

System integration

The missing link in the Energy transition !?

Mart van Bracht

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TOPSECTOR ENERGIE
Empowering the new economy



SYSTEM INTEGRATION

meaning, definition, explanation...









Leading framework for the development of the energy system

Tafel Elektriciteit

Doelen

20,2 Mt Minder CO₂-uitstoot
• 3/4 elektriciteit duurzaam

Maatregelen

- 7x zoveel wind
- 700 windmolens op zee
- 500 windmolens op land
- 75 miljoen zonnepanelen
- 40% goedkoper
- Burgers bepalen mee



Tafel Gebouwde Omgeving

Doelen

3,4 Mt Minder CO₂-uitstoot
• 2 miljoen woningen gasvrij
• Overige minder aardgasverbruik

Maatregelen

- Kwart tot helft goedkoper
- Betere apparaten
- Energiebelasting verschuift
- Gebouwgebonden financiering



Tafel Mobiliteit

Doelen

7,3 Mt Minder CO₂-uitstoot
• Elektrificatie personenvervoer
• Aanpassen mobiliteitsgedrag

Maatregelen

- 1 tot 2,8 miljoen elektrische auto's
- Laadinfrastructuur voor iedereen
- Schone auto's bevoordelen
- Minder reizen met de auto



Tafel Industrie

Doelen

14,3 Mt Minder CO₂-uitstoot
• Minder CO₂-uitstoot door industrie

Maatregelen

- Elektriciteit i.p.v. gas en olie
- Minder CO₂-opslag
- Energiebesparing



Tafel Landbouw en Landgebruik

Doelen

3,5 Mt Minder CO₂-uitstoot
• Meer duurzame energie

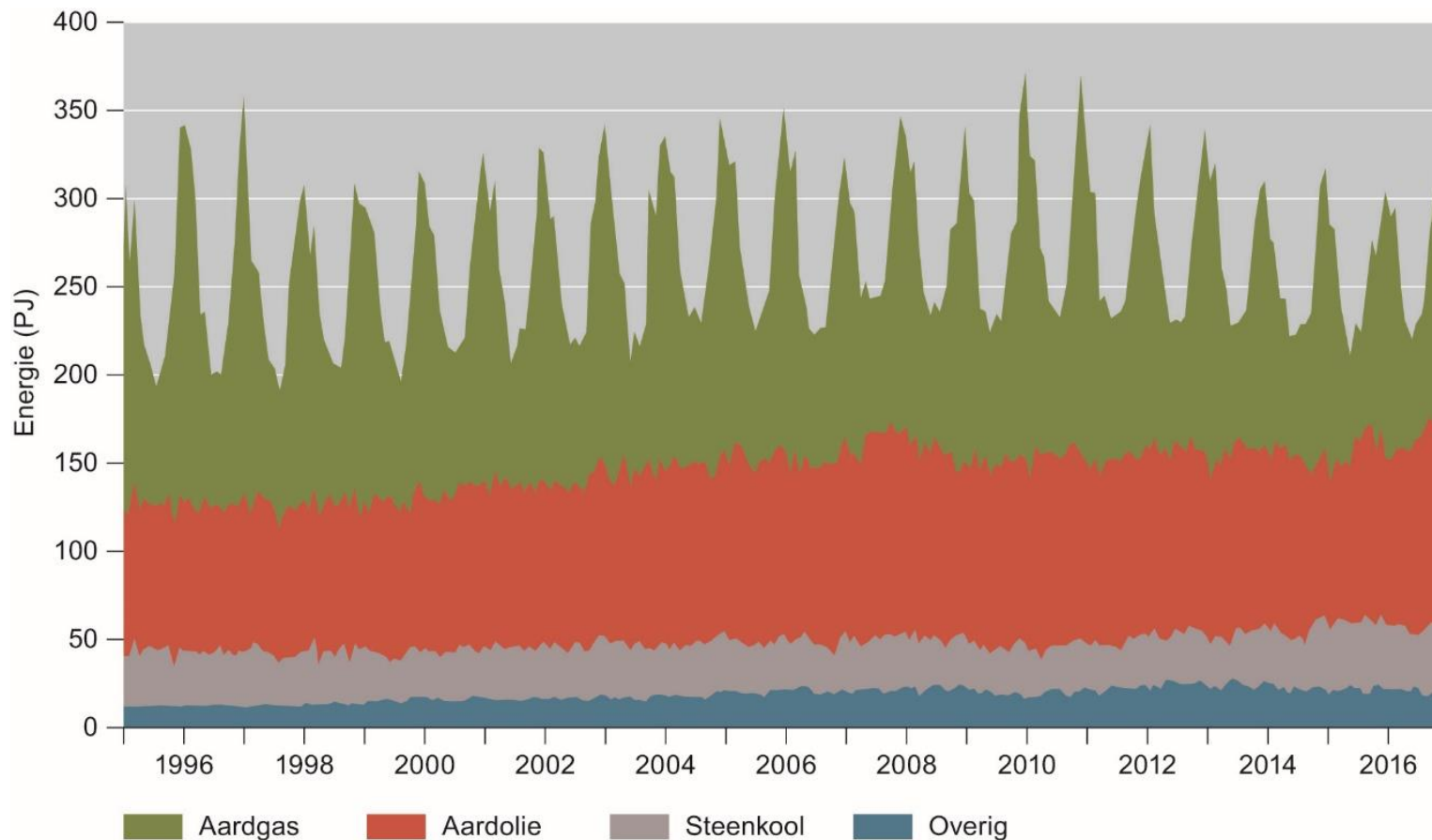
Maatregelen

- Geothermie in kassen
- Elektriciteit i.p.v. gas
- Meer bos en natuur



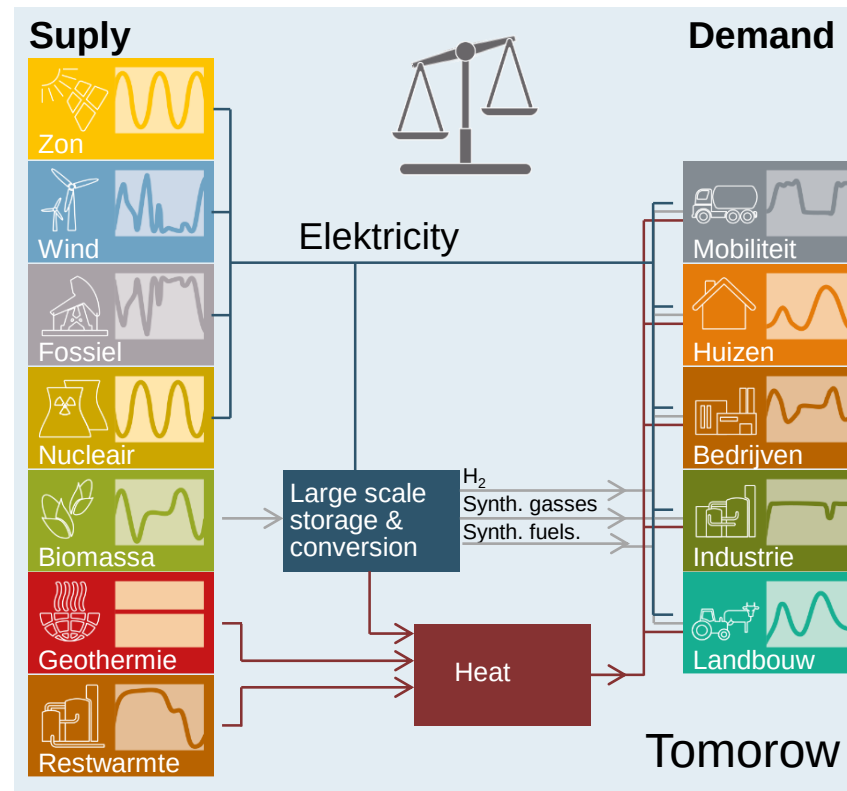
Dutch Climate agreement (Klimaat akkoord op hoofdlijnen 21/12/2018)

