US$ 100/t CO2-eq is 2.5-5.5 Gt CO2-eq/year [11].

ENERGY EFFICIENCY AND ENVIRONMENTAL ISSUES

❑ The role of the end-use energy efficiency in reduction of GHG emission

- Two scenarios for CO2-eq emission from the energy sector: the baseline scenario and so-called BLUE Map scenario [10].
- Advanced, intelligent and reliable energy policy measures have to be implemented at least in the majority of countries worldwide in order to reach such a development, like the one predicted within the BLUE Map scenario,

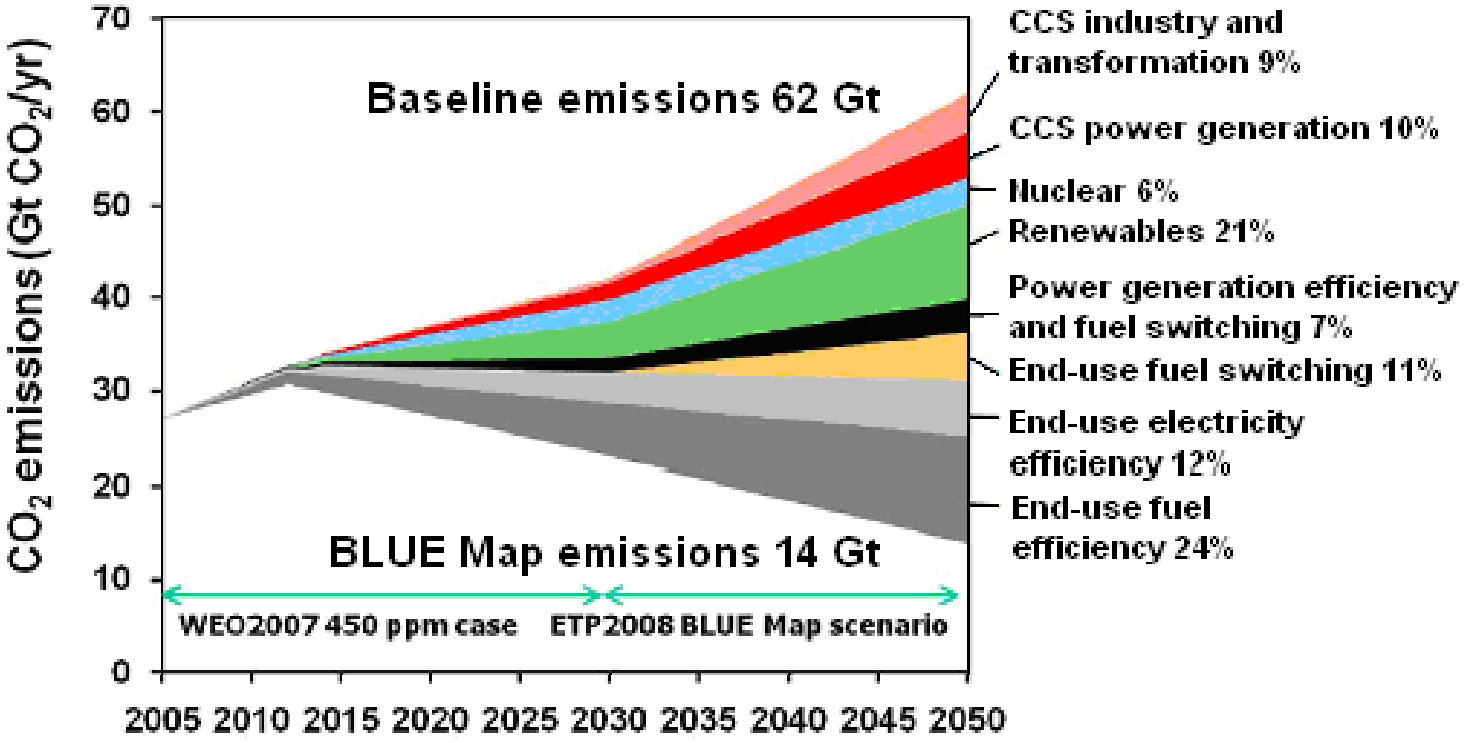


Fig. Cutting CO_2-eq emissions: the role of end-use EE [10]

