

# The European Commission's science and knowledge service

## Joint Research Centre



# Synthesis report on the evaluation of national notifications related to Article 14 of the Energy Efficiency Directive

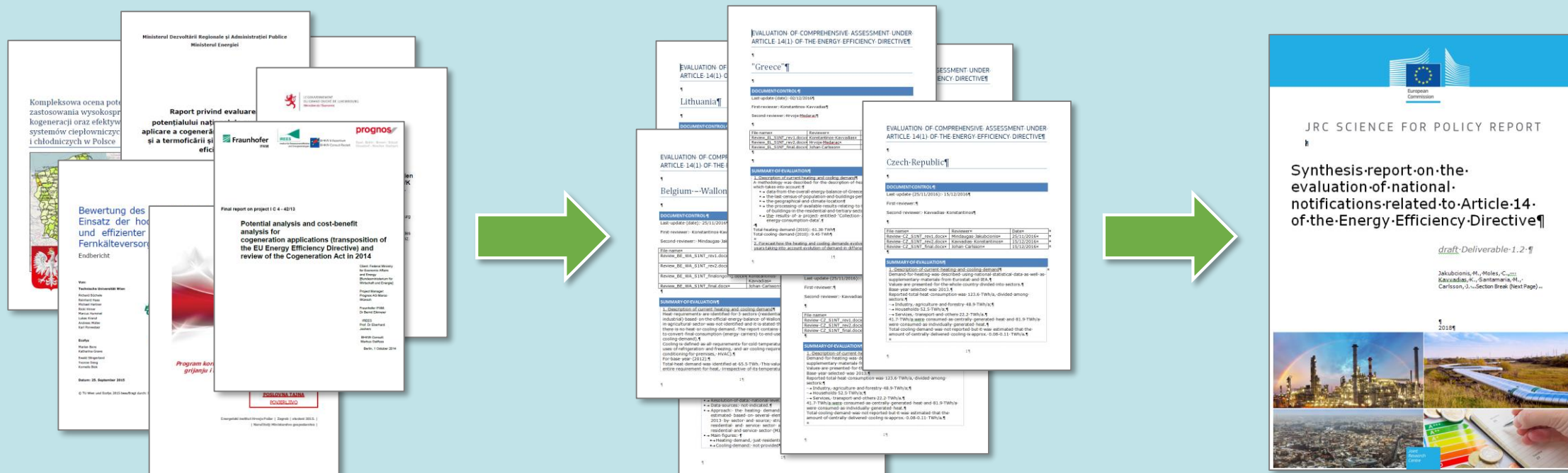
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Brussels

# Introduction

## Content and quality of MSs reports were evaluated from technical aspects

## Synthesis report

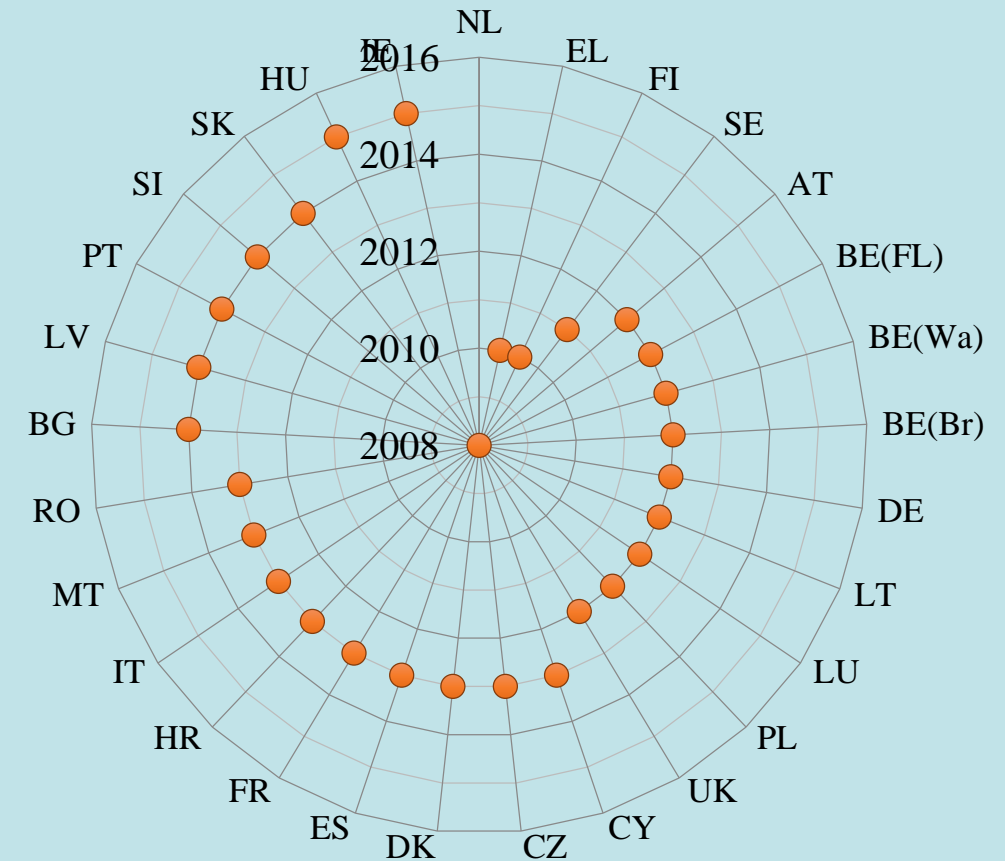


# Contents of the presentation

1. description of current heating and cooling demand
2. forecast of heating and cooling demand for the coming 10 years
3. heat map of the national territory
4. identification of the technical potential for HECHP, EDHC, and other efficient heating and cooling technologies
5. CBA and identification of economic potential
6. strategies, policies and measures that may be adopted
7. share of HECHP and progress achieved under Directive 2004/8/EC
8. estimate of the primary energy savings
9. estimate of public support measures
10. recommendations for future CAs

