Projects of Common Interest and the Rotterdam Nucleus Business Case

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Overview

- TEN-E Regulations and Projects of Common Interest?
- Conditions and criteria to become a CO_2 PCI
- Process and submission of a CO_2 PCI
- Introduction to the Rotterdam Nucleus – The GATEWAY Pilot Case
- CO_2 Sources / CO_2 storage
- Cost Benefit Analysis
- Development timeframe

TEN-E Regulations

- The Trans-European Networks for Energy (TEN-E) support the planning and financing of important energy infrastructure necessary to achieve the EU's energy and climate policy objectives.

- TEN-E Regulations 2013 (2014-2020) – following close consultations with all Member States, the Commission has identified 12 strategic trans-European energy infrastructure priorities

- 2014: EU thematic area: The development of transport infrastructure for captured CO_2

Projects of Common Interest

- The main vehicle to implement the TEN-E policy are projects of common interest (PCIs)
- Selected PCIs benefit from accelerated permit granting, assistance with regulatory measures and access to EU financial assistance through the Connecting Europe Facility of €5.85 billion
- The TEN-E Guidelines Regulation of 2013 lays down the rules and procedures to be respected in the identification, selection and treatment of energy 'projects of common interest (PCIs)
- So far, no PCIs on CO_2 infrastructure
- 3rd Call launched in March 2017

What can be included in a CO_2 PCI?

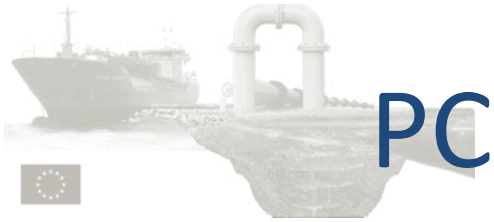
- (a) dedicated pipelines, other than upstream pipeline network, used to transport anthropogenic carbon dioxide from more than one source for the purpose of permanent geological storage of carbon dioxide pursuant to Directive 2009/31/EC

- (b) facilities for liquefaction and buffer storage of carbon dioxide in view of its further transportation – **no storage equipment, no ships**

- (c) any equipment or installation essential for the system in question to operate properly, securely and efficiently, including protection, monitoring and control systems.

General criteria for a PCI

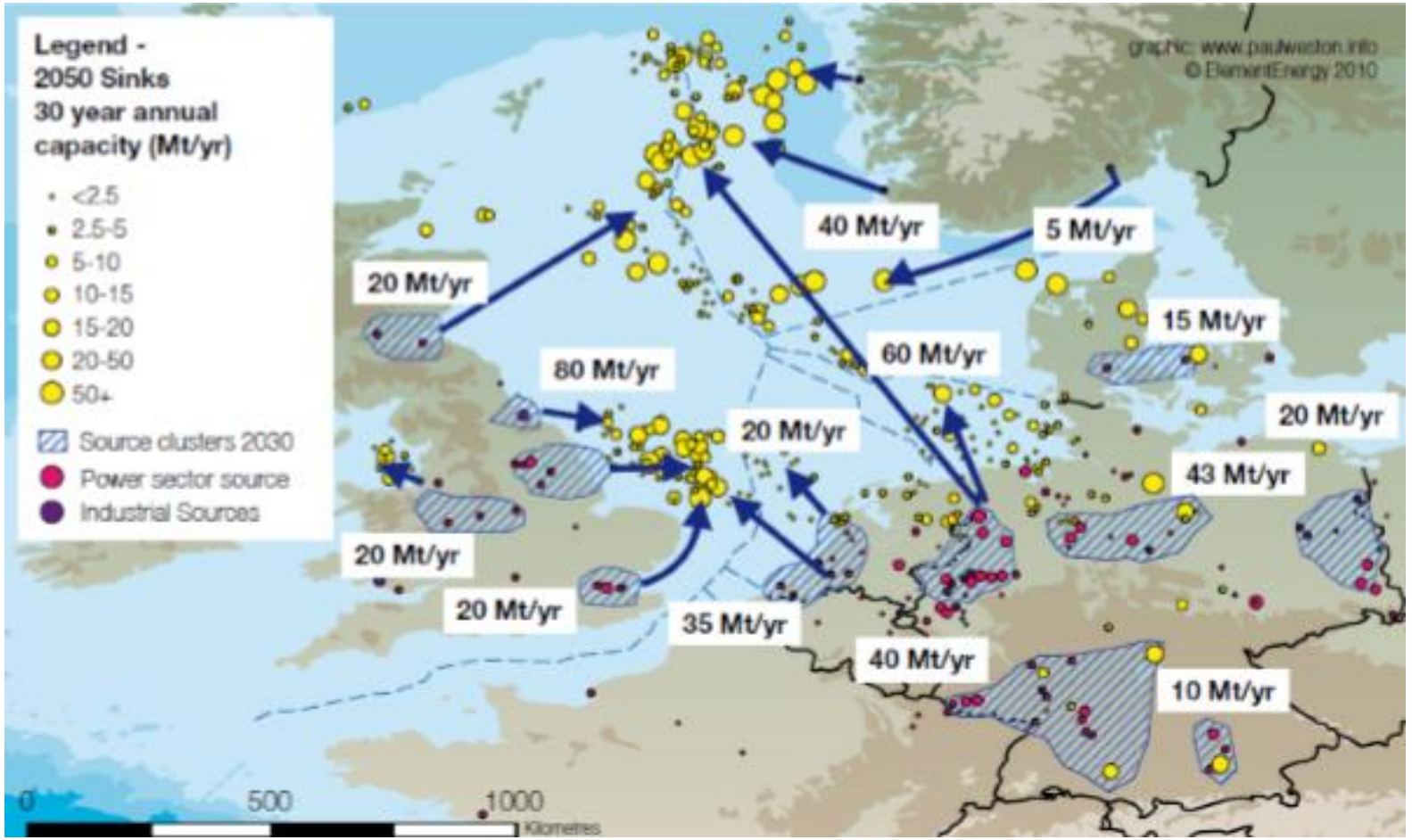
- (a) the project is necessary for at least one of the energy infrastructure priority corridors and areas;
- (b) the potential overall ***benefits of the project, outweigh its costs***, including in the longer term; and
- (c) the project meets any of the following criteria:
    - (i) involves at least two Member States by directly crossing the border of two or more Member States;
    - (ii) is located on the territory of one Member State and has a significant
    - (iii) crosses the border of at least one Member State and a European Economic Area country.



