

# Webinar

## 'CCS - Commercial Model and Financing'



# CATO Webinar

## Agenda and panelists

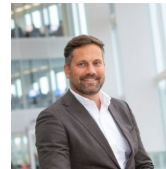


Introduction



**Brigitte Jacobs**  
CATO Director

Regulatory frameworks and bankability considerations



**Michiel Engelaar**  
Director Project Finance @ Deloitte

Cost aspects related to building a CO<sub>2</sub> capture plant



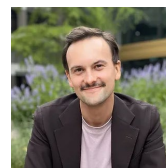
**Matthijs Koorstra**  
Head of Strategy and M&A @ Attero

Dutch SDE++ funding model for CCS and commercial implications for CO<sub>2</sub> transport and storage



**Stijn Santen**  
CCUS Business Development @ EBN

Panelist



**Roel Schoenmakers**  
Policy Officer Climate Policy @  
Ministry of Climate Policy and Green Growth

Discussion about earning money with CCS



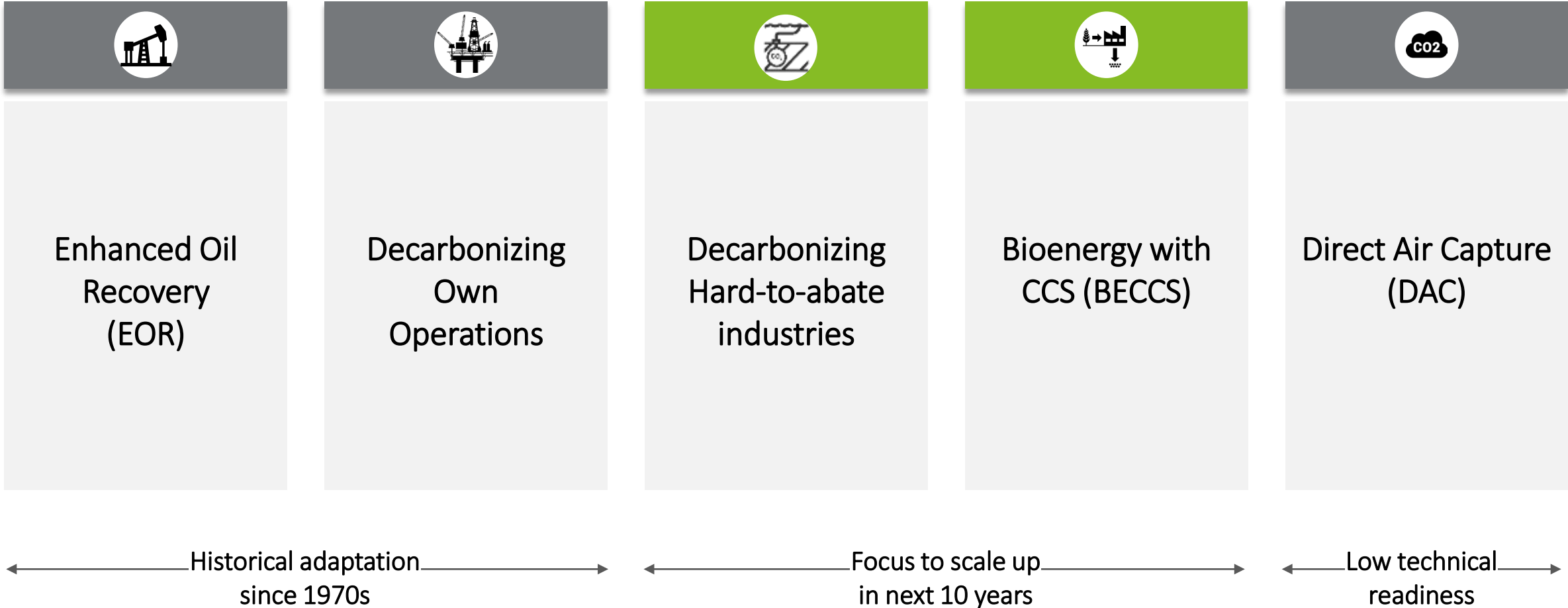
## CATO Webinar

# CCS – Commercial Model and Financing

Deloitte Netherlands, 24 September 2024 – Michiel Engelaar

# Financing “Traditional” CCS Projects

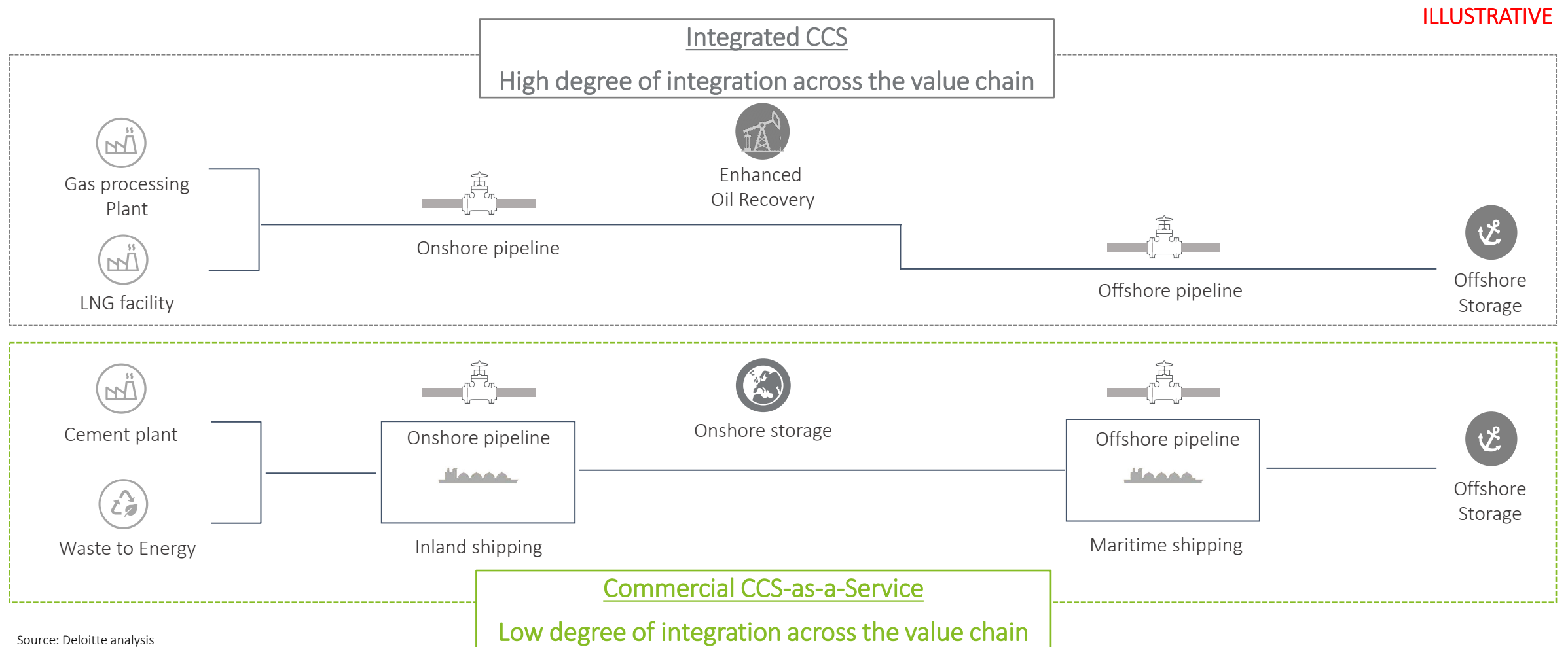
Historically, CCS was used for EOR and gas processing, but rapid scale up of CCS for hard-to-abate industries and BECCS will be required in the next decade to reach the climate targets



Source: Deloitte analysis

# Financing “Traditional” CCS Projects

Commercial CCS-as-a-service using a true merchant approach will be needed to offer the solution to various emitters



Source: Deloitte analysis

# Financing “Traditional” CCS Projects

The North Sea is emerging as a key hub for CCS with growing government support for cross-border trade

