

Committed partner for a more sustainable society



The business of district heating
Do Public Private Partnerships offer the solution

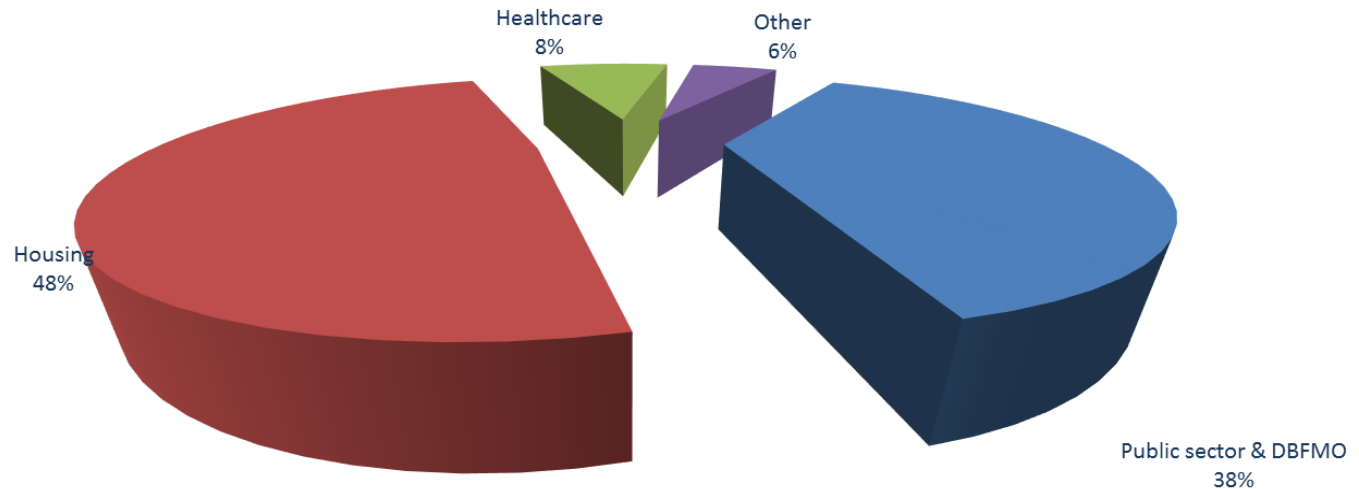
Reykjavik, 25th of October 2019
Caspar Boendermaker

Contents

- In short: introduction BNG Bank and PPP
- Dutch Climate Agreement
- Addicted to natural gas
- Neighborhood by neighborhood approach
- Most efficient approach is complicated
- Do PPP's bring the solution ?

BNG Bank – Promotional Bank

- Long-term loans at the lowest rates for municipalities, housing associations and care & education
- 90% public sector loans
- 10% project finance & PPP contracts

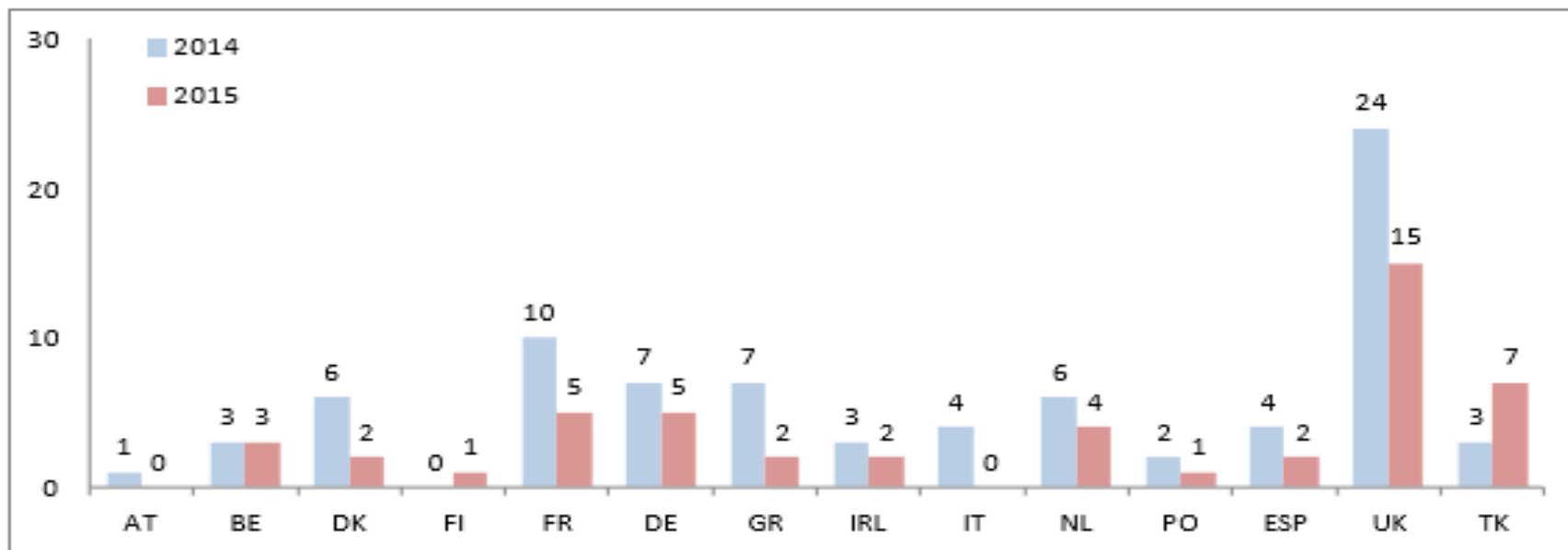


WORLD'S SAFEST BANKS 2018 – The Global Top 50

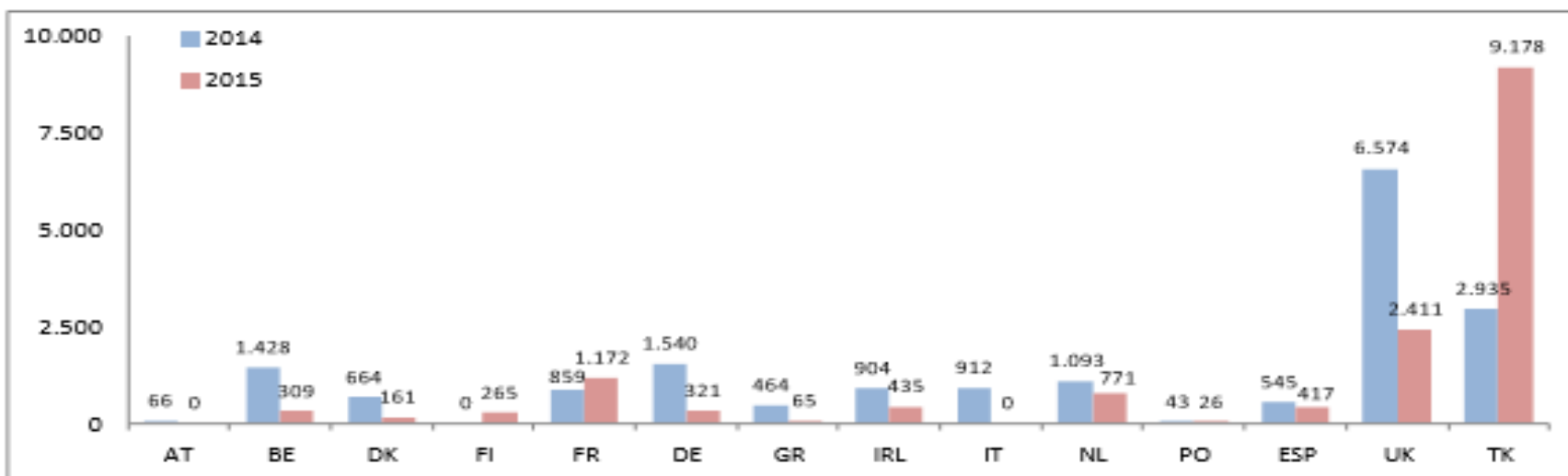
Rank	Company Name	Country	Fitch	Moody's	S&P	Total Score	Assets (\$ Mil.)	Statement Date
1	KfW	Germany	AAA	Aaa	AAA	30	566,486	31-Dec-2017
2	Zuercher Kantonalbank	Switzerland	AAA	Aaa	AAA	30	167,945	31-Dec-2017
3	Landwirtschaftliche Retenbank	Germany	AAA	Aaa	AAA	30	108,711	31-Dec-2017
4	L-Bank	Germany	AAA	Aaa	AAA	30	84,640	31-Dec-2017
5	BNG Bank N.V.	Netherlands	AA+	Aaa	AAA	29	167,932	31-Dec-2017

PPP in infrastructure in the Netherlands

	buildings	roads	Water works
Exploitation phase	14	10	2
Realisation phase	2	4	3
Procerement phase		2	
	16	16	5



Figuur 1 - aantal afgesloten PPS-projecten per land; Bron: EPEC



**Figuur 2 - totaal transactiebedrag afgesloten PPS-projecten per land (M€);
Bron: EPEC**

Climate & sustainability = topic no 1.



