How Feasible is Decarbonisation in SE Europe? The Role of Cogeneration of Heat and Power

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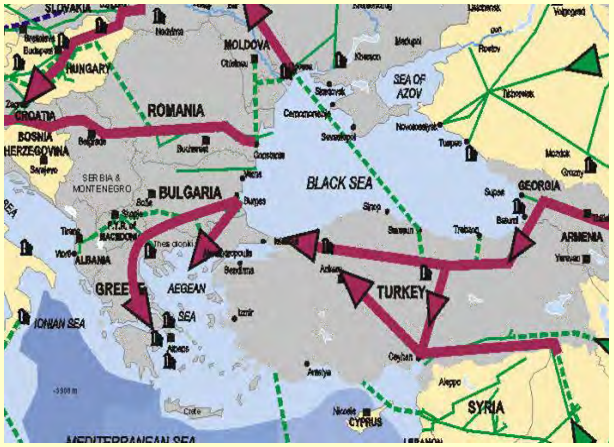
June, 2016

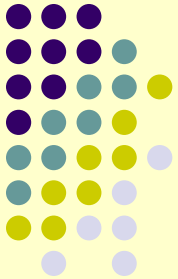
Data of SE Europe

- In SE Europe live 138 million people
- Its area is 3 times the size of France
- 11 independent states, where
  5 members of EU (1981-2004-2013)
  1 accession country to EU
  3 in negotiation procedures with EU
  4 member: Council of Europe



- Many States in the Region faced political transition in the past years, now the situation is stabilized.
- Political, cultural, financial connections were developed between their inhabitants all previous years.

Natural resources in S.E. Europe



- Rich in oil production (220,000 bbl/day)
- Notable quantities of N.G. (~ 1,00 million Nm^3/yr)
- Many countries are rich in resources as:

  - coal, lignite

  - bauxite, chromites, copper, iron ore, etc.,

  - Mainly coal and lignite, in large quantities in reserves (i.e. Albania – 300 yrs, consumption of 80s), but

    - low calorific value,

    - high in ash content

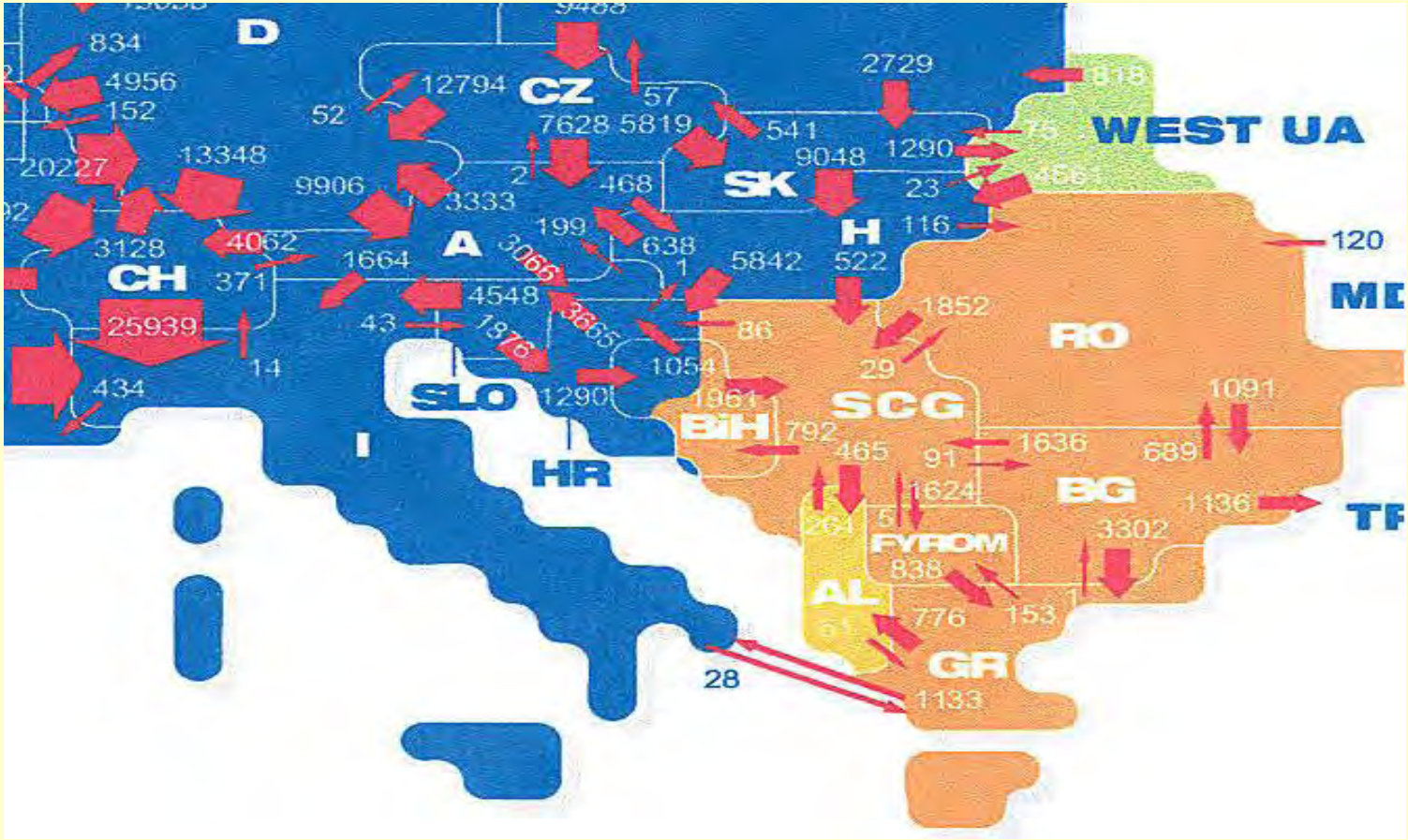
  - RES (hydro, wind, biomass, solar, geothermal)

