



CO₂ Capture Project



Project Report update to CSLF

www.co2captureproject.org

CSLF Berlin Meeting, Potsdam,
Germany, 29th September'05



CO₂ Capture Project

CO₂ Capture Project

- The CO₂ Capture Project (CCP) is an international cooperative partnership between industry, governments, academics and environmental interest groups which is focused on technology development of CO₂ Capture and Geological Storage.
- Multi-phase program;
 - Phase 1 – 2001-2004 completed
Identification/selection/initial development
 - **Phase 2 – 2004-2008 just started**
developing and refining technology performance
 - Phase 3 – 2008-2012
demonstration



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CO₂ Capture Project

CCP2 project objectives

- Undertake additional research and technology development to reduce cost of CO₂ capture from large fixed combustion sources by 60 – 80% relative to baseline
- Reduce technology performance uncertainty and deliver low-cost CO₂ capture technologies to demonstration stage by 2008
- Demonstrate that the geological storage of CO₂ is secure and can represent a viable Greenhouse Gas mitigation technique. Develop technology to address critical issues such as storage site/project certification, well integrity and monitoring
- Increase public awareness and acceptance of CCS
- Expand economic/ infrastructure scenarios for complete integration of the CO₂ capture, transportation and storage value chain



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CCP program challenges

- Cost of CO₂ capture
 - Technology portfolio
 - Fossil fuels from gas to coal
- Public acceptance
 - Engaging broad group of stakeholders
 - Working with NGO's
 - Communication/education.....language
- Informing the debate on matters around the need for a “market” from a technology standpoint



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Who is involved in CCP2?



EU DG Research

Directorate - General Research
Program Manager: Vassilios Kougionas



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The Research Council of Norway
Program Manager: Hans-Roar Sørheim



NETL US Dept. of Energy

National Energy Technology Laboratory
Program Manager: David Lang

Joint Industry Partnership (JIP)

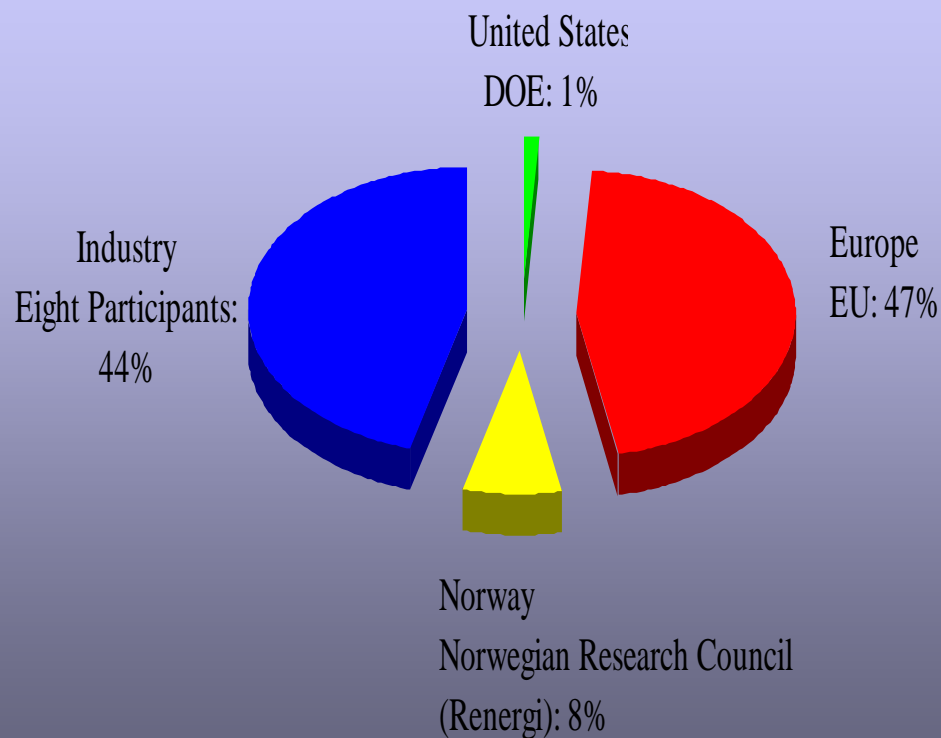




CO₂ Capture Project

Project structure

- International public-private collaboration
- Regional programs
- Sharing among programs to leverage results, reduce duplication
- \$14m Total Government Co-Funding (56%)
- \$25m Project Cost in phase 2, \$50m cumulative



