

A new generation of EN standards for implementing the Energy Performance of Building Directive (EPBD)

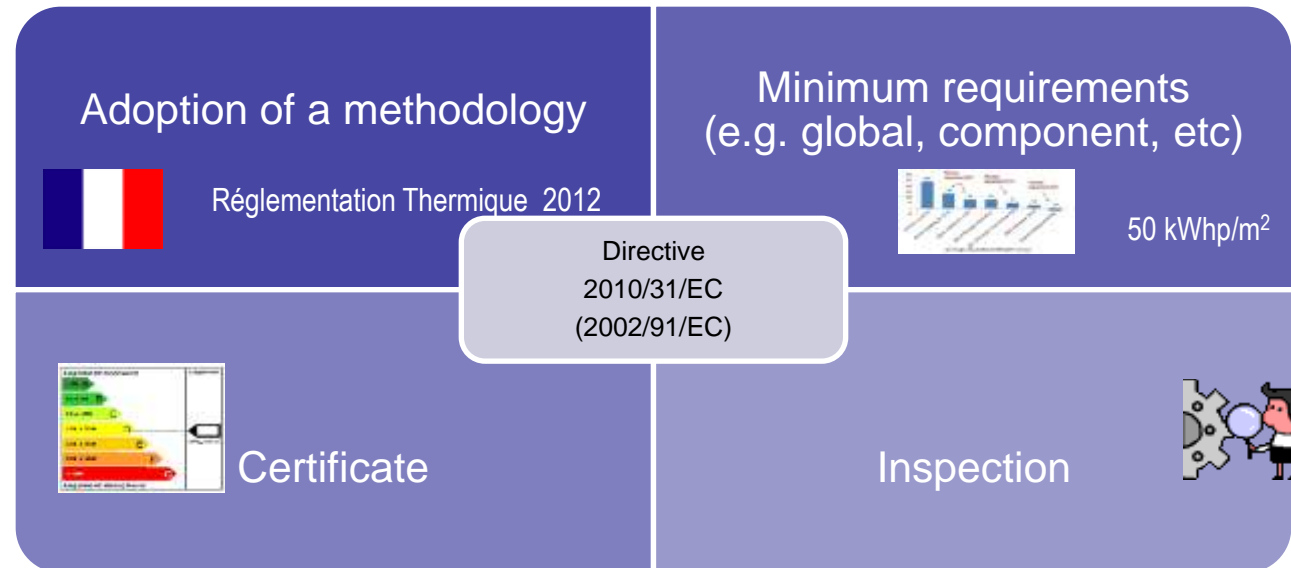
Vienna 27 May 2013

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Convenor CEN TC228/WG4

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Directive «Energy performance of buildings» (EPBD)



Recast 2010/31/EC

- Calculation of **cost-optimal level** of min requirements (art. 5)
- **Technical building systems** (art. 8)
- **Nearly zero-energy buildings** (definition and roadmap (art. 9)
- Voluntary **common European** certification scheme of non residential buildings (art.11)

The articles (general frame) of the Directive has to be transposed at national level
(e.g. >RT2012, DPE)

Each Member State use different national approach



(Brueghel / Vienna)

Tower of Babel

Compare apples with pears



(Magritte)

Not possible to compare performance
(e.g. calculation method, square meters, etc)
No common evaluation of systems
(no technical neutral solutions, add barriers)

Actual situation

European harmonisation by CEN standards



- EC gave mandate to CEN**
- To elaborate new generation of EN standards
 - **Direct reference** for Member States

Solution

Time schedule:

- CEN Work **started in 2012** (with prEN 15603 “Overall energy performance”)
- CEN work **should be finished 2015** (the whole CEN package (sectorial standards))

