

Cogeneration as Part of a Sustainable Energy Future

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Istanbul, Turkey

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COGEN
EUROPE The European Association
for the Promotion of Cogeneration

Table of Contents

1. About COGEN Europe
2. What is Cogeneration?
3. Overview of CHP in Europe - Today
4. CHP in Europe - Tomorrow
5. Cogeneration National Snapshot Survey (2017)
6. Policy Outlook



1. About COGEN Europe

Who We Are

COGEN Europe

-  ...is the **European Association** representing the cogeneration sector.
-  ...aims at promoting the **benefits and wider use of cogeneration in Europe**.
-  ...works **together with EU Institutions, Member States and other stakeholders** to develop sustainable energy policies.
-  ...is a **membership based/driven organisation** with over 50 members (13 national associations and over 40 corporate members).
-  ...was established in 1993 as a not-for-profit organisation under Belgian law.
-  ...is based in **Brussels**.
-  ...has a **Secretariat** of 7 staff.

Our Members

Our National Members
(representing over 70% of
CHP capacity in Europe)

Belgium (Flanders)		Hungary		Slovenia	
Czech Republic		Italy		Spain	
France		Poland	<i>Kogen Polska</i>	Turkey	
Germany		Portugal		United Kingdom	
Greece					



Our Corporate Members
(covering the entire
energy value chain)

How We Shape Policy

Public Affairs



Consultations and meetings in Brussels with EU Institutions and relevant stakeholders to present point of view of cogeneration sector.



Targeted Public Affairs campaigns.



Active involvement in Brussels stakeholder platforms such as the European Energy Forum (EEF), IDEAS, EEFIG, DecarbEurope, DecarbHeat, Brussels Electricity Club (BEC).

Projects



Managing EU co-funded projects to support further advancement and deployment of cogeneration technologies and solutions.

Information Dissemination



Sharing the latest cogeneration policy and Europe-wide market developments with our members.



Promotion of our positions and activities via relevant specialised media (Decentralized Energy, Cogeneration Channel, EurActiv, Politico, EnergyPost, etc.) and social media.

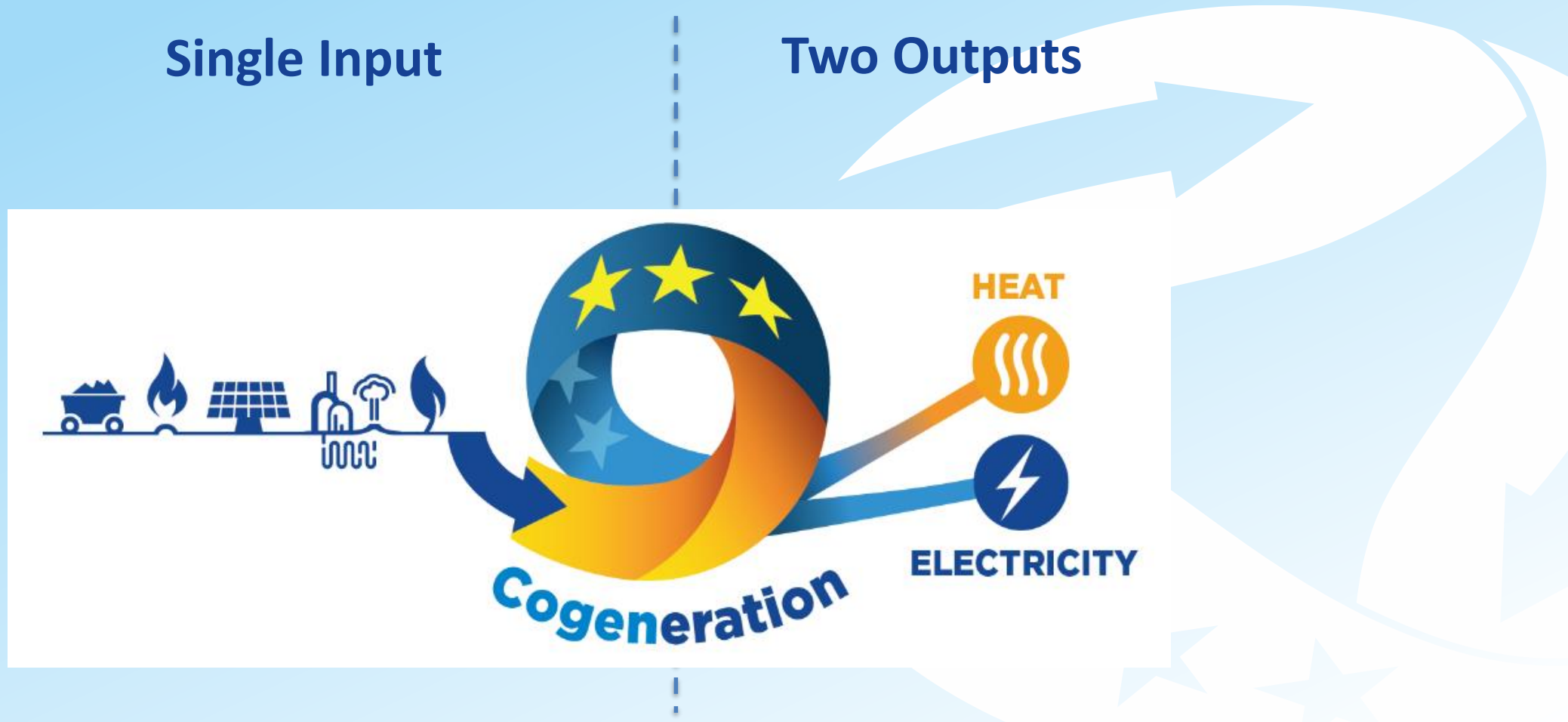


2. What is Cogeneration?

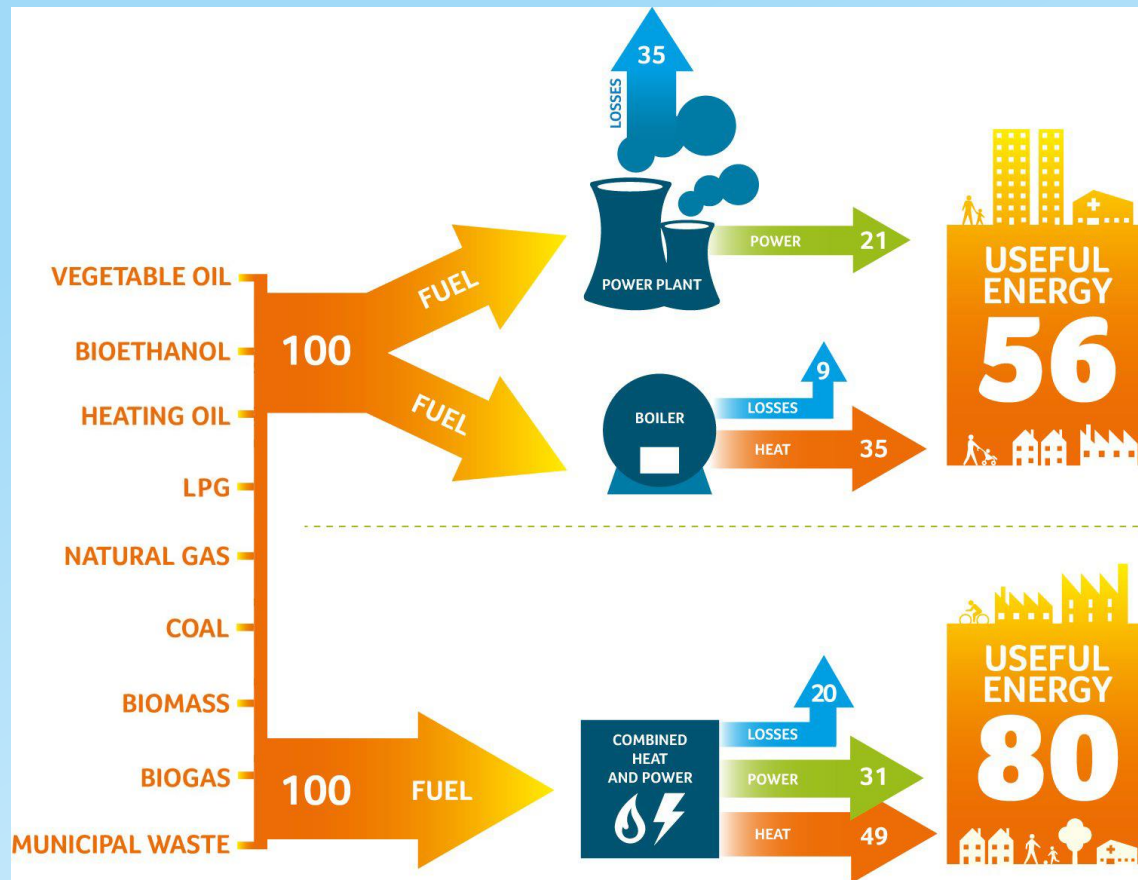
What is Cogeneration?

