Covenant of Mayors
for Climate & Energy

Covenant of Mayors & CEDEC webinar

Promotion of energy efficiency and renewables in buildings

25 September 2017
12h00-13h00 (CEST)

CEDEC

Covenant of Mayors
for Climate & Energy

Objective

Show how local energy companies actively contribute to the promotion of energy efficiency and the use of renewable energy in buildings, focusing on two countries - Belgium and Germany.

CEDEC

AGENDA

12h00	**Introduction** **Ms Ludovica Sara Fondi,** the European Federation of Local Energy Companies (CEDEC)
12h05	**Mr Patrick Claessens**, Director of the Network Access Management Department at Sibelga
12h25	**Mr Fabian Schmitz-Grethlein,** Deputy Chief of the Energy Department at the German Association of Local Public Utilities (VKU)
12h45-13h00	**Q & A** Participants (please, use the 'chat window' to write your questions)

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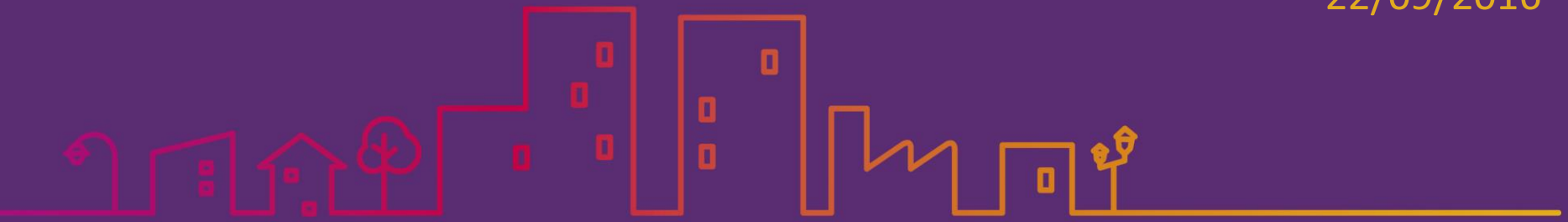
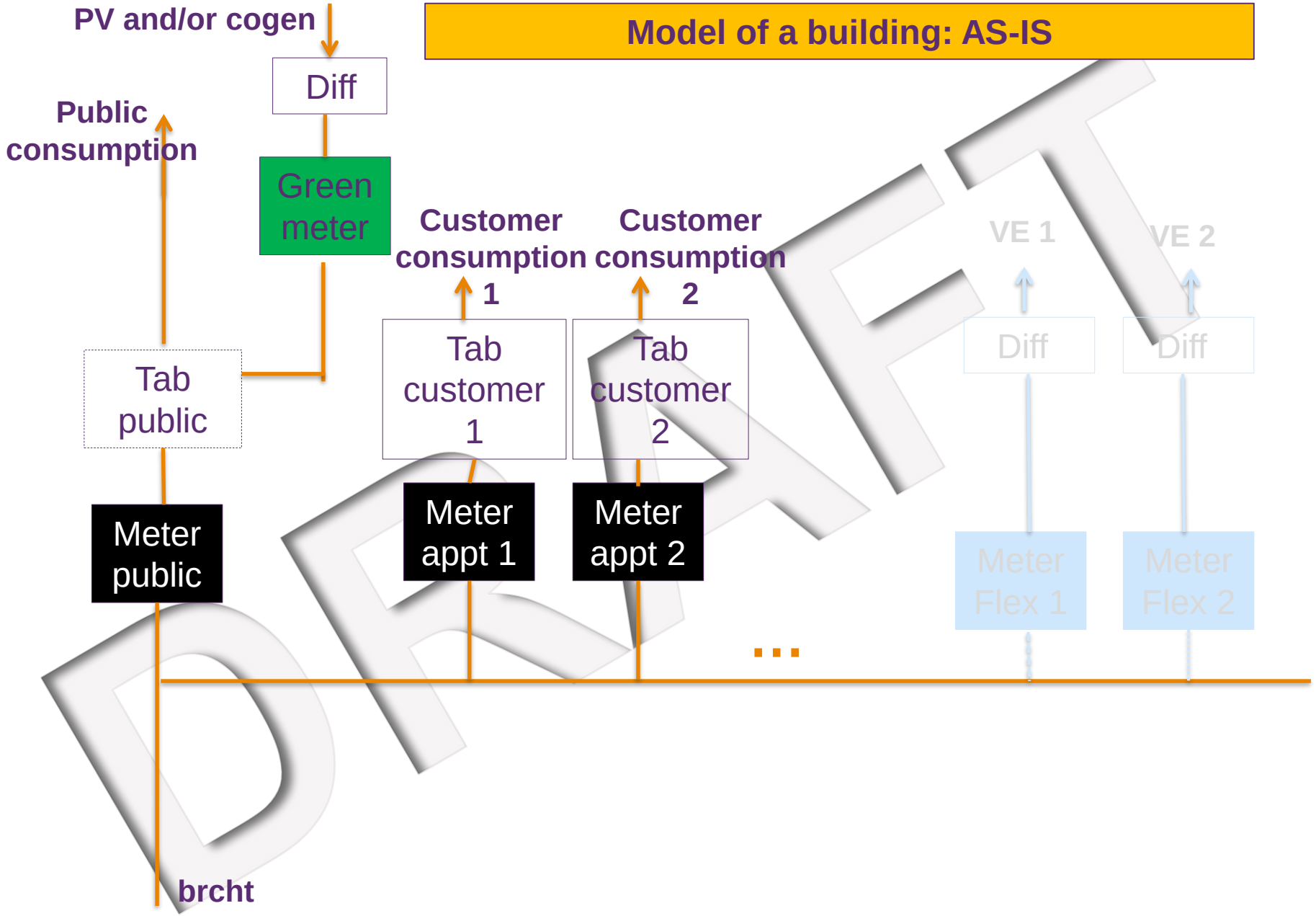
Brugel monthly meeting

Sharing green electricity

22/09/2016



Model of a building: AS-IS



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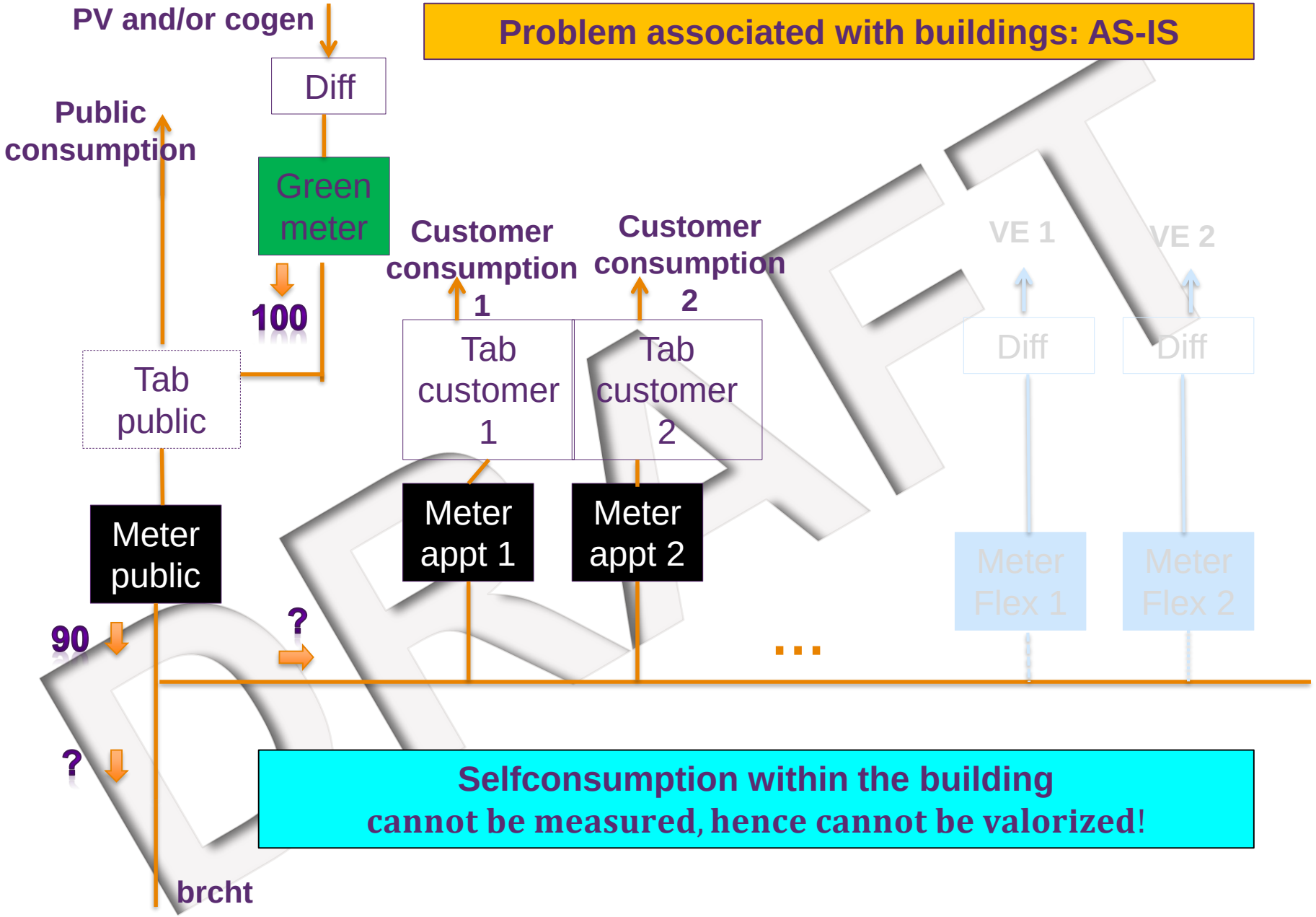
Problem associated with buildings: AS-IS



Selfconsumption within the building cannot be measured, hence cannot be valorized!

