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EED Art. 14 CHP, Heating and Cooling *Smart, efficient and sustainable heating and cooling systems*

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CA-EED: CT7 leader - Efficiency in Energy Supply



12th ENERGY EFFICIENCY COORDINATION GROUP MEETING

Energy Community Secretariat, Vienna, 15 November 2016

EED – Art. 14:

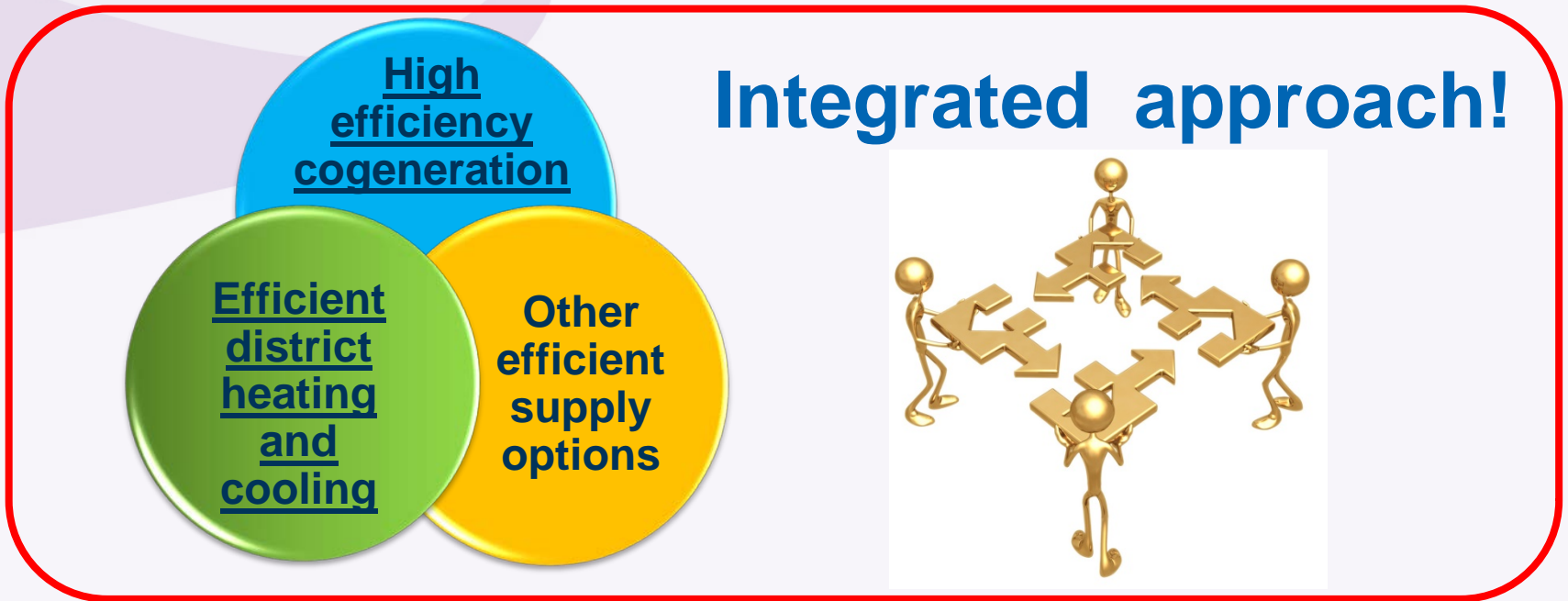
Efficiency in energy supply

overall objective



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The overall objective is to encourage the identification and delivery of cost effective potential for efficient heating and cooling through the use of:

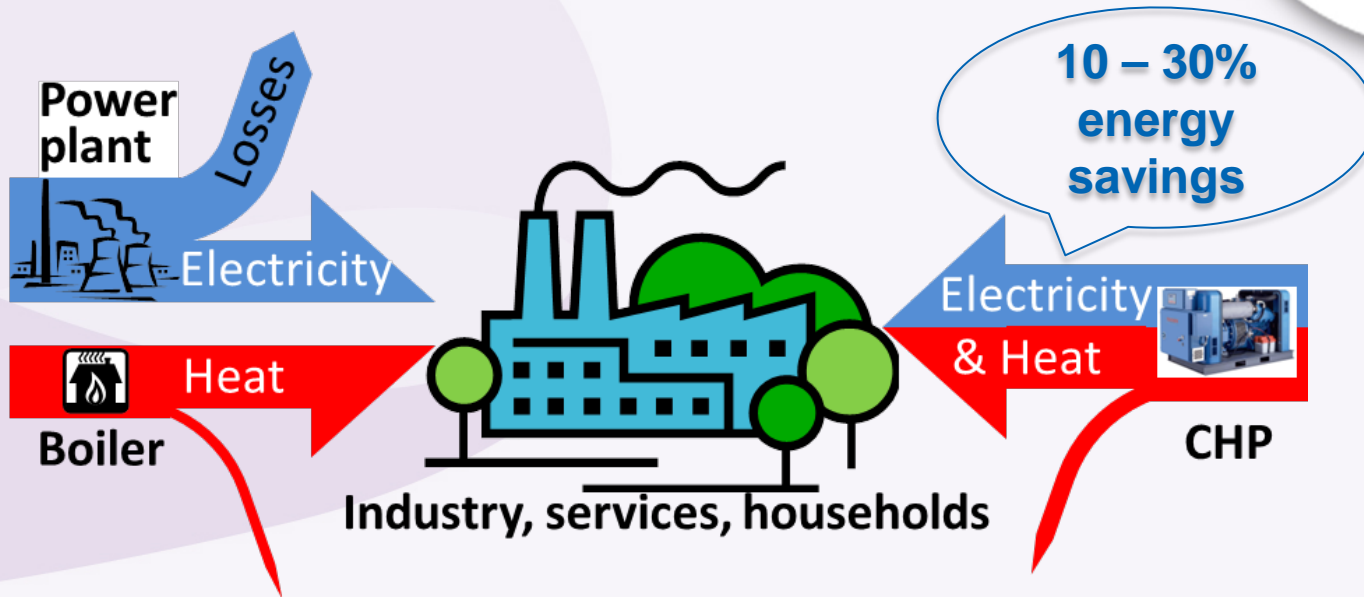


Efficient heating & cooling: planning & utilization

High-efficiency cogeneration (CHP) definition



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Requested
Criteria



High-efficiency cogeneration (CHP) criteria



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1. Annual overall efficiency > 75 %

(80% for combined cycle GT and condensing steam turbines)

- If not fulfilled only part of electricity eligible:

$$E_{\text{CHP}} = H_{\text{CHP}} * C$$

2. Primary energy savings >10 (>0 micro CHP)

$$\text{PES} = 1 - \left(\frac{1}{\frac{\eta_{\text{CHP}_H} + \eta_{\text{CHP}_E}}{\eta_{\text{Ref}_H} + \eta_{\text{Ref}_E}}} \right) \times 100 \%$$

Values of CHP unit

Harmonised eff. reference values for separate production of EI & H
(EU) 2015/2402

Harmonised efficiency reference values for separate production of electricity (EU) 2015/2402



| Category | Type of fuel | Year of construction | | | |
|----------|--------------|--|-----------|-----------|------|
| | | Before 2012 | 2012-2015 | From 2016 | |
| Solids | S1 | Hard coal including anthracite, bituminous coal, sub-bituminous coal, coke, semi-coke, pet coke | 44,2 | 44,2 | 44,2 |
| | S2 | Lignite, lignite briquettes, shale oil | 41,8 | 41,8 | 41,8 |
| | S3 | Peat, peat briquettes | 39,0 | 39,0 | 39,0 |
| | S4 | Dry biomass including wood and other solid biomass including wood pellets and briquettes, dried woodchips, clean and dry waste wood, nut shells and olive and other stones | 33,0 | 33,0 | 37,0 |
| | S5 | Other solid biomass including all wood not included under S4 and black and brown liquor. | 25,0 | 25,0 | 30,0 |
| | S6 | Municipal and industrial waste (non-renewable) and renewable/biodegradable waste | 25,0 | 25,0 | 25,0 |
| Liquids | L7 | Heavy fuel oil, gas/diesel oil, other oil products | 44,2 | 44,2 | 44,2 |
| | L8 | Bio-liquids including bio-methanol, bioethanol, bio-butanol, biodiesel and other bio-liquids | 44,2 | 44,2 | 44,2 |
| | L9 | Waste liquids including biodegradable and non-renewable waste (including tallow, fat and spent grain). | 25,0 | 25,0 | 29,0 |
| Gaseous | G10 | Natural gas, LPG, LNG and biomethane | 52,5 | 52,5 | 53,0 |
| | G11 | Refinery gases hydrogen and synthesis gas | 44,2 | 44,2 | 44,2 |
| | G12 | Biogas produced from anaerobic digestion, landfill, and sewage treatment | 42,0 | 42,0 | 42,0 |
| | G13 | Coke oven gas, blast furnace gas, mining gas, and other recovered gases (excluding refinery gas) | 35,0 | 35,0 | 35,0 |
| Other | O14 | Waste heat (including high temperature process exhaust gases, product from exothermic chemical reactions) | | | 30,0 |
| | O15 | Nuclear | | | 33,0 |
| | O16 | Solar thermal | | | 30,0 |
| | O17 | Geothermal | | | 19,5 |
| | O18 | Other fuels not mentioned above | | | 30,0 |