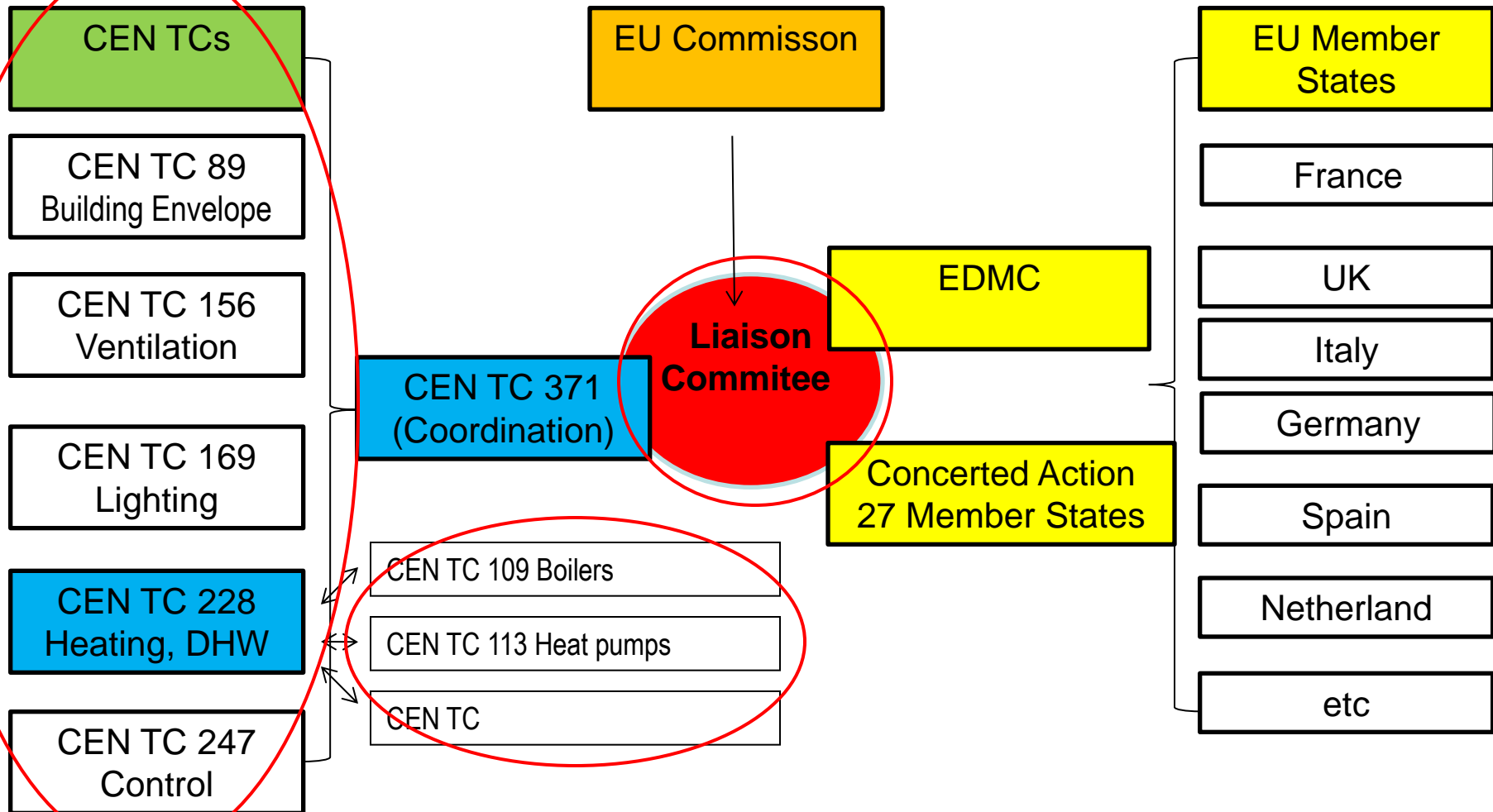
Important topics for DHC

- Assessment boundary
 - > are DHC systems taken into account?
- Primary energy concept
 - > how is energy supply taken into account
- Common definitions
 - > how the renewables are defined, surplus heat?
- Evaluation and Labeling of DHC systems
 - > are there common rules (allocation method), link with EP certificate?
- Biofuel, Cogeneration, etc