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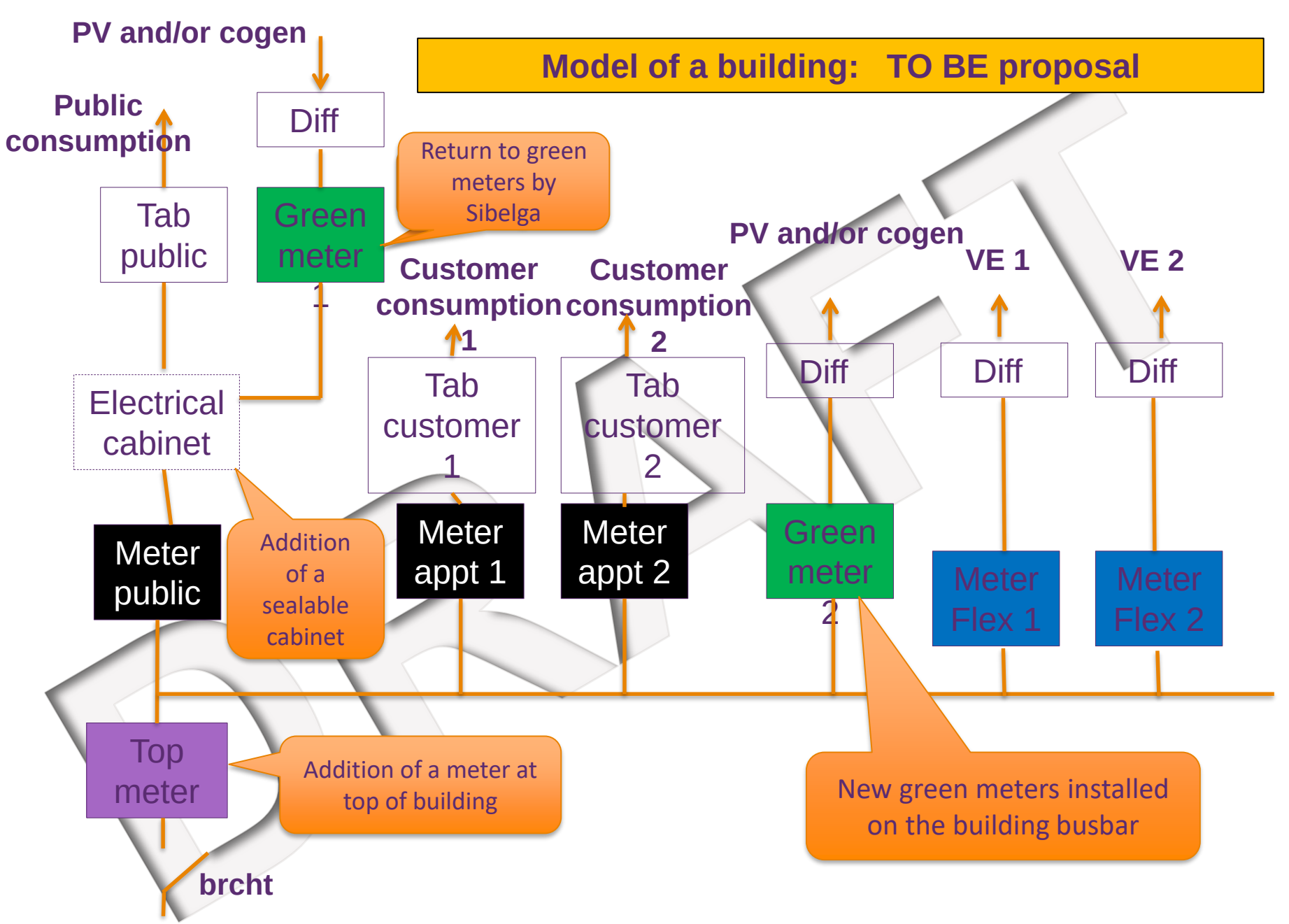
Model of a building: TO BE proposal



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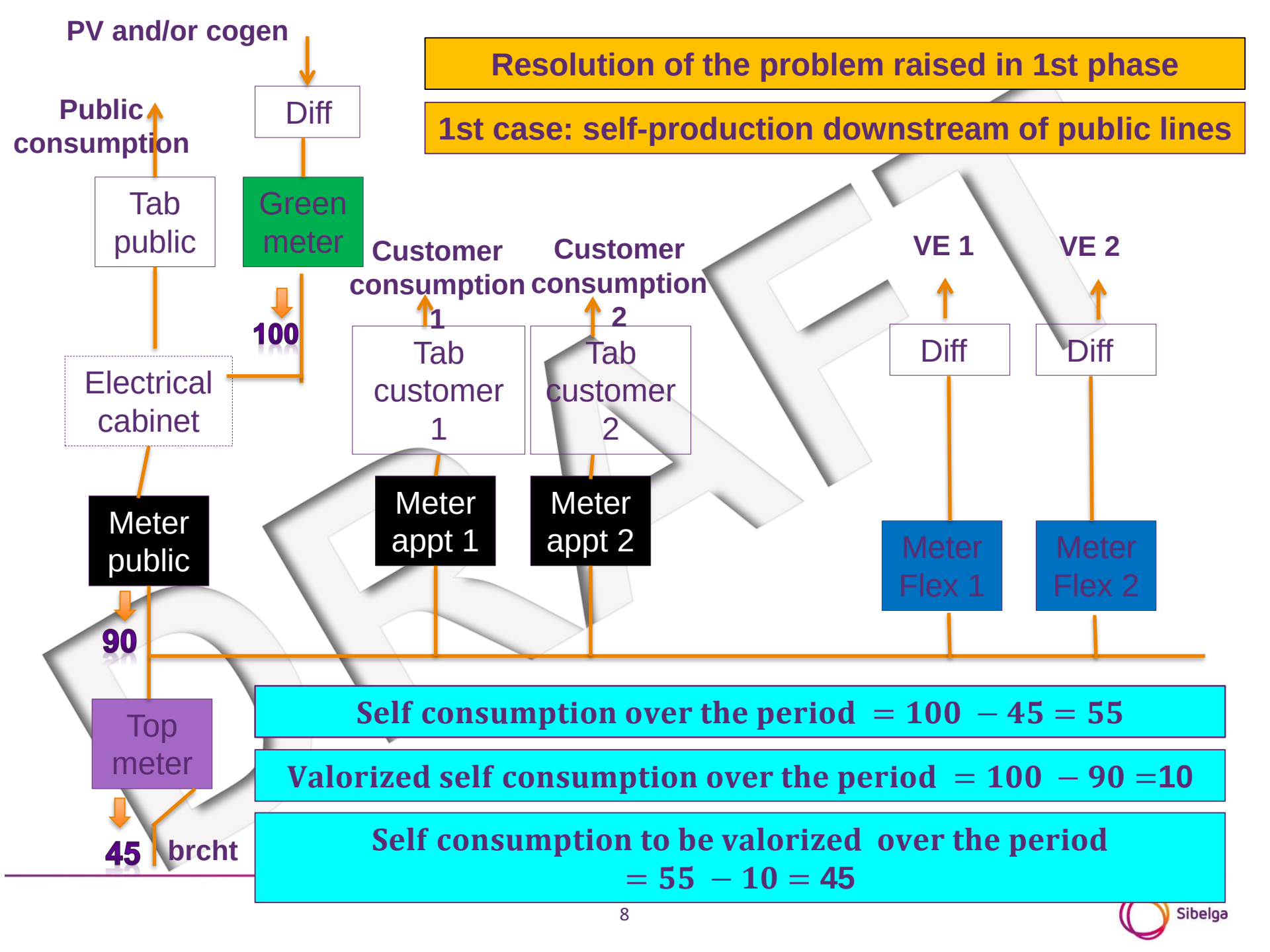