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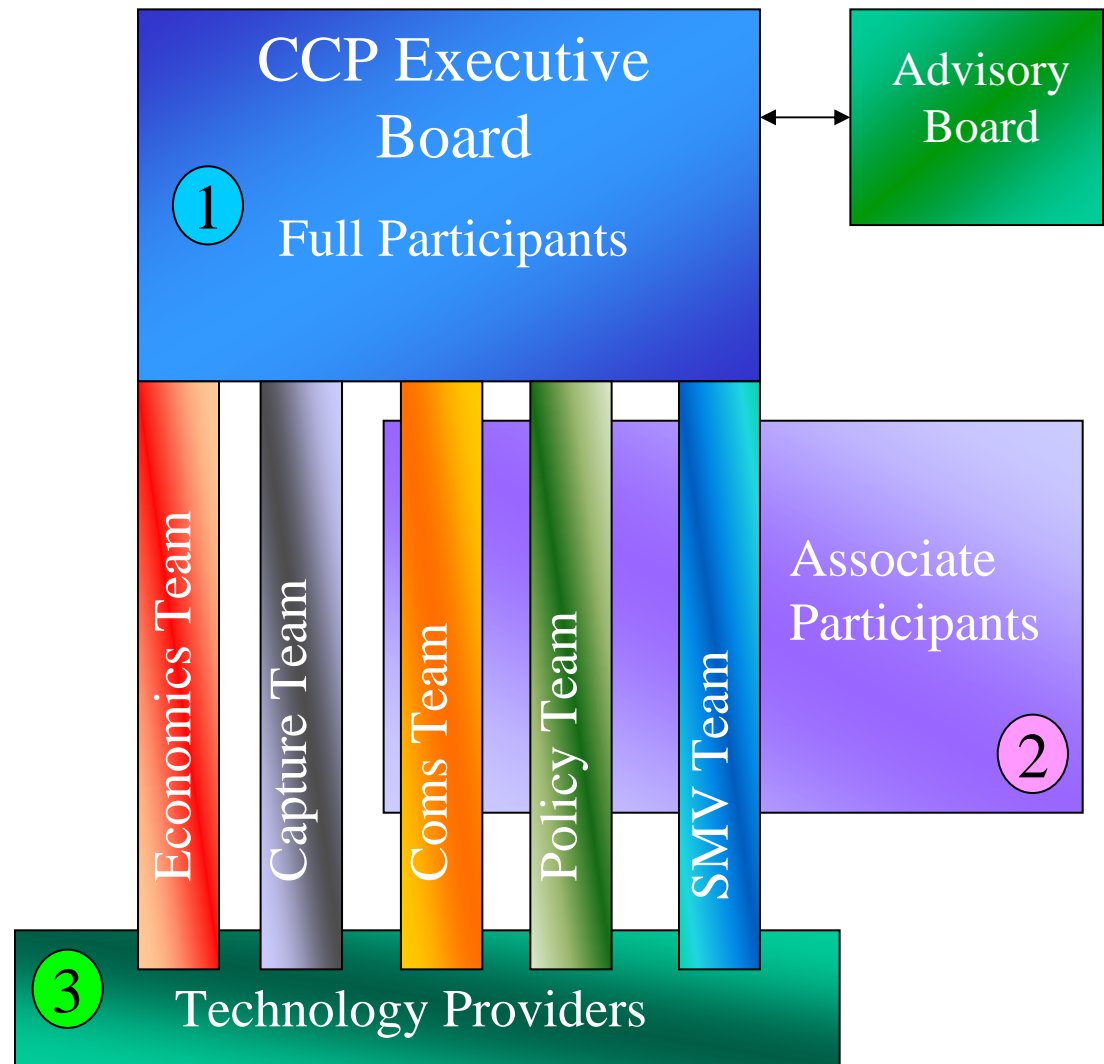


