



COGEN

Voor kwaliteitsvolle Warmte-krachtkoppeling

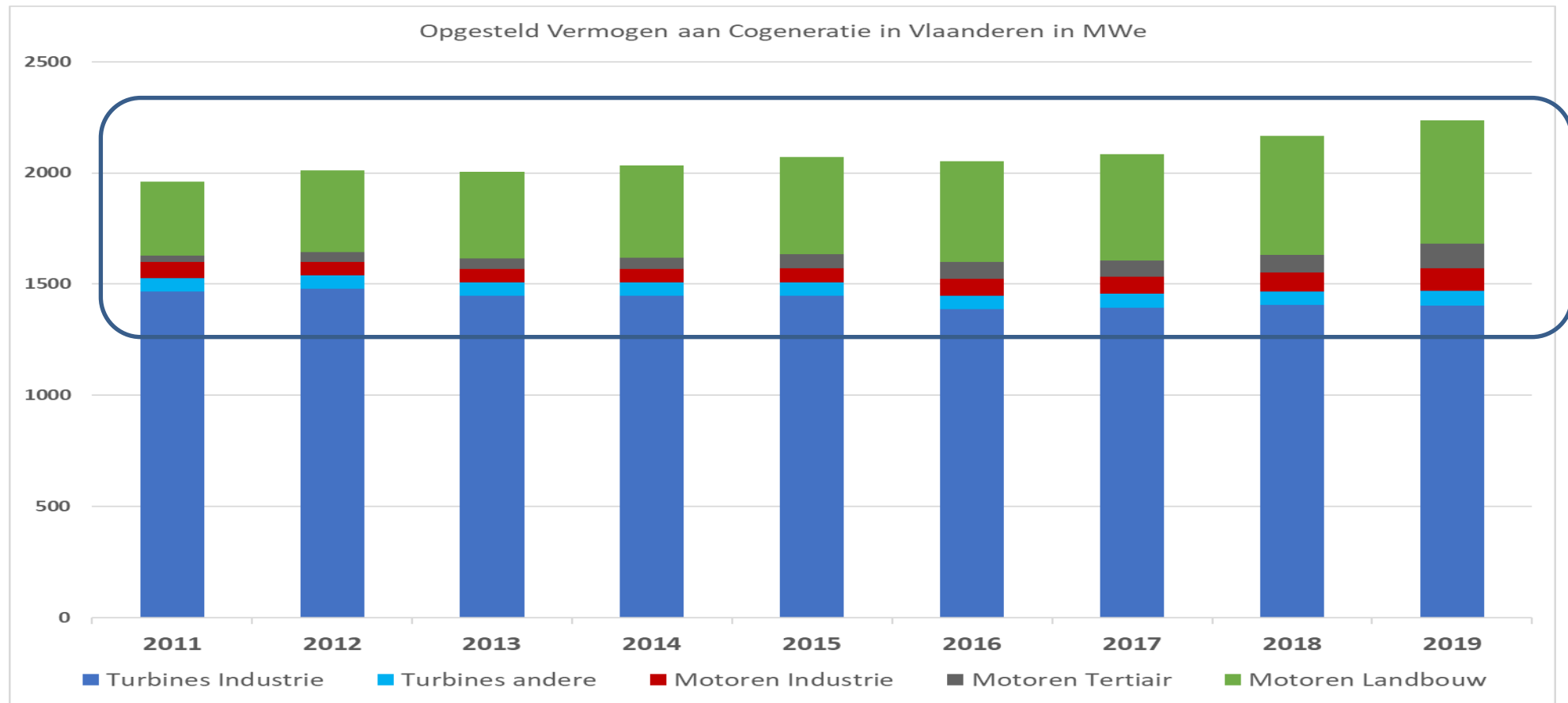
Cogeneration in Flanders status and future

