COGEN EUROPE

EU Energy & Climate Policy Landscape & Cogeneration

COGEN EUROPE

COGEN Hungary Annual Conference

11 March 2026

Our Vision

The cogeneration sector is committed to creating a resilient, decentralised, 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
- bringing together heat, electricity and gas networks, allowing the efficient integration of substantial amounts of renewable energy and providing energy when and where needed
- enabling an integrated energy system and a cost-effective transition towards a sustainable future

Our Mission

Cross-sectoral voice of the cogeneration industry.

Work with EU Institutions and stakeholders to shape better policies by:

Building a robust evidence-base demonstrating the benefits of cogeneration.

Using the expertise of our membership.

Establishing strong coalitions and partnerships.

Members - I

National Associations

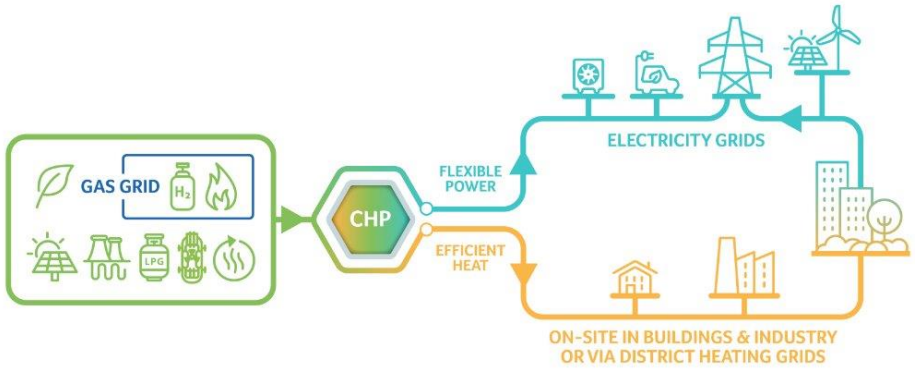
Members - II

Corporate Members

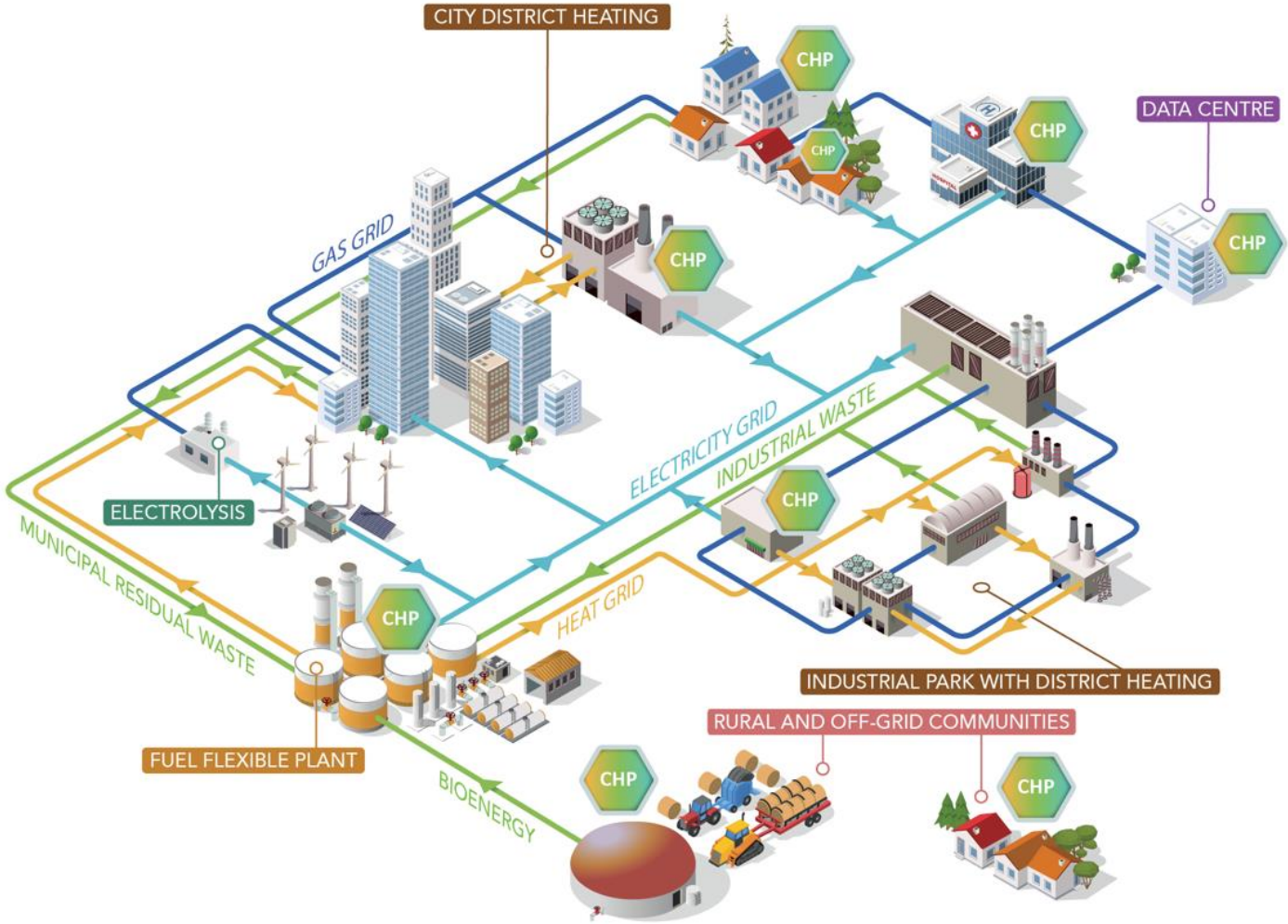
Why Cogeneration?

