

Enabling the deployment of industrial CCS clusters globally and in Europe

GCCSI European CCS Forum

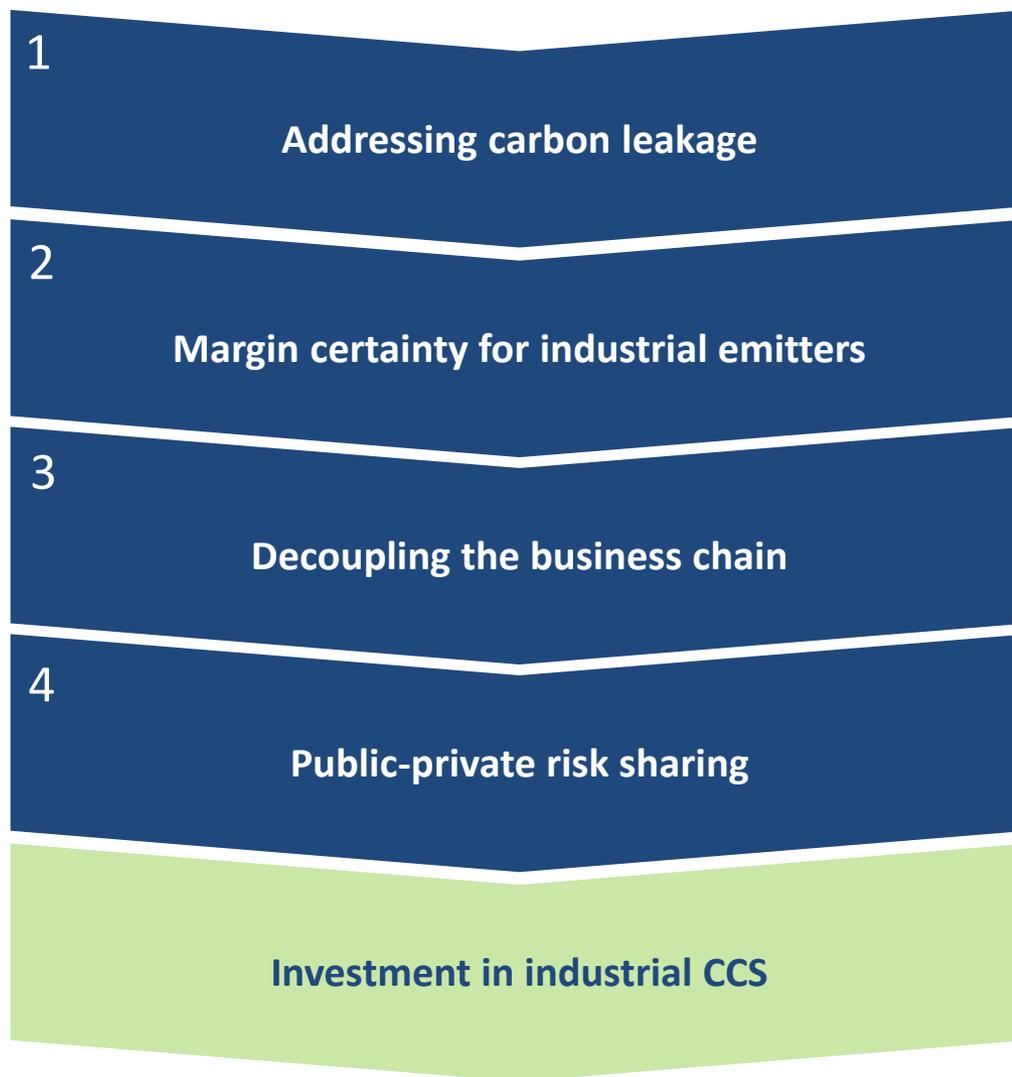
Session 1: Meeting the Paris Agreement –
the importance of CCS hubs and clusters

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Key enablers to unlock private investment in industrial CCS globally



Short-term funding options for industrial CCS clusters in Europe

Can be leveraged for the construction phase with the right guarantees; however, equity, debt and associated returns should be paid back during the operation phase

Private investment (debt & equity)

Could be significant and included in the project cash-flow if accompanied with government guarantees/subsidies