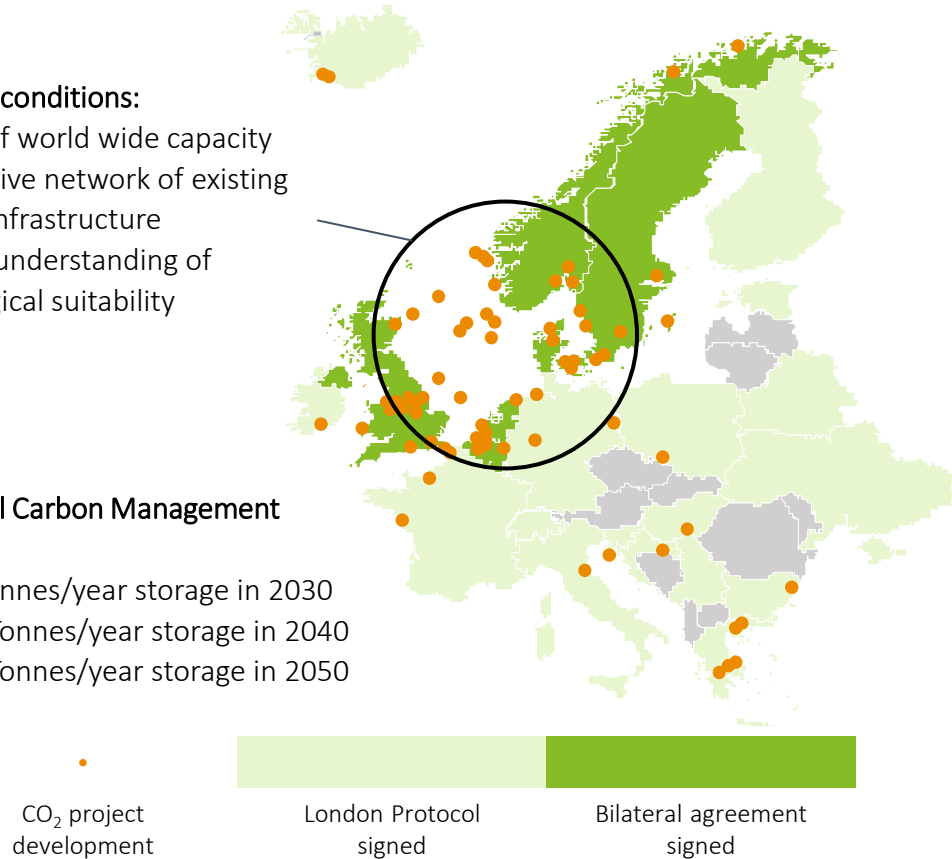
## European cross-border CO<sub>2</sub> landscape (2024)

### Favourable conditions:

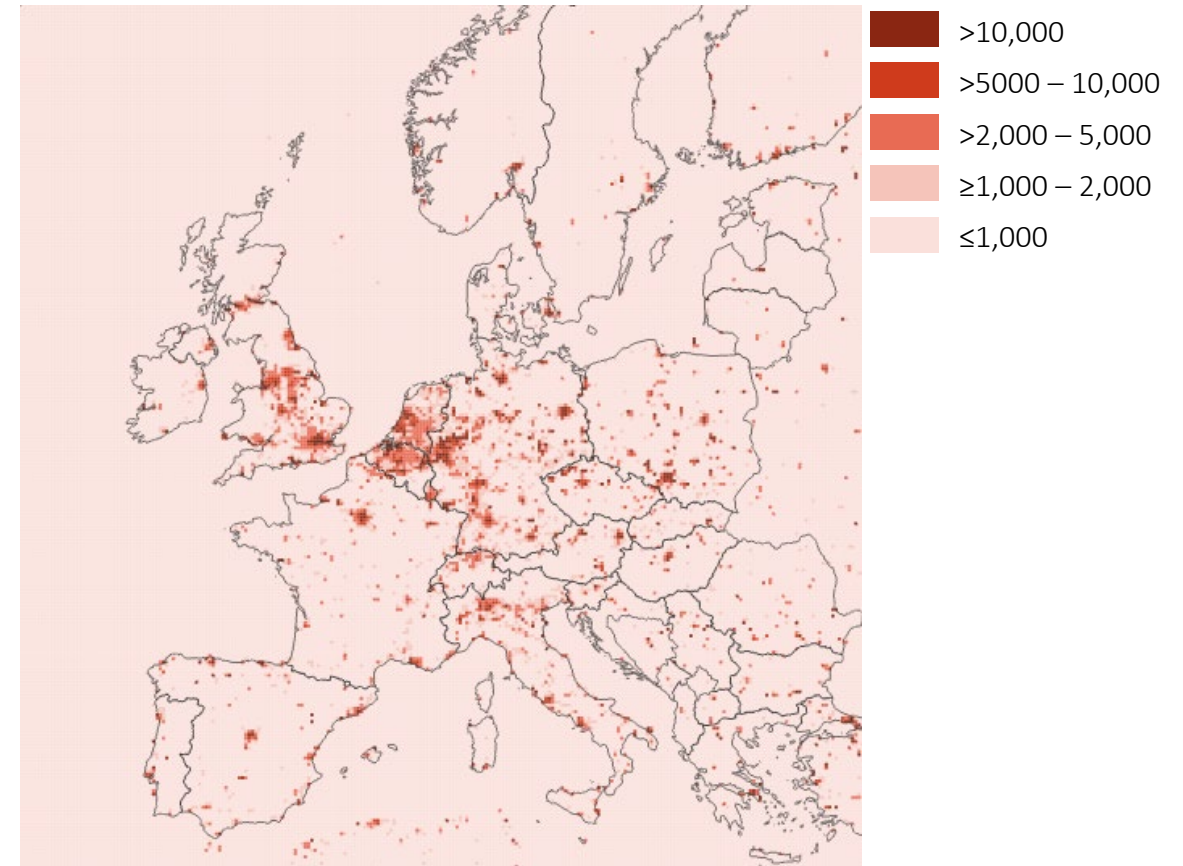
- ~2/3 of world wide capacity
- Extensive network of existing O&G infrastructure
- Good understanding of geological suitability