Cogeneration transforms 90% of the energy into useful heat and electricity for homes, factories, buildings and farms.

Backbone of Local and Integrated Energy

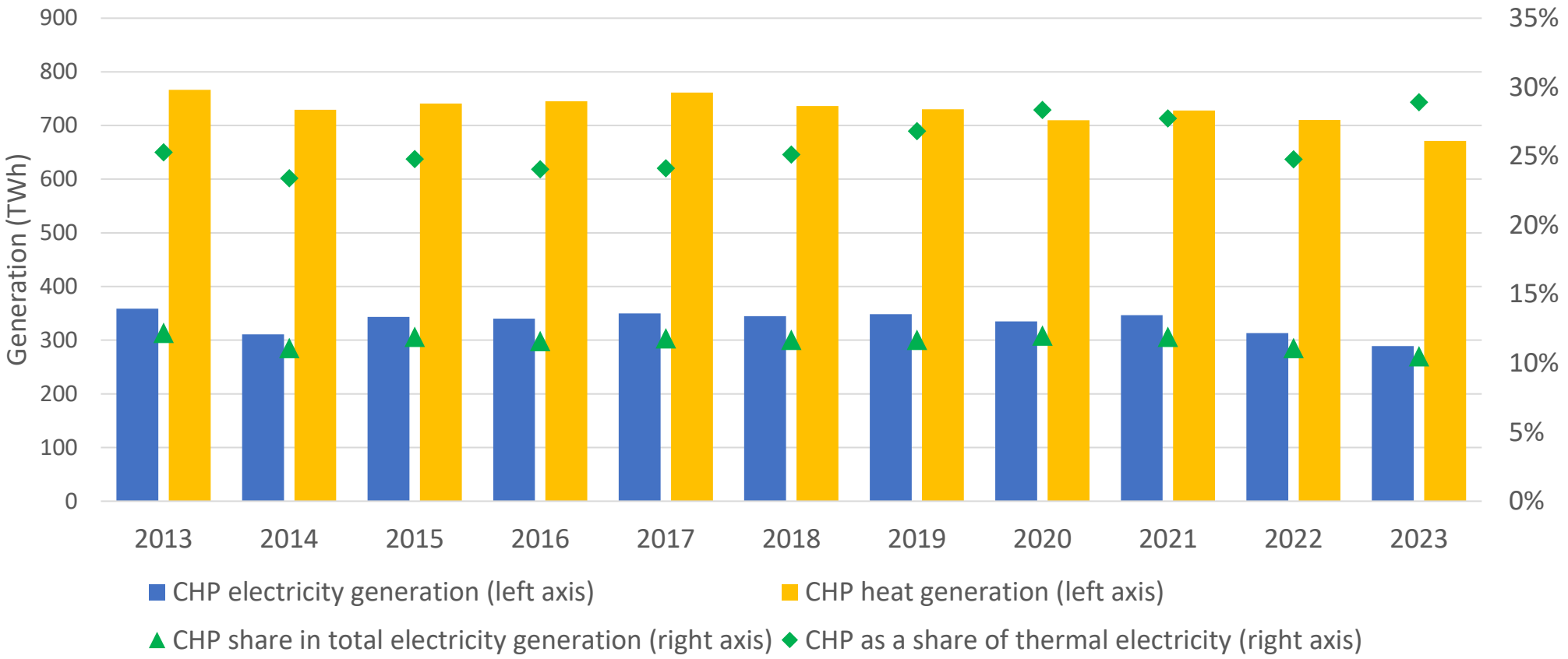


CHP enables the **integration of the energy system** by efficiently linking electricity, heat and gas at the local level and **providing energy when and where needed.**



