

CODE2

**Cogeneration Observatory
and Dissemination Europe**



Cogeneration roadmap for POLAND

Summary

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1. Where are we now?

1. CHP statistics

The installed capacity of high-efficiency cogeneration in 2012 was 8,7 GW with 27 TWh of high efficient electricity generation and linked 70 TWh heat production 70 TWh in 2010. The cogeneration share in gross electricity production is more than 17% (above EU28 average level).

2. Energy and Climate Strategy of Poland

The key goals of the energy and climate policies are to improve the energy efficiency, increase utilisation of renewable energy sources and decrease the emissions of CO₂, SO₂, NO_x and dust in the next years.

Cogeneration is one of the key technology which can contribute 295 PJ of the primary energy savings and 32 Mt CO₂ savings to the stated energy efficiency and CO₂ reduction targets of Poland till 2020 according to the government own assessment.

3. Awareness

General public awareness about cogeneration in Poland is rather good, having in mind the prevailing large scale cogeneration units currently active in district heating. District heating is the most common form of the heat supply to households and services in Poland¹. The attitude toward cogeneration is positive on the several levels of discussions (parliament, government, press, etc.) and the awareness on the advantages and benefits is growing. Awareness on the benefits of small scale (less than 1 MWe) and micro-CHP is still very low due to the premature market, unfavourable economic conditions and good natural gas penetration only in the south and west part of Poland. Several successful renewable cogeneration projects on biogas and biomass are raising awareness of the RES cogeneration¹.

2. Barriers to CHP

Although several improvements have happened in recent years, lack of real action "*Lots of plans, little concrete action*"¹ is a recent general assessment of the situation in the energy sector in Poland and cogeneration as well with only limited growth in recent years. Poland is still facing several barriers preventing faster development of cogeneration investments as presented in the **Figure 1**.