prEN 15603
Overall energy performance

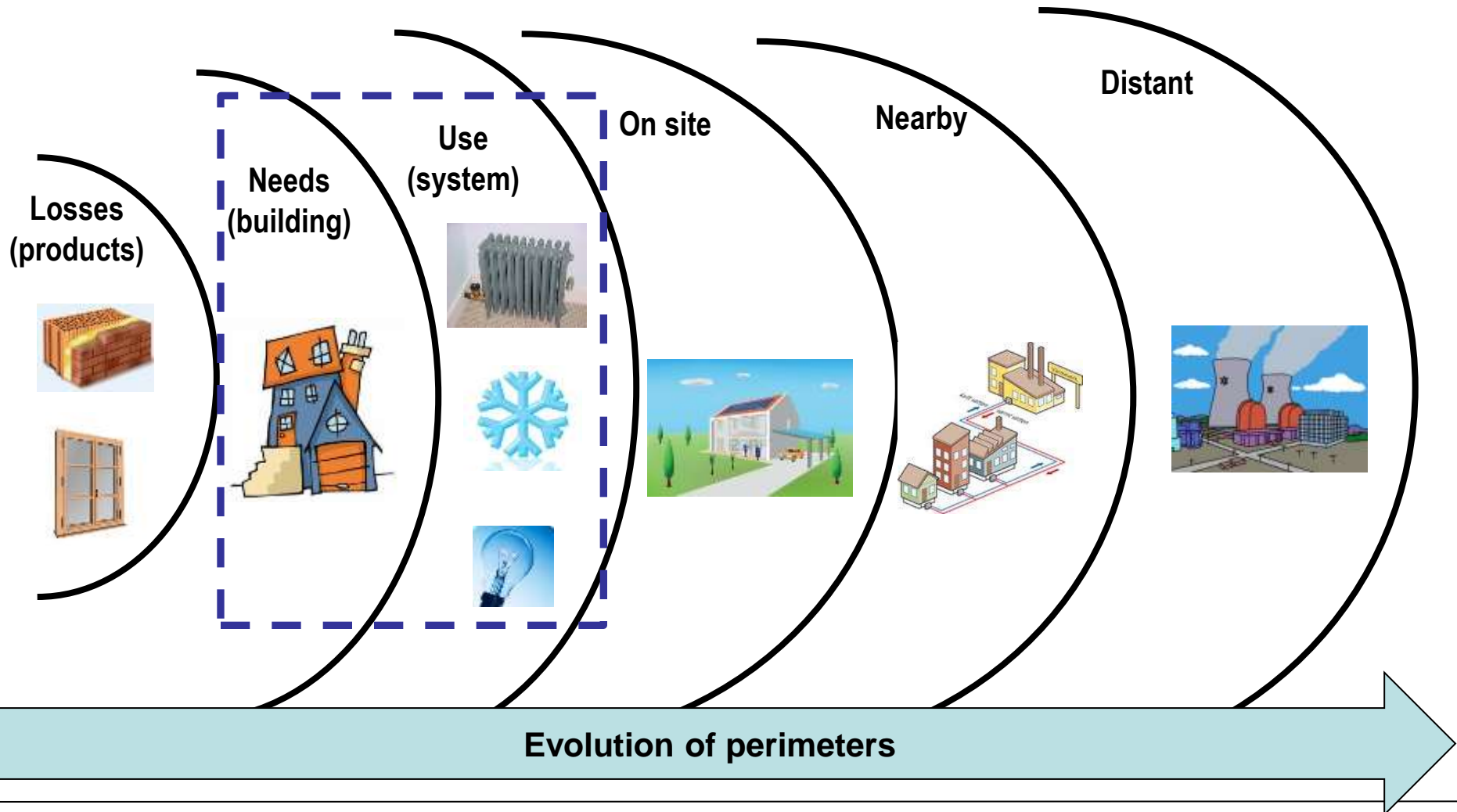
prEN 15316 – 4.5
Performance of District heating