Overview of CHP in Europe

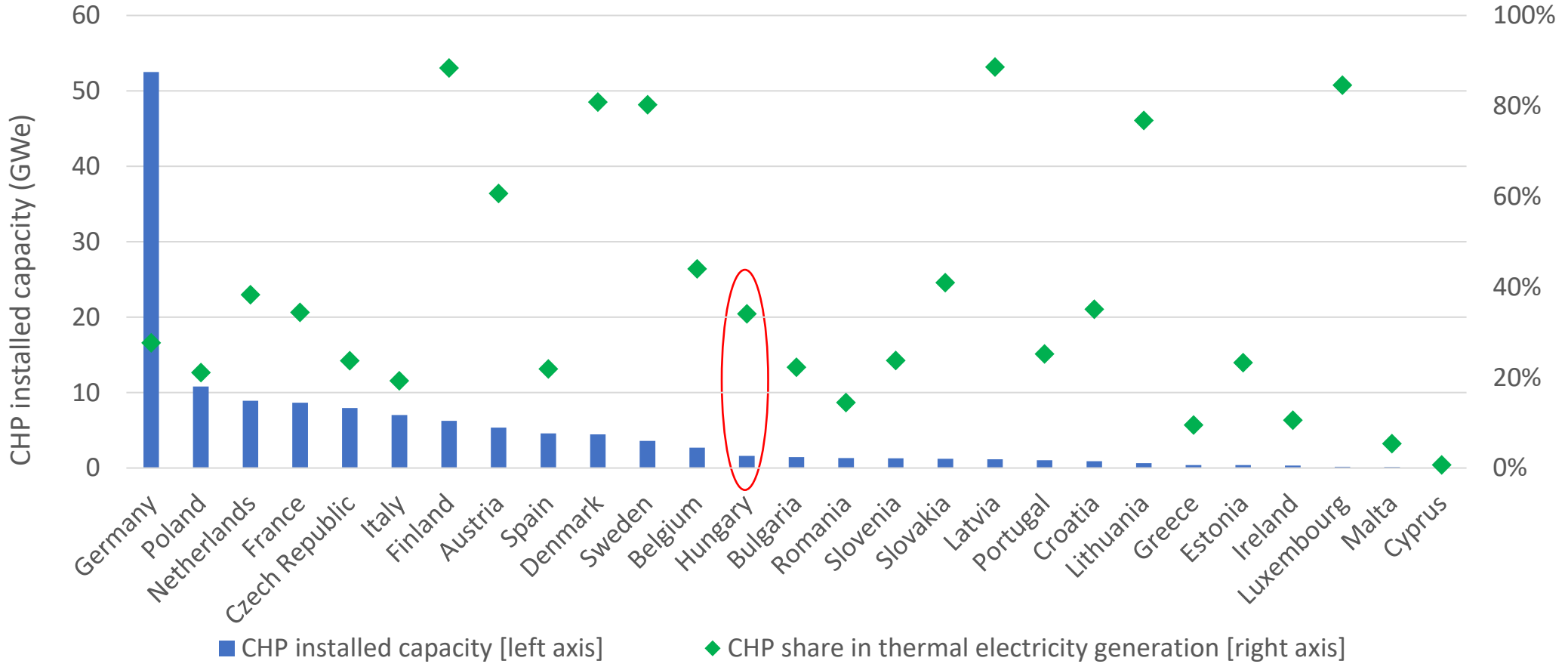
Overview of CHP in EU27



- ✓ CHP generates 10.5% of total electricity (decreasing) and 28.2% of thermal power production (increasing).
- ✓ CHP across the EU reduces up to 150 Mt of CO_2 (eq. to the emissions of ~90 million petrol cars).
- ✓ More than 24 Mtoe of primary energy saving (eq. to Austria's final energy consumption).

Source: Eurostat (2025)