¹ Polska energetyka 2013, eGospodarka.pl

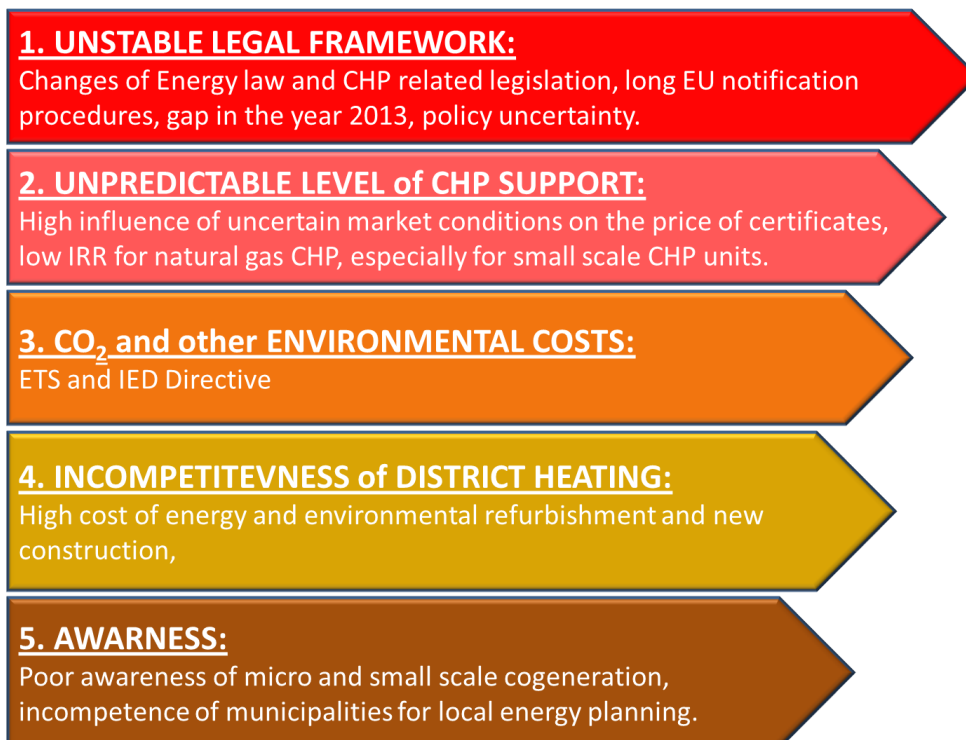


Figure 1 - Main actual barriers preventing faster CHP development in Poland

3. What is possible? Cogeneration and market opportunities

The installed capacity of the high-efficiency cogeneration in Poland could be increased by more than 50% i.e. for 4.000 MWe (total installed CHP capacity more than 12 000 MWe) by 2030. The heat generation from cogeneration plants would be increased for almost 200 PJ and the electricity production would be more than double compared to the production in the year 2006 and would supply 48 TWh or 22% of the gross electricity demand.

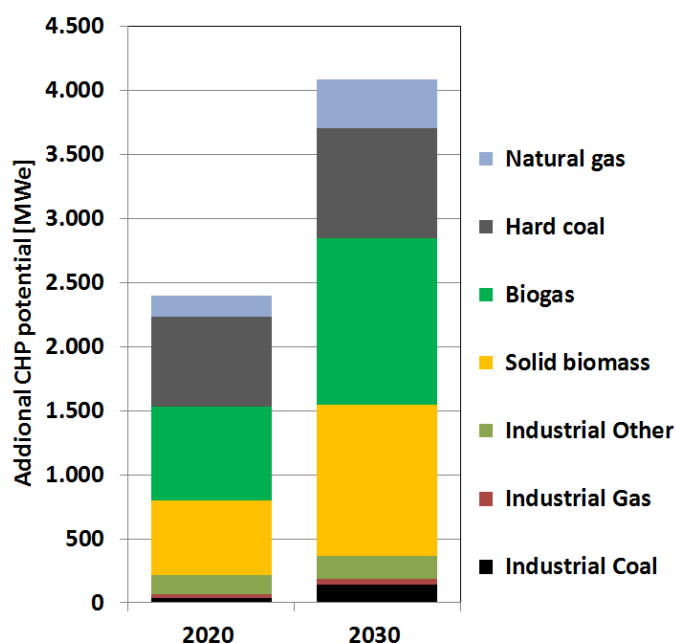


Figure 2 - Additional economic CHP potential till 2030²

² Policy of Poland until 2030, Ministry of Economy, Energy Warsaw 2009.

4. How do we arrive there? The Roadmap

Following the publication of the **Energy Policy of Poland until 2030** and the recent Poland energy policy orientation, the energy efficiency and renewable energy sources (RES) are key priorities to achieve EU goals for the year 2020 and 2030 where cogeneration is one of the key technologies for the implementation.

The following **Strategy for development of cogeneration till the year 2030** with the next three key quantitative goals for cogeneration would result in a clear growth scenario for cogeneration in Poland.

1. **Electricity generation in the high efficiency cogeneration should double till the year 2030 compared to 2006 to 48 TWh;**
2. **High efficiency cogeneration on the RES should reach at least 20% of the total cogeneration capacity installed in the year 2030.**
3. **Enforcing the sustainable local energy planning to enable sustainable solutions for heat supply with a special emphasis on the further development of the district heating and cooling (DHC) with cogeneration, use of RES and waste heat utilisation.**