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Project structure

Three ways to participate in CCP2;

1. As a Full participant
2. As an Associate participant
3. As a technology provider



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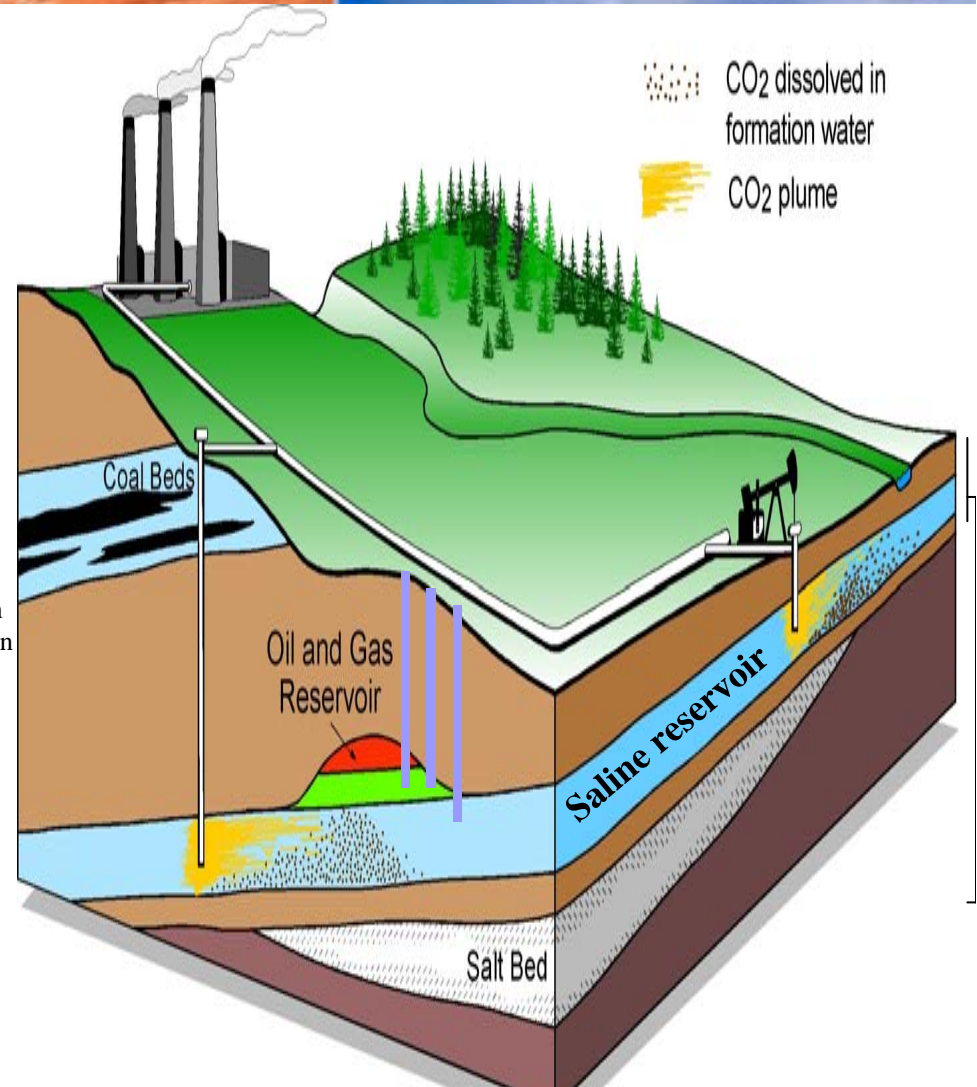
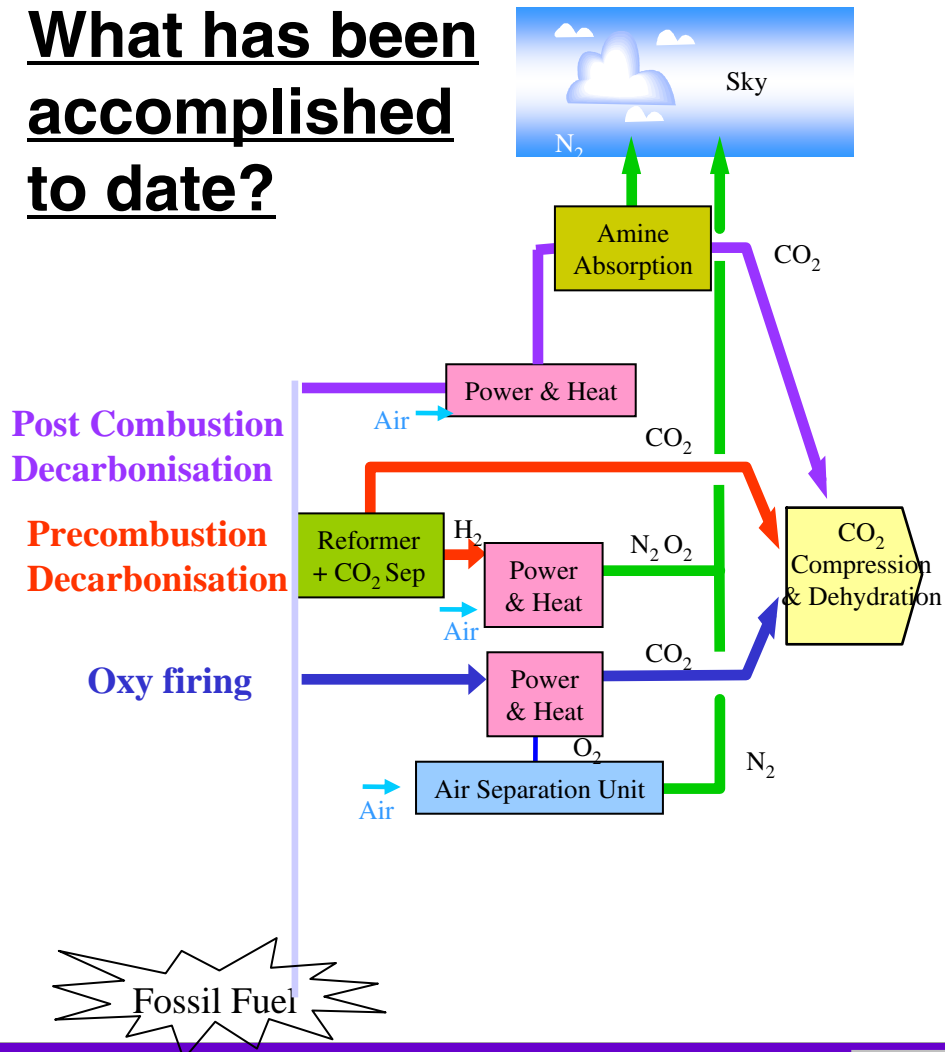
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What has been accomplished to date?