Single Input

Two Outputs



Cogeneration Benefits: Efficiency



- Transforms more than 80% of the energy into useful heat and electricity for factories, offices, public buildings and homes.
- Saves between 15-40% energy compared to the separate supply of electricity and heat from conventional power stations and boilers.

Cogeneration Benefits: Consumer Empowerment



Cogeneration Benefits: Local & Flexible

Distributed

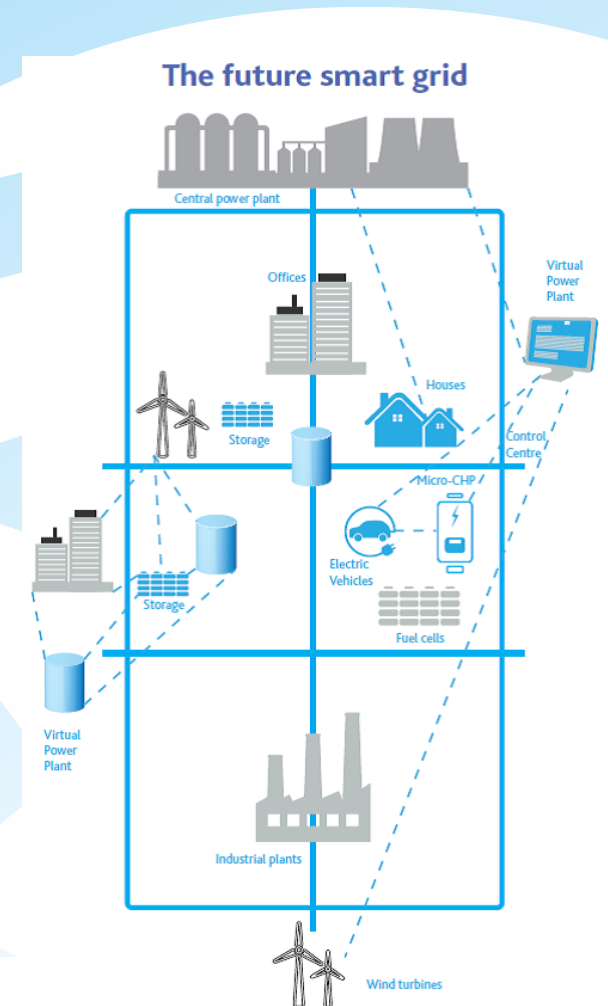
- Located near or at the point of consumption, reducing generation and costs.

Dispatchable

- Controllable and predictable generation patterns.

Demand Response & Smart Grids Ready

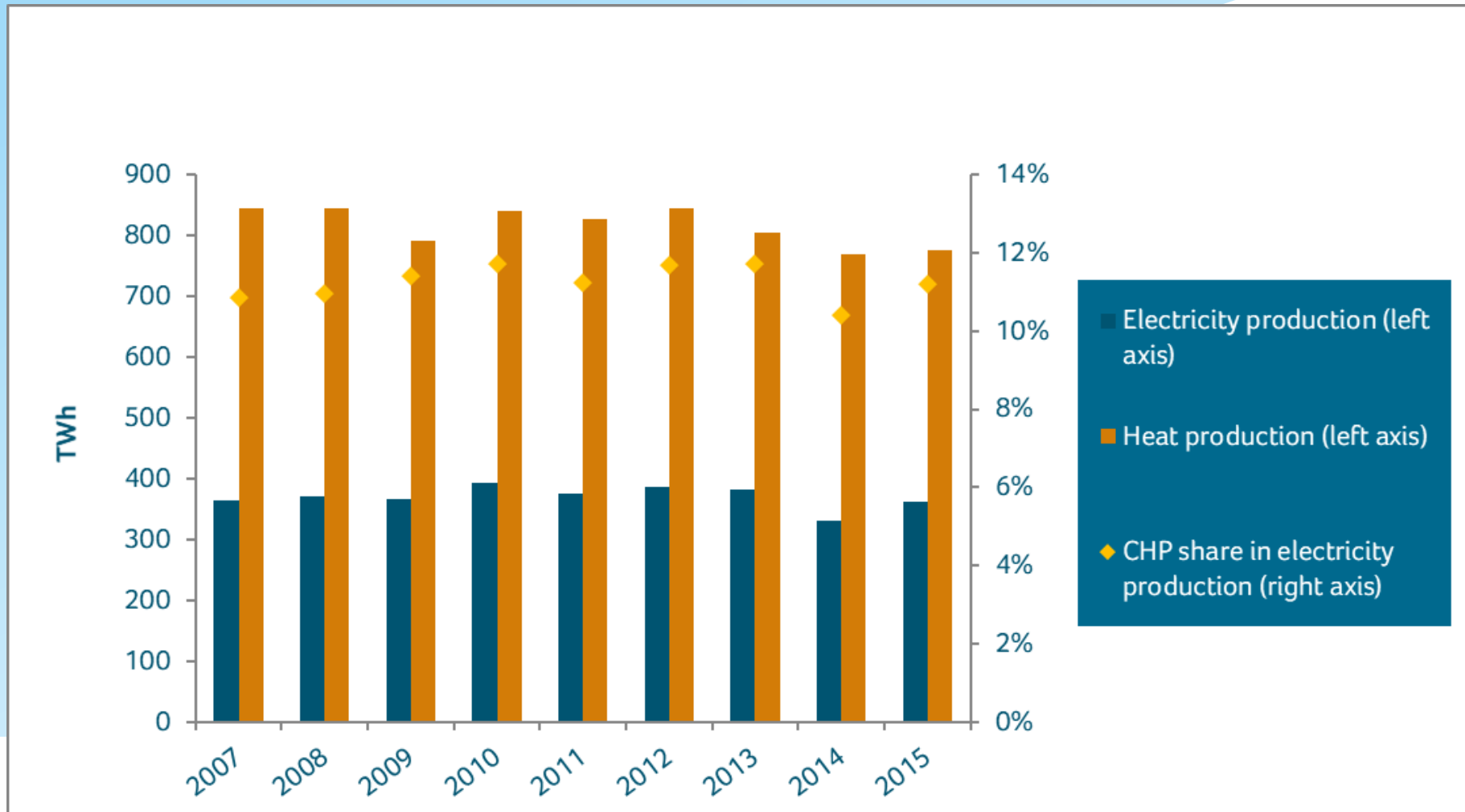
- Can ramp up or down, making use of controls and storage, to respond to energy system needs.



3. Overview of CHP in Europe - Today

CHP in Europe - Overview

Electricity and Heat Generation (2007-2015)



