



Potential for district heating/cooling and cogeneration in EU

An analysis of member states assessments under EED Art.14

Erwin CORNELIS – Pieter VINGERHOETS

eccee Summer Study – Paper 2-141-17

Hyères – June 1st, 2017



Outline of this presentation

- Introducing the EED Art 14
- Introducing this study / paper
- Assessment of the reports submitted by the EU Member States
- Conclusions - recommendations

Introducing the EED Art 14

🍃 Aim

- ⚡ Promotion of efficiency in heating and cooling

🍃 Focus

- ⚡ Efficient district heating and cooling (DHC)
- ⚡ High-efficient cogeneration (CHP)

🍃 Method

- ⚡ Comprehensive assessment of the potential of DHC and CHP

🍃 Deadline

- ⚡ 31 December 2015

CHAPTER III
EFFICIENCY IN ENERGY SUPPLY

Article 14

Promotion of efficiency in heating and cooling

1. By 31 December 2015, Member States shall carry out and notify to the Commission a comprehensive assessment of the potential for the application of high-efficiency cogeneration and efficient district heating and cooling, containing the information set out in Annex VIII. If they have already carried out an equivalent assessment, they shall notify it to the Commission.

Introducing the EED Art 14

🌿 Comprehensive assessment of the potential of DHC and CHP

✦ Includes a Cost-Benefit Analysis (CBA) aiming at identifying the most resource-and cost-efficient solutions to meeting heating and cooling needs

- 🏠 Description of the heating and cooling demand
- 🏠 A forecast how this demand will change in the next 10 years
- 🏠 A map with the geographical distribution of heating demand/generation
- 🏠 The potential of CHP and DHC to satisfy the demand
 - Technical and economic potential
- 🏠 An estimate of the primary energy to be saved

✦ Definition of Policies and Measures

- 🏠 To tap the identified potential and to support the development of DHC / CHP

Introducing the EED Art 14

Supporting documents

✦ Guidance note SWD(2013) 449 final

🏠 clarifies the methodology to perform the CBA

🏠 Recommends a procedure

- 1 • Current heating and cooling demand
- 2 • Forecast of H/C demand
- 3 • Map of main supply points
- 4 • Technical potential of DHC / CHP
- 5 • Economic potential of DHC / CHP
- 6 • Strategies, policies, measures

✦ JRC-report

🏠 a more detailed and practical approach and best practices

COMMISSION STAFF WORKING DOCUMENT

Guidance note on Directive 2012/27/EU on energy efficiency, amending Directives 2009/125/EC and 2010/30/EC, and repealing Directives 2004/8/EC and 2006/32/EC

Article 14: Promotion of efficiency in heating and cooling

JRC SCIENCE FOR POLICY REPORT

Best practices and informal guidance on how to implement the Comprehensive Assessment at Member State level

2017-06-05

5

confidential

Introducing this study / paper

🍃 Aim

- ✂ Analysis of the submitted comprehensive assessment reports

🍃 Research question

- ✂ Has the EED Art 14 created a momentum to integrate efficient heating and cooling in the national policies of the EU Member States?

🍃 Assessed aspects

- ✂ Current and forecasted heating and cooling demand
- ✂ Mapping of heating and cooling demand and potential supply points
- ✂ Results of the technical and economic potential studies for CHP and DHC
- ✂ Energy savings from policies aiming at reducing the H/C demand
- ✂ Reported policies and measures to realize the potential for CHP and DHC