PCI CO_2 Specific criteria

- (i) the avoidance of carbon dioxide emissions while maintaining security of energy supply;
- (ii) increasing the resilience and security of carbon dioxide transport;
- (iii) the efficient use of resources, by enabling the connection of multiple carbon dioxide sources and storage sites via common infrastructure and minimising environmental burden and risks.
- Proposed carbon dioxide transport projects shall be presented as part of a plan, developed by at least two Member States
- The Commission shall also take into account the potential for future extension to include additional Member States.

Identifying PCIs in the EU



Element Energy, 2010

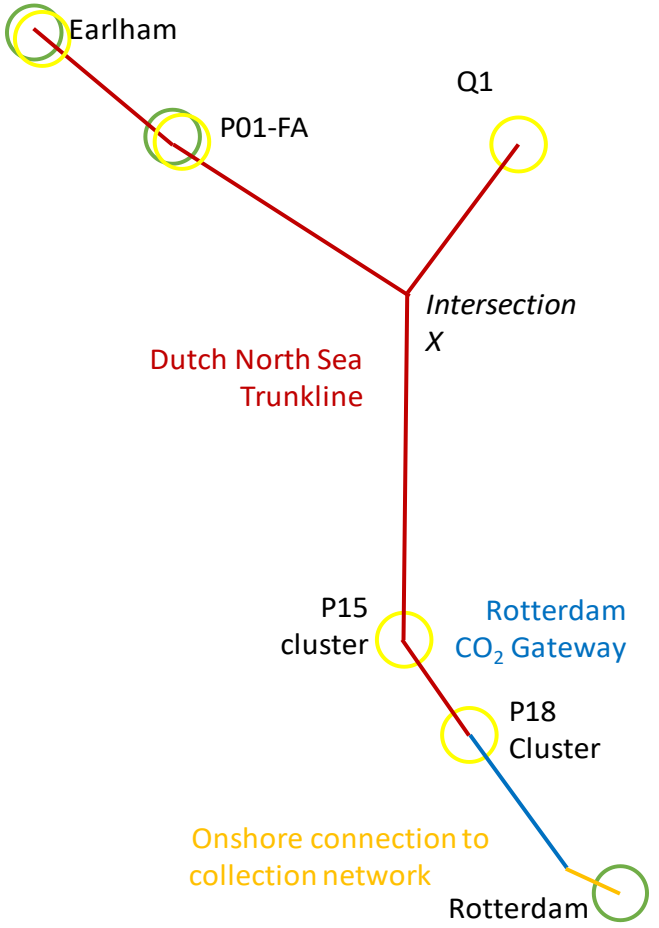
Rotterdam Nucleus PCI proposal – Objectives

- Provide **large scale CO_2 transportation** for emitters in the Port of Rotterdam to 40 Mt of well-defined CO_2 storage capacity within 20 km of the Dutch coast, and to several hundreds of megatonnes of storage further offshore.

