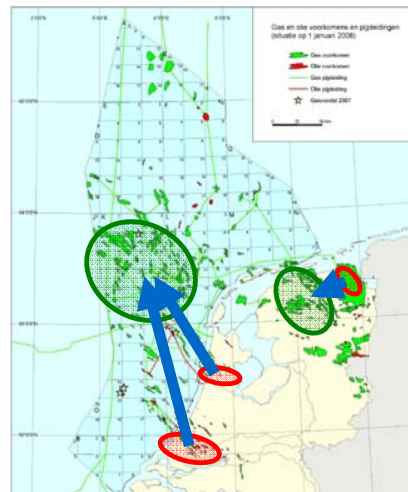


CCS in ETS

How will it work?

Monitoring



Vincent Swinkels

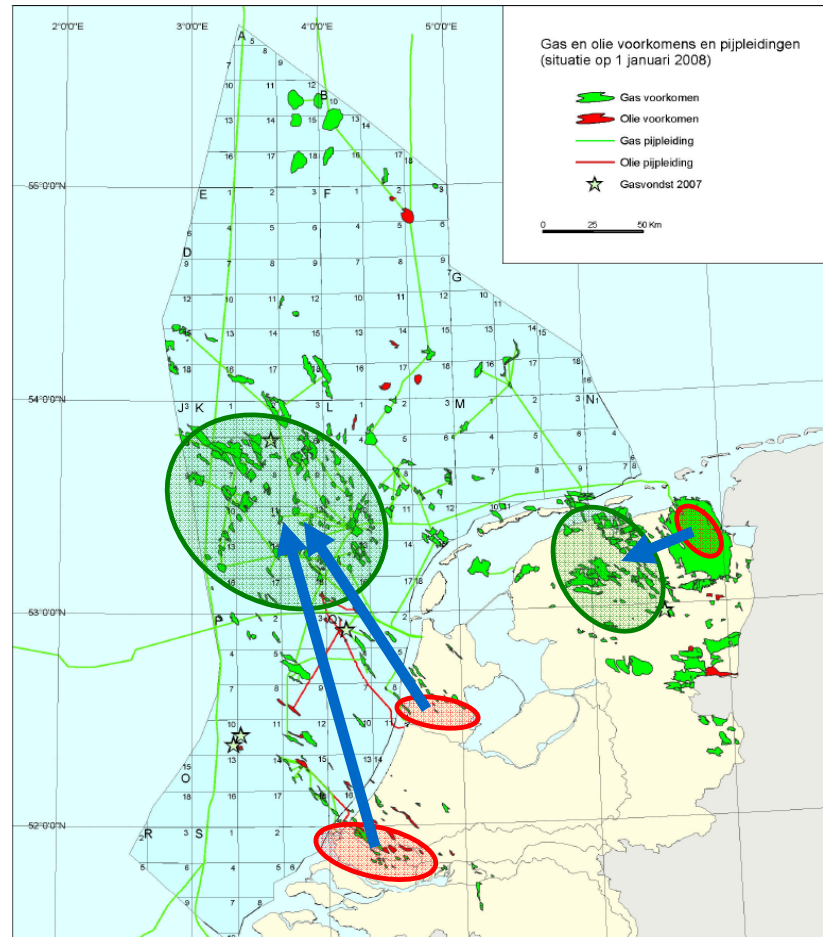
June 2008

Content

- Introduction
- Changes to ETS
- Monitoring in CCS and ETS Directives:
differences and overlap
- Leakage
- Position of biomass
- Conclusions