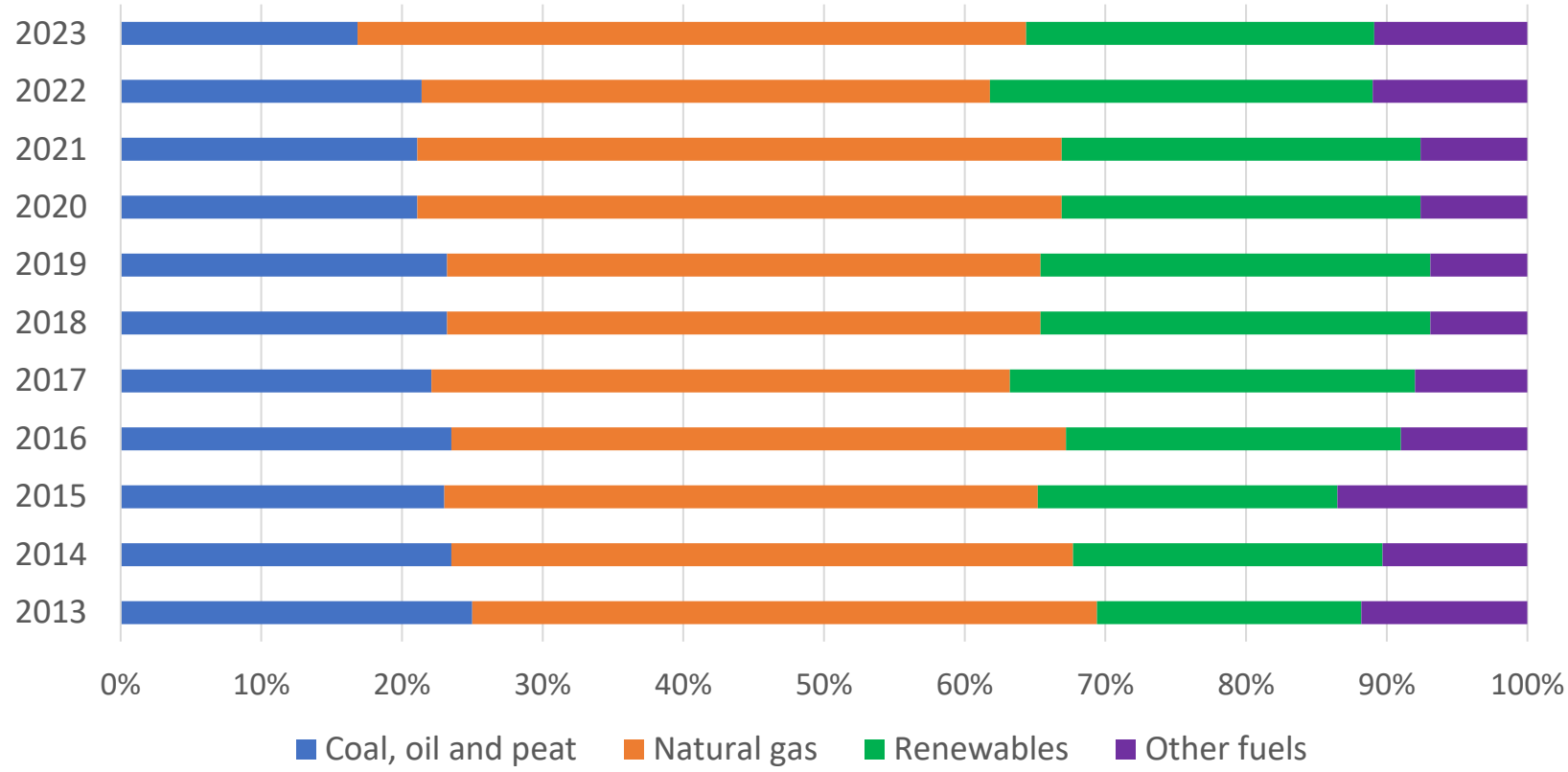
CHP by Country in 2023



- ✓ 134 GWe installed in EU-27 across DHC, industry and buildings, with 75% of capacity installed in 7 EU countries.
- ✓ CHP "champions" cover more than 50% of thermal generation via CHP, have long experience with DHC; and.
- ✓ Remaining untapped potential for CHP in countries where CHP accounts for less than 30% of thermally produced electricity.

Source: Eurostat (2025)

CHP Fuel Mix in the EU



- ✓ Stable share of natural gas use in CHP.
- ✓ Increase of RES, reaching 25% in 2023 (from 18% in 2013). High variation in RES CHP uptake across EU countries, ranging from 1% to 92%. High shares in Denmark, Sweden, Latvia, Portugal, Estonia & Luxembourg.
- ✓ Most of RES in H&C is delivered via CHP, especially in DHC.
- ✓ Steady decline in solid fossil fuels and oil use in CHP.

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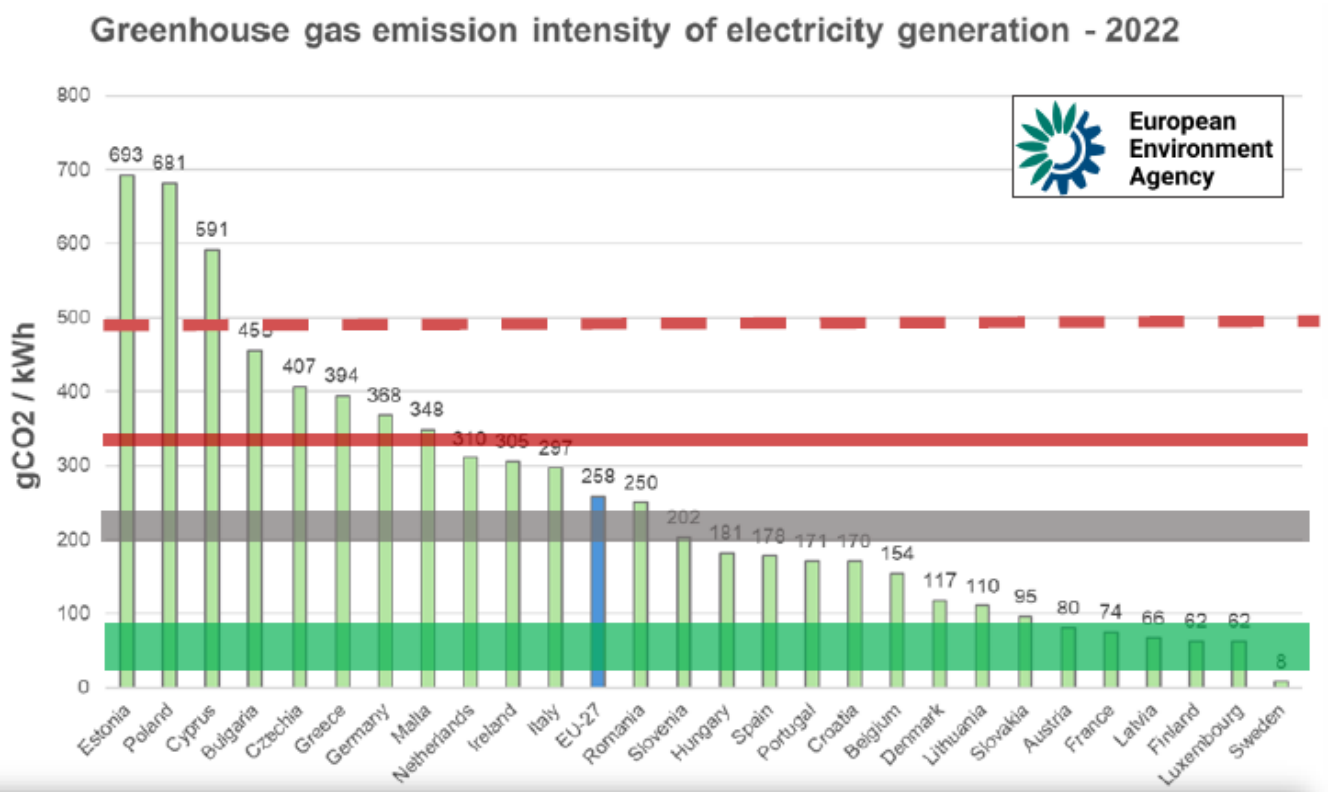
Source: Eurostat (2025)

