

Integrated Carbon: Creating CCU/S value chains for industries

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E.ON Energy Projects

The energy contracting partner for large industrial customers

Our Solutions

- ✓ Tailor-made, large scale, decentralized energy generation
- ✓ Build own operate @ customer site
- ✓ One Stop Shop
- ✓ Continuous Asset optimization
- ✓ Technology agnostic
- ✓ IQ Energy - fully digital and integrated power plant
- ✓ Carbon Capture & Storage



Selected references from our portfolio



Power plant Terneuzen (NL)

Power: 0 MW
Steam: 350 t/h
Client: Dow



Power plant Tisselt (BE)

Power: 3,6 MW
Steam: 25 t/h
Client: Etex/Promat



Power plant Ertvelde (BE)

Power: 6 MW
Steam: 50 t/h
Client: Oleon



Power plant Antwerpen (BE)

Power: 80 MW
Steam: 150 t/h
Client: Evonik



Power plant Grenzach-Whylen (DE)

Power: 30 MW
Steam: 80 t/h
Client: DSM Nutritional Products



Power plant Greifswald (DE)

Power: 37 MW
Steam: 47 t/h
Client: OPAL Gastransport



Power plant Hattorf (DE)

Power: 30 MW
Steam: 80 t/h
Client: K + S



Power plant Marl (DE)

Power: 60 MW
Steam: 130 t/h
Client: Evonik



Power plant Plattling (DE)

Power: 123 MW
Steam: 200 t/h
Client: UPM



Power plant Gendorf (DE)

Power: 47,5 MW
Steam: 110 t/h
Client: InfraServ Gendorf



Power plant Kemsley (UK)

Power: 73 MW
Steam: 180 t/h
Client: DS Smith



Power plant Hürth (DE)

Power: 20 MW
Steam: 50 t/h
Client: UPM



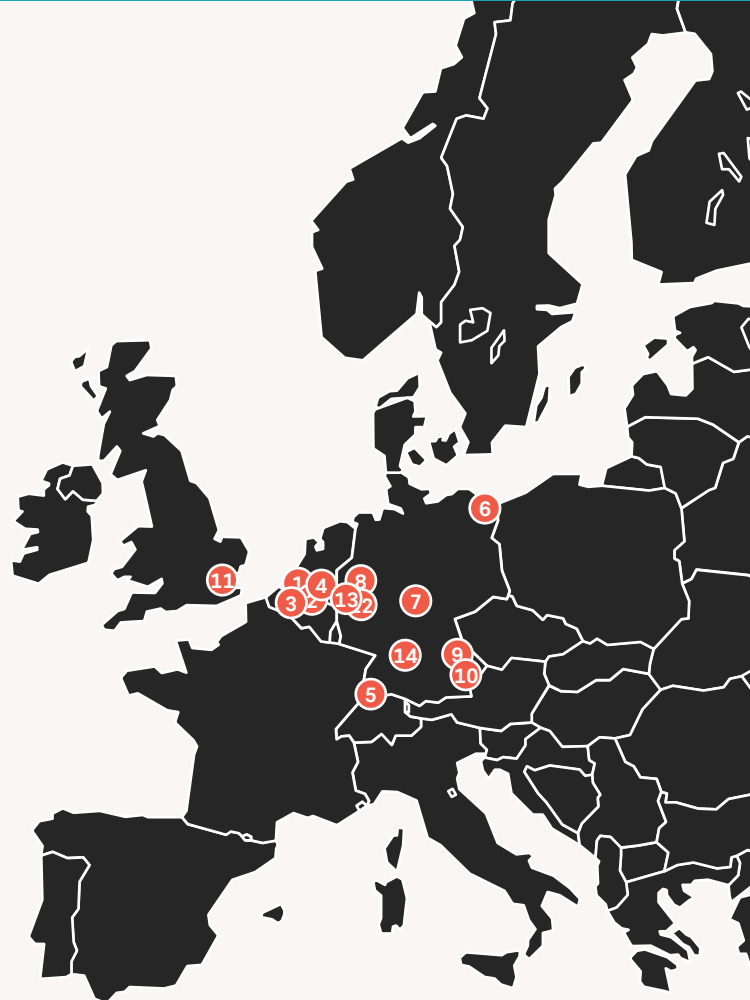
Power plant Neuss (DE)

Power: 17 MW
Steam: 70 t/h
Client: MM Neuss



Power plant Aschaffenburg (DE)