GENERAL INFORMATION ABOUT ENERGY IN R. MACEDONIA

- **ANNUAL ENERGY DEMAND OF THE COUNTRY ~124,000 TJ/year**

- **ANNUAL ELECTRICITY GENERATION**
  - **Total ~6400 GWh/year**
  - **Thermal power plants ~5200 GWh/tear**
  - **Hydro power plants ~1200 GWh/year**

- **ASSESSMENTS FOR POSSIBLE SAVINGS WITH PROPER ENERGY EFFICIENCY POLICY AND MEASURES IMPLEMENTATION: UP TO 15% OF THE RECENT ENERGY DEMAND, UNTIL 2020!**

Cleaner and more cost effective industry in Macedonia

P0429060

MAK-09/006

A three-years program funded by

NORWEGIAN MINISTRY OF FOREIGN AFFAIRS

Norwegian Ministry of Foreign Affairs

MAIN AIM OF THE PROJECT

- Identifying environmentally sound energy projects and preparing these projects for financing
- Contribute to the reduction of the greenhouse gas emissions and a more cost efficient energy intensive industry in Republic of Macedonia
- Address barriers to project implementation by building local competence, increasing awareness, developing a pipeline of climate projects ready for financing
- Assisting the Macedonian industry for future EU obligations by increasing social responsibility and competitiveness and producing goods in an environmental friendly manner
- Assess possibility of carbon financing to cover part of investment costs
- Building of local competence for identifying and developing climate changes projects

