CHP developments in Europe

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7 April, 2016

COGEN EUROPE
The European Association for the Promotion of Cogeneration

Outline

- **About COGEN Europe**
- **CHP in Europe Overview**
- **"2016 Cogeneration National Snapshot Survey" – Summary of results**
  - ✓ Market status & Policy developments
  - ✓ Case study – CHP in Germany
  - ✓ Sector outlook in the next 5 years
  - ✓ Recommendations
- **Upcoming Policy Initiatives at EU Level**
- **Conclusions**

About COGEN Europe

Who we are

Structure

- European Association for the promotion of cogeneration
- Established in 1993 as a not-for-profit organisation under Belgian law, headquartered in Brussels
- Secretariat of 5 + 2 people

Vision

- *"Through the promotion of cogeneration, to grow an industry which changes the way Europe provides heat and electricity for a sustainable future"*

Our approach

- We promote the wider use of cogeneration as part of Europe's sustainable energy strategy
- We provide our views to policymakers involved in the EU legislative process, by liaising with key actors in the European Commission and European Parliament
- We work closely with other stakeholders and with selected media (Decentralised Energy, Cogeneration Channel, European Energy Innovation …)

What we do

- Regular liaison with the relevant departments of the European Commission (DG ENER, DG CLIMA, DG ENVI, DG R&D and DG GROWTH);
- Links with key Members of the European Parliament (MEPs) and monitoring of relevant EP Committees (ITRE and ENVI);
- Cooperation with other key industry associations (CEPI, CEFIC, FoodDrinkEurope, CEWEP, FuelsEurope, Cerame-Unie, EuroHeat & Power, EHI), renewable associations (EREC, AEBIOM, EREF, EUBIA, EGEC) and city representations (Energy Cities, Covenant of Mayors);
- A set of active internal working groups which formulate and propose COGEN Europe's positions on key topics (e.g. on Energy Efficiency Directive, electricity Network Codes, micro-CHP, bio-energy CHP and Industrial Emissions Directive);
- Participation to R&D projects co-funded by the European Union (CODE2, ene.field, PACE);
- Regular events such as our Annual Conference, EP dinner debates and others.

Our Members

- **Around 50 corporate members, including:**

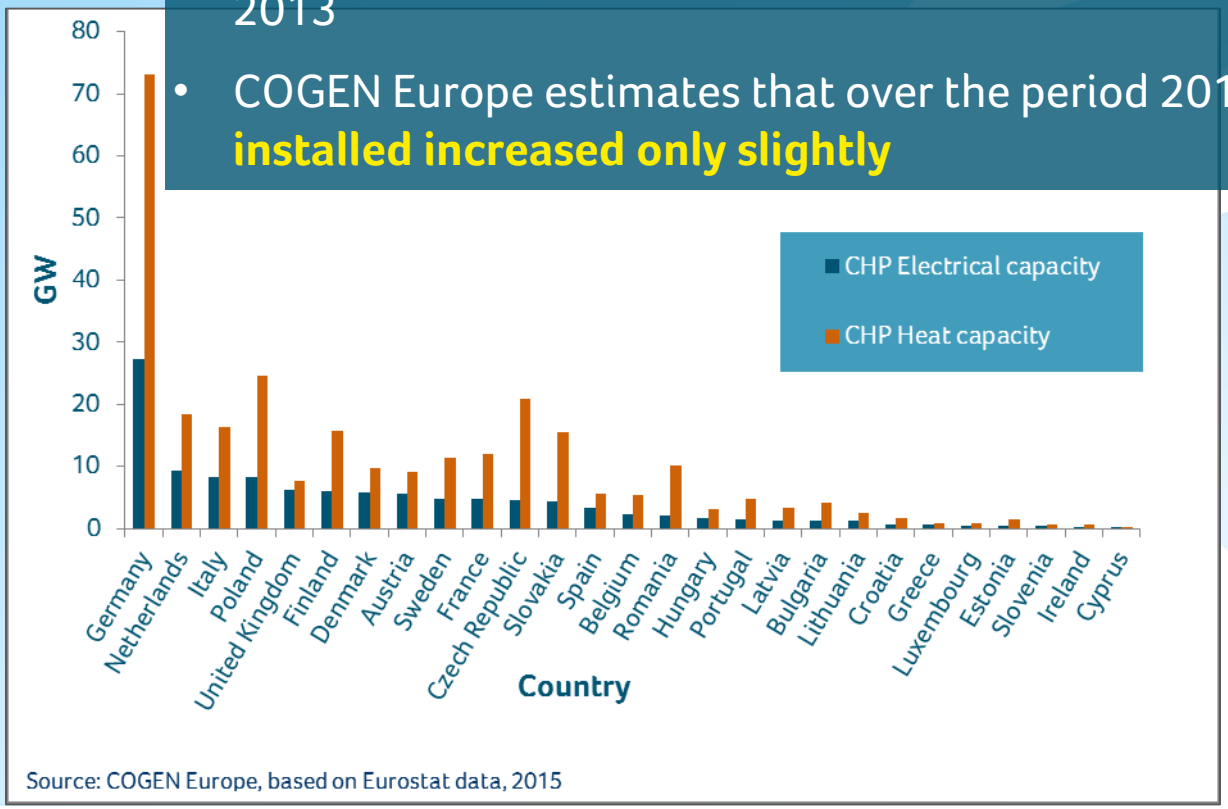
- **14 National COGEN Associations**

Overview of CHP in Europe

CHP in Europe – an overview

Installed capacity

- Total installed capacity in EU-28 & Turkey was **~120 GWe** in 2013
- COGEN Europe estimates that over the period 2012-2015 **net installed increased only slightly**