Introducing this study / paper

🍃 Number of assessed reports

✂ 28 EU MS

✂ -3 ; reports not submitted by Dec 2016

✂ -1 ; still not translated into English by Dec 2016

✂ +2 ; 3 reports for Belgium

✂ 26 reports assessed

1. Current and forecasted heating and cooling demand

🌿 Current H/C demand

- ✂ Reported in all analysed CBAs
- ✂ BUT different base year

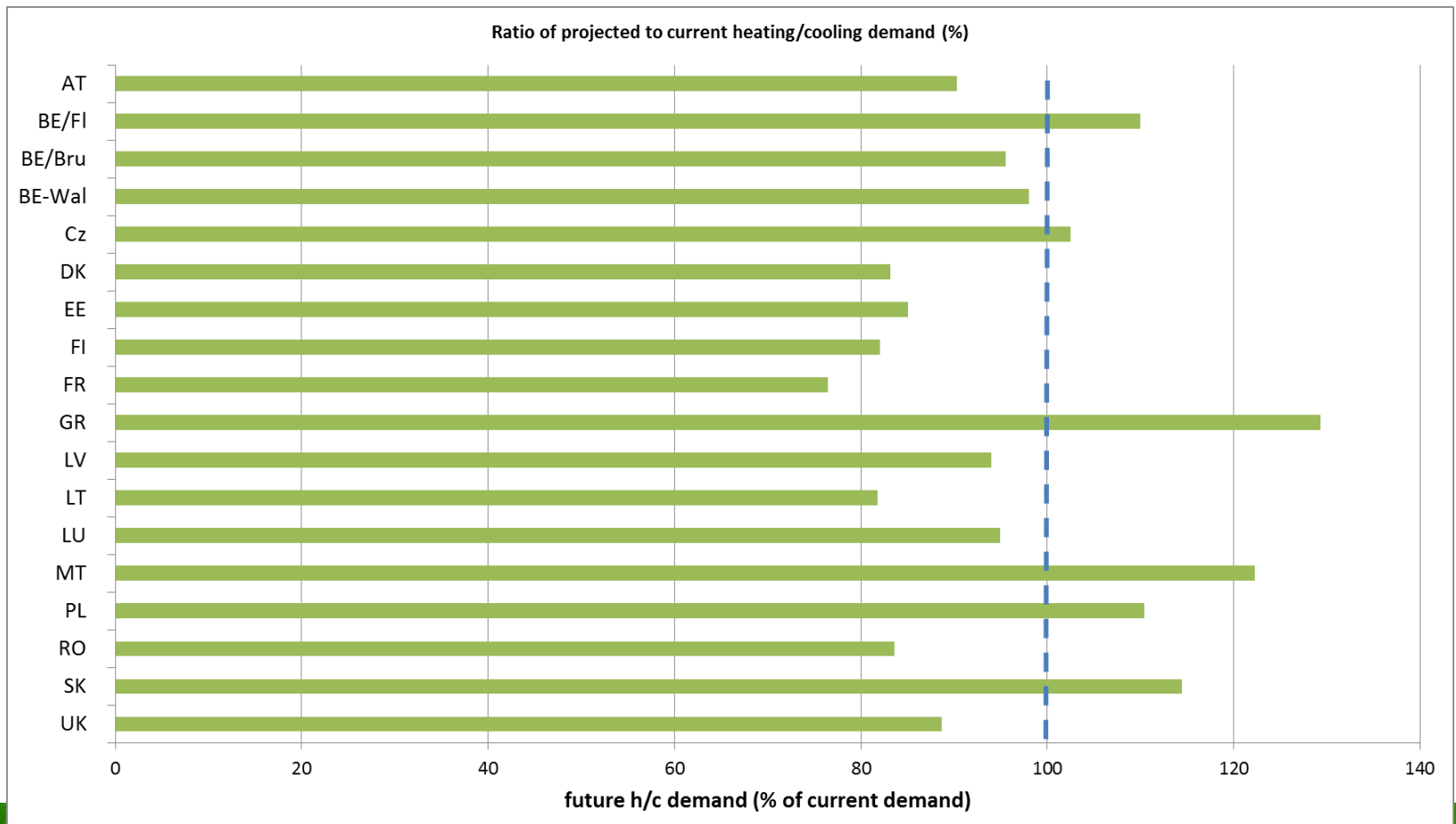
🌿 Future H/C demand

- ✂ Reported by 18 EU MS
- ✂ BUT in different units, using different time horizons, covering different technologies / sectors
- ✂ Observations
 - 🏠 Decline in heating demand in most EU MS
 - 🏠 Cooling demand: fraction of heating demand
 - Except for ES (13%); MT (56%)

1. Current and forecasted heating and cooling demand

2025	2030	2035	2040	2044
x				
		x		
	x			
	x			
x				
		x		
	x			
x				
	x			
	x			
	x			
	x			
	x			
				x
	x			
x				
x				