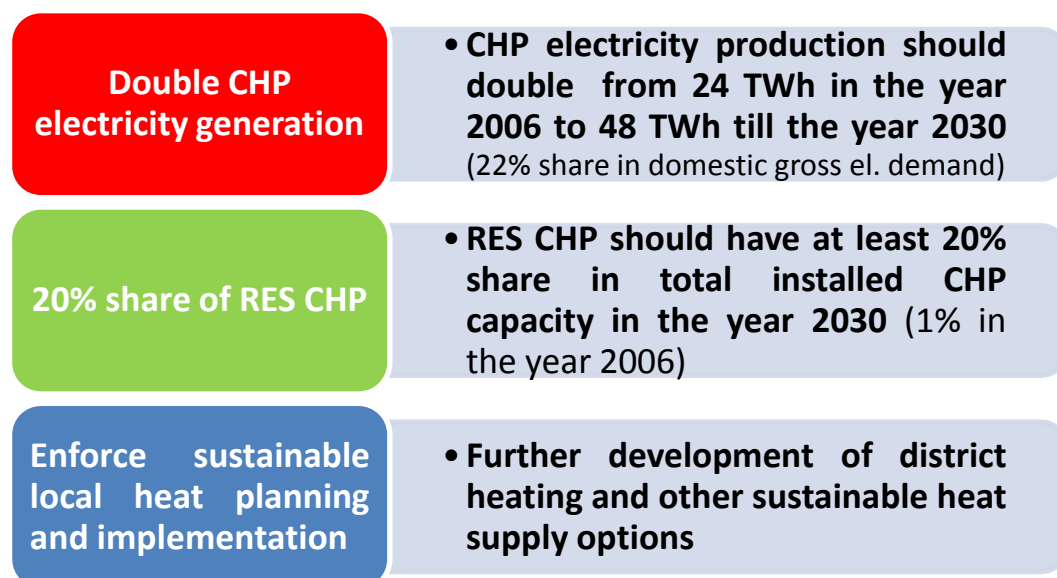


Figure 3 - Key goals of the Strategy for development of cogeneration till the year 2030

The main requirement to achieve these measurable goals of the cogeneration strategy is to establish a **proper supporting framework with the following different specific measures to address the barriers identified and fill policy and market gaps.**

1) Establishing long term stable legal framework for cogeneration

To set the framework for action, a vision and set goals for cogeneration in existing strategic, policy and action documents on the national level, should be better reflected in the related executive legislation and support instruments to enable a meaningful contribution of cogeneration to the EU and national goals.

The Ministry of Economy should **accelerate legislative procedures** for approval of all cogeneration related legislation (Energy law renewal, issuing new Renewable law and all related executive legislation for support and operation of cogeneration) and especially the notification procedure within the DG Competition **to establish a long term stable legal framework for cogeneration**. Establishing better actors' coordination and cooperation in preparation of legal framework for cogeneration would contribute to the final quality and success of the framework.

2) Modify the CHP & RES certificates support scheme as necessary to achieve a stable and effective system.

Overcoming the current gap in cogeneration support with fast approval of all necessary legislative acts is an urgent task of the Ministry of Economy. The final goal is **to establish midterm a stable and predictive support environment** (at least till the year 2020, orientated toward 2030) for implementation of a cogeneration growth strategy following the set goals. Special focus on the instruments for assuring sufficient economic incentive for investors should be on:

- setting different levels of the support for the existing and new installed CHP plants,
- transparent and active regulation of the support scheme which should, if possible, include some elements for mitigation of excessive energy market volatility (especially the current extremely low electricity prices), fluctuation of the fuel prices, inclusion of all environmental costs (ETS, IED), etc.,
- setting a predictable behaviour of the support scheme of a time period of the support to enable investors to calculate a reliable return on investment³,
- keep the support for wood biomass co firing for the cogeneration plants.

3) Providing measures to assure competitiveness of district heating networks to encourage development of additional cogeneration in DH in Poland

Considering existing huge cogeneration heat supply in the district heating network and the large assessed economic potential, Ministry of Economy should devote a special concern to the further development and competitiveness of the district heating systems. New instruments are proposed to support the energy efficiency and environmental retrofit in DH and assure the competitiveness of DH compared to the other individual heating alternatives:

- Subsidies (EU funds) and the soft loans for energy and environmental retrofit and extension of the district heating system with cogeneration and use of the RES,
- Active programmes and the financial support of the new connections to the district heating network,
- Simplification of the administrative procedures (simple standardised procedures), obligatory connections for the new buildings in the DH area (effective legislation provision),

³ Maximum 10 years supporting period prescribed by State Aid guidelines is usually too short for return of investment for larger CHP units.