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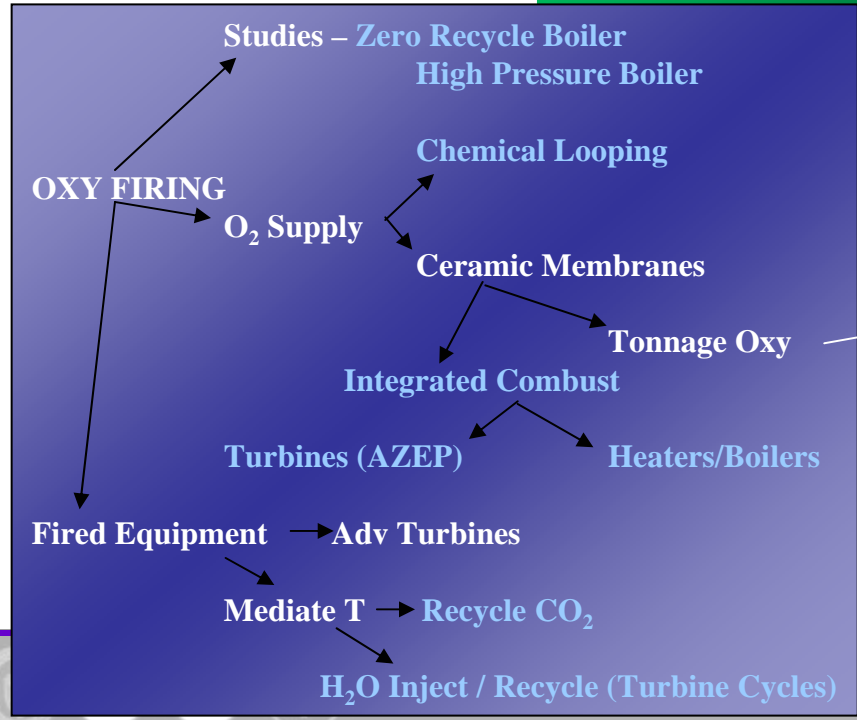
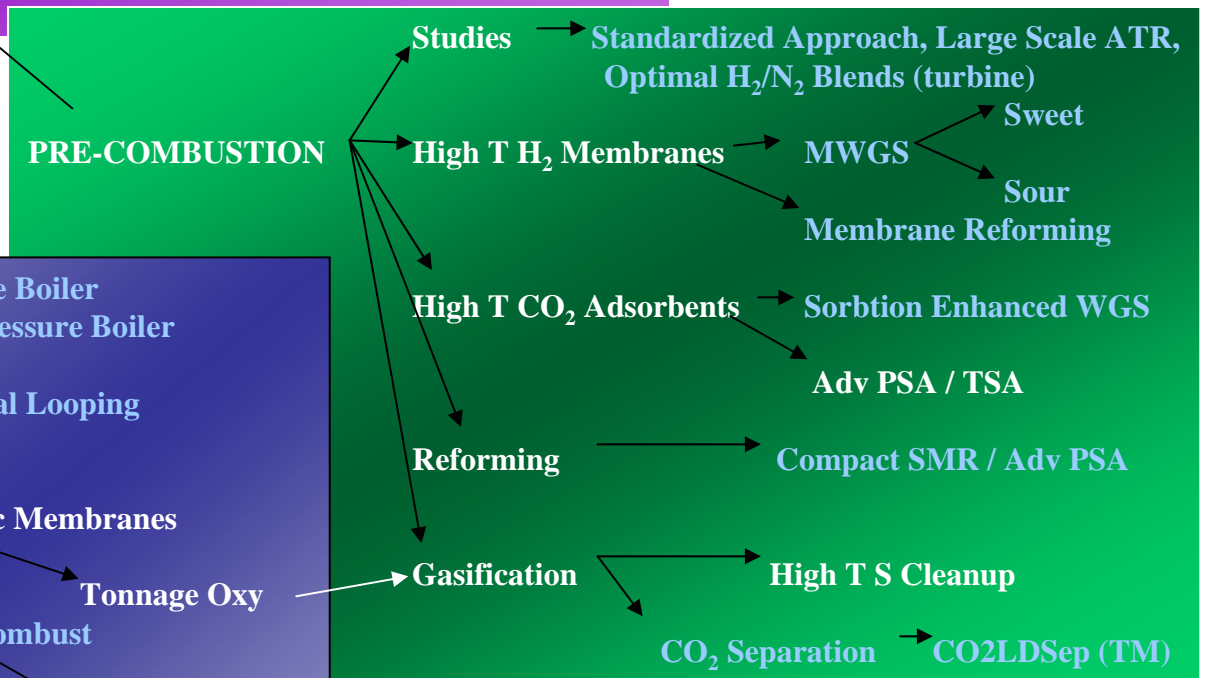
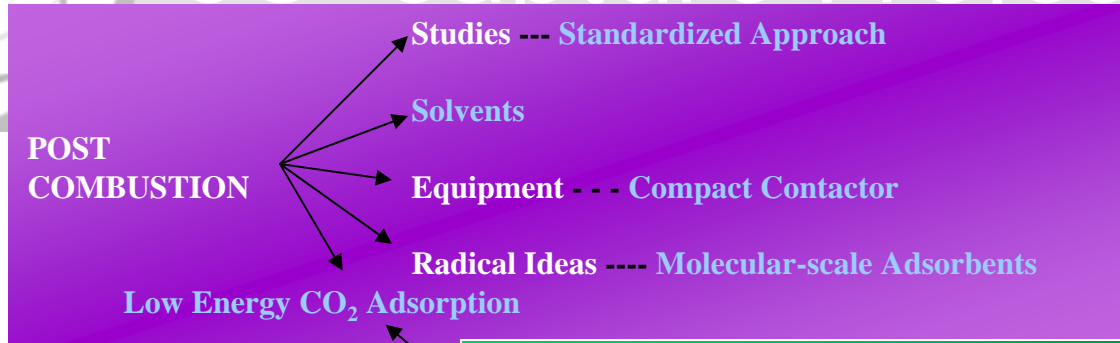