prEN 15316 – series



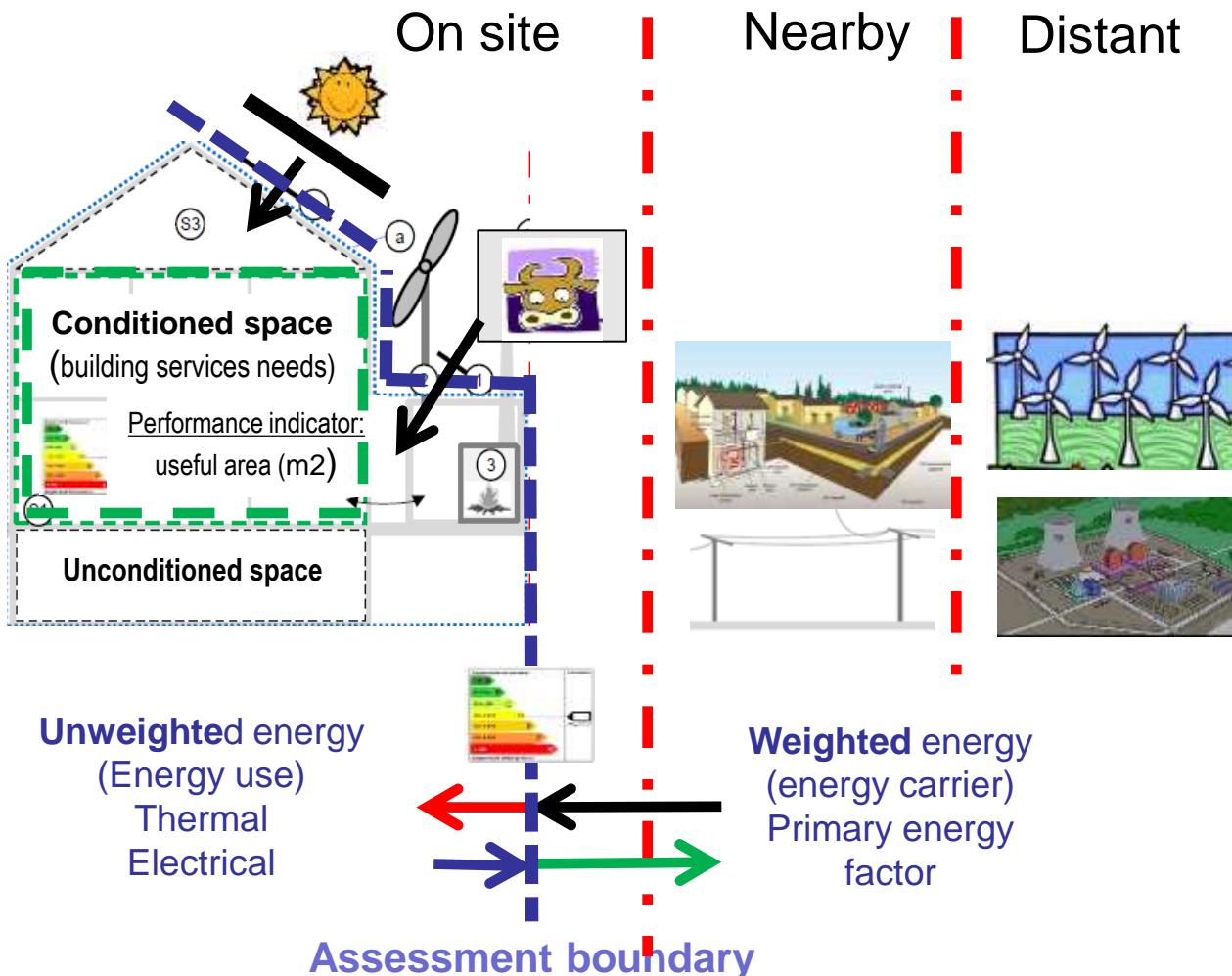
Assessment of energy performance

Evaluation perimeters / assessment boundaries



Assessment boundary and perimeters

Fundamental definitions



Steps to determine boundary and perimeters

- 1) Determine **conditioned space** ([CEN/A4](#))
building services; start of EP calculation;
useful area (performance indicator)
- 2) Place the **assessment boundary** ([CEN](#))
EP balance of energy flows:
delivered - exported (e.g.. renewables)
Inside: all losses (e.g. boiler), unweighted;
outside : PE factor; weighted ([CEN/A8](#));
- 3) Define **on site** ([CEN/A6](#); [land + bdg](#))
the parcel of land and delivering energy
> only on site production from on site
renewable sources and CHP thermally
driven can be re-exported
- 4) Define **nearby** ([CEN](#))
Used only at local or district level,
specific equipment to be connected
> specific PE factor ([CEN/A8](#))
- 5) Define **distant** ([CEN](#))
All the other energy sources
> specific PE factor