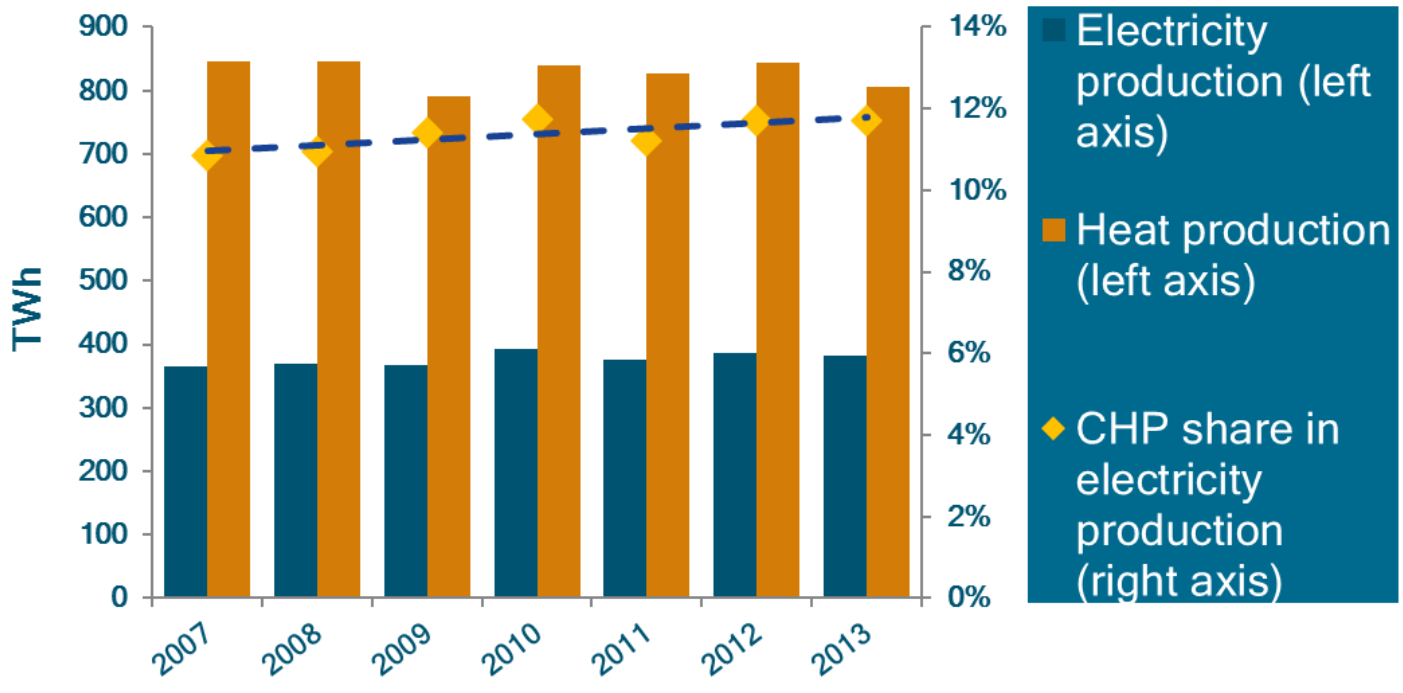


Source: COGEN Europe, based on Eurostat data, 2015

CHP in Europe – an overview

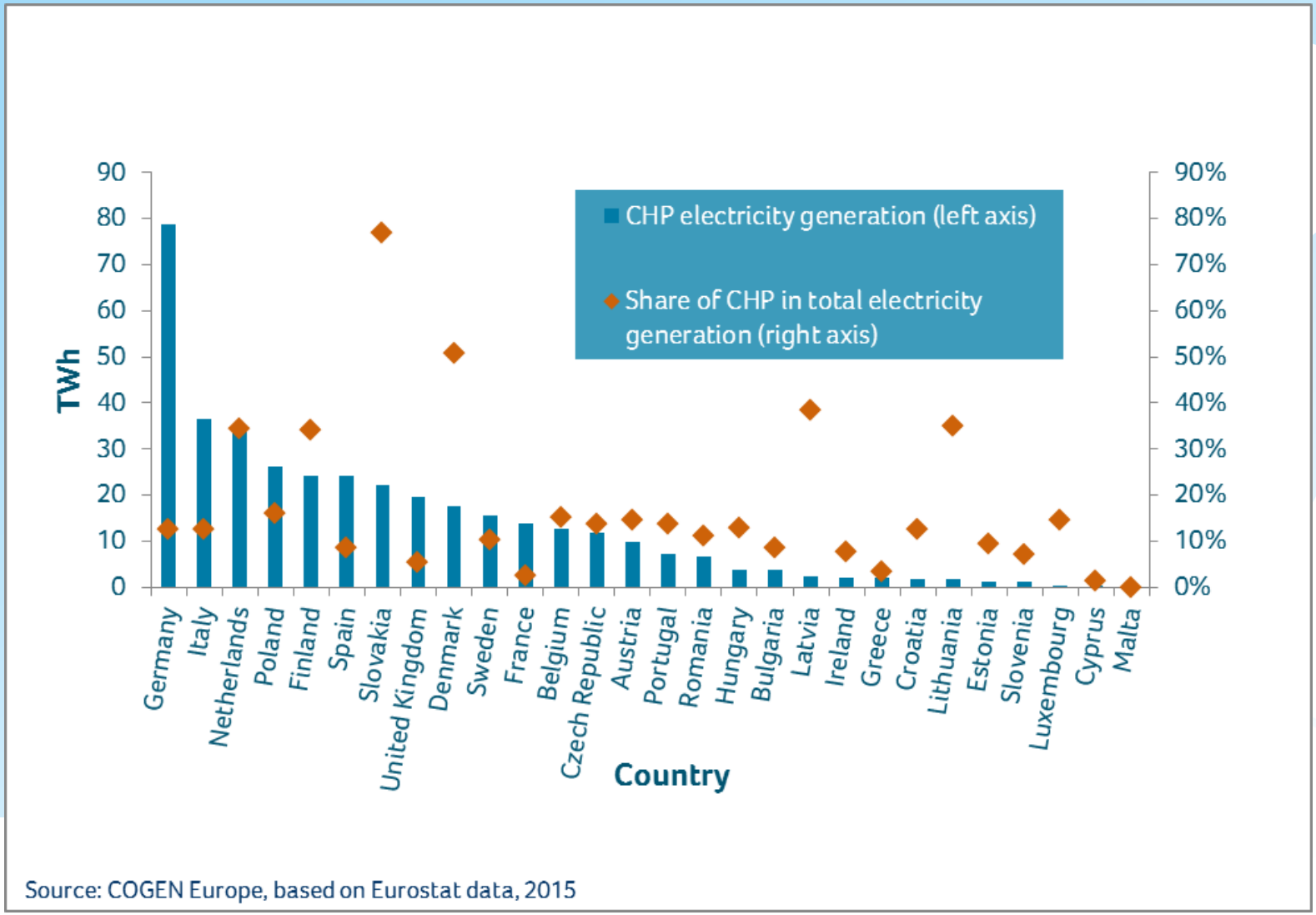
Electricity and heat generation

- **EU28 CHP share** is hovering at **12%**
- **Economic potential** identified by Member States is **20% share in total electricity & 25% of total heat production by 2030** (CODE2, 2014)



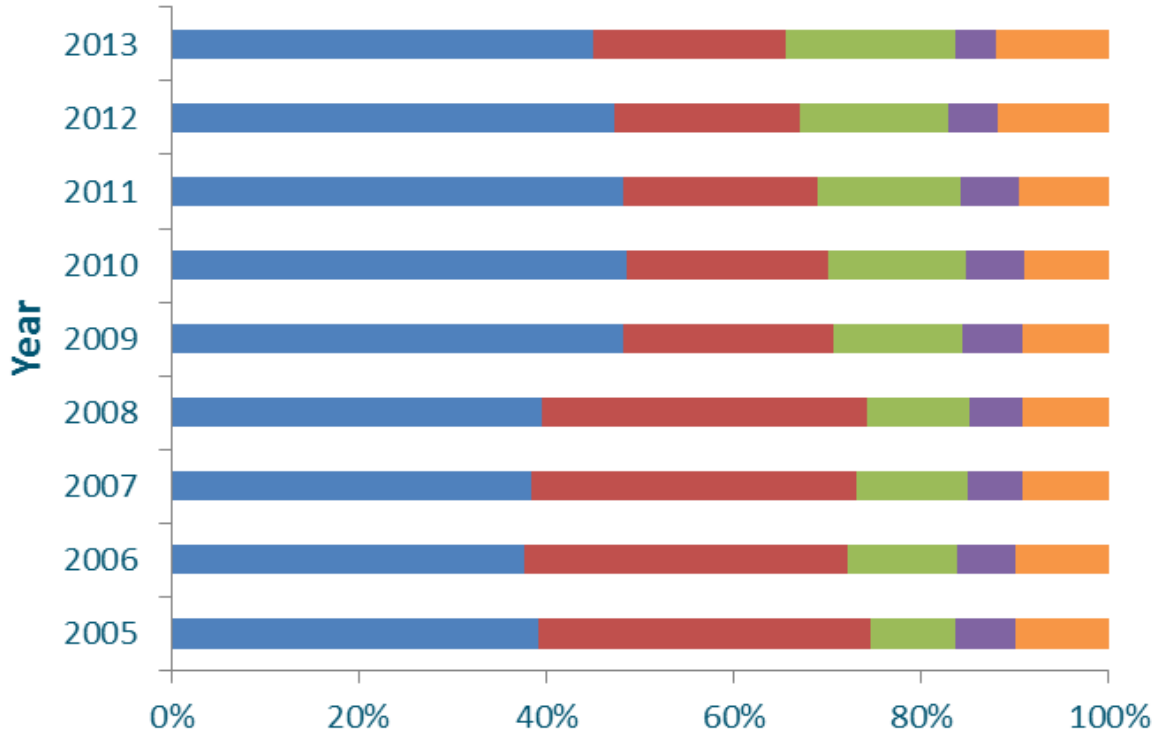
Data source: European Commission, Eurostat, 2015

