Electricity Market Reform: COGEN Europe's key recommendations

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COGEN Europe supports a comprehensive and ambitious Electricity Market Reform (EMR), as part of resilient and efficient integrated energy systems, with the aim to achieve the lowest cost decarbonisation for highest level of security of supply and consumer protection.

Electricity market design is a key component of Europe's decarbonisation pathway, as electricity is becoming increasingly important in the context of the broader energy system. Growing shares of renewable electricity production presents opportunities to rapidly decarbonise the overall energy system, by displacing polluting and inefficient conventional generation. Along these positive developments, increasing electrification and the uptake of intermittent renewable power will increase demand for security of supply and flexibility resources.

Energy systems integration is emerging as a new approach in energy system planning and operation foster synergies between electricity, heat and gas systems, with the aim to accelerate decarbonization, increase energy resiliency and protect consumers from price shocks. Consumer electricity prices are the product of a complex set of factors involving costs related to energy markets, system adequacy, flexibility, grids. Achieving affordable energy prices for consumers will therefore require higher energy efficiency and an integrated approach to energy systems, to deliver the lowest cost solutions at all stages of electricity production, transmission, distribution, and end-use.

To address these challenges the Electricity Market Reform must follow the key principles below:

1. Put Energy Efficiency First

Energy efficiency is not sufficiently emphasized in the EMR, despite the fact that the power sector wastes more than 200 Mtoe of energy in conversion, transmission and distribution (Eurostat, 2023). This energy wasted as heat dispersed into the atmosphere accounts for more than the entire heating and cooling demand of buildings.

- ✓ *In line with EE1st, the EMR must prioritise high efficiency cogeneration for the efficient supply of dispatchable power, to displace less efficient peaking gas power plants and complement PV/wind generation.*
- ✓ *Support distributed power generation, including on-site industrial cogeneration, to reduce strain on power grids, including shifting or reducing peak demand, reducing grid losses and the need to reinforce power grids.*

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2. Support all flexibility solutions across integrated energy systems

Given the higher uptake of intermittent renewable electricity and increased electrification rates, the power system will need to become more flexible to ensure that supply and demand for electricity are always in balance. Demand response and batteries can contribute to a certain extent to address short-term flexibility needs. In addition, distributed efficient generation coming from non-weather dependent renewables and cogeneration will be critical to cover the remaining demand cost-effectively, especially in view of tackling seasonal variations.

- ✓ *The EMR must promote a range of clean flexibility services to ensure the lowest cost balancing of supply and demand.*
- ✓ *Flexibility services must be assessed and promoted across integrated energy systems, considering multiple energy carriers, including heat and gas sectors.*
- ✓ *In addition to demand-response and storage solutions, the national flexibility assessments and indicative objective should include clean flexible generation such as dispatchable renewable power and energy from high efficiency cogeneration.*

3. Ensure security of supply, through long term signals for dispatchable generation capacity

Across European regions, power adequacy concerns may persist despite the massive scale up of PV and wind generation capacity and the uptake of flexibility options. This is likely in areas with high electrification rates, large seasonal variation in heat/electricity demand and insufficient grid capacity to transport intermittent electricity produced further away from consumption points. To address expected adequacy concerns and ensure security of supply at lowest cost for consumers, long-term investments signals are needed to ensure sufficient dispatchable capacity is installed.

- ✓ *Enable Member States to introduce capacity mechanisms as more permanent electricity market design tools.*
- ✓ *Prioritise cogeneration for capacity mechanisms to ensure the highest efficiency balancing capacity, as the fuel mix decarbonises.*

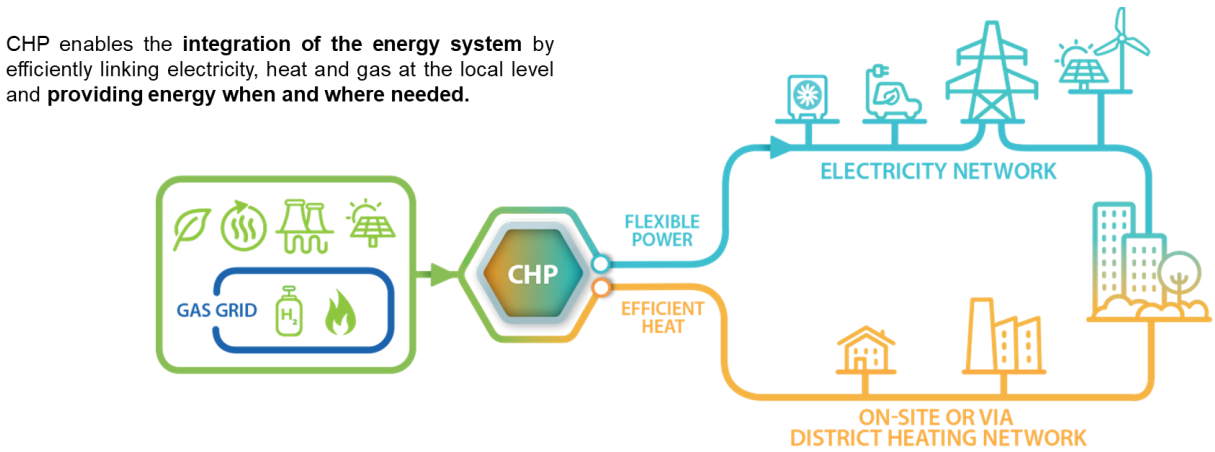
4. Empower consumers to produce their own efficient distributed power (and/or heat), enabling them to share it and provide system services

From a consumer perspective, the affordable and continuous supply of clean energy is of utmost importance. Energy consumers are increasingly opting for self-generation solutions to become more energy independent and protect themselves against excessive and volatile energy prices.