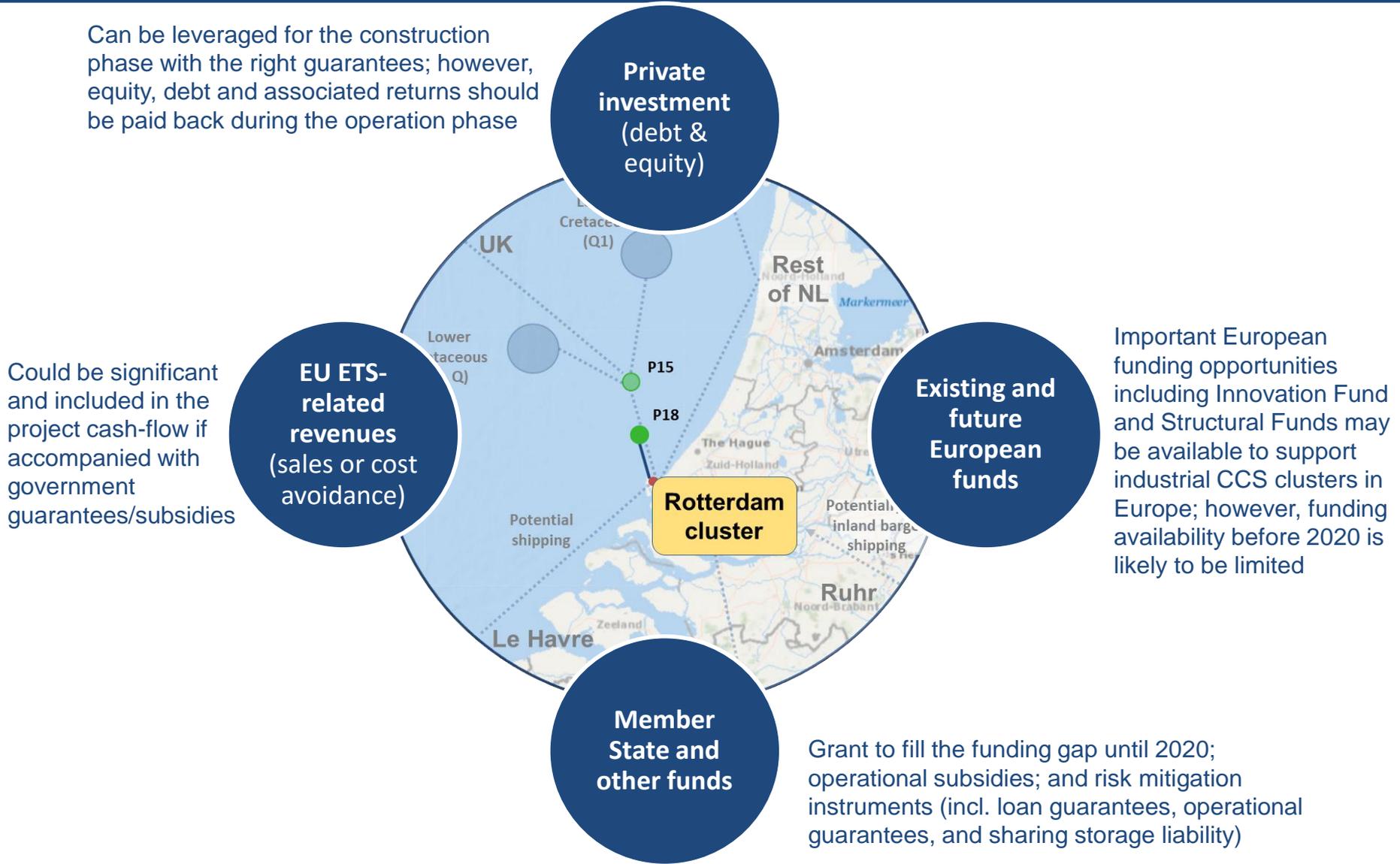
EU ETS-related revenues (sales or cost avoidance)

Important European funding opportunities including Innovation Fund and Structural Funds may be available to support industrial CCS clusters in Europe; however, funding availability before 2020 is likely to be limited

Existing and future European funds

Member State and other funds

Grant to fill the funding gap until 2020; operational subsidies; and risk mitigation instruments (incl. loan guarantees, operational guarantees, and sharing storage liability)



Tension between long-term ambition and short-term investment decisions in Europe: How can we justify investment in CCS now?