# Demand description: Base year

- The base year was in most cases 2012 or 2013. The oldest set of data used 2008 as base year
- Some reports used different base years for different demands/sectors, up to 5 years

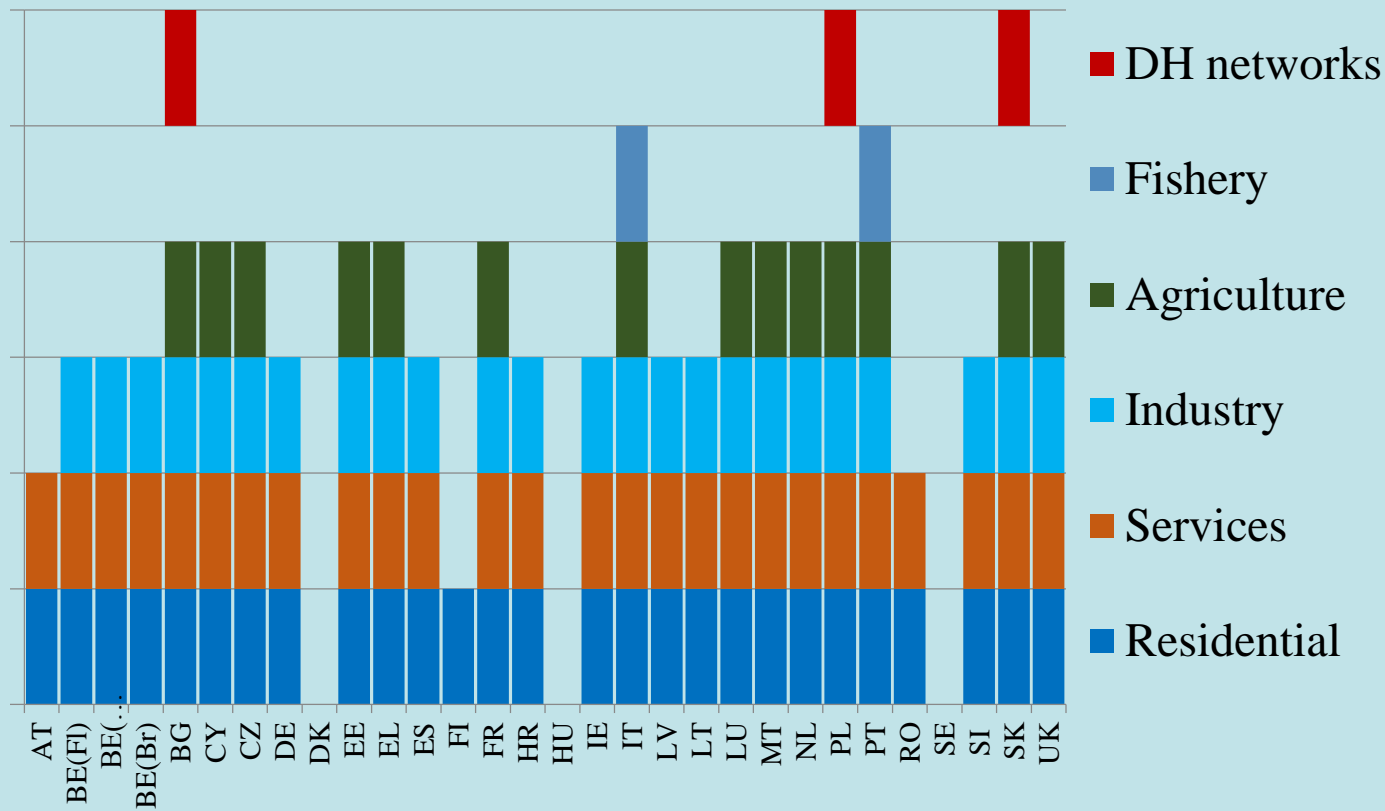


# Demand description: Heating and cooling demand

|          | Heating demand quantified | Cooling demand quantified |
|----------|---------------------------|---------------------------|
| AT       | Yes                       | Yes                       |
| BE – Fl. | Yes                       | Partially                 |
| BE – Wa. | Yes                       | Yes                       |
| BE – Br. | Yes                       | Yes                       |
| BG       | Yes                       | Yes                       |
| CY       | Yes                       | Yes                       |
| CZ       | Yes                       | No                        |
| DE       | Yes                       | Partially                 |
| DK       | Yes                       | Yes                       |
| EE       | Partially                 | No                        |
| EL       | Yes                       | Yes                       |
| ES       | Yes                       | Yes                       |
| FI       | Yes                       | Yes                       |
| FR       | Yes                       | No                        |
| HR       | Yes                       | Yes                       |
| HU       | Only DH                   | No                        |
| IE       | Yes                       | No                        |
| IT       | Yes                       | Yes                       |
| LV       | Yes                       | No                        |
| LT       | Only DH                   | No                        |
| LU       | Yes                       | Yes                       |
| MT       | Yes                       | Yes                       |
| NL       | Yes                       | Yes                       |
| PL       | Yes                       | Yes                       |
| PT       | Yes                       | Yes                       |
| RO       | Yes                       | No                        |
| SE       | Only DH                   | Only DC                   |
| SI       | Yes                       | Partially                 |
| SK       | Yes                       | No                        |
| UK       | Yes                       | Yes                       |

- All MSs provided description of heating demand, although at different level of detail
- Nine reports contained no description of cooling demand and 3 contained partial descriptions
- Generally, the level of detail in describing the cooling demand was much lower than for heating demand

# Demand description: Sectorial disaggregation



- Heating demand usually estimated for residential, services and industry
- 11 reports also included agriculture
- Cooling demand usually without sectorial disaggregation



