



KIVI NIRIA

infrastructure for a renewable society

WARMTENETWERK



meer comfort met minder fossiele energie



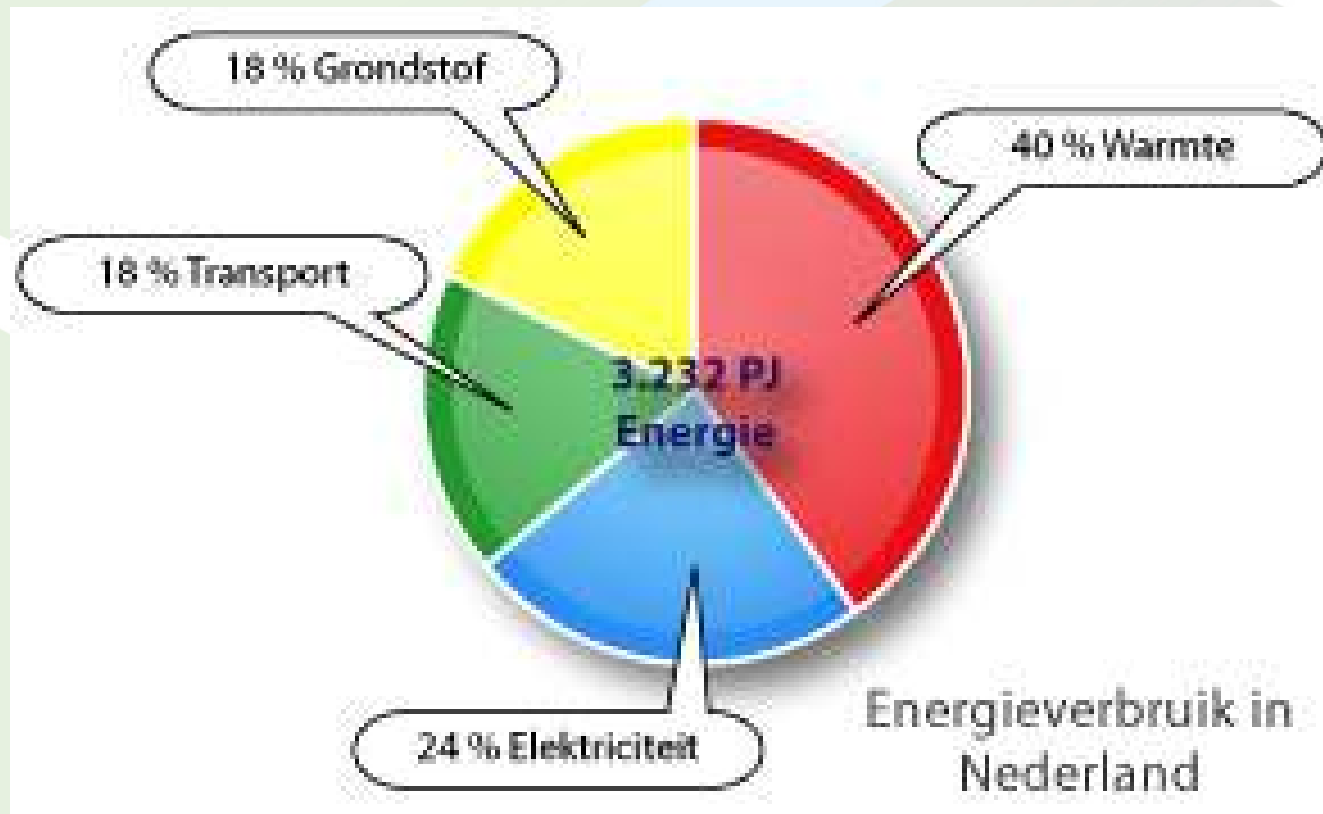
Klaas de Jong

23th March 2011

Far more energy needed for heating than for generation of electricity

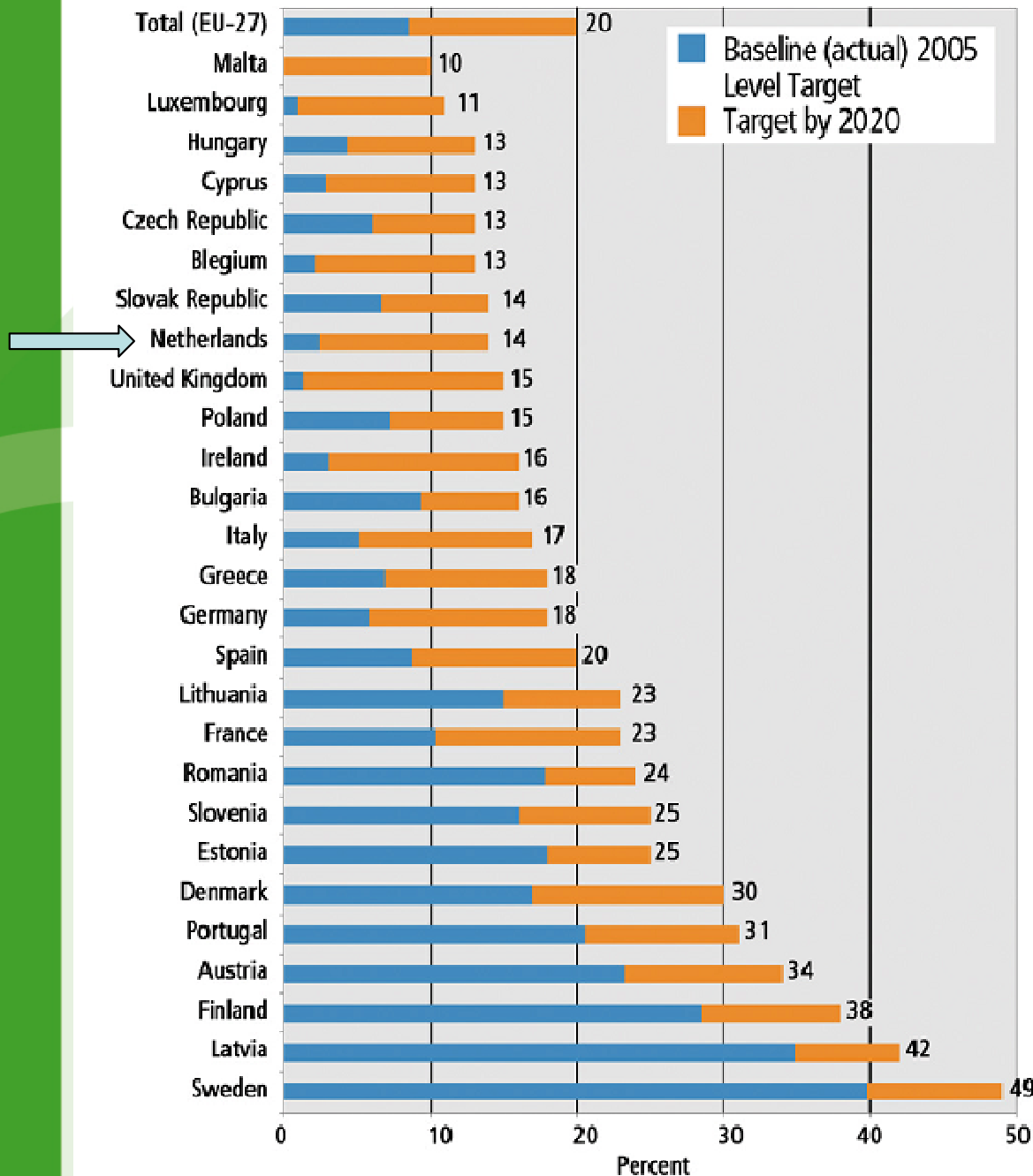


Primary energy balance of The Netherlands



Average efficiency of Dutch power stations is 40%
Gross consumption of electricity is 40% of primary