- **Over-size** pipelines, compression and utility equipment to allow future use by **third-party countries** based on priority CO_2 transport corridors identified by Member State governments through the **North Sea Basin Task Force**.

- Contribute to **EU energy security** by unlocking stranded natural gas reserves in both the UK and the Netherland's sectors of the North Sea, and use a portion of the **value** to contribute to the costs of a 130 km CO_2 trunkline passing across or close to future CO_2 storage sites with a potential storage capacity of 150 $MtCO_2$.

PCI: Rotterdam Nucleus



- **Project Promoter: Port of Rotterdam Authority**

One PCI – three pipelines

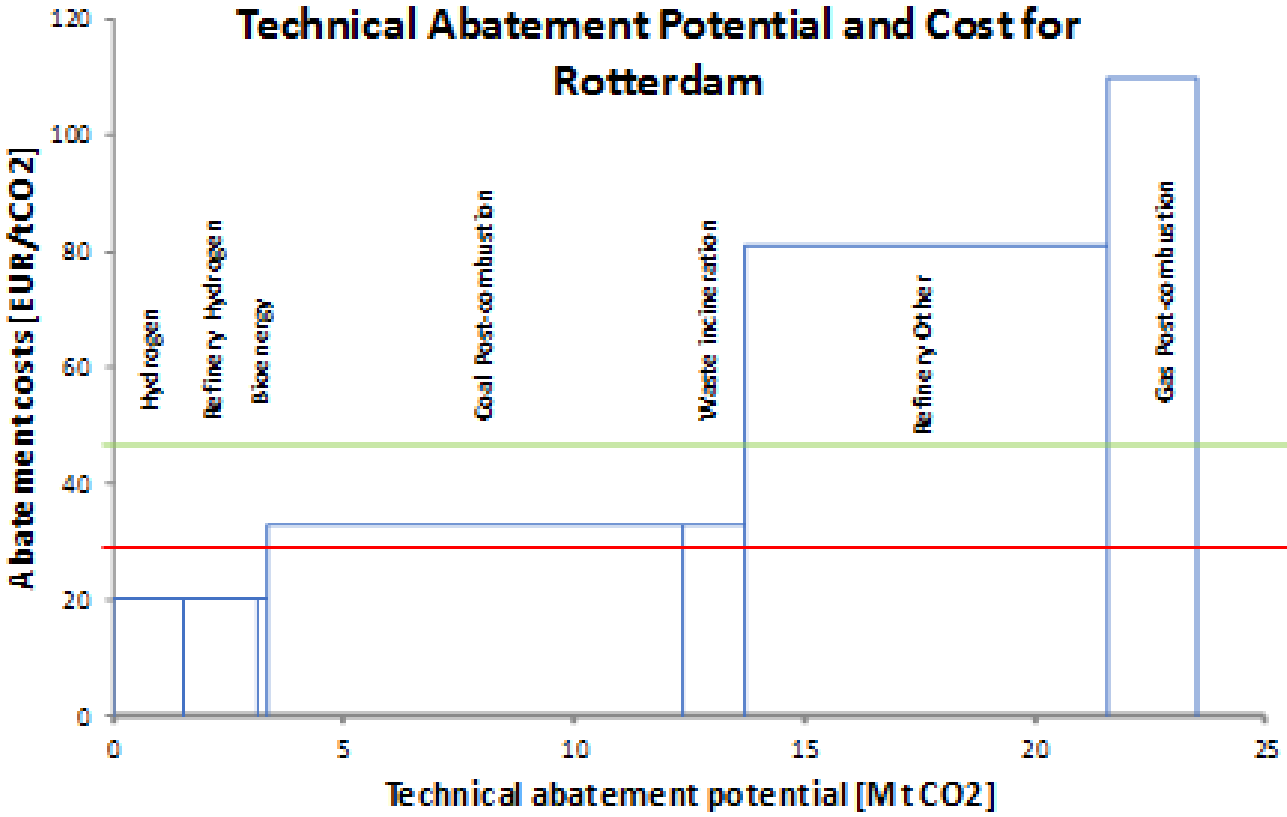
- **Rotterdam collection network link (YELLOW):** (18 km), A low-pressure pipeline connect to the existing OCAP CO_2 transport pipeline to the ROAD CCS Project.