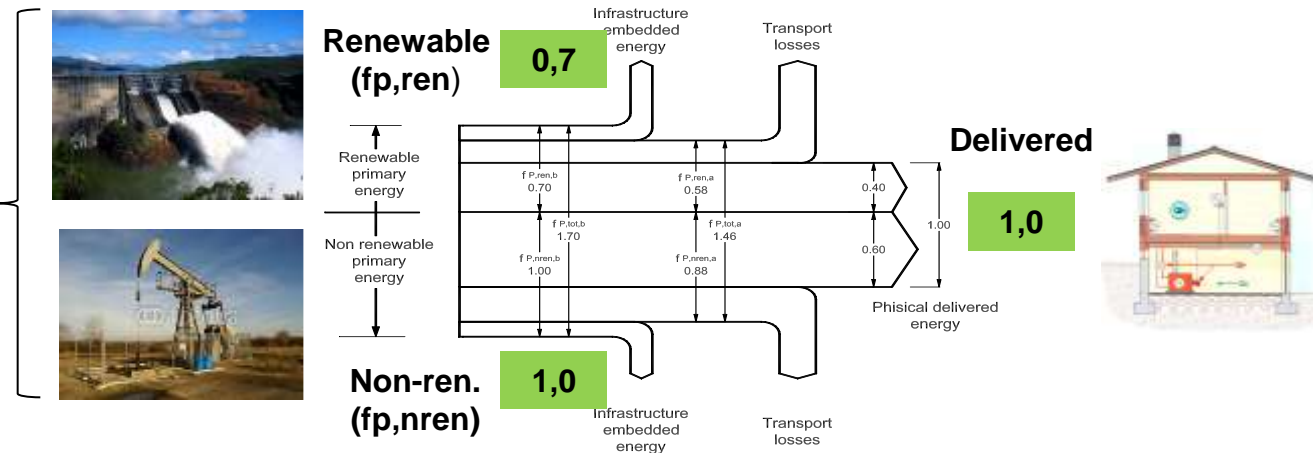
Primary energy factors counting

- energy overhead;
- renewable energies.

Primary energy factor (general)

- Total (fp,tot)
- Non-renewable (fp,nren)
- Renewable (fp,ren)

Total (fp,tot) **1,7**



To deliver 1kWh, 1.7 kWh are needed

Primary energy factors - new!! concepts

Primary energy factor (delivered)

