

Recommendation of Projects for CSLF Recognition

Trygve Riis, Technical Chair

September 20, 2011

Beijing, China



Submission Forms



- **Secretariat received submission forms for six projects:**
 - **Zero Emission Porto Tolle (ZEPT) Power Project**
 - **Jänschwalde Project**
 - **SaskPower CCS Project**
 - **CGS Europe Project**
 - **Rotterdam Opslag en Afvang Demonstratieproject (ROAD)**
 - **CO₂ Capture Project, Phase 3**



Zero Emission Porto Tolle (ZEPT) Power Project



- **Location:** Northeast Italy
- **Description:** Post-combustion CCS of 40% of flue gas from existing power unit
 - 1 million tons per year CO₂ storage in deep saline aquifer, approximately 100 km from project site
 - Prove retrofit option for high efficiency coal-fired units
- **Nominators:** Italy & European Commission

Technical Group recommends CSLF recognition for this project



Jänschwalde Project



- **Location:** Eastern Germany
- **Description:** Oxyfuel & Post-Combustion Capture
 - Large scale lignite fuel project
 - Existing 250 MW power plant units will be converted, 1 for oxyfuel operation, 1 for post-combustion capture
 - Storage options for 1.7 million tons CO₂ annually include deep saline aquifers and depleted gas fields
- **Nominators:** Germany & European Commission

Technical Group recommends CSLF recognition for this project



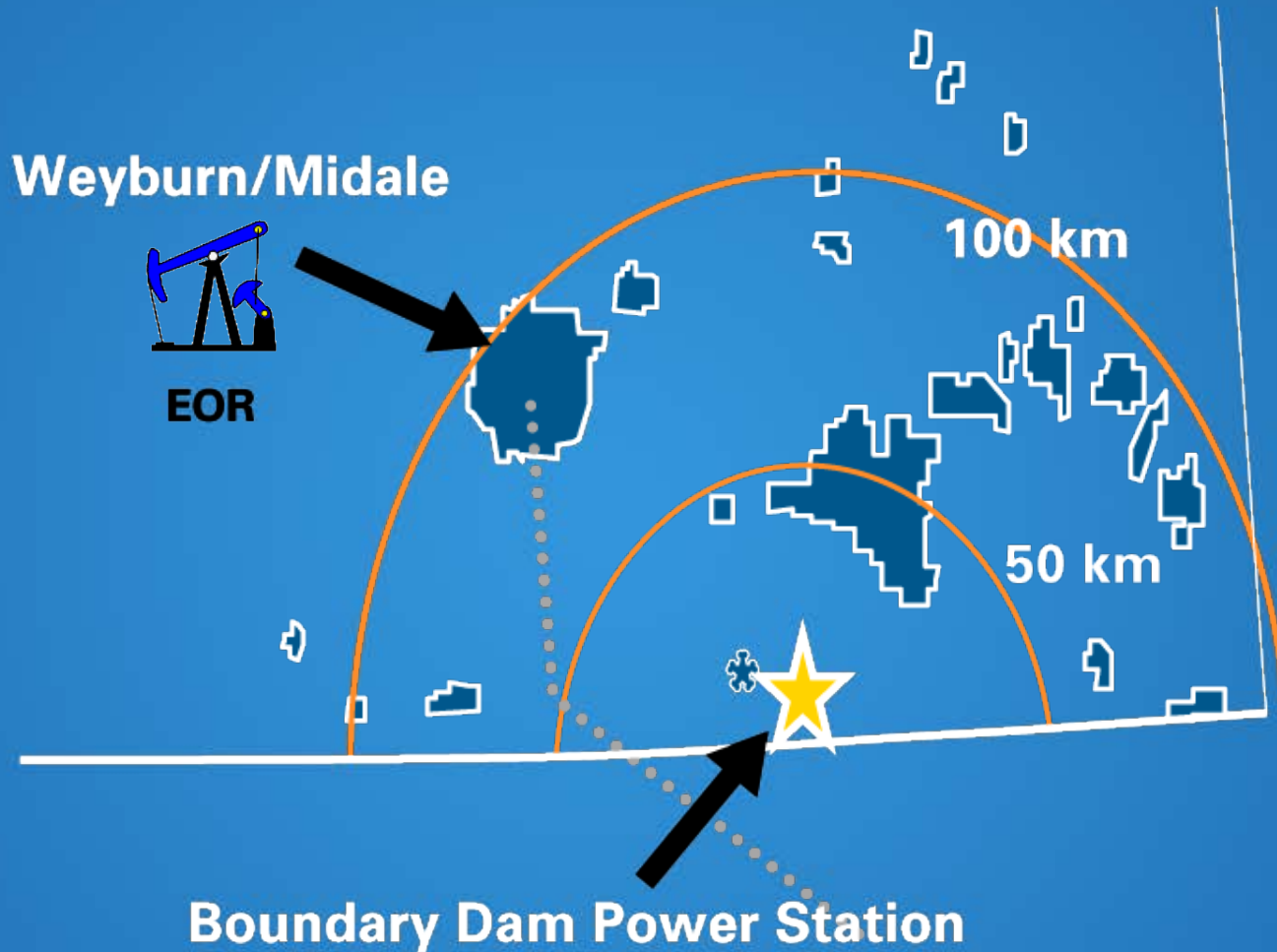
SaskPower Integrated CCS Demonstration Project



