

Minimum requirements for the implementation of EU CCS demonstration projects

A stable, long-term framework must be in place to create strategic alignment for CCS



- ZEP supports EU CO₂ reduction targets of 20% by 2020 (aspiring to 30%) and 60%-85% by 2050
- This must be reflected in the energy policy targets of Member States
- Key requirements for the development and implementation of CCS are:
 - Suitable geological conditions for CO₂ storage
 - Implementation of the Storage Directive in Member States
 - A sound business case
 - Public and political support



Industry is willing to develop and implement CCS as a critical carbon mitigation technology if all requirements are fulfilled

Key milestone in project development is the Financial Investment Decision (FID)



- FID is the final step for authorising capital expenditure with the consent of shareholders, in accordance with the corporate governance rules of investors/privately-owned companies
- Each CCS demo project requires capital expenditure of several 100 million up to 1 billion+ Euros *and* additional operating costs; plus financial obligations for CO₂ storage
- FID requires a sound business case (incl. all costs and deadlines), profitability analysis and risk evaluation
- Financial aid criteria for integrated CCS projects have a substantial influence on FID

Prerequisites for FID (1)

Legal Framework, Engineering, Permits, Contracts



- **National Legal Framework** for CO₂ capture, transport and storage in place
 - must be established prior to preparation of approval
 - is the basis for the approval process
 - storage liability must be clarified, including requirements for any monitoring and remediation fund (financial security)
- **Construction and operation permits** for *all* elements of the CCS value chain obtained – capture, transport and storage
- All **project contracts** ready to sign/final
- **Cost estimate with 10% accuracy** for capex and opex
- **Commercial arrangements** between project partners in place

Engineering Phase	Scouting	BoD (PDP); Pre-Engineering	BDP; Basic-Engineering	EPC-Front-End; Project-Definition
Accuracy of cost estimate at end of phase	± 30 - 40 %	± 30 %	± 20 %	± 10 %

} FEED

Prerequisites for FID (2)

Financing, Risk Assessment

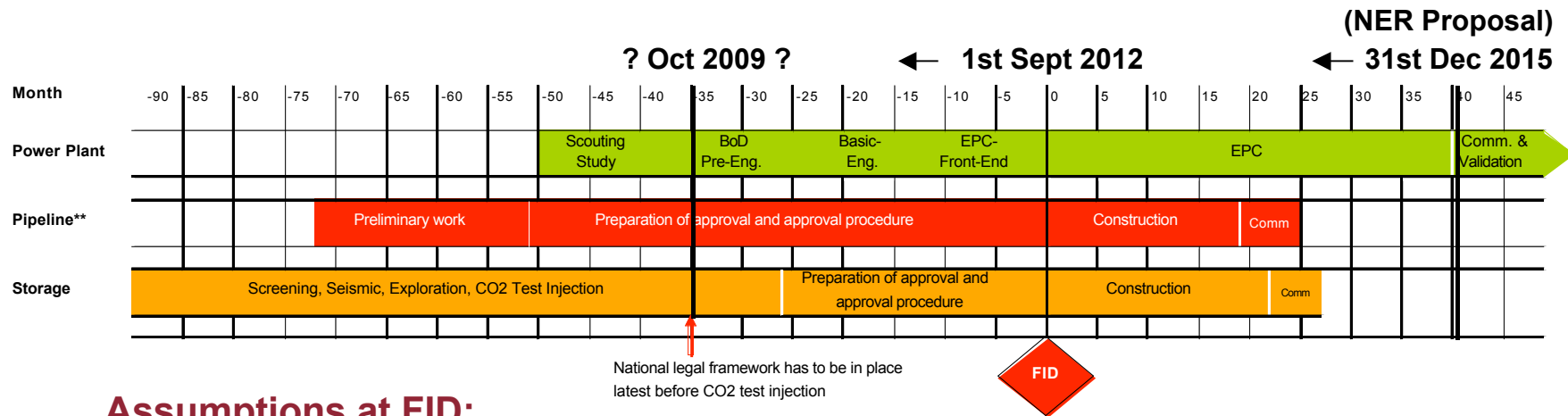


- **Financing** is a crucial element of any demo project. **Financial closing must be reached**, taking into account the following boundary conditions:
 - **Revenues:** the development of the new low-carbon electricity market is immature and still uncertain
 - **Contingencies:** there are no reference cases for CCS demo projects which can give an indication of possible contingencies
 - **Subsidisation:** demo projects will incur high additional capital/operating costs & risks and therefore need funding (national and EU), based on viable regulations, e.g. project developer needs clarity on force majeure provisions

- **Risk Assessment**
 - Identification and evaluation of risks for the project developer (incl. a comprehensive risk mitigation strategy) must be set up prior to FID
 - Commodity risks for fuel, CO₂ allowances, wholesale power must be assessed
 - Member States and the Commission should be encouraged to share in as many risks as possible, e.g. future regulatory change for a particular project

Required time scales – Example*

CO₂ transport by pipeline
CO₂ storage onshore in deep saline aquifers



Assumptions at FID:

- Permits for power plant, pipeline and storage site have been granted
- Funding scheme secured 2 months before decision – at the latest
- No major investments have been made

Before FID: Timeline is determined by **pipeline** and **storage**
After FID: Timeline is determined by **power plant (capture)**



Time is running out if demo projects to be operational by 2015 – as mandated by EU Heads of State

Conclusion

- CCS is the single biggest lever for reducing CO₂ emissions – by 20% by 2050 (IEA)
- Industry is willing and able to demonstrate CCS at large-scale, but each project will incur significant costs and risks
- In order to assess the risks involved in storing CO₂, and establish a permitting procedure, a national regulatory framework must be in place
- Timing of the regulatory framework will determine engineering and approval schedules up until FID; legal disputes during the subsequent construction phase cannot be ruled out

 ***2015 target for the implementation of EU CCS demo projects is achievable – but only if national regulatory frameworks are in place by end 2010 at the latest***