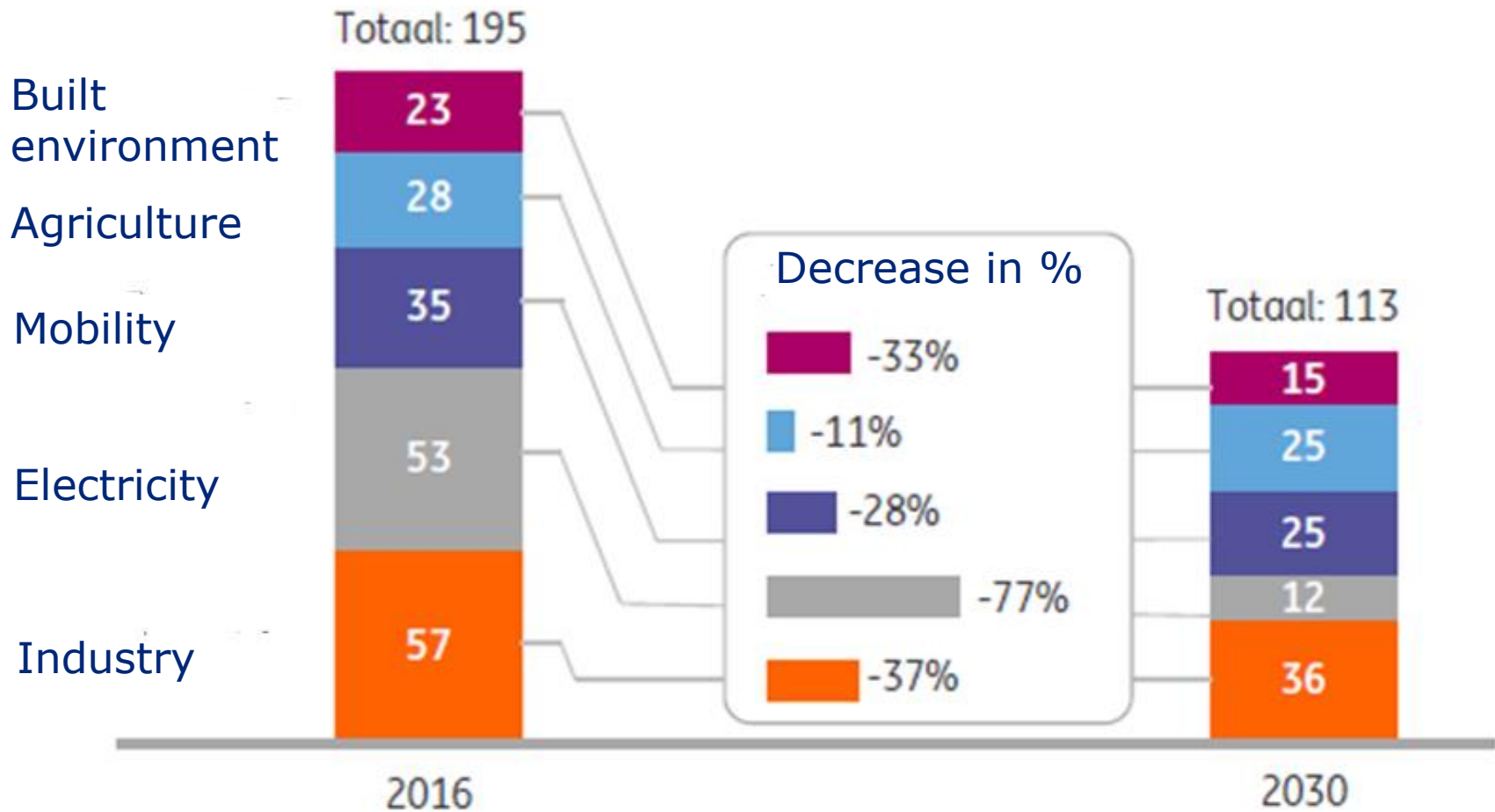


Involvd partner for a more sustainable Netherlands



Involed partner for a more sustainable Netherlands

Climate Agreement summarized (in megaton C02)



Co2 emissions mainly in power plants and industry

Company	Province	Co2 emission
1 RWE Eemshaven Centrale	GR	8,3
2 Tata Steel IJmuiden B.V.	NH	6,3
3 Uniper Maasvlakte Powerplant 3	ZH	4,7
4 Shell Nederland Raffinaderij B.V.	ZH	4,3
5 Nuon Centrale Hemweg	NH	4
6 Yara Sluiskil B.V.	ZE	3,7
7 Nuon Power Velsen (gas)	NH	3,6
8 Essent Amercentrale (Geertruidenberg)	NE	3,5
9 ENGIE Centrale Rotterdam	ZH	3,2
10 Dow Benelux B.V. (Terneuzen)	ZE	2,7
11 Shell Nederland Chemie B.V. Moerdijk	NE	2,6
12 BP Raffinaderij Rotterdam B.V.	ZH	2,3
13 ENGIE Eemscentrale (gas)	GR	2,2
14 Nuon Power IJmond (gas)	NH	2,1
15 ESSO Raffinaderij Rotterdam	ZH	2,1



