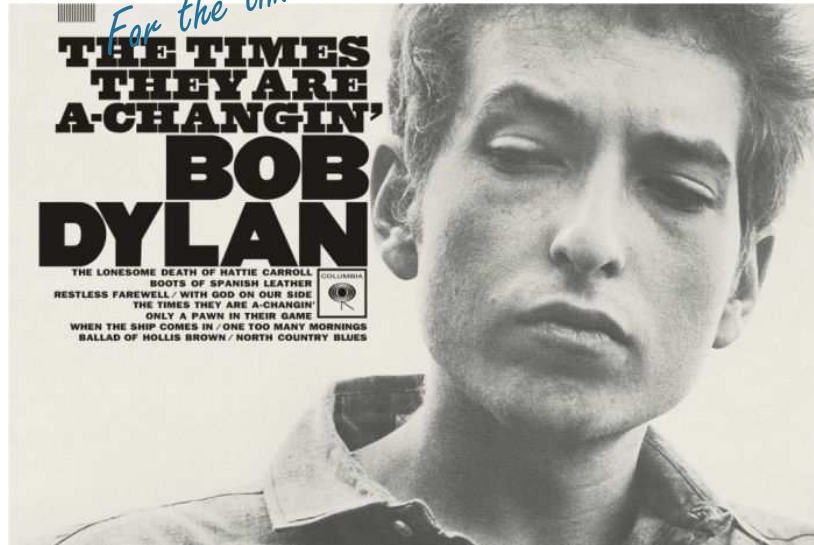




Netherlands Enterprise Agency

*Come gather around people
Wherever you roam
And admit that the waters
Around you have grown
And accept it that soon
You'll be drenched to the bone
And if your breath to you is worth saving
Then you better start swimming or you'll sink like a stone
For the times they are a-changing*