# Demand description: Methods used

- Very high level of detail was achieved when energy consumption was estimated based on separate buildings
- Other countries, not having such detailed information, often prepared estimates based on lower administrative division units, for instance LAU-2 (municipalities)
- In order to fill data gaps or to ensure consistency of estimations different data sources and methods were used.
- The estimation of cooling demand often required many assumptions due to the scarcity of data



# Demand description: Recommendations

- The CA should include a description of the whole heating and cooling demand, i.e. not only the one provided by CHP and DHC or some sectors
- Level of spatial resolution of available data should be improved. In some cases only country level data was used
- Cooling demand should be identified at the same level of detail as heating demand
- Harmonise sectors to be analysed, base year etc

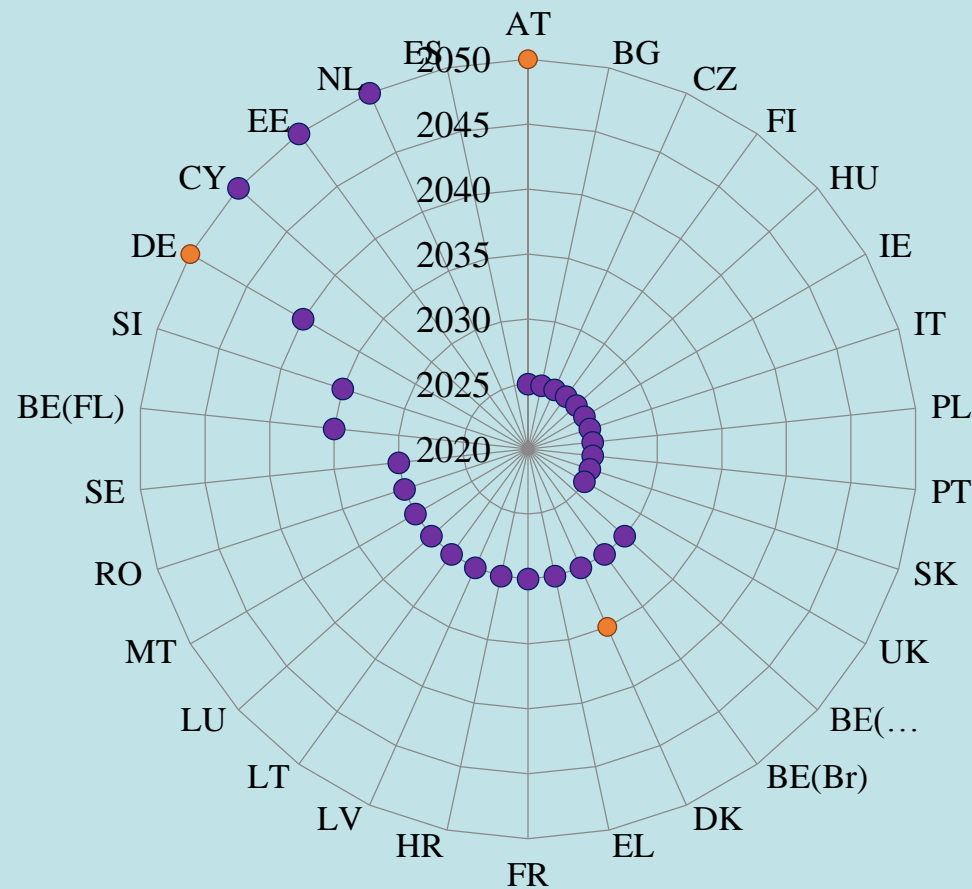
# Demand forecast: Results

|        | Heating forecast | Cooling forecast |
|--------|------------------|------------------|
| AT     | Yes              | Yes              |
| BE(FL) | Yes              | No               |
| BE(Wa) | Yes              | No               |
| BE(Br) | Yes              | Yes              |
| BG     | Yes              | Yes              |
| CY     | Yes              | Yes              |
| CZ     | Yes              | No               |
| DE     | Partially        | Partially        |
| DK     | Yes              | Yes              |
| EE     | DH only          | No               |
| EL     | Yes              | Yes              |
| ES     | No               | No               |
| FI     | Yes              | Yes              |
| FR     | Yes              | No               |
| HR     | Yes              | Yes              |
| HU     | Only DH          | No               |
| IE     | No values        | No               |
| IT     | No               | No               |
| LV     | Yes              | No               |
| LT     | DH only          | No               |
| LU     | Partially        | No               |
| MT     | Yes              | Yes              |
| NL     | Yes              | Yes              |
| PL     | Yes              | Yes              |
| PT     | Partially        | Partially        |
| RO     | Yes              | No               |
| SE     | DH only          | For DC           |
| SI     | Yes              | Yes              |
| SK     | Yes              | No               |
| UK     | Yes              | Yes              |

- Forecasts using econometric exponential models, others used different indicators derived from both European and/or national sources
- Level of sectorial disaggregation of the heating demand forecast generally followed the same principles as the current demand description
- In majority of reports cooling demand was not forecasted