- Power plants
- Steel
- Oil refining
- Chemical industry

Three buttons to turn



SAVING

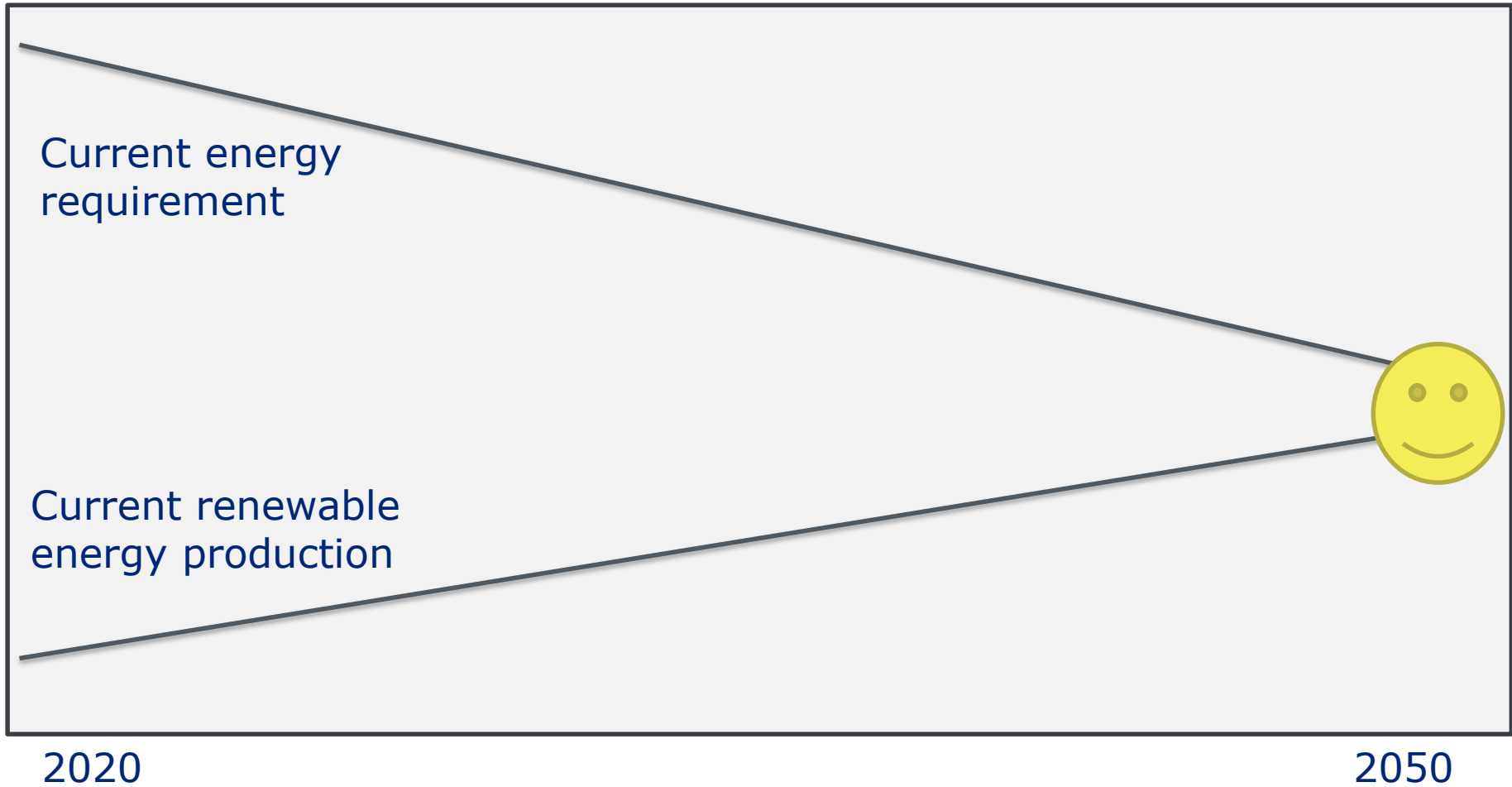


RENEWABLE
ELECTRICITY

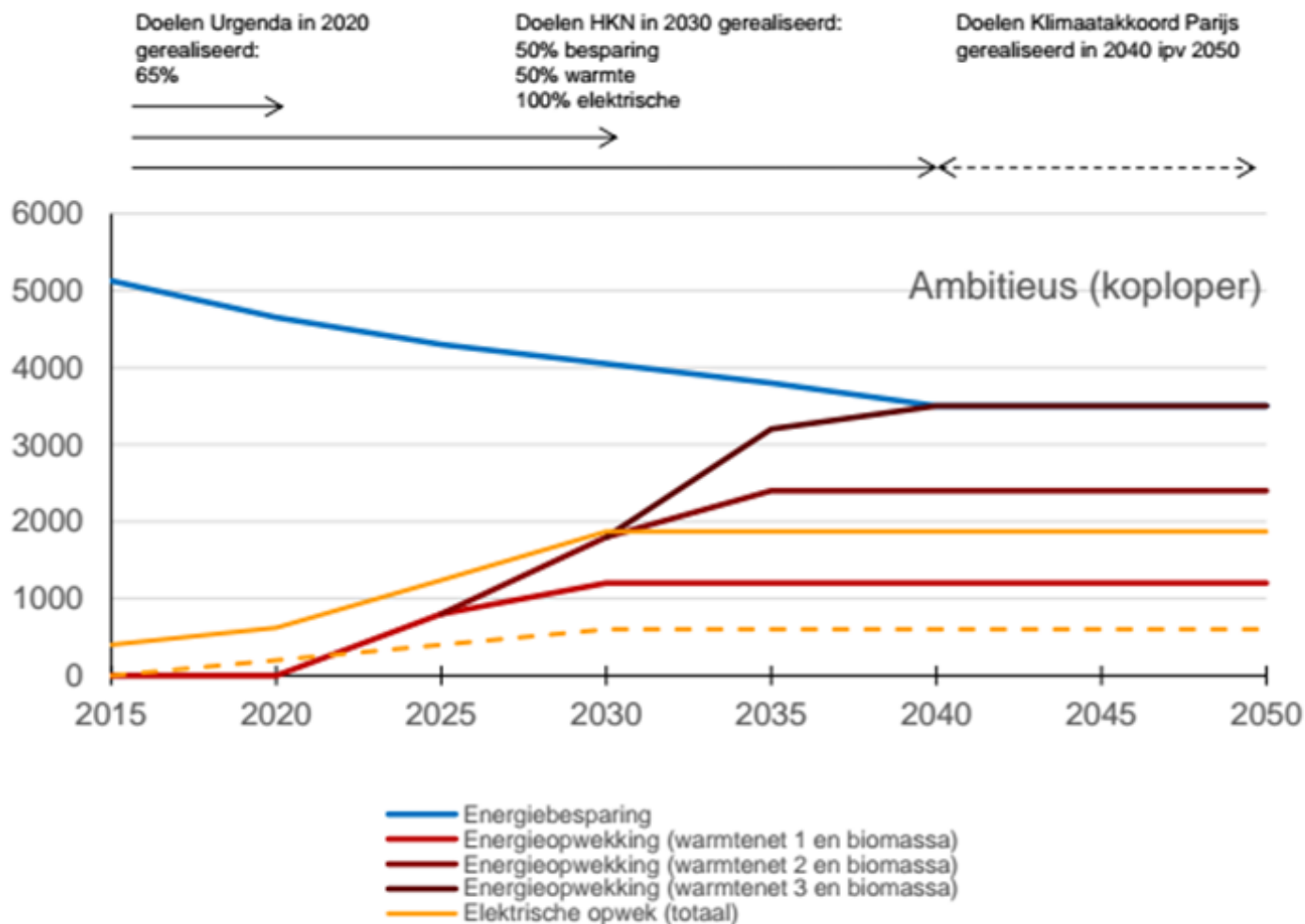


RENEWABLE
HEAT

Future scenario



Scenario 2040;