Recent developments for CCS in the Netherlands

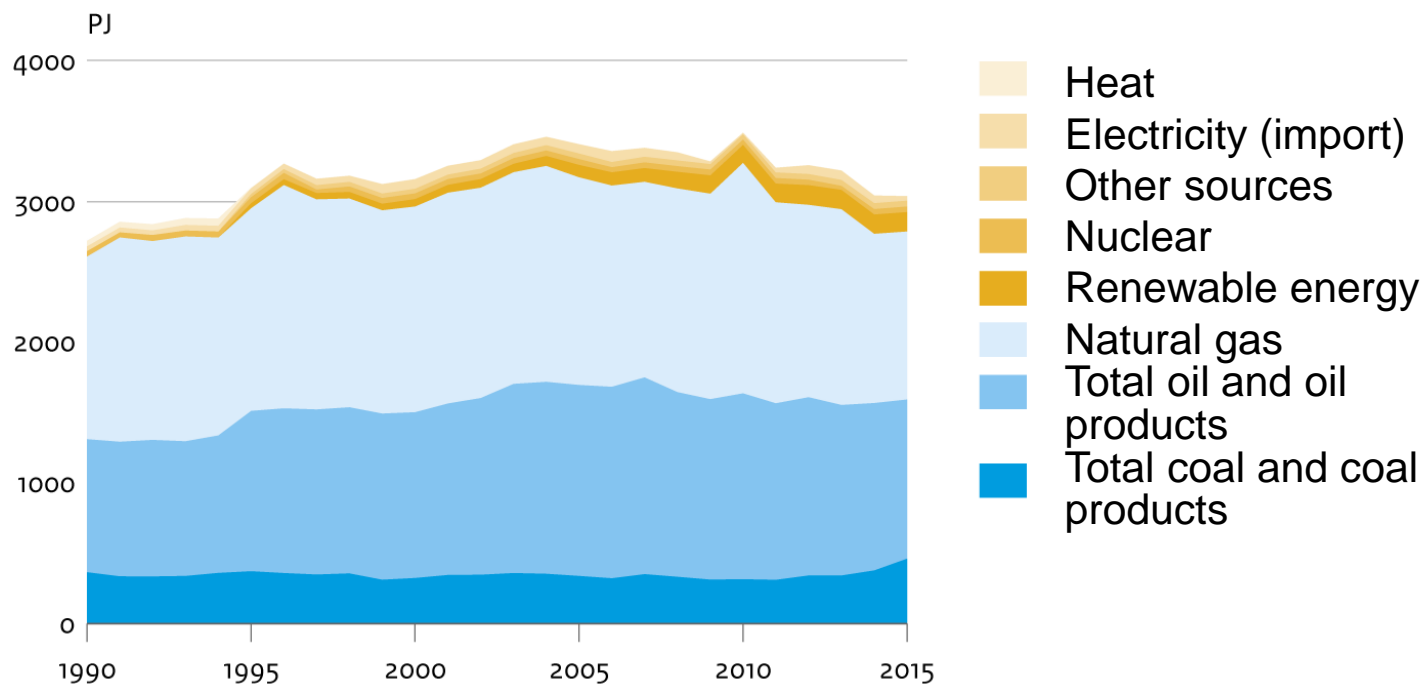
Gerdi Breembroek

Netherlands Enterprise Agency



Nederland - End-use energy

Energieverbruik per energiedrager



Bron: CBS

CBS/juh6
www.clo.nl/nl005420



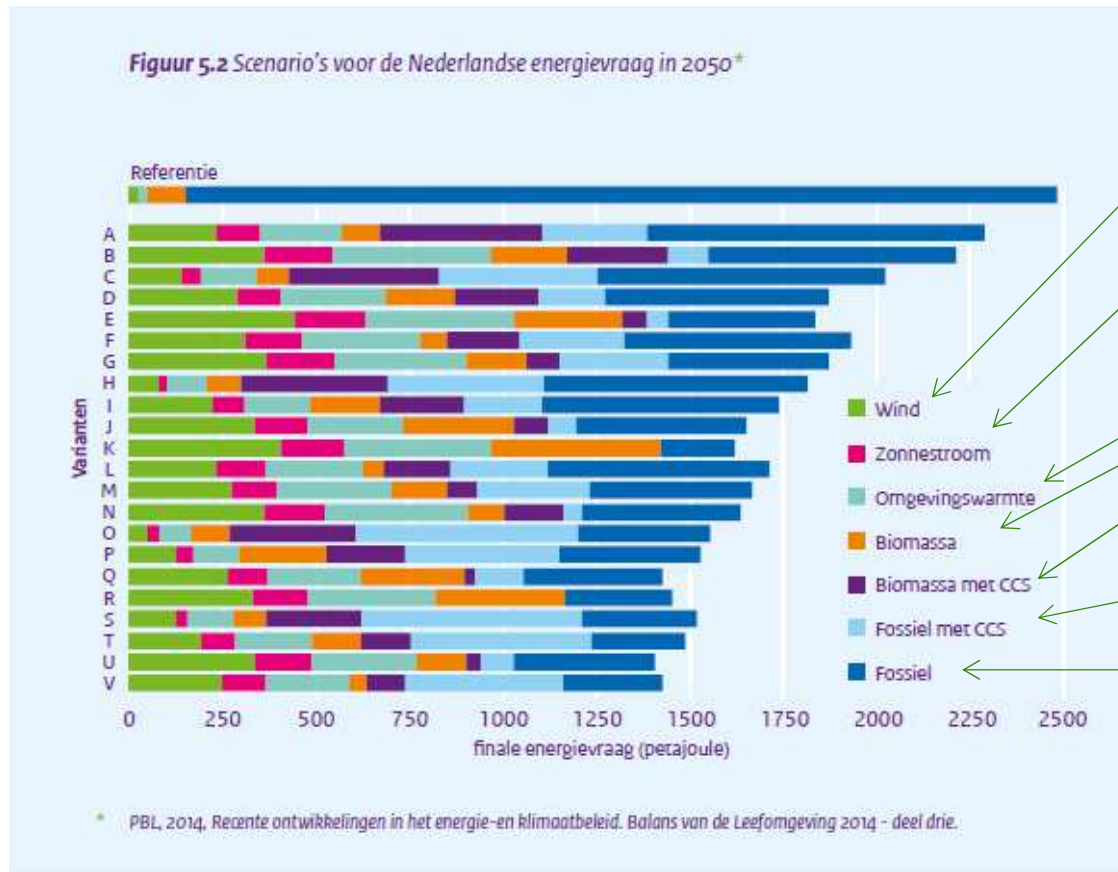
Energy report 2023 - 2050



- January 2016: long-term vision on Energy
 - Towards a low-carbon energy economy that is safe, reliable and affordable
1. Focus on reducing CO₂
 2. Innovation and economic opportunities
 3. Energy as part of spatial planning