Power: 48 MW
Steam: 100 t/h
Client: DS Smith



CCU/S at E.ON

A one-stop industrial decarbonization solution

End-to-End Carbon Management Solution for customer and own assets

EIS to build, own and operate

Carbon Capture systems onsite – site specific, technology agnostic, optimal efficiency

Site Energy Management via IQ Energy

Manage & integrate all energy (& product) vectors

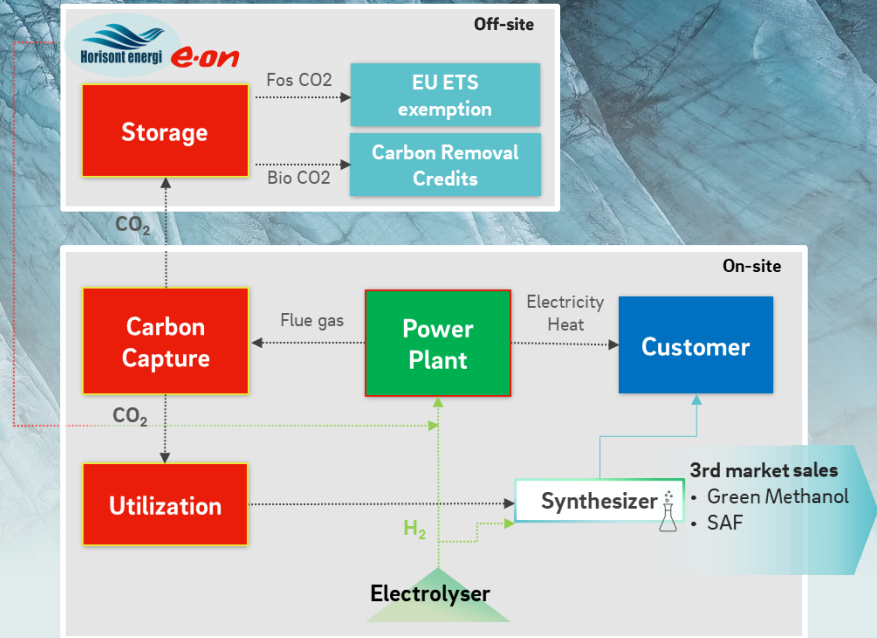
Optimize value extraction

Utilization

Carbon and H₂/NH₃ (imported or onsite electrolysis) create base for recycled / clean base chemicals