CHP Generation Lowers Emissions vs. EU's Power Grids



Average power-only gas plant → 498g CO_2/kWh elec.

New power-only gas plant → 340g CO_2 /kWh elec.

CHP gas plant → <270g CO_2 /kWh elec. & heat

CHP with Low-C, RES gases, H_2 → 10-90 g CO_2 /kWh elec. & heat

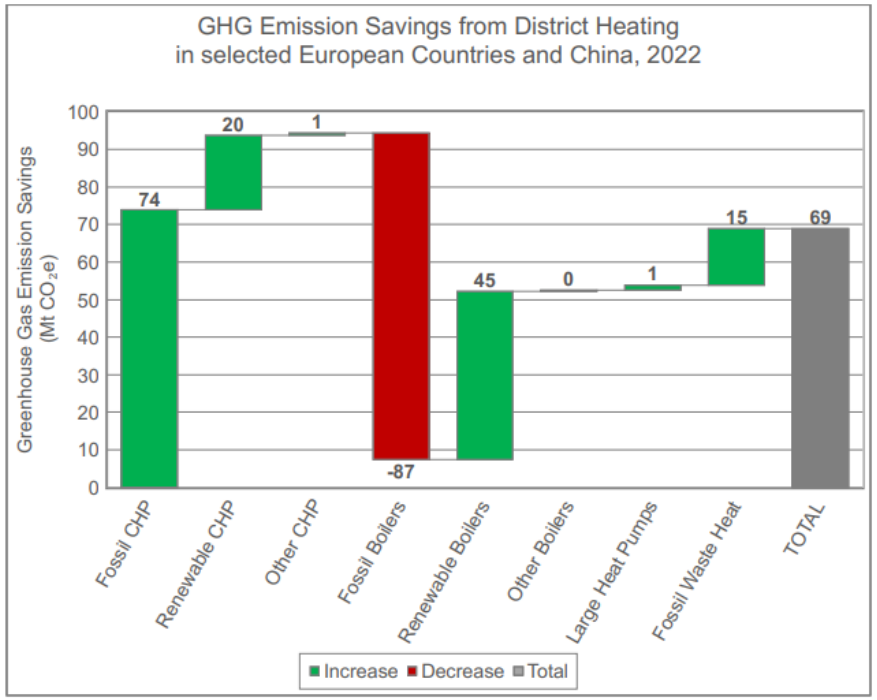
Source: EEA (2022)