Energy markets in S.E. Europe

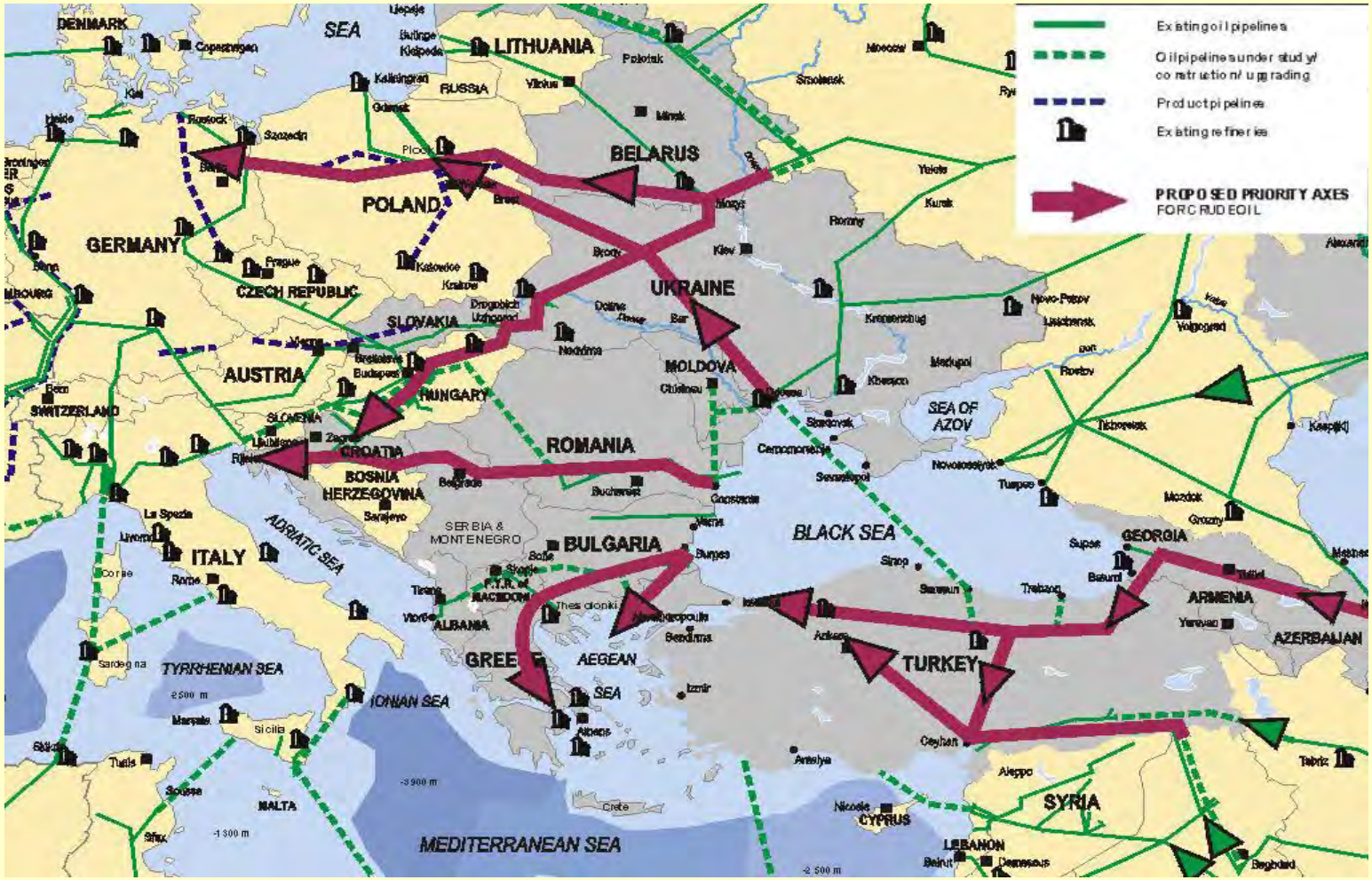
- Monitoring into a new level of development, due to:
  - Globalization of energy production
  - Liberalization of energy markets
  - Regional Cooperation
  - New technologies

