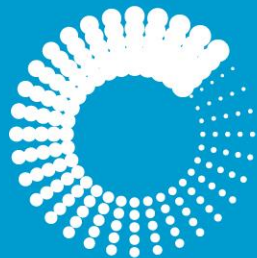


# **The CCS roadmap**

## **The process and preliminary results**

CATO meeting 15 november 2017

Hans Warmenhoven or Margriet Kuijper



De Gemeeynt

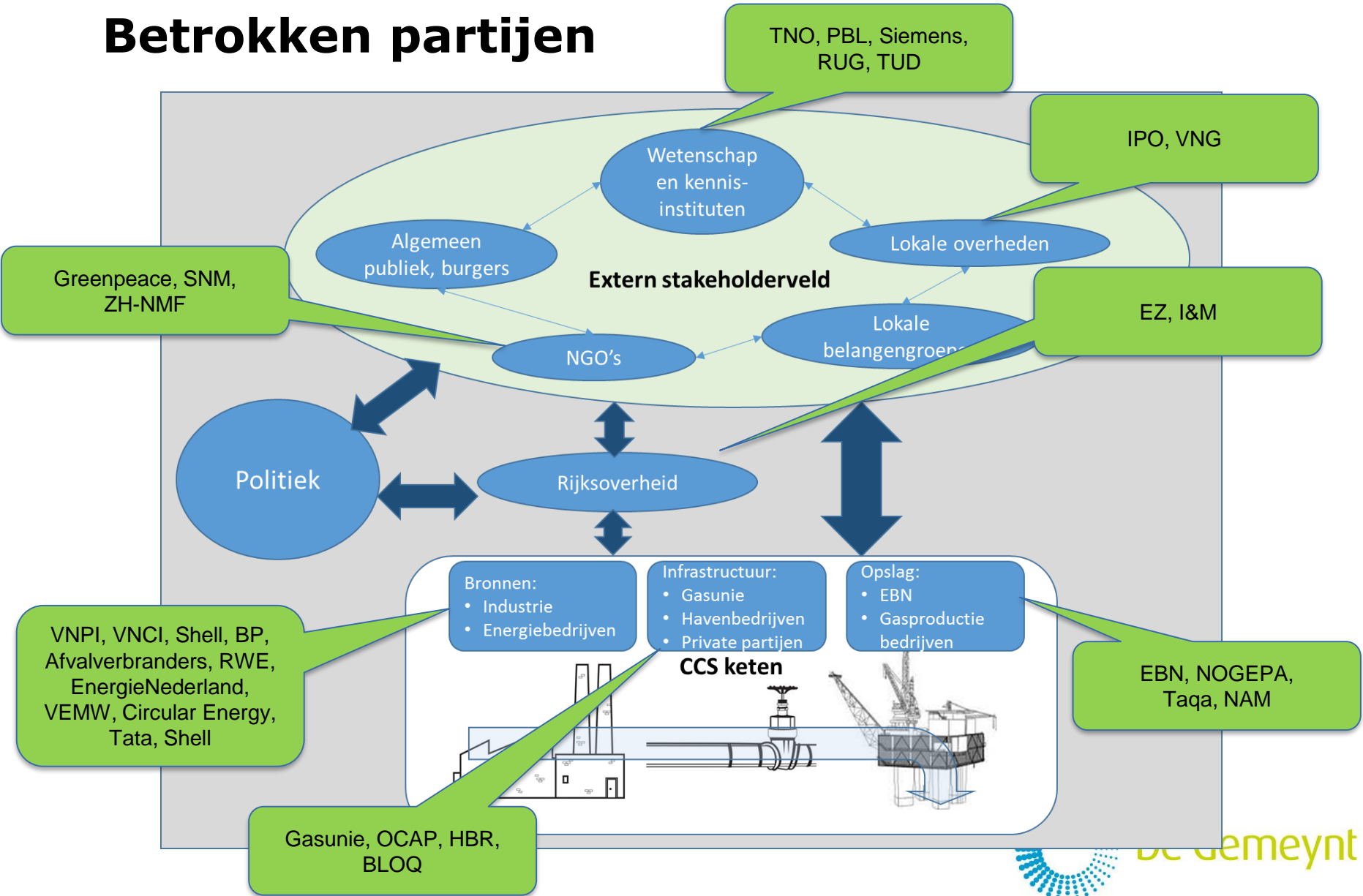
# Objective of the process

Design of a widely accepted roadmap for the introduction of CCS in the Netherlands.