Resolution of the problem raised in 1st phase

1st case: self-production downstream of public lines

Self consumption over the period $= 100 - 45 = 55$

Valorized self consumption over the period $= 100 - 90 = 10$

Self consumption to be valorized over the period $= 55 - 10 = 45$

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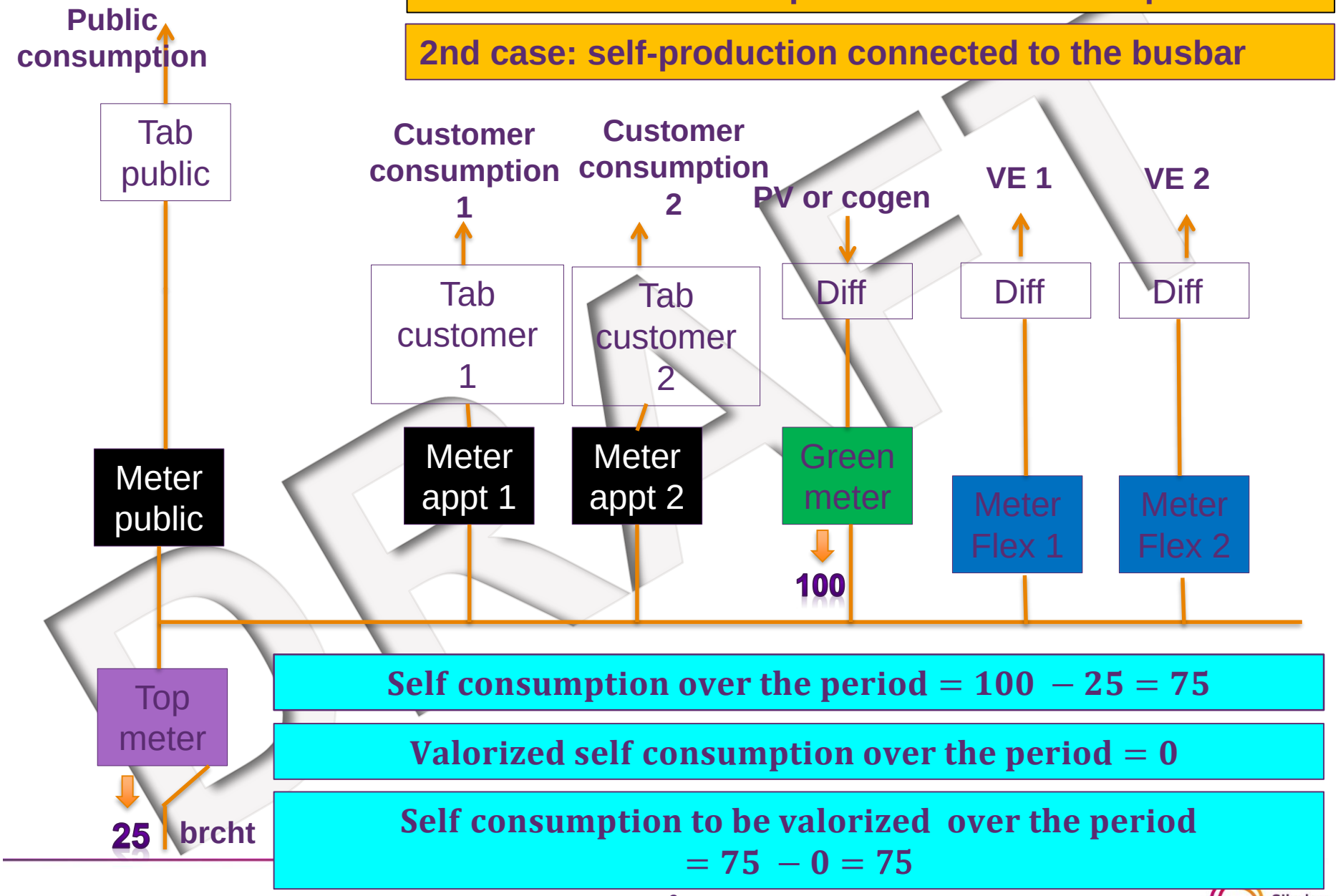
Resolution of the problem raised in 1st phase

2nd case: self-production connected to the busbar



Self consumption over the period = 100 − 25 = 75

Valorized self consumption over the period = 0

Self consumption to be valorized over the period = 75 − 0 = 75

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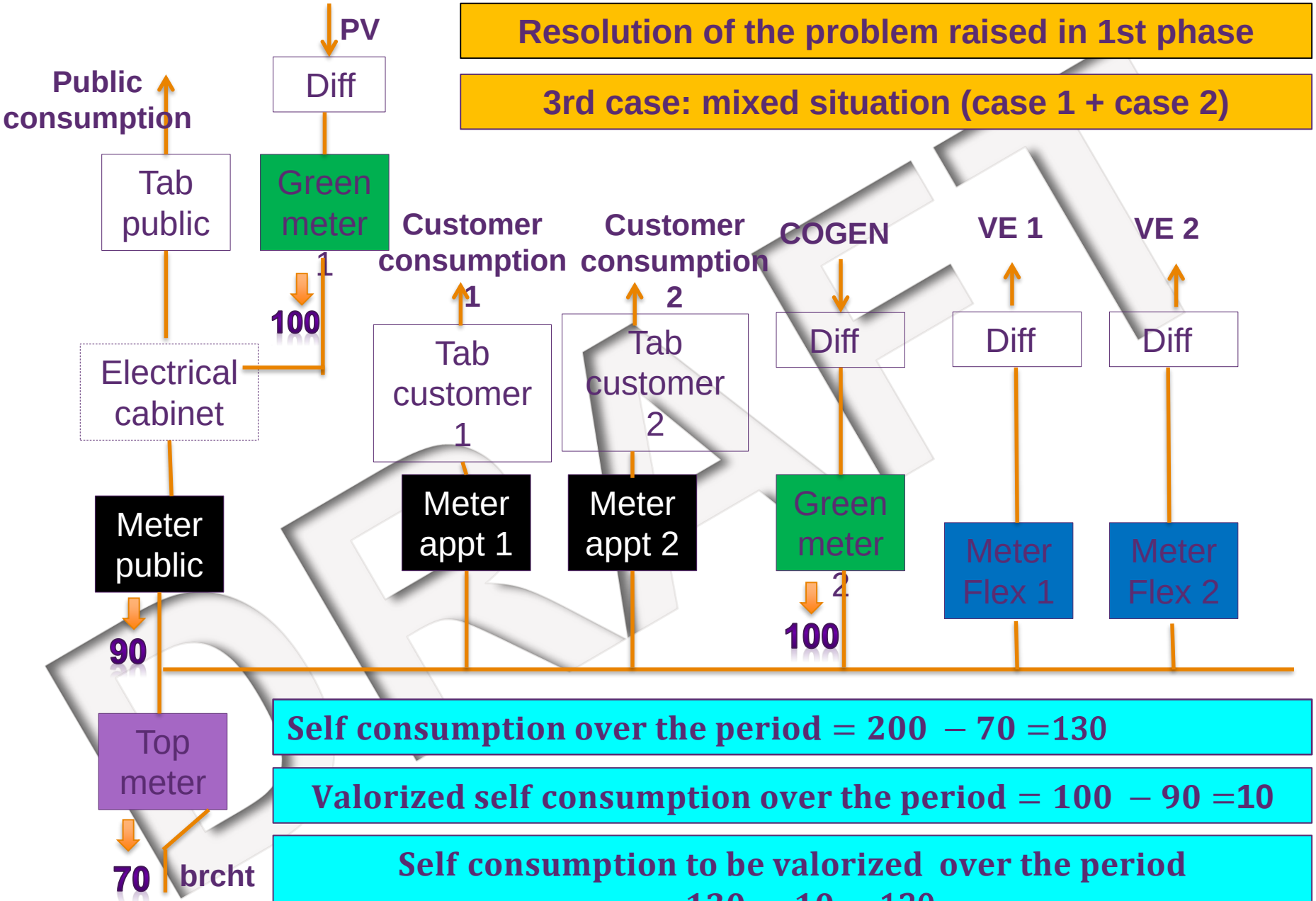
Resolution of the problem raised in 1st phase

3rd case: mixed situation (case 1 + case 2)