COMPONENTS OF THE PROJECT

Energy Efficiency

Environmental Management

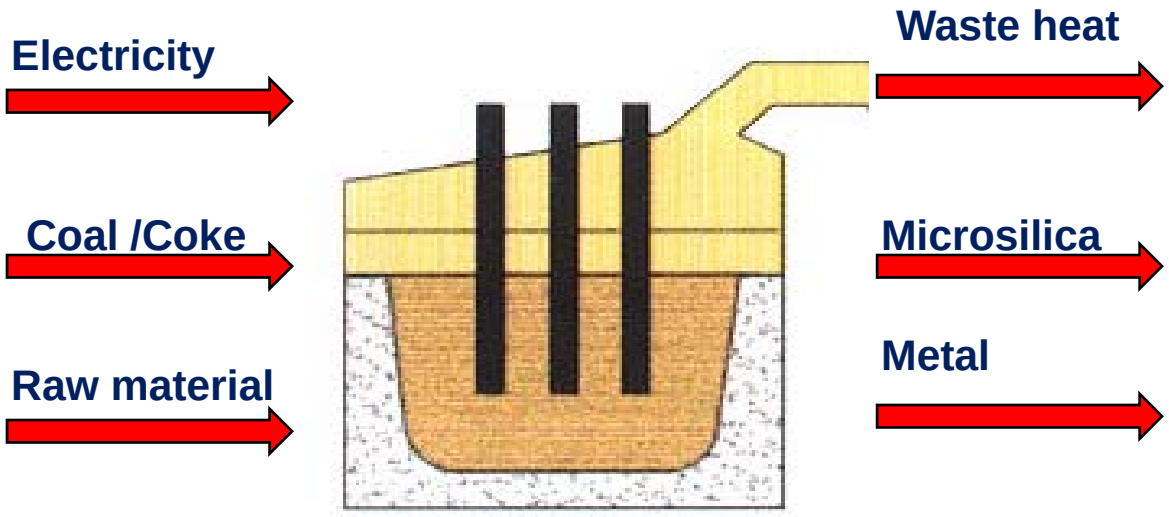
Student Exchange

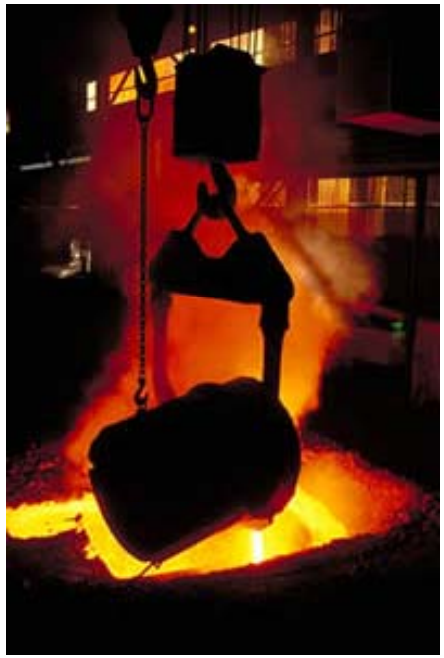