2017-06-05



2. Mapping of H/C demand and potential supply points

🌿 Requested output

⚡ H/C demand

- 🏠 Municipalities and conurbations with a plot ratio of at least 0.3
- 🏠 Industrial zones; demand > 20 GWh/a

⚡ Production

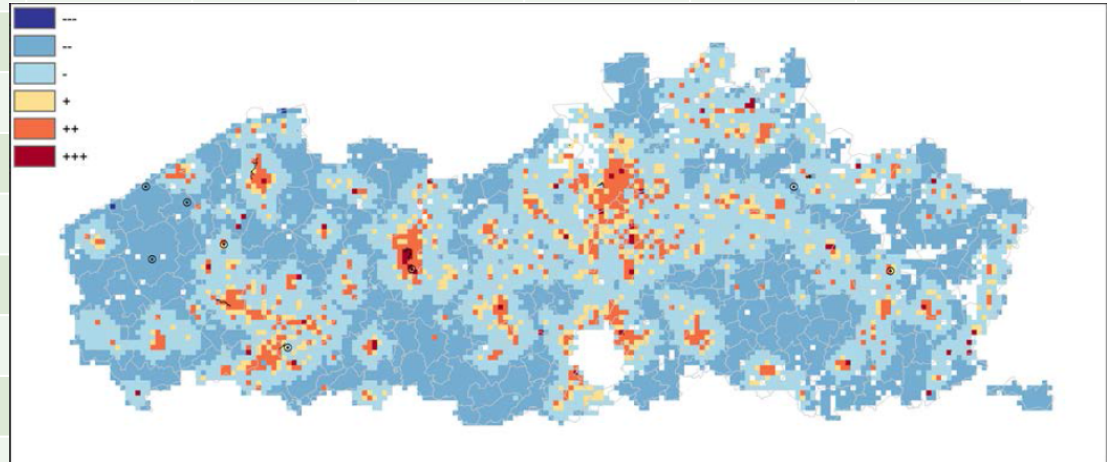
- 🏠 Power stations >20 GWh/a
- 🏠 Waste incinerators
- 🏠 CHP installations

🌿 Submitted heat maps

- ⚡ A high variation in quality: sophisticated interactive maps ↔ indication of key indicators on municipal level

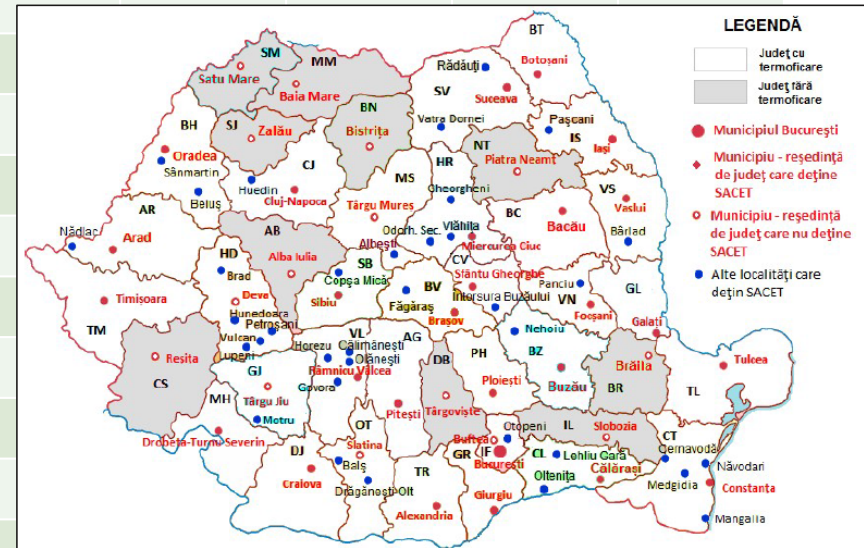
2. Mapping of H/C demand and potential supply points