CHP Critical for Decarbonisation/Efficiency via DHC

INTERNATIONAL ENERGY AGENCY TECHNOLOGY COLLABORATION PROGRAMME ON
DISTRICT HEATING AND COOLING

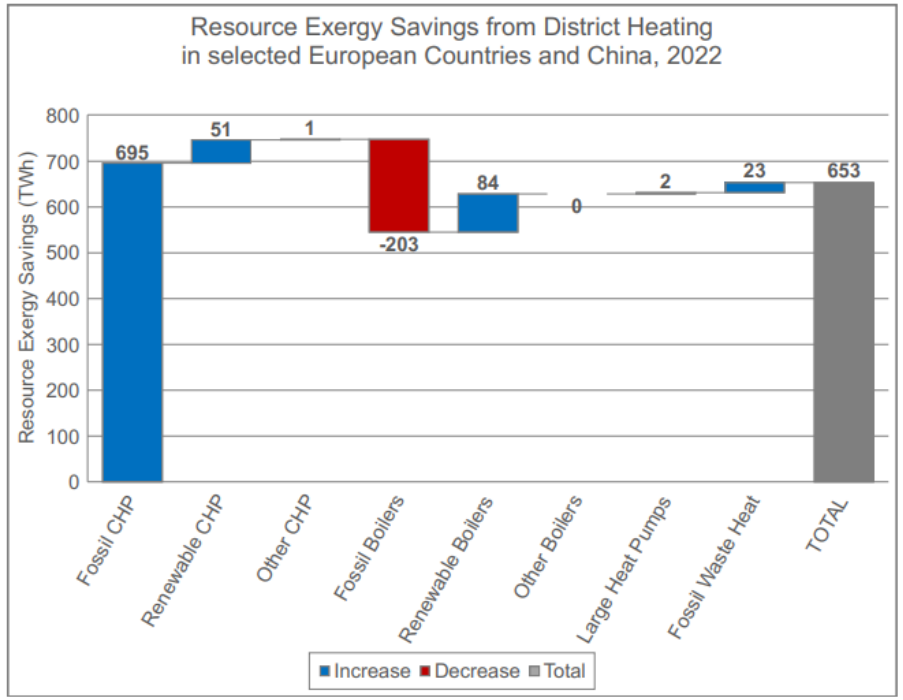
District Heating: The Proven Path to Fast, Efficient Decarbonization

District heating already delivers large-scale, proven emissions cuts and efficiency gains.



Resource Exergy — A Next-Level Metric Enabling True Efficiency

It captures both quantity and quality — the real useful work energy can deliver.



- ✓ IEA/DHC Collaborative Analysis: District heating already delivers large-scale, proven emissions cuts and efficiency gains.
- ✓ CHP was the backbone in 2022: cogeneration maximised fuel efficiency compared with separate generation.

Source: IEA/DHC, 2025 **District Heating: The Proven Path to Fast, Efficient Decarbonization.**

Policy Update

EU Institutions Milestones

Timeline	H1/2026	H2/2026
Council	**Cypriot Presidency** Envi Councils (5-6 Feb, 17 March, 25 June) Energy Councils (16 March, 12-13 May, 26 June) Informal Working Party on Nuclear Issues (16-17 April)	**Irish Presidency**
European Commission	**Ongoing Consultations** Lot1 Energy Labelling | Grids Action Plan **Expected Proposals/Initiatives** Industrial Accelerator Act (4 March) Energy Package (10 March) H&C Strategy | Electrification Action Plan Security of Supply Framework (19 May) EU Scheme for Rating the Sustainability of Data Centres Energy Union Governance Update EU Taxonomy revision	**Expected Proposals/Initiatives** Energy Union Package for the Decade Ahead: CCS, EE Framework, RES Framework | PEF Review Climate Package for the Decade Ahead
European Parliament	**Adopted/To be Adopted** Energy Taxation Directive Report (5/12) **Expected Initiatives** INI on H&C Strategy/Electrification EU Grids Package MFF/Horizon/EU Competitiveness Fund	

Upcoming Policy Initiatives

Heating and Cooling Strategy

Accelerate decarbonisation of heating and cooling by integrating RES and energy efficiency in buildings and industry, addressing demand-supply inefficiencies, and advancing energy system integration.
Public consultation deadline: 20 November. Expected publication: Q2 2026.

Electrification Action Plan

Promote the switch to electrification by addressing key barriers.
Public consultation deadline: 20 November. Expected publication: Q2 2026.

Security of Energy Supply Framework

Revision of Electricity and Gas directives to prepare Europe's energy system for a more decarbonised, electrified, and integrated future.
Expected publication: Q2 2026.

COGEN Europe Study

Role of Future-proof CHP in the Future Energy System

Flexibilisation

CHP adapts to smartly produce electricity to complement PV/wind

Hybridisation

CHP and Power-to-Heat are combined and operated optimally

Multiple operating modes

1. high efficiency CHP
2. flexible CHP
3. power-only plant with some heat recovery
4. provider of ancillary grid services

RES integration

CHP efficiently integrates increasing blends of RES fuels

CHP efficiently integrates increasing blends of RES fuels. CHP+PtH hybrids can integrate even higher RES across electricity, gas, heat

Structure of the Analysis

The study analyses six case studies covering a diverse set of geographies, industries, and CHP technologies.

Analysed Use Cases

	1	2	3	4	5	6
Countries						?
Type / End-user	**Chemical Industry**	**Pulp & Paper Industry**	**District heating** (Toruń)	**District heating** (Craiova)	**Pharmaceutical Industry**	**Data Centre**
CHP Technology	**Simple-cycle gas-turbine**	**Combined-cycle gas-turbine**	**Combined-cycle gas-turbine**	**Gas-engine**	**Gas-engine in tri-generation**	**Gas-engine**

Comparative Analysis of the Use Cases

Set-ups modelled for each use case:

1. CHP set-up

2. Non-CHP set-up

Dimensions of the analysis evaluated for each use case
(by comparing CHP set-up and non-CHP set-up):

- **1. Complementarity** with electrified & renewable technologies
- **2. Energy Efficiency**
- **3. Decarbonisation**
- **4. Competitiveness & Affordability**
- **5. Wider System Impact**

Study commissioned by: COGEN EUROPE

Study executed by: COMPASS LEXECON

Setting the Scene – Cogeneration in the light of EU Climate Targets

Cogeneration could offer solutions for arising (cost-)challenges that may question EU climate targets.