Self consumption over the period = 200 − 70 =130

Valorized self consumption over the period = 100 − 90 =10

Self consumption to be valorized over the period = 130 − 10 = 120

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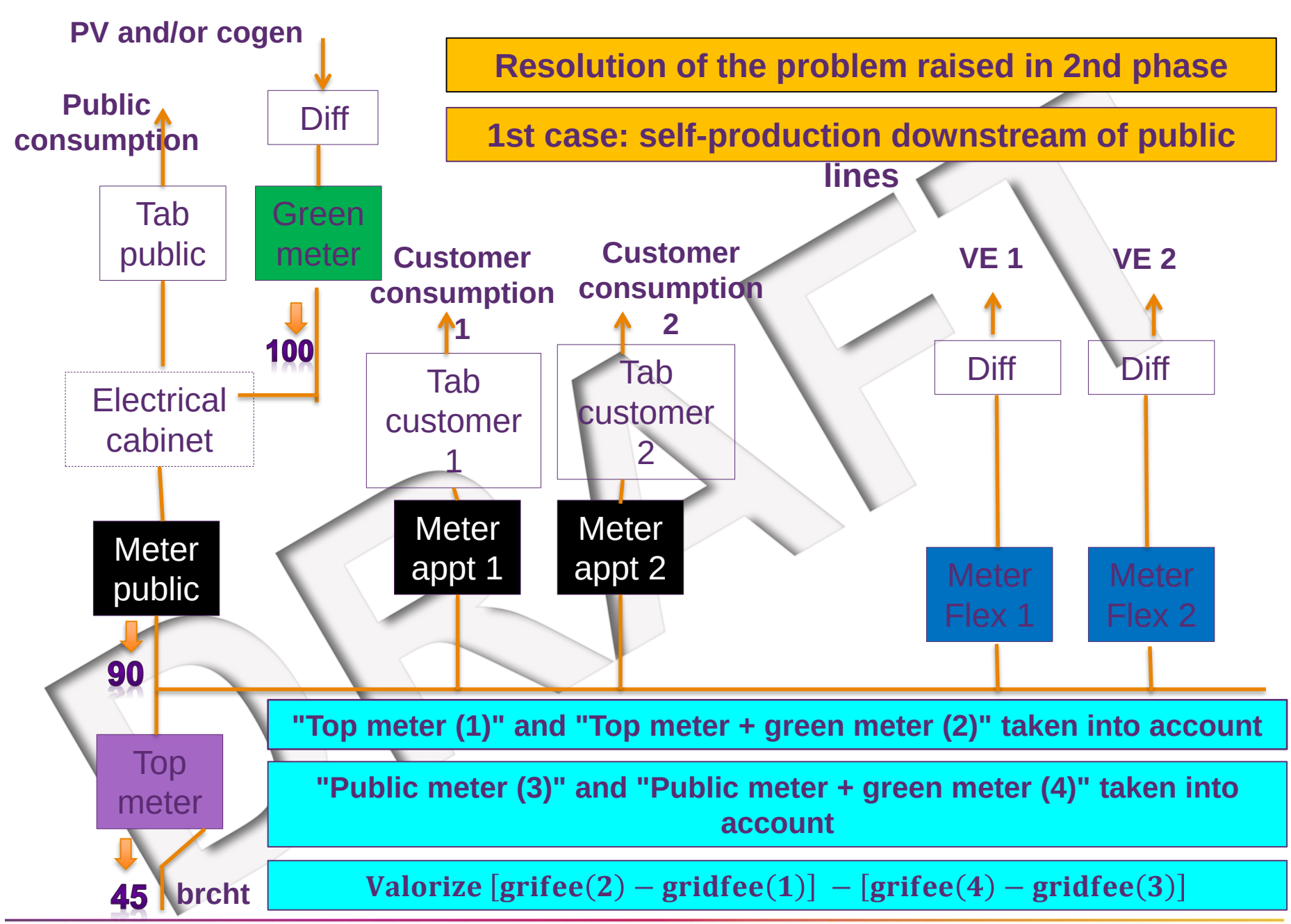

Resolution of the problem raised in 2nd phase

1st case: self-production downstream of public lines

"Top meter (1)" and "Top meter + green meter (2)" taken into account

"Public meter (3)" and "Public meter + green meter (4)" taken into account

$$\text{Valorize } [\text{grifee}(2) - \text{gridfee}(1)] - [\text{grifee}(4) - \text{gridfee}(3)]$$

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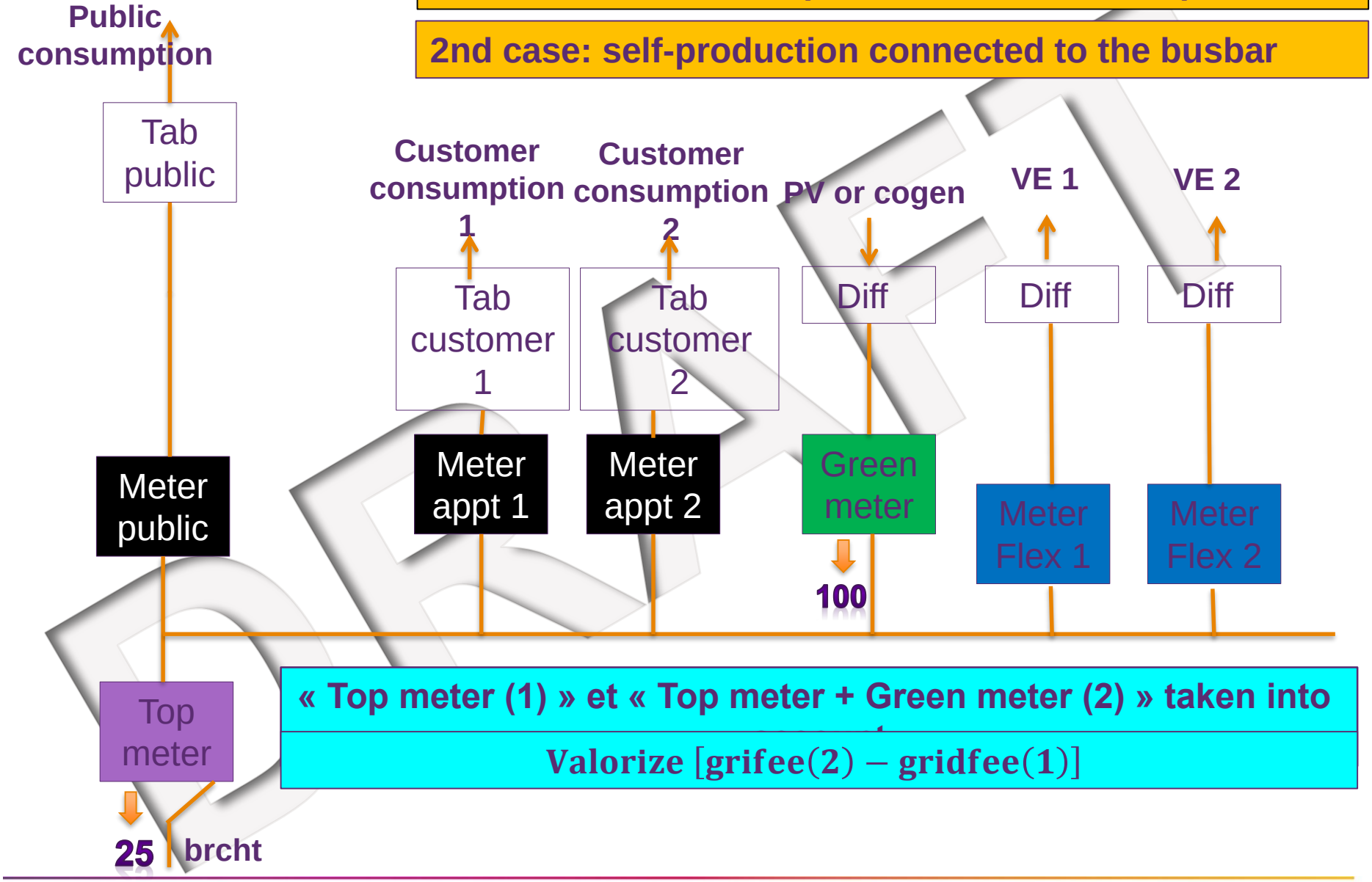
Resolution of the problem raised in 2nd phase

2nd case: self-production connected to the busbar



« Top meter (1) » et « Top meter + Green meter (2) » taken into

$$\text{Valorize } [\text{grifee}(2) - \text{gridfee}(1)]$$

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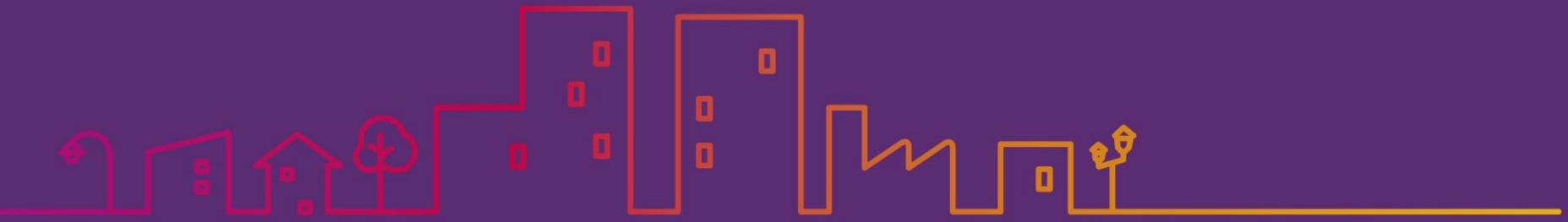
Sharing green energy

Calculated example of a representative large residential building in the Brussels-Capital region



Calculated example – large residential building

- **Assumptions**
  - Building of 325 apartments with annual consumption of 750 MWh:
    - 100 customers on SLP 22 with an EAV of 3 MWh
    - 225 customers on SLP 21 with an EAV of 2 MWh
    - Consumption from public lines is not taken into account (assumed to be less significant)
  - The connection is from a network cabinet located within the building
  - Cogen production = 1,000 MWh broken down by quarter hours
- **Equation:**
  - "Building consumption" = (A+ - A-) + cogen production
  - ⇔ (A+ - A-) = "building consumption" - "cogen production"
  - ⇔ (A+ - A-) = 750 MWh – 1,000 MWh = - 250 MWh
  - Extraction A+ = ∑1/4h MAX ((A+ - A-);0) = 274 MWh
  - Feed-in A- = ∑1/4h MAX ((A- - A+);0) = 524 MWh
  - Self-consumption = "building consumption" - A+ = 476 MWh