- **Location:** Boundary Dam Unit 3 in Estevan, Saskatchewan
- **Description:** First application of full stream flue gas treatment for a pulverized coal unit
 - Post combustion capture
 - Cansolve Technology
 - 90% Overall CO₂ Capture
 - 1 million tons CO₂ for Enhanced Oil Recovery
 - Post-EOR CO₂ Sequestration
- **Nominators:** Canada & U.S.
- **Project Contact:** SaskPower

Technical Group recommends CSLF recognition for this project

Boundary Dam ICCS Demonstration



Conclusions



- Preserves coal as a fuel source and maintains fuel mix diversity.
- Cost of electricity competitive with natural gas.
- Provides information needed for making future decisions.
- Develops EOR CO₂ buyer market - has significant positive economic impact for the provincial economy.
- Future projects more economic - COE \$100/MWh.



CGS Europe Project



- **Location:** Pan-European
- **Description:** Designed to facilitate large scale demonstration and deployment of CCS
 - Integration & Networking
 - Knowledge Management designed to accelerate the large-scale implementation of CCS including knowledge repositories
 - Knowledge development
 - Knowledge dissemination
- **Nominators:** France, Italy, Norway & European Commission
- **Project Contact:** BRGM

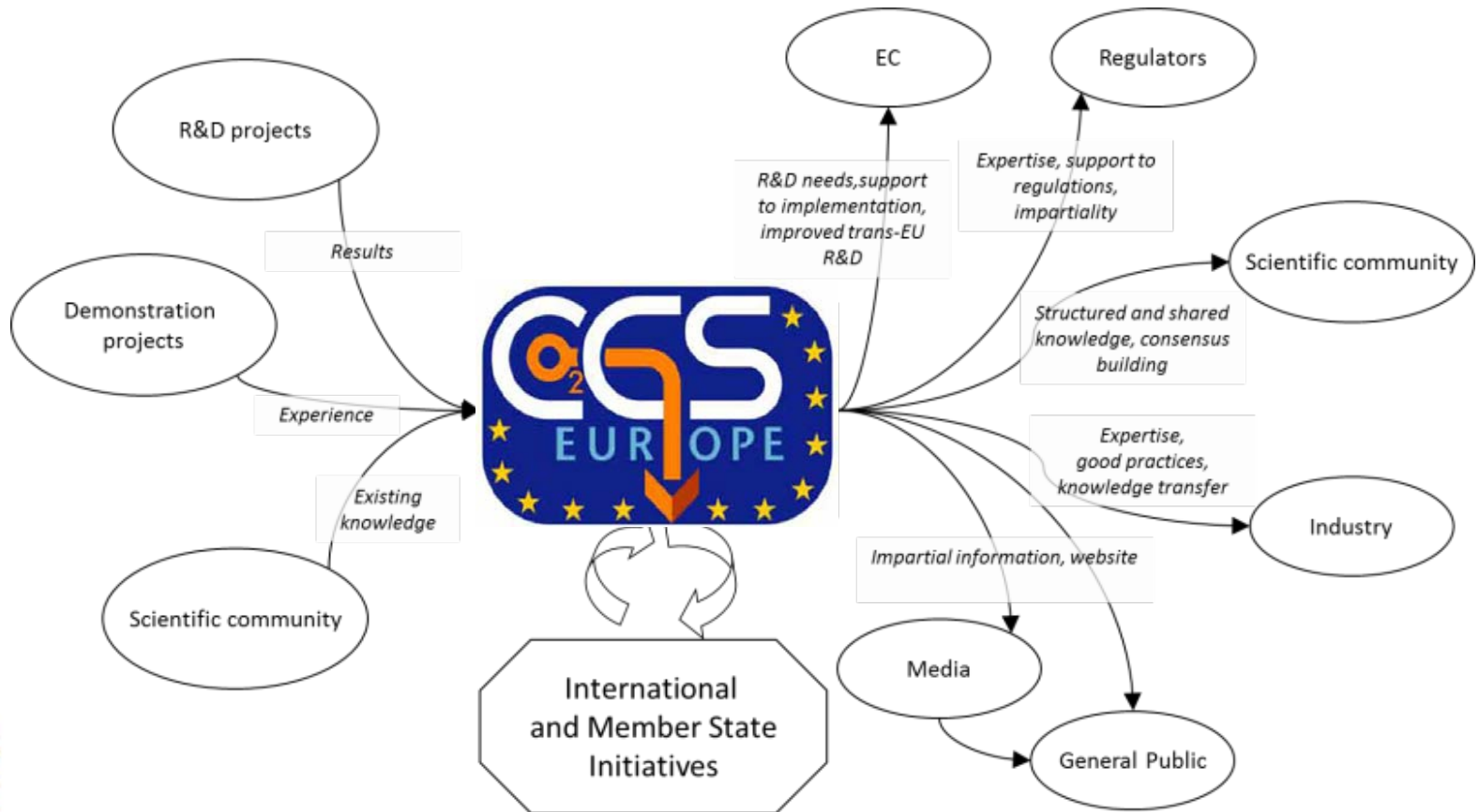
Technical Group recommends CSLF recognition for this project

Project details

- A 'coordination action' financed by the EC FP7: total budget of 2.9 M€
- 3 year funding duration: launched on 1st November 2010
- Aim to continue as a long-lasting organization well beyond period of EU funding
- Advisory board comprising key participants from ZEP, Global CCS Institute & WWF will provide external feedback and advice as to how best to orientate CGS Europe activities