The big challenge

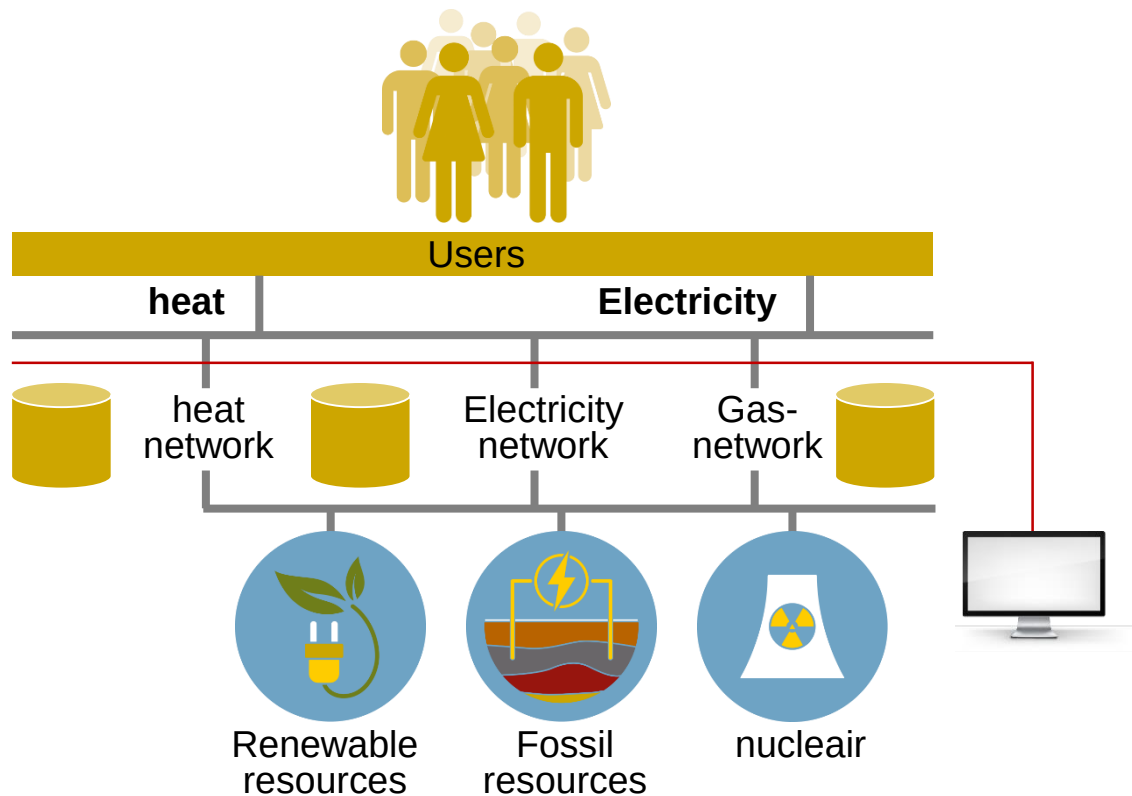


Bron: CBS

Development energy system

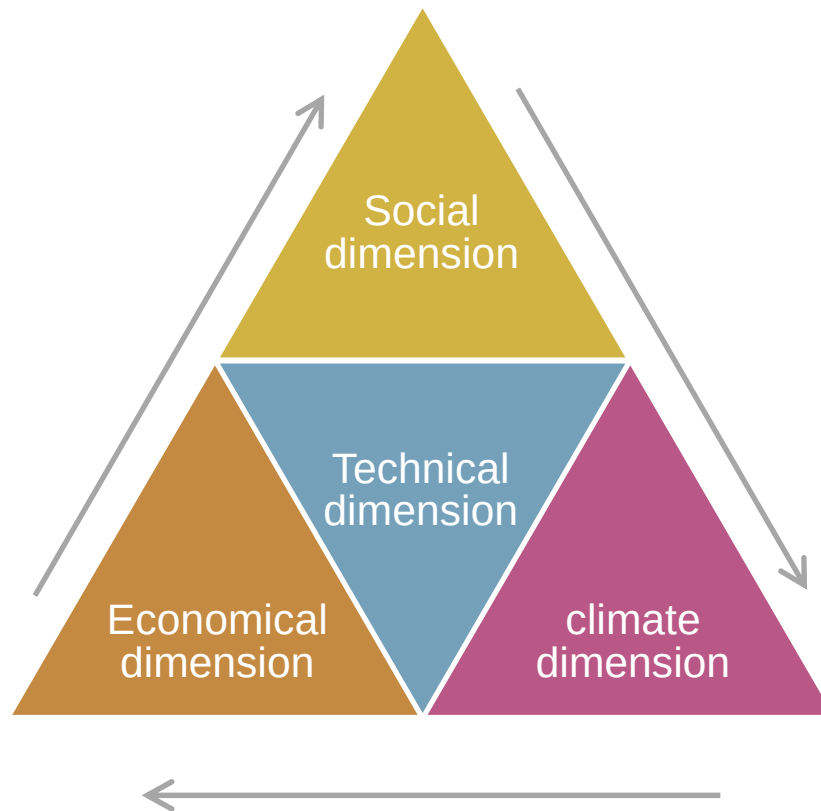


Energy system



- Energy usage
- ICT
- storage & conversion
- Networks
- Energy production central & local