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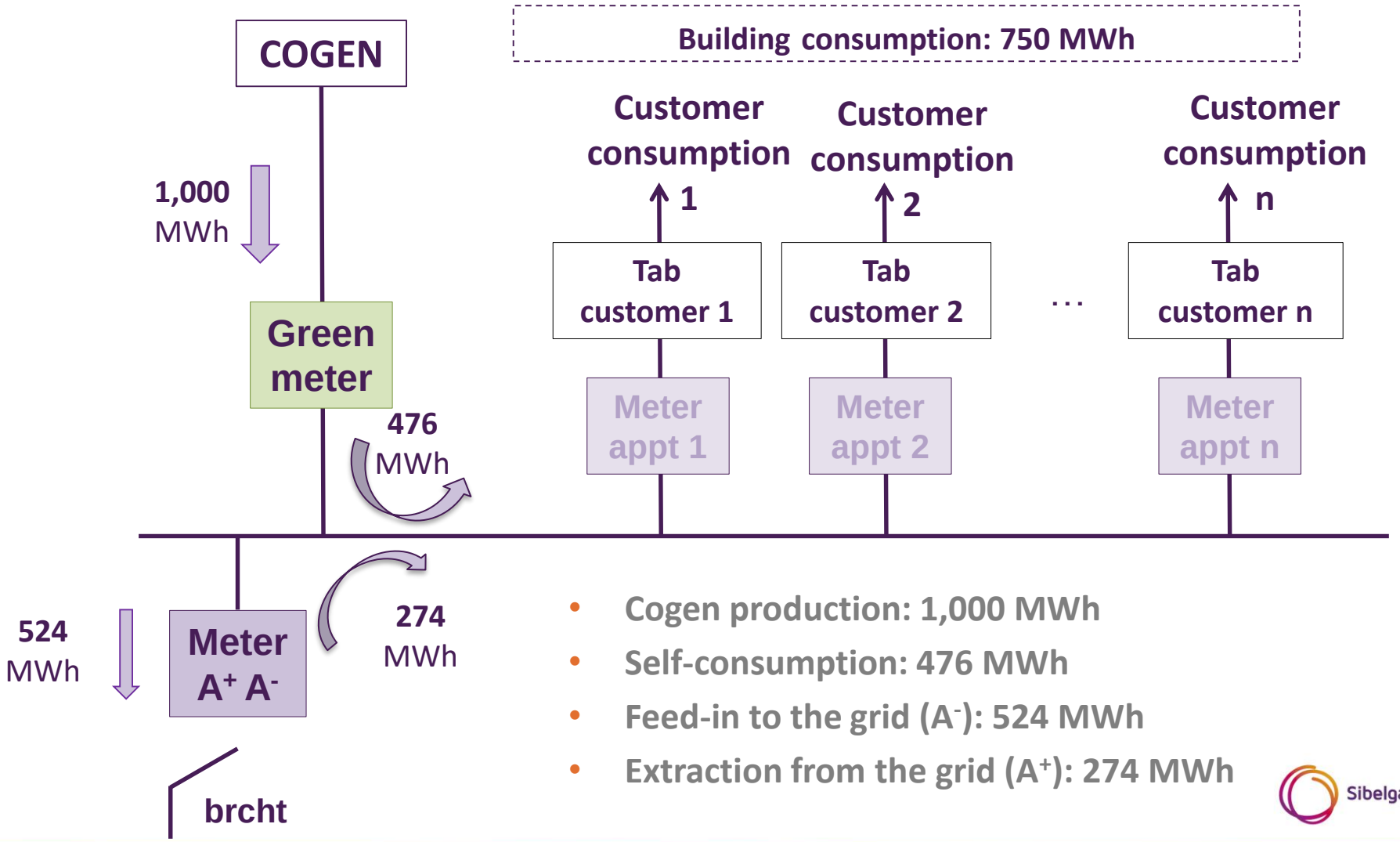
Schematic of the situation



- Cogen production: 1,000 MWh
- Self-consumption: 476 MWh
- Feed-in to the grid (A^-): 524 MWh
- Extraction from the grid (A^+): 274 MWh

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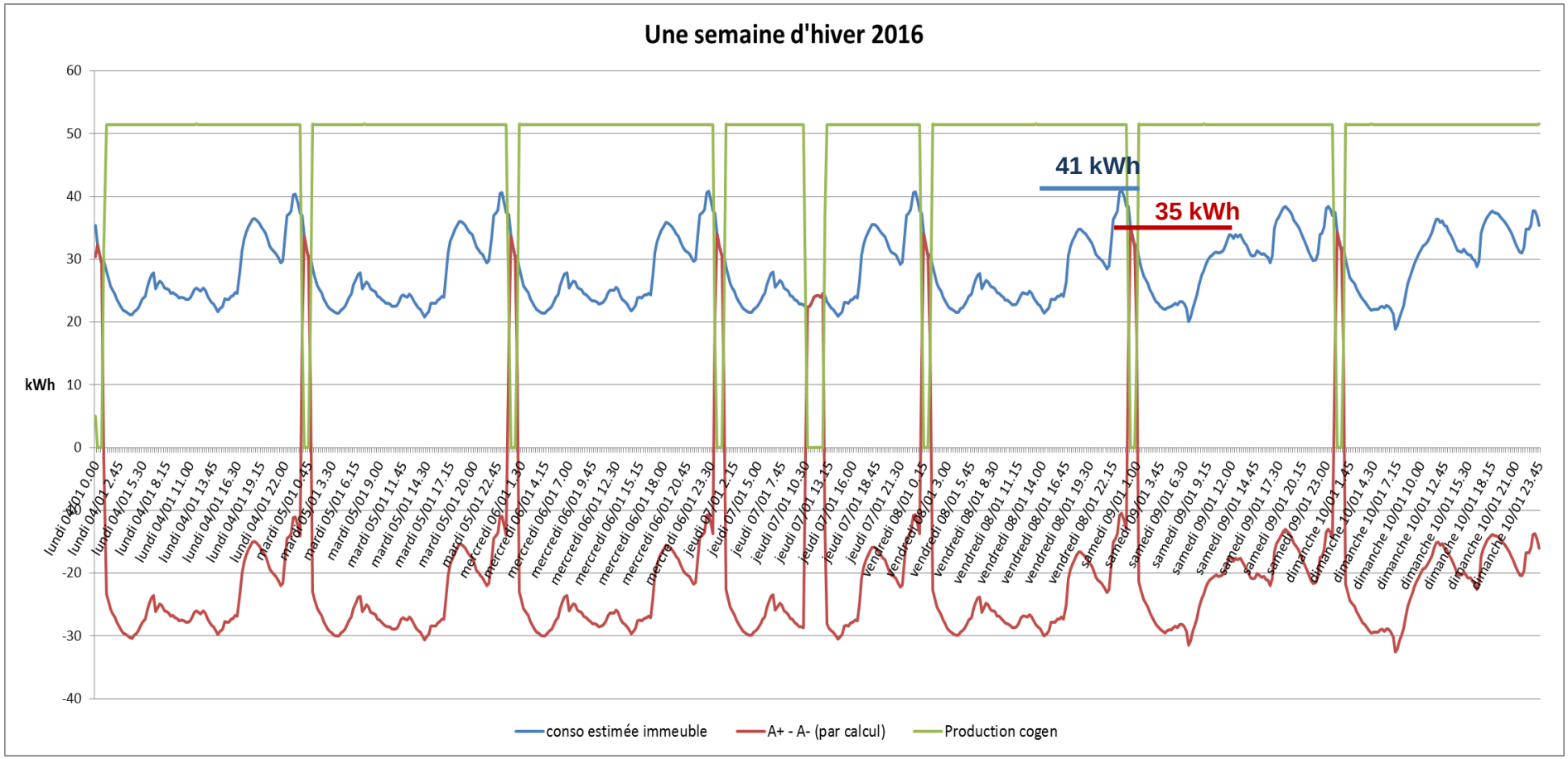
Consumption and production during one week in winter



- Weekly peak of estimated consumption: evening around 23:00 ≈ 41 kWh ≈ 164 kW
- Weekly peak A^{+}- A^{-}: evening around 0:15 ≈ 35 kWh ≈ 140 kW