# Demand forecast: Timeframe of the forecast

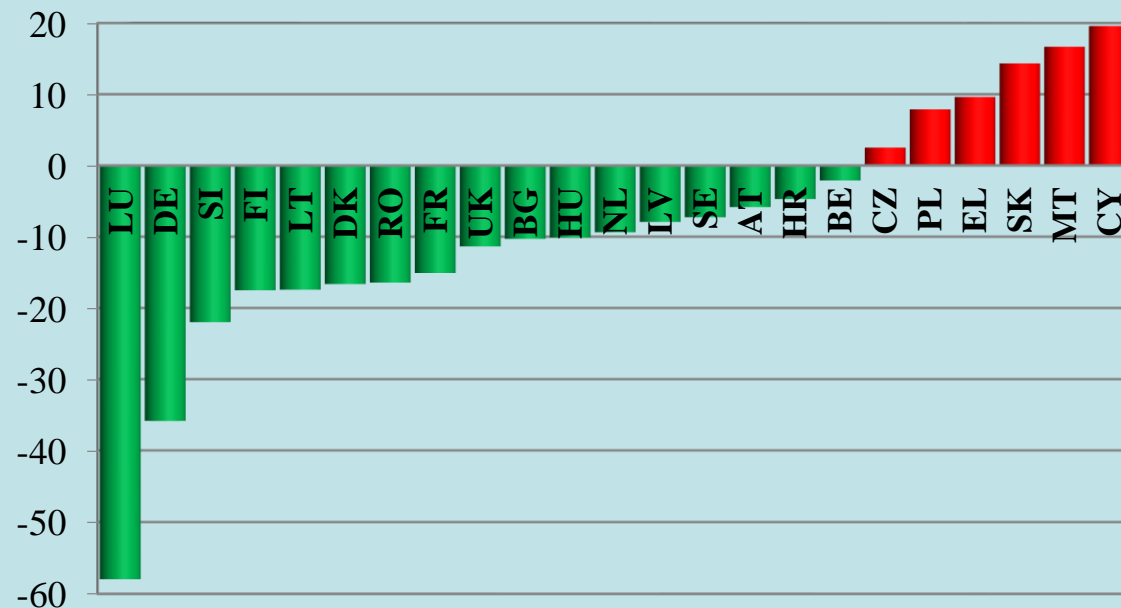
- All analysed reports provided heating demand forecast for the next 10 years
- Four MSs provided demand forecasts till 2050, but in most cases they were until 2025 or 2030



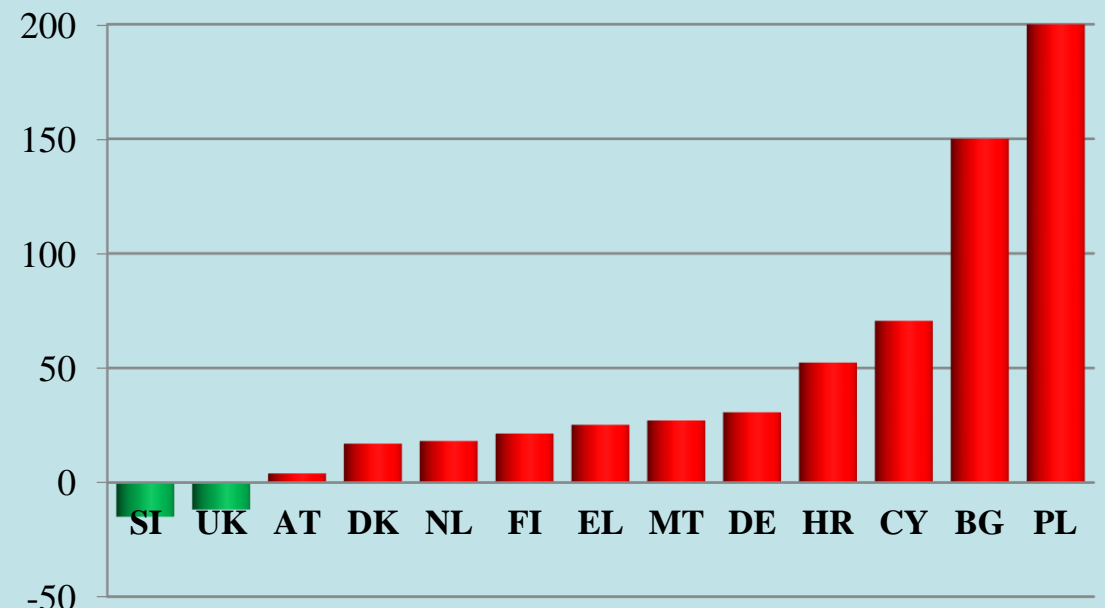
# Demand forecast: Projected changes in heating and cooling demand

- 5 reports contained no forecast of heating demand and 13 no forecast of cooling demand