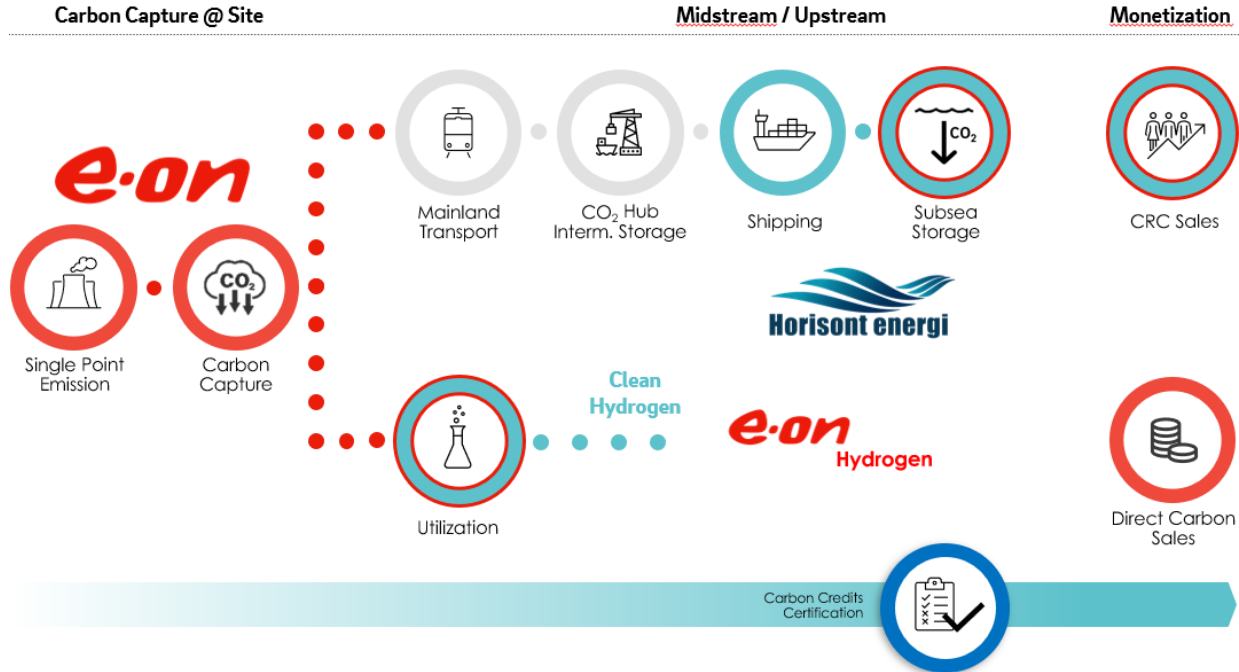
Transport & Storage

Delivery of optimized T&S value chain, monetization via Carbon markets (EU ETS/ CRC market)



CCU/S Value Chain – The Opportunity

Customer-specific optimized carbon cycle



- **Vertical integration** from capture to storage allows for full service offering and **optimized risk management**
- **Technology agnostic** approach allows for **site specific capture option**
- Complexity allows for **specialized full chain market players**
- **Portfolio effects** allow room for optimization on all value chain levels
- **Long term asset optimization** will drive value over lifetime of the asset in differing market environments

CCU/S Value Chain – Challenge I

Carbon Capture @ Site

Technology Choice

- TRL
- Heat driven / Power driven
- Site / Permitting
- Ease of Procurement Process
- Asset Management Options
- Digitization Options

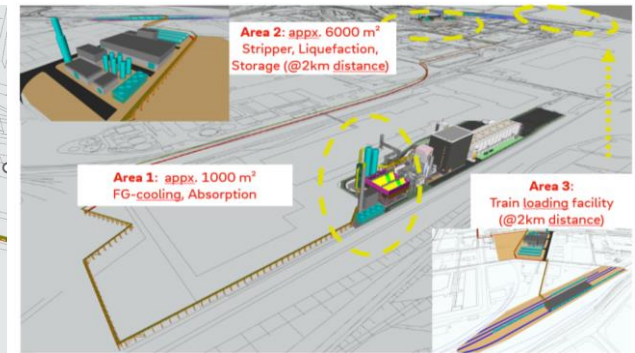
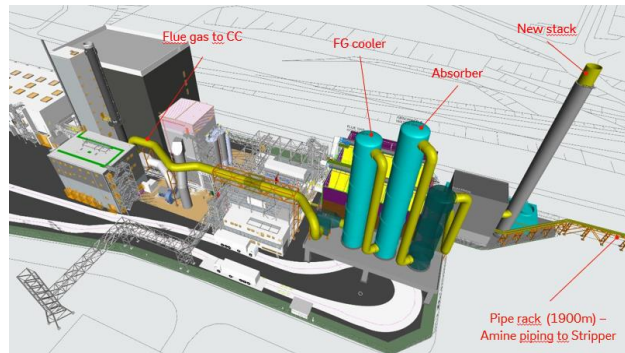
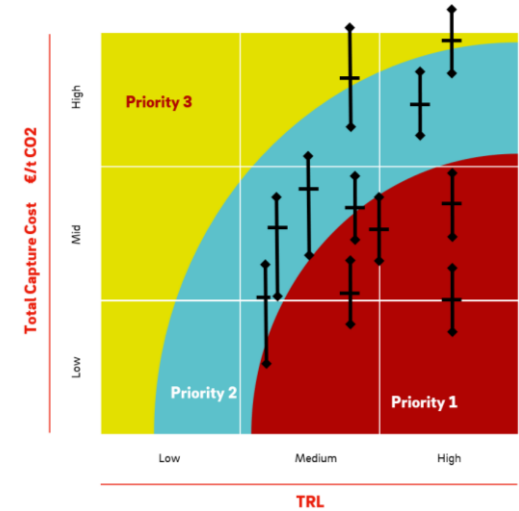
Brownfield Complication

- Space@Stack
- Infrastructure Options
- CCU/CCS route

Energy Optimization

- Waste heat (inlet/outlet)
- Renewable Sources
- Flexibility
- Asset Management Options

Type of solvent	Description	EPC	Refer-ences	Environ. Impact
Chemical Absorption	Non proprietary amine (open MEA)	●	●	●
	Proprietary amines	●	●	●
Chemical Absorption	Potassium carbonate + Enzyme	●	●	●
	Hot Potassium Carbonate	●	●	●
Non-amine based	Phase changing Pot. Carbonate	●	●	●
	Chilled ammonia	●	●	●



IQ Energy

With **E.ON IQ Energy**, we offer our customers an intelligent, asset-based energy supply solution that has been specially developed for energy-intensive industries. Using data from the operation of the power plant and production facilities, the grid and the commodity markets, E.ON IQ Energy helps to make the energy supply efficient, flexible and highly economical.