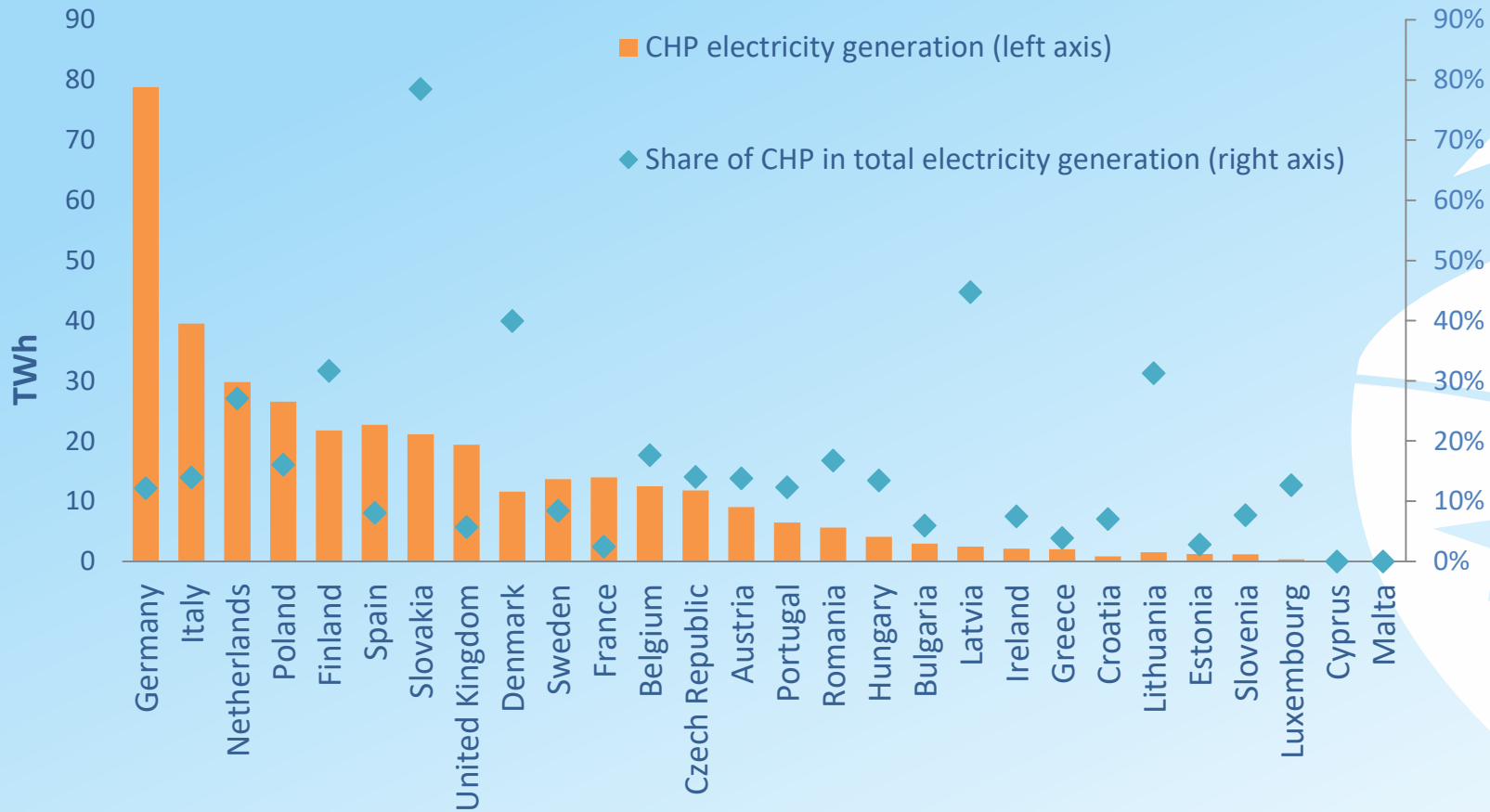
Cogeneration Today



Cogeneration provides
11% of all electricity and 15%
of all heat in the EU.

- More than 100,000 European consumers self-generate electricity and heat with cogeneration in their homes and businesses.
- 70 million Europeans use district heating, half of which is supplied by cogeneration.
- Majority of refineries, paper mills and chemical manufactures use cogeneration to produce their own efficient, secure and low-carbon electricity and heat.
- Delivers around 15% of EU's energy efficiency and 20% of EU's climate and energy 2020 objectives.

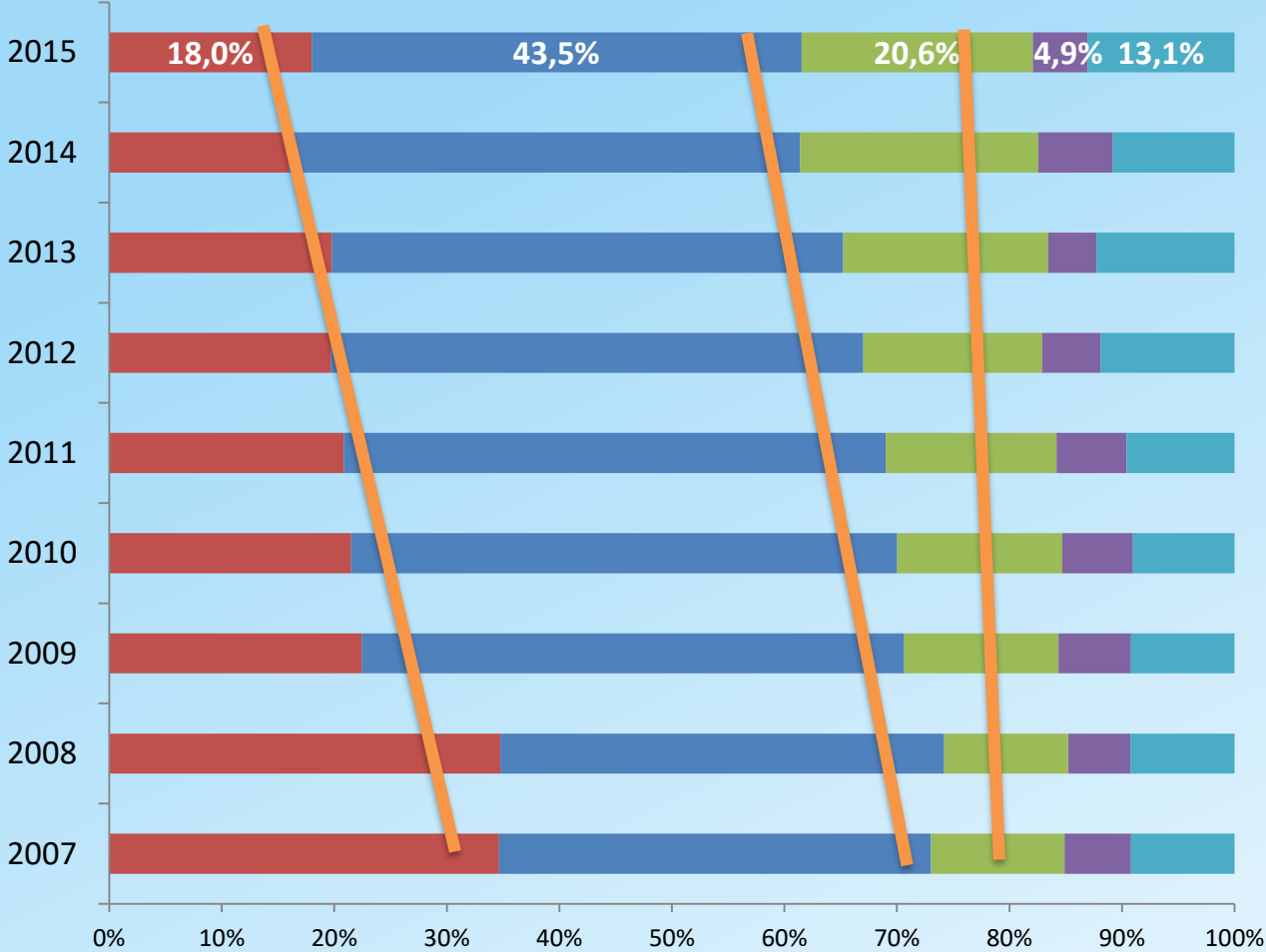
Cogeneration Today: Uptake Across EU



- **Largest cogeneration markets:** Germany, Italy, The Netherlands and Poland.
- **Highest share of cogeneration in electricity generation (> 30%):** Slovakia, Denmark, Latvia and Lithuania.

Source: European Commission, Eurostat (2017)