- ✓ *EMR should recognise efficient and renewable dispatchable generation produced behind the meter to ensure peak shaving and flexibility services, as long as it meets clean energy standards in line with EU legislation (EU Taxonomy, Energy Efficiency Directive, Renewable Energy Directive)*

Cogeneration: An enabling solution for a resilient, efficient and cost-effective net-zero power sector

With the right market design, cogeneration can adopt a virtuous behavior for the power grids, generating flexible power at times of peak demand and insufficient PV and wind. Its contribution will be critical both during the energy transition and as part of a net-zero emissions energy system in 2050.



Distributed cogeneration can displace less efficient large scale gas peaking plants, required in the energy mix to ensure back-up power for PV and wind intermittency. Smaller distributed CHPs can ramp up and down more efficiently and quicker than a large peaking plant (e.g. 10 modular CHPs of 10 MW vs. a 100 MW CCGT). Distributed cogeneration can more easily and faster decarbonise by incorporating larger proportions of renewable fuels like biogas, biomethane and hydrogen. The added benefit is that cogeneration recovers the heat that would otherwise be wasted in conventional power production. This heat can be used directly in district heating or industry, as well as thermally stored for later use (at much lower cost compared to power storage).

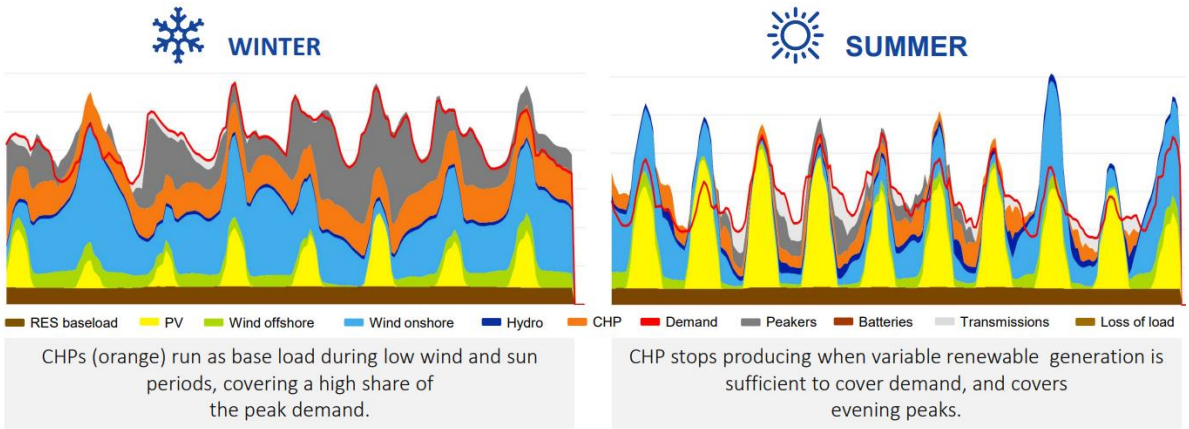


Figure 1: Net-zero emissions scenario for Germany in 2050 - Optimal contribution of PV, Wind & CHP (Source, Artelys, 2020)

About cogeneration

- Cogeneration is an energy efficiency principle, defined as the simultaneous production of power and heat. It improves the efficiency of thermal power production by recovering the heat that would otherwise be wasted in conventional power plants. This recovered waste heat can be used to meet demand in district heating, industrial processes or in buildings.
- Today cogeneration saves more than 30 bcm of energy, including 15 bcm of direct natural gas reductions.
- Cogeneration plants are installed across district heating, key industries and individual buildings across Europe. More than 120 GWe of electrical capacity installed delivers more than 12% of EU's electricity demand.
- Approximately half of cogeneration plants are installed "behind the meter", efficiently producing heat and electricity for the chemical, paper, steel, alumina and other key European industries.
- District heating across Europe rely more than 50% on cogenerated heat, while the electricity produced is supplied to local grids.
- Innovative cogeneration systems are being deployed to flexibly integrate increasing shares of renewable sources, different types of storage and complement heat pumps, PV as well as wind generation.

Cogeneration ready for the future

Hassfurt, Germany

- Hassfurt generates 200% of electricity demand from RES + **H2 from excess PV/wind**
- **2 CHPs** run **flexibly** on **up to 100% H2 & on biogas,** at times of insufficient PV/wind

Szlachęcin, Poland

- **Waste heat, CHP, heat pumps & district heating**
- **CHP uses waste heat** recovered from sewage treatment plant
- **Heat pump powered by CHP electricity**

Bresia, Italy

- Steelmaker ORI Martin **recovers exhaust gases** to reduce pollution
- **On-site CHP uses waste heat** to generate heat & electricity for the city
- CHP **heat** supplied via DHC to **2000 homes**
- CHP **power** supplied to **700 homes**

PACE Project, EU

- **Flagship EU project**
- Over 2500 micro-CHP installed in 10 EU countries
- **>24m kWh of self-produced electricity**, mitigating peak demand & complementing PV/wind

Sources: Hassfurt, Szlachęcin, Brescia, PACE Project

About COGEN Europe

COGEN Europe, the European Association for the Promotion of Cogeneration, is the cross-sectoral voice of the cogeneration industry. We have over 60 members: 13 national associations and 50 organisations spanning the entire value chain from technology manufacturers and users to consultancies. The cogeneration sector is committed to the creation of a resilient, decentralised and carbon neutral European energy system by 2050 with cogeneration as its backbone, empowering European citizens and industry to generate their own efficient, reliable and affordable clean heat and power locally.
EU Transparency Register Identification Number: 38305846546-70, https://www.cogeneurope.eu/

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