EU MS	Map characteristics		Mandatory data layers				Additional data layers			
	Interactive	Resolution (1)	Heating demand	Cooling demand	DH/C infrastructure	Potential H/C supply points	Industrial excess heat	Biomass potential	Geothermal potential	Solar thermal potential
AT	Yes	50 x 50 m ²	✓			✓		✓	✓	
BE-BRU	No	Stat. sect.	✓	✓						
BE-FLA	No	1.2 x 1.2 km ²	✓	✓						
BE-WAL	No	Municipal	✓							
CY	No	Stat. sect.	✓							
CZ	No	Municipal	±							
DE	No	County	✓							
DK	No	1 x 1 km ²	✓	✓						
EE	No					±				
EL	No	Municipal	✓	✓		✓				
ES	Yes	100 x 100 m ²	✓			✓	✓	✓	✓	✓
FI	No	Municipal	✓	✓	✓	±				
FR	Yes	200 x 200 m ²	✓	✓	✓	✓				

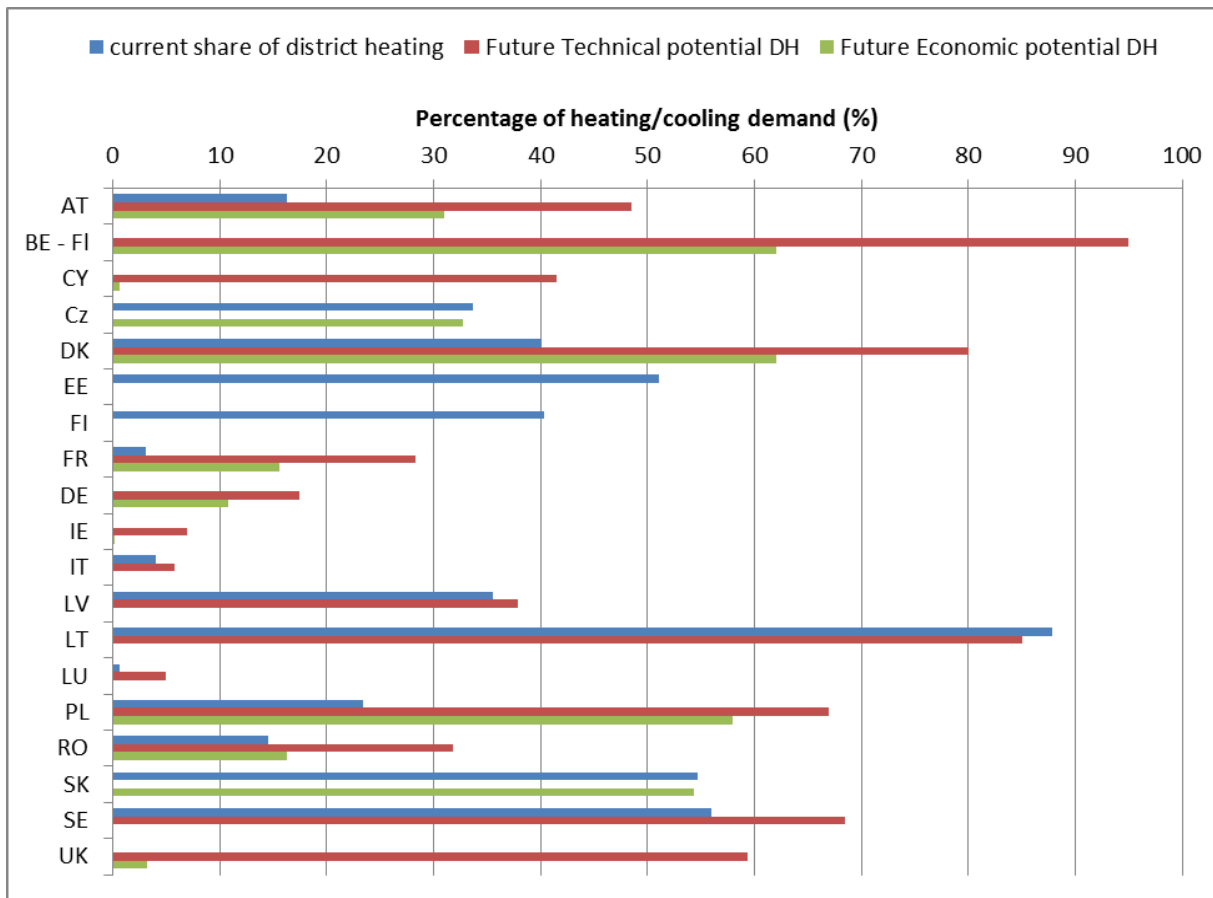


2. Mapping of H/C demand and potential supply points

