

EU Demonstration Programme for CO₂ Capture and Storage (CCS)

ZEP's Proposal



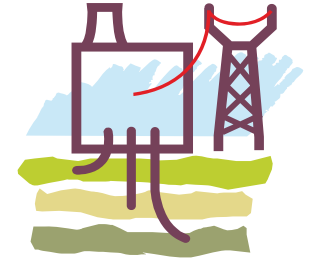
Prof. Niels Peter Christensen

Co-Chair Technology Taskforce, ZEP

March 3, 2009

What are we?

European Technology Platform for
Zero Emission Fossil Fuel Power Plants (ZEP)



ETP Role:

define a strategic agenda for the development and deployment of technologies involving major economic or societal challenges.

- **Founded in 2005 by the European Commission**
- **Unique and broad coalition of stakeholders:**
European utilities, petroleum companies, equipment suppliers, scientists, geologists and environmental NGOs.
- **200 people in 19 different countries contribute**
- **35 different companies and organizations represented on ZEP's board**

Milestones

**September
2006**

Strategic Research Agenda (SRA) and Strategic Deployment Document (SDD) endorsed at First General Assembly

December 2006

Input to EU Strategic Energy Technology Plan - holistic approach embracing Technology, Policy & Regulation, Demonstration and Public Communication

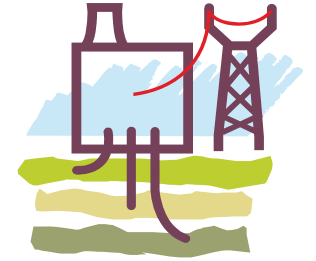
**October
2007**

EU Flagship Programme launched at Second General Assembly

November 2008

'EU Demonstration Programme for CCS - ZEP's Proposal' published

AGENDA



Climate Change and the Need for CCS

The Role of an EU CCS Demonstration Programme

EU Demonstration Programme Set-up

Conditions for Successful Implementation



The Impacts of Climate Change

↓
2°C
↑



Weather



Water



Food



Health



Ecosystem



Social

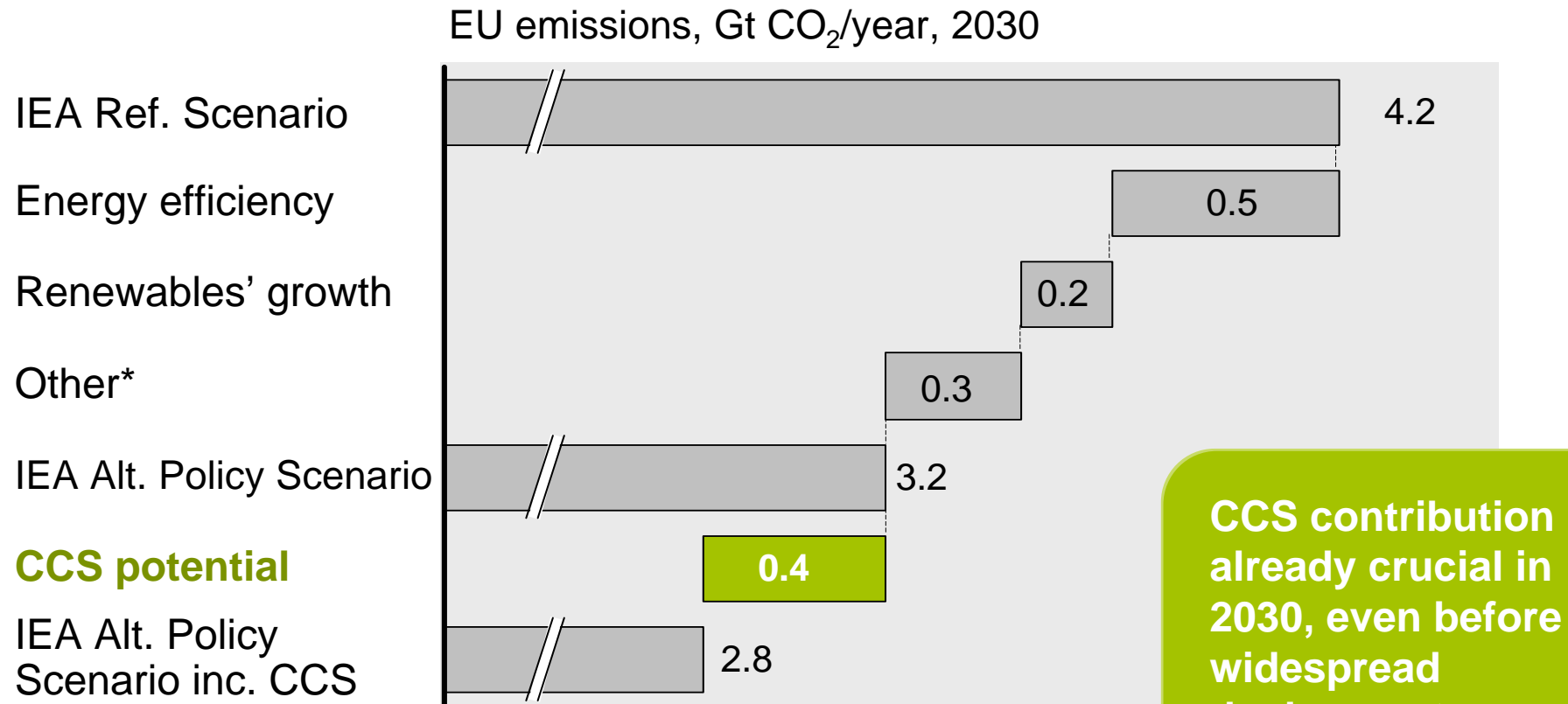


GDP

Need for 50% reduction in emissions by 2030 versus Business as Usual

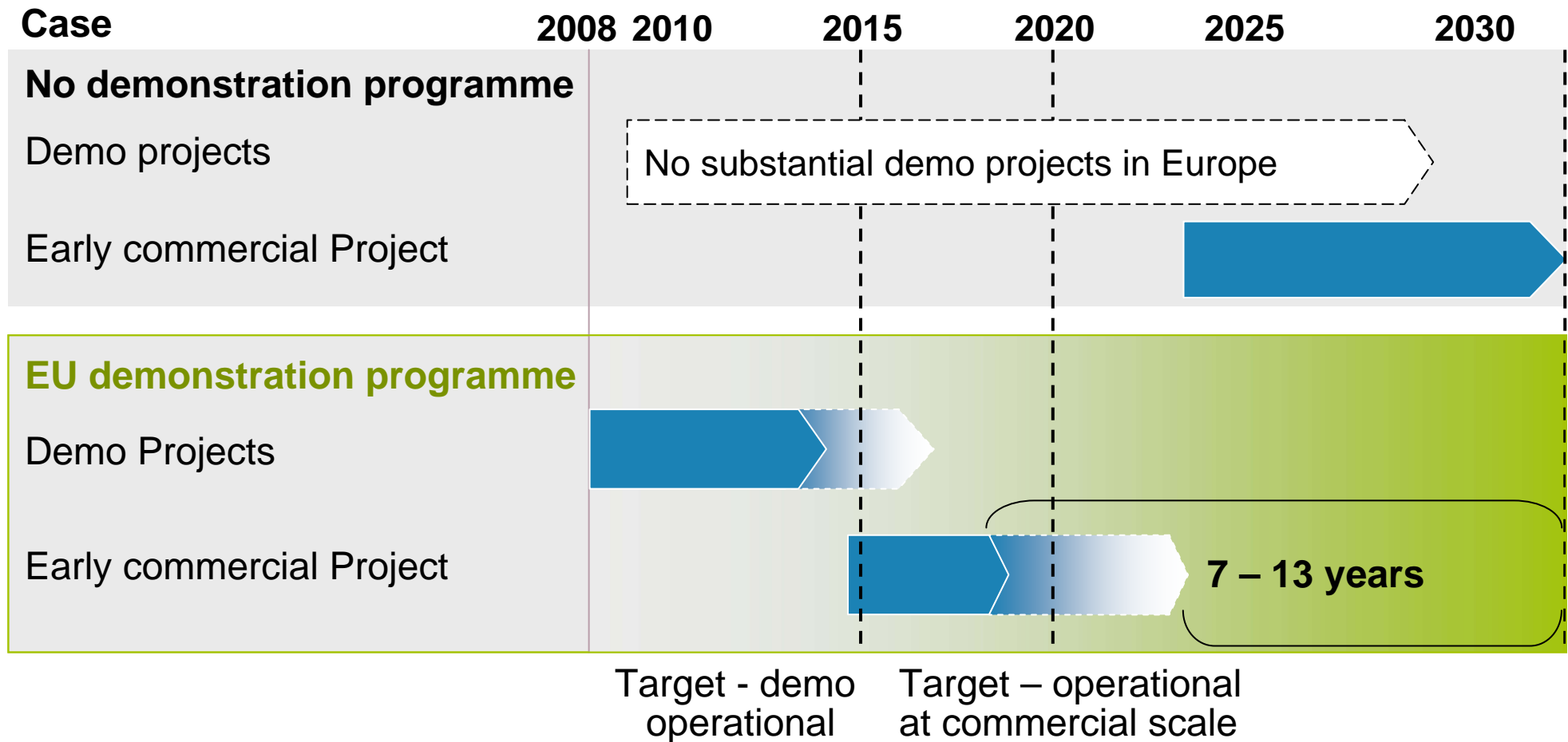


CCS is a Key Solution to Reaching Emission Reductions Targets



**CCS contribution
already crucial in
2030, even before
widespread
deployment**

An EU Demonstration Programme Gives CCS a ~10 Year Head-Start



The Focus and Benefits of an EU CCS Demonstration Programme

Objective:

Enable
commercial
availability of
CCS by 2020

1

Validate technology



2

Bring down costs

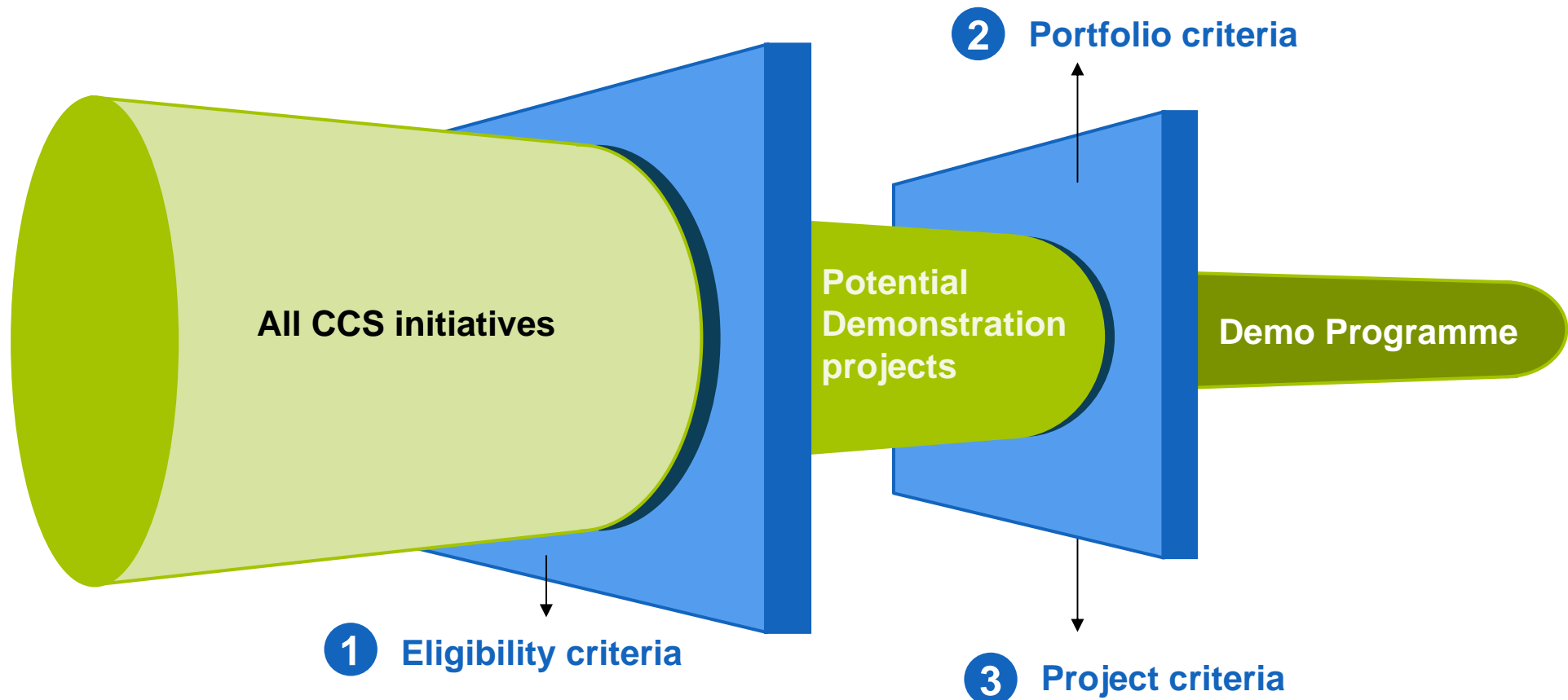


3

Contribute to public
acceptance of CCS

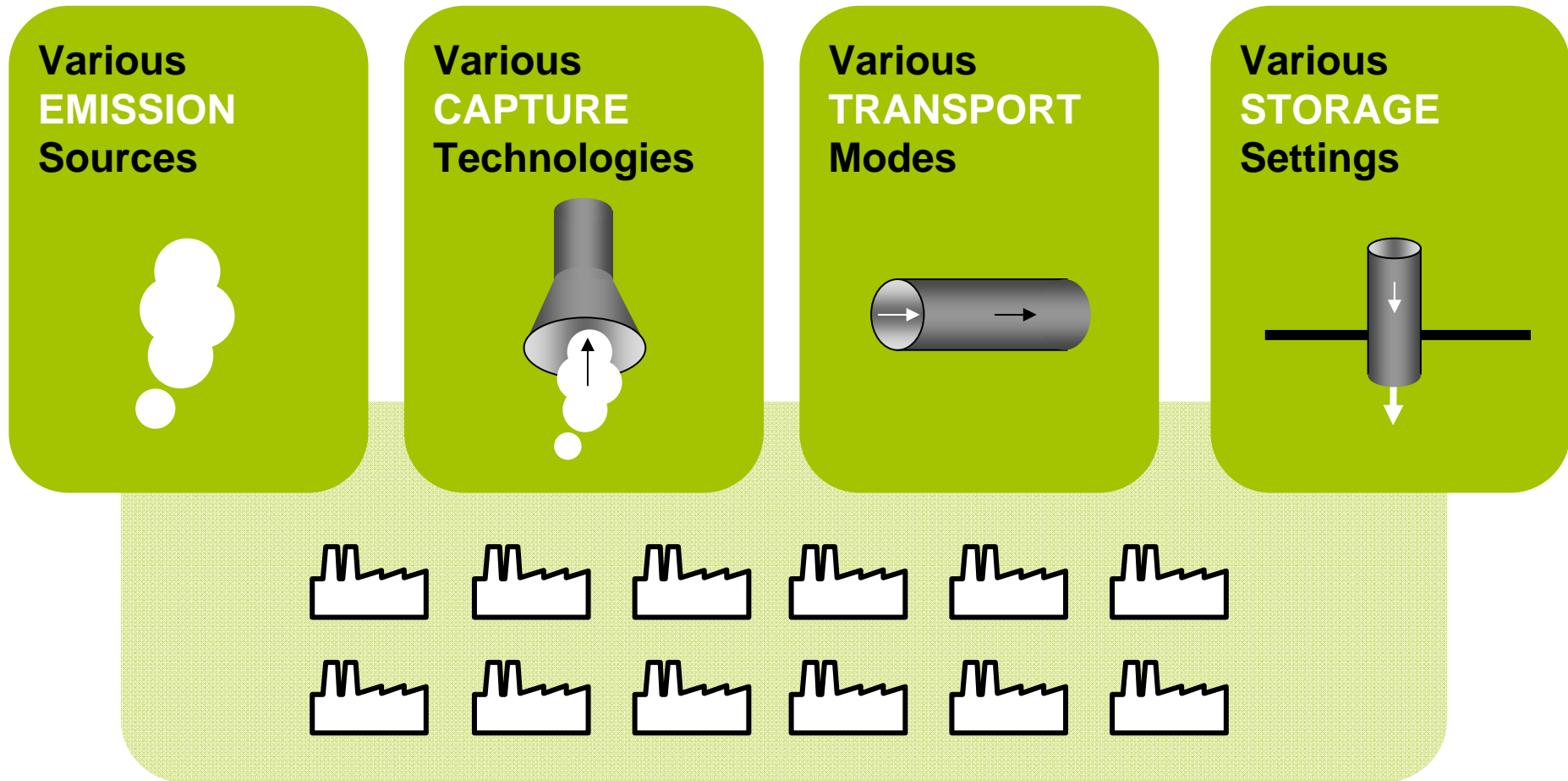


Selecting the Optimal Projects for an EU Demonstration Programme

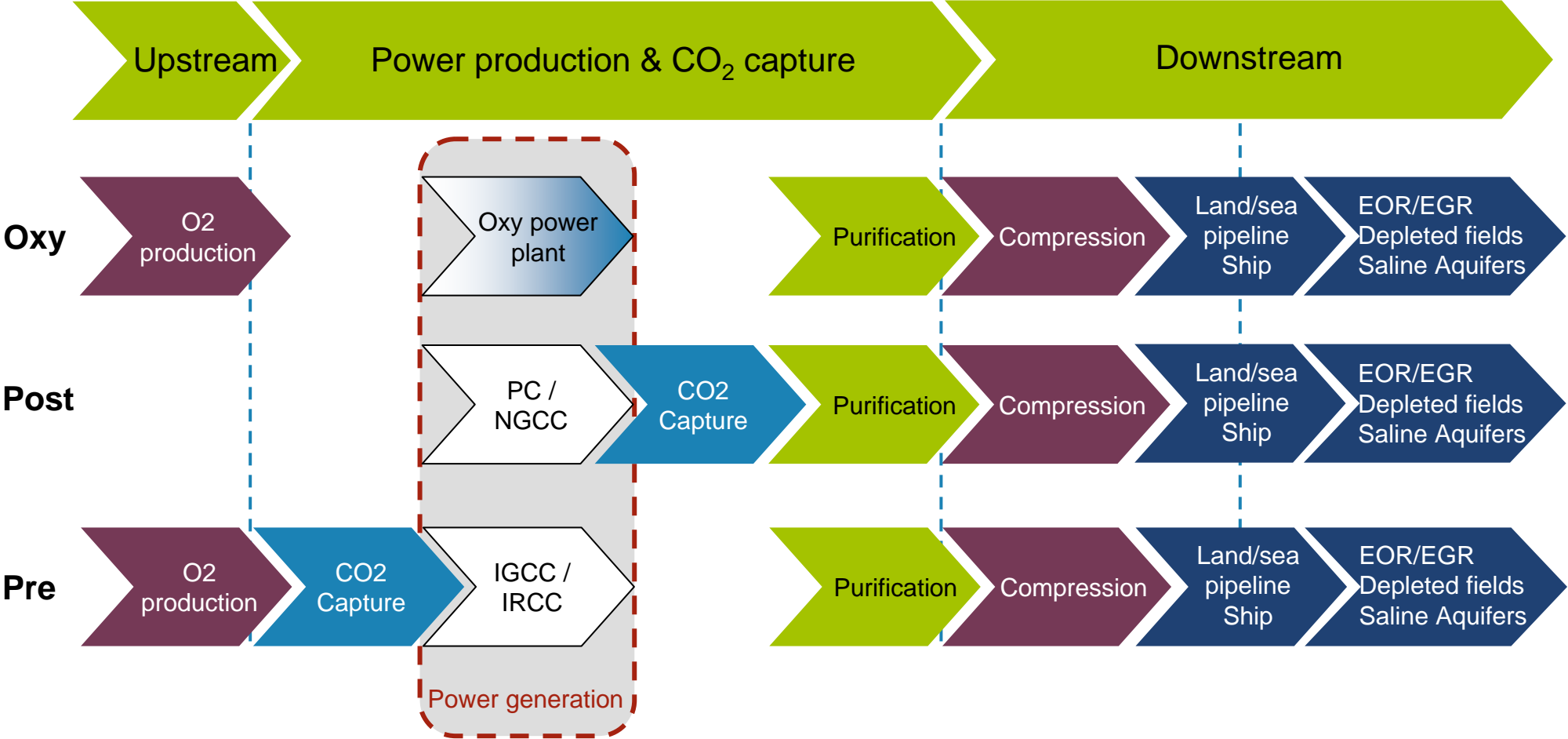