### EU Industrial Carbon Management Strategy:

- 50 mTonnes/year storage in 2030
- 280 mTonnes/year storage in 2040
- 450 mTonnes/year storage in 2050



## CO<sub>2</sub> emissions heatmap (ton per km<sup>2</sup>, 2021)



Source: Deloitte analysis

# Financing “Traditional” CCS Projects

To date, CCS Projects rely heavily on the involvement of government and players in the oil & gas industry

	Government	Strategic Players	Infrastructure Funds	Banks
Grants	✓	✗	✗	✗
Equity	✓	✓	✗	✗
Debt (Corporate)	✓	✗	✗	✓
Debt (Project Finance)	✗	✗	✗	✗

Sources: Deloitte analysis

## Carbon credits vs. Carbon removal

The business considerations between CCS and CCU differ; CCS relies on carbon credits and includes long-term liability risks, CCU relies on certification and green premiums

	Capture	Transport / transmission	Disposal	Monetization
CCS	<ul style="list-style-type: none"> <li>Stringent <b>purity</b> requirements</li> <li><b>Dehydration and compression</b> for transport and disposal</li> </ul>	<ul style="list-style-type: none"> <li><b>Long-range transport</b> to geological storage sites</li> <li><b>Cross-border</b> for EU countries with special bilateral agreements for CO<sub>2</sub> transport</li> </ul>	<ul style="list-style-type: none"> <li>CO<sub>2</sub> <b>injected</b> for sequestration in rock formations or <b>EOR</b> in depleted O&amp;G fields</li> <li>Long-term <b>liability risks</b> for the storage partner in case of future <b>leakage</b></li> </ul>	<ul style="list-style-type: none"> <li>Permanent CO<sub>2</sub> storage can yield <b>carbon credits or allowances</b>, which can be sold on regulated markets (e.g., <b>EU ETS, VCM</b>).</li> </ul>
CCU	<ul style="list-style-type: none"> <li><b>High purity</b> for CO<sub>2</sub> used in chemicals, fuels, or food &amp; beverages</li> <li><b>Certification of the carbon source</b> to obtain a green premium</li> </ul>	<ul style="list-style-type: none"> <li><b>Shorter-range transport</b> to a temporary storage facility or directly to the CO<sub>2</sub> buyer's</li> <li><b>Co-located or nearby facilities</b></li> </ul>	<ul style="list-style-type: none"> <li>CO<sub>2</sub> <b>feedstock</b> utilised in the horticulture and food &amp; beverages sectors</li> <li><b>Industrial applications</b> (e.g., petrochemicals, urea/ammonia, synthetic fuels)</li> </ul>	<ul style="list-style-type: none"> <li>The <b>user/buyer of CO<sub>2</sub></b> pays <b>directly</b></li> <li>Mandated to utilise captured carbon or can monetize through <b>green premiums</b></li> </ul>