Predicting 2050 is impossible However, CCS is a robust element



Wind

Solar

Ambient heat

Biomass

Biomass with CCS

Fossil with CCS

Fossil



Energie Agenda 7 December 2016



- Reduction of **CO₂**
- Early transition
- Capture and storage of CO₂ in industry, with no/few alternatives
- “ROAD first step in CCS transport network”



High temperature heat

Three main roads

- Prevent CO₂ emission
- Recycle waste streams, including heat
- CCS and CCU
 - ROAD first step to broader CCS network
 - CCS Roadmap
 - International collaboration, a.o. on infrastructure
 - Stimulate investment in CCS and CCU





In operation now ...

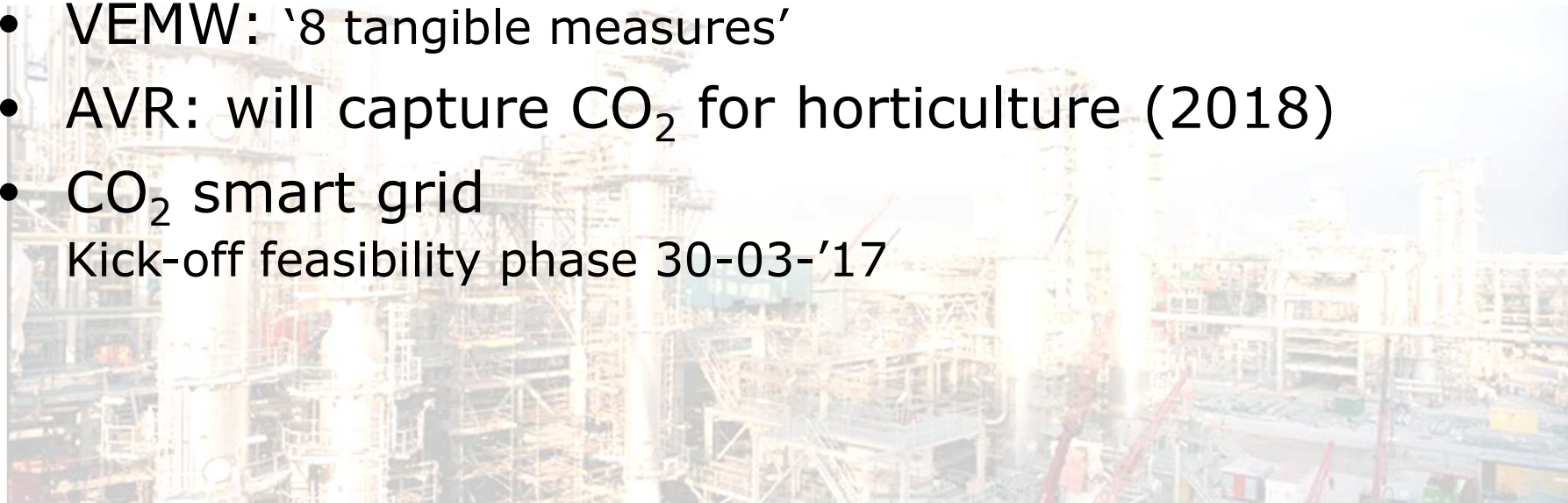
- OCAP and WarmCO₂ delivering about 500 kton/year CO₂ -> greenhouses
- CO₂ capture pilot at Waste Incinerator of Twence
<http://co2sbc.eu/>
- CO₂ storage:
 - K12b: innovative tracer
 - TAQA has a permit





CCS in the News ...

- ROAD: Uncertainty - coal phase out
- Rotterdam harbour
Energy in transition 29-03-'17: 'Decarbonisation pathways'
- VEMW: '8 tangible measures'
- AVR: will capture CO₂ for horticulture (2018)
- CO₂ smart grid
Kick-off feasibility phase 30-03-'17





Roadmap

- “Verkenning” – scouting for Roadmap nearly finalised
- CCS for industry broadly accepted (though from different angles)
- Three-phase approach
 - Preparation
 - Demonstration
 - Implementation
- Roadmap will consider a.o.:
 - Communication / public support
 - Transport & Storage potential (ongoing)
 - Organisation (financial, public/private ...)
 - Juridical aspects
- Ministries (EZ, I&M) will support the process