Only High-efficiency CHP eligible for

- **Support**
(State aid guidelines)
- **Certificates of Origin**

Efficient heating and cooling in EED



EED definitions:

- **‘High efficiency CHP’**
- **‘Efficient District heating and cooling (DHC)’ means a DHC system using at least:**
 - **50 % renewable energy,**
 - **50 % waste heat,**
 - **75 % cogenerated heat or**
 - **50 % of a combination of such energy and heat**
- **‘Efficient heating and cooling’ - measurably reduces the input of primary energy needed to supply one unit of delivered energy [...] in a cost effective way, taking into account the energy required for extraction, conversion, transport and distribution**

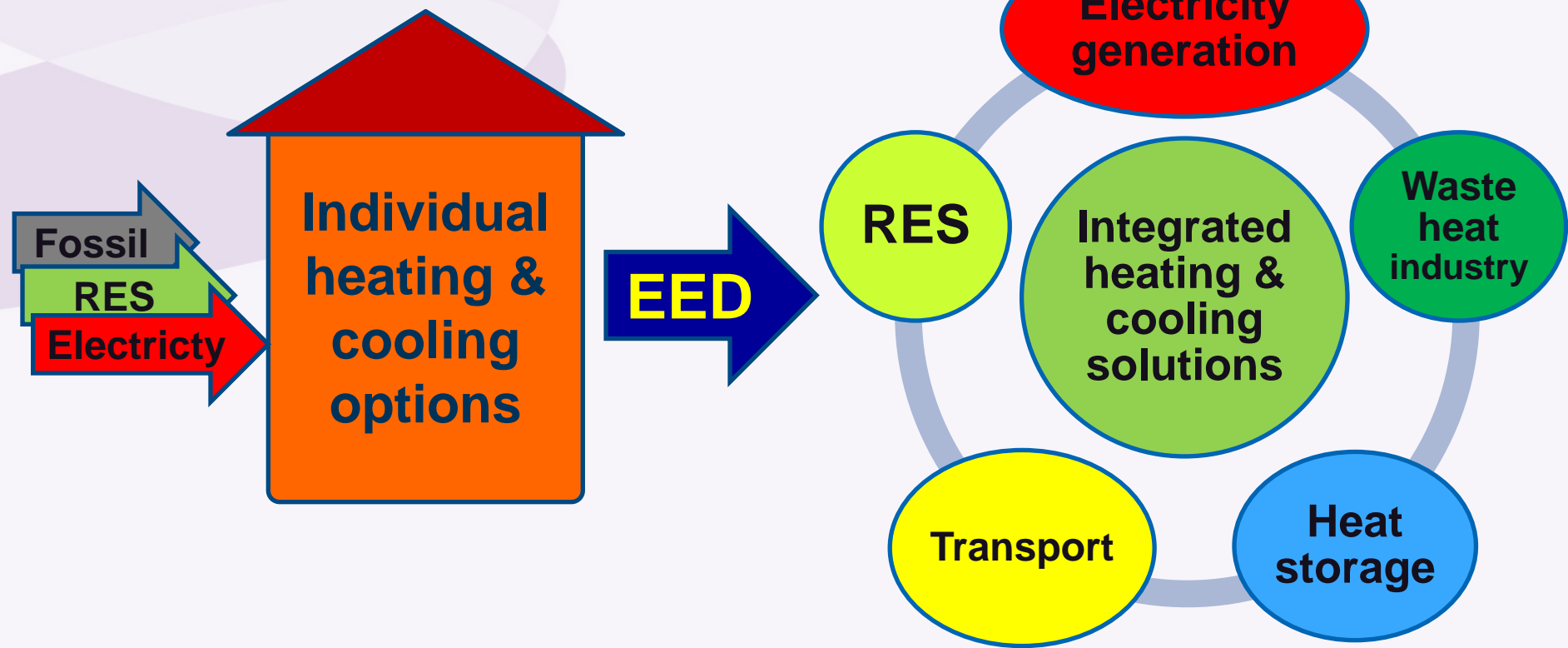
PE savings + Cost effectiveness = EED

Do we need heat planning?



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Sectors integrations!