- Improvement of the heat price regulation – better reflection of the market conditions and the cogeneration specifics (implementation of the benchmarking method for the determination of heat prices).

4) *Enforcing the local energy planning is ground for sustainable heat supply*

Improving the current legal framework for the provinces on their obligation to develop the “objectives for the heat, electrical energy and gaseous fuel supply plan” within the process of implementation of the Energy Efficiency Directive (EED), is an important task of the Ministry of Economy. This will enable a quality energy planning and the selection of sustainable heat supply alternatives. The Ministry of Economy should consider the following actions:

- Setting clear deadlines for the preparation of “objectives” and legal sanctions for provinces if they do not comply with the Energy law.
- Setting the clear sustainable heating mode priorities with proper legislative provisions for the implementation at the municipal level and with special focus on the district heating and cooling and the use of RES.
- Providing a financial and expert support, training for the municipal staff and the development of a standardized planning tool for the local heating and cooling.

5) *Support for development of the new financing & business models is key for the project implementation facing lack of private capital in the economic crisis*

The Ministry of Finance in cooperation with the Ministry of Economy should establish the necessary conditions which will enable the further development of the new financing models for the implementation of the energy efficiency projects by the ESCOs and other private investors:

- Improving legislation on the energy contracting, public private partnership and ESCO project implementation (clear legal basis for the constitution of the ESCo contracts, exclusion of the ESCo contracts from the municipal depth, ownership issues, etc.)
- Preparing a clear legislation interpretation and guidelines for the public sector on the ESCO project implementation
- Inclusion of the ESCO concept in the subsidies programme for more efficient allocation of the public funds⁴
- Training and promotion activities for the potential customers, banks, and implementation of the pilot projects⁵.

⁴ Subsidies programmes eliminate the possibility of ESCO co-financing. High subsidy rates discourage local government units from using other forms of financing (ESCO market in Poland - current state and development perspectives, IEE, March 2012).

⁵ Public private partnership has been unpopular among local government units, institutional capacity needs to be increased and trained (contracting, risk identification and allocation, etc.) to enable further development of this efficient implementation model.

6) *Raise of awareness and promotion of cogeneration is necessary for development of small scale and micro cogeneration*

Several responsible ministries should coordinate and steer a wide promotion campaign on the advantages of cogeneration technology for Poland at all levels including:

- Assessment of the economic benefits of faster development of the small and micro scale cogeneration in the area not covered by the district heating network:
 - establishing the domestic CHP manufacturing - creating new jobs),
 - support to the electrical grid (improving the quality of electricity supply).
- Promotion activities, good practice exchange
- Incorporation of cogeneration in education and research programmes

5. Roadmap impact assessment

Following the developing trend in the recent years approximately 30% of assted cogeneration economical potential could be economically exploited by further use of the already established support mechanisms till the year 2030 as “**business as usual**” but the potentials will be far away from being completely fulfilled using this approach.

With the proposed **Road map Cogeneration strategy** implementation we can significantly improve the environment for cogeneration development and facilitate a faster and more balanced growth of cogeneration utilisation in several applicable areas: district heating, industry, services and agriculture⁶. We have used the following standard energy and environmental indicators for the Roadmap impact assessment:

- **Electricity generation from cogeneration:** cogeneration could be almost doubled till the year **2030 to 48 TWh** from the existing 24,4 TWh in the year 2006 (27 TWh in 2012). The largest generation growth could be implemented in the new CHP plants using biogas and solid biomass.
- **Share of cogeneration electricity in gross electricity demand:** in the year 2030 cogeneration could contribute at least **22% of the final electricity demand** compared to the current 16% (an expected growth of the gross electricity demand in the period 2010 – 2030 is more than 50%)
- **Heat generation from cogeneration:** 252 PJ of current cogeneration heat generation could be increased to more than **440 PJ in the year 2030**.
- **Share of cogeneration heat in the final heat demand:** more than 40% of the expected heat demand in the year 2030 could be supplied by cogeneration compared to current 25% share.