CHP generated electricity and share in total electricity production by country in 2013



Source: COGEN Europe, based on Eurostat data, 2015

CHP fuel mix in the EU (2005-2013)



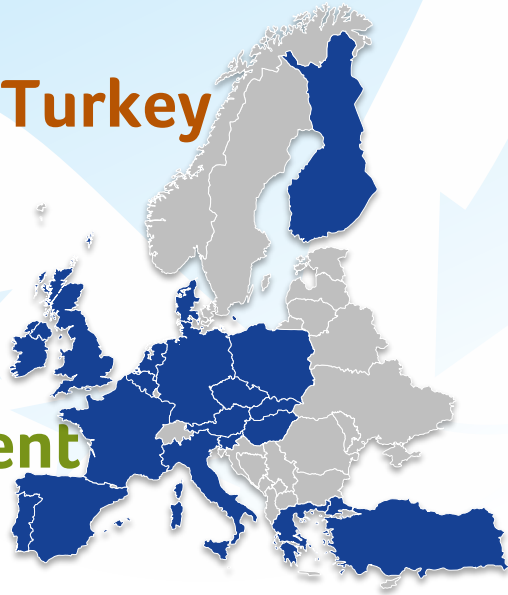
Source: COGEN Europe, based on Eurostat data, 2015

- CHP fuel mix strongly influenced by fuel price dynamics & support schemes
- **RES is increasing its share** in the CHP fuel mix, reaching **18% in 2013**

Expert contributions from **19** European countries...

2015 Cogeneration National Snapshot Survey

...representing **88%** of installed CHP capacity **in EU28 & Turkey**



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

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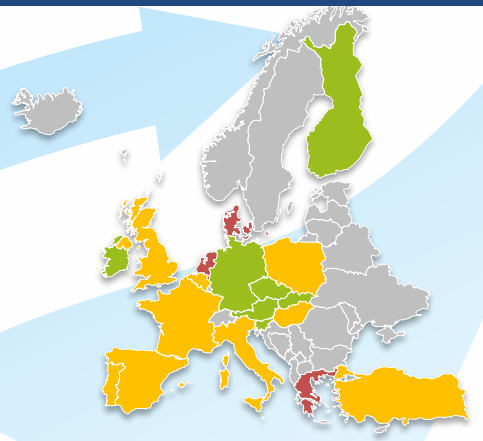
CHP market developments in Europe
Installed capacity (2011-2015)

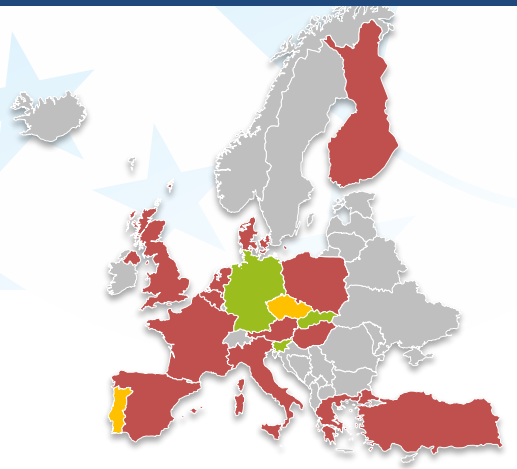
- Generally **stable installed capacity overall**, with **growth reported in markets representing 39% of installed capacity**

- More pronounced **standstill or decline in generated electricity** and share in total electricity production are at a due to a combination of the **economic downturn**, **unfavourable energy market conditions and unstable policy**.

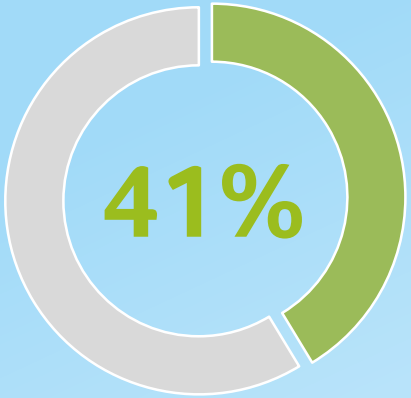
CHP installed capacity trends (2011-2015)



CHP generated electricity trends (2011-2015)

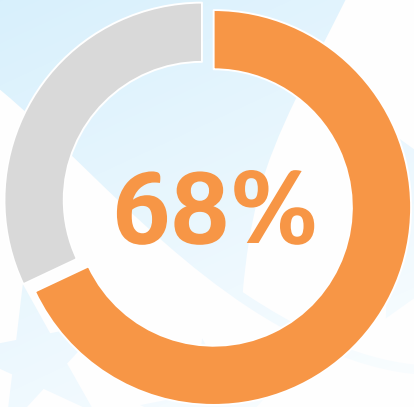


CHP market developments by application (2011-2015)



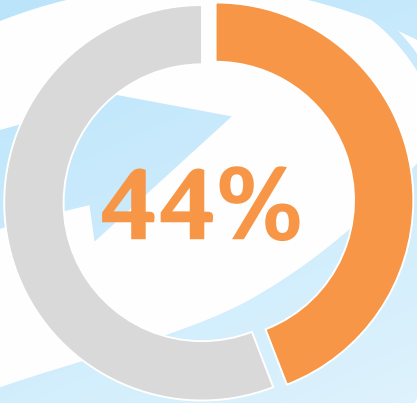
Commercial CHP is has taken off strongly in most national markets due to positive on-site spark spreads (BE, CZ, DE, HU, IE, PL, SI, UK).

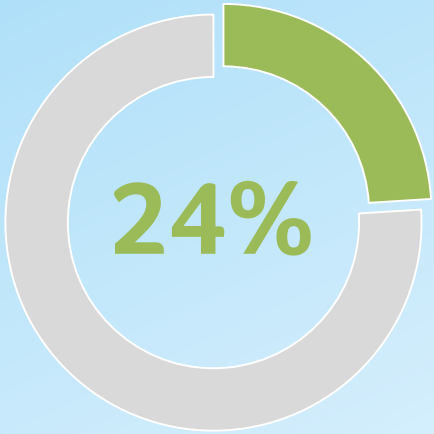
Flat trend for large industrial CHP in Europe, **as 68% of CHP markets reported either decline or no change.** Pockets of growth for this segment are reported in AU, CZ, HU, IE and TK.