Regional Cooperation in Energy issues

Electricity interconnection



Oil Interconnections



Natural Gas networks

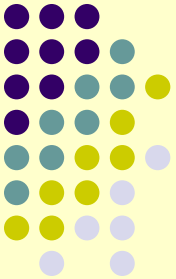
CHP in SE Europe

- Facts
  - Energy demand growth
  - Existing natural resources
  - Many states operate in a liberalized energy environment
  - Good interconnection in oil/NG/electricity
  - Experience in distributed electricity
  - In many countries, the developing of CHP is obstructed by institutional and legal barriers.

CHP in SE Europe

- In countries with planned economy in the past, CHP systems were developed to support DH systems and for heavy industrial purposes
- After political changes in 90s, industrial production was severely reduced and DH systems were ruined.
- In some countries (i.e Turkey), the increase of CHP installations was remarkable in the previous decades (4 MWe in 1994, 4500 MWe in 2004; an increase of 1125%), but stagnation was noted in the following years.
- In other countries (i.e. Greece) the penetration of CHP is limited, due to the structure of the electricity market and other barriers
- In other countries (i.e Serbia) CHP was strong few years ago, but now is struggling to start again
- Little penetration of CHP in tertiary sector

CHP in SE Europe



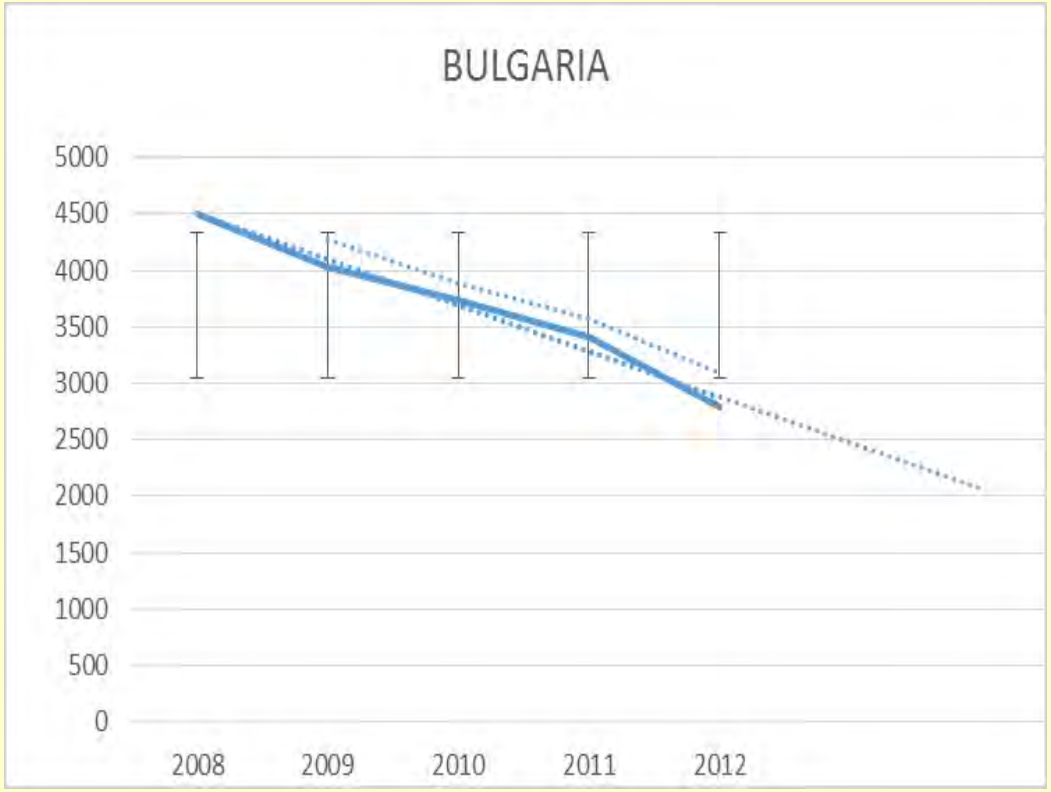
In general

- existing ‘know-how’ in CHP installations
- CHP is used mainly for industrial purposes
- the majority of CHP systems are steam/gas turbines
- in many countries of the region CHP systems are strongly connected with District Heating, but
- many of them need rehabilitation and therefore financial assistance
- Operation of DH systems in Greece creates a remarkable expertise (technical, maintenance)
- No many trigeneration applications in tertiary sector
- EED is under implementation in all EU SEE countries

CHP potential in SE Europe

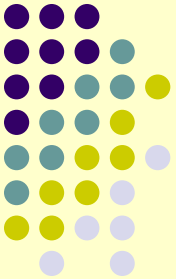
The Cogeneration in Bulgaria

Cogeneration has a long tradition in Bulgaria. Cogenerated electricity production passed through a decline period, mainly due to a shifting towards to the use of nuclear energy and of lack of new investments for this technology, but is recovering, the past 2-3 years.



GWh per year in Bulgaria

The Cogeneration in Bulgaria



- A more intense use of cogeneration is met in DH, showing a good prospective and an interest for large investments, by foreign investors. The implementation of EED* can lead to the increase of the share of cogenerated electricity from 7% in 2011 to 14% in 2030.
- Forecasts for heat production from CHP show that the share of cogeneration units on heating production will reach 30% to 2030. CHP development potentials are expected in the sectors of DH, agriculture & forestry sector, in tertiary and social infrastructure sector.
- The EED roadmap* path would deliver 7.8 to 10 TWh/yr of primary energy saving (PES) and more than 5 million tonnes of CO2 reductions are achievable in practice.