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CO Capture Project

CO₂ Capture Technology Map - CCP



CCP Projects in Blue

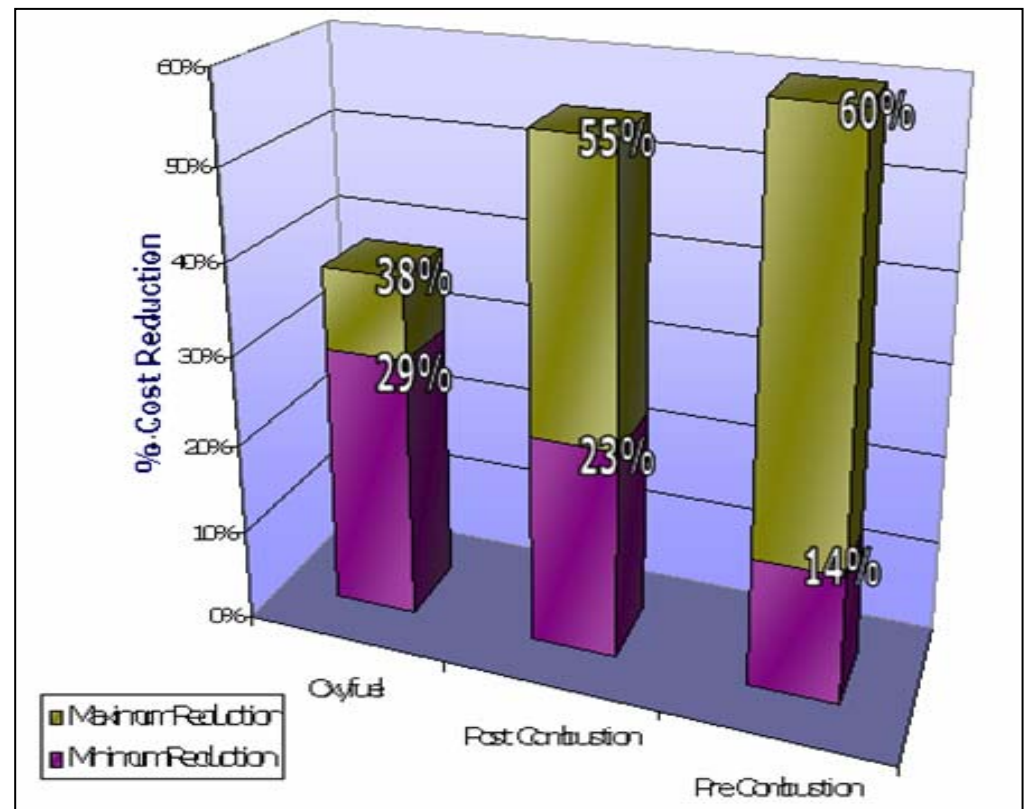




CO₂ Capture Project

CCP Phase 1 (CCP1) Overview – Capture Results

- The CO₂ Capture Project (CCP) has under development new technologies that could halve the cost of CO₂ capture (from \$60-80 to \$30 - 40/ton)
- Technologies developed by the CCP can be applied to a wide range of industry sectors, removing CO₂ from the combustion of oil, gas and coal
- Best technologies: Chemical looping, BIT and HMR