Comprehensive assessment (CA)

of the potential for the application of high efficient CHP and efficient district heating and cooling



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I. Heating and cooling demand description

- by sectors, 10 years forecast

II. Heat map:

- Heat linking within system boundaries
- Scenario construction: baseline + alternatives

Technical potential:
CHP & DHC

III. Cost-Benefit Analysis (CBA):

- economic analysis covering socio-economic and environmental factors
- to identify the most cost-effective and beneficial heating or cooling option for a given geographical area (NPV criterion for the evaluation)

Economic potential:
CHP & DHC

IV. Strategies, policy and measures

for development of identified cost beneficial potential

Strategies policy and measures: 6 key topics *(Annex VIII)*



- Increase the share of CHP in DHC & el. gen.**
- Development of the DHC infrastructure**
- Location of the waste heat generation close to the demand**
- Location of the heat demand close to the waste heat sources**
- Waste heat and RES sources connection to the DHC network**
- Consumer connection to the DHC network.**

Authorisation procedure

>20MW_{ther.inp.} - CBA Installation



Authorisation or equivalent permit criteria and procedures based on cost benefit analysis – installation level (after 5 June 2014):
for planned or substantially refurbished installations with total thermal input > 20 MW:

➤ **Thermal electricity generation:**

CBA for CHP

Exempted: Nuclear PP, Peak load/Back-up power, CCS

➤ **Industrial installation**

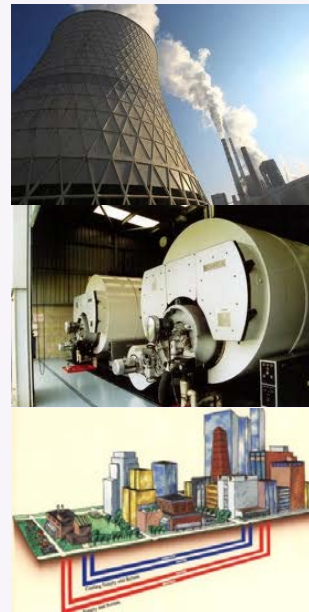
CBA for CHP & connection on DHC network

➤ **District heating and cooling network**

CBA for nearby industrial waste heat utilisation

- **MS to adopt detailed guidance on the CBA to ensure consistent, robust and quick application of this requirement across sites**

(common assumptions on payback periods, required rates of return on investment, projected fuel and electricity prices, policy costs and support levels)