Forecasted change in **heating** demand (from base to final year), %



Forecasted change in **cooling** demand (from base to final year), %

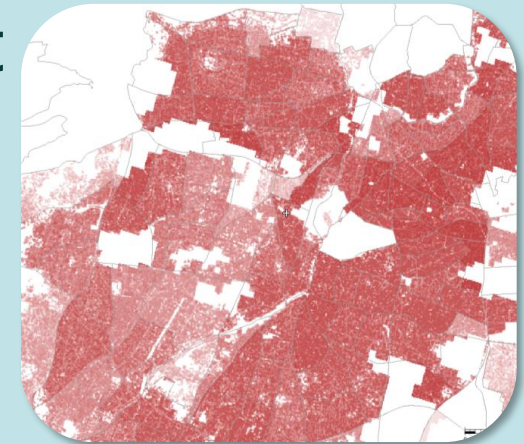


# Demand forecast: Recommendations

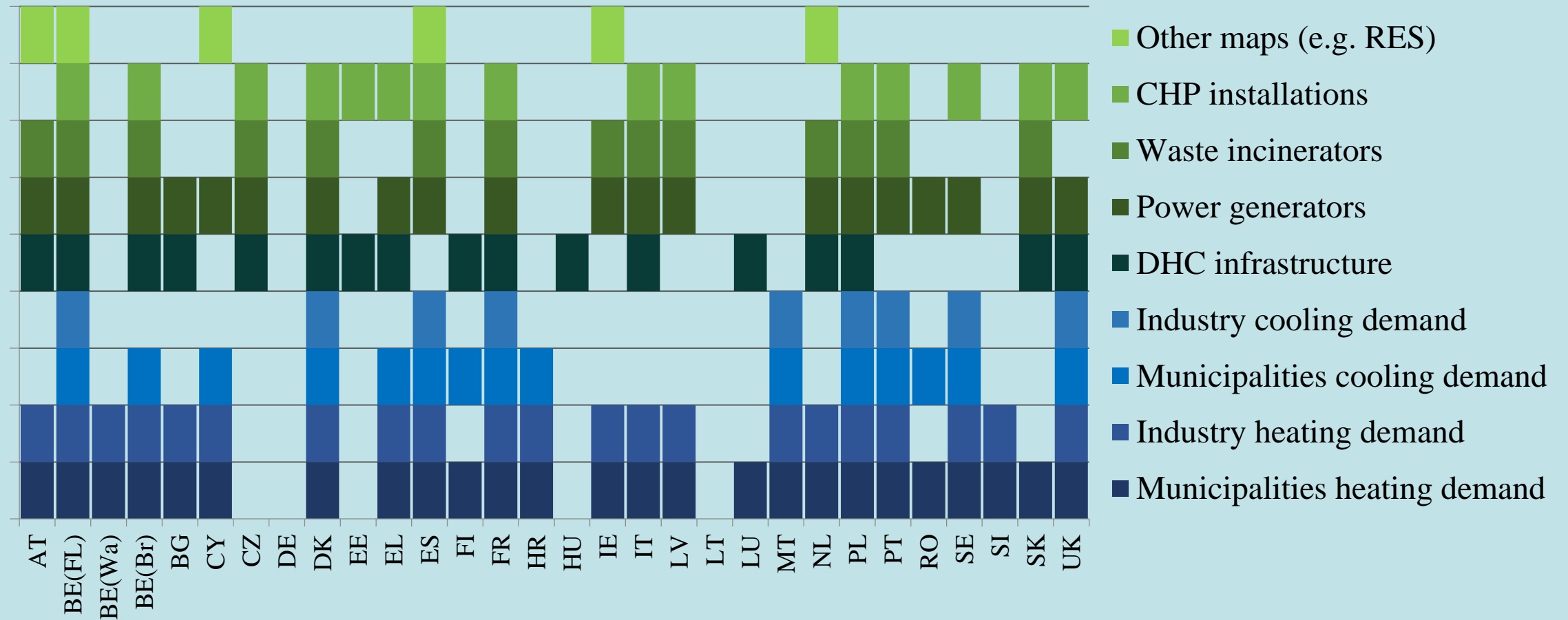
- Timeframe of heating and cooling demand forecasts should be made consistent with the timeframe of the CBA (instead of current requirement of 10 years)
- Forecasts of all energy demands (heating of buildings, SHW, cooling of buildings, industrial process heat consumption, etc.) should be included

# Heat map: Resolution

- Boundaries of municipalities or other territorial units were the most common way to represent heating and cooling demand in the heat maps
- Some heat maps used square grids of different dimensions, for instance 1x1 km<sup>2</sup>



# Heat map: Information presented



1. A DESCRIPTION OF HEATING AND COOLING DEMAND | 2. A FORECAST OF HEATING AND COOLING DEMAND

**3. A HEAT MAP OF THE NATIONAL TERRITORY** | 4. IDENTIFICATION OF THE TECHNICAL POTENTIAL | 5. CBA AND ECONOMIC POTENTIAL

6. STRATEGIES, POLICIES AND MEASURES | 7. THE SHARE OF HECHP AND PROGRESS ACHIEVED

8. AN ESTIMATE OF THE PRIMARY ENERGY SAVINGS | 9. AN ESTIMATE OF PUBLIC SUPPORT MEASURES

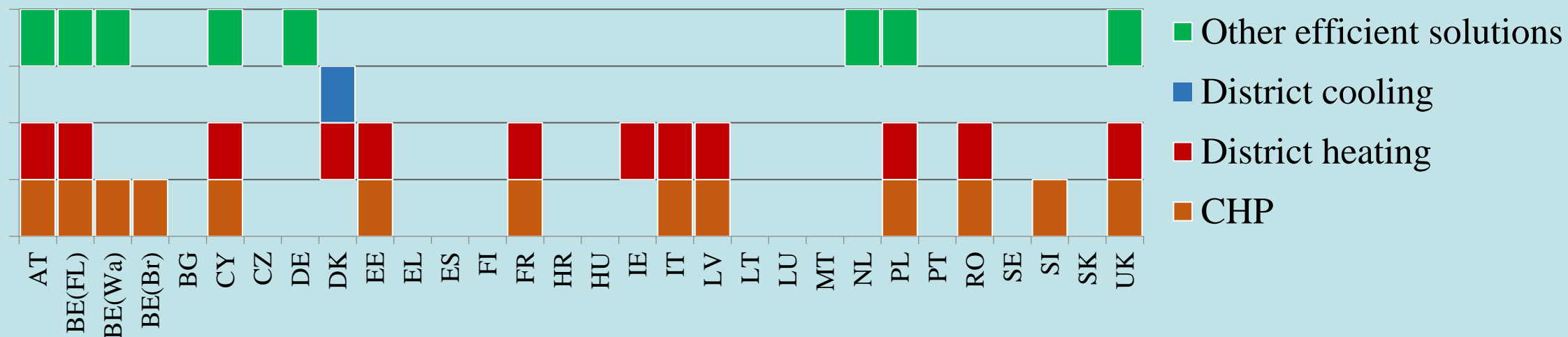


# Heat map: Recommendations

- Lack of precise specifications in EED allows various layers in different resolutions. -> heat map layers should be agreed upon before the next round of CA's in 2020
- EED Annex VIII provides a limited list of potential heating and cooling supply points to be included into a heat map. This list should be expanded with all potential heating and cooling supply points larger than 20 GWh, e.g. industries
- In order to provide more information for decision making process, it would be useful to visualize forecasted data on future heating and cooling demand as well