Cogeneration Today: Increasingly Renewable



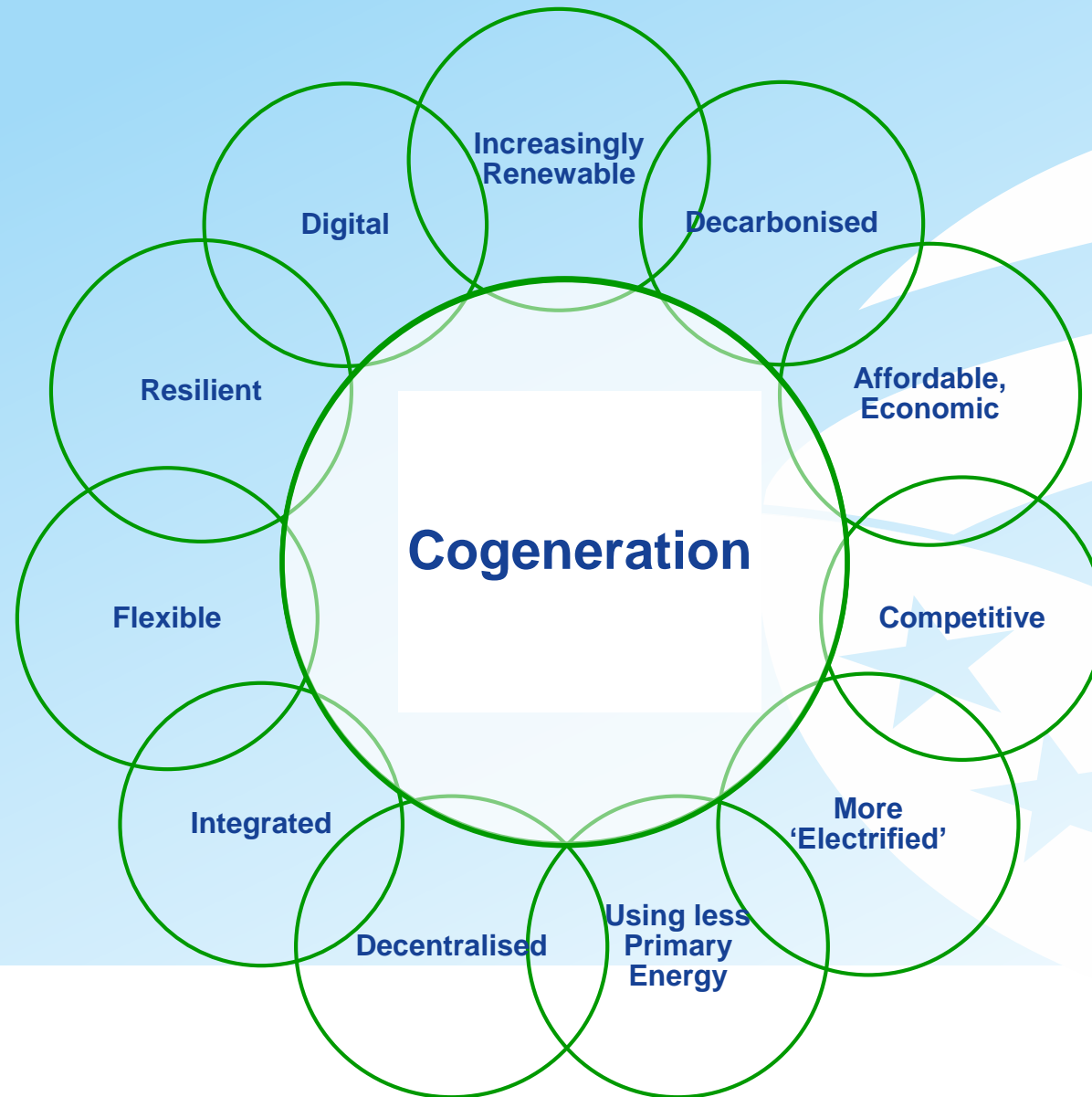
- Solid fossil fuels and peat
- Natural gas
- Renewable sources
- Oil and oil products
- Other fuels

CHP fuel mix strongly influenced by fuel price dynamics and support schemes.

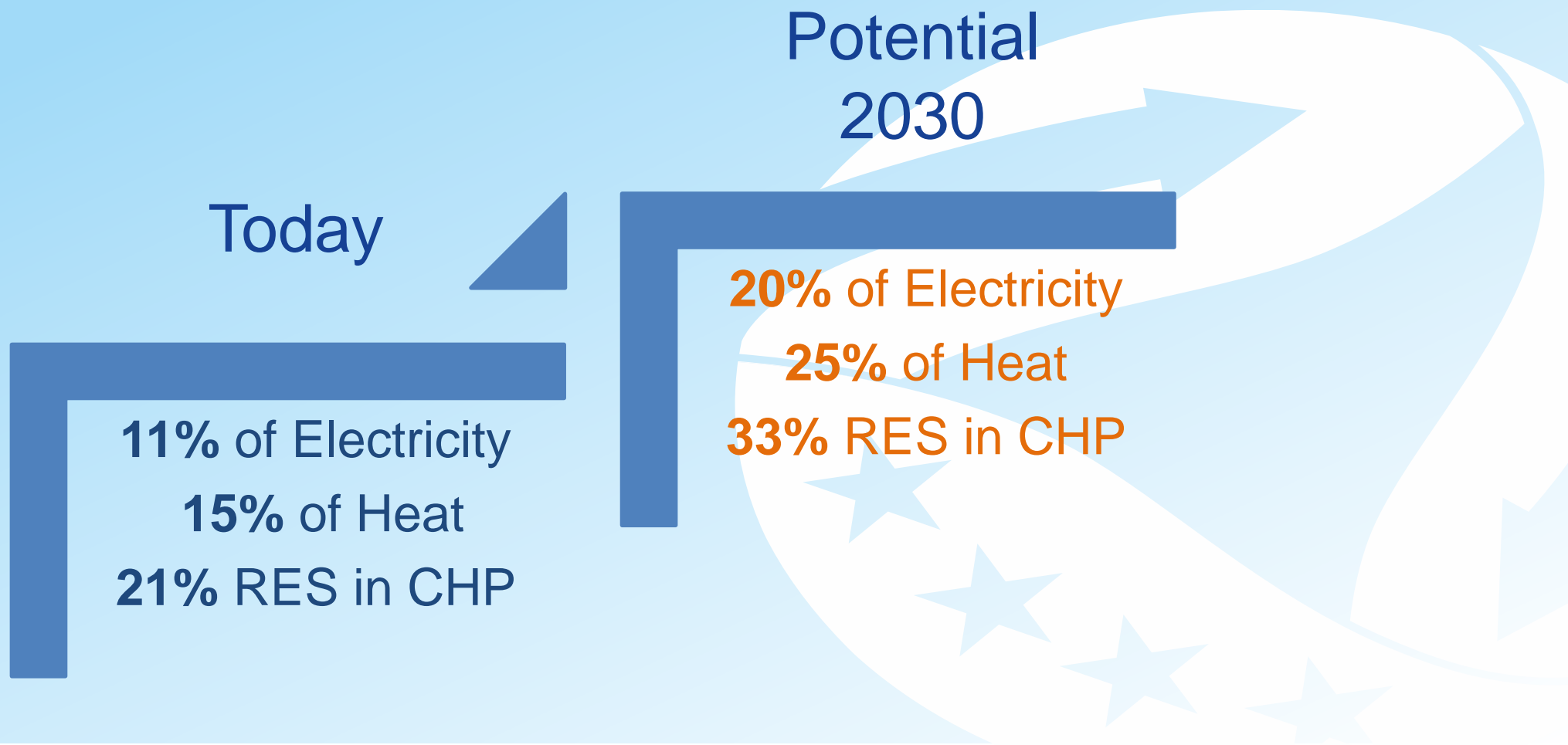
Source: European Commission, Eurostat (2017)

4. CHP in Europe - Tomorrow

Cogeneration in the Future Energy System



Untapped Cogeneration Potential in the EU



Source: EU Funded Project CODE2 (2014)

Cogeneration Can Delivery Key Benefits in 2030

Climate & Energy Targets



2020

11% - 17%
of EU Energy Efficiency
Target

16% - 25%
of EU GHG Target

2030

up to 26%
of EU Energy Efficiency
Target*

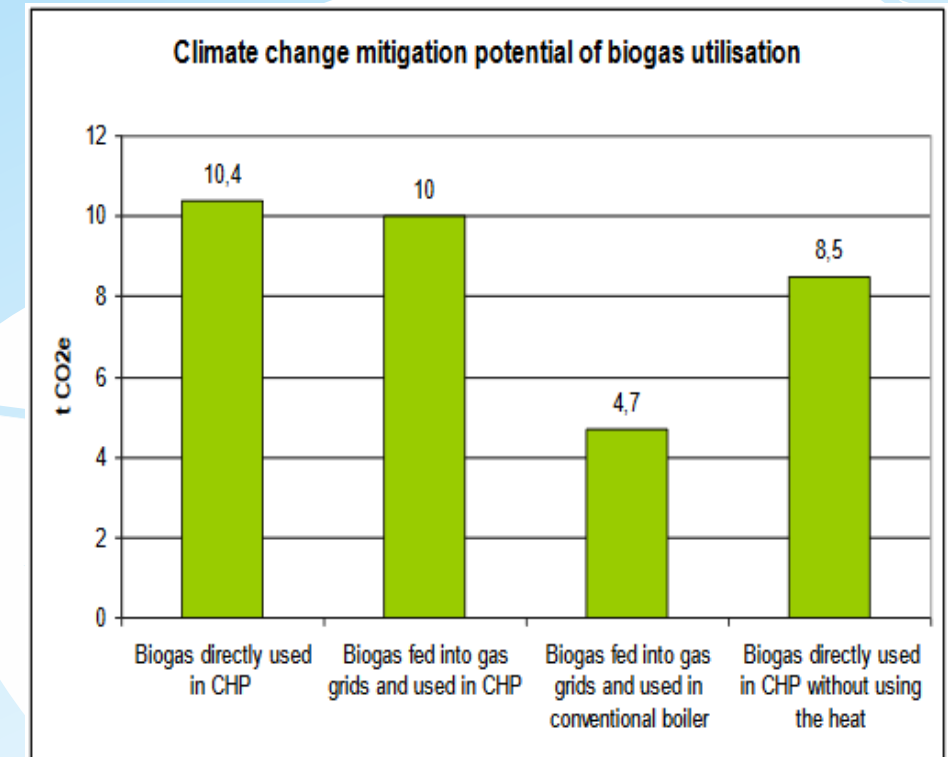
up to 25%
of EU GHG Target

* Assuming a 35% energy efficiency target in 2030.