EU MS	Map characteristics		Mandatory data layers				Additional data layers			
	Interactive	Resolution (1)	Heating demand	Cooling demand	DH/C infr.	Potential H/C supply points	Industrial excess heat	Biomass potential	Geothermal potential	Solar thermal potential
HU	No	Municipal	±		±					
IE	No	Stat. sect.	✓							
IT	No	300 x 300 m ²	✓	✓	✓					
LT	No									
LV	No	Municipal	✓	✓	✓					
LU	No	300 x 300 m ²	✓		✓					
MT	No	Municipal	✓							
NL	Yes	Building	✓		✓					
PL	Yes	Municipal	✓	✓	✓					
RO	No	County	✓		✓					
SE	No	1 x 1 km ²	±		✓	✓				
SK	No		±		✓	±				
UK	Yes	Stat. sect.	✓	✓	✓	✓	✓			



3a. Technical and economic potential studies for DHC



2017-06-05

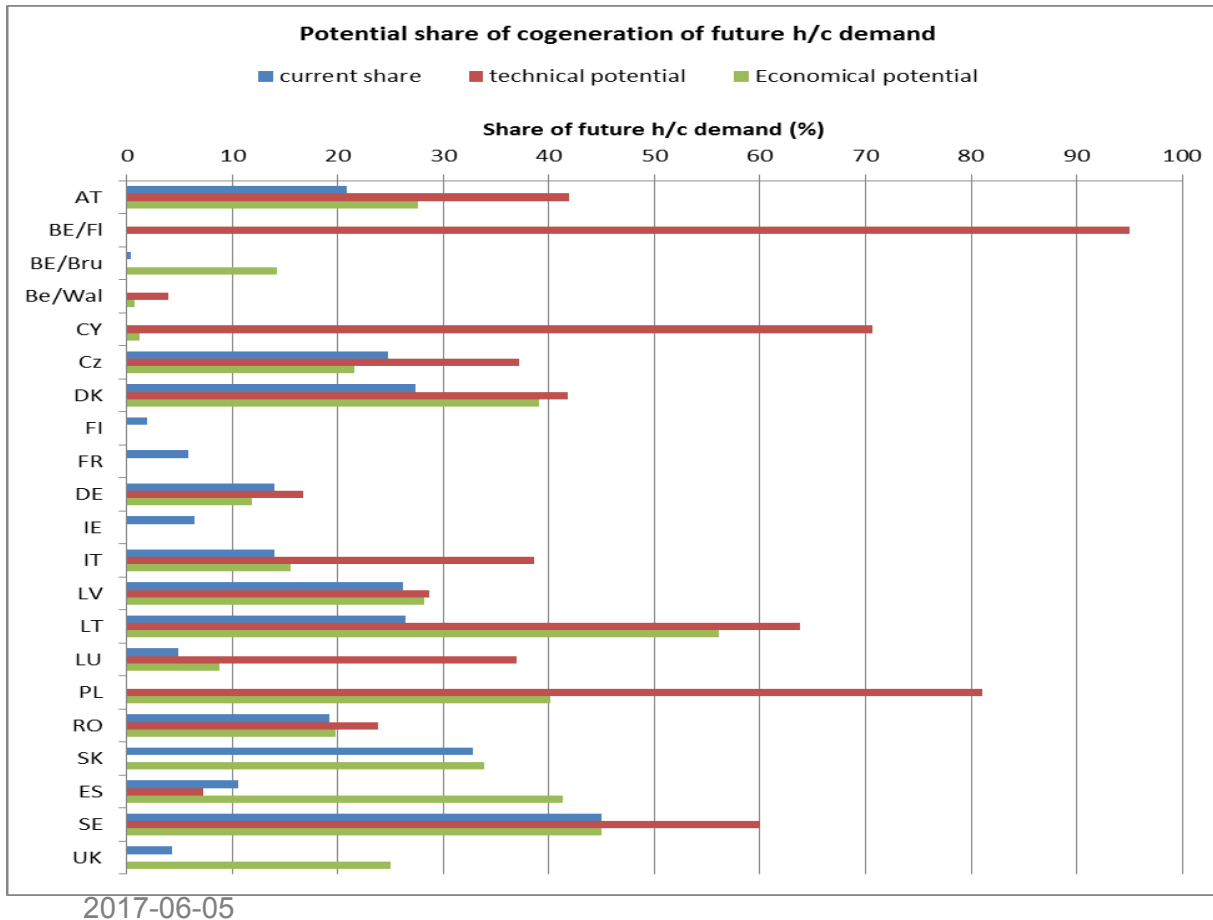
➤ Potential not reported in a homogenous way