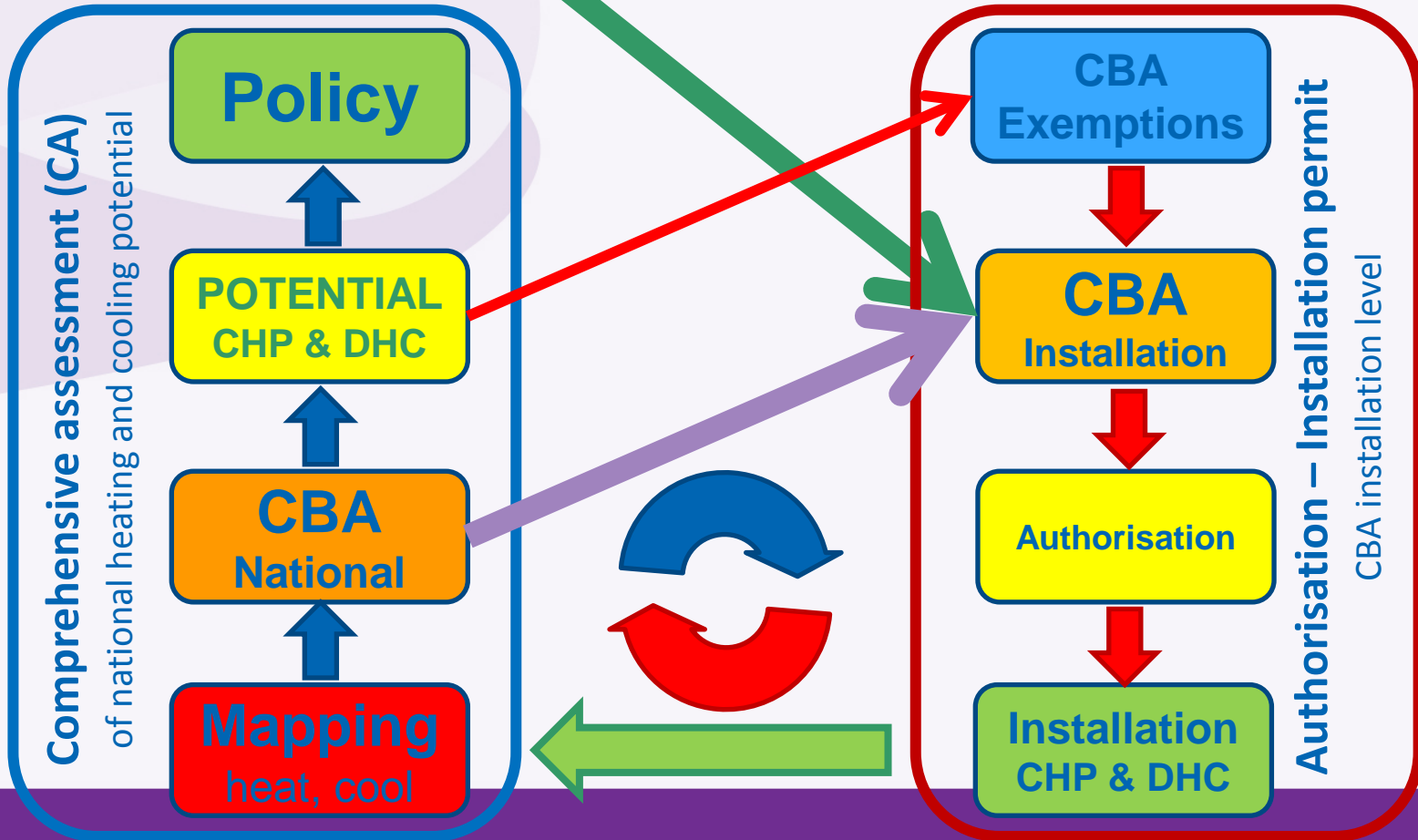
CBA – national & installation level

31.12.2015

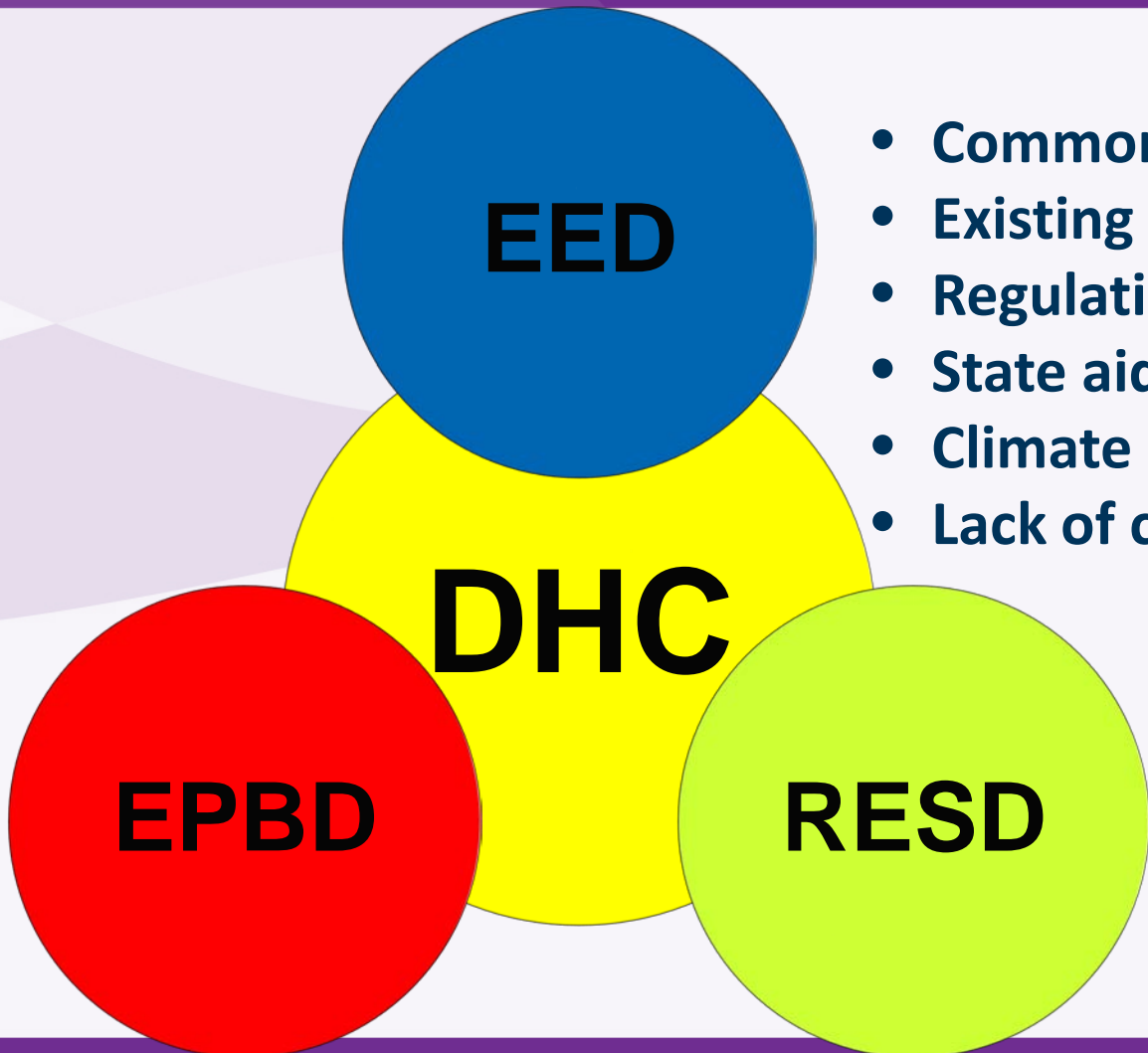
Regulation
Support
measures

Regulation
Authorisation

5.6.2014



District heating and cooling (DHC) linking technology



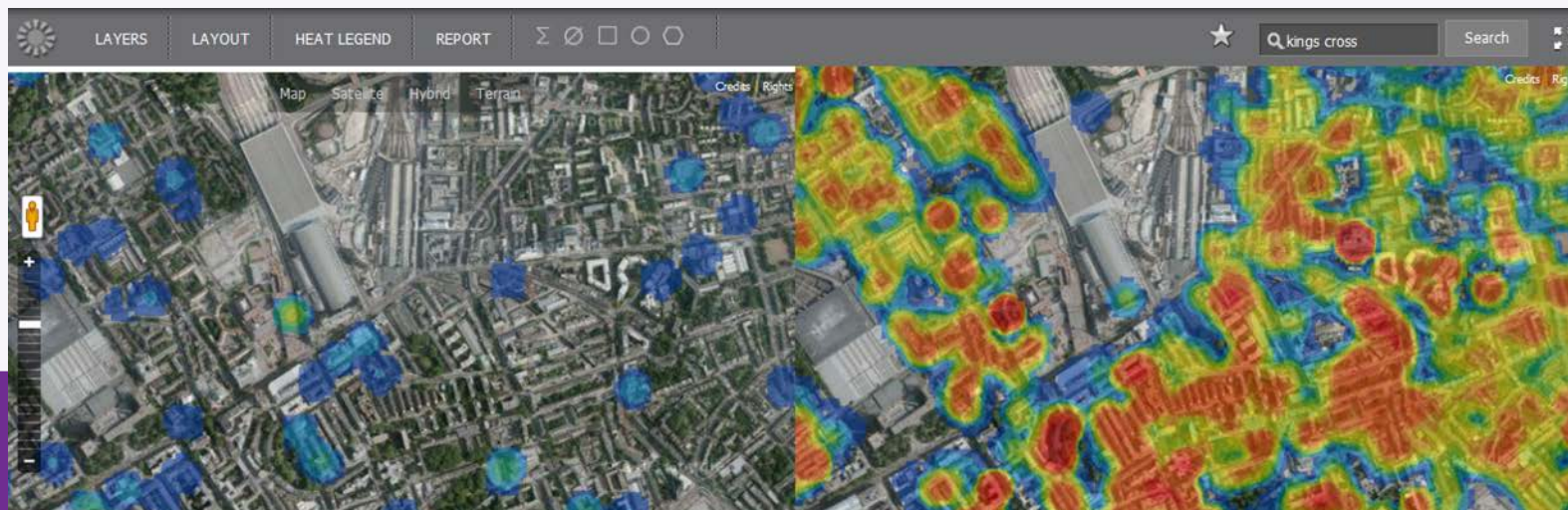
- Common goals & efforts, conflicts?
- Existing & new DHC?
- Regulation : competition?
- State aid
- Climate specific, tradition,...
- Lack of capacity, finance,...



Heating & cooling mapping *experiences*



- **Data challenge!!!**
- **Cooling – new focus**
- **New powerful tool for planning?**
 - Especially for MS with limited DHC experiences
 - Crucial on local/municipality level
 - Future updates?



New technologies, sources, approaches best practices



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Geothermal

District cooling

Planning tools



Solar DH

Large HP



Waste heat



Innovative new technologies & solutions:

- Technical data
- Real cases



Waste heat utilisation

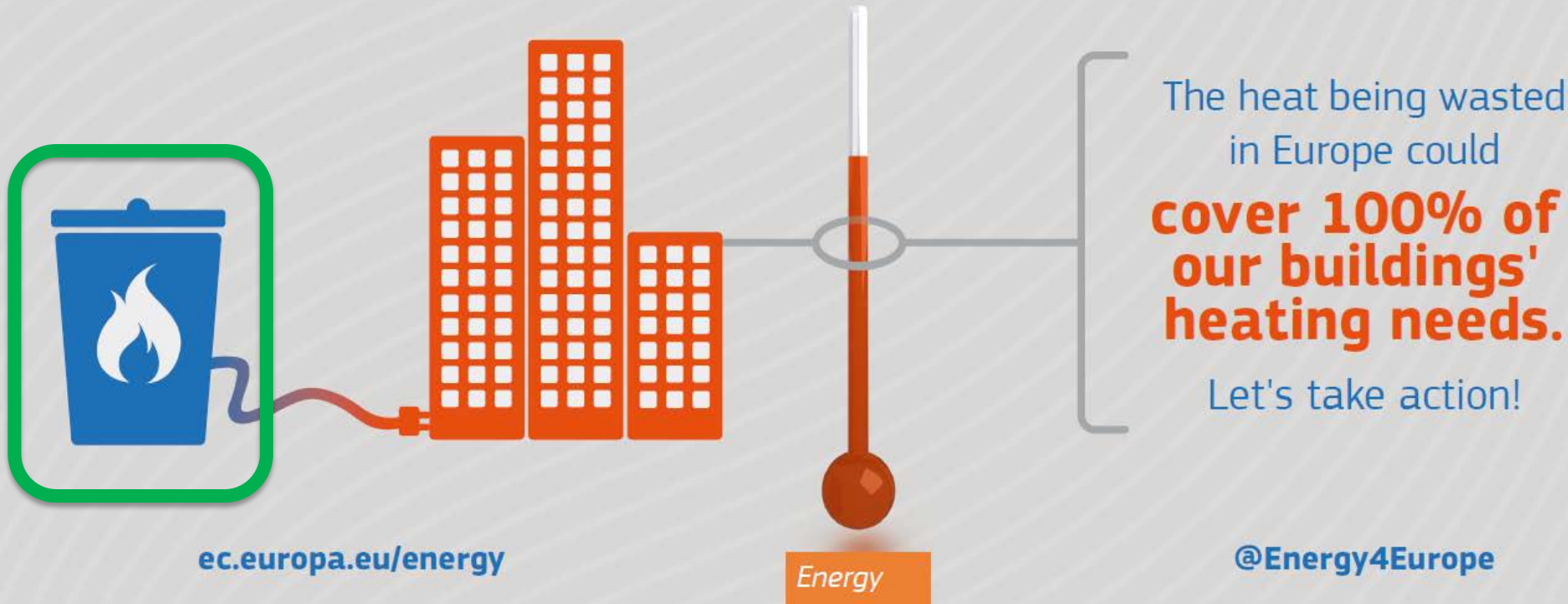
EU Strategy on Heating and Cooling



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**ENERGY
EFFICIENCY
FIRST!**