*Data from CODE2 Project : www.code2-project.eu

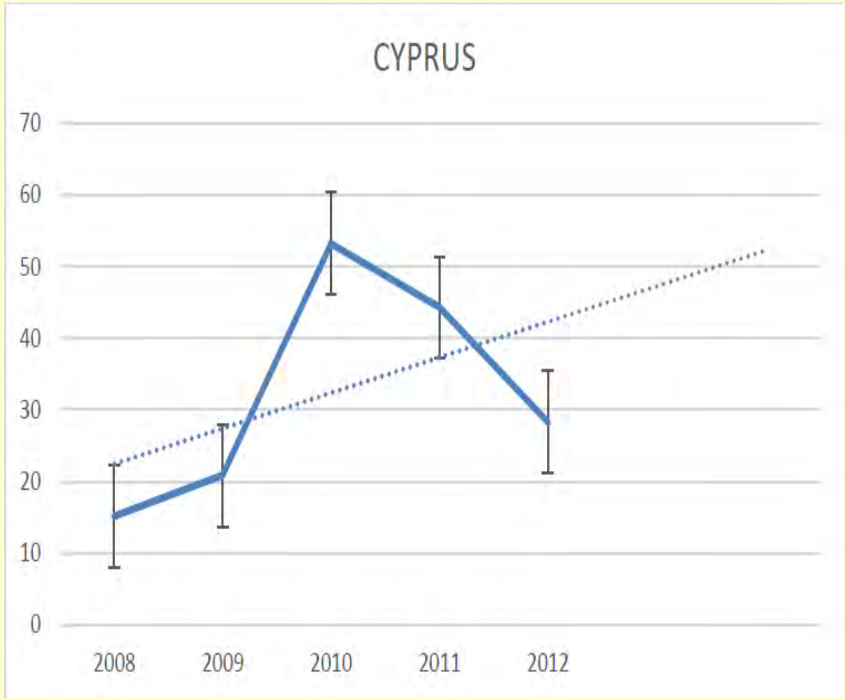
The Cogeneration in Cyprus

CHP is developing slowly in Cyprus, with few installations, mainly in agricultural sector. The share of CHP to the gross electricity generation is below 1%.

There has been government participation for the development of CHP in Cyprus, either on legal basis or on introducing support mechanisms for cogenerated electricity.

In Cyprus, economic viable are only micro- or small-scale CHP units, operating with biofuel. No district heating/cooling networks in operation, as no heat policy exists and the technology is unknown. For micro CHP, there is actually no market in Cyprus, due to a lack of NG supply and grid infrastructure.

PES for Cyprus* is estimated at 4.9 TWh per year and CO2 savings are estimated to be between 0.30 and 0.47 million tons per year in 2030, due to high penetration of biomass/biogas, as fuel.