# Identification of the technical potential: Results

- No clear definition or direct reference to technical potential in the EED: it just refers to *'identification of demand that could be satisfied by...'*
- Therefore, MSs could decide how to tackle and present

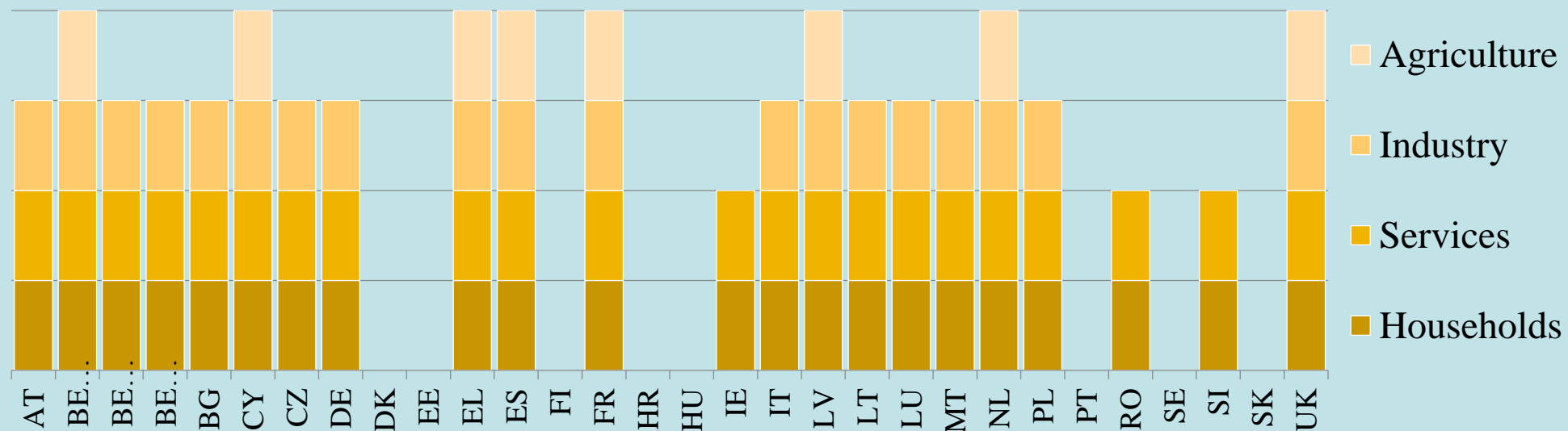


# Identification of the technical potential: Recommendations

- The Directive should explain how to estimate and report the technical potential
- A minimum list of technologies/heat sources to examine should be agreed. JRC proposes that CHP, DHC, waste heat from industry, geothermal, solar heat, heat pumps to be analysed

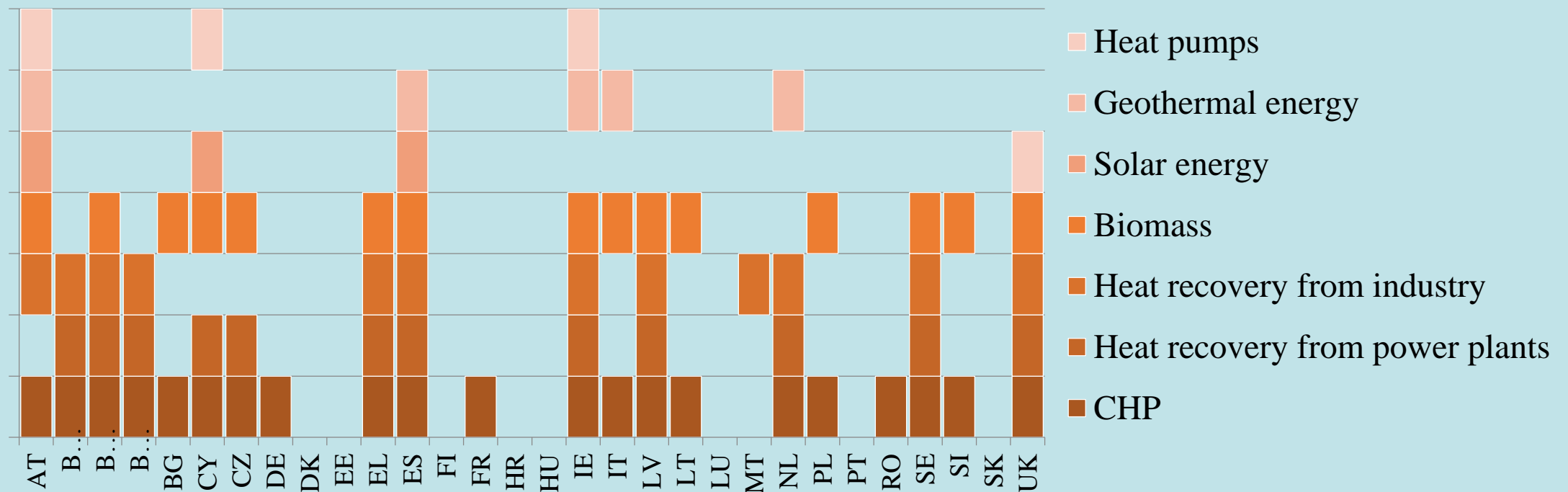
# Cost-Benefit Analysis: Sectors analysed

- 8 countries did not perform a CBA
- Only 9 countries included cooling demand into CBA