Outcome of the project…….

EXAMPLE: FERROALLOY INDUSTRY, SILMAK

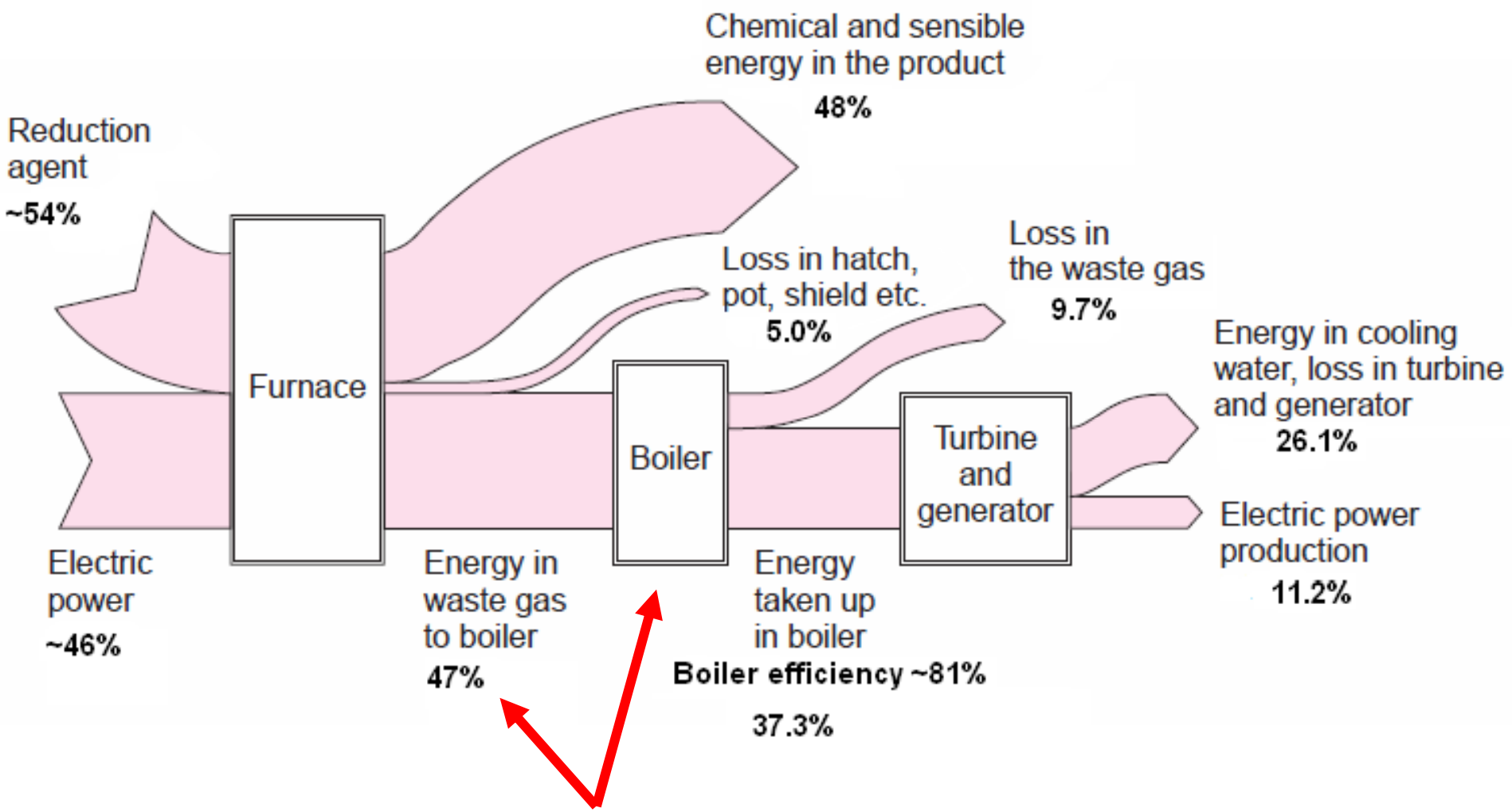
What is ferroalloy production ?