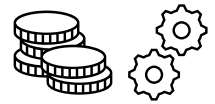
What is the future role of cogeneration in a decarbonising energy system and economy?

Costs borne by end-consumers are typically seen as a significant challenge in decarbonisation.

EU decarbonisation targets include significant emission reductions for the industrial and heat supply sector.

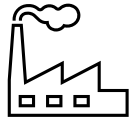
3 Role of CHP

Energy-efficient decarbonisation



Cost-efficient decarbonisation

2 Challenges



Competitiveness

Affordability

1 CO_2 emission reduction targets

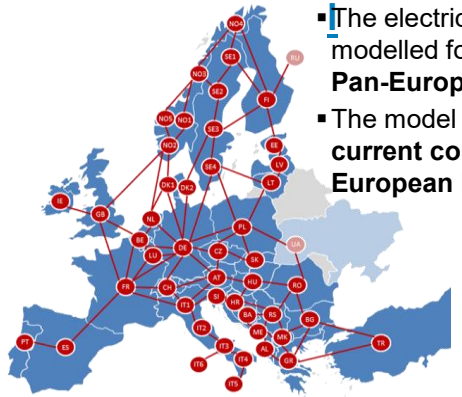
-55%[1]	-90%[1]	Climate Neutrality
2030	2040	2050

Note: [1] compared to 1990 levels
Source: Compass Lexecon Analysis based on EU climate targets.

Modelling Framework and Assumptions

We model the use cases as part of the European power sector on an hourly basis from 2025 to 2040, assuming evolving demand, capacities (both following the TYNDP 2024) and commodity prices.

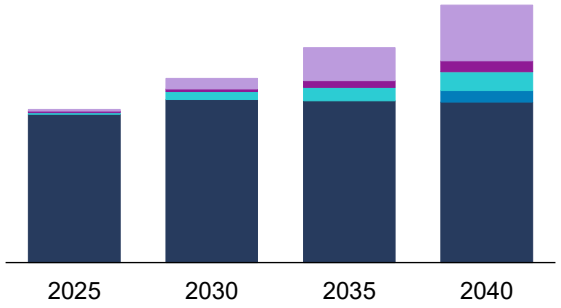
EU-Wide Power System Model



- The electricity market is modelled for the full **Pan-European system**.
- The model covers the **current configuration of European bidding zones**.

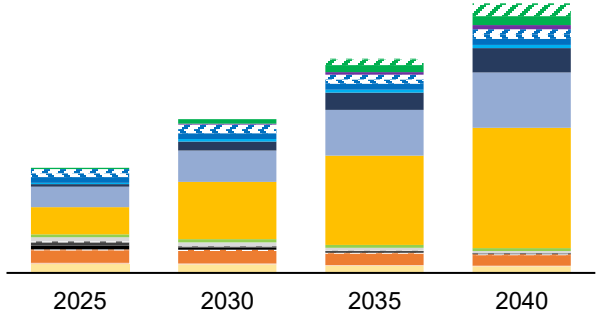
Evolving Electricity Demand

The projected power demand for the EU27 (and all modelled countries) follows the scenario of the **TYNDP 2024 „Distributed Energy Scenario“**.

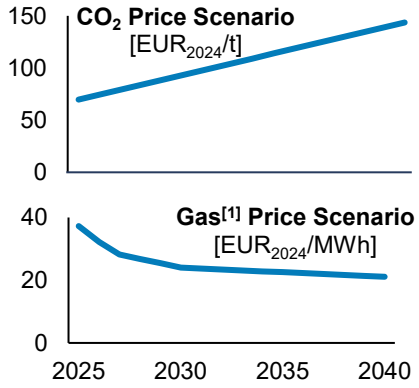


Evolving Generation Capacities

The projected power generation capacities follow the **“Distributed Energy Scenario“** scenario of the **TYNDP 2024** and **ERAA 2023** until 2040.



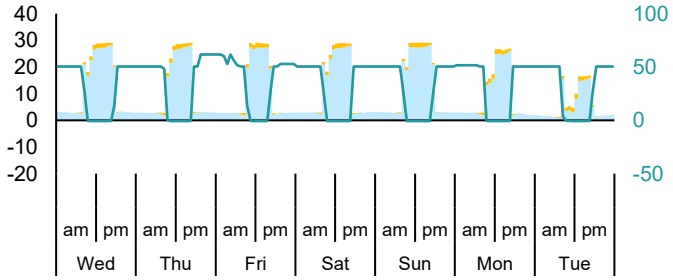
Commodity Price Evolvement



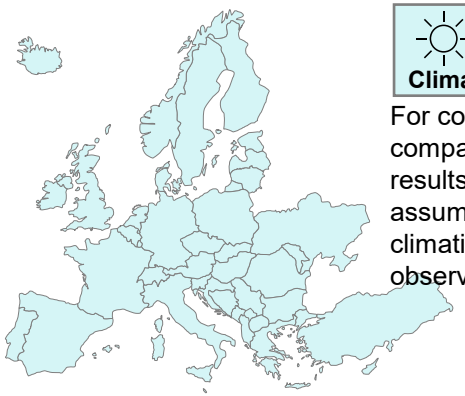
- Commodity prices are assumed to evolve over time.
- Scenario assumptions are chosen in line with IEA WEO scenarios.

