



Update Full Scale CCU Plant at Twence

Together ... making Carbon Capture happen now

DE Nieuwe Energiedag | 26 Oktober 2023
Groen Gas en Groene grondstoffen | I bouwen aan een mooi Oost-Nederland

R. de Vries – Manager Projects Twence
P. van Keep – Regional Sales Director Aker Carbon Capture


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 **AKER CARBON CAPTURE** 

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Full Scale CCU at Twence

- CCUS Roadmap richting 2030
- Eerste Full Scale CCU(S) Project
- Lessons Learned van EZK & EU
- Randvoorwaarden t.b.v. Net Zero
- CO₂ Footprint Twence in scope 1/2/3

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Ge-updated CCUS Roadmap => Net Zero in 2030

CCU routes:

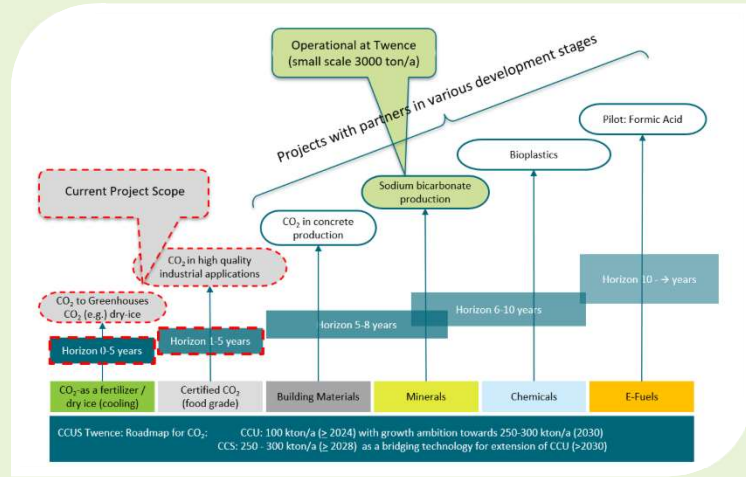
- CO₂ naar Glastuinbouw
- CO₂ naar droog-ijs en food grade toepassingen
- CO₂ ten behoeve van mineralen

Doel in 2030:

- Netto CO₂ neutrale footprint (Net Zero)
- En zomogelijk ook negatieve CO₂ emissies

CCS routes:

- Zijn al eerder dan 2030 nodig
- Dus nieuwe CCUS Projecten



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Full Scale CCU Project bij Twence

- *Lessons Learned tijdens de projectontwikkeling*
- *Challenges tijdens de financiering*



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Lessons Learned from Full Scale Project Development



- Key Success Factors:
 - MER | Vergunning | LCA | LCCM | EoW rechtsoordeel
- CO₂ contracten afhankelijk van 'Funding Challenge'
- 'Funding Challenge' afhankelijk van subsidie regelingen
- Specifieke subsidie schema's afhankelijk van Min. EZK:
 - Schaalbaarheid en Innovatieve Karakter
 - Compliance met EU/EC (Art.107 Treaty Funding EU)
- De-risking: ontwerp-verantwoordelijkheid bij hoofdcontractor
- Contracting aannemers en FID / financiering



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Preconditions for having received EU approval for state aid

Criteria assessed by DG Competition

- Environmental protection
- Market and re-use CO₂ produced by Twence
- Change of greenhouses by avoidance of 'summer heating' and switch to renewables
- Impact of national policy instrument

Conclusions

- Reduction fossil CO₂
- Sustainable
- State Aid granted is proportionate
- Low share in national volume of CO₂ captured and acting in restricted geographical market
- Limited and positive impact on competition

The Commission has made the overall conclusion that any possible distortion of competition or adverse effect on trade between Member States resulting from the envisaged measure would be limited, whereas the environmental benefits are clearly established and could not result from other types of competing initiatives, so that the **overall balance with regard to the objective of common interest of environmental protection is positive**



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Randvoorwaarden om een CO₂ neutraal bedrijf te worden

Strategische Projecten - 2023 - 2030 Circulaire Economie		03-2023	04-2023	01-2024	02-2024	03-2024	04-2024	01-2025	02-2025	03-2025	04-2025	01-2026	02-2026	03-2026	04-2026	01-2027	02-2027	03-2027	04-2027	01-2028	02-2028	03-2028	04-2028	01-2029	02-2029	03-2029	04-2029	
CO ₂ -afvang AEC lijn 3 (CCUS)																												
CO ₂ -afvang AEC lijn 1 en 2 (CCS)																												
CO ₂ -afvang op BEC (CCUS)																												
CCU mineralisatie met ETS partner (Full Scale)																												