WKK Ontmoetingsdag
26 Oktober 2021

CHP : status in Flanders



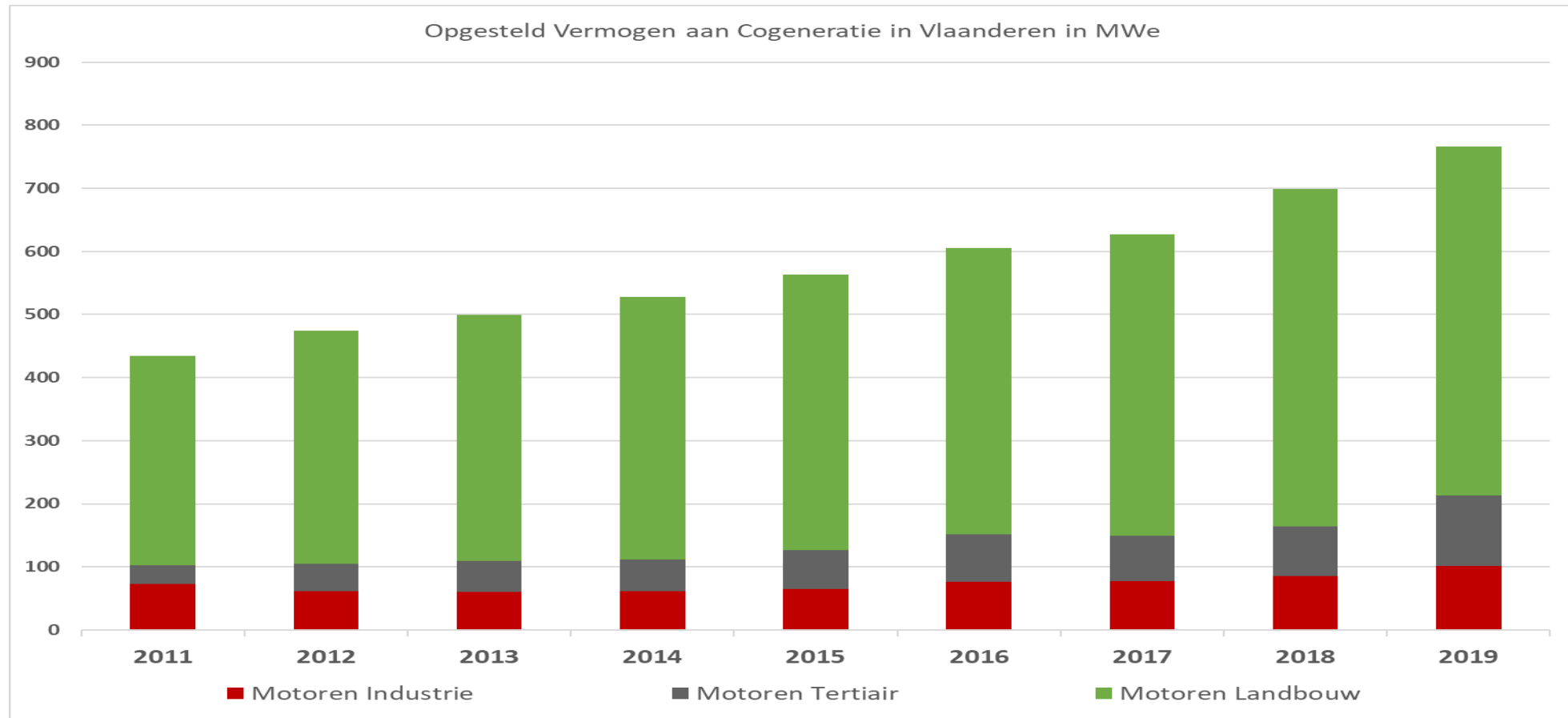
Growth in greenhouse horticulture, industry and building sector



CHP : status in Flanders



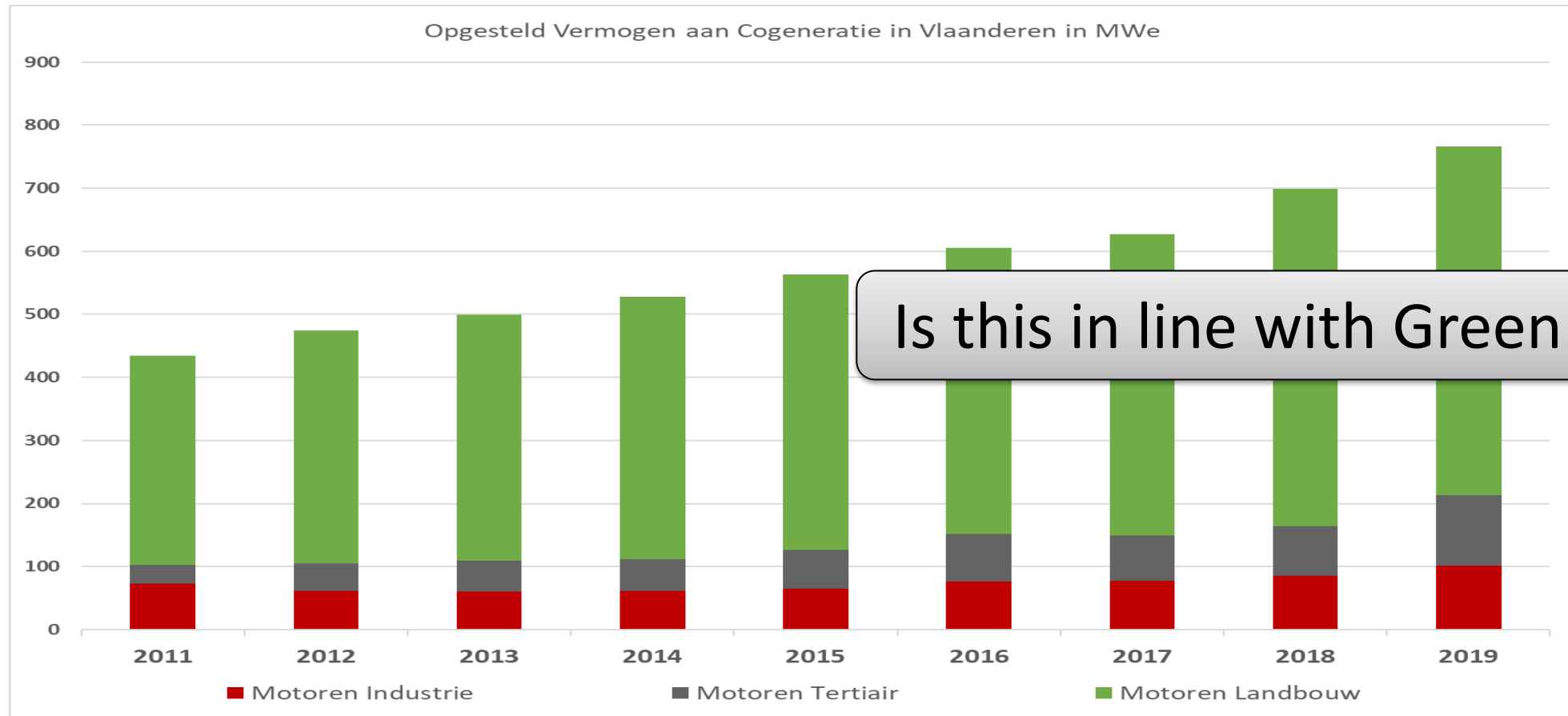
Growth in greenhouse horticulture, industry and building sector