Introduction

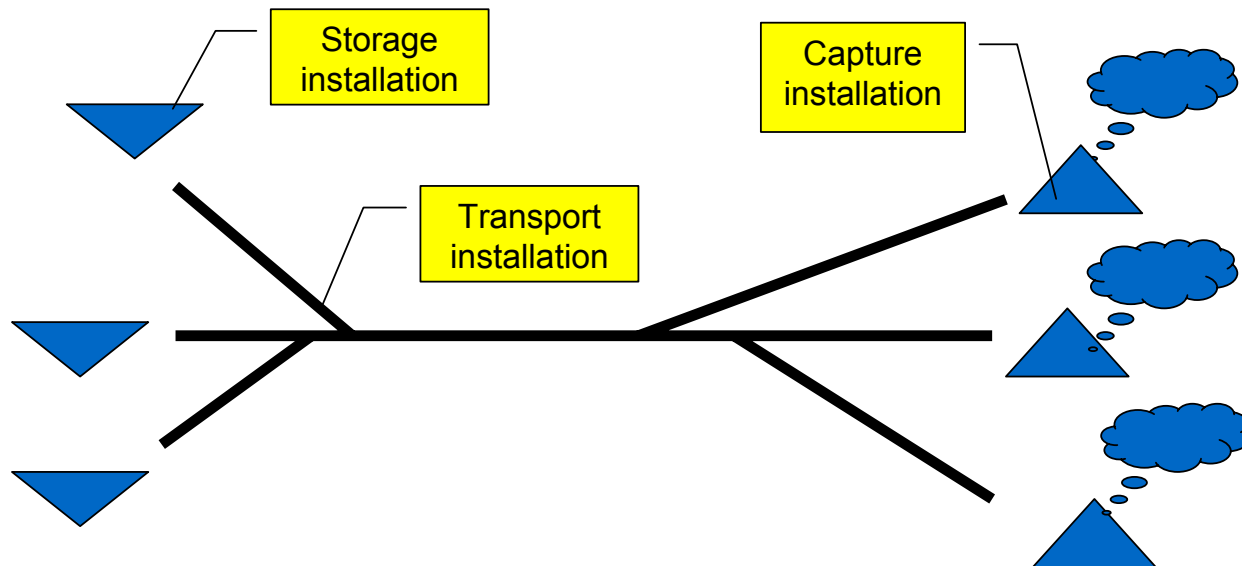
- DHV
- Involvement in ETS
- Involvement in CCS:
 - Environment ministry
 - Nogepe/ Ministry of Economical affairs
 - Northern Provinces



ETS highlights

- ETS: European emission trading system
- Operational since 2005
- Over 10.000 installations
 - Electricity production, combustion installations > 20MW
 - Steel, refineries, cement, glass, ceramics, paper industries
- Covers about 50% of European CO2 emissions
- Allocation based on grandfathering
- Duty to surrender allowances equal to actual CO2 emissions
- Current prices: €15-20 per ton CO2

Changes to ETS 1



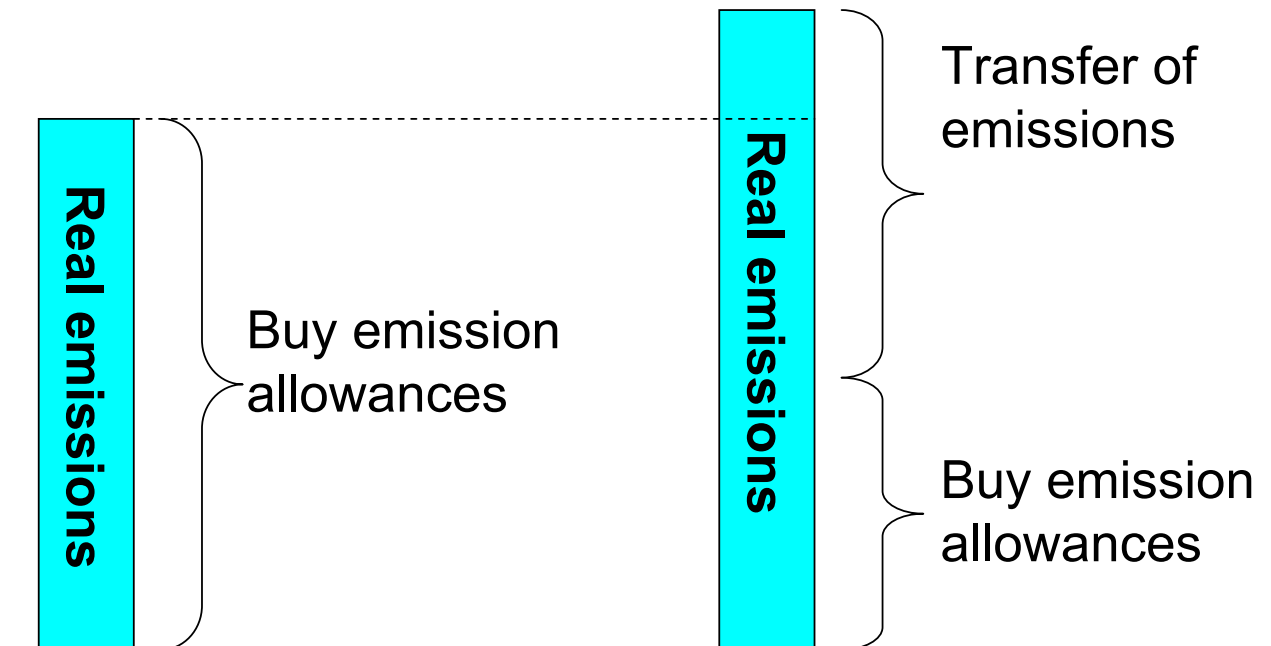
Changes to ETS 2

- Proposed changes to ETS Directive:
 - Capture, transport and storage are defined as installations under ETS
 - ◇ ETS permit
 - ◇ ETS monitoring plan
 - ◇ annual verification and reporting
 - Possibility to transfer emissions to other ETS installation for purpose of storage
 - From 2013 onwards
 - Auctioning for power plants, instead of free allocation