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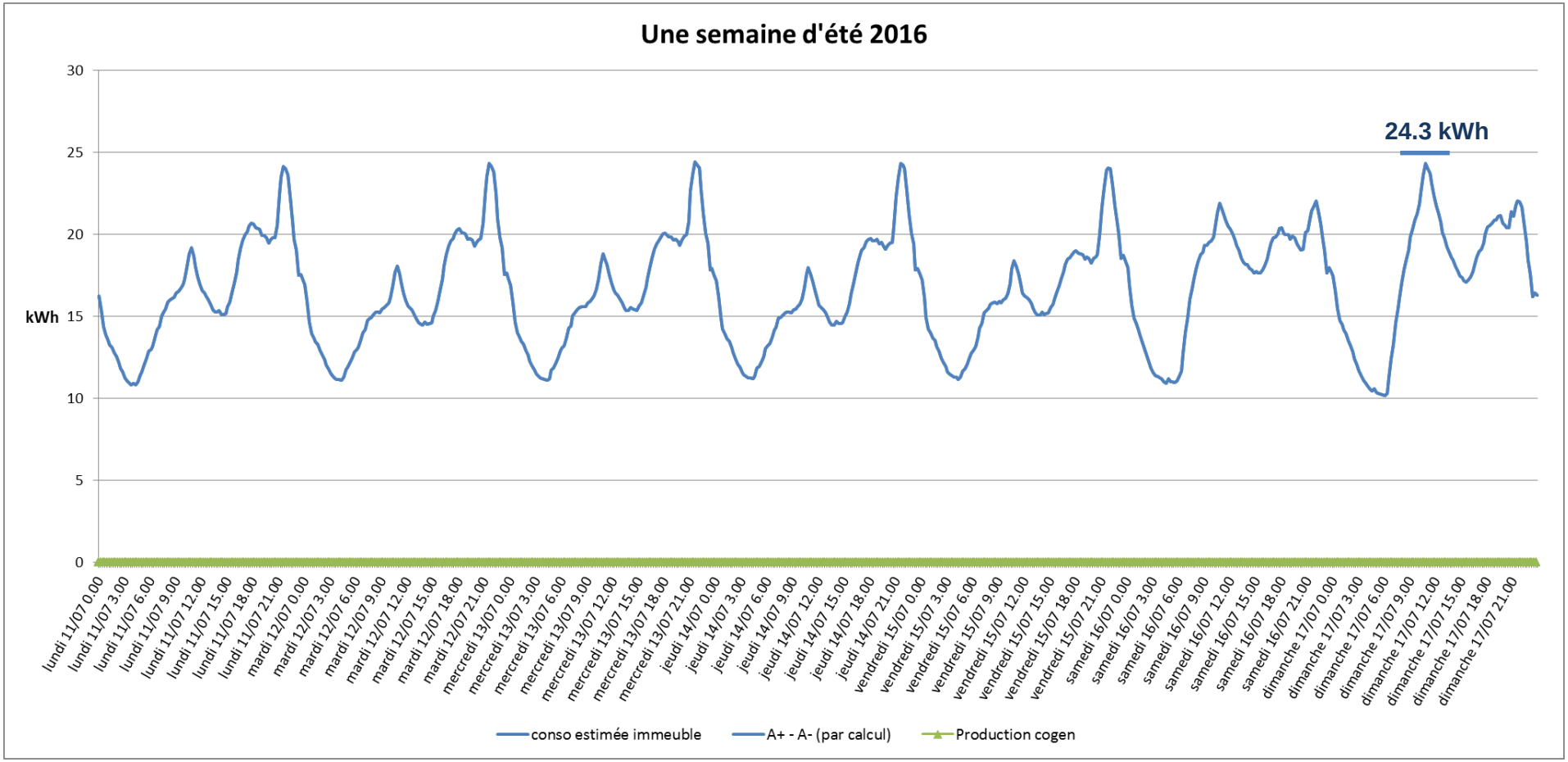
Consumption and production during one week in summer



- Cogen production = 0 => estimated consumption = A^+
- Weekly peak of estimated consumption = sunday 10:45 ≈ 24.3 kWh ≈ 97.2 kW

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kWh and capacitive tariffs simulation

- **Comparison of 2 scenarios:**
  - Scenario 1: 100% kWh tariff
  - Scenario 2: 50% kWh/50% capacitive tariff

	Conso immeuble 750 MWh	Prélèvement 274 MWh	Autoconsommation 476 MWh
Tarif distribution BT (2017 arrondi)		67 €/MWh	
Scénario 1: full énergie	**50.250,00 €**	**18.358,47 €**	
Gain pour le client			***31.891,53 €***
Energie max 1/4 h	41,73 kWh	39,30 kWh	
Pointe	166,94 kW	157,19 kW	
Tarif distribution BT (50% tarif BT 2017)		33,5 €/MWh	
Tarif capacitif		150,5 €/kW/an	
Scénario 2: 50% énergie 50% puissance	**50.250,00 €**	**32.836,58 €**	
Gain pour le client			***17.413,42 €***
∆ gain pour le client scenario 2 vs. 1			***-14.478,11 €***

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Summary (1/2)

- Cogeneration installed in a residential building has a beneficial impact on the B.T. grid in winter (annual peak)
- In principle, the shape of the diagrams should remain the same regardless of the type of apartment (electricity consumption and heat requirements both in proportion to the number of apartments)
- We can therefore extrapolate the observation from the preceding slides to apply to all residential buildings, as long as there are no major flexible loads (e.g. several garages housing electric vehicles)
- Even with electric vehicles, cogeneration will continue to offer significant advantages: recharging cycles can be optimised according to the production diagram
- Even assuming a gradual evolution towards the capacitive tariff, the discount would remain significant, certainly if a distinction were envisaged between full and off-peak hours.

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Summary (2/2)

- A simulation was also performed with PV panels:
  - the available area for this type of building would only allow the placement of a capacity of around 10 kVA, i.e. annual production in the order of 10 MWh
  - no feed-in is observed due to the size of this installation and the advantage, both environmental and financial, remains somewhat symbolic.

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VERBAND KOMMUNALER UNTERNEHMEN e.V.

WEBINAR
PROMOTION OF ENERGY EFFICIENCY AND RENEWABLES IN BUILDINGS

Fabian Schmitz-Grethlein
Verband kommunaler Unternehmen e. V.
25th September 2017

DIE KOMMUNALEN UNTERNEHMEN

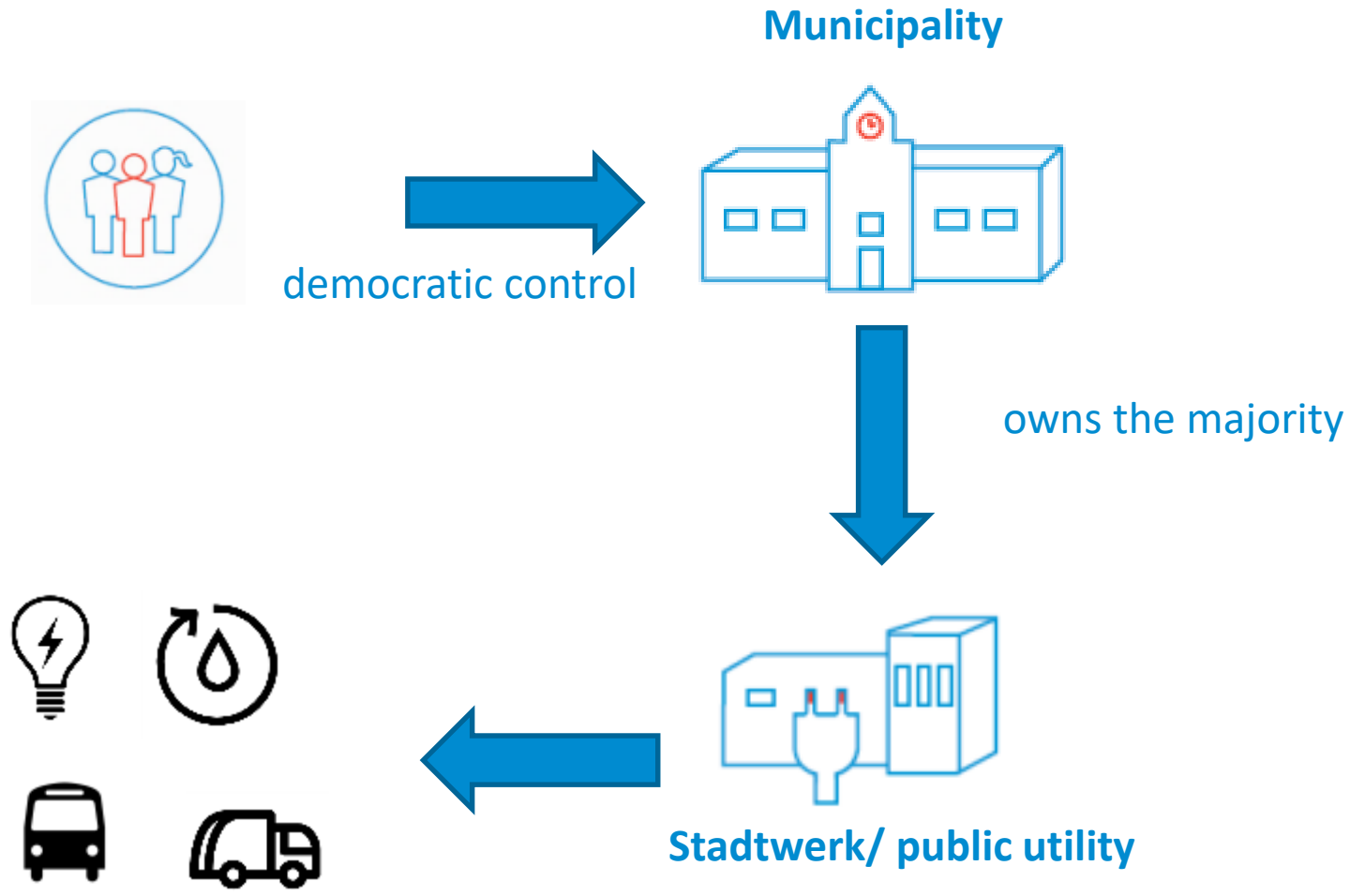
THE VKU: Our mission.