CHP market developments by application (2011-2015)

District heating remained relatively stable across Europe, with no change reported in 44% of CHP markets. DHC is however experiencing a renaissance in several counties incl. CZ, FR, IT, SK, SI, UK

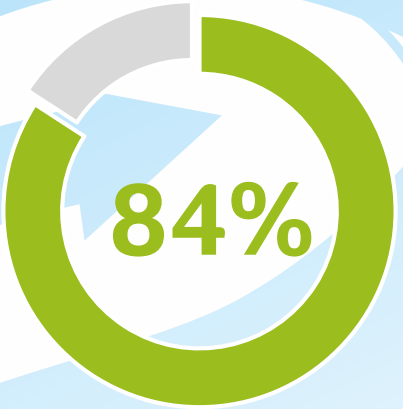


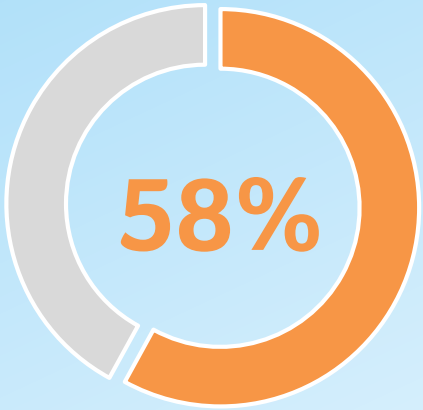


Micro-CHP growth is concentrated in three European countries representing 24% of European installed CHP capacity (BE, DE, SI)

CHP market developments by fuel (2011-2015)

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





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

Policy environment

CHP policy developments in 2015 - main trends

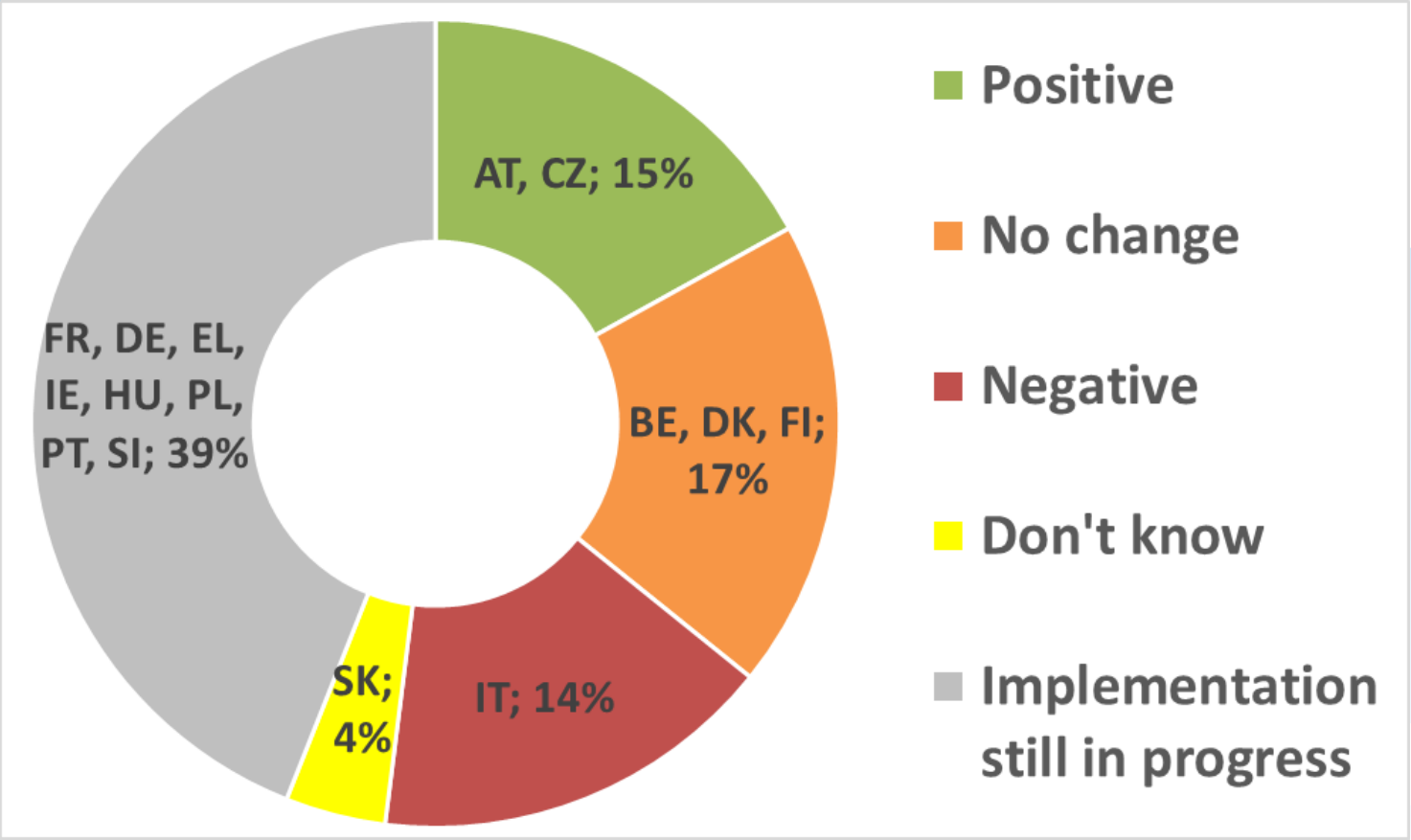
- Positive CHP market trends correlate with **stable, coherent and predictable policy frameworks**
- General policy instability sentiment in energy markets, reflected in CHP developments at national level
- **CHP is backed by strong political commitment in just a few countries**
- Energy Efficiency Directive implementation has been slow and lacking ambition → **impact on CHP still uncertain**
- Electricity markets regulation is becoming more prominent
- CHP supported via a mix of policy instruments across Europe
- **2014 State Aid Guidelines** for Environmental Protection coming into force → MS required to amend their support schemes accordingly

Energy Efficiency Directive Implementation

EED implementation deadline was December 2015:

- EU member states required to complete their Comprehensive Assessments of the potential of CHP (Art 14)
- MS to take appropriate actions to promote the further development of CHP (Art 14)
- Cost Benefit Analysis required for installations above 20 MW
- Guarantee the transmission & distribution of high efficiency CHP
- Simplified “install and inform” simplified connection procedure for micro-CHP