Figure 15. EU Renewable Energy Targets: Share of Final Energy by 2020



Commitment NL in EU
14% renewable of gross
energy consumption

2010 less than 4% in total

2020: 200 PJ renewable



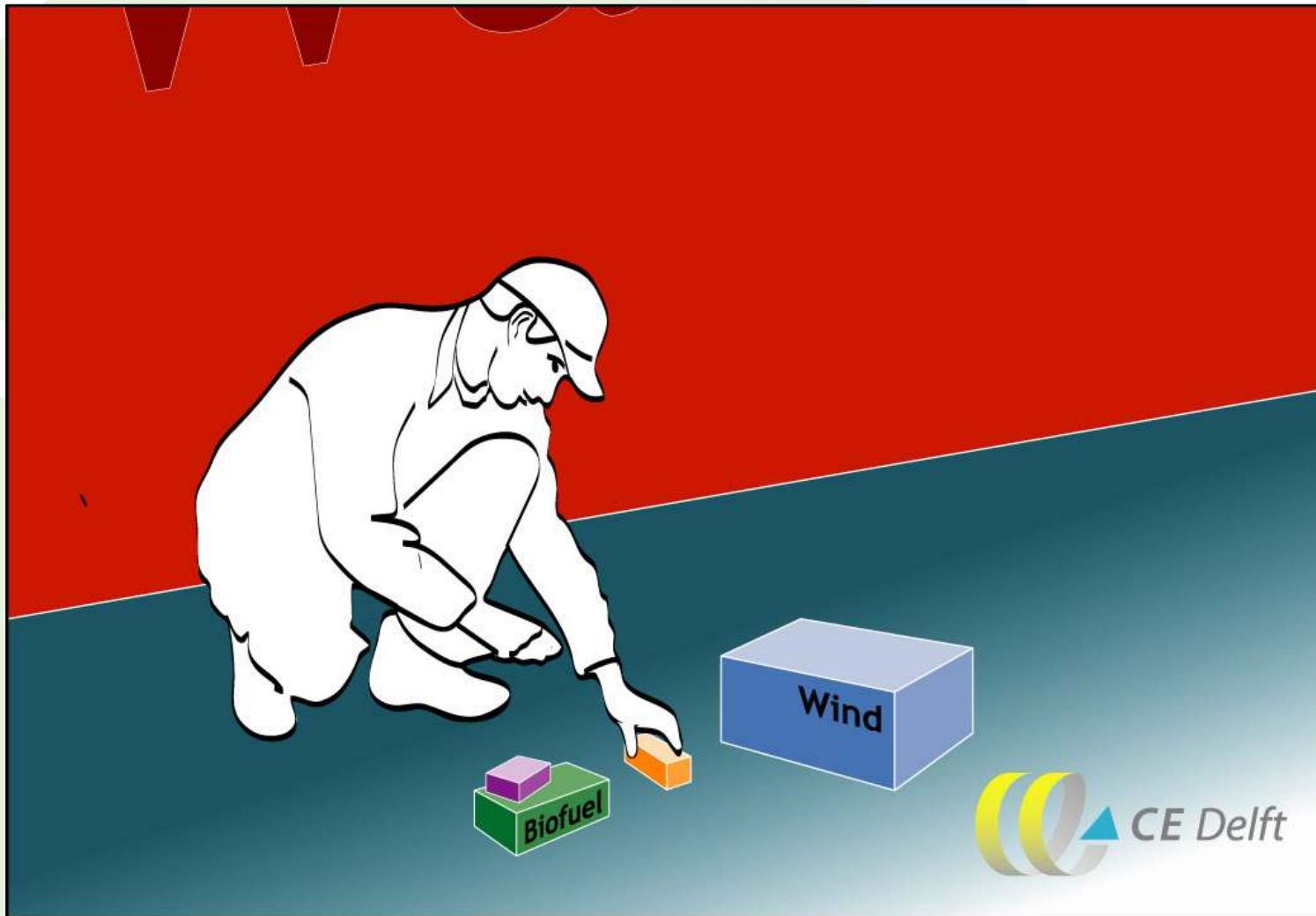
12.000 MW = 35 PJ

Renewable energy policy in The Netherlands

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Zooming out

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Renewable heat needs infrastructure