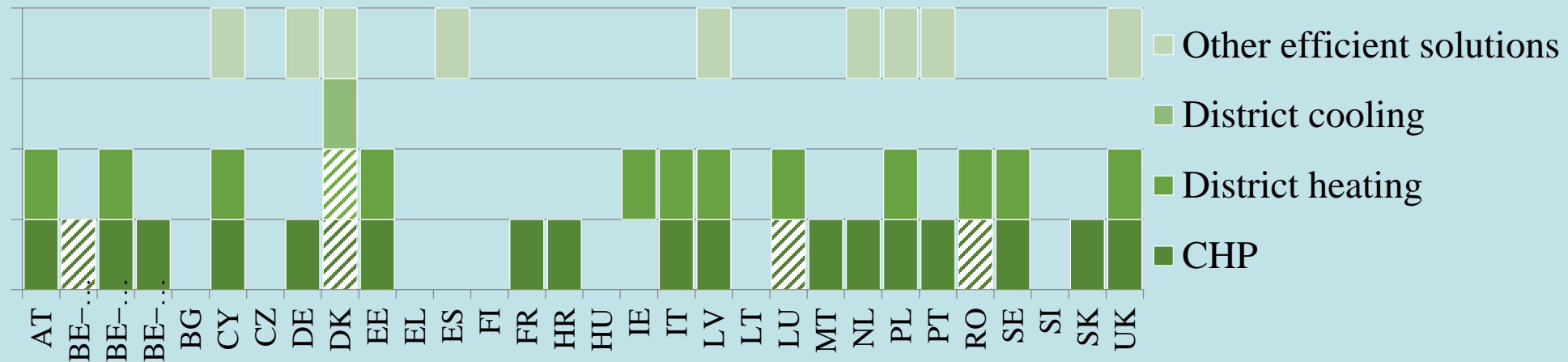
# Cost-Benefit Analysis: Heat supply options for efficient district heating networks

- Some MSs only considered natural gas CHP as a heat source for district heating network



# Cost-Benefit Analysis: Economic potential

- Economic potential is not clearly defined in the EED
- Several countries only performed a financial analysis, thus external costs were not accounted for



# Cost-Benefit Analysis: Recommendations

- Clarify connection between Annex IX and Annex VIII. Possibility to have concrete instructions in one Annex should be analysed
- Clear definitions of economic and financial potentials should be provided.
- Templates to report economic potentials, prices and assumptions



# Drafting strategies, policies and measures: Results

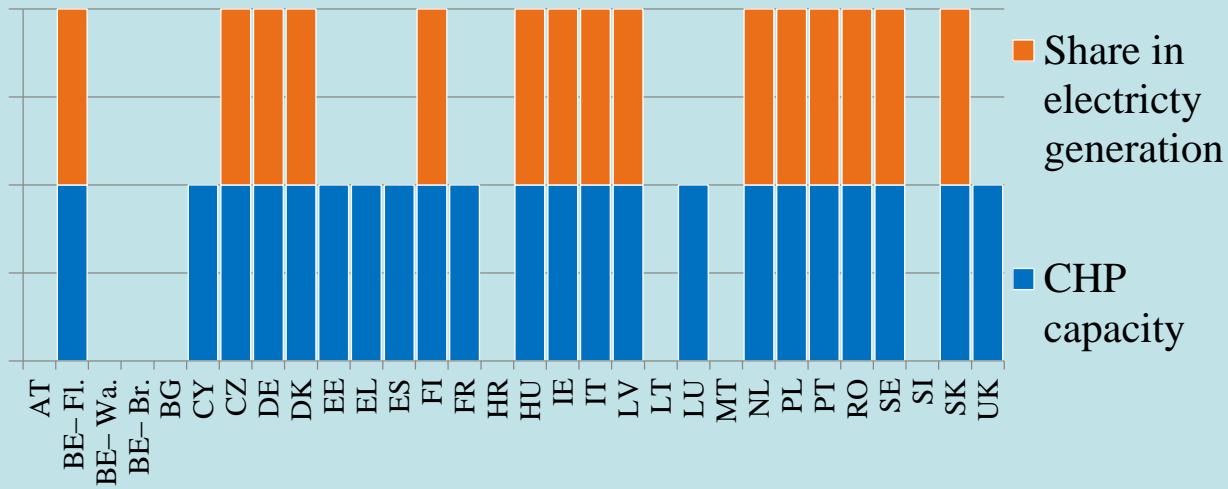
- One of the weakest topics in all reports
- 7 reports provided no information about strategies, policies and measures that may be adopted up to 2020 and 2030
- 12 reports provided only information about existing policies
- Information provided mostly related with CHP and district heating

# Drafting strategies, policies and measures: Recommendations

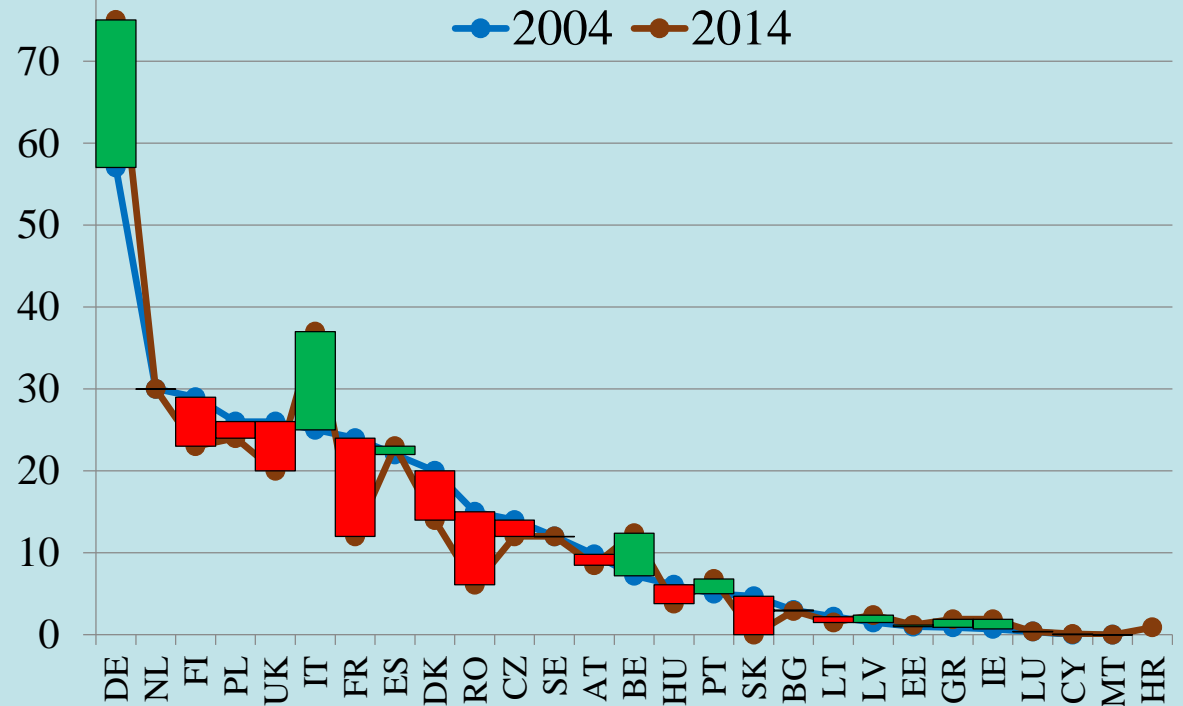
- Development of relevant strategies, policies and measures as a part of CA, should be strengthened
- Given the limited progress of cogeneration in many Member States, the reason for this should be evaluated