How ETS will finance CCS

No CCS

CCS



Monitoring in CCS and ETS

Directives have very different perspectives:

- CCS monitoring: Integrity and safety
- ETS monitoring:
 - CO₂ is money
 - If you cannot measure it, leave it out

Monitoring in CCS and ETS

	CCS	ETS
Volume, quality of CO2	Important	Important High accuracy
source of CO2	Nice to know	Important, Biomass?
Integrity, Safety of site	Important, main focus	Not relevant
Occurrence of leakage	important	important
Volume of leakage	Nice to know	Important High accuracy

Leakage

Under ETS:

- Leakage is regarded as emission of ETS installation
- Installation needs to surrender allowances
- Difficulties:
 - How to measure/ calculate with any degree of accuracy
 - Difference in time

Leakage: possible solutions

- Estimate emissions including 'penalty' to cover for uncertainty
- Limit ETS participation up to the point of injection.

Leakage: will it occur?

“Observations from engineered and natural analogues as well as models suggest that the fraction retained in **appropriately selected and managed reservoirs** is *very likely to exceed 99% over 100 years* and is *likely to exceed 99% over 1.000 years*”.

IPCC Special Report on CCS
September 2005

Biomass

Does it matter where CO₂ comes from?

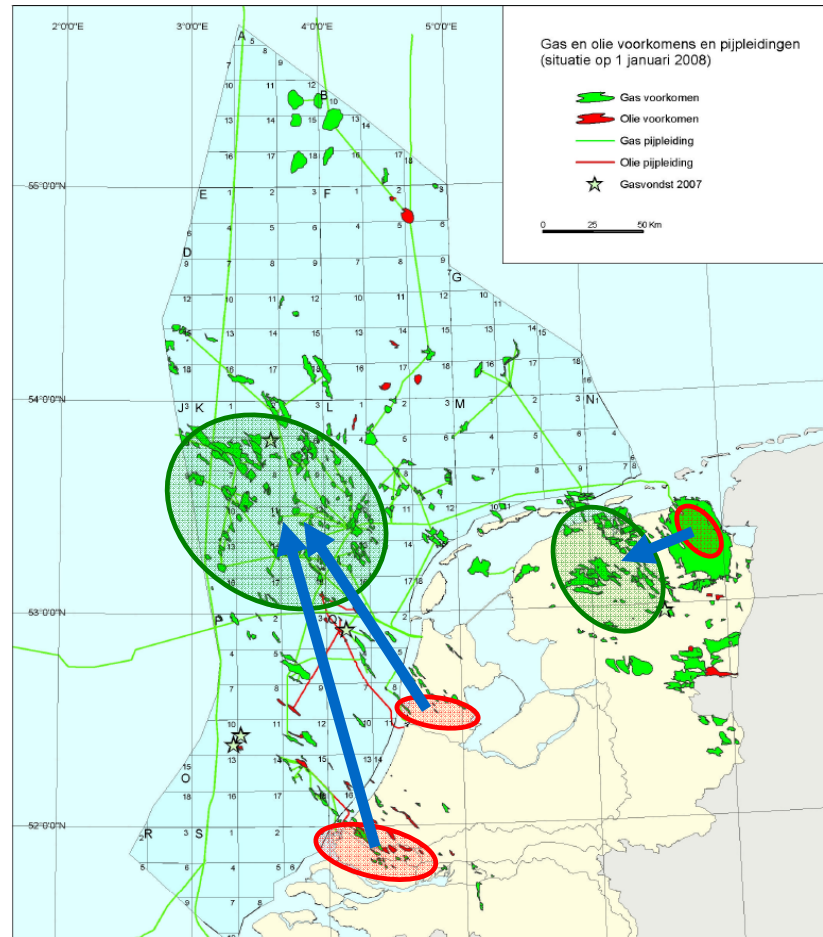
- For CCS: No
- For ETS: Yes
 - Biomass has emission factor zero
 - There is no value (within the system) for storage of biomass CO₂

Biomass: possible solutions

- Financial support outside of ETS
- Free allocation of allowances to CO2 biomass producers
 - Requires additional reserve in allocation!
- Administrative 'exchange' of emissions (and value of emissions) between biomass and non-biomass installations

Conclusions

- There is overlap on monitoring in current proposals
 - Focus CCS monitoring on integrity, geology, leakage detection
 - Focus ETS monitoring on volume, quality, source of (injected) CO₂
- Leave CO₂ leakage out of ETS
- Investigate administrative exchange of CO₂ emissions
 - For biomass
 - For installations far from pipelines and storage fields



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