Three buttons to turn



SAVING

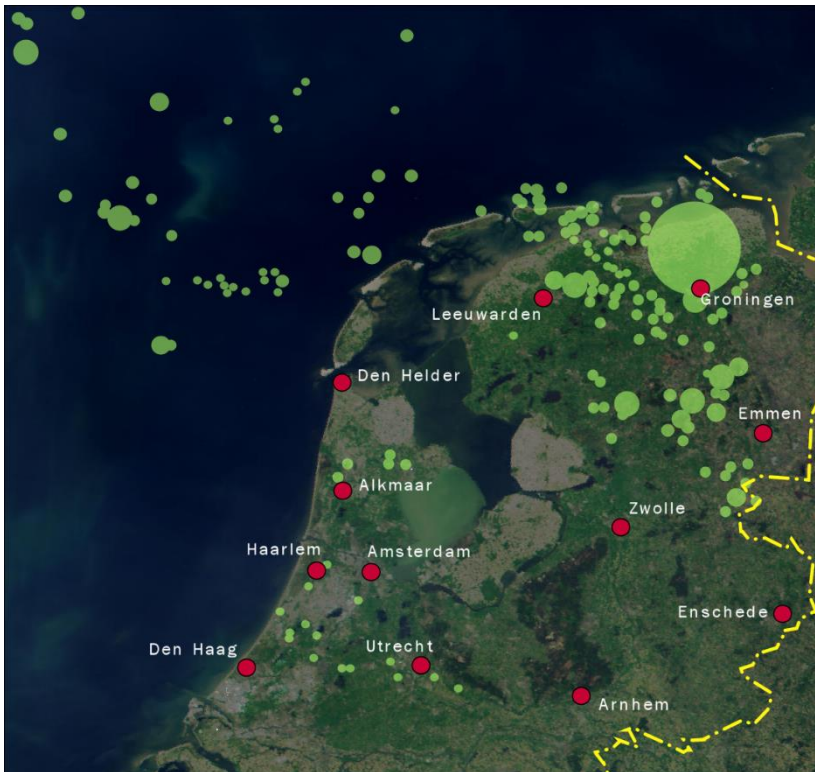


RENEWABLE
ELECTRICITY

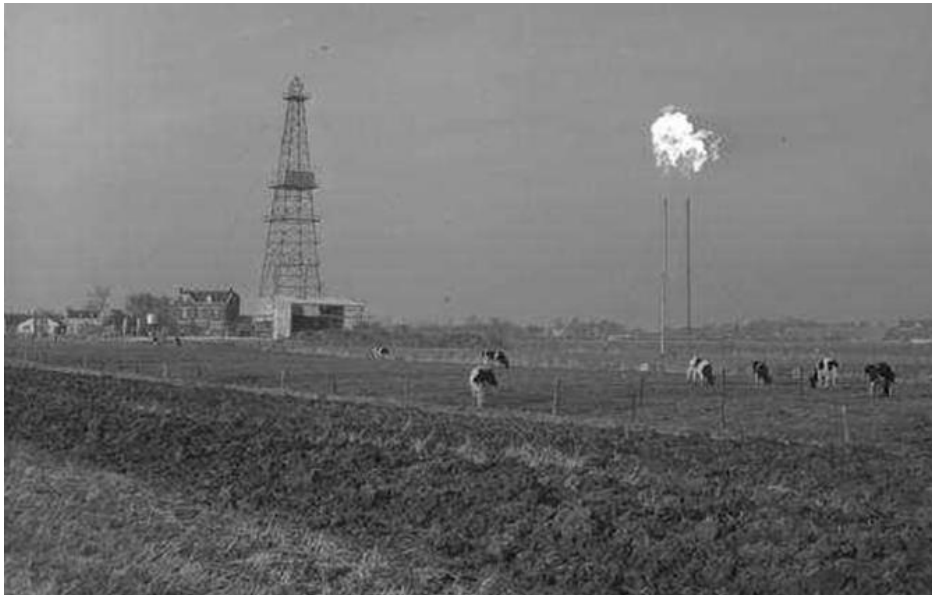


RENEWABLE
HEAT

Natural Gas in NL



Built up a natural gas distribution network





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Earthquake







Future
without
natural gas ?