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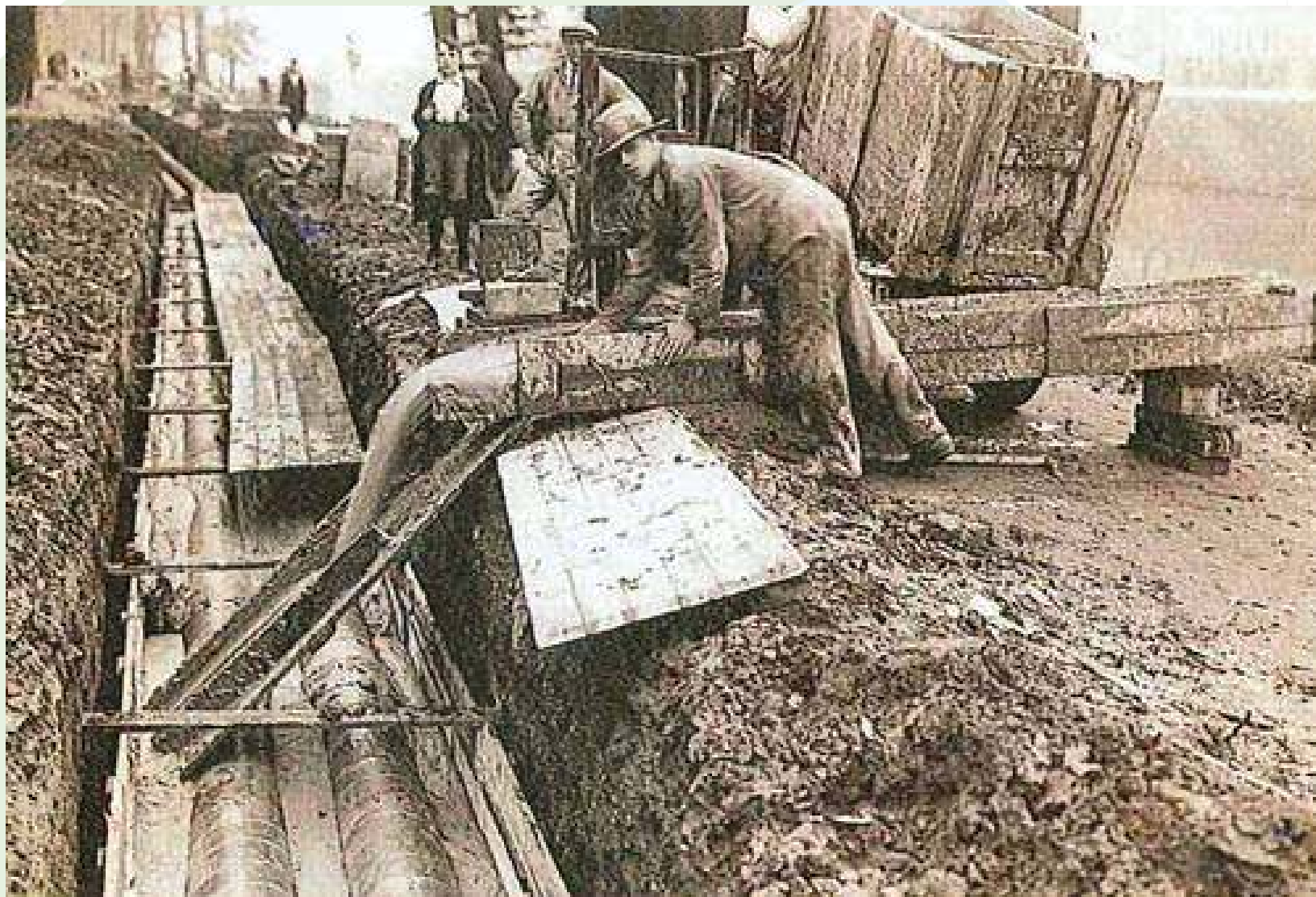
Utrecht 1923

first district heating in NL

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Traditional heating grid heatsource: power station