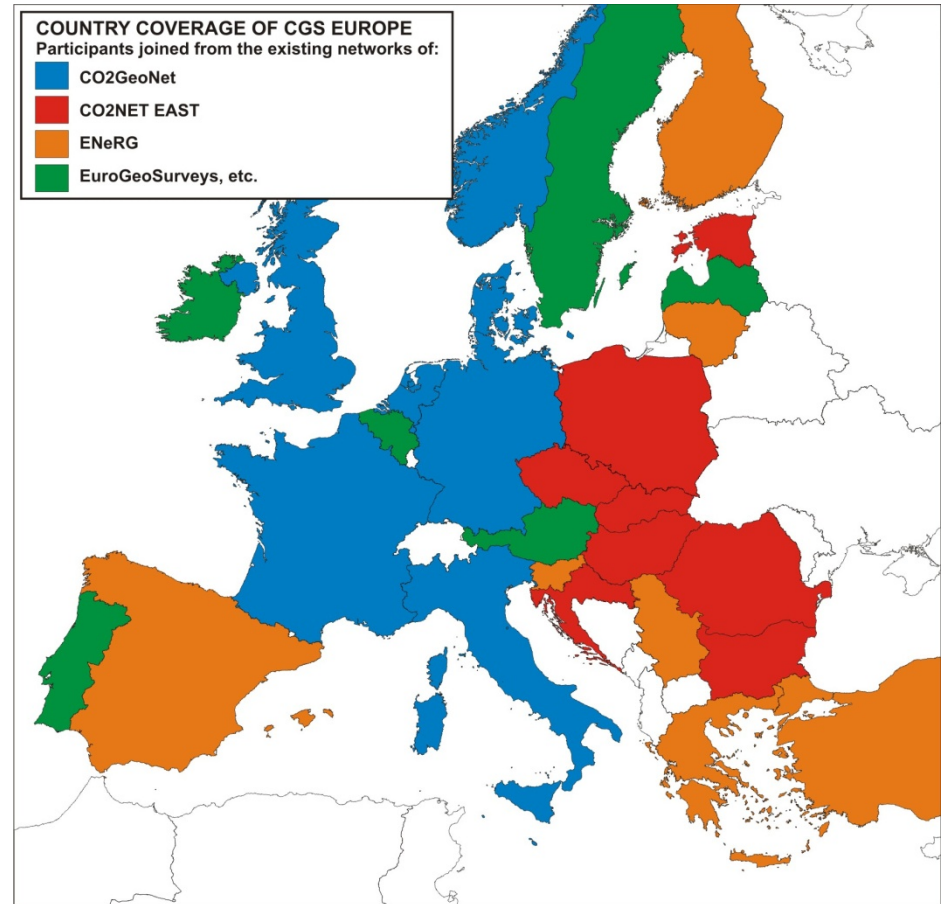


Project aims



Who is involved?

- **24 partners** (one of which, the **CO2GeoNet Association**, comprises 11 of its members as third parties) from **28 participant countries**
- Almost complete European coverage and specifically includes all countries with considerable storage potential
- All participants are key research institutes in their countries and many are leaders on CO₂ storage research at national and international levels, working as independent bodies





Rotterdam Opslag en Afvang Demonstratieproject (ROAD)