- FeSi , Si-metal production
  - Open and semi closed furnace
  - Hot flue gas





PRINCIPAL ENERGY BALANCE OF A FeSi FURNACE



VERY IMPORTANT: Large waste heat recovery projects may be eligible for CDM!

- Recovered energy substitutes coal power
- UNFCCC approved methodology ACM 0012 is applicable
- Gross potential for CO_2 emission reduction per year is tremendous

The SILMAK case

- At present, only small share of heat is recovering (for heating purposes)

There are three aspects that make the project important for the future of SILMAK:
1. Reduction of electricity costs by 20 %
2. Combination with installation of bag-house filters (which SILMAK has to do within 2013), will reduce the total investments because the need for gas coolers is eliminated.
3. Sale of carbon credits as a CDM project. We estimate CO2 reductions to be 60-65.000 tons/year. A CO2 price of 10 EUR/ton CO2 could give annual income of 600-650.000 EUR/year for post-Kyoto delivery.

OTHER LOCAL EXPERIENCES

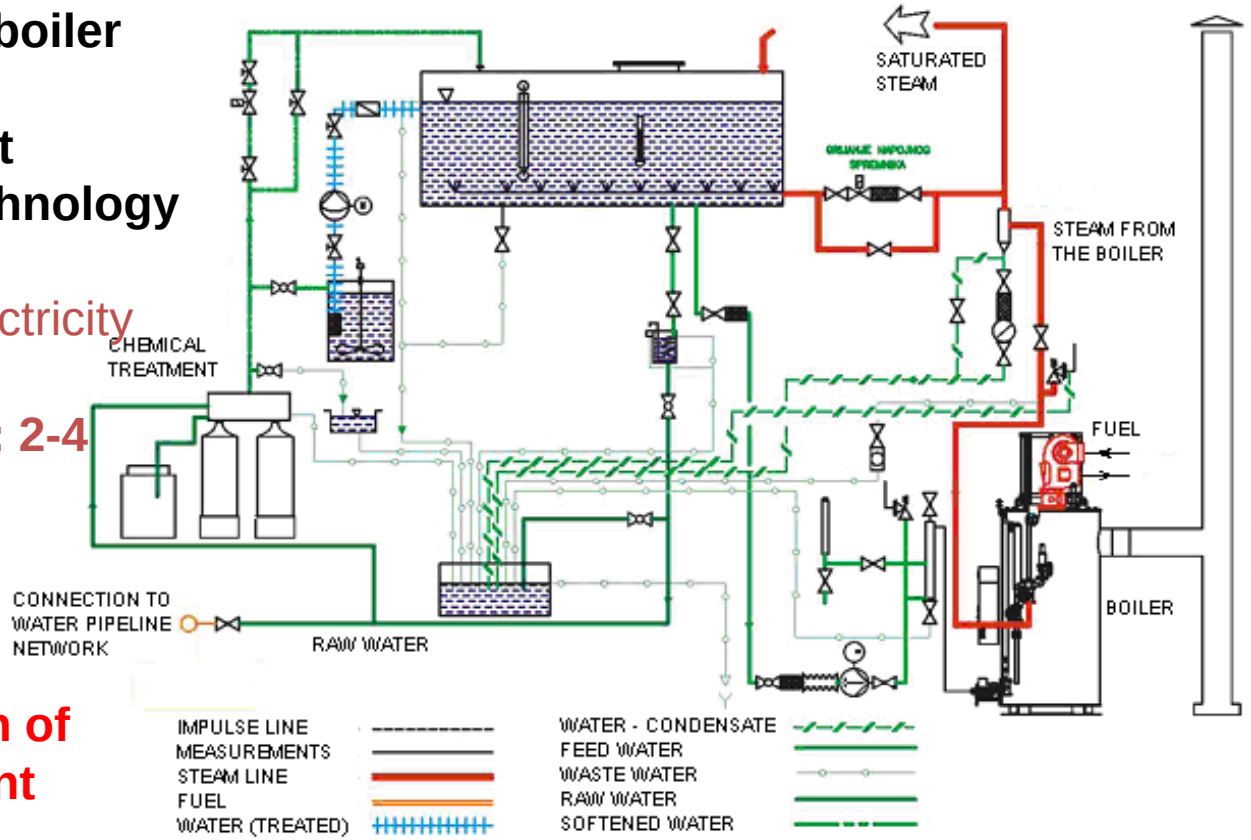
Concrete production and concrete products industry

Some of the proposed energy measures

- **a programme of progressive revitalization and replacement of the equipment in the central boiler plant**
- **a programme for revitalization and rehabilitation of the steam-condensate pipeline system**
- **New, container type boiler plant**
- **New compressor unit**
- **Improvements in technology processes**