CHP : status in Flanders



Growth in greenhouse horticulture, industry and building sector



Questions linked to 2030 and 2050



- Is CHP still a useful technology in building sector ?
- Is electrification of heat the solution ?
- Will heat pumps dominate at the expense of CHP ?

COGEN Vlaanderen is reflecting on these questions !
- first thoughts -

Analysis of residential heating profile 100 kWth – single technology



	Gas Boiler	CHP	Heat Pump	PV
Electric capacity (kWe)	0	-54 (production)	40 (offtake)	
Thermal capacity (kWth)	100	100	100 (@ -10°C)	0
Investment cost	10 000 €	100 000 €	40 000 €	
		Very low utilisation (1800 hours)	Important grid load 1400 h utilisation	

Analysis of residential heating profile 100 kWth – combined technologies



	Gas Boiler	CHP	Heat Pump	PV
Electric capacity (kWe)	0	-10 (production) →	9,5 (offtake)	
Thermal capacity (kWth)	90	20,4	31 (@ -10°C)	0
Investment Cost	10 000 €	35 000 €	11 000 €	
Primary Energy transformed into heat = 176%	2% of heat demand	Utilisation 3400 hours	No grid load	

Analysis of residential heating profile 100 kWth – combined technologies



	Gas Boiler	CHP	Heat Pump	PV
Electric capacity (kWe)	0	-10 (production) →	9,5 (offtake) ←	-14
Thermal capacity (kWth)	90	20,4	31 (@ -10°C)	0
Investment Cost	10 000€	35 000 €	11 000 €	15 000 €
Primary Energy transformed into heat = 246 %	2% of heat demand	Utilisation 2700 hours	No grid load 21% of heat by PV 46% of heat by CHP	

Analysis of residential heating profile 100 kWth – combined technologies



	Gas Boiler	CHP	Heat Pump	PV
Electric capacity (kWe)	0	-10 (production) →	9,5 (offtake) ←	-14
Thermal capacity (kWth)	90	20,4	31 (@ -10°C)	0
Investment Cost	10 000€	35 000 €	11 000 €	15 000 €
Primary Energy transformed into heat = 246 %	2% of heat demand	Utilisation 2700 hours	No grid load 21% of heat by PV 46% of heat by CHP	

Is this only reduction of fossil fuels ?



Analysis of residential heating profile

Some key figures (1)

- Total residential use of Natural Gas in Belgium:
40 000 000 MWh
- Total residential use of Heating Oil in Belgium:
10 000 000 MWh
- Total direct fossile CO₂ emissions from residential use:
11,28 Milj. Ton CO₂



Analysis of residential heating profile

Some key figures (2)

- Reducing residential CO₂-emissions:
-> insulation and energetic renovation!

50 000 000 MWh



25 000 000 MWh

11,28 Mio Ton CO₂





5,4 Mio Ton CO₂ - **52 %**



Analysis of residential heating profile

Some key figures (3)

- Reducing residential CO₂-emissions:
-> switching to CHP-HP-PV combination

25 000 000 MWh  10 416 667 MWh
5,4 Milj. Ton CO₂  2,25 Milj. Ton CO₂ **- 58 %**

- Total emission reduction:

11,28 Milj. Ton CO₂  2.25 Milj. Ton CO₂ **- 80 %**

Note : estimation of biomethane by Fluxys : 15 4000 000 MWh

Analysis of residential heating profile 100 kWth – Conclusion



- CHP and Heat Pumps = sector coupling in reverse directions
- Electrification of heat should NOT result in a security of supply issue in the electricity sector
- Cost effective energy transition = combining technologies
- Optimize investments between central and local

To be elaborated in 2022