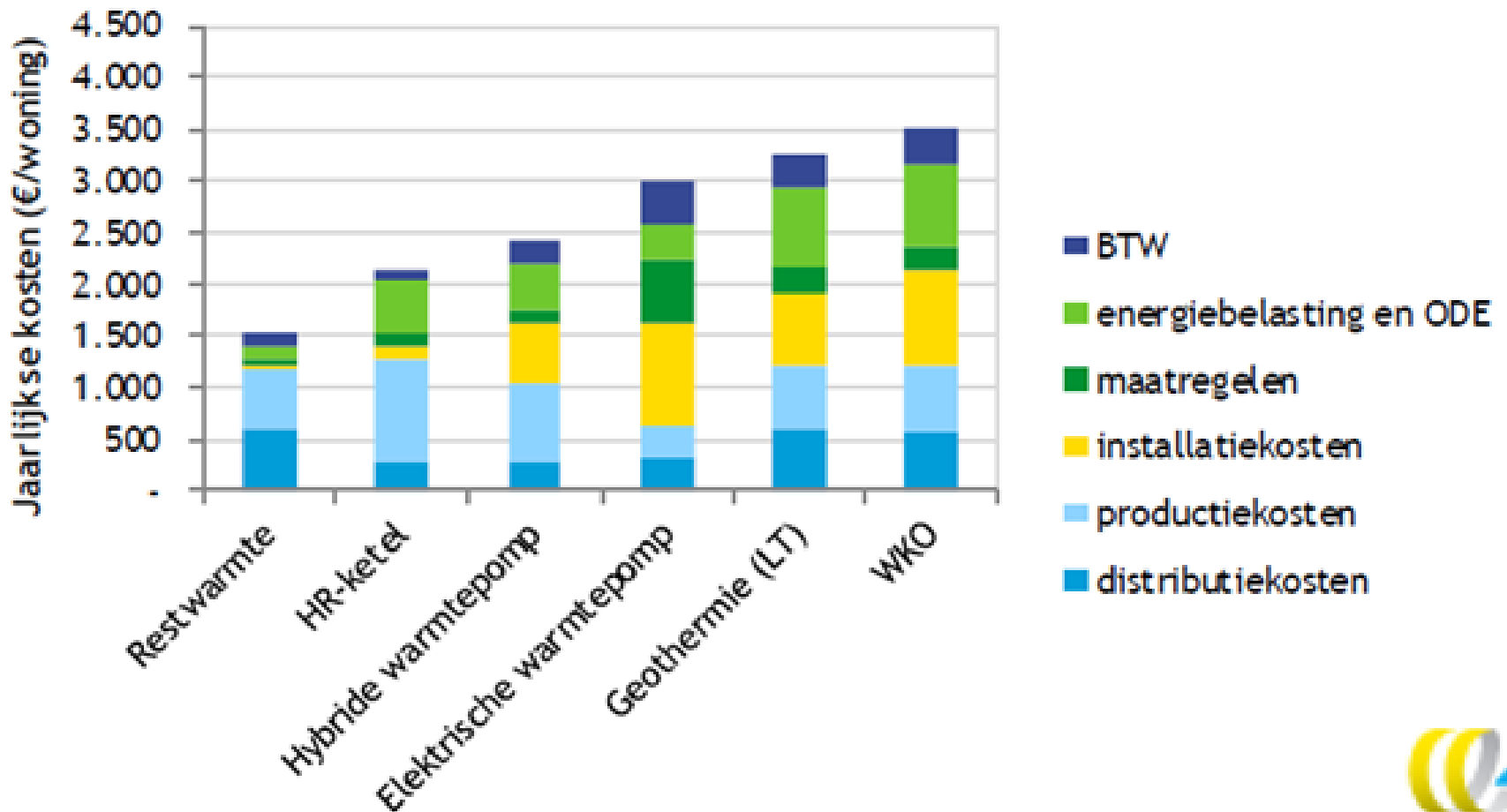


CEGOIA - model

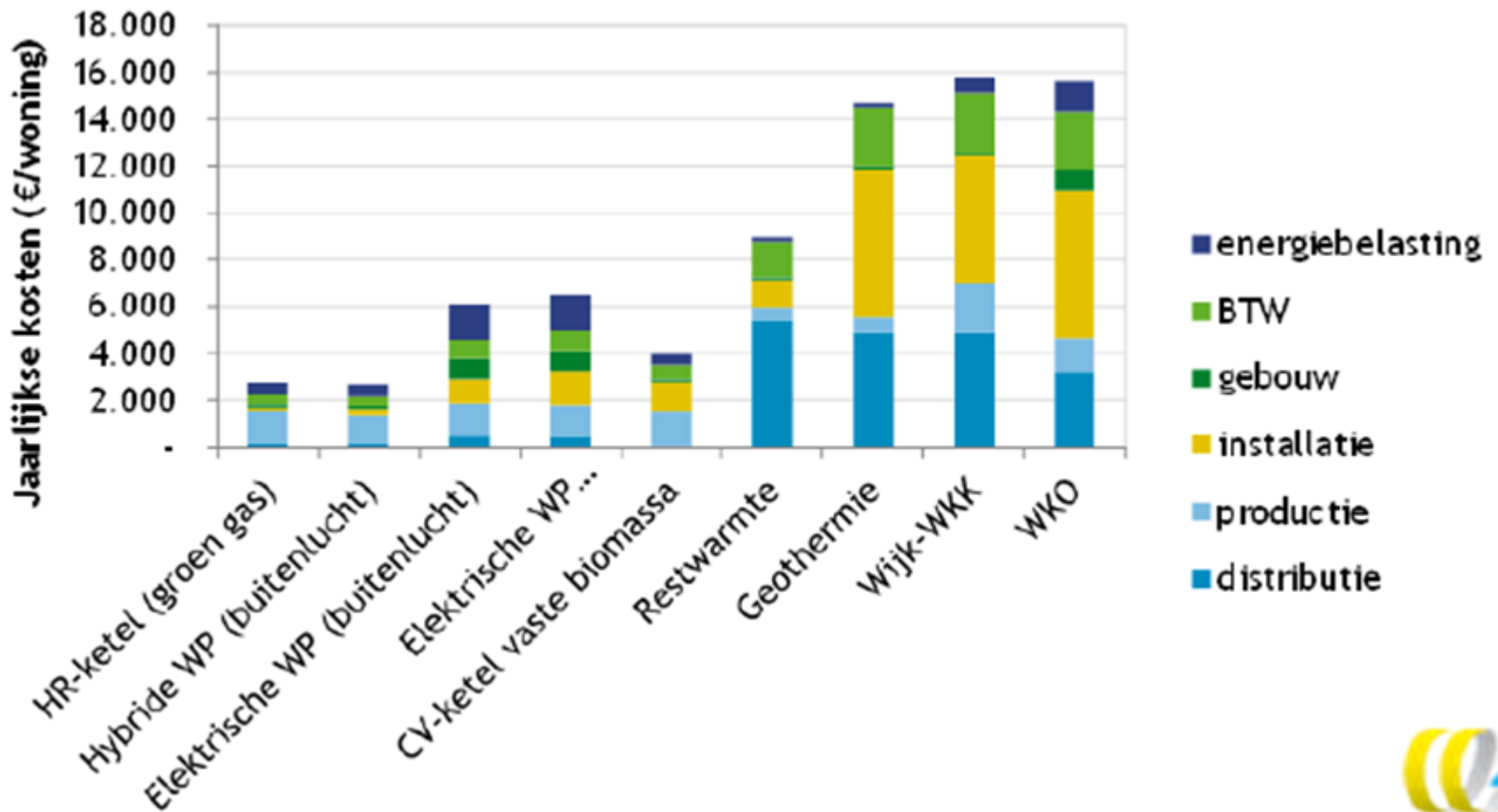
Bijlage



Future costs for heating – urban neighborhood with high population density

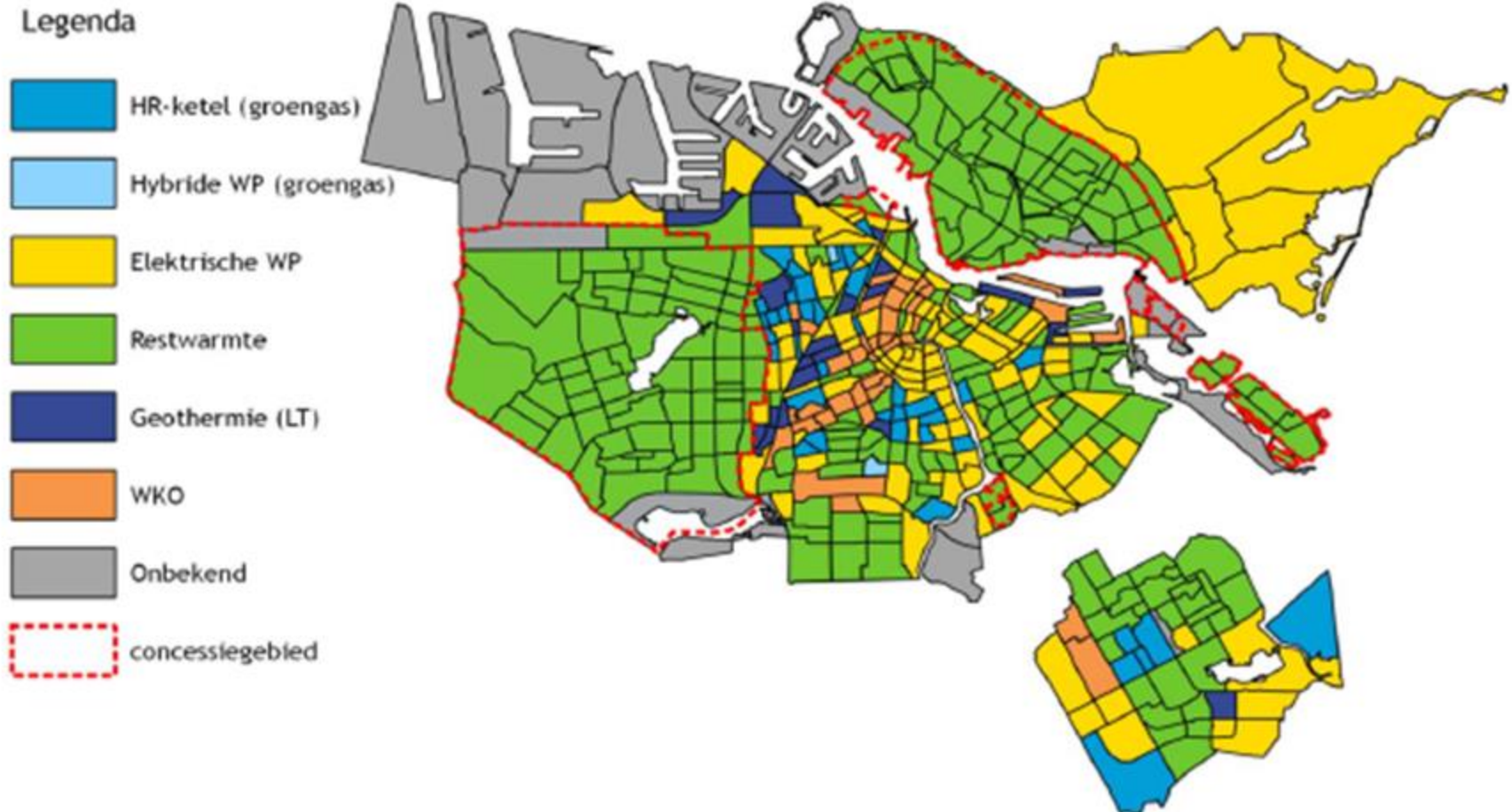


Future costs for heating – rural area with low population density



Future costs for heating – Amsterdam

Cheapest option per neighborhood



..KLIMAATAKKOORD..?



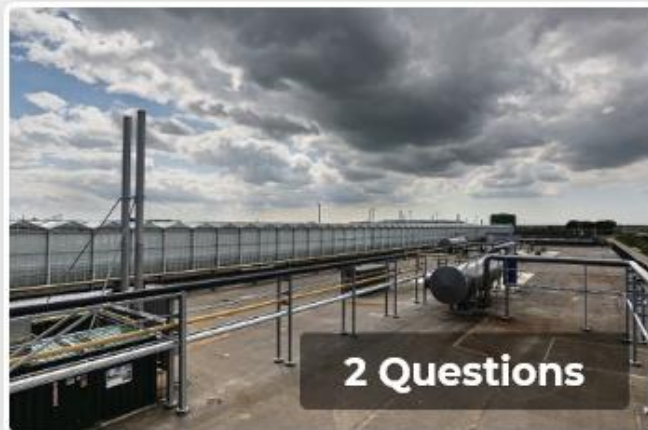
..WELK KLIMAATAKKOORD..?!



YBM

Some questions

- Please go to: www.kahoot.it
- Enter pin:
- Good luck !