❑ Benefits: less fuel and electricity consumption, less emission

❑ **Simple pay-back period: 2-4 years**



Schematic representation of the steam generation plant

OTHER LOCAL EXPERIENCES

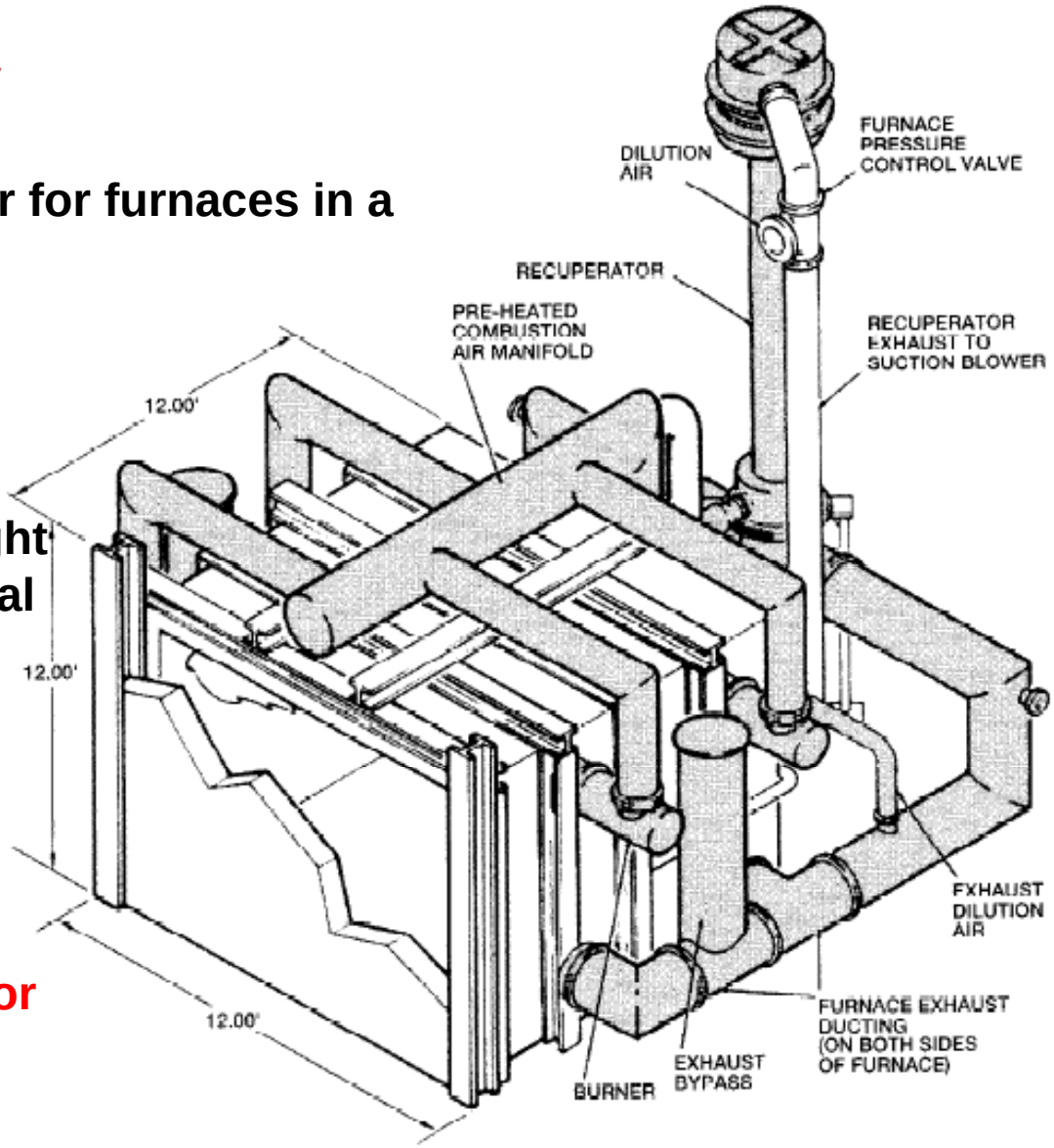
❑ OTHER INDUSTRY SECTORS

❑ Metal processing industry

- **Re-design of furnaces**
- **Heat the combustion air for furnaces in a recuperative air-heater**
- **Switch- over from the existing fuel, light oil, to natural gas**

Benefits:

Only replacements of light oil, electricity with natural gas means cost saving of around 75.000 EUR/ annualy



Heat recuperation system for a chamber forge furnace

OTHER LOCAL EXPERIENCES

❑ OTHER INDUSTRY BRANCHES, SERVICES, …

❑ **Textile industry (wool and yarn production and processing, other textile branches)**

- Energy audit;
- Boiler plant;
- Rehabilitation of steam-condensate pipeline system;
- Heat recuperation in different processes and operations

❑ **Production of refractory materials**

- Waste heat recovery – high temperature chamber furnaces
- Rehabilitation of compressed air system
- Boiler plant

❑ **Chemical industry**

- Boiler station
- Steam-condensate system rehabilitation

❑ **Wood processing and furniture production industry**

❑ **Hospitals, health-care centres**

CONCLUDING REMARKS

- **Energy is not cheap and it will not be so, 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: public, health care sector, hotels, etc.**
- **Some of the most important consequences of the implementation of energy efficiency and energy saving measures are local and global environmental gains, including reduction of GHG emission.**
- **Well-designed and effective policies, implementation of comprehensive energy management standards, as well as regulatory frameworks, can have a significant positive impact on efficient industry energy use.**

Thank You for Your attention!

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