- **Location:** Maasvlakte, Rotterdam; Zuid-Holland, The Netherlands
- **Description:** Demonstrate that an industrial scale, integrated CCS-chain can be applied in a reliable and efficient way within 10 years.
 - 1.1 million tons CO₂ per year from new E.ON Maasvlakte Power Plant 3, 250 MW
 - CO₂ will be injected into depleted gas reservoirs 3,500 meters below sea bed
- **Nominators:** Netherlands & European Commission
- **Project Contact:** Hans Schoenmakers

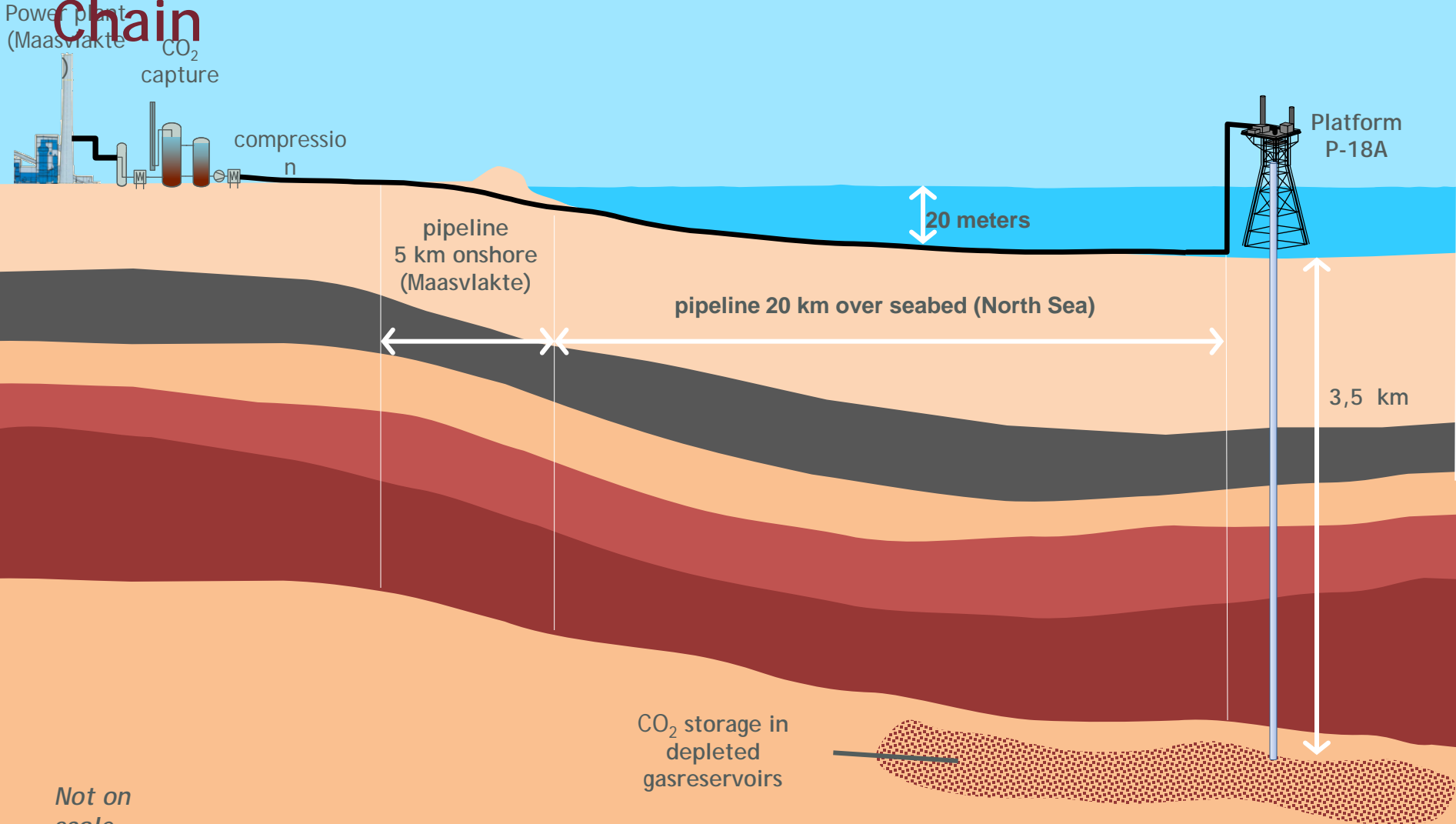
Technical Group recommends CSLF recognition for this project