Intelligent, automated and self-controlled **CHP** plant with highest degree of flexibility



Digital interface to **customer production** leveraging energy flexibility potentials



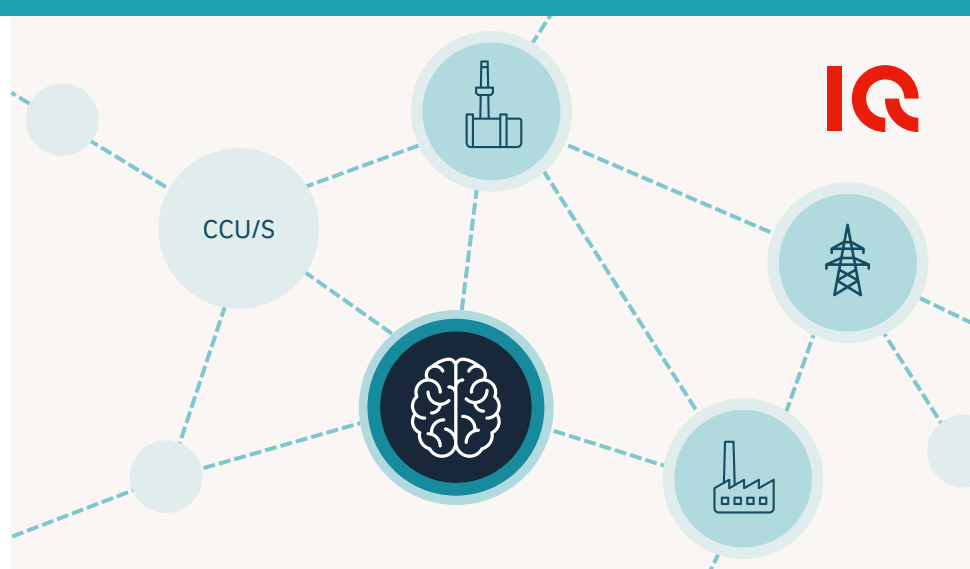
Asset-backed and fully automated **cross-energy market optimisation**



Holistic and integrating **IQ Energy Platform** with a comfortable User Interface



Modular design open to integrate any new technologies (e.g. CCUS, green gas, RES,..)



Site	e.l. Power, in MW	Go-live
DSM Grenzach	30	2018
DSS Kemsley	73	2019/22
UPM Plattling	120	2021/22
FSK Neuss	30	2023
UPM Hürth	20	2023
DSS Aschaffenburg	50	2025

CCU/S Value Chain – Challenge II

The spec & infrastructure game

3rd step:

Decide on solution, modularity, extension capability – capex/opex impact

2nd step:

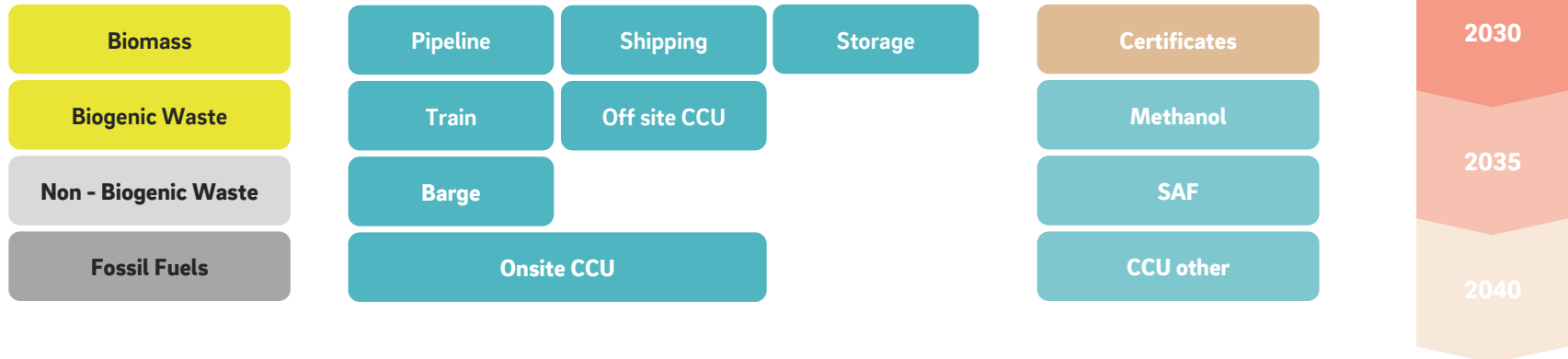
Evaluate technical minimum standards for being compatible with various routes