Source: EU Funded Project CODE2 (2014)

Significant Potential for Renewable Cogeneration

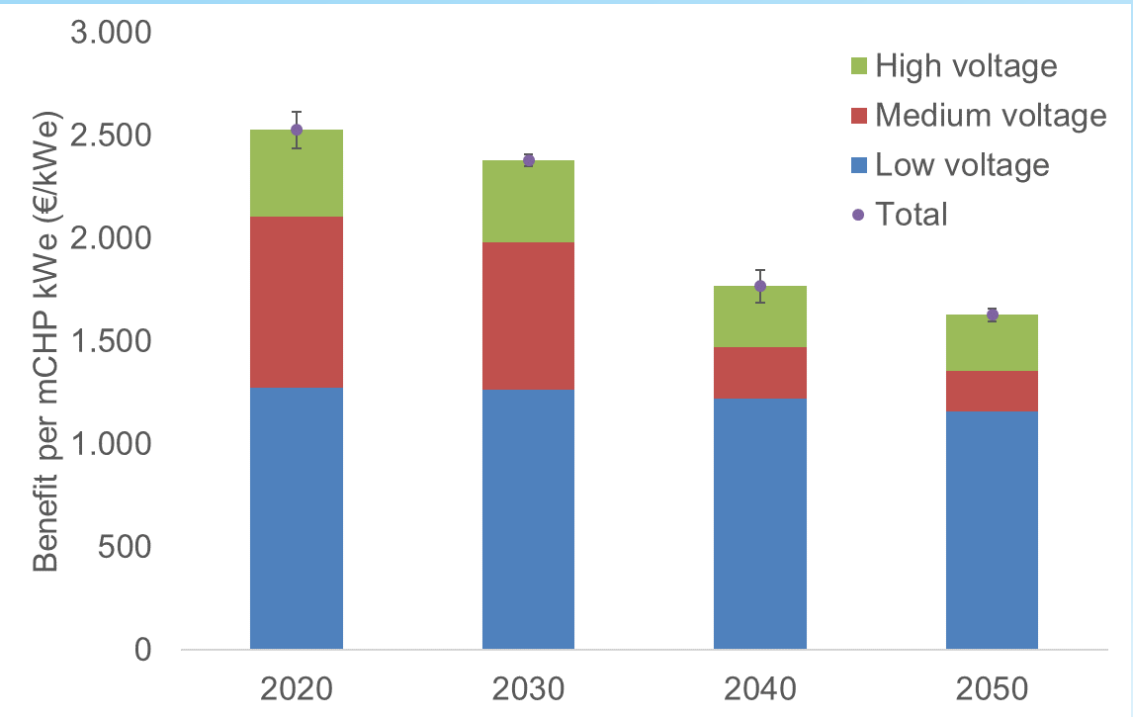
- Cogeneration is key to enable the sustainable use of bioenergy fuels, maximising their decarbonisation potential.
- Today **21% of cogeneration comes from renewables** and 60% of bioenergy electricity comes from cogeneration.
- Under optimum policy and market conditions, **33% of the cogeneration mix could be renewable in 2030.**



Sources: EU Funded Project CODE2 (2014) & FNR, IFEU, UBA, 1/2011

Micro-cogeneration Energy System Cost Reductions

Micro-CHP Distribution Network Cost Reductions per kW Installed (2020-2050)



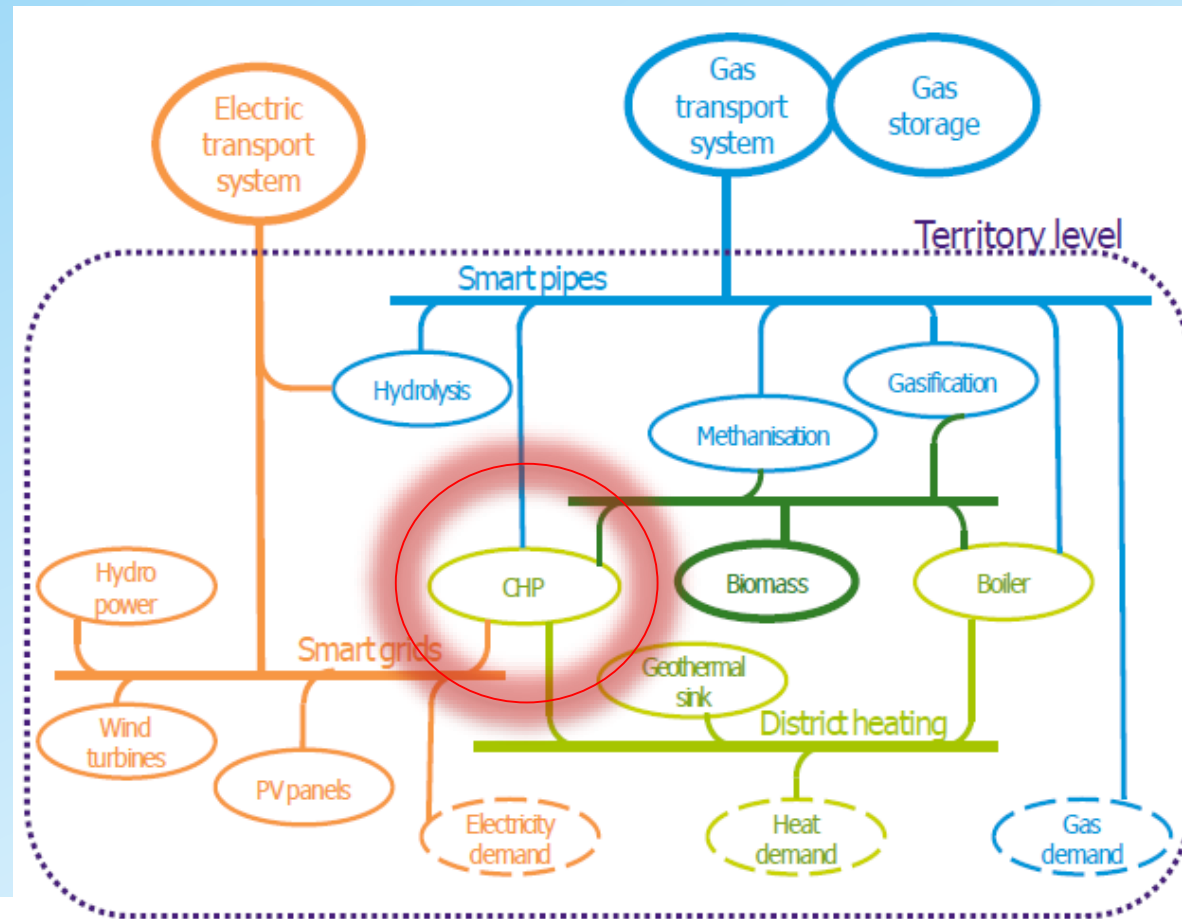
Source: EU Funded Project ene.field (2017)

Up to 31 GW
micro-CHP potential
in 2030.

€ 62 bn
in avoided grid
investments associated
with micro-CHP.

Up to 28%
of EU's projected grid
reinforcements needs
potentially delivered
by micro-CHP.

Cogeneration at the Centre of Europe's Future Energy System



Expert contributions from **20** CHP national experts...