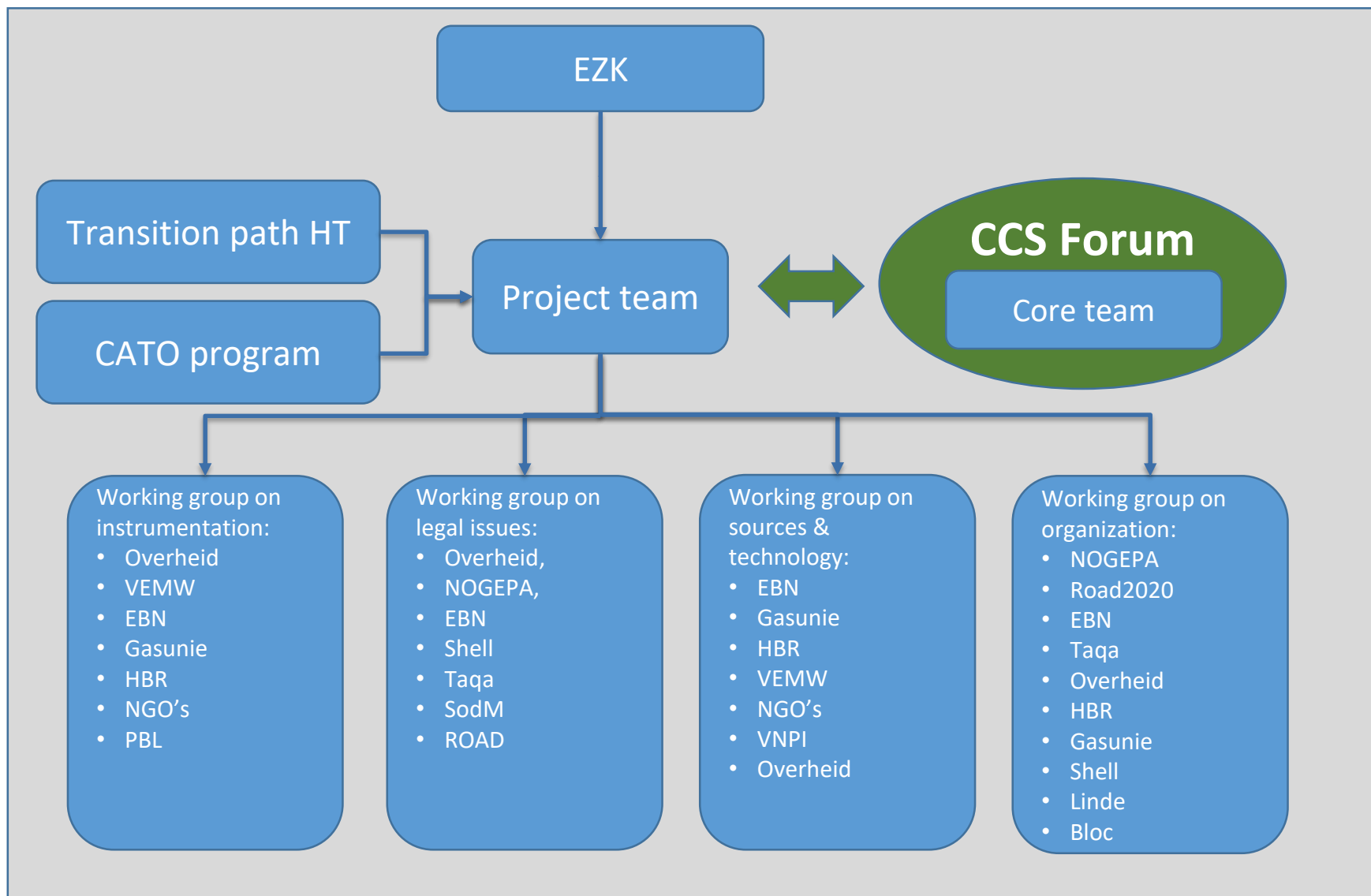
- The sources to be connected
- The planning
- The short term steps
- The organization
- Outline of a research agenda

On controversial issues the roadmap does not make the decisions but shows the options and the consequences of different choices.