AMBITION**DISAPPOINTMENT****RECOVERY****UK**

Drax's £2bn 'clean coal' project wins government funding

Shell to progress Peterhead Carbon Capture and Storage project

Autumn Statement: £1bn carbon capture storage funds scrapped

The Government finally switches on to a clean growth strategy

Netherlands

Norway commits funding to ROAD

Dutch government says energy companies pull out of carbon storage project

Dutch coalition accord: the Netherlands goes for climate leadership in Europe

Norway

CCS: How Norway is attempting to capture a future industry

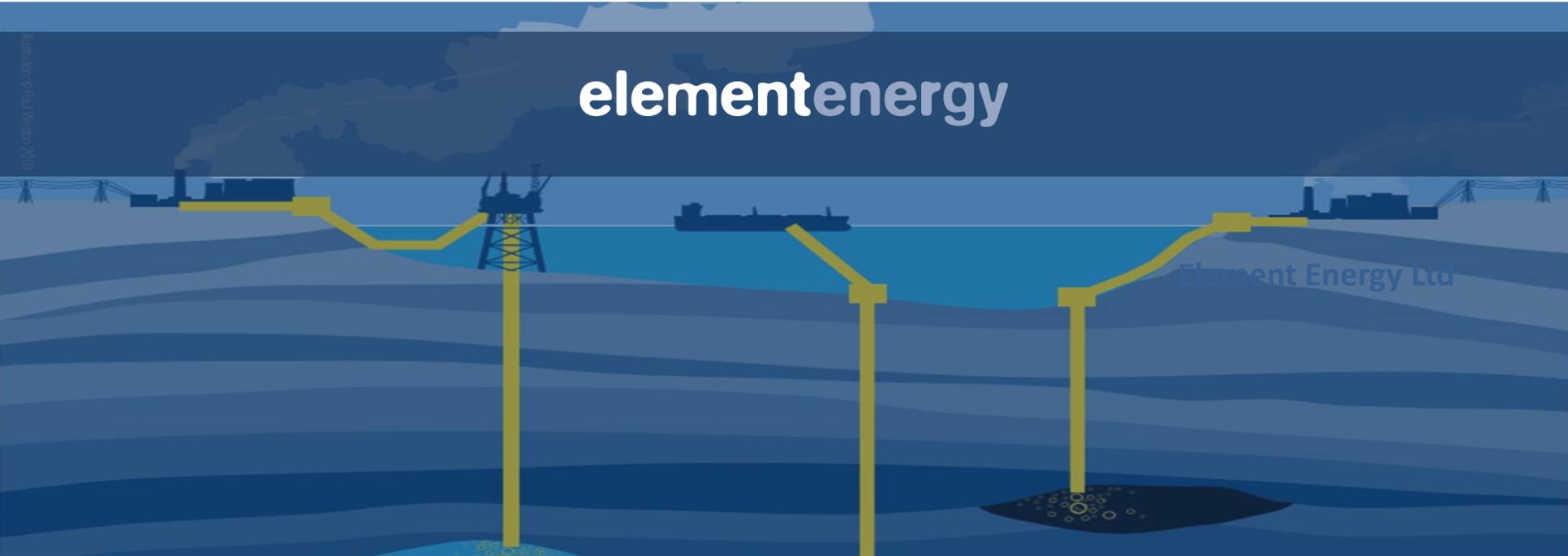
Carbon capture in doubt after Norway buries 90pc of budget

Key messages for European policy-makers

- **Clarify unique role(s) of CCS in Europe considering decarbonisation pathways and timeline**
 - Power: Flexible gas generation – “CCS AND renewables” rather than “CCS OR renewables”
 - Industrial CCS clusters to decarbonise energy-intensive industries in addition to low-hanging fruit
 - CCS & hydrogen and bio-CCS to achieve negative emissions
- **Justify public support for CCS in the short-term by focussing on value**
 - Treasury and government bodies do not tend to use “energy-system modelling” to make policy decisions
 - Most European governments currently focus on 2020 and 2030 targets – 2050 messages are too long-term
 - Using the right metric is important – industrial CCS can be cheaper than offshore wind using €/tCO₂abated
 - Consider target audience, regional priorities and public perception of these “values”
- **Use limited public funding to deliver benchmark CCS projects and enabling infrastructure**
 - Consider unique role(s) of CCS in Europe and significant storage appraisal requirement
 - Identify low-cost opportunities for CO₂ infrastructure (e.g. re-use T&S infrastructure)
 - Make use of other public funding options including European funds and EU-ETS related revenues
- **Collaboration to enable timely deployment of CCS?**
 - International/European collaboration to deliver archetypal/benchmark CCS projects on budget, on time
 - Public-private collaboration to implement successful CCS policies and business models (4 enablers)
 - Similar to international collaboration on CCS R&D

Element Energy is a leading low carbon energy consultancy working in a range of sectors including carbon capture and storage, low carbon transport, low carbon buildings, renewable power generation, energy networks, and energy storage. Element Energy works with a broad range of private and public sector clients to address challenges across the low carbon energy sector.

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The background of the slide features a stylized illustration of an industrial carbon capture and storage (CCS) system. It shows a blue sky with clouds, a body of water with a ship, and a cross-section of the ground. Yellow pipes connect industrial facilities on the surface to underground storage reservoirs. The word 'elementenergy' is written in white lowercase letters across the center of the image. The text 'Element Energy Ltd' is visible in the background on the right side.

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