EED implementation experiencing delays and a lack of ambition

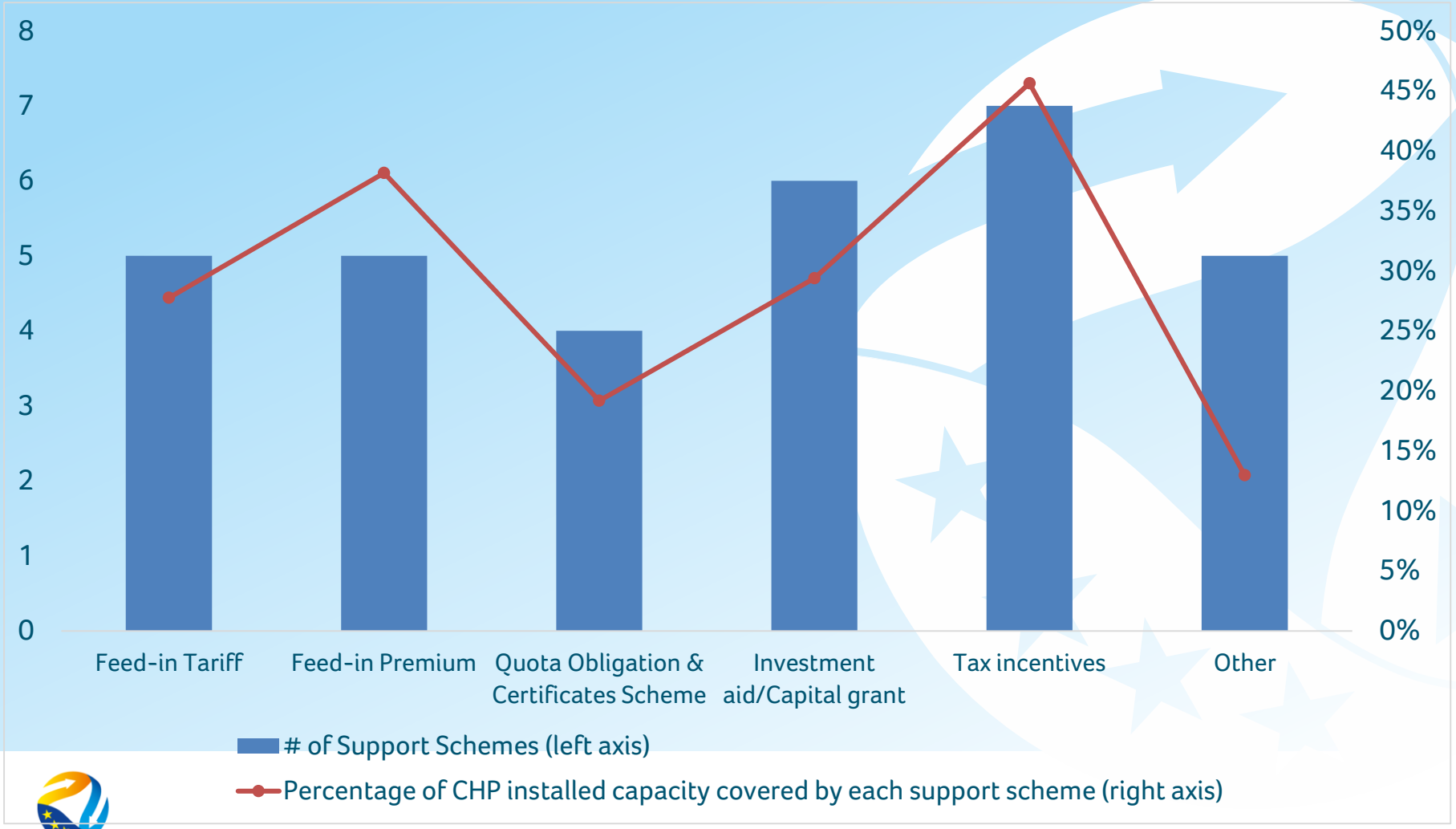


Electricity market regulations
- treatment of self-consumption -

- An important share of CHP in Europe is embedded in industries, small businesses and buildings → **most embedded CHPs designed for self-consumption**
- European Commission upcoming Electricity Market Design package to include **guidelines on self-consumption**
- Meanwhile Member States have different approaches in the treatment of self-consumed cogenerated electricity → tariff schemes for self-consumption newly adopted/in the pipeline with uncertain impact on CHP
- **Some examples:**
  - Expected introduction of capacity based tariffs in Belgium
  - One size fits all tariff for both CHP an intermittent RES in Czech Republic
  - On-going debate in UK on removal of embedded benefits for CHP

Available support for CHP

in EU28 & Turkey in 2016



CHP Support Schemes by country in 2016

	Feed-in Tariff	Feed-in Premium	Certificates Scheme	CAPEX support	Tax incentives	Other	No support
Austria				✓			
Czech Republic		✓			✓		
Denmark						✓	
Finland		✓		✓	✓		
Flanders (Belgium)			✓	✓	✓		
France	✓	✓			✓	✓	
Germany	✓	✓			✓		
Greece	✓						
Hungary						✓	
Ireland	✓				✓		
Italy			✓		✓	✓	
Netherlands				✓	✓		
Poland			✓	✓			
Portugal	✓						
Slovak Republic		✓					
Slovenia						✓	
Spain						✓	
Turkey							✗
United Kingdom					✓		

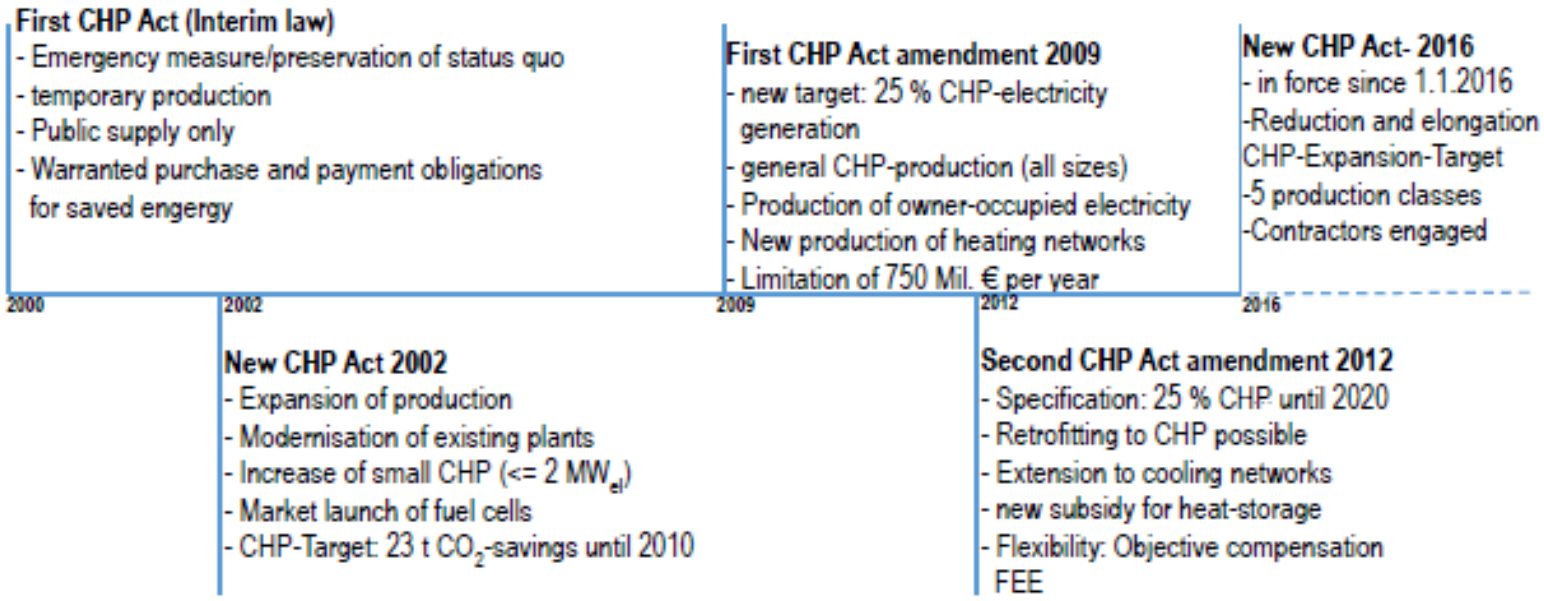
- **Support scheme instability considered as a major problem for investor confidence**
- Most support schemes are considered **inadequate for CHP needs**
- In some cases inconsistency between different types of support may upset the market