- ✂ Despite guidelines by JRC
- ✂ As a consequence: hard to compare results of different EU MS

➤ Significant different Member States

- ✂ BE ↔ LU
- ✂ LV ↔ LT
- ✂ GR ↔ CY (on heat pumps)

3a. Technical and economic potential studies for CHP



✦ Potential not reported in a homogenous way

✦ Technical potential

✦ Correlates with share of district heating and existing share of CHP

✦ Economic potential

✦ Not much additional investment compared to current levels in most MS

4. Energy savings from policies aiming at reducing the H/C demand

Member State		Reported energy savings	Unit	Comment
Austria	AT	13%	%	Primary energy savings compared to 2012
Cyprus	CY	70%	%	70% => 100 units of fuel generate 70 units of electricity
Denmark	DK	209.0	PJ	PJ Primary energy savings compared to 2012 in the wind case
Finland	FI	1.7	TWh/year	only for industrial waste heat
France	FR	186.1	TWh/year	
Germany	DE	56.0	Mtonne	Million tonne CO ₂ saved/year
Italy	IT	0.6	Mtoe/year	Techno-economic savings potential
Lithuania	LT	2.8	TWh	Savings by renovation of buildings, not by cogeneration or DH
The Netherlands	NL	12.0	Mtonne	Extra CO ₂ emission if CHP units are replaced by coal plants 25 PJ savings from residual heat networks
Poland	PL	7.0	Mtonne	CO ₂ emission savings in 2014, no outlook data given
Slovakia	SK	6.0	PJ	Primary energy savings of CHP in 2014 compared to separate production of electricity
Sweden	SE	16.4	TWh	Primary Energy Savings from expansion of DHC and CHP

✶ Energy savings not reported in a homogenous way

- ✶ If reported at all ...
- ✶ Too much room for interpretation of the EED
- ✶ No comparison between EU MS possible

5. Analysis of the proposed policies and measures (PAMs)

Existing PAMs: reported by 22 / 26 MS

- ✦ Mainly PAMs supporting CHP and DHC via mechanisms such as project subsidies, certificates or tax exemptions
- ✦ A few on waste heat recovery or organising future urban planning

New PAMs: reported by 6 / 26 MS

Considering additional PAMs: by 5 / 26 MS

- ✦ Mainly supporting CHP and DHC
- ✦ some: reduction of HC demand / replacement of less efficient heating devices by more efficient ones / energy recovery from municipal waste

Estimation of PAMs: by 6 / 26 MS

Conclusions

🍃 Research question

- ✂ Has the EED Art 14 created a momentum to integrate efficient heating and cooling in the national policies of the EU Member States?

🍃 Result of the assessment of the submitted reports

- ✂ Questionable whether the listed PAMs will close the gap between technical and economic potential
- ✂ On the other hand: was it realistic to ask the EU MS to carry out a complete CBA and a full analysis of the PAMs?

🍃 However, outcomes of the EED Art 14

- ✂ It adds heating and cooling to the political agendas of the EU MS
- ✂ A first time that mapping is requested

2017-06-05 🏠 Does this herald a new trend in energy analysis tools?

Recommendations

- An update of the CBAs by 2020
 - ✦ Keep the momentum going
- The use of a reporting template and a set of key indicators
 - ✦ Allows to compare the results
- Collaboration between EU MS
 - ✦ Diffusion of assessment methods and geographical analysis tools

Thank you for your attention !

Erwin CORNELIS – Pieter Vingerhoets

EnergyVille

Thor Park 8300

3600 Genk

Belgium

erwin.cornelis@energyville.be

Pieter.vingerhoets@energyville.be