- VKU: association of municipally determined economic enterprises, represents the interests of the local public utility sector in Germany, which includes both supply and disposal services.

- VKU-Members: provide services of general interest in Germany within the framework of local self-government, working driven by economic competition, serve the interests of citizens by maintaining a service structure that counteracts the forces of market concentration and forms an integral part of Germany's social market economy.

VERBAND KOMMUNALER UNTERNEHMEN e.V.

What are public utilities, so called Stadtwerke?



Services of General Interest.

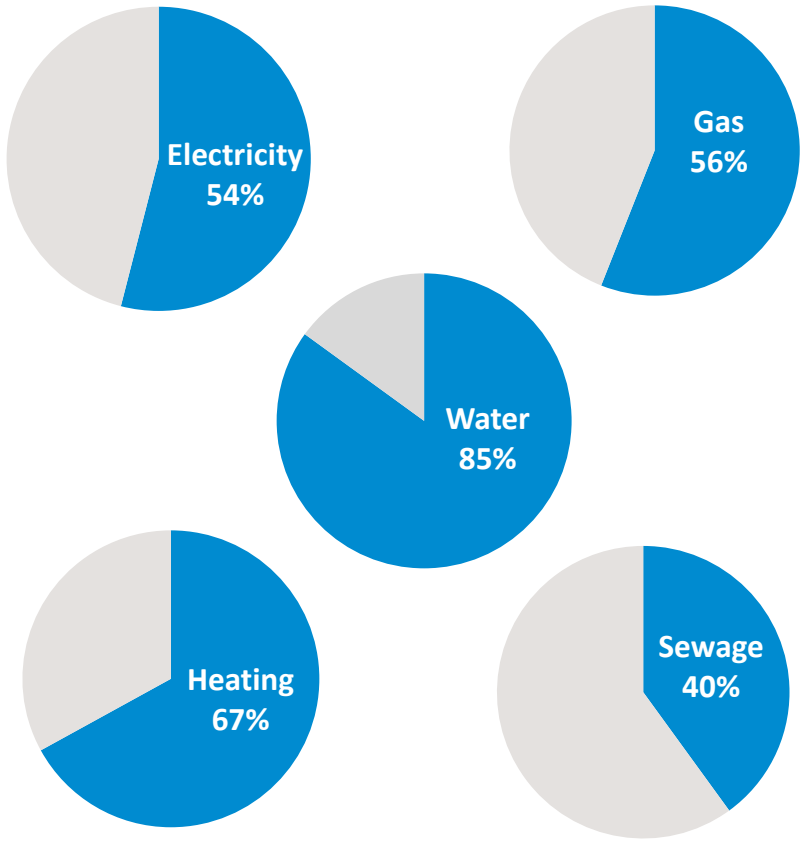
Contribution of local public utilities.

Number of Members: **1,452**

Employees: **258,194**

Turnover: **111,965 million euros**

Investments: **9,352 million euros**



Source: Stat. Bundesamt, 2014

PUBLIC UTILITIES WORKING LOCALLY FOR GOOD CLIMATE AND ECONOMIC CONSERVATION

Public utilities for sustainable developement – together with the municipalities.

Regional potential

Plans for heat supply

Climate friendly heat supply

Public transport

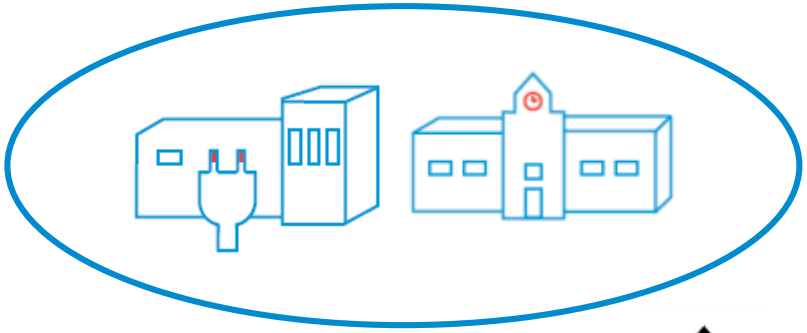
Charging infrastructure

E-mobility

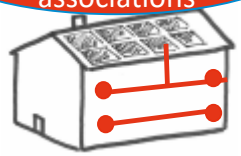
Municipal housing associations

Municipal buildings

Energy efficiency/ energetic restoration

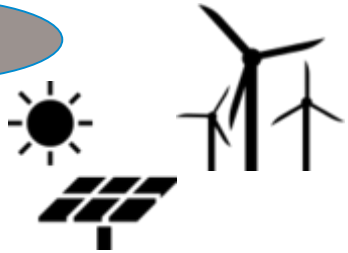


Municipal housing associations



Models for tenants („Mieterstrom“)

Projects with cities



Renewable energies

Intelligent lighting

Street lighting

Public utilities provide sustainable services for citizens.

contracting

Information, advice

Heat supply

Private charging poles

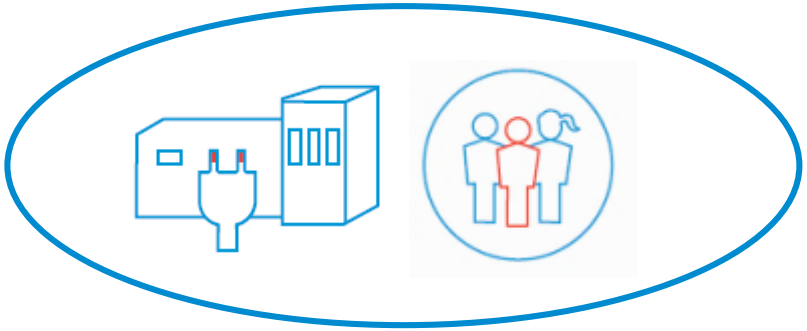
invoicing

E-mobility

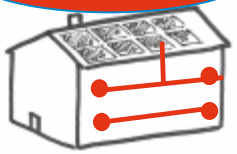
Energy service (savings)

Efficiency consulting

Energy efficiency



cooperation



Models for tenants („Mieterstrom“)

Project participation

PV contracting

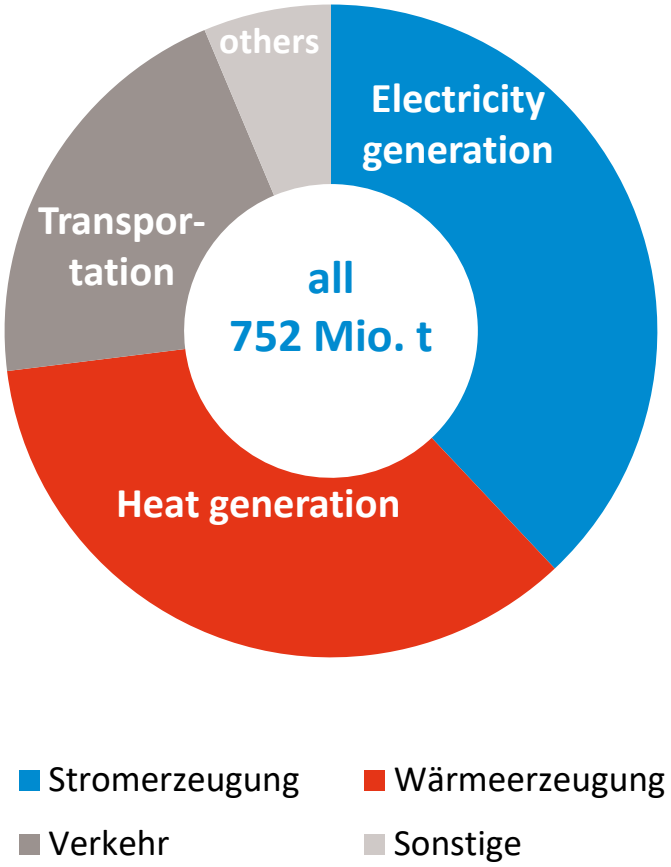
Renewable energies

Digitalization / connection

security

Smart Home

Challenge in the coming years: Reducing CO_2 in the heat and transportation sector.