Project Objectives & Anticipated Outcomes

- Concept development full CCS chain
- Engineering: capture plant, integration with base power plant, pipeline, platform modifications and well workover
- Permitting
- Construction
- Demonstrating full chain operation for 5 years
- Subsequent commercial operation
- Continuous knowledge sharing

ROAD CO₂ Capture, Transport and Storage

Chain





CO₂ Capture Project Phase 3



- **Location:** Houston, Texas, United States
- **Description:** Advance the technologies to improve operational approaches in order to reduce costs and accelerate the deployment of CCS.
 - 4 work streams
 - Storage, Monitoring & Verification
 - Capture
 - Policy Incentives
 - Communication
 - Plus Economic Modeling to bind it together
- **Nominators:** United Kingdom & United States
- **Project Contact:** CO₂ Capture Project

Technical Group recommends CSLF recognition for this project

The CO₂ Capture Project (CCP) is an award-winning partnership of seven major energy companies working to advance the technologies that will underpin the deployment of industrial-scale CO₂ capture and storage (CCS). The CCP is currently in its third phase of activity:

- Phase 1 (CCP1, 2001-2004) technology screening/proof of concept – **completed**
- Phase 2 (CCP2, 2004-2009) intensive development – **completed**
- Phase 3 (CCP3, 2009-2013) demonstration – **on going**

The CCP is funded primarily by:

- Member and associate member contributions
- Government grants
- In-kind contributions

CCP3 project members are:

BP (Program Operator), Chevron, ConocoPhillips, Eni, Petrobras, Shell, Suncor and associate member EPRI.

Program Objectives

In order to help make CCS a practical reality, in reducing emissions from power plants and heavy industrial processes such as oil and gas refining and gas processing, the CCP aims to accomplish the following goals:

- **Increase technical and cost knowledge** associated with CO₂ capture technologies and confirm that geological storage of CO₂ is a secure and viable means of reducing greenhouse gas emissions
- **Reduce CO₂ capture costs by 20-30%** by supporting the development of improved technologies
- **Quantify remaining assurance issues** surrounding geological storage of CO₂ through site assessments, field surveys and numerical approaches; and rapid dissemination of results to stakeholder groups
- **Validate cost-effectiveness of monitoring technologies** with design and testing of emerging and integrated systems
- **Cooperate with interested parties to share information** about both capture and storage demonstrations