Case Study – CHP in Germany

CHP market developments in Germany

- Largest CHP market in Europe CHP currently generates approx. 96 TWh electricity
- The share of CHP in the total electricity generation is 16.2%
- The share of CHP-heat (200 TWh) in the heat market (>300°C) is approx. 20%
- High level political commitment to CHP counterbalancing poor spark spreads
  - CHP Law incl. CHP target
  - CHP considered an important contributor to achieving Energiewende objectives → CHP projected to contribute as much as 18% towards the additional required CO_2 reductions

German CHP policy developments



Source: B.KWK, 2016

German CHP policy developments
2016 CHP Law

Awaiting European Commission Approval

CHP Act 2012 (ct/kWh)		Bundestag Decision of 03.12.2015 for CHP Act 2016 (ct/kWh; Flexible rule in each case, meaning up to each performance share)					
Level kW_{el}	Generated CHP electricity	Level kW_{el}	CHP electricity for own consumption			Electricity supply for end users in customers' facility or closed distribution system	CHP electricity fed into general supply grid (Increase by 0,6 when CHP electricity replaces hard coal or brown coal CHP electricity)
			Property supply	electricity cost-intensive industry	Industrial sector according to RE Act2014 App. 4 (when Regulation adopted by the Min. of Econ.)		
≤50	5.41	≤50	4.00	5.41	1. total generation costs>Market price 2. Bonus ≤ (total generation costs-Market price)	4.0	8.0
		>50 to ≤100	3.00	4.0		3.0	6.0
>50 to ≤250	4.0	>100 to ≤250	0			2.0	5.0
≤2000	2.4	>250 to ≤2000	0	2.4		1.5	4.4
>2000	1.8	>2000	0	1.8		1.0	3.1
Liable to GHG Emissions Trading Act	2.1	Liable to GHG Emissions Trading Act	0	2.1			3.4

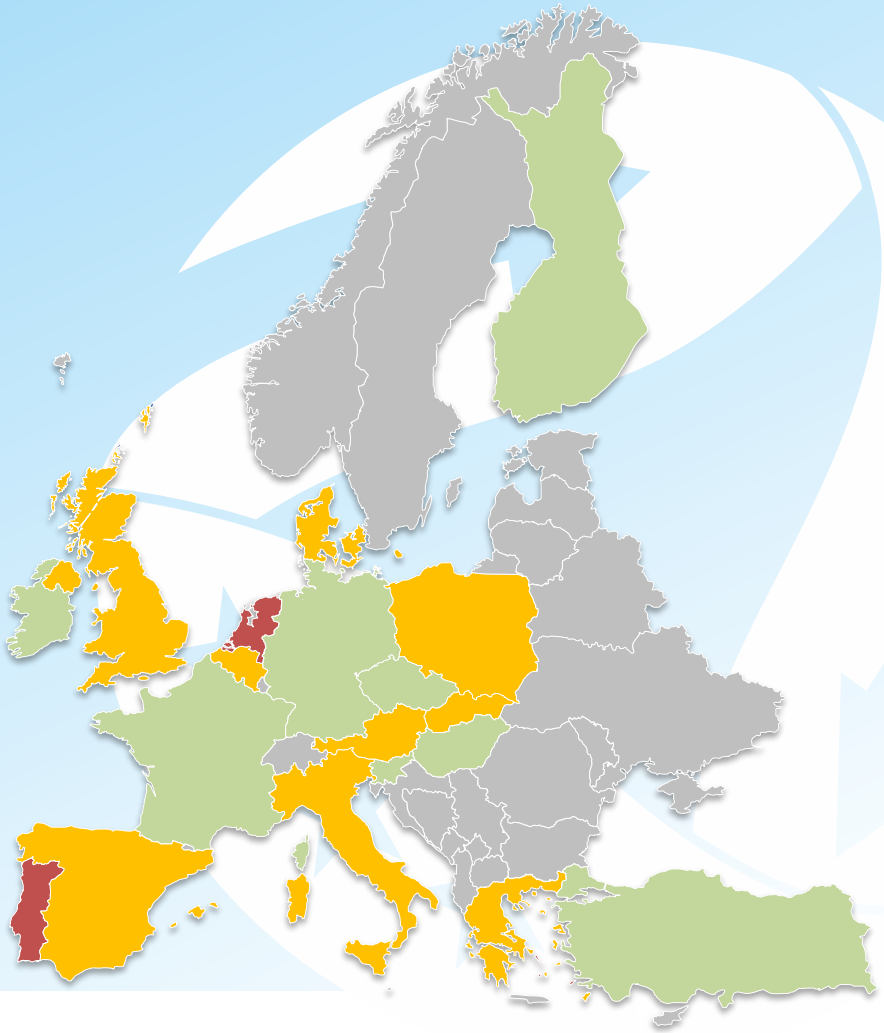
Source: B.KWK, 2016

CHP markets outlook

5-year CHP markets outlook

In more than **40% of the CHP markets surveyed, experts expect moderate growth** in the next 5 years.

- **Segments with growth potential:** commercial, light industry, hospitals, domestic, renewables, trigeneration, waste to energy
- **Expected decline in selected countries:** large industry