To Achieve the Programme's Goals, the Portfolio Needs to Test...

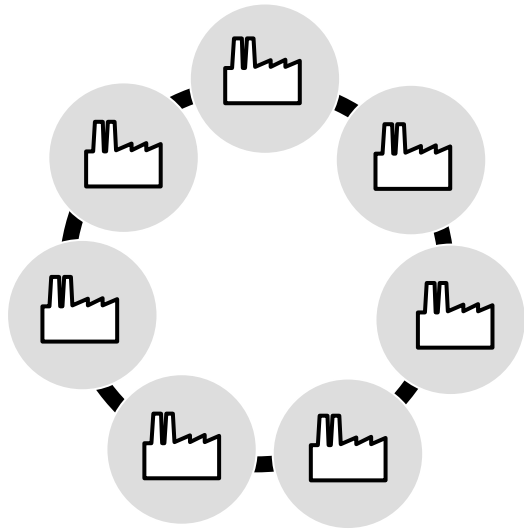
Context: the portfolio should also ensure several non-technical elements



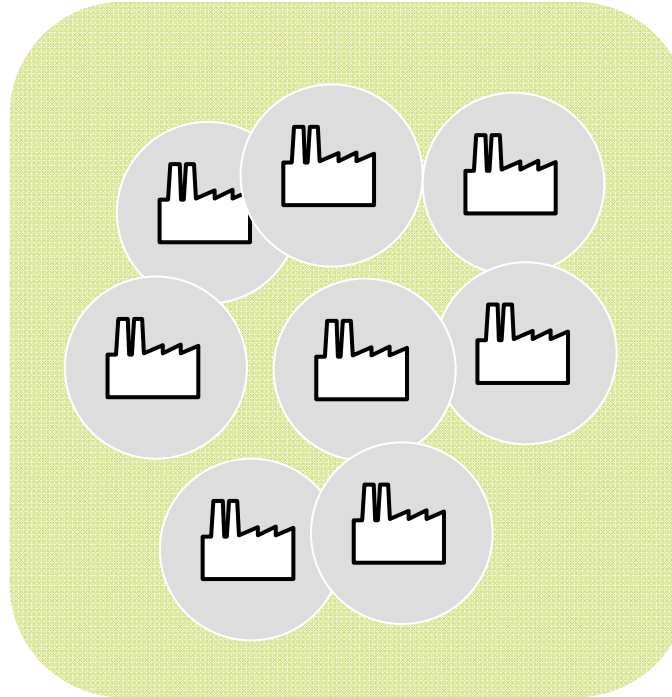
Overview of the Technology Blocks Along the CO₂, Capture, Transport and Storage Value Chains