13 large heating grids in NL - 225.000 households connected

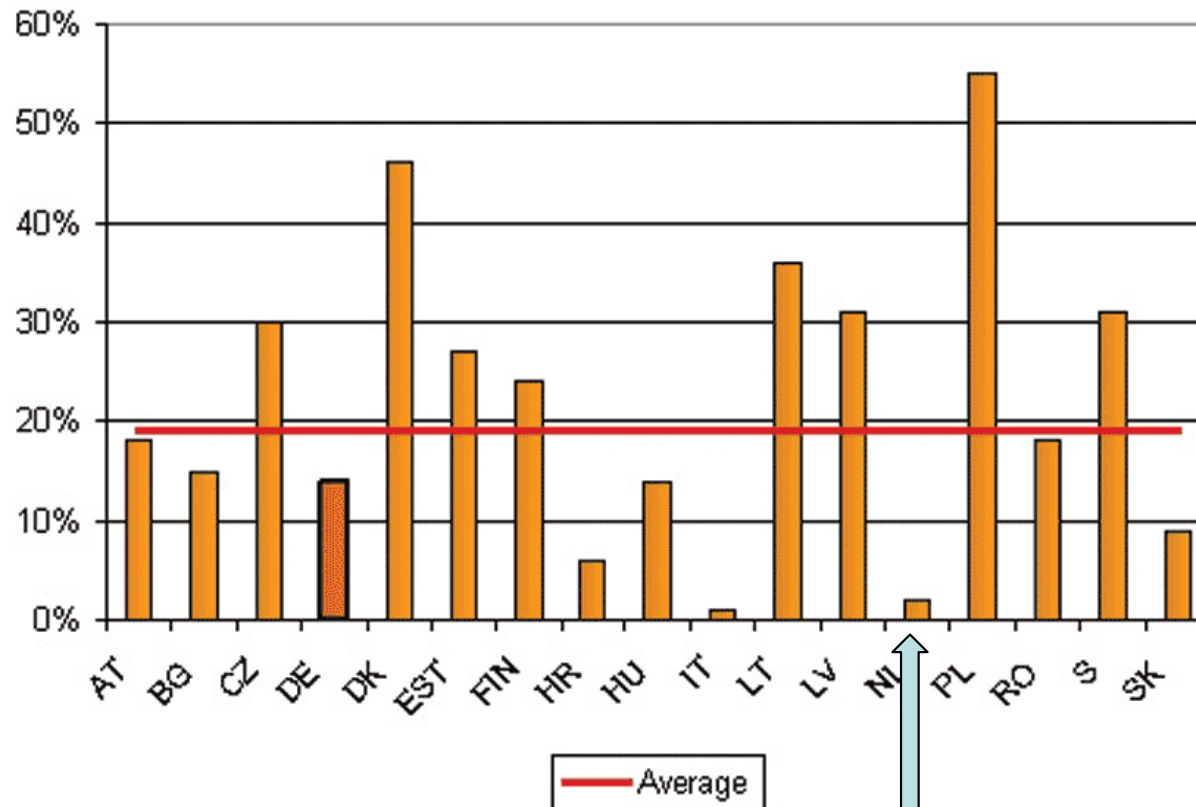
NL lacks infrastructure

DH 3-4% of total heat consumption in NL

Natural gas grid is extremely dominant in NL



District heating market share in Europe

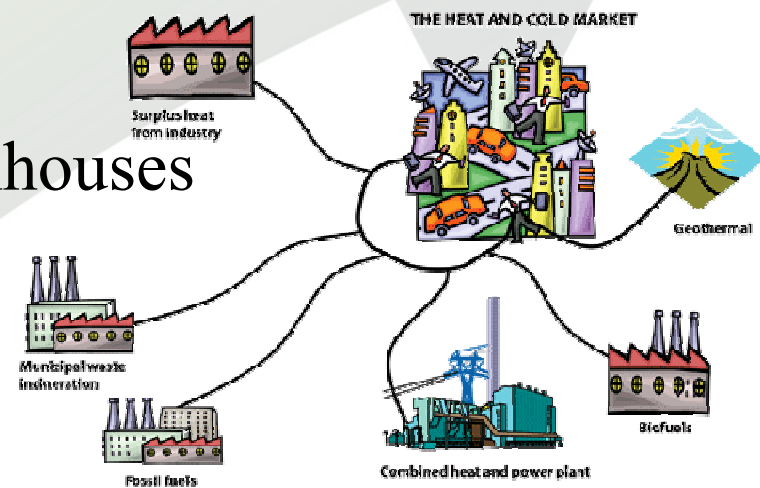


But:
heating houses
and other
buildings at 21 C
with natural gas
is not smart

Times are changing in favour of district energy



- various players in the field:
 - utilities
 - municipalities
 - waste-to-energy companies
 - port authorities
 - farmers and owners of greenhouses
 - corporations
- new heat sources:
 - biogas
 - wood
 - surplus heat from industry and data centers
 - seasonal storage of heat and cold
 - geothermal heat
 - solar heat



Waste-to-energy becomes a mayor heat supplier (50% renewable)

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Amsterdam, Rotterdam, Delfzijl, Alkmaar, Dordrecht, Roosendaal, Hengelo-Enschede, Roosendaal, Harlingen

glastuinbouw Terneuzen Warmte + CO₂ van Yara

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Tomaten telen zonder
aardgas





Energiebesparende wijken in opkomst

Koeienpoep: lekker warm!

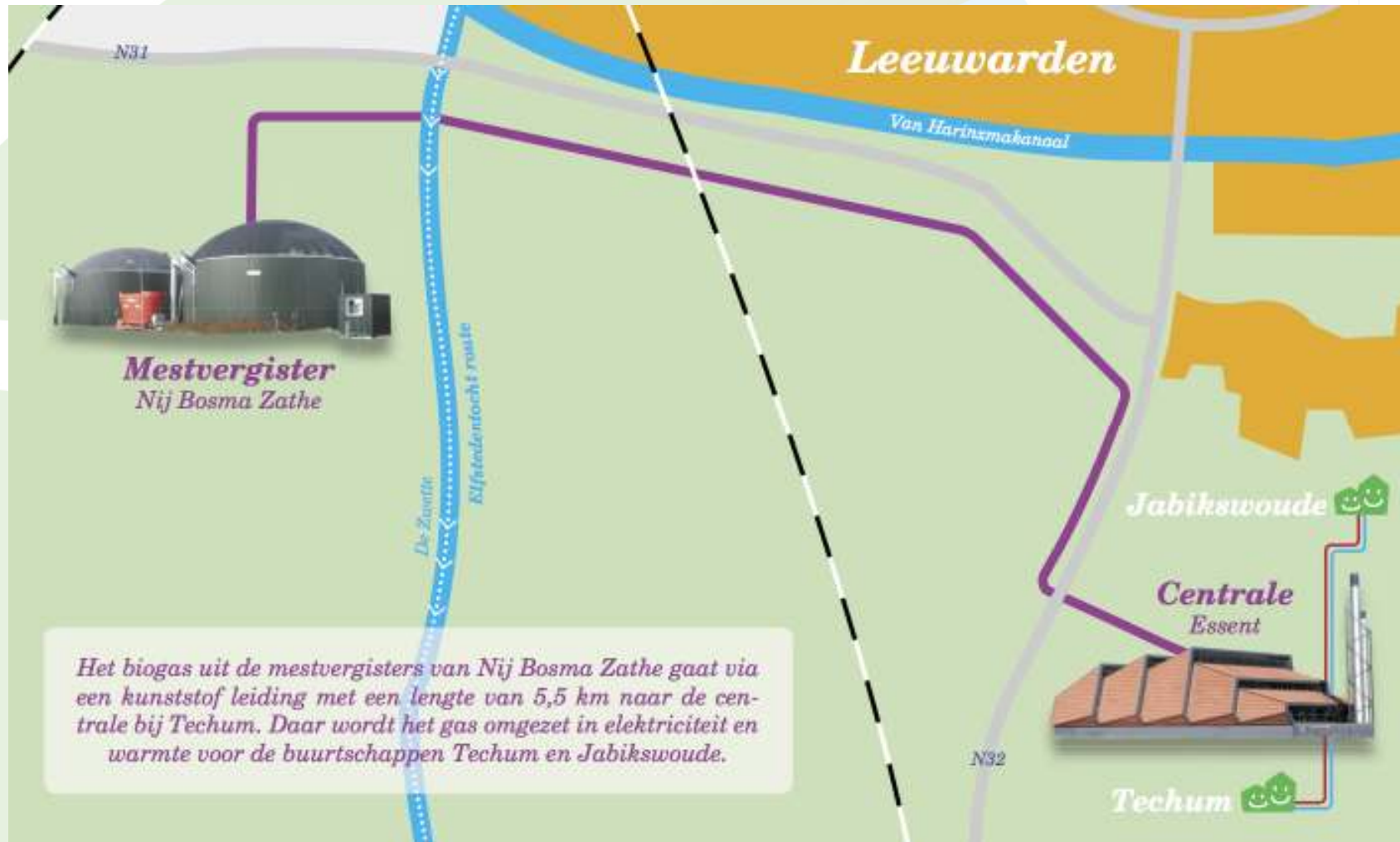
Energie uit het traditionele elektriciteitsnet? Nog even en het is hopeloos