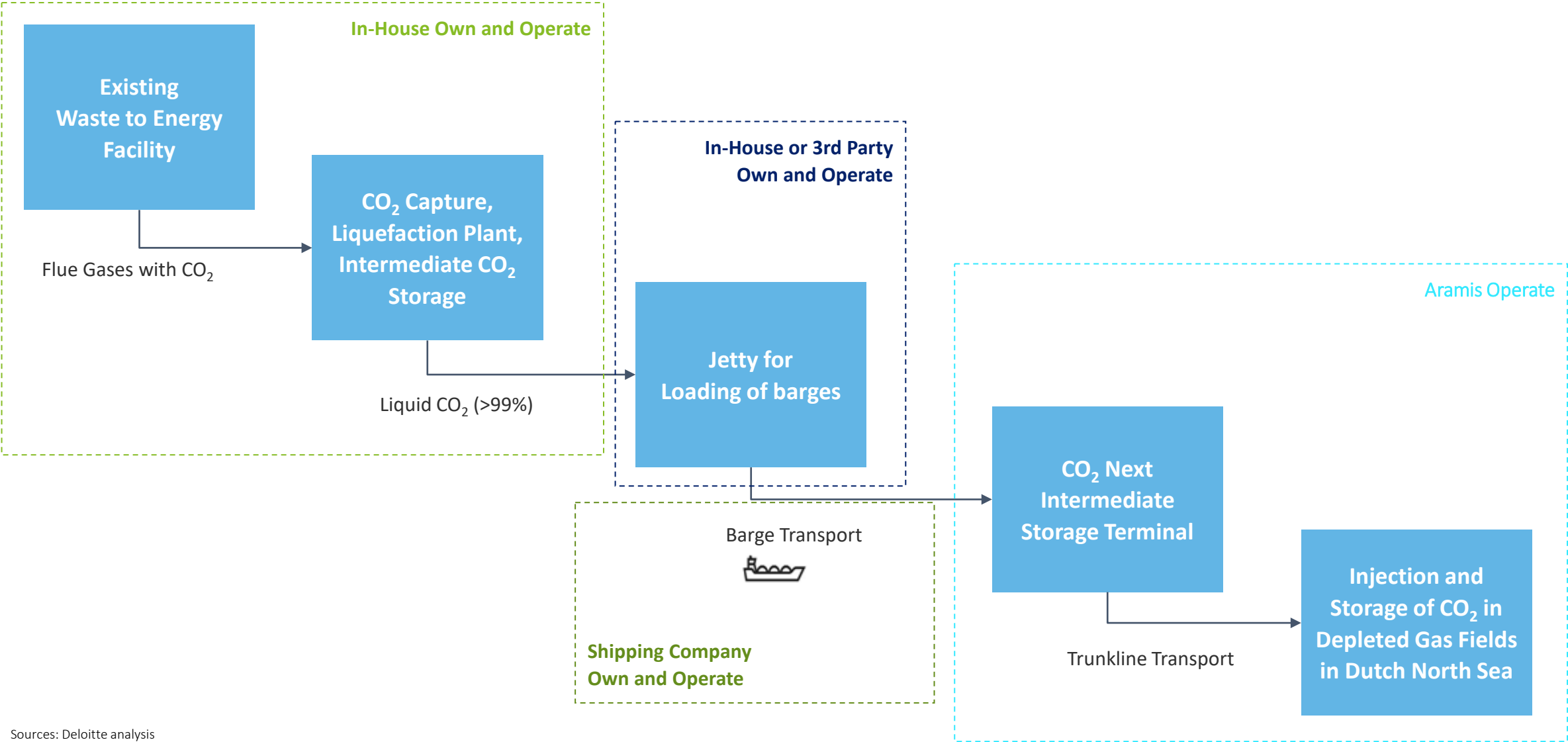
## CATO Webinar

# Cost Aspects Related to Building a Carbon Capture Plant

Attero, 24 September 2024 – Matthijs Koorstra

# Cost aspects related to building a carbon capture plant

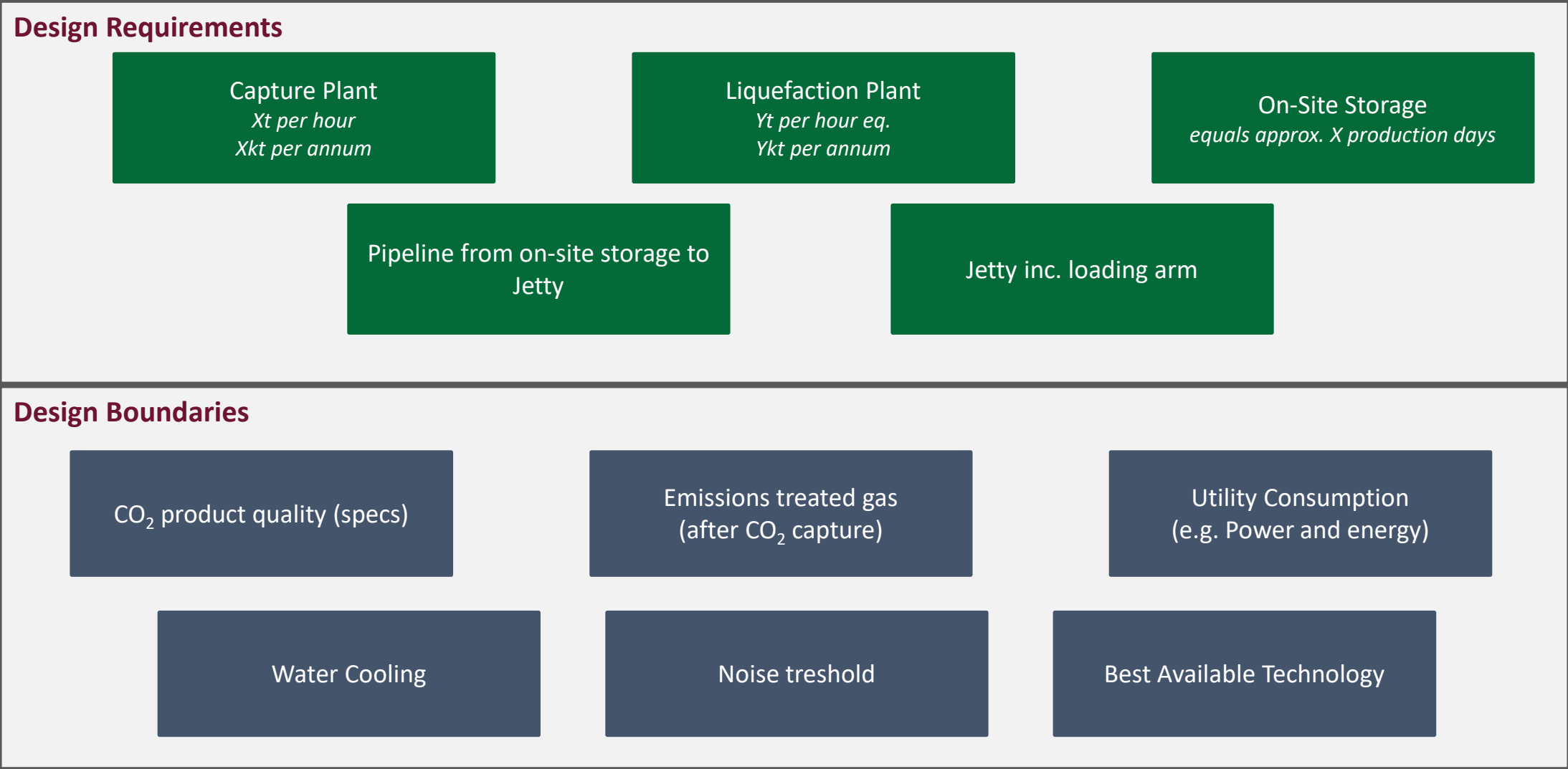
## Carbon Capture Value Chain Overview



Sources: Deloitte analysis

# Cost aspects related to building a carbon capture plant

## Design Overview



## Cost aspects related to building a carbon capture plant

### Revenue and Cost Overview

Revenue line item	Explanation	% Revenue
CO <sub>2</sub> credits/offsets	Avoided tax, sale of (biogenic) credits	60%
Subsidies and grants	e.g. SDE subsidy	40%

Cost line item	Explanation	% TCO
Capex /T&S	CAPEX and T&S costs	72%
Maintenance exp.	External maintenance costs	7%
Energy exp.	Power and steam consumption	15%
Other opex	Incl. - Chemicals (Solvents) -General & Administrative -Staffing	6%