It's not just about technology

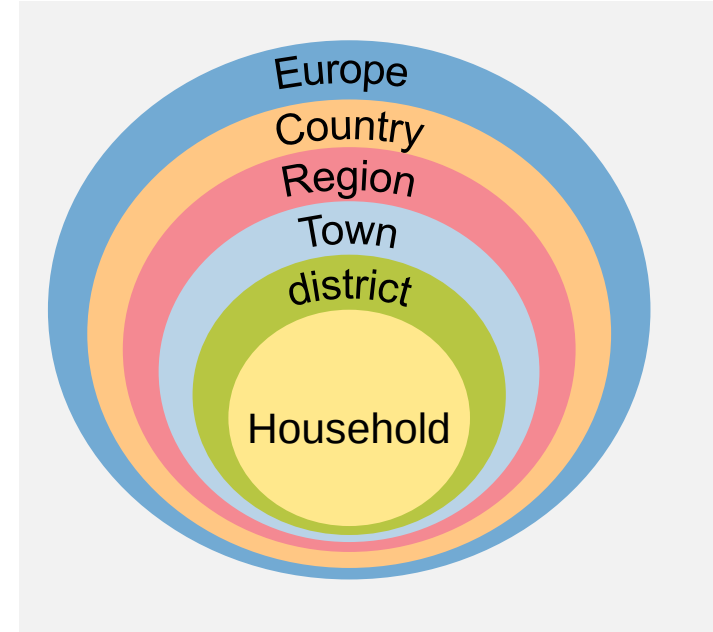


Example: North Sea Wind Power hub

← Potential markets

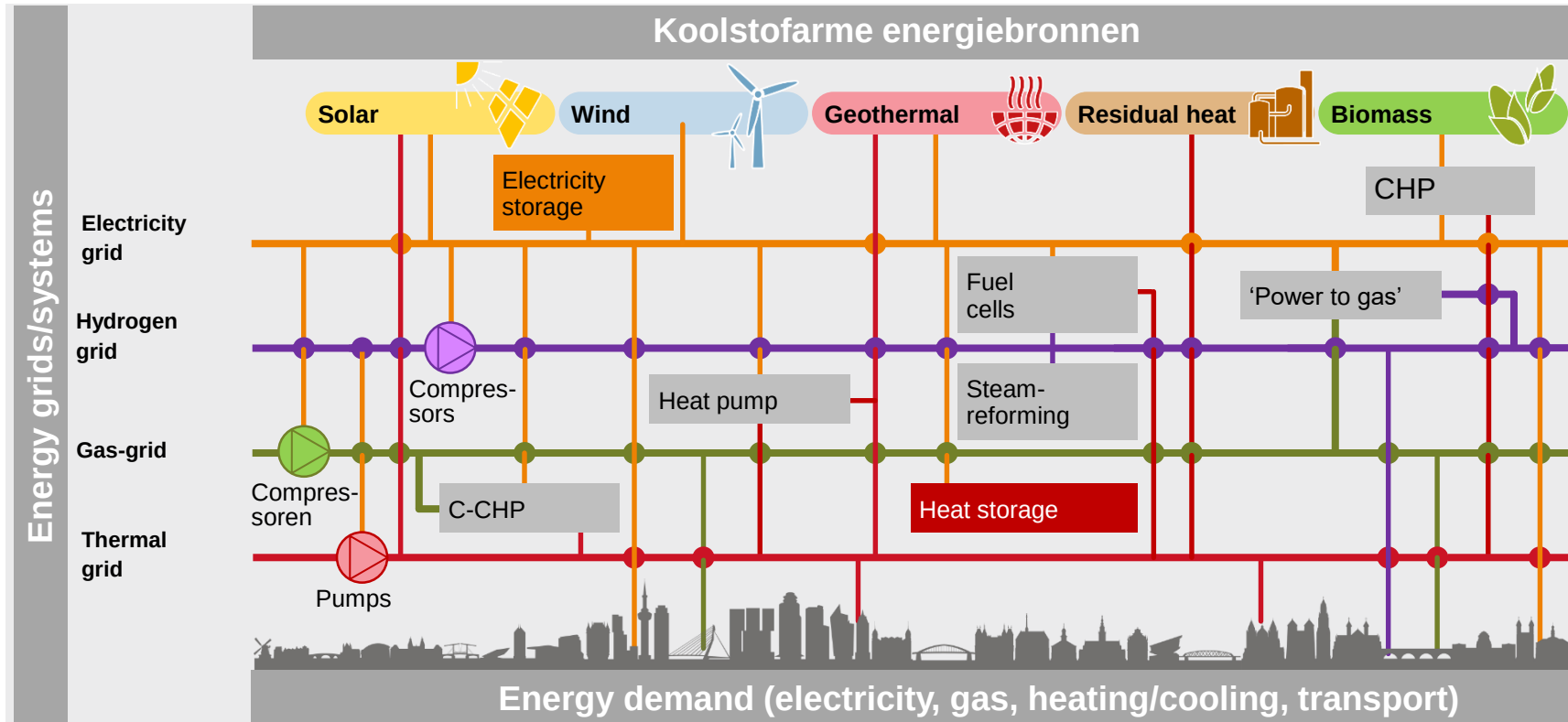


The energy system becomes complex: everything is interrelated

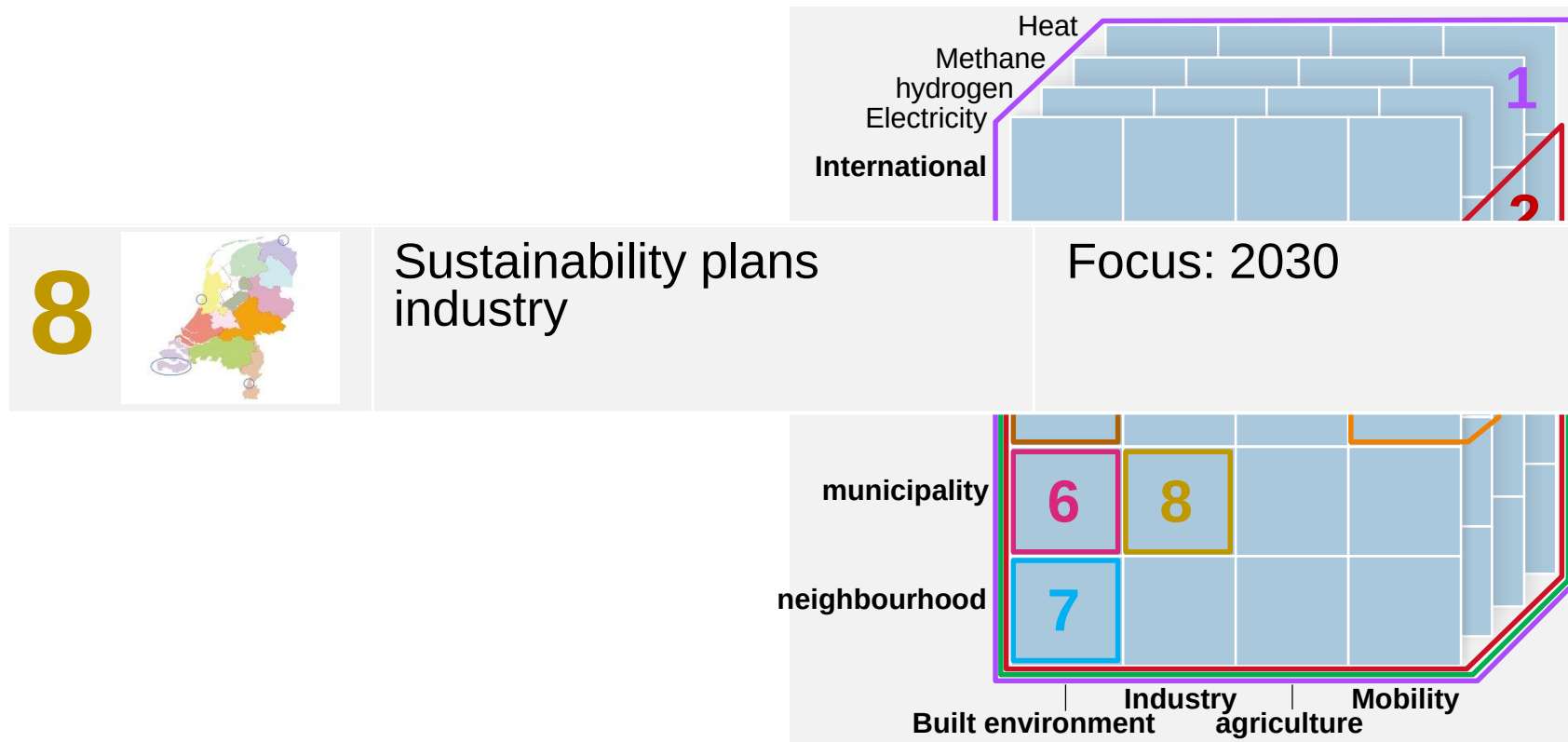


System of systems/ Nested systems