Leeuwarden raw biogas to CHP for district heating

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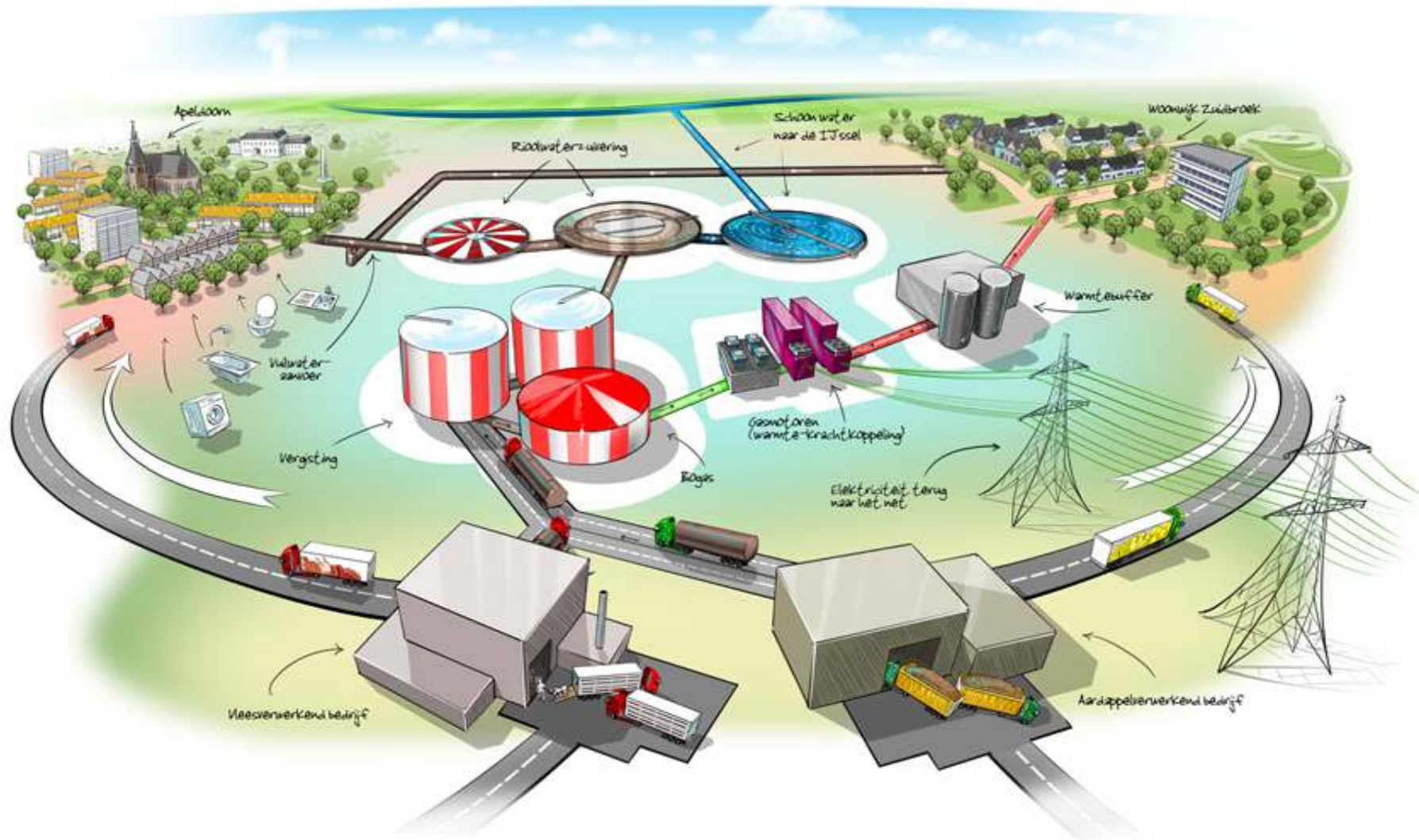
Transport van ruw biogas over 5 kilometer
Biogas-wkk geplaatst bij woonwijk