1st step:

Evaluate the Carbon Valorization Route

Technical Impact (Purification / Specs ?)

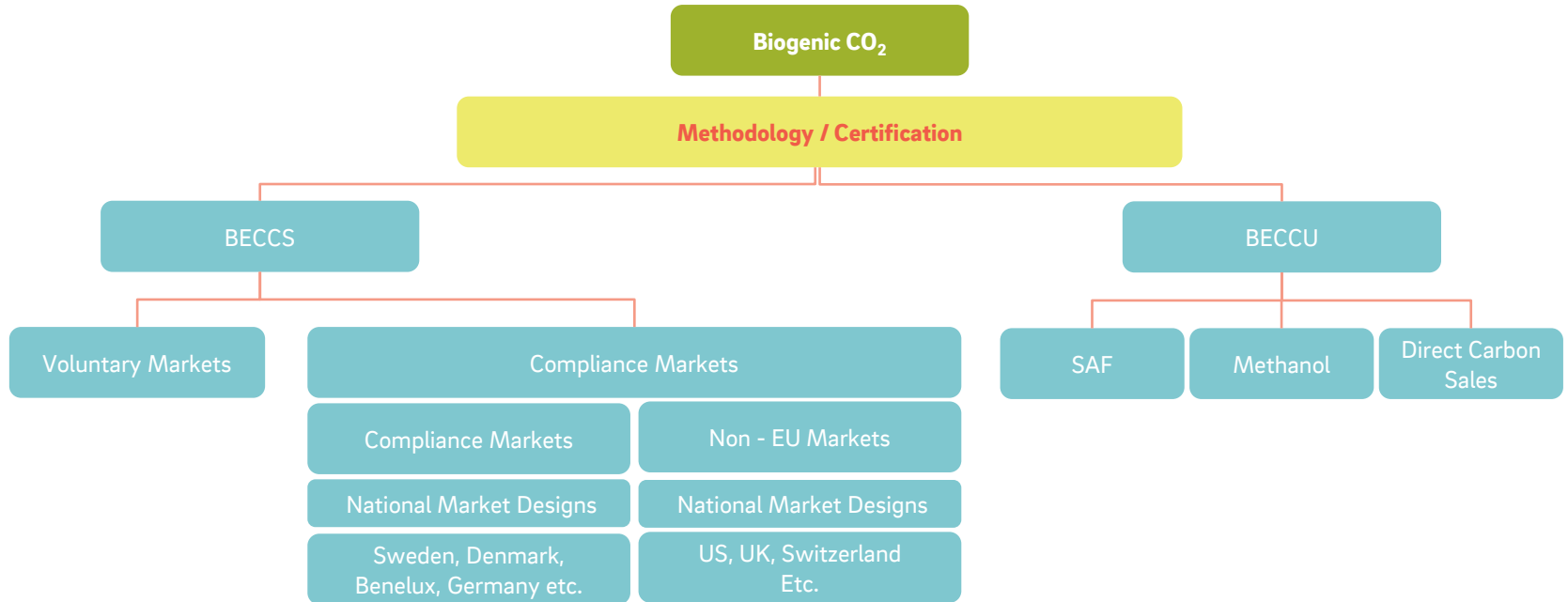
Commercial Impact (Winning Markets ?)



CCU/S Value Chain – Challenge III

Monetization

Revenue Lines for biogenic CO₂



**What it takes to
get it going ...**



Capability



Commitment



Capital



Courage

**...and a good
sense of humour**

An aerial photograph of a dense evergreen forest, likely a spruce or fir forest, with varying shades of green and some yellowish-green trees. The text 'Thank You!' is overlaid in a large, white, sans-serif font in the center of the image. At the top of the image, there is a horizontal bar with a red-to-yellow gradient. The text 'e.on' is located at the bottom center in a white, italicized, sans-serif font.

**Thank
You!**

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