⁶ We are still facing lack of proper assessment of small scale and micro CHP potential in households, which is not included in this assessment.

- **Primary energy savings (PES): 47 TWh⁷ or 4,1%** of the current primary energy supply could be reached by the cogeneration. Additional cogeneration units could contribute around **20% i.e. 3 Mtoe** of the Poland indicative primary energy saving target 13,6 Mtoe in 2020.
- **CO₂ savings:** potential cogeneration CO₂ savings in the year 2030 could reach up to **30 million tCO₂**.⁸

Graphical presentation of the used electricity indicators for the Business as usual and the Roadmap scenario is shown in the **Figure 4**. Removal of barriers and activities foreseen in the Roadmap scenario would especially speed up the modernisation of large cogeneration and replacement of the heat only boilers in the existing smaller district heating systems and enable faster utilisation of the RES in cogeneration. The Roadmap scenario would have several benefits also for the faster renovation and development of the cogeneration in industry and SMEs, resulting in the increased competitiveness and the new jobs creation.

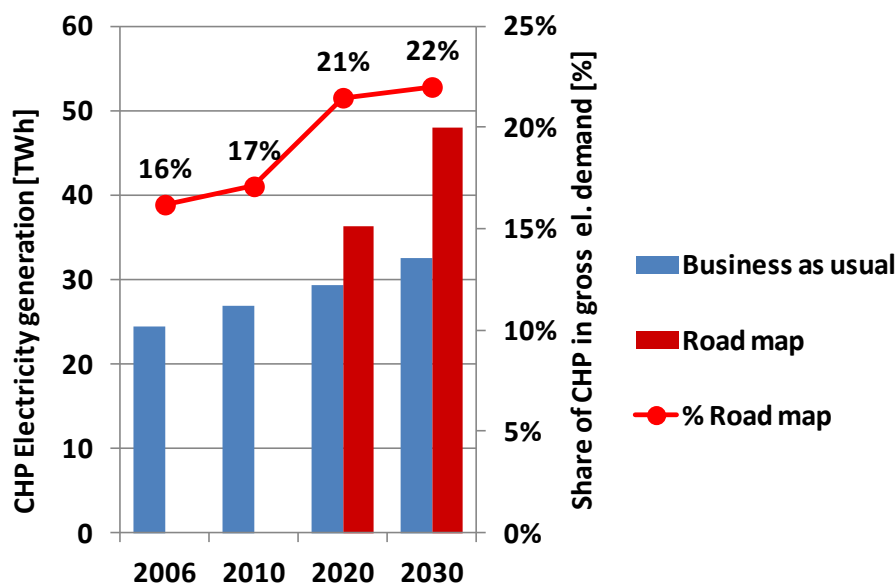


Figure 4 - CHP Electricity indicators for the Roadmap and both scenarios

The advantages of the proposed CHP Roadmap strategy are evident, as the cogeneration could contribute more than 1/5 of the future electricity and more than 2/5 of the heat demand in Poland, doubling the today's electricity generation and significantly contributing 4 Mtoe of the primary energy savings and at least 30 Mt of the CO₂ reduction till 2030. Further development of cogeneration would have several broader economic benefits by reinforcing of the domestic cogeneration manufacturing and support services and creation of new jobs.

For more detailed information about the CHP Roadmap for Poland please refer to the complete document available at www.code2-project.eu.

⁷ Calculated by substitution method – new developed method for assessment of actual achieved savings, which is higher than 39 TWh assessed by the EED methodology.

⁸ General estimate assuming achieved PES and CO₂ emission factor for coal (coal has the largest share in CHP fuel consumption, beside use of RES).