MWh per year in Cyprus

* Data from CODE2 Project : www.code2-project.eu

The Cogeneration in Greece

Greece has one of the lowest % of cogenerated electricity among EU MS, although it has a 40-yr tradition on CHP, initially in the industrial sector.

Today the installed CHP capacity is steady for the past five years, about 570 MWe, covering mainly industrial and tertiary sectors. The appropriate legal framework is in place, for the promotion of CHP, along with supporting mechanisms for independent producers, but Greece is lagging of long-term stability and complexity in legislation (i.e. frequent changes of energy laws, amendments) and bureaucracy in the procedures that prevents any investor for acting.

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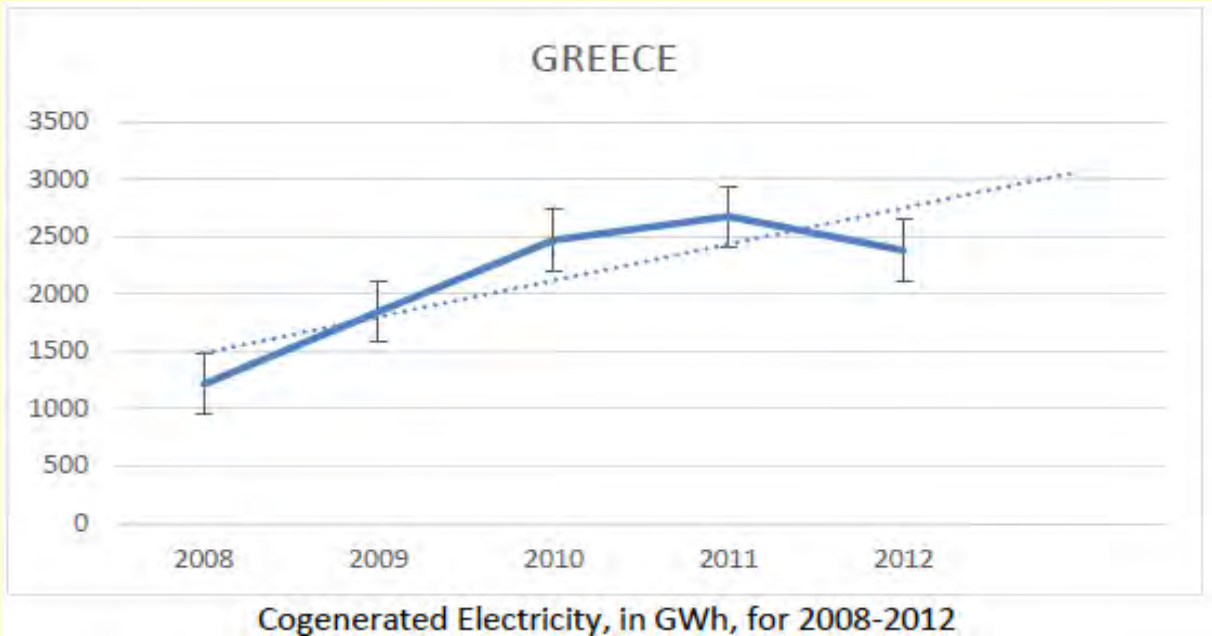
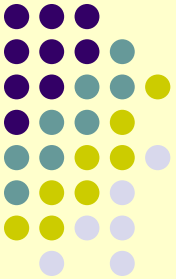