2017 Cogeneration National Snapshot Survey

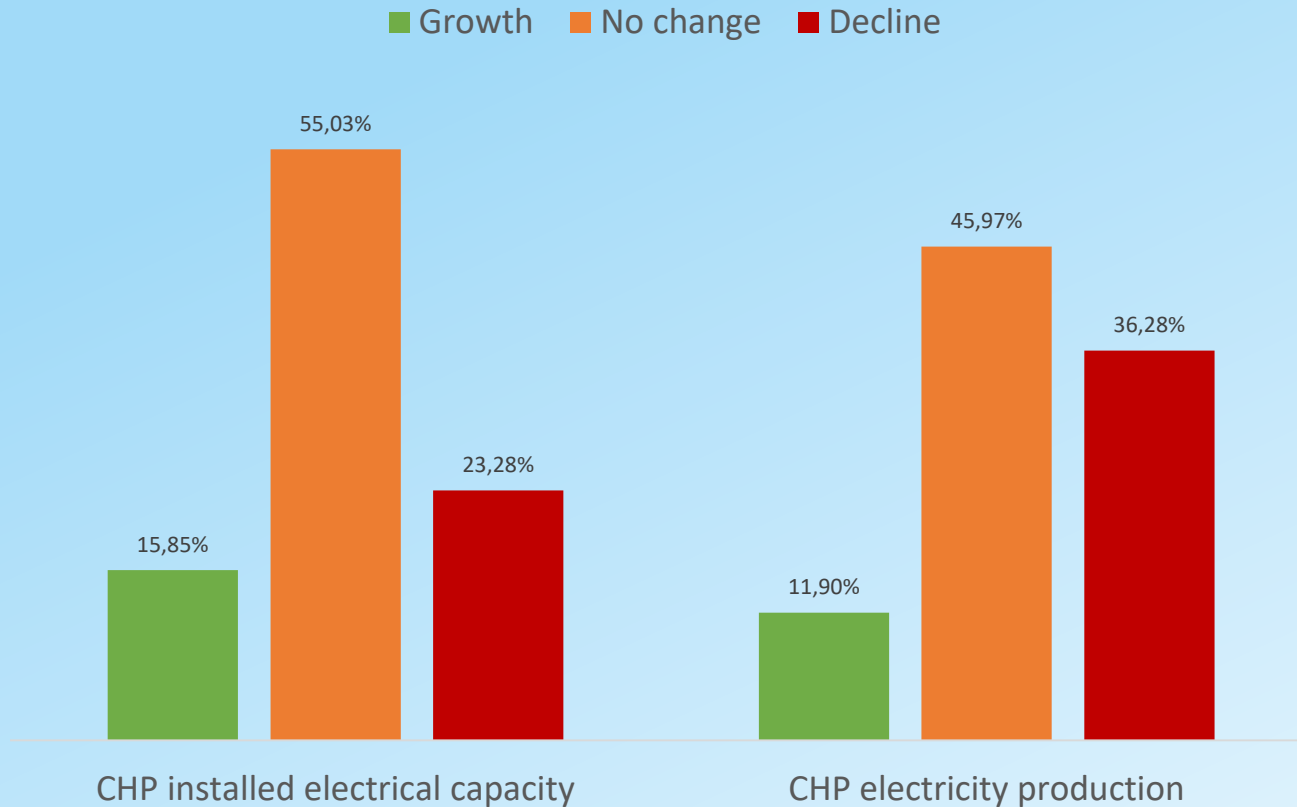
...representing **95%** of installed capacity **in EU28 & Turkey**

...capturing the **European CHP industry sentiment**

...expanding outside of Europe, with **guest contribution from Japan**



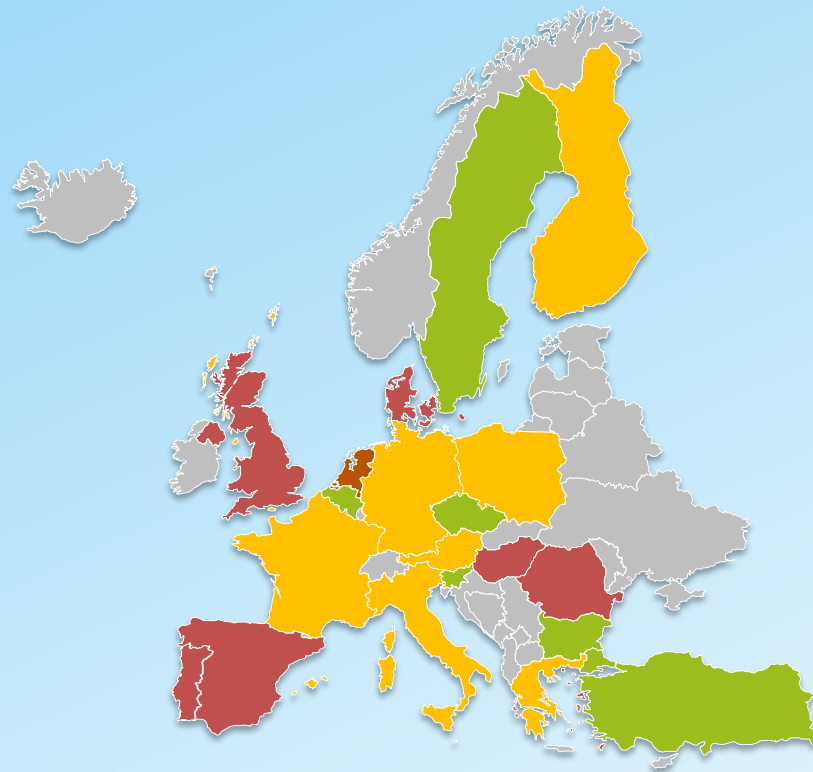
CHP Market Trends in Europe (2012-2016)



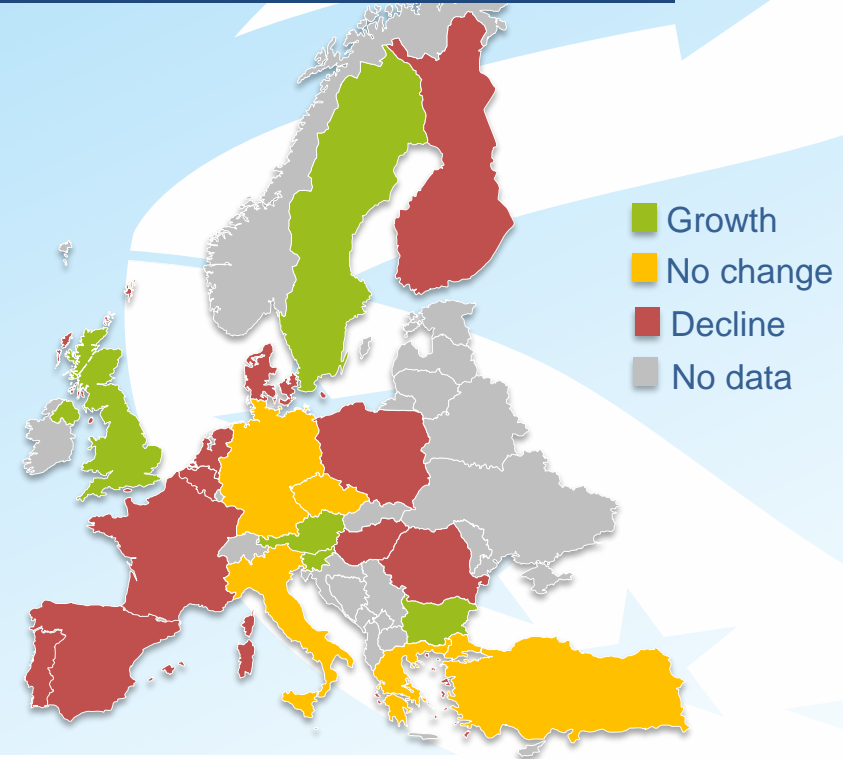
Generally **stable installed capacity**, but more pronounced **standstill or decline in generated electricity** and share in total electricity production are at a due to a combination of **unfavourable energy market conditions and insufficient support.**

CHP Market Developments in Europe (2012-2016)

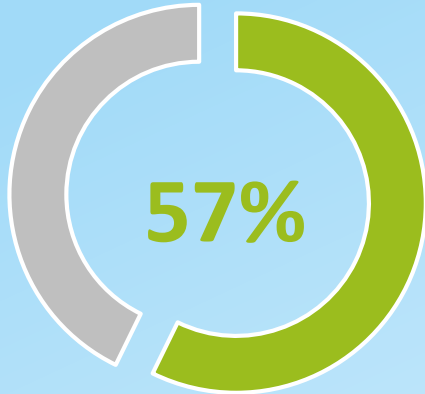
CHP Installed Capacity



CHP Generated Electricity

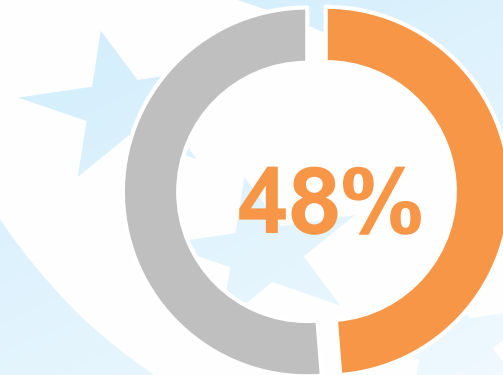


CHP Market Trends - by Application (2012-2016)



Commercial CHP growth continued in most national markets due to positive on-site spark spreads.