# Betrokken partijen



# Organization process



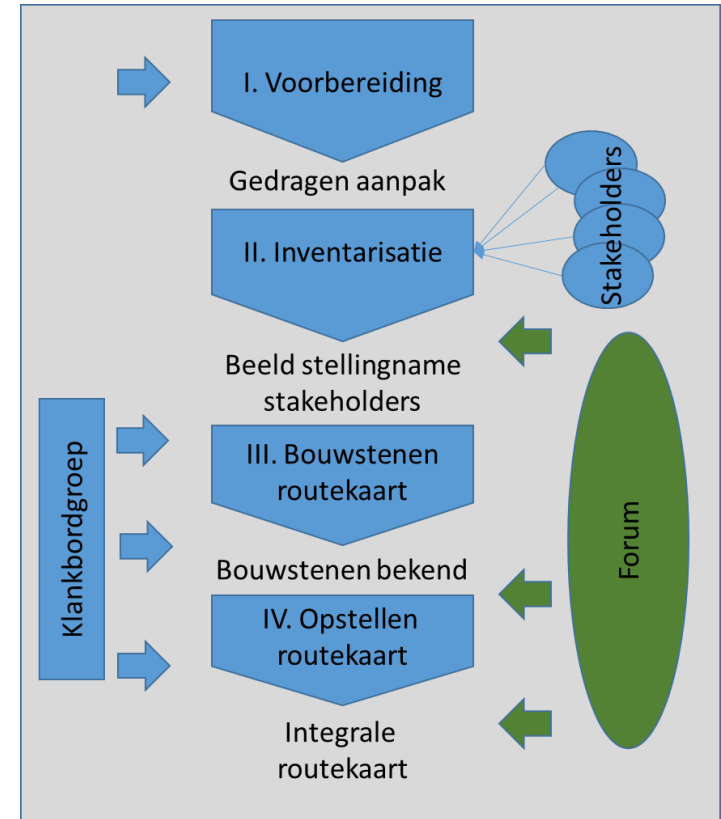
# Process

## Current status:

- Preparation of draft papers on the main issues
- First forum meeting
- Four working groups

## Next steps:

- Two forum meetings
- One core group meeting
- Working groups on controversial issues.
- Final report by the end of January



# Main working group results

## CCS sources

- There are three different categories of sources where CCS could be implemented
- Based on different views on the overall transition different choices can be made on the categories that should implement CCS. These choices result in an overall potential for CCS.
- Pre combustion CCS on a system level, production of blue hydrogen, can be interesting because it clears the path for the introduction of green hydrogen and therefore takes away the fear of lock ins.

# Main working group results

## Organization transport and storage

- Development of T&O by a (semi-) public organization can help resolve several barriers and will help to limit the overall costs.
- Ongoing and future projects can help clarify the options:
  - Gasunie/EBN project on an 'open-access' infrastructure in the Rotterdam area
  - Min EZK project on potential market models
- On the short term it is important to determine which fields are of importance for the CCS ambitions and should therefore not yet be abandoned when the gas production is terminated.
- Initial CCS projects can probably be scaled up at limited additional costs.

# Main working group results

## Legal issues:

- In principle the legal framework in the Netherlands is sufficient to implement CCS projects.
- Regulations could be further tuned for the specific situation in the Netherlands :
  - EC directive is applicable on both aquifers and gas fields; that is not optimal in the Dutch situation and can be further specified for the Dutch situation.
  - The ETS-regulation, especially on monitoring, has been developed for above ground installations. The expected detail and level of certainty is feasible in an underground situation. Based on experience with the first projects a fit for purpose approach should be designed for storage situations.
- The ETS regulation and the mining law now have a different view on the way to handle potential migration out of a storage site.



# Main working group results

## Instrumentation

- It is important to fund R&D both generic as project specific using PPS constructions
- Relevant public organizations should be mandated to invest in transport and storage infrastructure.
- It could be an option to subsidize the capex related to transport and storage to bring down the overall costs.
- A specific tender should be opened to fund a number of start-up projects that create a maximum learning effect and prepare the way for further rollout.
- For further roll-out a more generic instrument should be introduced that stimulates emission reduction in industry. Such an instrument should not compete with the funding for renewable energy.

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