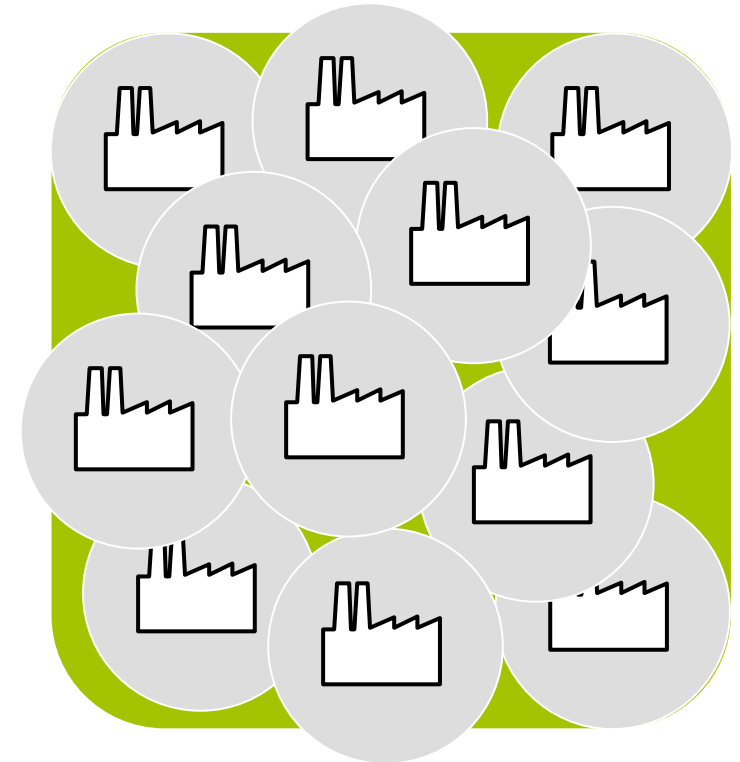
EU CCS Demonstration Programme = 10-12 Projects Required



In an ideal world, a theoretical minimum of 7 projects is needed to test all criteria



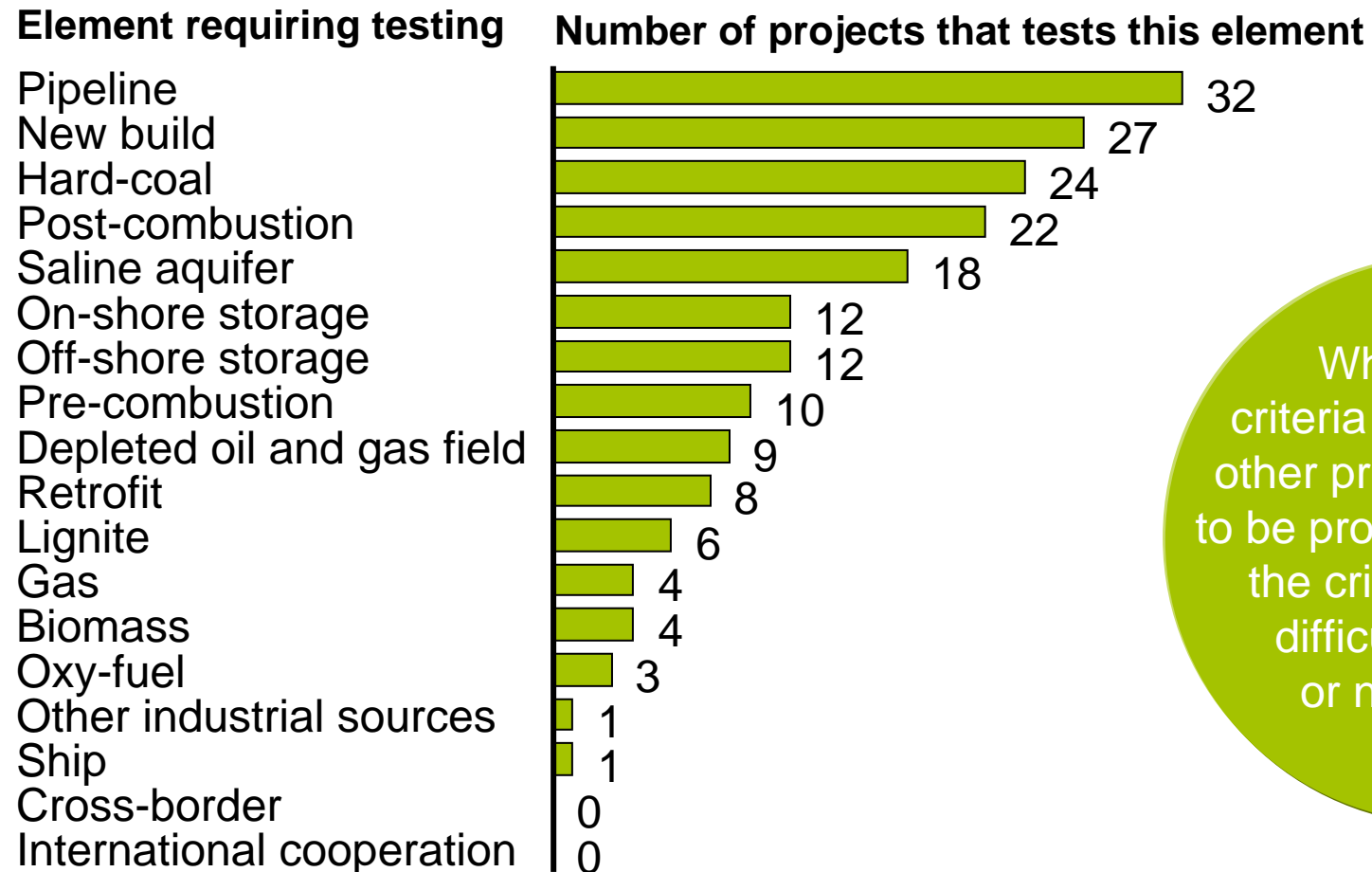
In reality, 8 projects are required to test the vast majority of the criteria