CCS Routekaart,
verkenning
Concept 6 april 2017

Hans Warminghoven en Jan Paul van
Soest



Recent highlights in international collaboration

- SET Plan TWG9 CCUS
 - Implementation Plan to be finalised
- ECCSEL
 - To be founded 12 June 2017
- Connecting Europe Facility
 - CO₂ transport infrastructure. PCIs had to be handed in by Easter
- Mission Innovation
 - 2017: which Challenges to join?
- ZEP, NSBTF, CSLF: NL participates

The screenshot displays the SETIS (Strategic Energy Technologies Information System) website. The main content area features a large graphic titled "SET-Plan Implementation Progress Reports" with a circular diagram. Below this is a section for "Energy Union" with "SET-Plan 10 Key Actions" listed in a table. The table has two columns: "Energy Union" and "SET-Plan 10 Key Actions". The "Energy Union" column lists categories like "No1 in Renewables", "Consumers in the Energy System", "Efficient Energy Systems", "Sustainable Transport", "Carbon Capture Utilisation and Storage", and "Nuclear Safety". The "SET-Plan 10 Key Actions" column lists 10 numbered actions, such as "1. Performant renewable technologies integrated in the system" and "10. Nuclear safety". To the right of the table are links for "Towards an Integrated Roadmap", "SET-Plan Calendar", "SETIS Magazine", "Energy Systems Modeling", and "Energy Systems Modeling". At the bottom, there is a "JRC reports" section with a list of reports and a "Latest interviews" section featuring a profile of Marc Oliver Bettzüge, Director of the Institute of Energy Economics at the JRC.



Research & innovation

- Dutch partners in many H2020 projects
 - Stepwise; ENOS; LEILAC; Gateway; FresMe etc.
- Dutch partners in all high-ranked proposals in ACT
 - No decisions taken yet
- EnOp: <http://www.projectenop.eu/>
- TKI Gas
 - 'TKI Surplus tender' spring 2017
 - CCUS tender expected later this year



#hoedan

- CCS may start in niches, but will not move without policies for support
- Demonstration, early implementation, and full implementation need their specific approaches
- The Netherlands cannot afford to discard this option
 - But then 'somebody' has to pay...



Things to take home

- CCUS for energy intensive industries firm on the Agenda
- Public acceptance seems more positive
- CCU can offer early opportunities, but CCS will bring down emissions
- Roadmap for CCUS in the process
- Front runners!
- So: working on #hoedan






Our closest neighbours...

http://www.energieagentur.nrw/kwk/4rd_international_workshop_co2_cuccr_and_p2x_power_and_heat_for_the_future

CCU and 'power to X'
15-16 May 2017
Düsseldorf

Kraft-Wärme-Kopplung EnergieAgentur.NRW
Klimaschutz made in NRW

THEMEN | MELDUNGEN | SERVICE | TERMINE | PRESSE | EA.NRW



VERANSTALTUNGEN KRAFT-WÄRME-KOPPLUNG

VERANSTALTUNG | 15.05.2017 - 16.05.2017 | DÜSSELDORF / ESSEN

4th International Workshop "CO₂: CCU/CCR and P2X"

Increasing shares of renewable energies in energy conversion and exploitation of energy efficiency potentials are key strategies to limit the increase of global average temperature by a maximum of 2 °C compared to pre-industrial level. In addition, other concepts can make a contribution, such as the re-usage of CO₂ from conversion and production processes for chemical products or together with excessive electricity for fuels, heat or power again. The workshop, organized by the Power Plant Technology Network of EnergyRegion.NRW together with Partners from Norway and the Netherlands offers the opportunity to update the information basis on CCU and Power-to-X, to establish new contacts, to discuss current issues directly, and to initialize joint activities and projects.

WEITERE THEMEN KRAFT-WÄRME-KOPPLUNG

ÜBERBLICK
Was bedeutet Kraft-Wärme-Kopplung? Was macht die Technologie so besonders effizient? Ein Überblick.
» mehr

KWK FÜR NRW
Hausbesitzer und Unternehmen finden bei unserer Kampagne alle Informationen rund um Kraft-Wärme-Kopplung.
» mehr

NETZWERK KRAFTWERKSTECHNIK NRW
Das Netzwerk koordiniert im Auftrag der



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