Cogenerated Electricity, in GWh, for 2008-2012

The Cogeneration in Greece

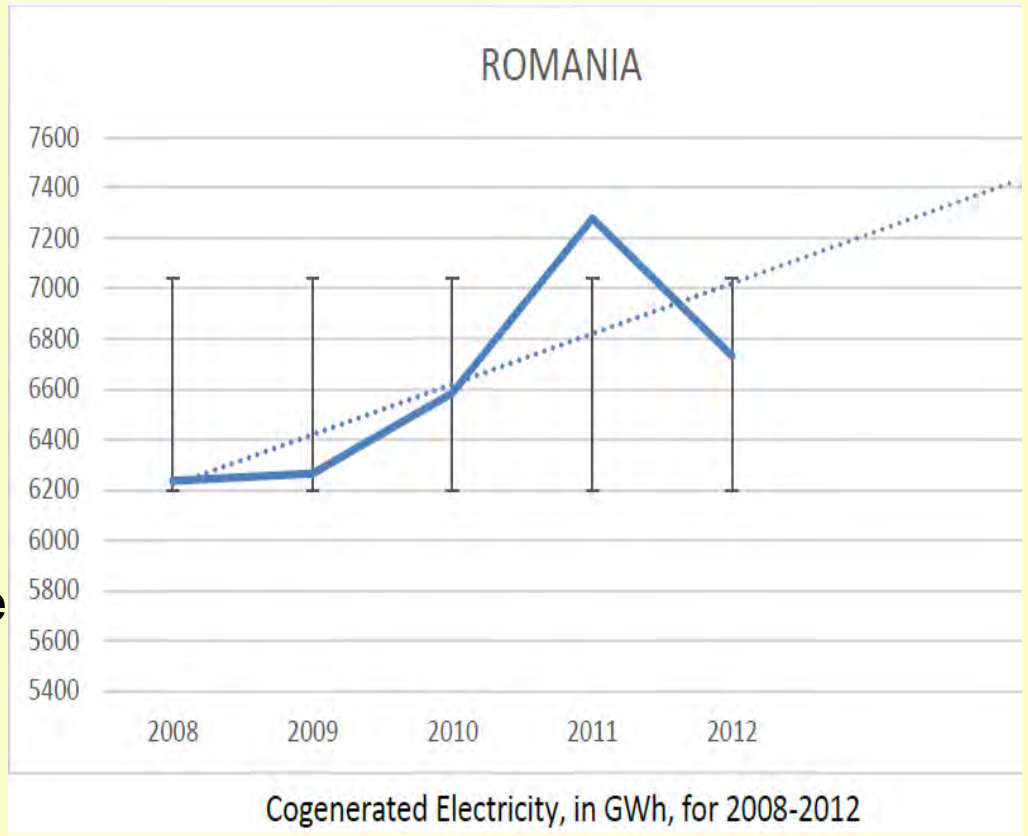


- A key factor for the promotion of CHP, in Greece, is the existing energy prices, i.e. rather high gas price – one of the highest in EU, which along with the current economic crisis makes any CHP investment more difficult.
- The recent revision of the feed-in-tariffs to lower ones for cogenerated electricity injected to the Network affects seriously the viability of the existing CHP units.
- According to studies, performed before the recession, there was a sound economic potential in different sectors of the economy for cogeneration, i.e. industry/DHS, tertiary sector and in m-CHP.
- The EED roadmap* path would deliver 11.1 TWh/annum of primary energy saving (PES) and 7 million tonnes of CO2 reductions under the EED methodology.