To test all criteria in reality, an estimated 2-4 additional projects are required, bringing the total to 10-12

34 EU Projects Announced, Ensuring Competition

Though announced, these projects are awaiting further decisions on funding, legislation

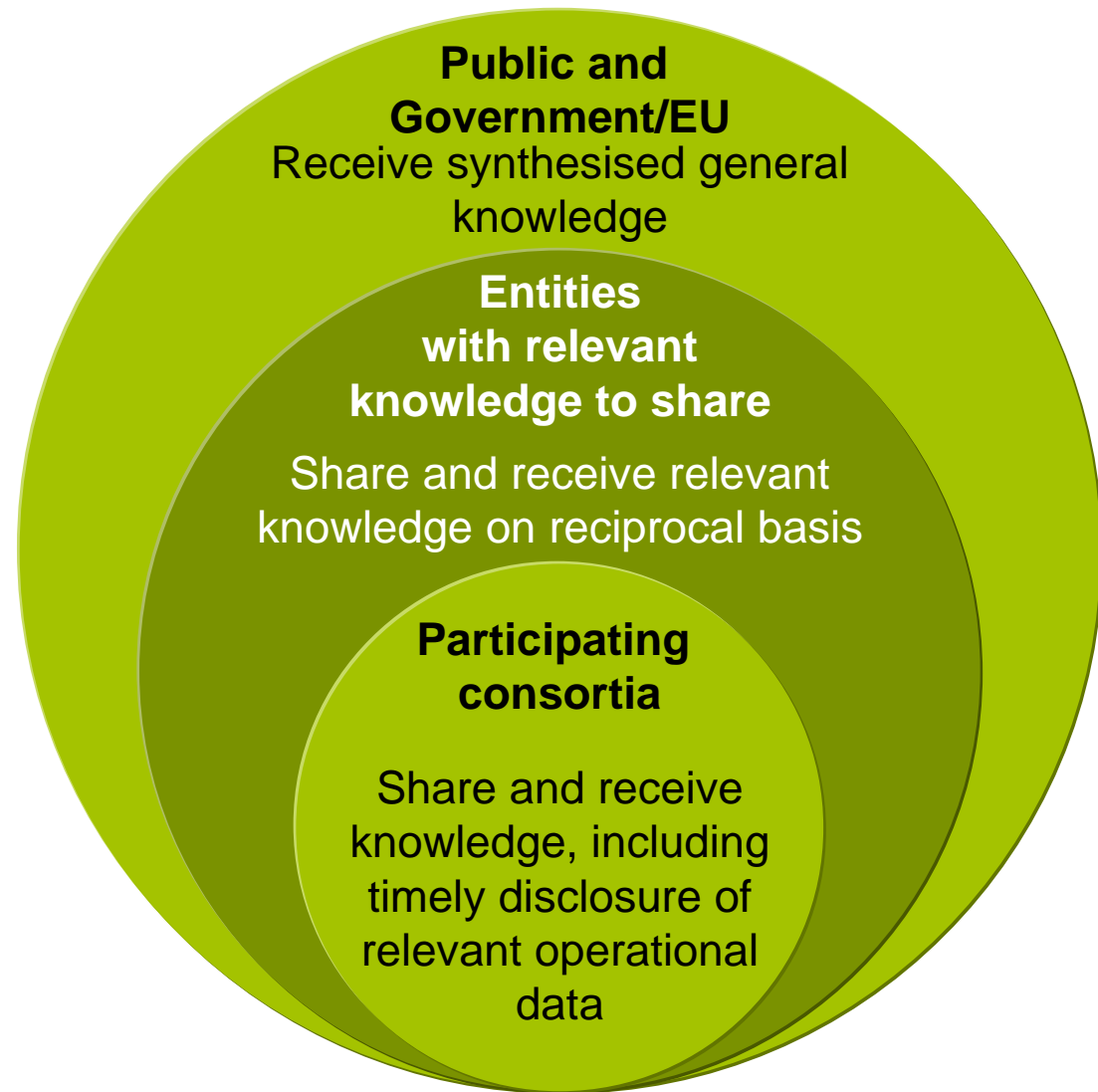


When tender criteria are published, other projects are likely to be proposed that meet the criteria currently difficult to satisfy, or not satisfied at all