- On site
- Nearby
- Distant

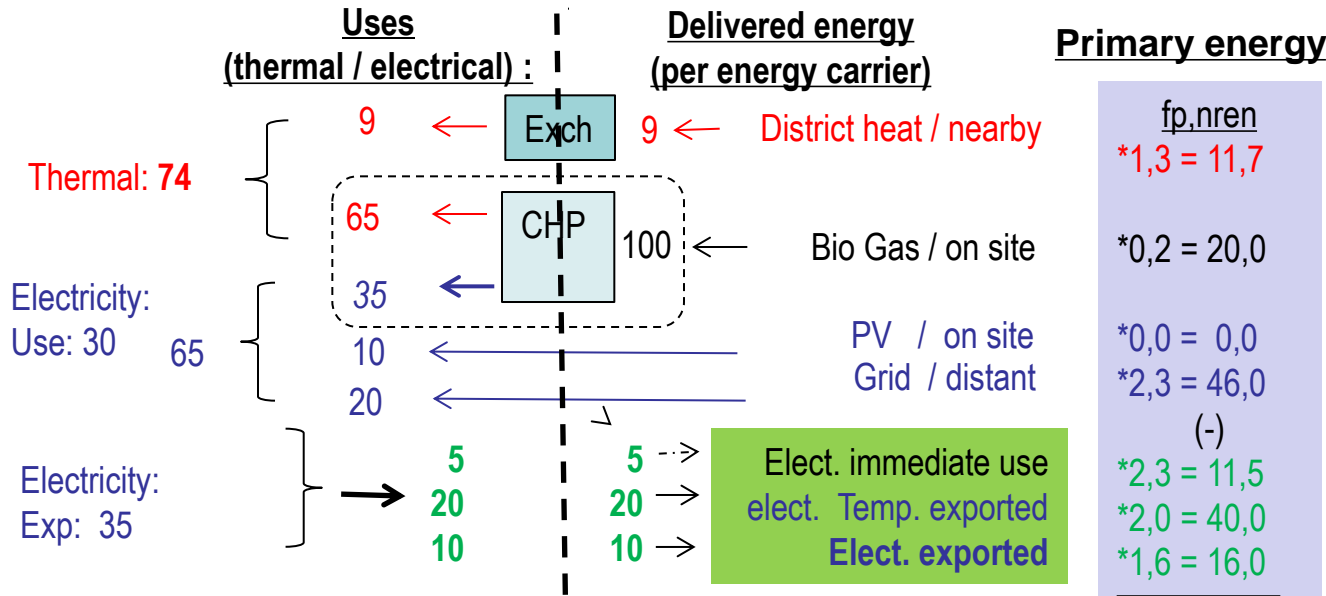


Primary energy factor (exported)

- Immediate use
- Temporary exported
- Exported (never used in building)

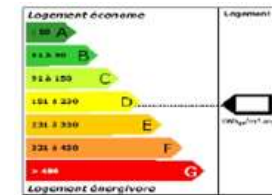
Calculation primary energy balance (7.5) Example

Assessment boundary



CEN option
Energy performance indicator
calculated with $f_{p,nren}$

$$E_P = \sum (E_{del,i} f_{P,del,i}) - \sum (E_{exp,i} f_{P,exp,i})$$



$E_{p,nren} = 10,2$

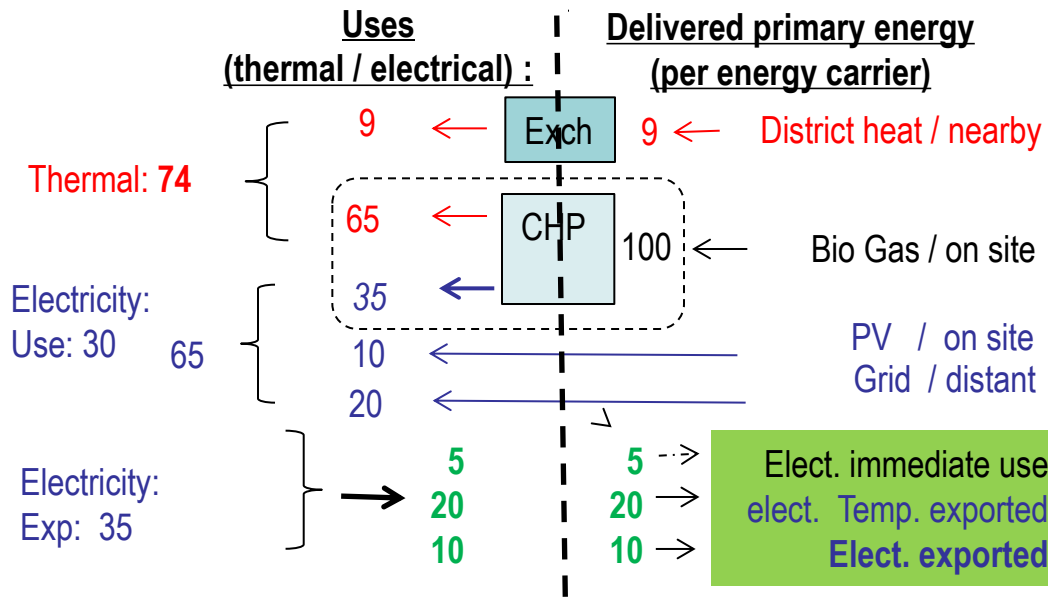
Technical building systems

- **Units:** kWh/m²year
- **Exch:** Heat exchanger district heating
- **CHP:** cogeneration unit fueled by biomass