CHP Outlook

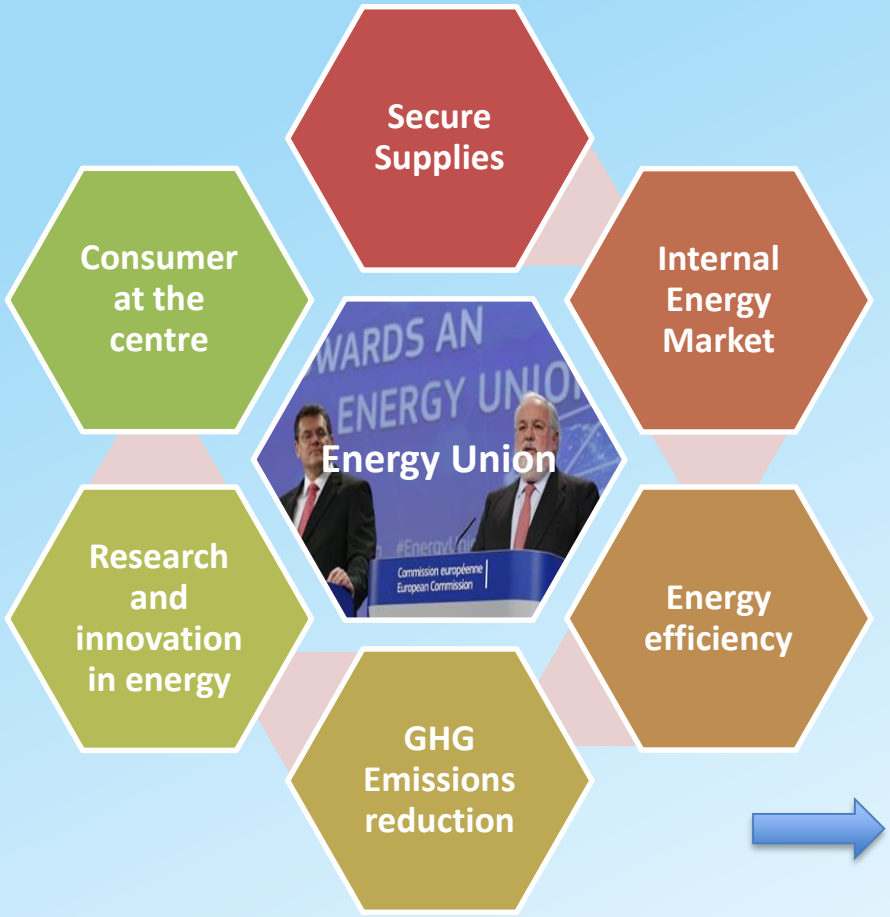
Prerequisites for growth

Better prospects for the CHP sector are contingent on:

- ✓ An ambitious **implementation of the EED**
- ✓ A favourable and **stable policy environment**
- ✓ **Improvement of energy market** conditions
- ✓ Improved **investment/financing opportunities**
- ✓ **Better awareness** of CHP technologies

EU Energy & Climate Policy Framework

State of the Energy Union (Nov. 2015)



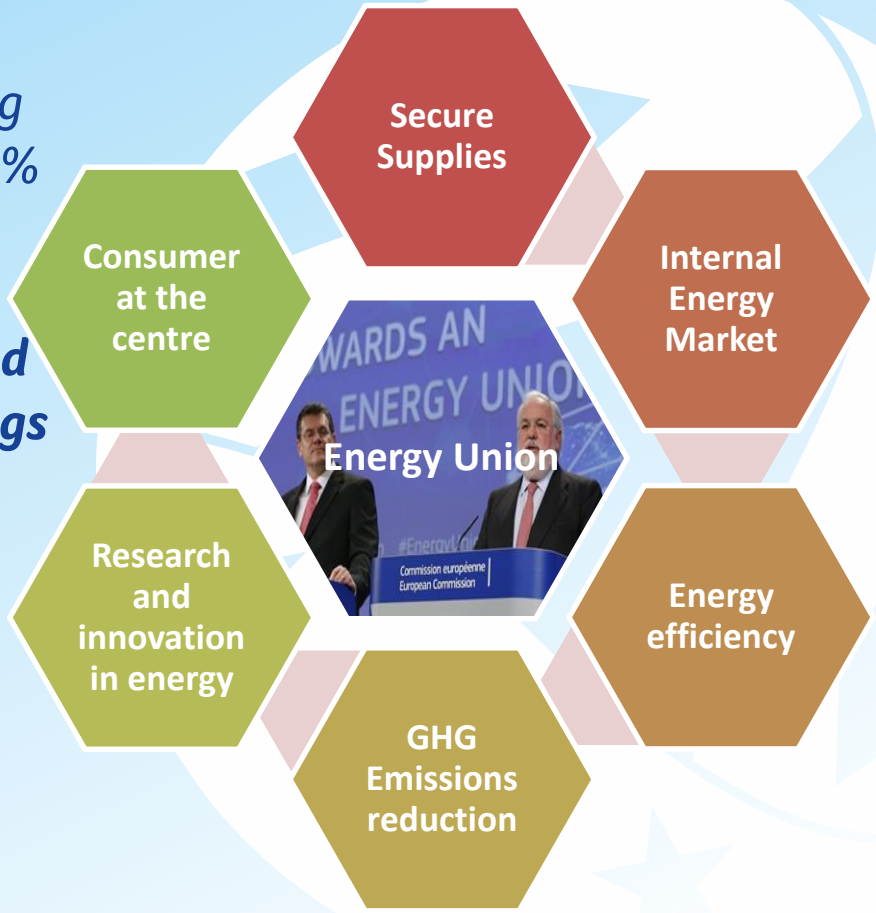
*"For the generation sector, the **analysed performance indicators showed a worsening trend in most countries**. In particular, the **share of heat produced from high-efficiency combined heat and power (CHP) as well as high-efficiency district heating and cooling needs to be further promoted** by Member States"*

MS need to step up efforts in promoting CHP & DHC

Source: State of Energy Union Communication, November 2015

State of the Energy Union (Nov. 2015)

"The report on progress in implementing the 2020 energy efficiency target of 20% by 2020 [...] shows that despite significant progress made, ***collective efforts of Member States correspond to only 17.6% primary energy savings compared to projections for 2020."***



Greater focus is needed on primary energy savings for EU to achieve its energy efficiency target

Source: State of Energy Union Communication, November 2015

2016: year of delivery of the Energy Union (for EU Commission)