- **The Rotterdam CO_2 Gateway (BLUE):** A 25 km high pressure CO_2 pipeline with a capacity of 10 $MtCO_2$/a linking the ROAD CCS Project to the P18-A platform.

- **The Dutch North Sea Trunkline (RED):** A main spine pipeline of around 130km will extend from the Earlham "Fizzy" and P1-FA fields in the Southern North Sea to the P18 storage facility. The spine pipeline is designed to be oversized for the initial use, which is to transport the separated CO2 from these high-CO_2 fields to the initial storage locations of P18 / P15.

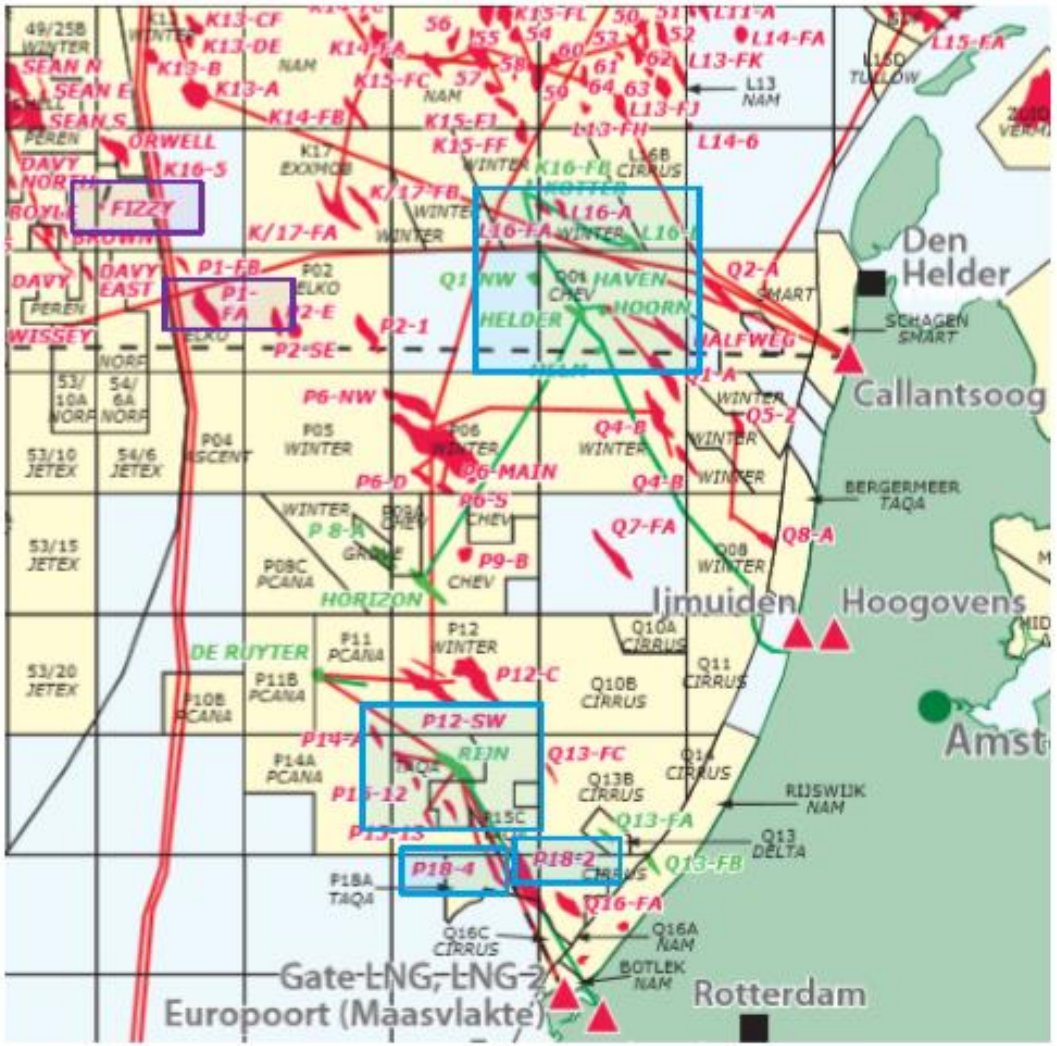
CO_2 sources in the RN

CO2 Mt/a	Sources					
Year	Earlham	P1-EA	Road CCS	CO_2 from OCAP	Future source	Future source
2042	0.0	0.0	1.1	0.5	1.5	1.6