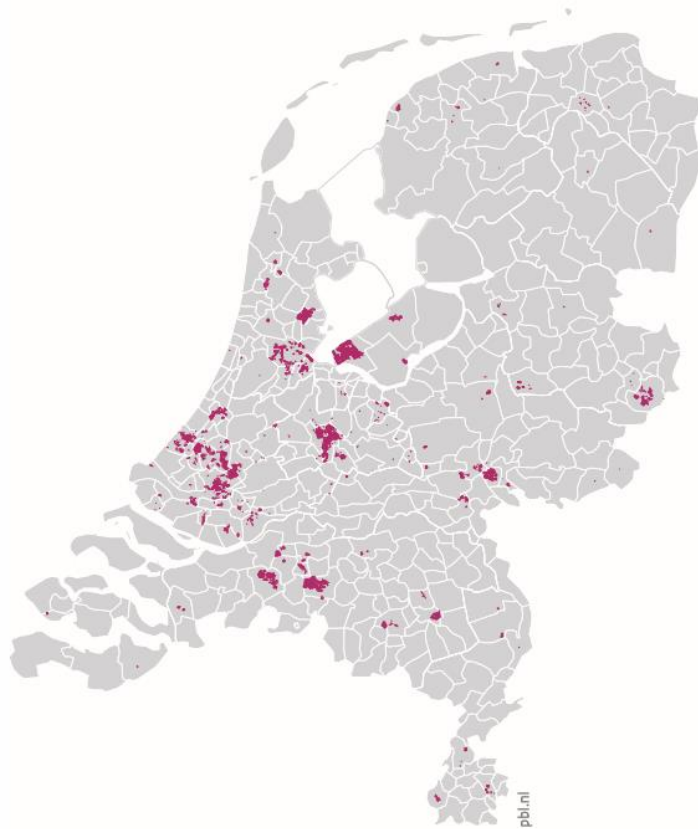
Draft Do PPP's bring the solution

casparboendermaker

 Visible to only you

Heat Networks in the Netherlands

Warmtenetten, 2015

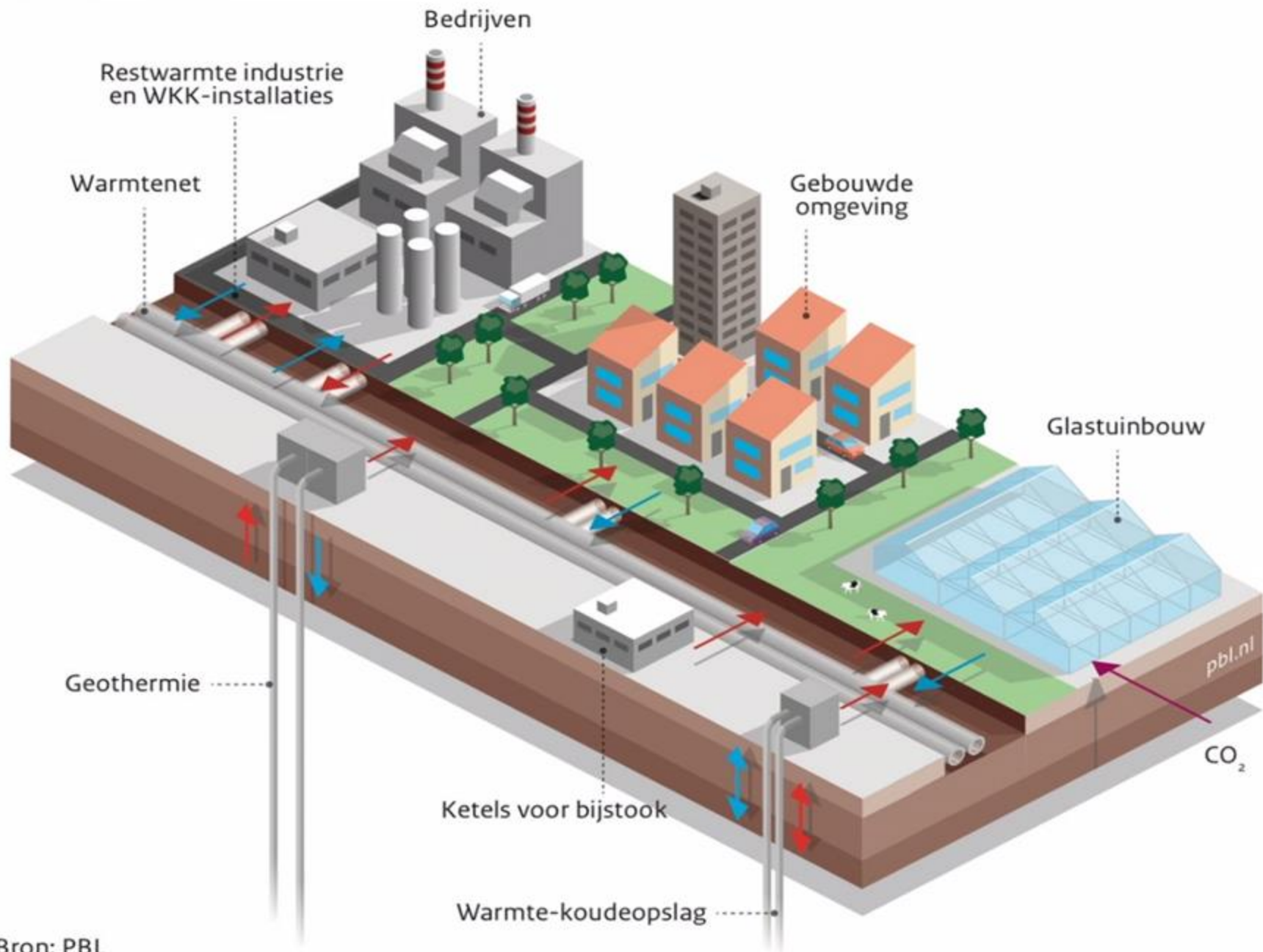


Bron: PBL

Bij ACM aangemelde warmtenetten in 2015

Leveranciers ¹⁾	Aantal netten	Aantal aansluitingen	Aandeel (%) aansluitingen
Grote leveranciers			
1 Nuon	34	110.206	22
2 EnNatuurlijk	49	62.653	12
3 Eneco	70	116.890	23
4 SV Purmerend	1	24.850	5
5 HVC	5	5.467	1
Subtotaal grote leveranciers	159	320.066	63
Kleine leveranciers			
1 Woningcorporaties	3.002	162.119	32
2 Overige	665	29.680	6
Subtotaal kleine leveranciers	3.667	191.799	37
Totaal	4.160	511.865	100

Bron: Ecorys 2016: 15



Bron: PBL

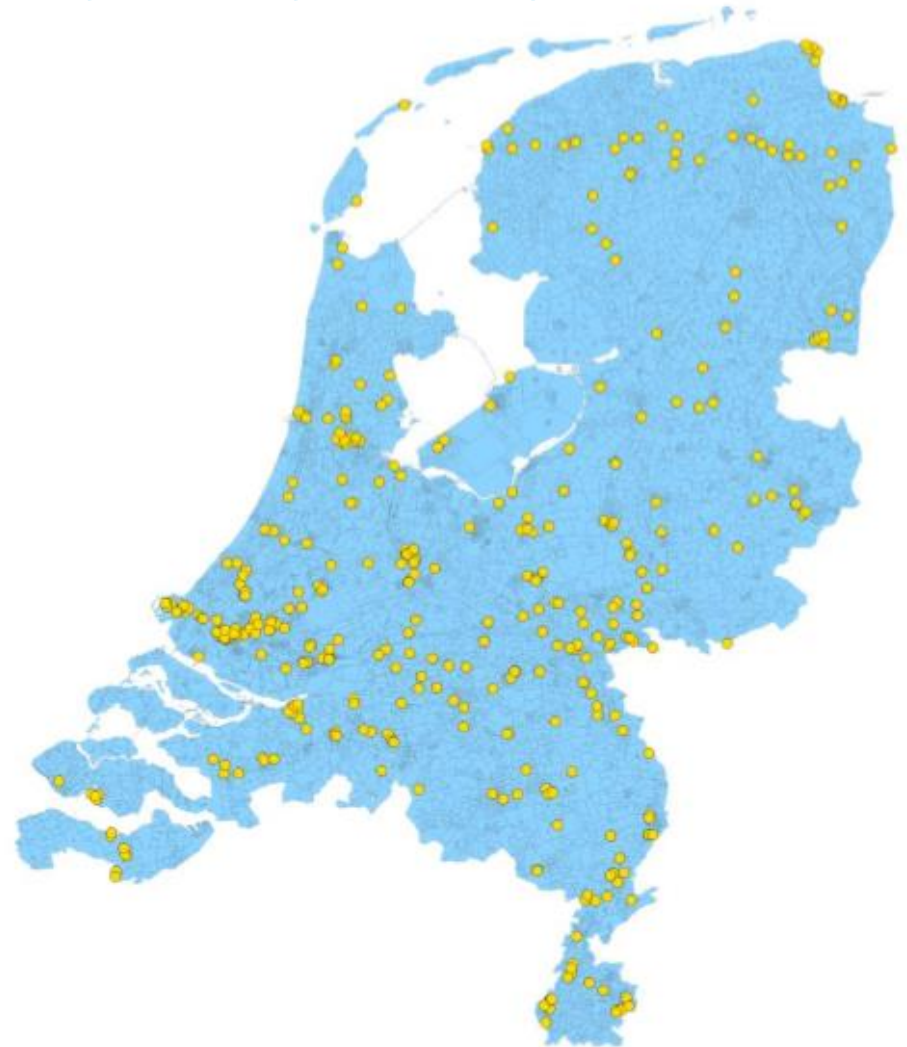
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Almost all municipalities will have heat networks

Opschaling aardwarmte in warmtenetten

Een analyse van de meerwaarde van de play-based portfolio benadering

Berenschot  CE Delft  if



Simplified view

- Price of energy fluctuates - market prices fluctuate and taxes vary;
- Average prices are not equal to marginal prices. Both providers and buyers look at the marginal cost price;
- The number of hours that an installation 'runs' (full load hours) or the distribution in time of the hours on which people need energy (usage profile) plays an important role.