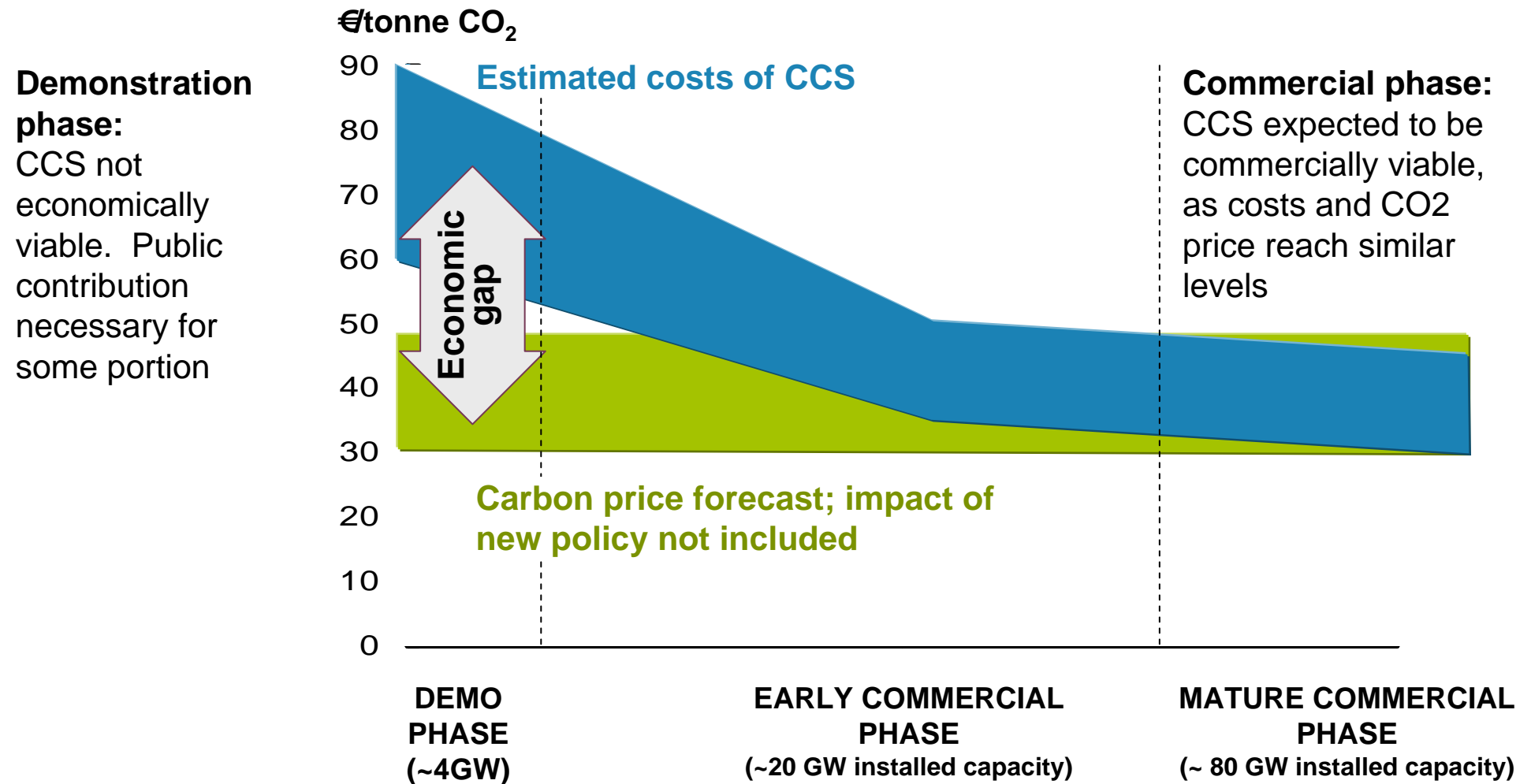
Maximising Global Knowledge Development and Sharing on CCS

Necessary and sufficient knowledge

needs to be developed and shared to achieve global implementation of CCS from 2020 onwards