*Data from CODE2 Project : www.code2-project.eu

The Cogeneration in Romania

Cogeneration has a long-tradition in Romania. Due to structural changes in the economy following the 1989 Revolution and more recent economic problems, CHP share on the total electricity production sharply declined between 2005-2008, but has made a slight comeback since indicating the start of an upturn.



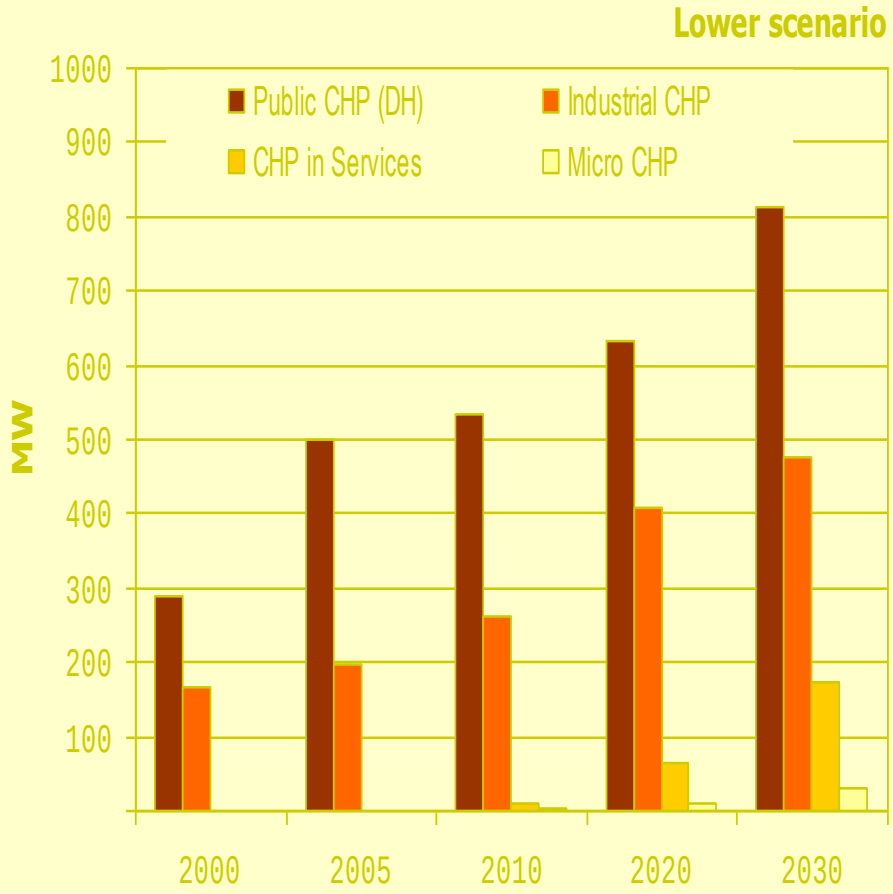
Cogenerated Electricity, in GWh, for 2008-2012