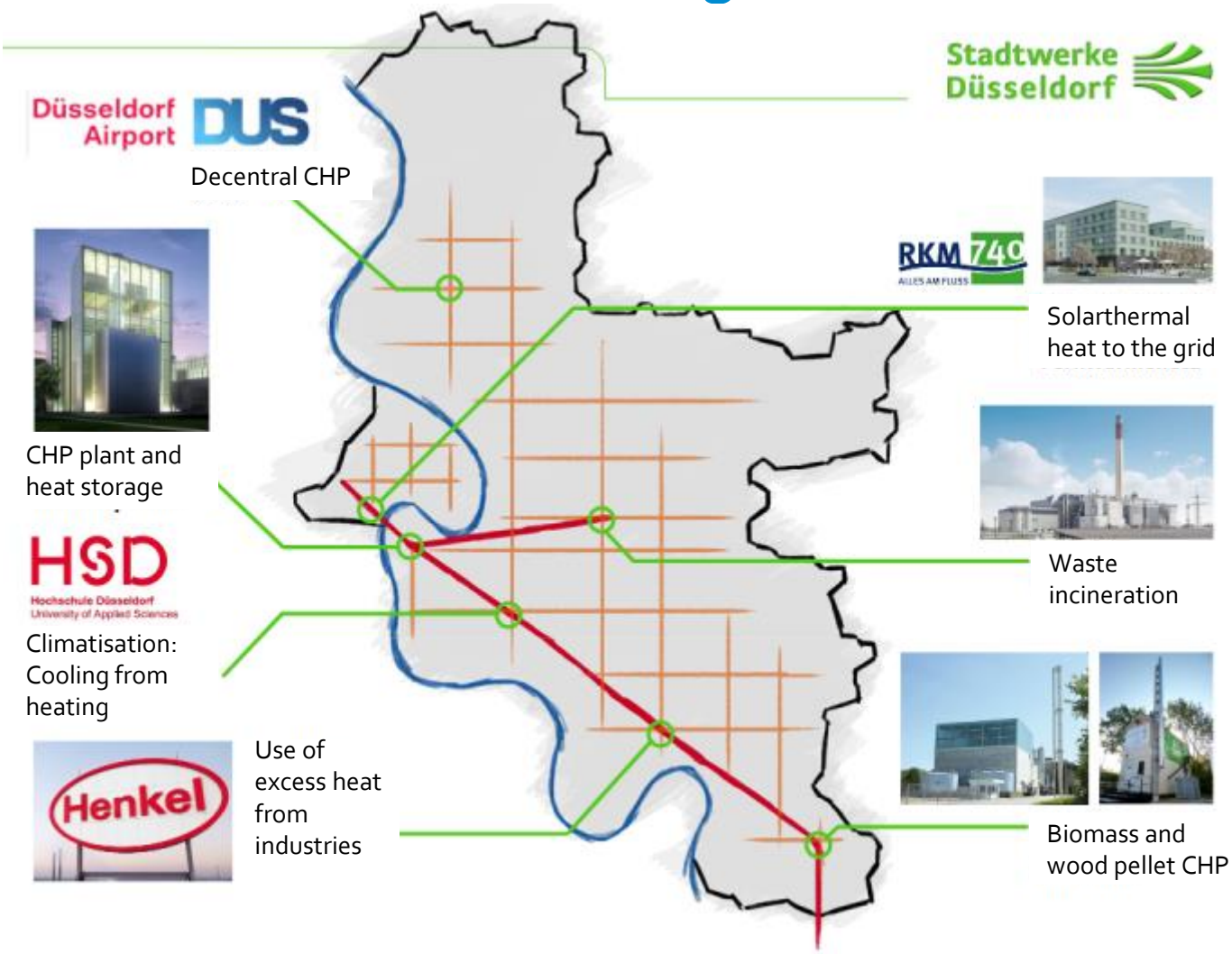
CO_2 emissions 2014;
source: Umweltbundesamt

– Climate target for Germany: Reducing its GHG emissions between 80 – 95 % until 2050

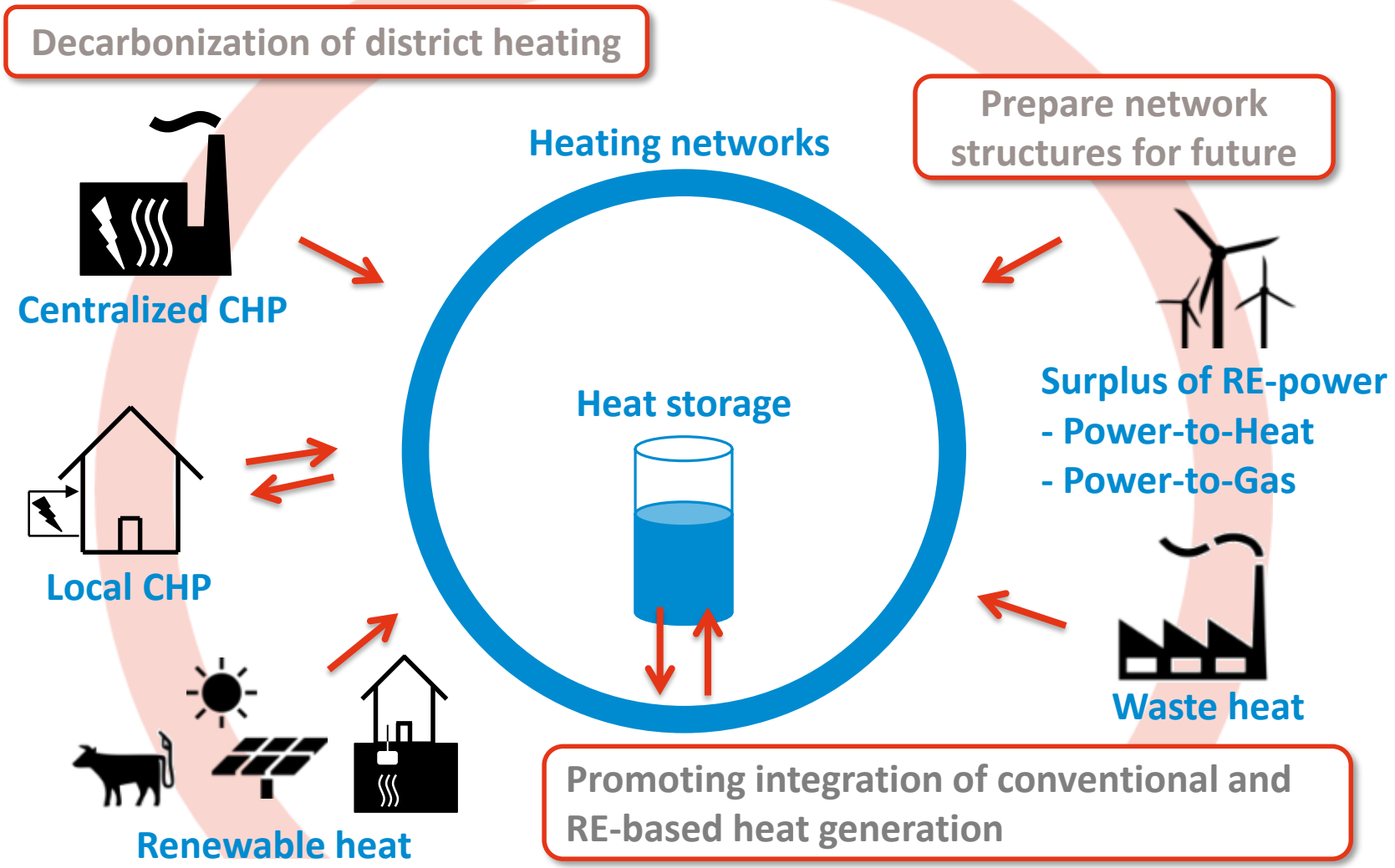
– RE share today:
  – Energy sector: 30 % ✓
  – Heat sector : 14 % !
  – transportation: 5 % !

Laying out plans

Utilities in Urban Heat Planning.



Utilities develop custom-made concepts for heating and cooling of buildings and housing areas.



Public utilities: ready to support housing projects with services for e-mobility.

- **Future criteria for attractiveness of rented and owned appartment and housing projects.**
  - **Energy supply**: fairly priced energy and heating from regional and local sources
  - **Broadband communication services**: hardly possible to let or sale appartments without highspeed internet
  - **E-Mobility**: growing demand of electric mobility promotes the role of charging infrastructure → becomes quality criterion of housing projects

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Conditions of real estate and housing companies.

- **Highly interestet in increase of attractiveness of property and projects.**
  - Interest in electric mobility and charging solutions already available but
  - Still need for education
- **Companies need/want standardized solutions from a single source.**
  - Full service solutions from a single mould
  - Self initiated projects of owners/tenants usually not allowed
  - Companies prefer employment of known and trustet service providers/ electricians

Potential for services of municipal utilities.

- **Active development of E-Mobility concept in cooperation.**
  - Calculation of demand for load capacity
  - Optimization of charging infrastructure via load- and charge management, electric storage technologies and implementation into energy management system of building
  - Optimization of connection to electric distribution networks (cost factor for investors)
  - Installation, operation and maintenance of charging infrastructure
  - And many more...

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Bottom line

Local climate protection needs strong economic actors.

- There is **huge potential** for climate protection and environmental conservation in the communities, cities and municipalities. Particularly in and around buildings.

- Many citizens, municipalities and companies are **interested** in enhancing their efforts for climate protection and sustainable developement.

- Heating & Cooling as well as transport are too sectors that need to be adressed.

- **Support and coordination** are necessary.

- Many municipalities have a **lack of know how**. Locally based utilities **know the local circumstances and actors**.

- **Political will and economic capacity** have to work hand in hand.

Thank you!

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Head of Unit
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