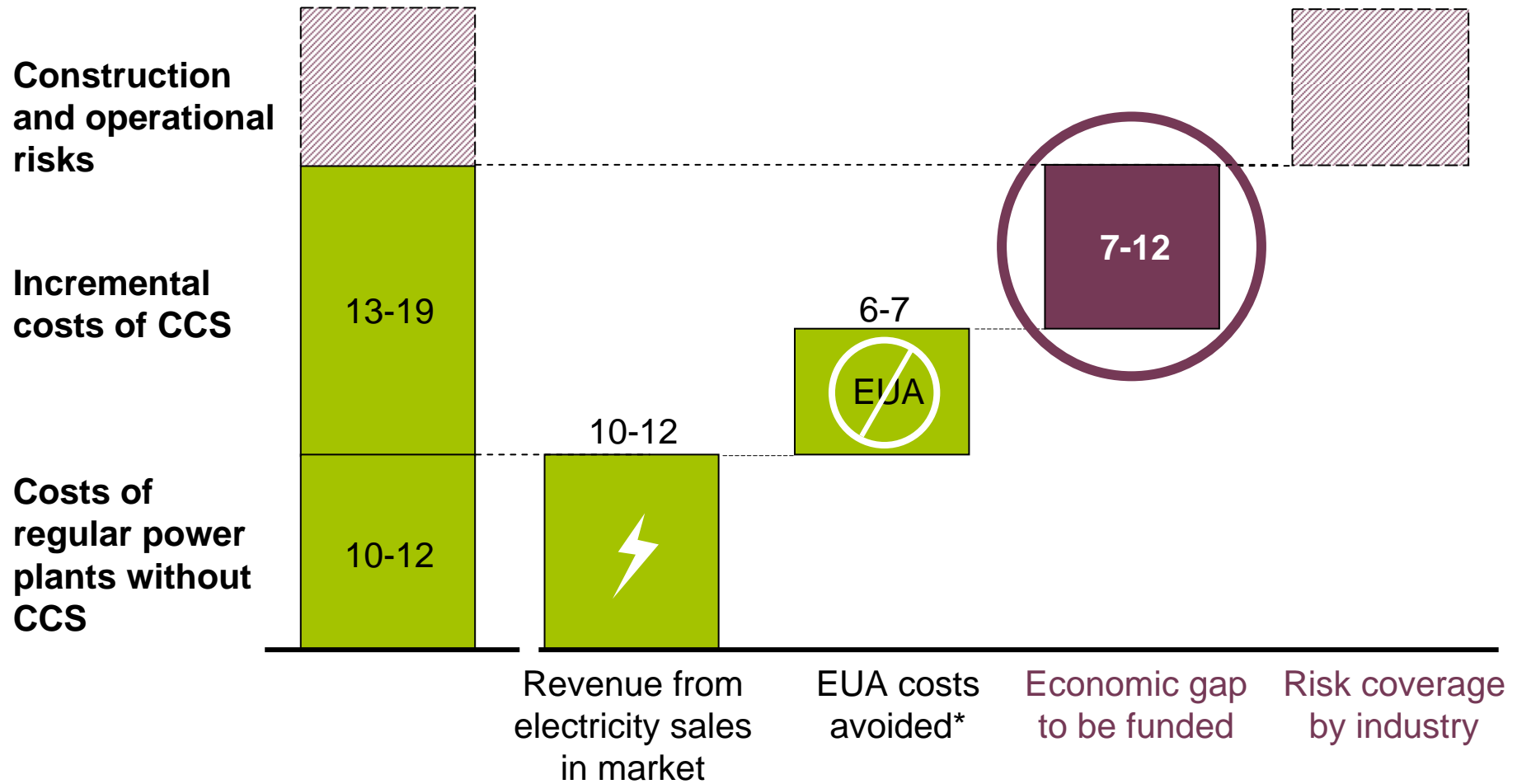


Demonstration Phase Requires Funding to Fill the Economic Gap



10-12 Demonstration Projects = €7 Billion - €12 Billion in Funding

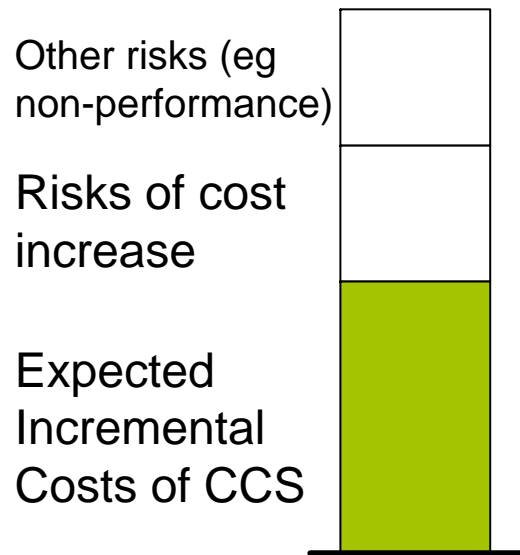
Present value over lifetime, € billion



* ETS Emission Unit Allowances (EUAs), assumed to be at €35/tonne CO₂

Industry, Public to Jointly Share CCS Costs, Construction & Operational Risks

Proposed approach to covering costs and risks



1

Industry is prepared to cover the majority of the risks

- Given the innovative nature, risks are significantly higher than in normal project
- Risks have a large potential downside and little upside (as gains from higher carbon price will be returned to the public)
- “No performance, no pay”
- Risks size is similar to total expected costs

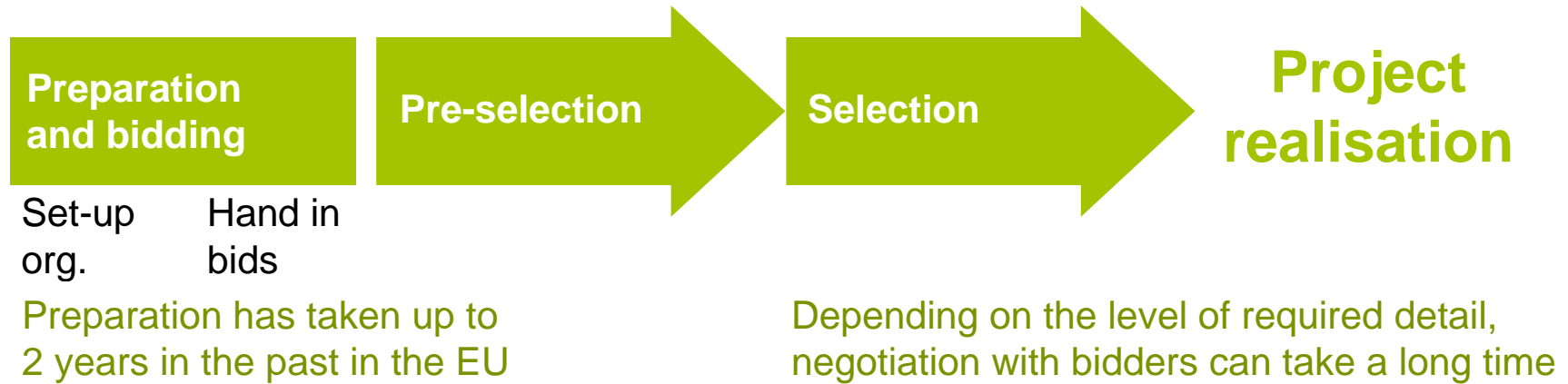
2

With industry bearing risks and the base costs of the power plant, public is asked to cover expected incremental costs of CCS

A competitive tender will:

- Define the risk to be carried by bidders
- Solicit maximum financial contribution from bidders

ZEP Seeks Engagement Toward Rapid Tendering Process



ZEP advice

- Shorten preparation as much as possible (requiring large political will)
- Pragmatic first round, to scale down number of bidders
- Example: 10-page “Expression of Interest” in recent Canadian tender
- Keep sufficient time for negotiation and selection

The exact organisation of the tender can be done in a number of ways ZEP looks forward to engaging with Member States and the EC to find the most effective way, combining speed and quality

Conclusion

CCS will play a key role in combating climate change, as the single biggest abatement lever.

An EU CCS Demonstration Program is required to make CCS commercially viable by 2020

EU funding for a CCS Demonstration Programme will help make this happen!

Next steps

Delivery of 10 – 12 CCS demonstration plants by 2015 is an unprecedented challenge for EC and MS

ZEP's stakeholders can give valuable input into the process for allocating EU funds

For demonstration plants to begin by 2015:

- Allowances must be allocated by mid-2010
- Firms need to make investment decisions by late 2010

Tendering at national and European level should be avoided and national CCS legislation should be in place as soon as possible