- CCUS projecten vragen 5 – 7 jaar ontwikkeling / ontwerp / montage en IBS
- CCS routes versnellen want CCU routes vragen veel langere ontwikkeltijd
- Financiering nieuwe CCUS projecten zijn cruciaal om alle fossiele CO₂ af te vangen voorafgaand aan 2030

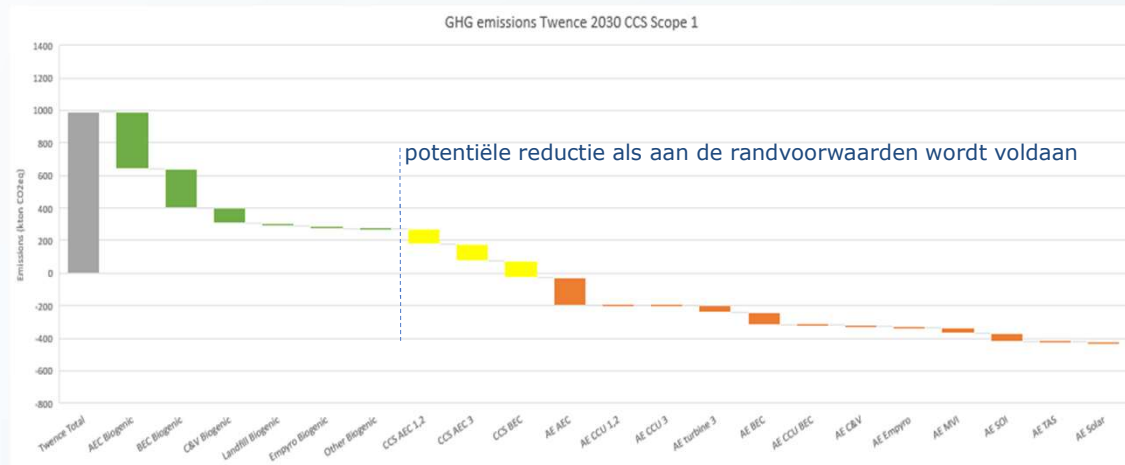
Beleidsinstrumenten voor CCUS projecten (schaal > 250 kton/jaar)

- Administratieve allocatie van fossiele and biogene afgevangen CO₂
- CCS steunkaders (SDE++) voor 'off the CCS grid' bedrijven
- CCS steunkaders: benutting grensoverschrijdende CO₂ transportinfrastructuur



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CO₂ Footprint van Twence – een forecast naar 2030



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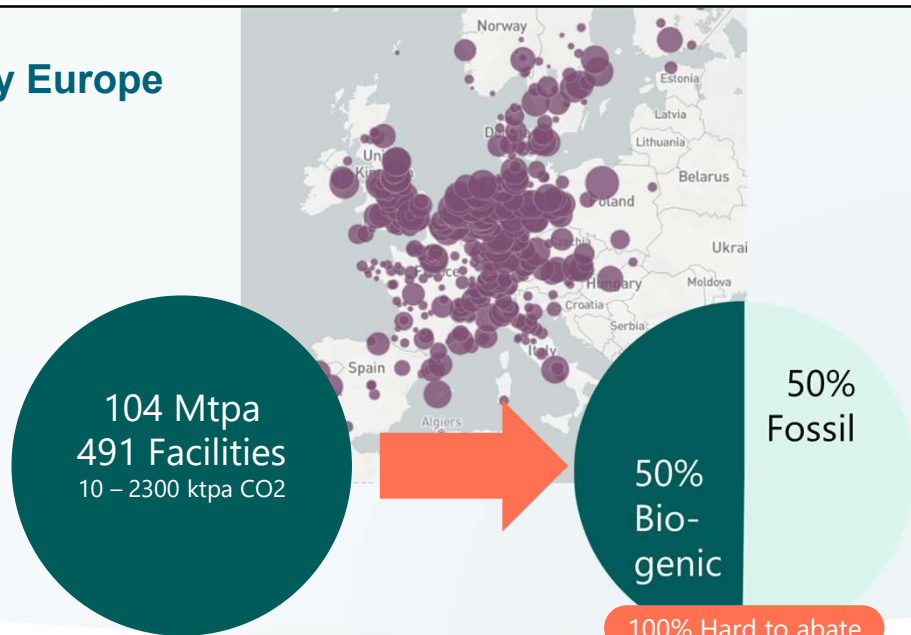
Waste to Energy