# The share of HECHP, the potential established and progress achieved: Results

What was reported?



Gross electricity generation by CHP



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6. STRATEGIES, POLICIES AND MEASURES | **7. THE SHARE OF HECHP AND PROGRESS ACHIEVED**
8. AN ESTIMATE OF THE PRIMARY ENERGY SAVINGS | 9. AN ESTIMATE OF PUBLIC SUPPORT MEASURES

# The share of HECHP, the potential established and progress achieved: Recommendations

- EUROSTAT data - the realisation of HECHP potential in several Member States is low. The reasons should be evaluated.

# Estimation of primary energy savings: Results

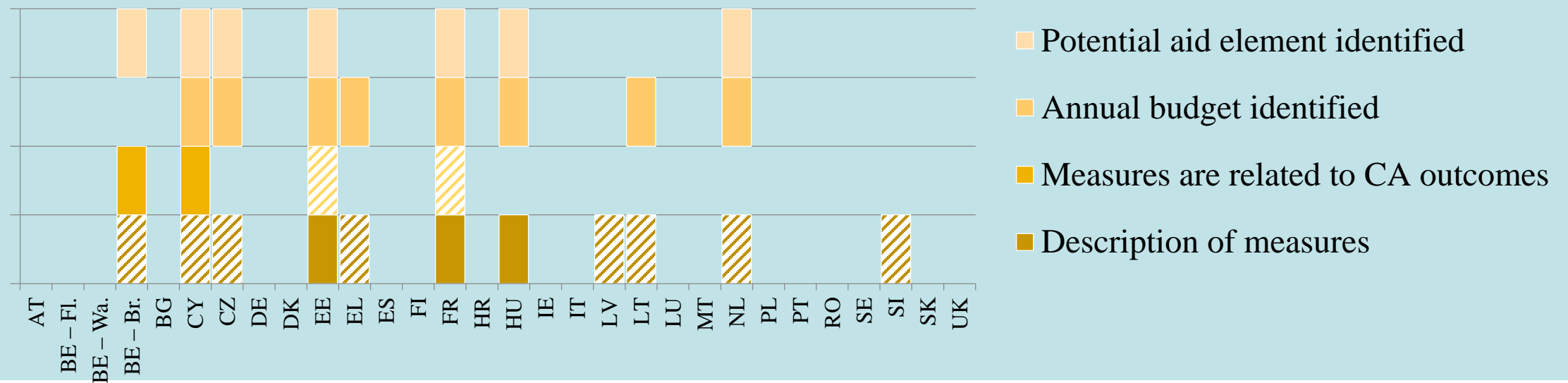
- 15 MSs provided no estimation of primary energy savings;
- Primary energy savings were mainly reported using two methods:
  - For a scenario compared to the baseline
  - For a specific high efficiency technology compared to another conventional one

# Estimation of primary energy savings: Recommendations

- The EED does not clearly indicate what primary energy savings the MSs should evaluate, which creates confusion and non-harmonized reports. A more precise definition should be agreed upon, e.g. compared to baseline

# Public support measures to heating and cooling: Results

- Only two reports described public support measures to heating and cooling related directly to the CA performed and two more reports discussed how existing measures support the implementation of the identified potential





# Public support measures to heating and cooling: Recommendations

- The reasons for the absence of estimates of public support measures to heating and cooling in the majority of reports should be investigated

# Main findings

- The scope of the comprehensive assessment is very large and it was a major effort for Member States to execute it
- Most Member States did not perform all elements of the assessments as described in the EED and the SWD
- The assessments differed significantly in terms of approaches and how data were reported
- The CAs contain some weaknesses, but they have also made Member States more conscious of the energy efficiency potentials. If these weaknesses will be addressed before the next round of assessments, then the benefits will be significantly enhanced

# General recommendations

- The next round of assessments should be based on a more harmonised set of data and a more standardized way to prepare the assessments, possibly making use of a reporting template
- Annexes VIII and IX of EED should be updated, ambiguities addressed and more details on the analysis provided
- The reuse of outdated analyses significantly deviating from the ones presented in the EED should not be allowed

# General recommendations

- Data collection should be improved at MS level. MSs with experience in collecting data for heating and cooling could share their data collection practises with other MSs
- While HECHP and DHC remain part of the systematic analysis, other potentially efficient solutions should be assessed, e.g. waste heat from industries, renewable heat sources and heat pumps
- The reasons of many MSs not addressing all the elements of the assessments as described in the EED should be clarified and further actions should be taken

# Thank you