Sewage treatment plant generates heat and power

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Geothermal heat Pijnacker

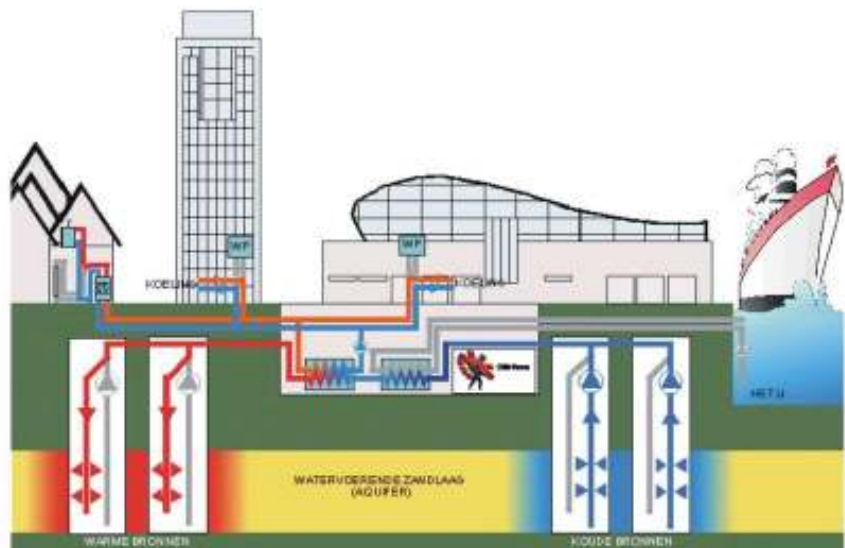


Two geothermal wells in operation in Pijnacker; third is planned



Greenhouse Ammerlaan heating grid to swimming pool, sports centre and college





DWA installatie- en energieadvies

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Oostelijke Handelskade Amsterdam

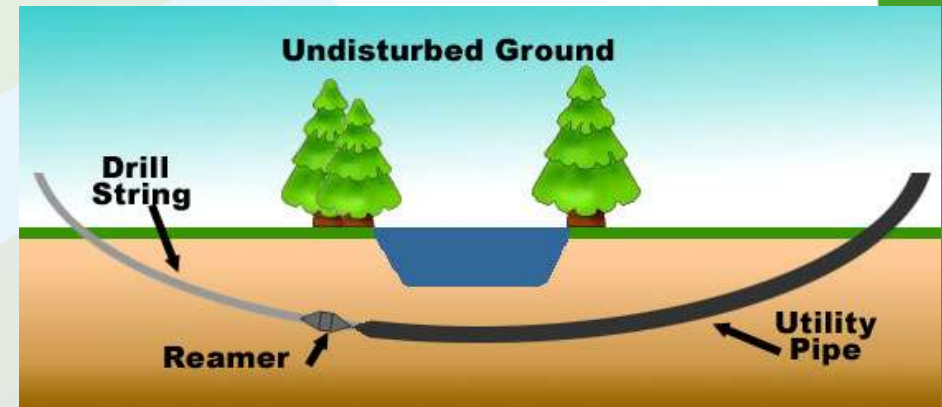
Innovation

-  Horizontal directional drilling
-  Flexible pipes
-  Lower temperatures
-  Dynamic control

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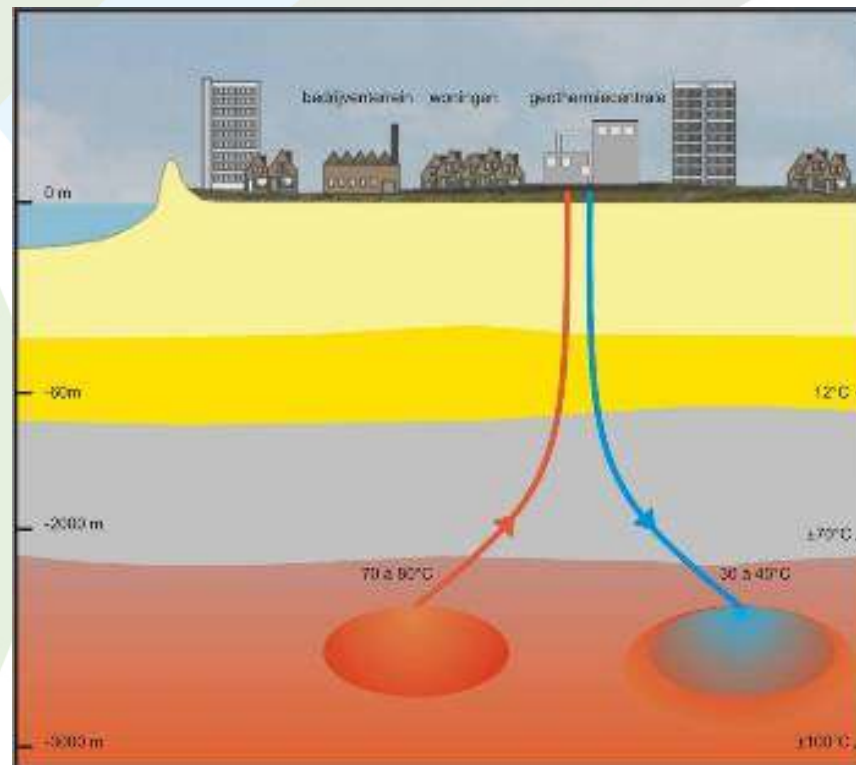
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Geothermal heat and seasonal storage



- 🏠 Huge potential for geothermal heat in The Netherlands at 2.000-4.000 m
- 🏠 High temperature storage at depths of 500 m
- 🏠 Absorption heat pumps for higher output of geothermal well and generation of cold