At European level in a **flat trend for large industrial CHP**, though there are pockets of growth for this segment in Bulgaria, Czech Republic, Hungary and Sweden.



Other growth opportunities for CHP: horticulture sector, fuel cell CHP, in SMEs, landfill plants, healthcare & tourism, food & drink and sewage treatment.

CHP Market Trends - by Application (2012-2016)

District heating connected CHP remained relatively stable across Europe, with some countries experiencing decline (incl. AT, DE, HU and RO).

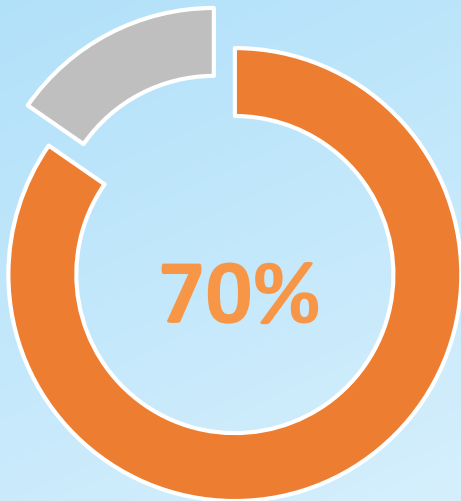
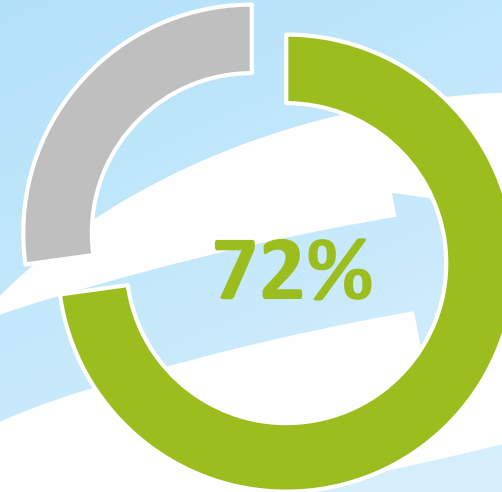
Growth in domestic micro-CHP was strong in several European countries representing 36% of European installed CHP capacity (AT, DE and FR).



70%

CHP Market Developments by Fuel (2012-2016)

RES CHP is growing in the majority of markets across Europe.



CHP experts report stagnation or decline for gas CHP throughout European markets.

Main Factors Affecting CHP Markets at National Level



- CHP recognized at the political level for its role in energy transition (DE, AT, CZ and SI)
- Stable support schemes in some markets (especially for RES)
- High on-site spark spreads (due to high/increasing retail electricity prices) in key markets

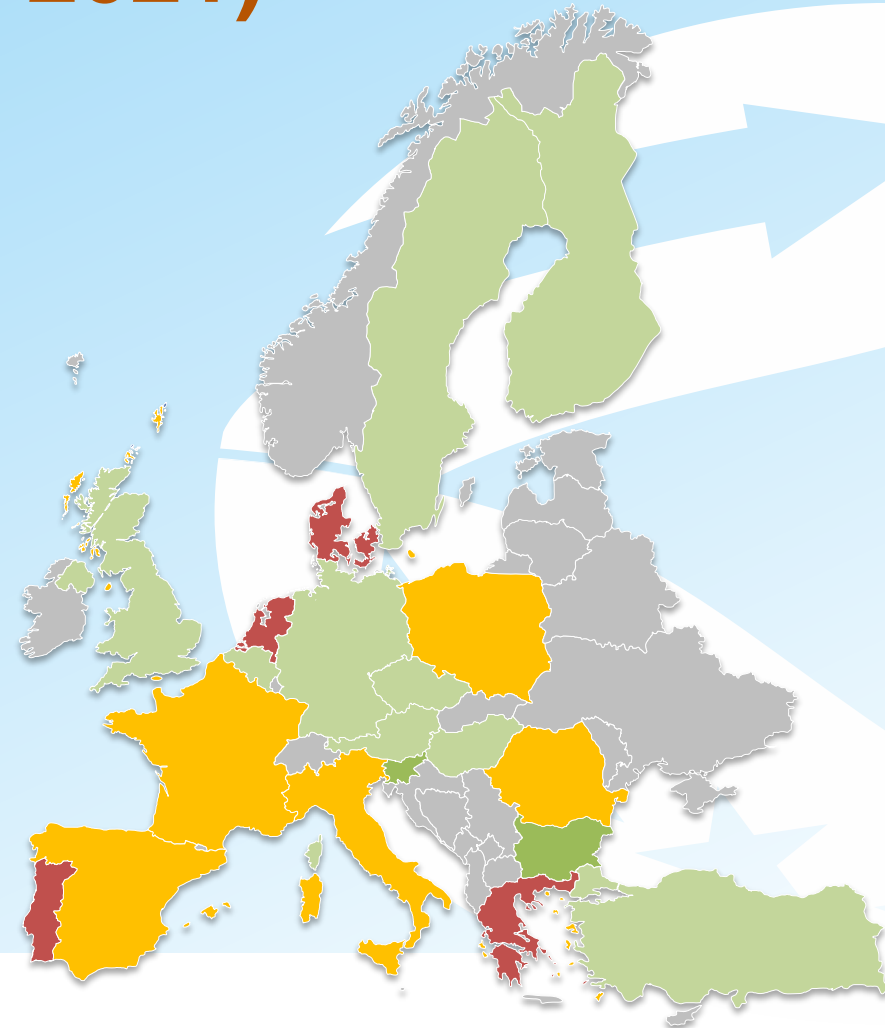


- Unfavorable wholesale clean spark spreads (i.e. low wholesale elec. prices making coal PPs more profitable) (DE)
- Unpredictable regulatory framework
- Lack of focus on integrated planning – heat & electricity (RO)
- Burdensome administrative procedures (i.e. permits, grid connection)



Five Year CHP Markets Outlook (2016-2021)

In nearly **60%** of the **CHP markets** in Europe, experts expect **steady and moderate growth** in the next 5 years.



Cogeneration in Turkey

National Energy Efficiency Action Plans – An opportunity for CHP in Turkey?

2017

- Main objective: 14% primary energy consumption by 2023;
- Measures include: higher renewable use, development of further DHC & CHP, energy efficiency financing mechanisms; and
- 11 billion US\$ in energy efficiency investments.

2018

- Strong emphasis given to CHP utilisation in all applicable areas towards 2023.

Current CHP Developments

- Moderate growth in CHP capacity;
- Main barriers: high natural gas prices and low electricity prices discourage wide usage of CHP systems; and
- Key growth segments: industrial, commercial and renewable CHP.



Turkey's largest capacity cogeneration facilities with 380 MWe and 400 tons of steam production Kazan Soda Facility (Ankara)

Source: BusinessTurkeyToday.com

6. Policy Environment

“Clean Energy for all Europeans” Package

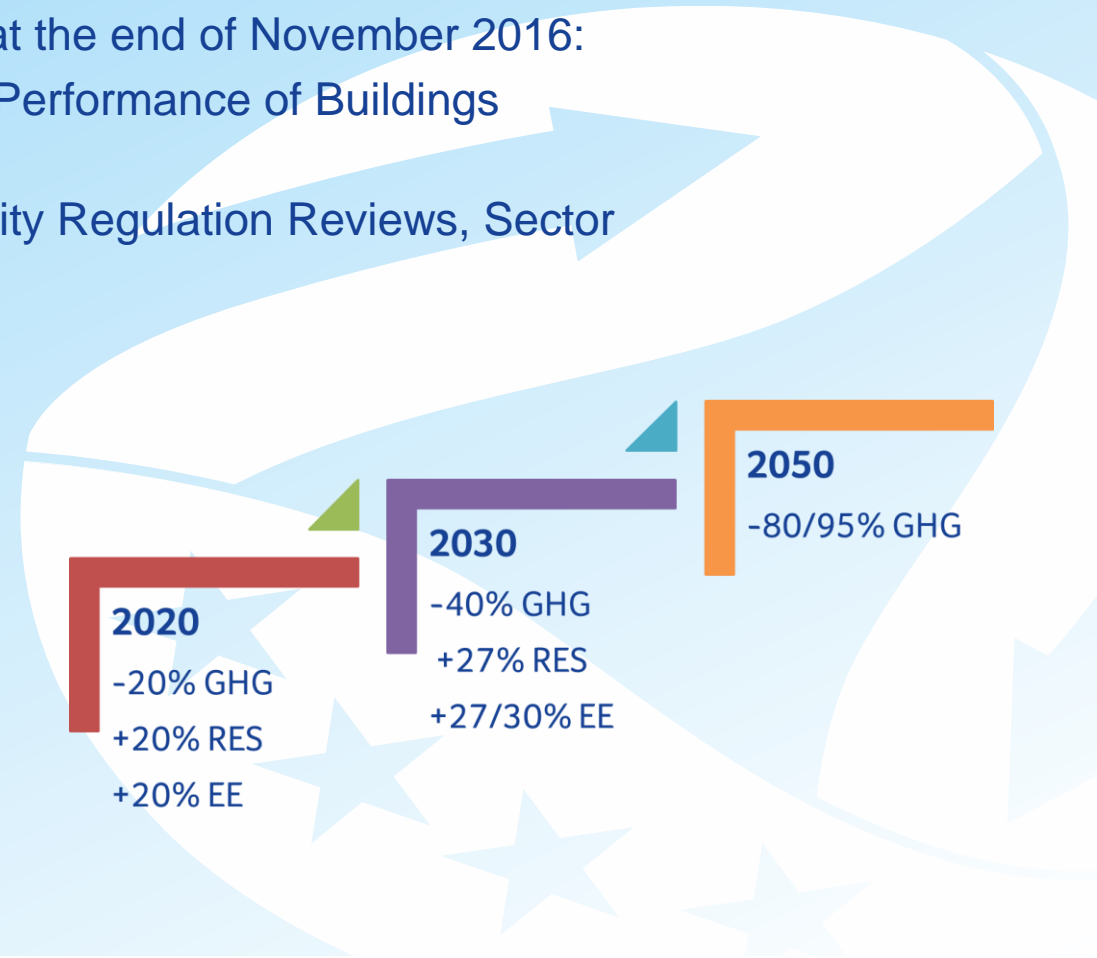
- **European Commission** published major legislative package at the end of November 2016:

- **Energy Efficiency:** Energy Efficiency Directive & Energy Performance of Buildings Directive Reviews
- **Market Design Initiative:** Electricity Directive and Electricity Regulation Reviews, Sector inquiry into capacity mechanisms
- **Renewable Energy Directive Review**
- **Energy Union Governance Proposal (new)**

- Key legislative package, setting the 2030 policy framework for the energy sector.

- Three key aims:

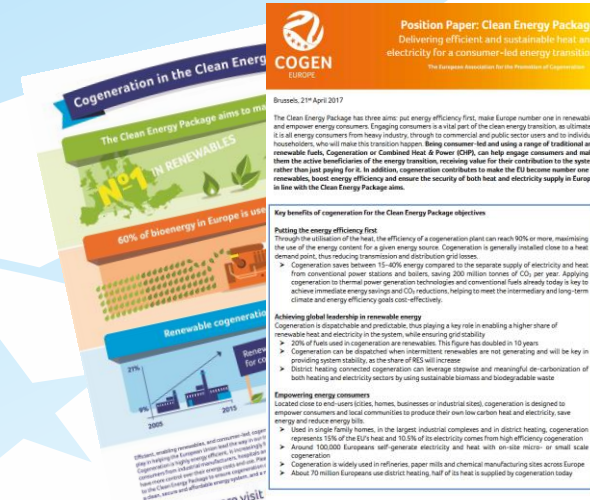
- Put energy efficiency (EE) first
- Make Europe #1 in RES
- Empower energy consumers



COGEN Europe's High-Level Recommendations on the Clean Energy Package

Enabling cogeneration to contribute towards a consumer-led, secure, clean and affordable energy transition:

- Take a **consumer-centered approach** to policymaking;
- “**Energy efficiency first**” principle should prevail; and
- **Energy systems’ integration is key:** policy should take a holistic approach & explore **synergies** between electricity, heat and gas networks.



COGEN Europe's Position Papers are available online!

Policy Implementation: Key to further CHP Development

CHP/DHC Comprehensive Assessments

Member States should **introduce new policy measures to achieve CHP potential identified as part of Comprehensive Assessments** (Energy Efficiency Directive, Art 14).

Favourable Electricity Rules for CHP

TSOs & DSOs should **facilitate grid connection, access & priority of dispatch for CHP / simplified grid connection for micro-CHP** (Energy Efficiency Directive, Art 15).

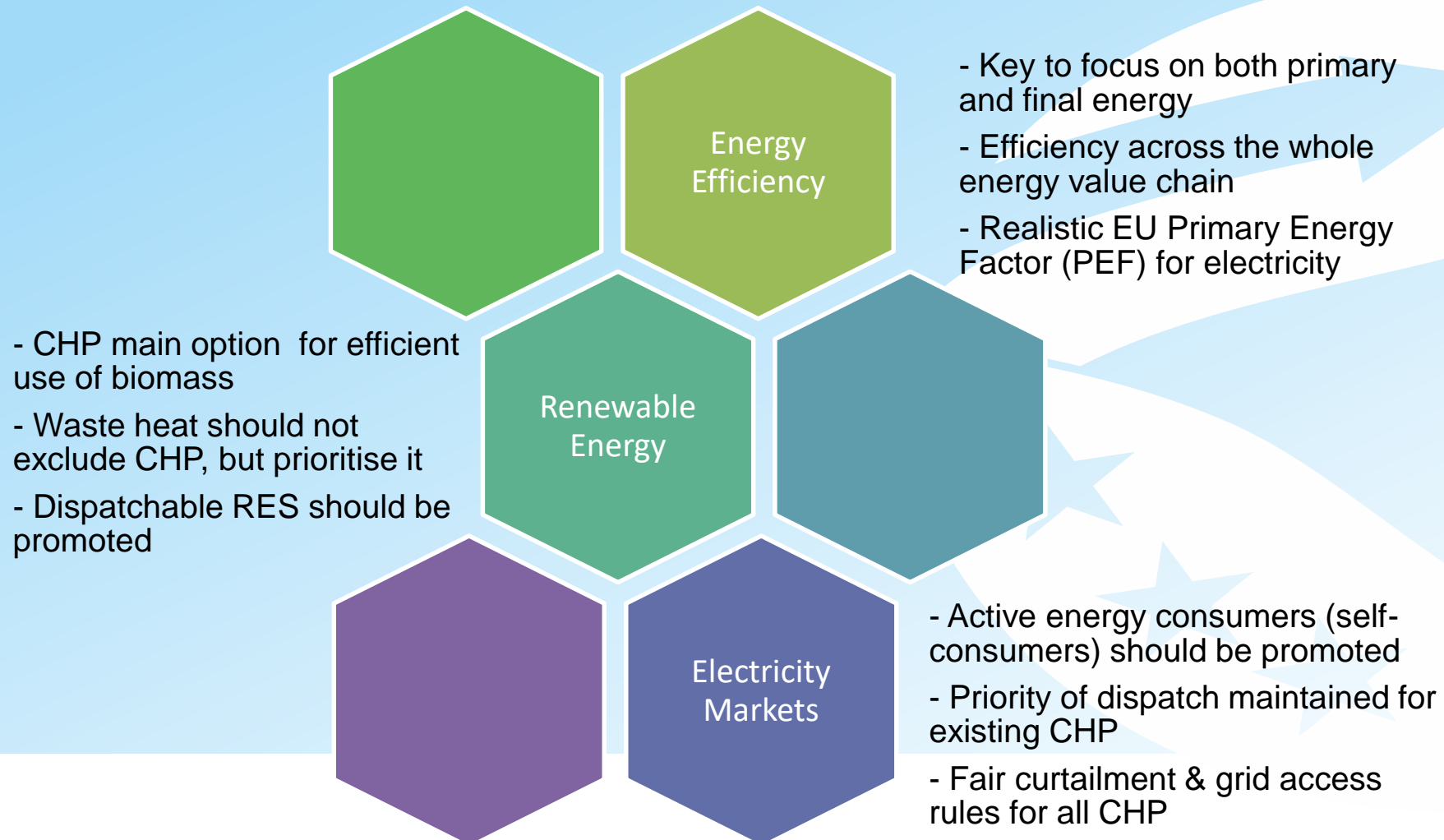
CHP Enabled to Contribute to Energy Savings Obligation

CHP & DHC eligible up to 25% of “Energy Savings Obligation”, which Member States could exploit more (Energy Efficiency Directive, Art 7).

Network Codes

Derogation for must-run CHP & micro-CHP as part of the Network Code on Requirements for Generators. Dedicated derogations possible for fault ride through.

Opportunities & Risks for CHP in the Clean Energy Package



25

COGEN

EUROPE

Celebrating 25 years

Join us!

**Anniversary
Annual
Conference,
Awards
& Gala Dinner**

5-6 June, 2018

Brussels, Belgium



Thank you for your attention!

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