EU Network Codes Implementation

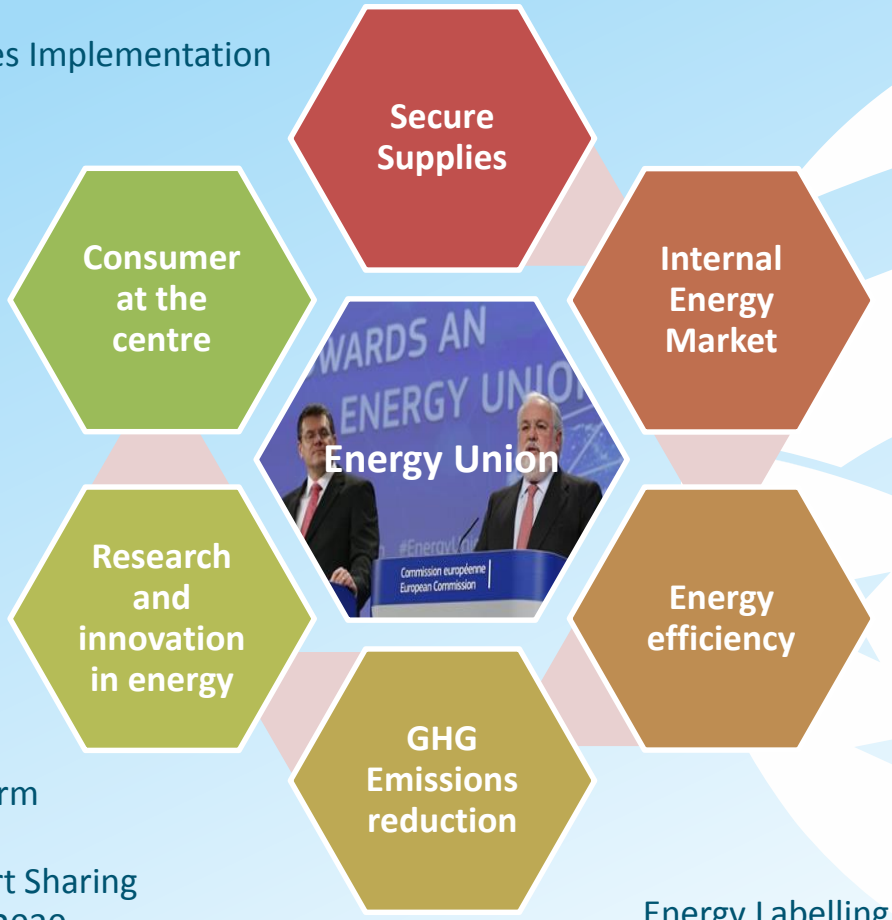
New Deal for energy consumers

Renewable Energy Self-Consumption Communication

Integrated Strategic Energy Technology (SET) Plan

EU ETS reform

New Effort Sharing Decision 2030



Electricity Market Design Initiative

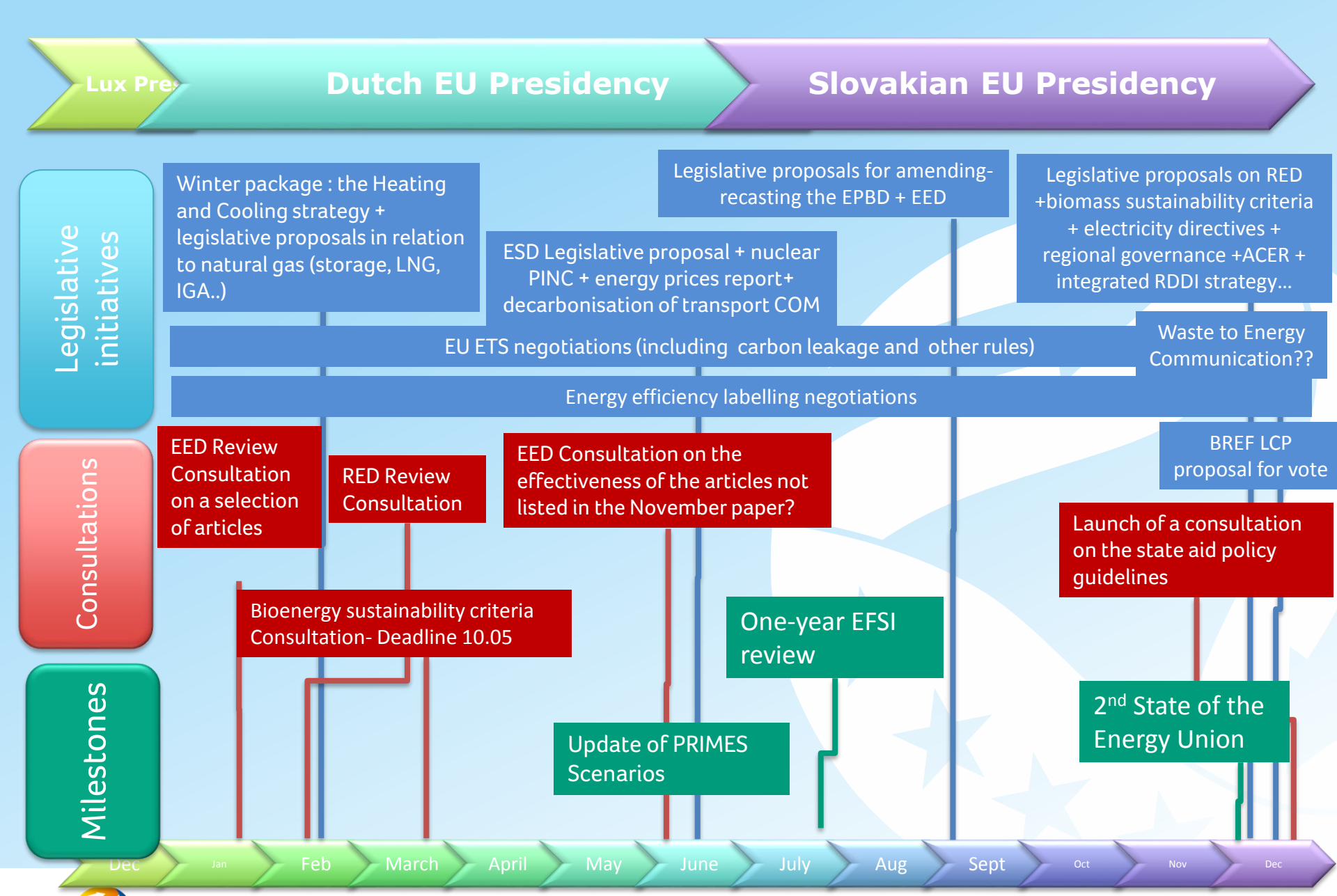
RES D Review

EED Review

EPBD Review

Energy Labelling Review

Heating and Cooling Strategy issued on 16 February!



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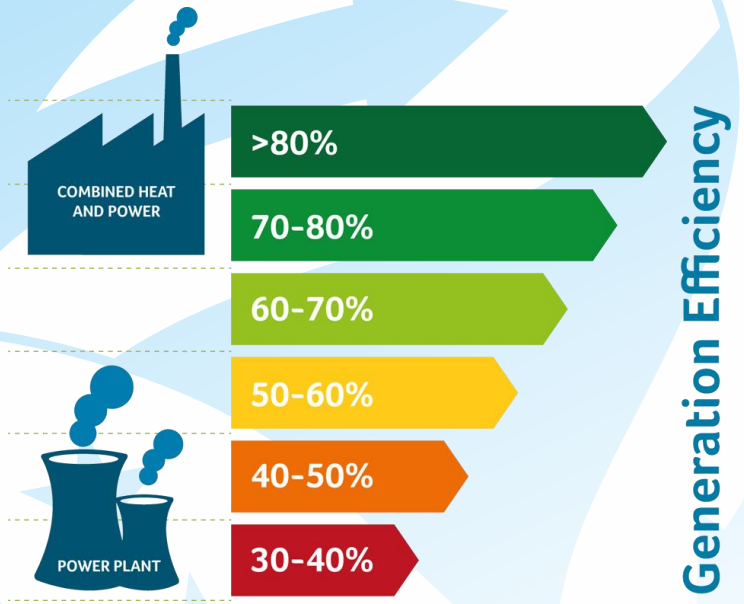
Conclusions

Mixed overall picture for CHP in Europe

- ✓ Most national markets experiencing **moderate overall growth**
- ✓ **Growth is driven by several sectors including small industrial, commercial sectors and renewable CHP**
- ✓ **CHP segments under pressure** from unfavorable energy markets conditions (i.e. clean spark spreads) and policy instability include **large industrial CHP and gas based CHP**

Reaching CHP potential contingent on…

- **Coherent, adequate and stable policy environments** are a must
- **Recovery of the energy markets** will positively affect CHP
- Smart, targeted and affordable **financing is key**
- Sector growth is linked to **higher awareness of CHP benefits** among small energy users, policymakers and financiers



EU policy developments

- Delivering on the **Energy Union framework** key importance for CHP
  - "**Energy efficiency first**" principle should prevail
  - Greater focus on **primary energy savings**
  - **Integrated approach to the energy system** → policy should take a holistic approach & explore **synergies between electricity, heat and gas networks**
- **Heating & Cooling Strategy** represents a milestone for CHP sector → actionable follow-up measures are needed
- **Energy Efficiency Directive (Art. 14 & 15) implementation** should be more ambitious and targeted towards harnessing CHP potential

Thank you for your attention!

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