Hourly Modelling Granularity

All the modelling for the study was performed on **hourly resolution.** Importantly, this captures also intra-day fluctuations in supply and demand.



Consistent Weather Conditions



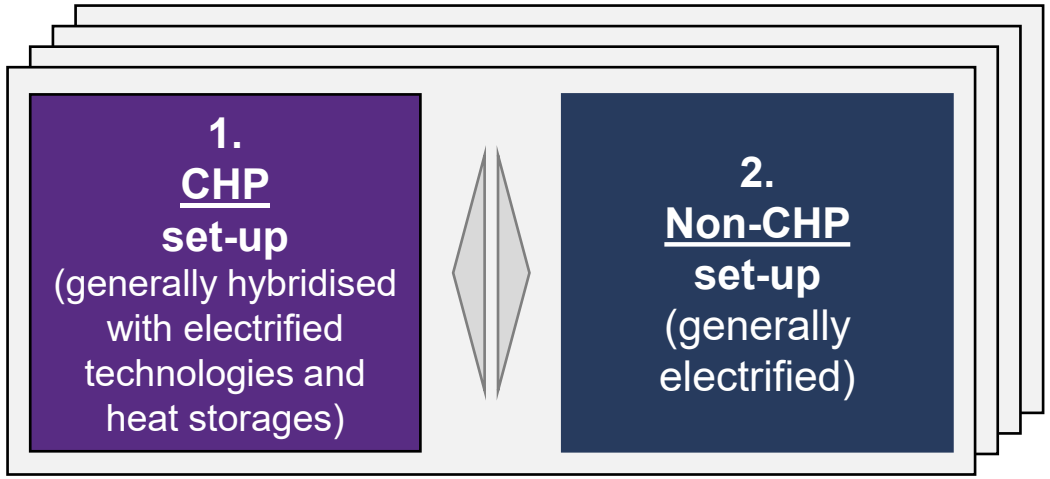
Climate year 2009

For consistency & comparability of results: all modelling assumes the same climatic conditions (as observed in 2009).

Abbreviations: ERAA … European Resource Adequacy Assessment.
Notes: [1] As shown in more detail in the documentation of assumptions, we also assume an increasing share of biomethane (in line with TYNDP 2024 assumptions) in the gas fuel mix.
Source: Compass Lexecon analysis based on aligned study assumptions.

Study Approach: Case Study Comparison of CHP and non-CHP Set-Ups

For each case study we analyse two configurations (1) a set-up including a CHP and (2) an alternative without CHP using a series of criteria.

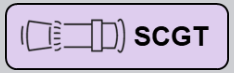
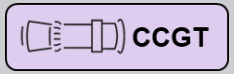


1. **Complementarity** with electrified and renewable technologies
2. **Energy Efficiency**
3. **Decarbonisation**
4. **Competitiveness & Affordability**
5. **Wider System Impact**

Source: Compass Lexecon Analysis

Overview: Use-case Specification

In all specified use cases, the chosen generation set-ups are **hybridised** (i.e. heat can be generated using the CHP and alternatively electricity based) and evolve dynamically over time.

	1	2	3	4
Country				
Use case	**Chemical Industry**	**Pharmaceutical Industry**	**District heating of Toruń**	**District heating of Craiova**
Gas CHP Technology	 SCGT	 Engine	 CCGT	 Engine
Other Technologies[1] (in both scenarios)	E-Boiler, Solar PV, Gas HOB, Heat Storage	E-Boiler, Solar PV, Gas HOB, Elec. Chiller, Abs. Chiller	E-Boiler, Heat pump, Gas HOB, Biomass, Geothermal, Heat storage	E-Boiler, Heat pump, Gas HOB, Solar thermal, Heat storage
Full-Capacity Electrification (hybridization) in both scenarios?	✓ CHP: by **2035** Non-CHP: by **2025**	✓ by **2025**	✓ by **2025** (during 98% of the year)	✓ by **2025**

Note: [1] Lack of CHP in non-CHP scenario is compensated by additional gas HOB capacities (all use cases) and additional E-Boiler capacities (only Spain).
Abbreviations: SCGT … Simple Cycle Gas Turbine, CCGT … Combined Cycle Gas Turbine, HOB … Heat-only-Boiler, PV … Photovoltaic, Abs. … Absorption.
Source: Compass Lexecon analysis based on workshop discussion with COGEN Europe and its members.

Study Launch Event

Other Upcoming Events

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