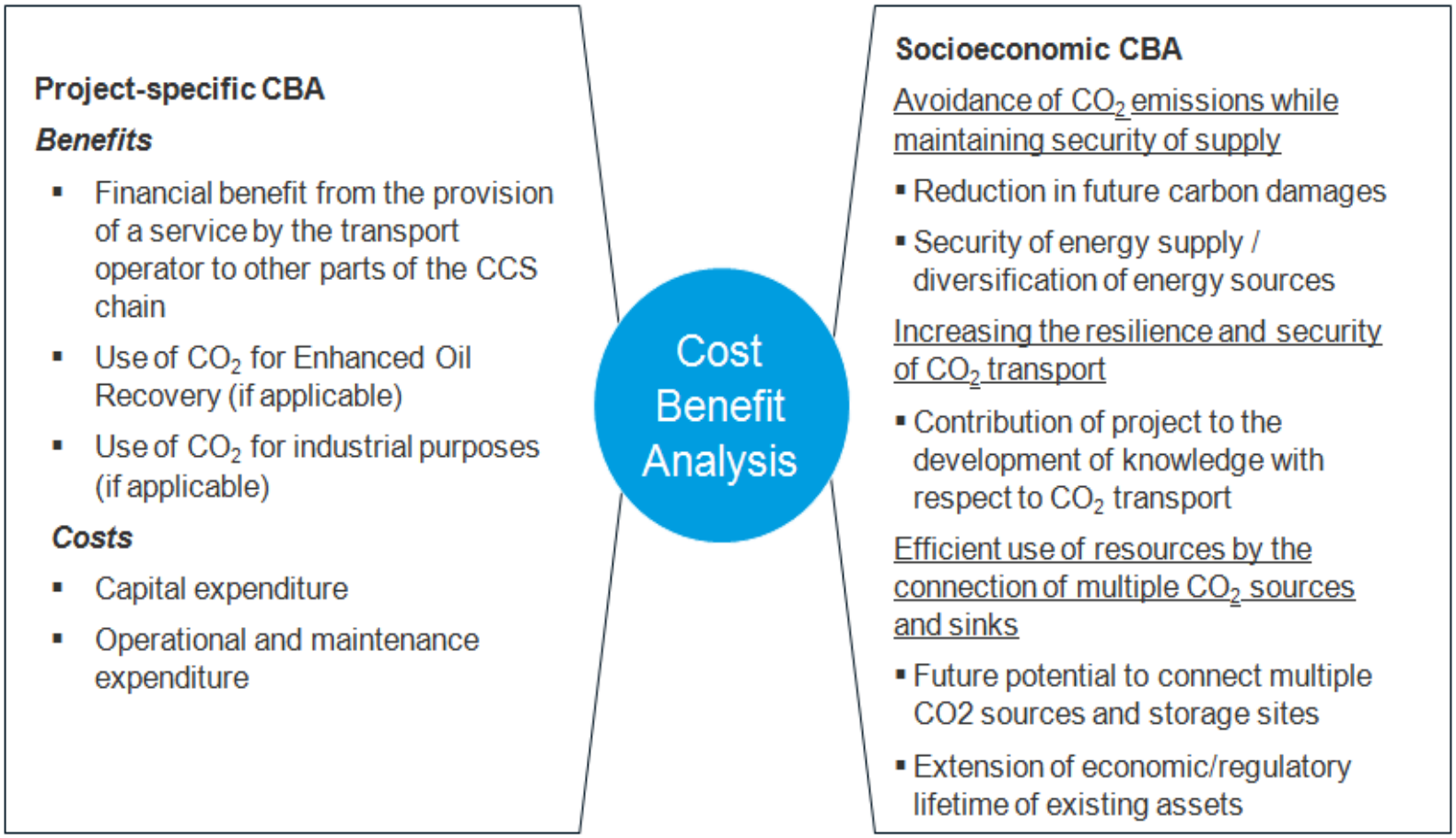


Storage in the RN application

Rese Platf
P18-
P18-
P15-
P15-
P15-
Earlh
P01-
Q1 st



Cost Benefit Analysis approach

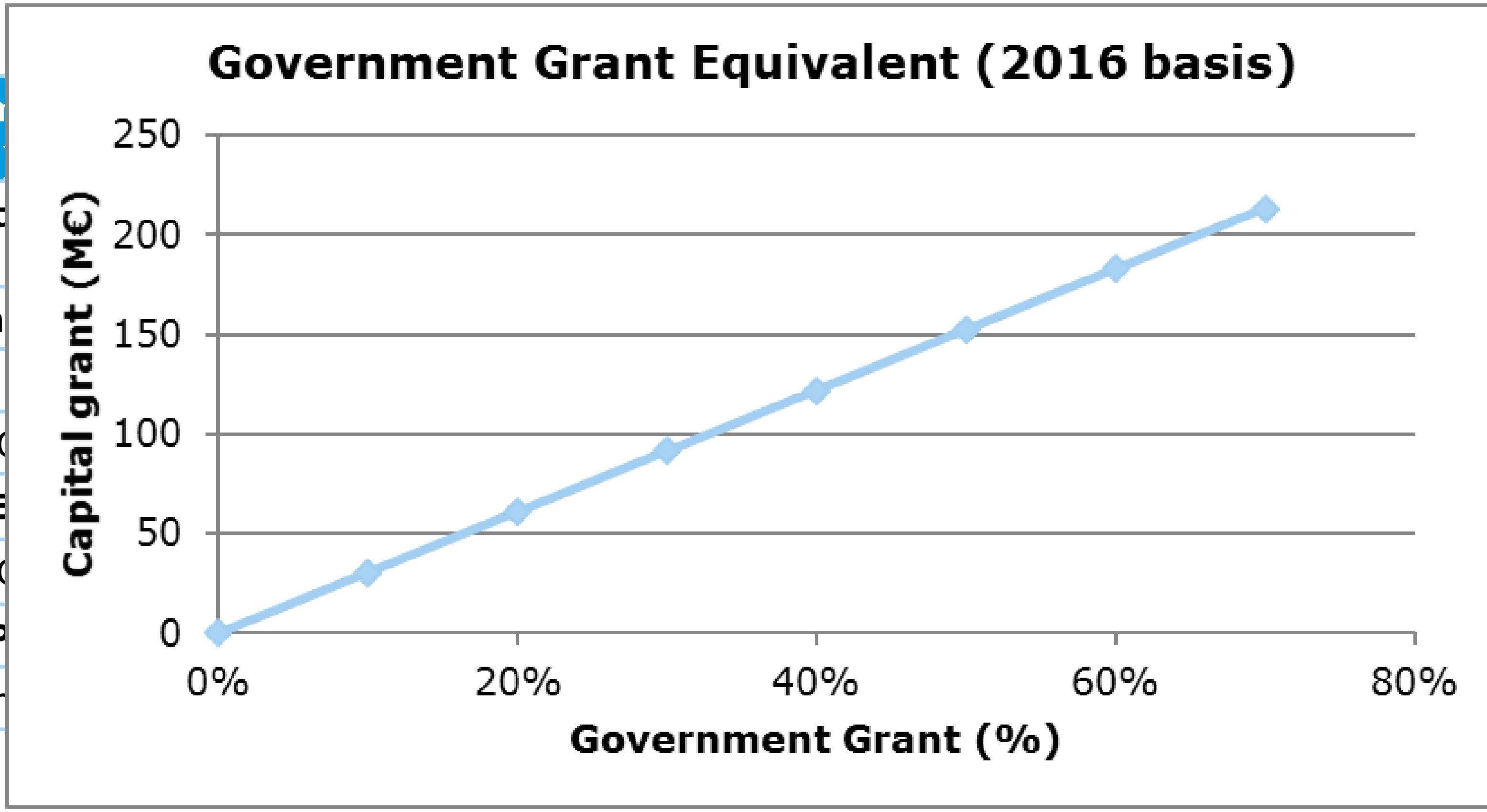


Project-specific CBA

- Fixed time horizon of 20 years
- Only project cash in- and out-flows
- Exclude accounting items such as depreciation, reserves, interest, loan repayments
- A financial discount rate to be used but not specified (8%)
- Costs – only CAPEX and OPEX
- Benefits can include:
  - Tariff charged by project for transporting CO_2
  - Use of CO_2 for re-use/EOR
  - **Benefits from climate policy (EU-ETS or tax) NOT included**
- Subtract residual value of infrastructure in case of +NPV