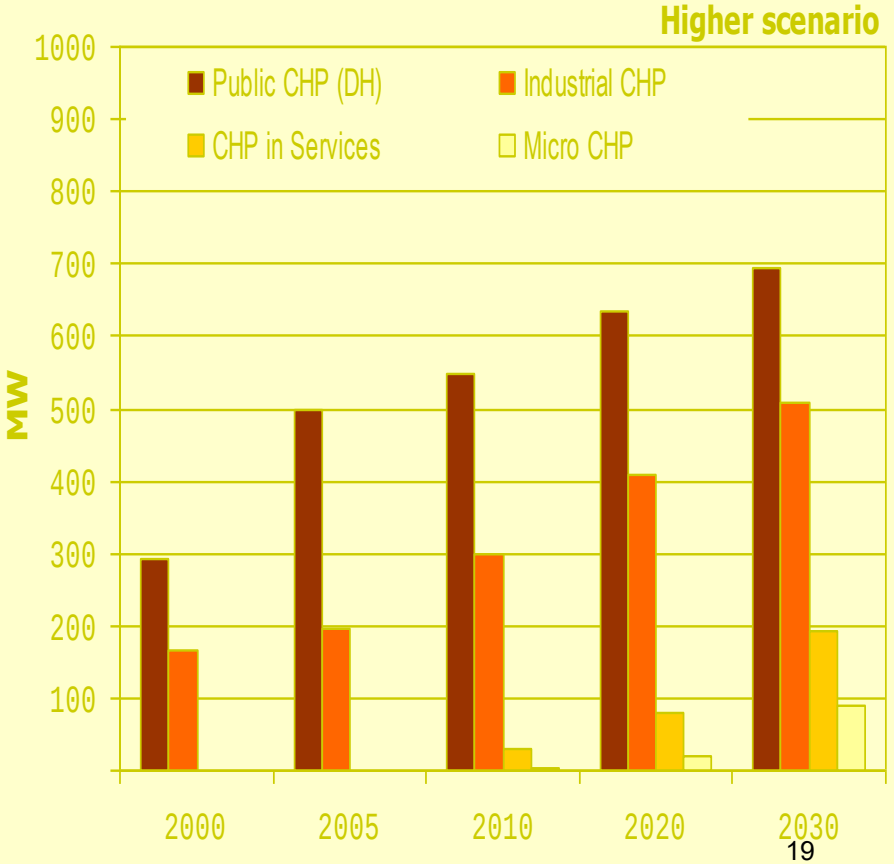
The Cogeneration in Romania

- The further development and modernization of the CHP sector is considered as a key measure to improve energy efficiency in Romania.
- Public support for CHP in Romania has been generally favorable, as the Government launched in 2011 a bonus scheme (feed-in-premium) offering operational support for electricity produced in high efficiency CHP.
- Aged district heating and electricity networks, bureaucracy and the limited scope of support schemes constitute the main barriers for the further development of the CHP sector in Romania, resulting low investor confidence and limited deployment of new CHP installations.
- Under the Energy Efficiency Directive (EED) methodology* CHP would deliver 9.3 TWh/annum in primary energy saving (PES).

* Data from CODE2 Project : www.code2-project.eu

Expected Trends in CHP in Croatia

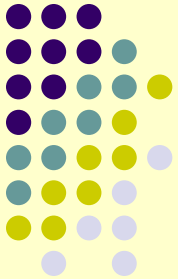




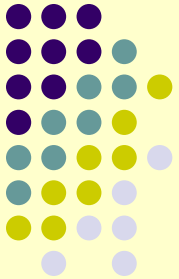
Proposals

- In the 21st century, Cooperation in Energy between SE European countries should become more tight.
- Distribution networks, N.G. and oil pipelines -planned and/or under construction - show the way.
- Promotion of Decentralised systems, DH&C Systems, Trigeneration systems in the Region should be further developed.
- Cogeneration of Heat/Cool and Power is a field where cooperation and common actions should take place, benefiting the Environment, the Economy of the Region and improving the living standards of the inhabitants with continuous energy supply, better quality, primary energy sources conservation.

Steps for promoting Cogeneration in SE Europe



- Procedures of grid connection, technical, engineering and construction in general
- Procedures and tariffs for top-up and, in particular, back-up power supplies to the CHP
- Defined purchasing price for surplus of cogenerated electricity
- Recognize potential contribution to emissions reductions
- Better tariffs for cogenerated power delivered to grid
- Set national target of CHP production by each M-S
- Capacity building for CHP consulting and designers
- Informing and educating potential users
- Fiscal and other initial measures (financial incentives, the role of ESCOs, etc)



THANK YOU FOR YOUR ATTENTION

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