*“Usually it is more
carbon neutral”*

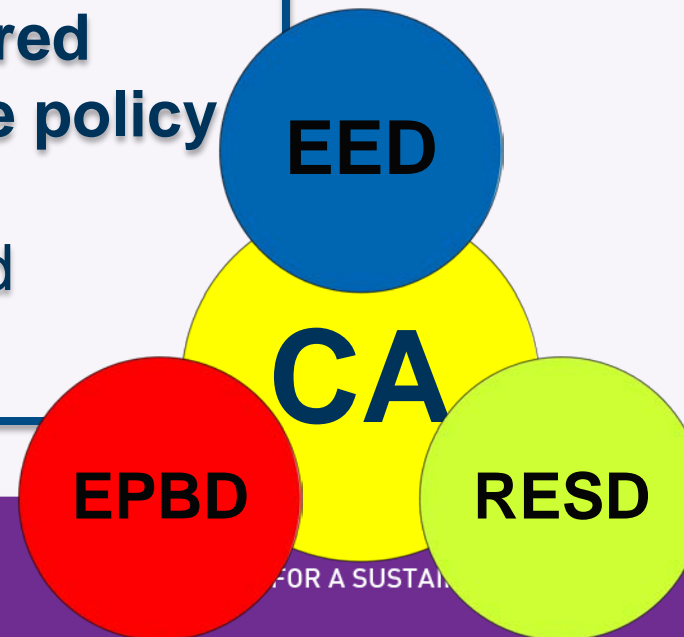


Comprehensive assessment (CA) *lessons learned*

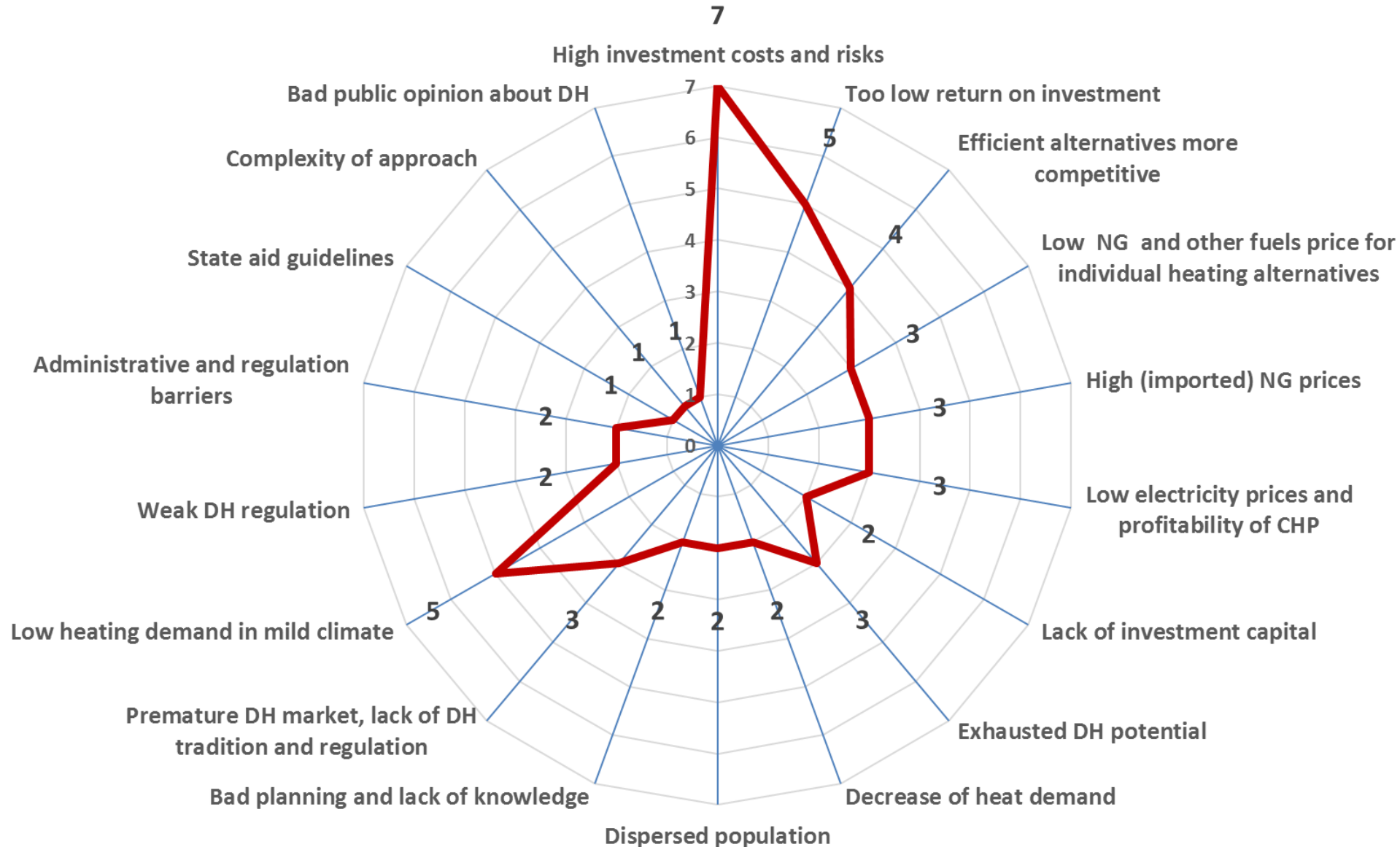


CA = Start point – not end result!

- **Brought more clarity to:**
 - Current heating and cooling demand and
 - the future role of DHC and heat supply in MS
- **Large potential assessed** – especially socio-economic
- **Limited policy and measures triggered**
- **Linking different energy and climate policy goals - directives**
 - contribution to National Energy and Climate Plans



Main barrier for further developing of DH in EU



Sources of useful information



Energy Efficiency

Market Uptake Activities
in support of the New Heating and Cooling Strategy

Overview of projects 2016

European Commission

Executive Agency for SMEs

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Welcome to the Concerted Action for the Energy Efficiency Directive

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The Energy Efficiency Directive (EED – 2012/27/EU) was adopted on 25 October 2012, and has now been transposed by all Member States (MS). The EED Directive establishes a common framework of measures for the promotion of energy efficiency within the Union in order to ensure the achievement of the Union's 2020 headline target on energy efficiency and to pave the way for further energy efficiency improvements beyond that date.

[READ MORE](#)

CA EPBD PLENARY MEETING
15 - 16 FEBRUARY 2017, MALTA

[MORE INFO](#)

CA EED PLENARY MEETING DATES
18-19 OCTOBER 2016 - BRATISLAVA, SLOVAKIA

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CA RES II PLENARY MEETING

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<http://www.ca-eed.eu>

Thank you for your attention!



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