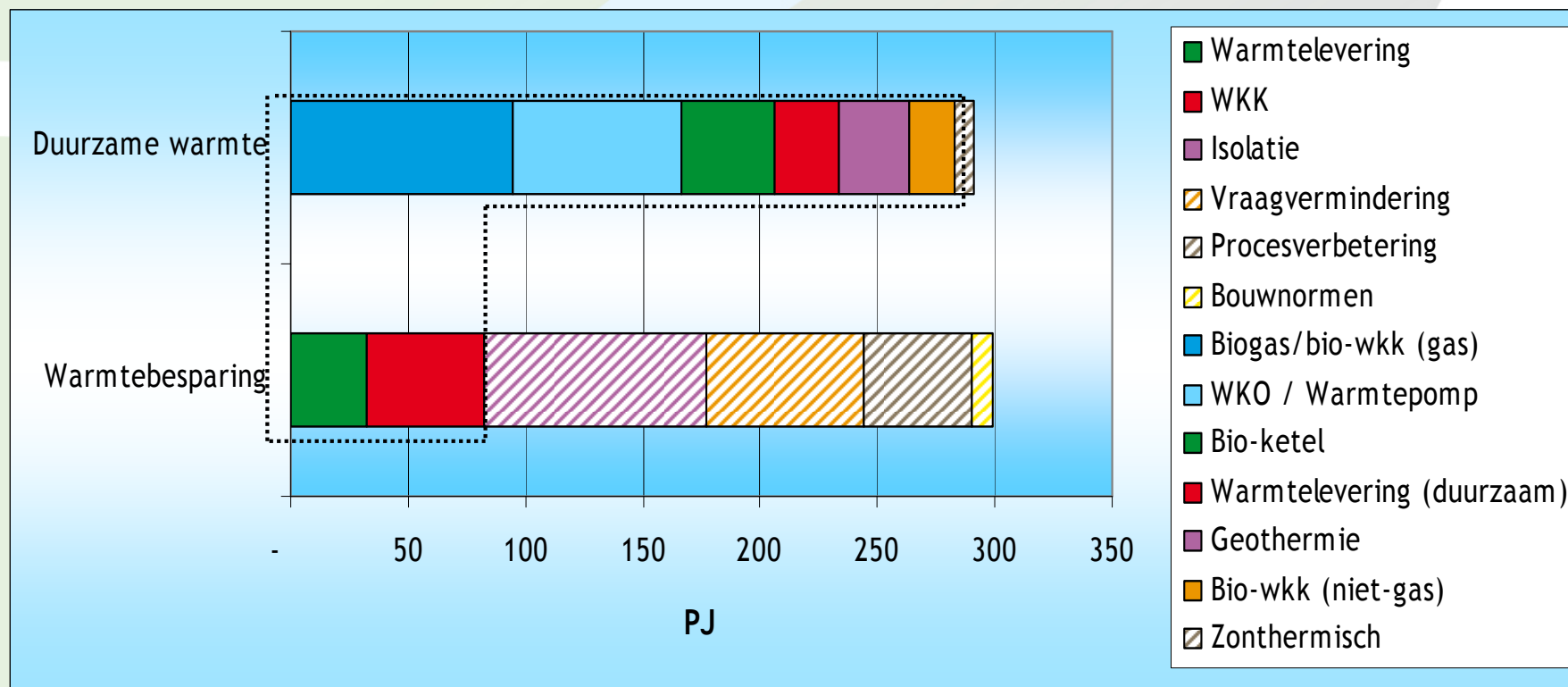
200 PJ savings heat demand + 200 PJ renewable heat in 2020

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- Manifest Warmtenetwerk 2 x 200 PJ in 2020
- Long term potential much higher



Is this transition possible?



18 km 34 MW

80 °C

43 °C



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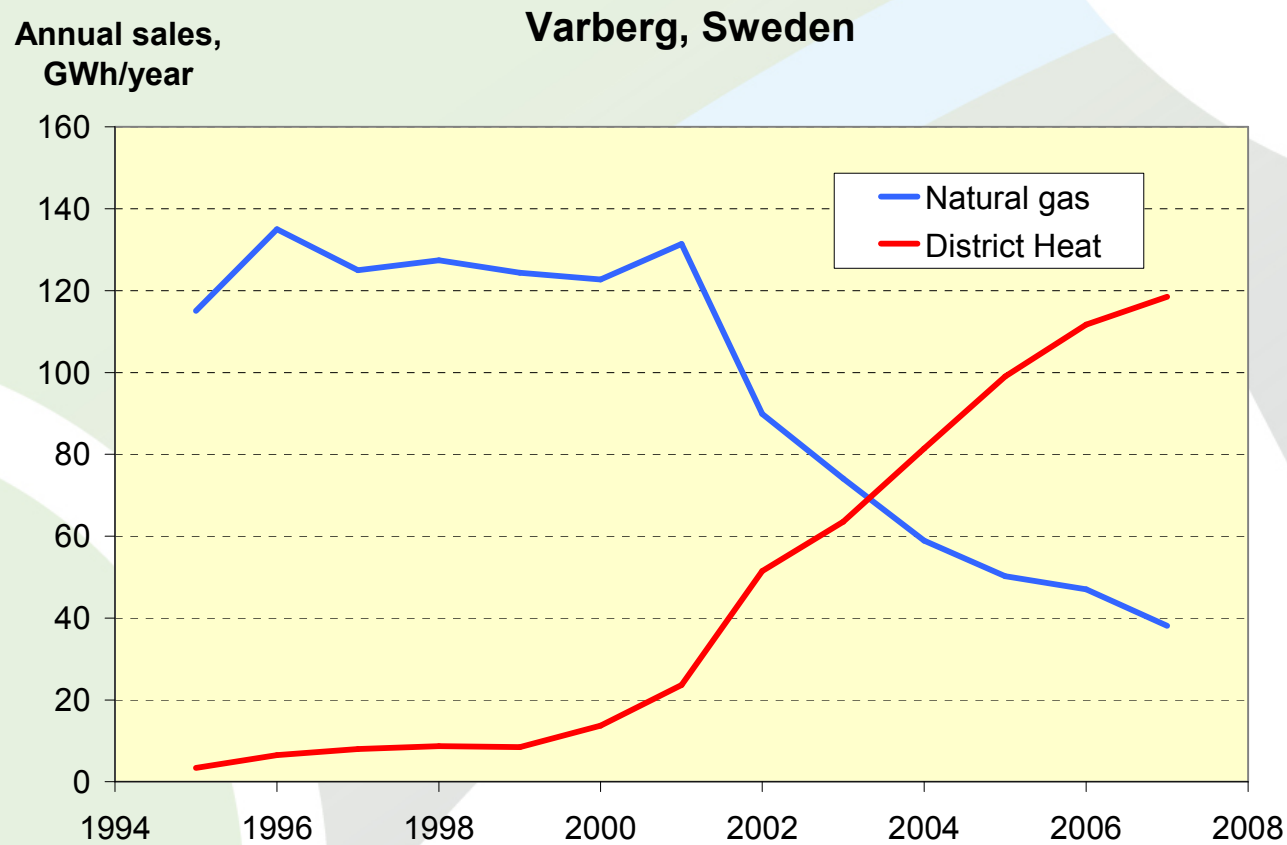
SÖDRA