Heat Supply



Residual Heat



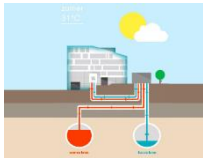
Fossil Energy Plants

stadswarmte en afval energie



Renewable energy

Geothermie/biomassa



Heat Cold Storage systems



Heat Power Coupling

Distribution & Transport

Heat pipe / network



Heat Demand

Horticulture



Industry



Consumers in built-up areas



Heat Supply



Residual Heat



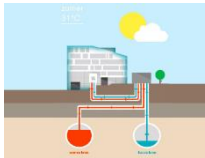
Fossil Energy Plants

stadswarmte en afval energie



Renewable energy

Geothermie/biomassa



Heat Cold Storage systems



Heat Power Coupling

Distribution & Transport

Long heat transfer pipe



Short pipe

No pipe

Heat Demand

Horticulture

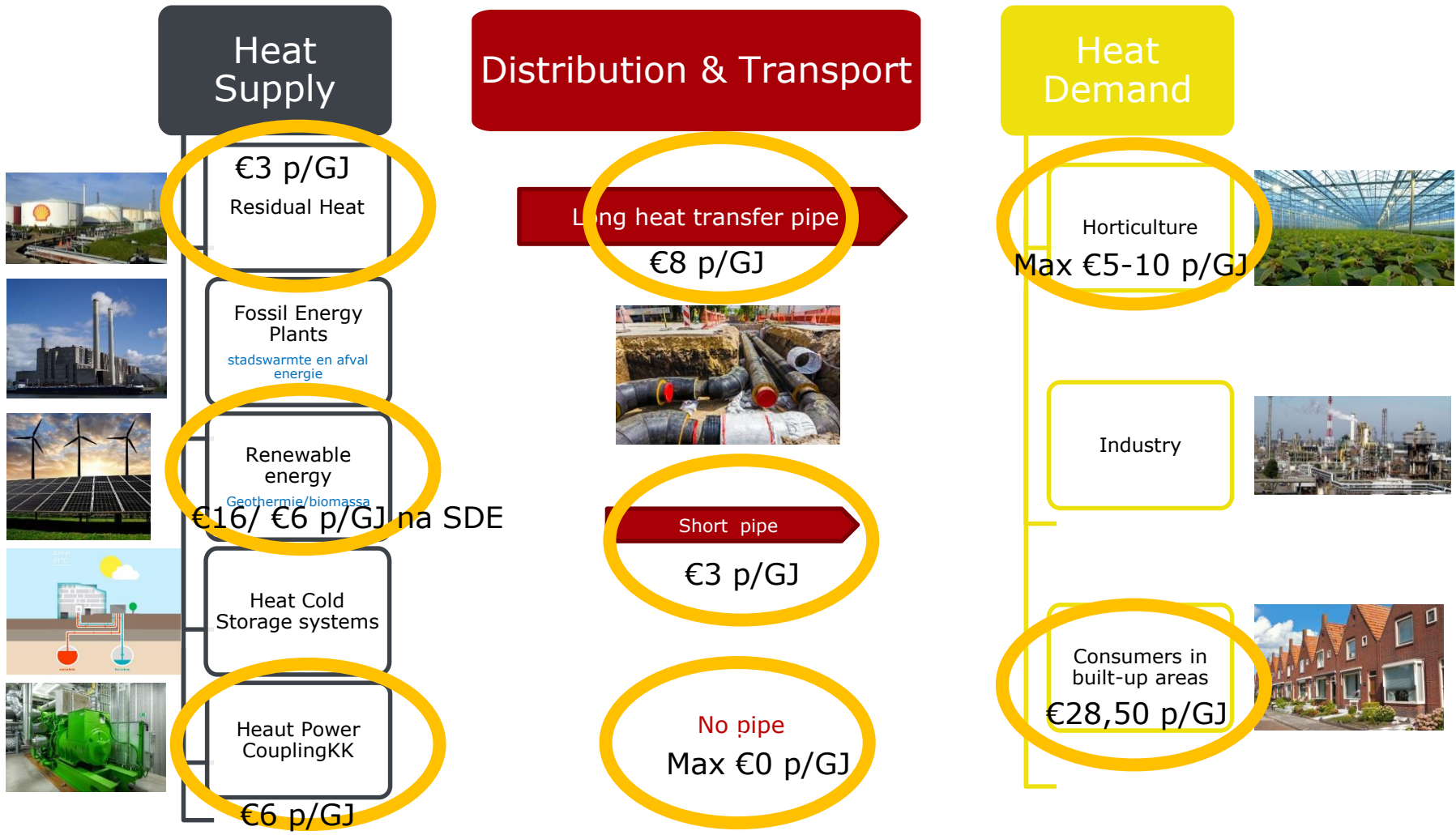


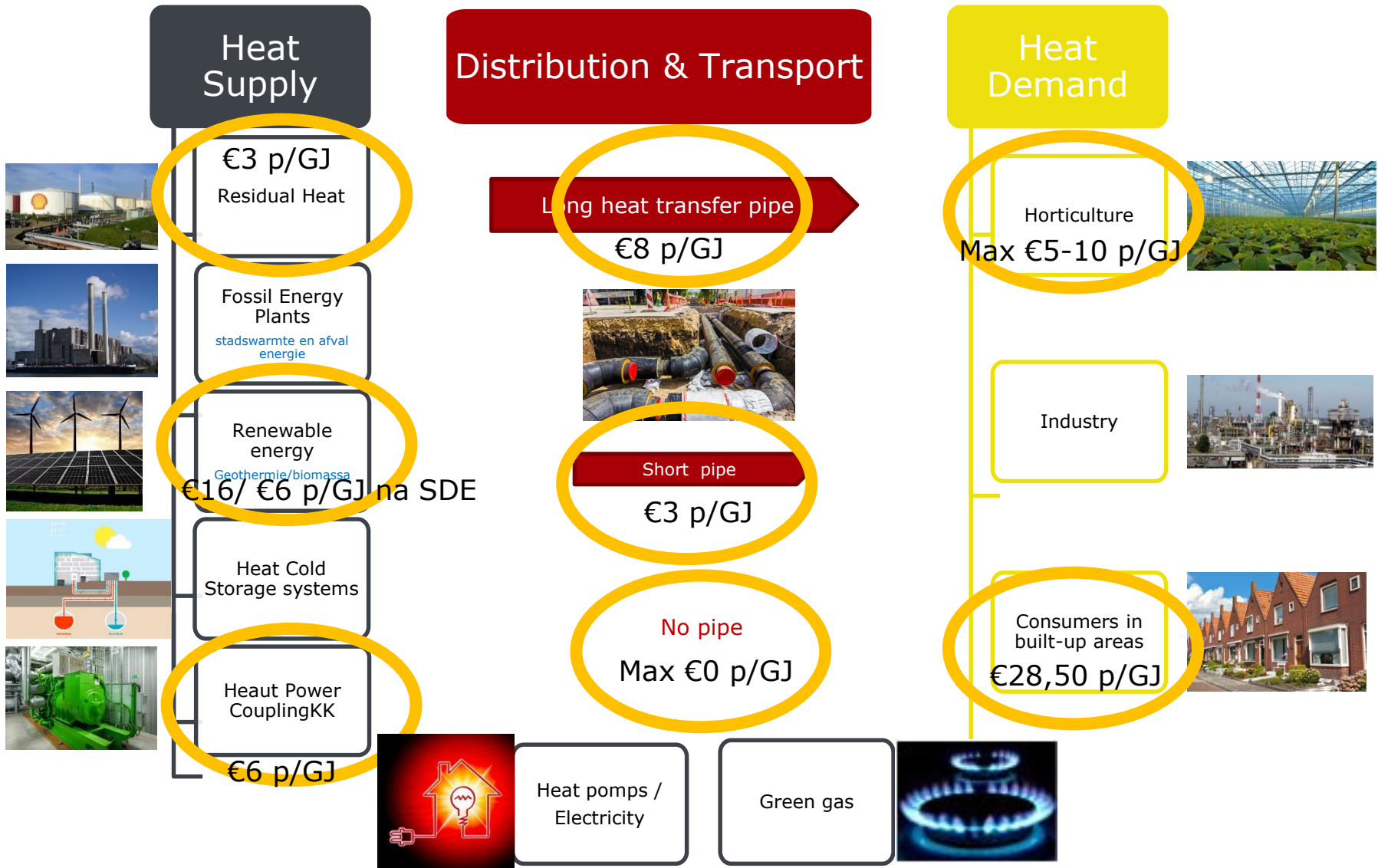
Industry



Consumers in built-up areas







Cafeteria-model



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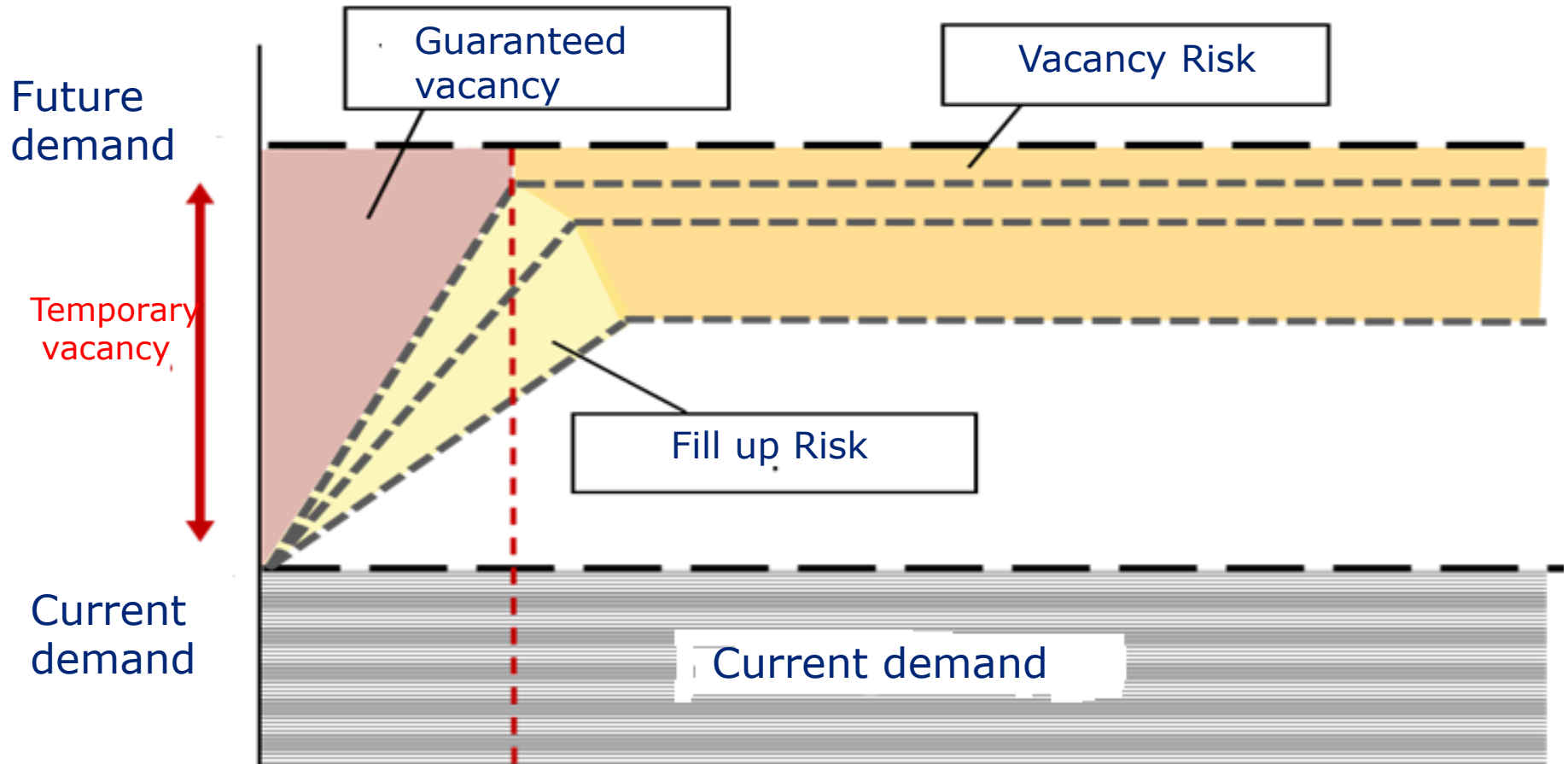
	company	example	Ownership distribution network	Ownership heat source	customers	Market system	IRR	Life Cycle
netbeheerder	Enexis, Stedin, Liander	Niet toegestaan	Public Company	Nvt	Nvt	Open	4%*	40 jr*
Gemeente NV	WB Purmerend	Purmerend	Municipality	Gemeente	Gebouwde omgeving	Closed	4%*	40 jr*
	Warmtebedrijf Rotterdam	Rotterdam	Municipality	Privaat	Gebouwde omgeving	Closed		
Publieke NV	HVC	Alkmaar/Heerhugoward, Dordrecht	Public Company	Publieke NV (HVC)	Gebouwde omgeving	Closed	6%*	15-20 jr*
	HVC/Capturam, EBW	Trias Westland, EBW	Public Company / PrivateCompany	Publieke NV & Privaat	Horticulture	Closed		
	Mijnwater BV	Zuid Limburg	Public NV (LEF)	Publieke NV	Gebouwde omgeving	Closed	8%*	15 jr*
Niet gereguleerde netbeheerder	Alliander Duurzame Gebiedsontwikkeling, Empuls	Zaanstad, Nijmegen	Public Company	Privaat	Gebouwde omgeving	Closed	6-8%*	15-20 jr*