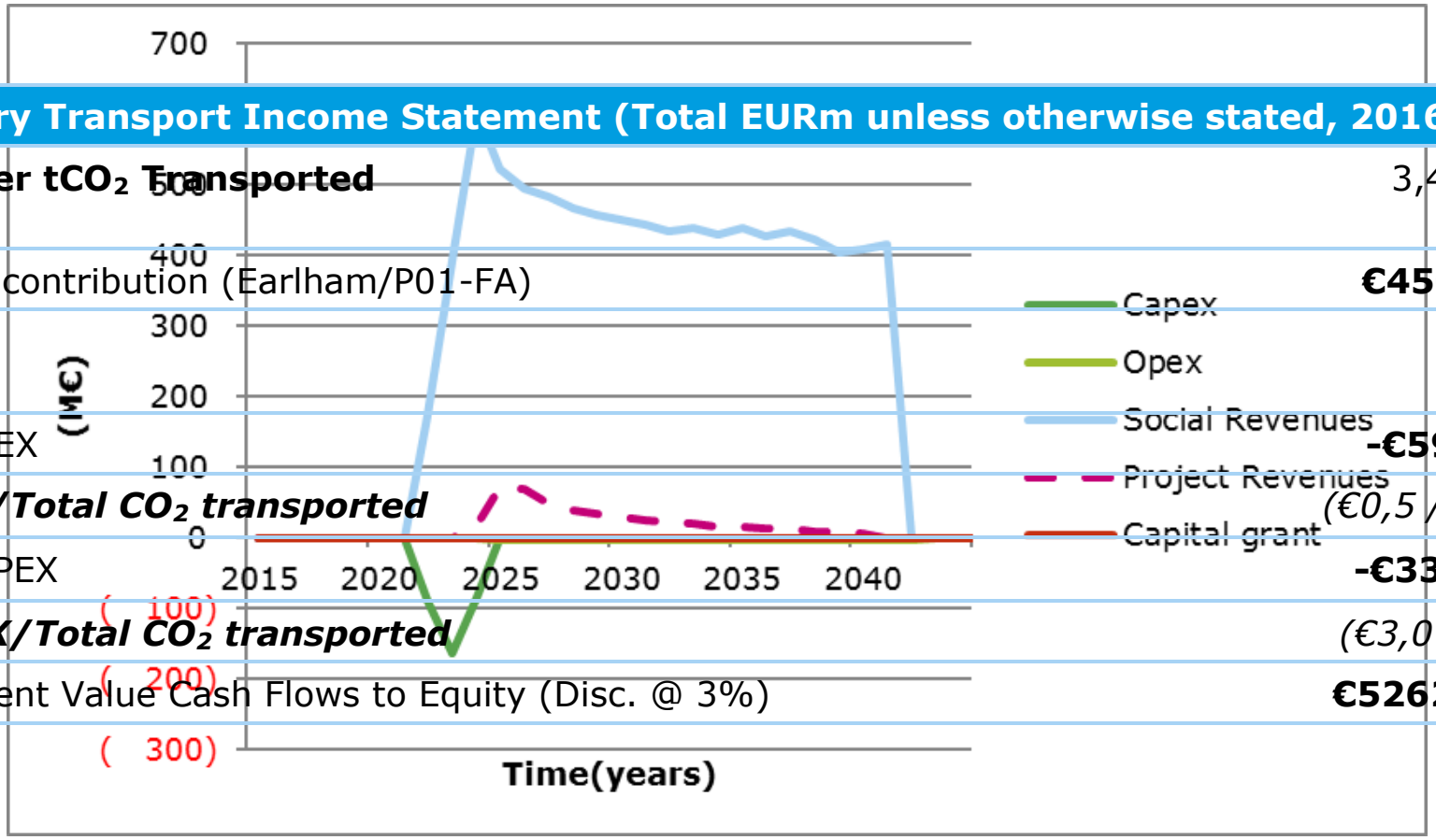
Cost benefit analysis

Summ… Basis)	.6
Cost	
Reven…	
Total (	
OPE…	
Total (	
CAP…	)
Net Pr…	

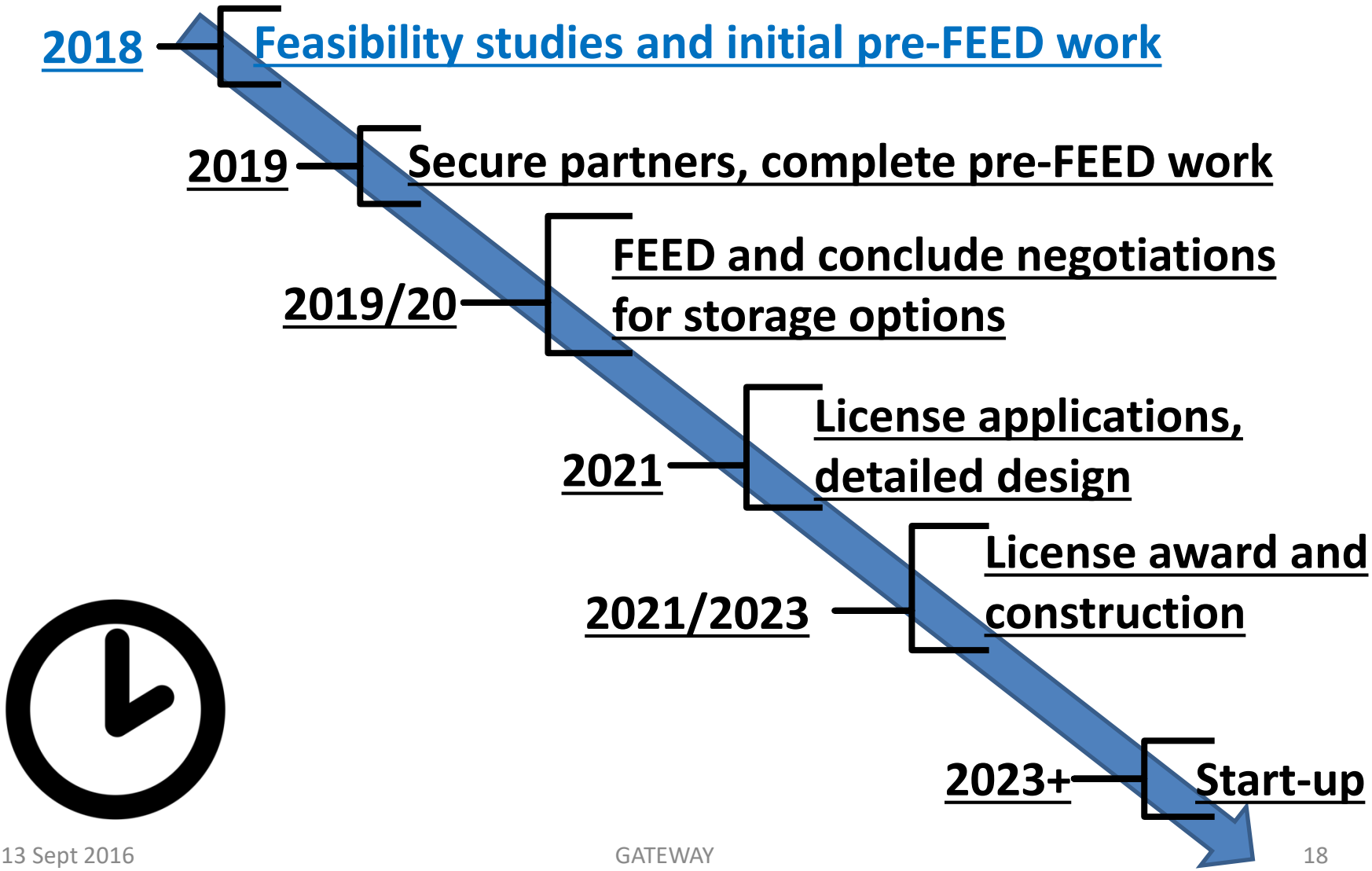


Social Cost Benefit Analysis

Summary Transport Income Statement (Total EURm unless otherwise stated, 2016 Bas	
Cost per tCO_2 Transported	3,48
External contribution (Earlham/P01-FA)	**€450,5m**
Total OPEX	**-€59,4m**
OPEX/Total CO_2 transported	*(€0,5 /tCO_2*
Total CAPEX	**-€338.3m**
CAPEX/Total CO_2 transported	*(€3,0 /tCO*
Net Present Value Cash Flows to Equity (Disc. @ 3%)	**€5262.0m**



Simplified development timeline



Thank you

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