Calculation from the uses (thermal ,electrical) , to the delivered energy (energy carriers), to primary energy

Calculation share of renewable (RER) (7.6) Example

Assessment boundary



RER calculation

fp,ren	fp,tot
*0,0 = 00,0	*1,3 = 11,7
*0,9 = 90,0	*1,1 = 110,0
*1,0 = 10,0	*1,0 = 10,0
*0,2 = 4,0	*2,5 = 50,0
(-)	(-)
Option A1	*2,5 = 12,5
Only delivered	*2,2 = 44,0
	*1,8 = 19,2
Ep,nren = 104	Ep,tot = 106

Technical building systems

- **Units:** kWh/m2year
- **Exch:** Heat exchanger district heating
- **CHP:** cogeneration unit fueled by biomass

CEN option

Ep,ren calculated with fp,ren
Ep,tot calculated with fp,tot

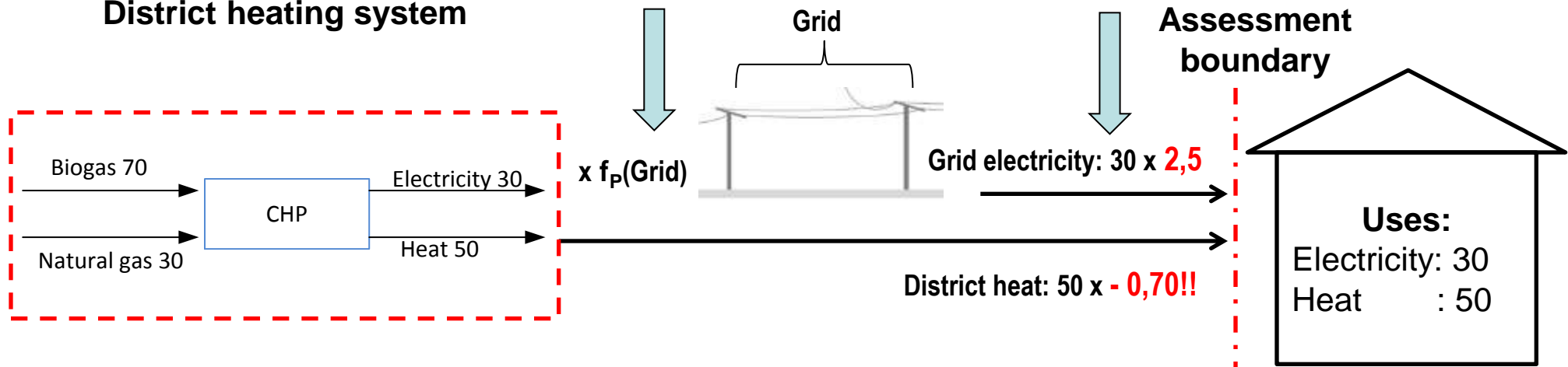
RER = 104/106 = 98%

Calculation from the uses, to the delivered energy (thermal ,electrical), to the energy carriers, to primary energy

Should be the same f_p Grid factors !?

Do district heat compensate the difference of CHP / grid electricity in the Overall balance?

District heating system



Are national methods aware of these problems?

- European allocation method (EN standard) is a “must” in order to valorize the European experience
- Importance of cooperation between CEN and DHC system professionals (it is the right moment!)

EN standards will play a **major role** in the transposition of European Directives

- EPBD Directive for the assessment of the **building** energy performance
- Ecodesign Directive for the assessment of **products** (e.g. substations)

EN standards will have a **significant impact** on **DHC systems**

It is important that in the EN standards:

- assessment of **buildings** is not limited to the building alone but **includes energy supply**
- assessment of **technical systems** and energy **supply chain** is **fair and transparent**
- **positive impact** of DHC system can be **shown**
(common European certification scheme, cost optimum calculation)

Professional associations acting European wide should

- **be actively involved in related EN standardization and preliminary studies**
- **support the application of EN standards on national level**

Merci
Danke
Thank you