The energy system is becoming complex: infrastructure

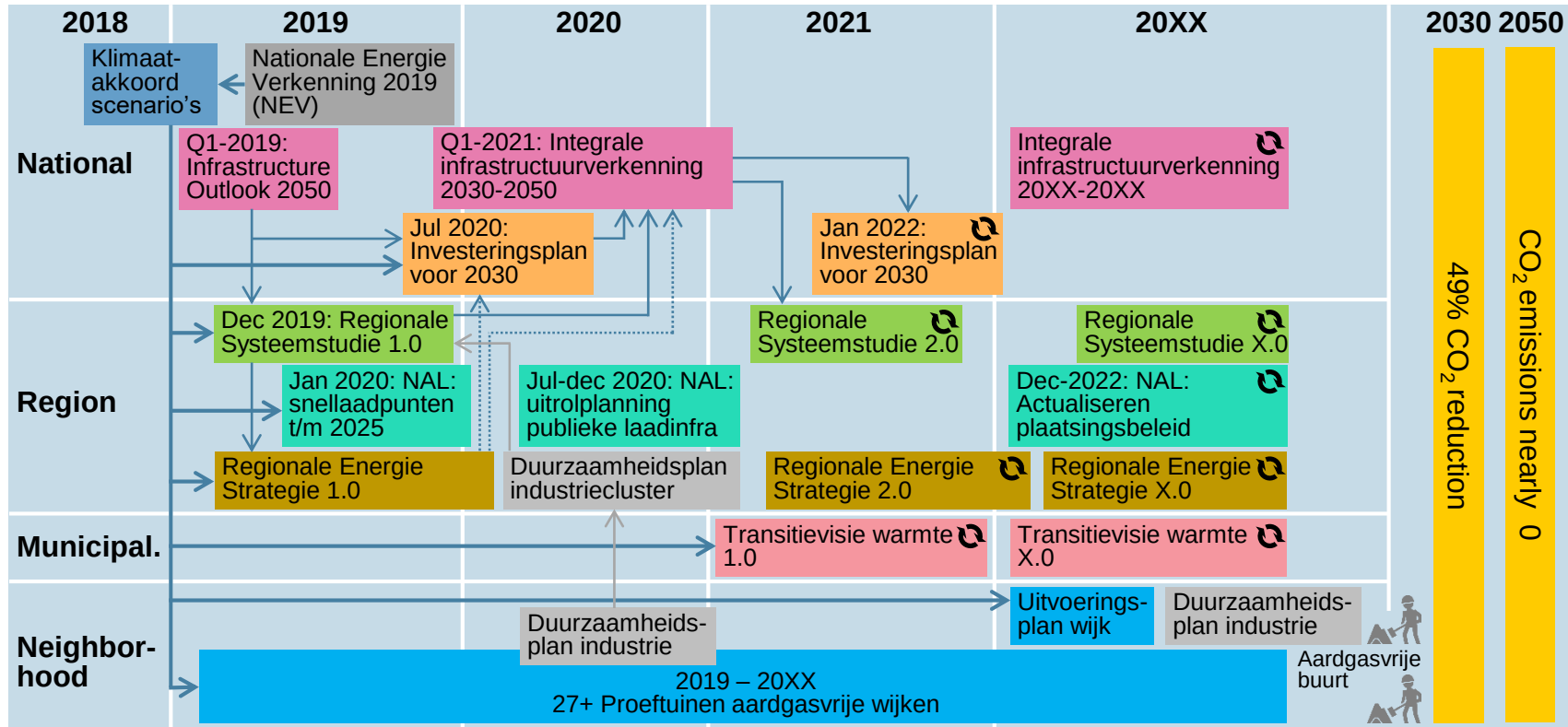


The energy system is becoming complex: policy making



Netbeheer NL: Werkgroep: Integraal Netwerk en Energiesysteem van de Toekomst (iNET)

The energy system is becoming complex: policy making



Netbeheer NL: Werkgroep: Integraal Netwerk en Energiesysteem van de Toekomst (INET)

Key challenge: how do we take effective decisions

ensuring that the energy system is also affordable in the future and just as reliable and safe as today



Key Challenge 2: how to orchestrate this policy process?

This requires:

- Guiding principles
- A director to orchestrate decision making
- An integrated decision-making process that considers multiple trade-offs (technical, economic, social, climate, space, etc.)
- Effective and efficient participation of all stakeholders
- A viable form of control/management
- High-quality unambiguous data and information and analytical tools





Thanks for your attention