VE VARBERG ENERGI

55.000 inhabitants

In Varberg they say: "we can!"







Varberg changed over to natural gas in eighties







In recent years from gas to district heating

priorities



-  Invest in energy saving
-  Invest in renewable energy for electricity, transport and heat
-  Invest in smart infrastructure for heat with smart financine constructions
-  Regional planning and coöperation is essential for utilisation of local biomass, waste-to-energy, surplus heat from industry and renewable heat like geothermal

Foundation Warmtenetwerk goals

-  Less fossile fuels for heating and cooling
-  Promotion of renewable heat and cold
-  Promotion of district energy projects
-  innovation
-  More effective regulations
-  Knowledge transfer

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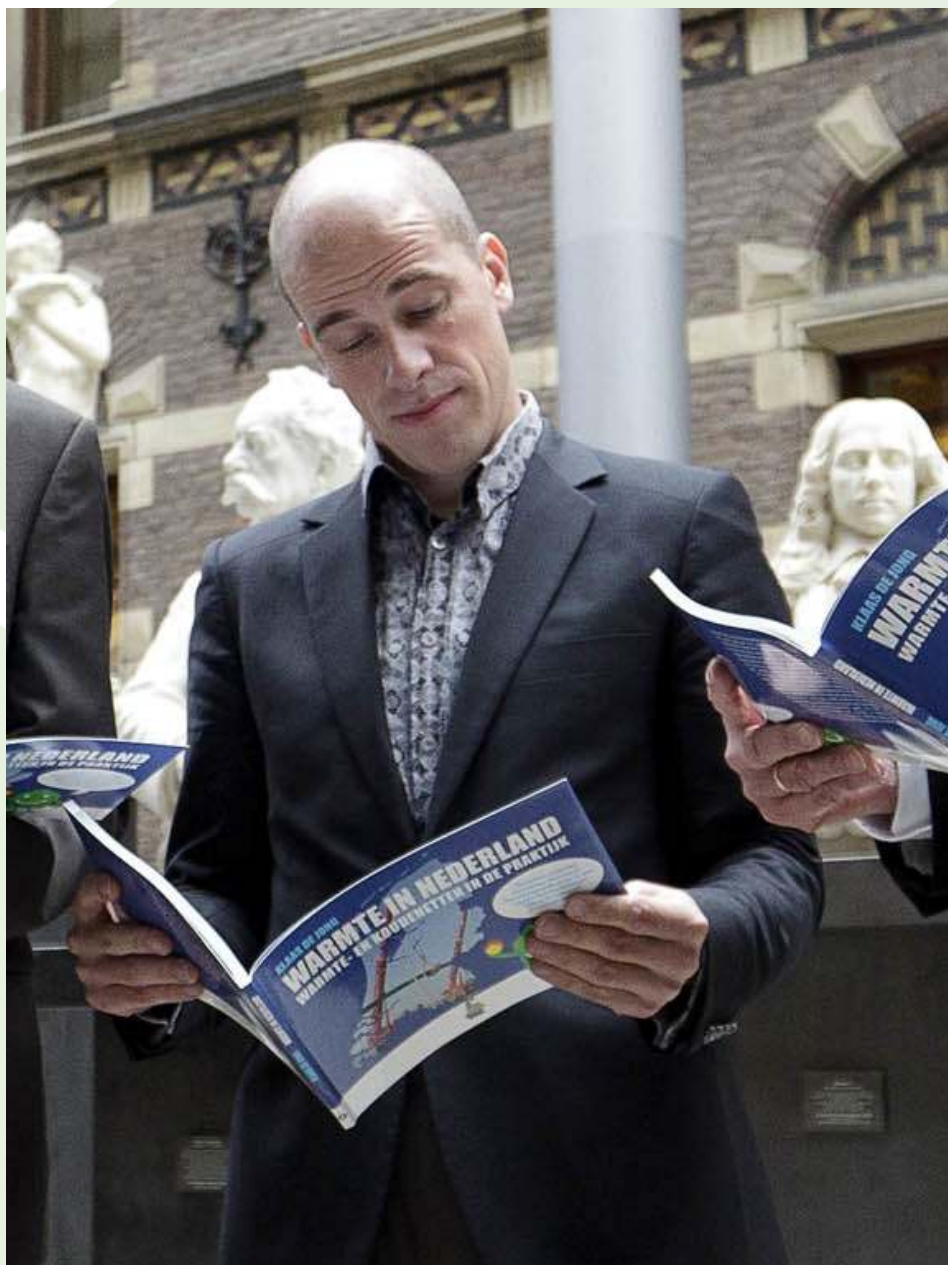
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Warmte in Nederland



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Contents:



Energie in Nederland



Exergie en trias energetica



Warmtenetten in EU



Warmtenetten in NL



Bijzondere warmtekanten



Bijzondere wijkcentrales



Toekomst warmtenetten



Toekomst is al begonnen



Innovatie



Praktijkvoorbeelden



Stappenplan



Stichting Warmtenetwerk