	Joulz	Stoomnet Botlek	Public Company	Privaat	Industry	Closed		
Grote commerciële aanbieder	NUON, Essent	A'dam, Almere, Utrecht, Tilburg, Enschede,	Private Company	Privaat	Gebouwde Omgeving	Closed	8%*	15 jr*
Kleine commerciële aanbieder	Groene Energie Ede	Ede	Private Company	Privaat	Gebouwde omgeving	Closed	8%	15 jr*
Coöperatie	Texel Energie, Thermo Bello Culemborg,	Texel, Culemborg	Coöperation	Coöperatief	Gebouwde omgeving	Closed	4%*	20 jr*
WKO-systemen	E-teck, Zon Energie	Goes, Zandvoort etc	mixed	Privaat	Gebouwde omgeving	Closed	8%*	15 jr*

Energie infrastructuur - distributie



- 1- municipal company (Purmerend; Mijnwater BV; Rotterdam)
- 2- indirect municipal company (HVC; Alkmaar, Dordrecht)
- 3- network company (Empuls, NetVerder, Firan)
- 4- private company / former network company (NUON heat, ENECO heat and EnNatural)
- 5- private company / private entrepreneur (Groene Energie Ede, Zon Energie, Eteck Goes) –
- 6- Housing corporation (small-scale / block heating)
- 7- District / cooperative possession (Thermo Bello)

Typical risks for a newly developed heat system



Regulation or laissez faire ? Or concessions ?

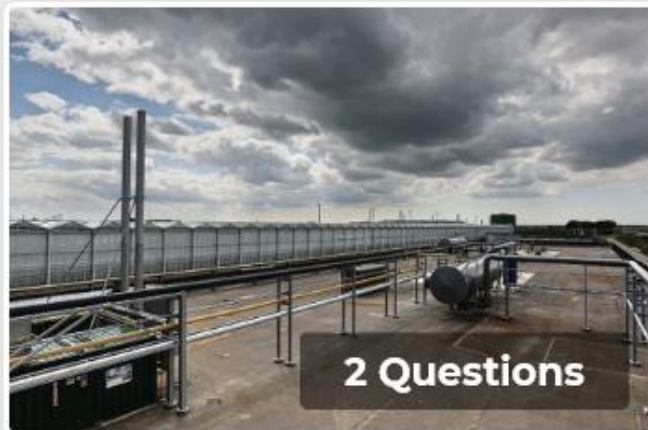
Regulering energiemarkt



De energiemarkt kent partijen die een netwerk beheren en partijen die via dit netwerk energie leveren aan consumenten en bedrijven. Het leveren van energie is een vrije markt. De netbeheerders zijn monopolisten. De energiemarkt kent daarom specifieke wetgeving waar ACM op toeziet. ACM doet dit omdat de consument gebaat is bij betaalbare en betrouwbare energie.

Some questions

- Please go to: www.kahoot.it
- Enter pin:
- Good luck !



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