- 100.000 ton/per jaar
- CCU naar regionale glastuinbouw
- Geplande inbedrijfname eind 2023



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WtE Industry Europe

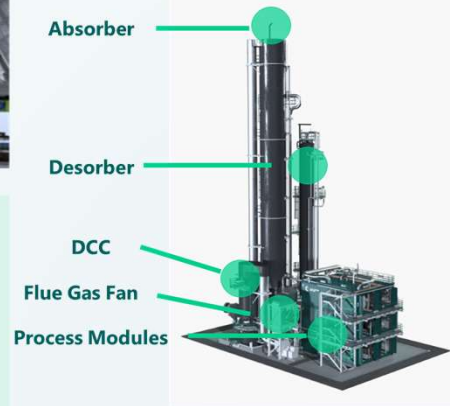


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How do you build 491 plants?



Just Catch™ Modular



Just Catch™

Capacity: 40, 100 & 400 kilotons/year

- Modularized and cost efficient
- ~15 - 24 months delivery time
- Easy transport and installation
- Compact design – 25m x 19m
- 100% automated

Big Catch™

Capacity: > 500 kilotons/year

- Made to order
- ~30-36 months delivery time
- Larger footprint
- Using bulk materials – cost efficient
- Retrofit potential

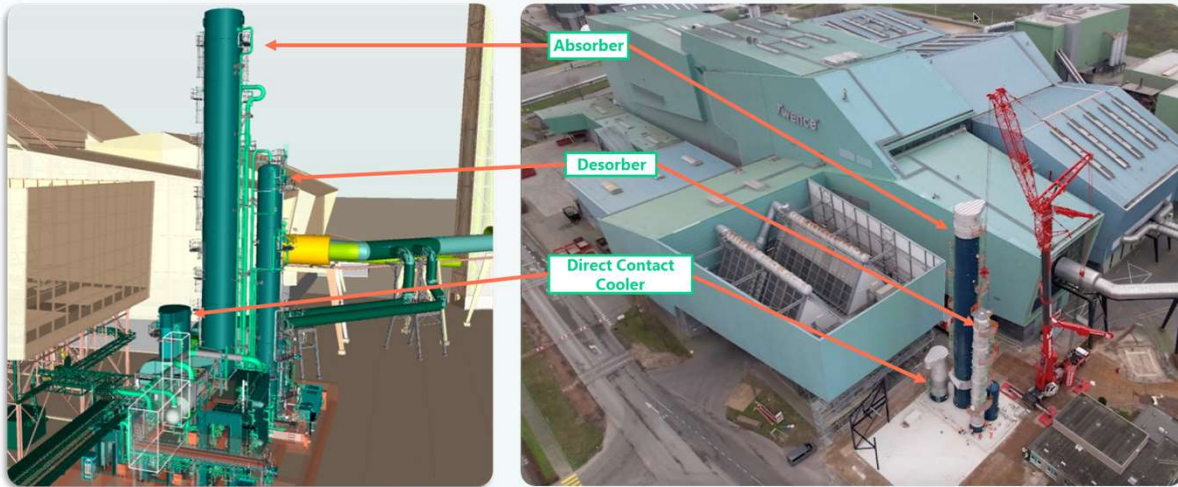


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Just catch 100 Model and in Real Life Installation



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Process contrainers



14

Connecting duct



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What can be achieved in a year?



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Lessons learned - 3rd generation Just Catch™ 100



- More energy efficient
- Small footprint, ~18 x 25 m, ~45 m high
- Taking operating space to the next level
- The ACC Energy Saver™ – now as standard
- Fewer modules

Key features optimized

- Modularized core process modules - transportable on road
- Pre-fabricated
- Easy to install
- Short delivery time

Enabled by mass production principles



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Samen de regio verduurzamen!
Hoe?

Door gezamenlijk de uitdagingen aan te gaan en
gezamenlijk te bouwen aan verduurzaming

Bedankt voor uw aandacht
Tijd voor vragen en discussie



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