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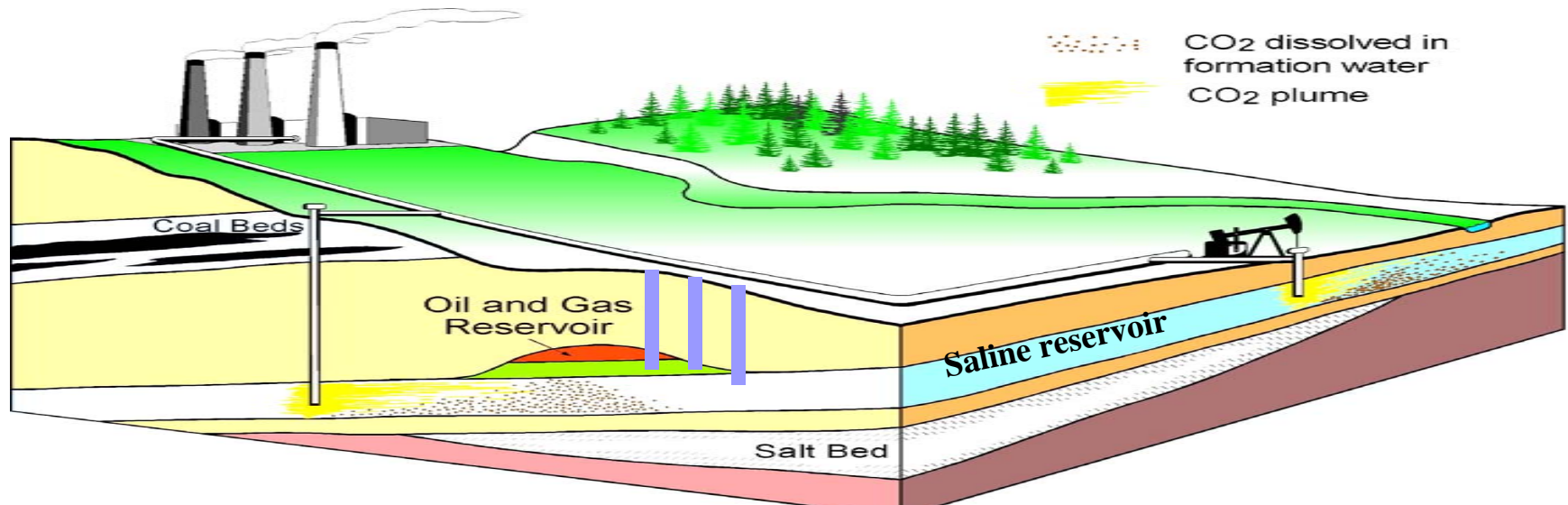
CCP Phase 1 (CCP1) Overview – storage program

Integrity of geologic and engineered systems

Optimization of processes and economic offsets

Monitoring of performance and leakage

Risk assessment of containment systems



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CCP Phase 1 (CCP1) Overview – Storage Results

30+ Studies from R&D organizations and consultants from the US, EU, Norway and Australia addressing issues in storage:

Major findings include:

- Containment predictability of geologic systems
- Favourable comparison with natural & industrial analogs
- Well integrity is a concern but mitigating factors and engineering solutions exist
- Economic efficiencies and offsets are available for capture purity, pipeline transportation and enhanced recovery
- Cost-effective monitoring technologies from multiple vantage points are available or under development but testing is needed
- Suitable probabilistic and deterministic risk assessment protocols have been developed but need to be benchmarked, simplified and tested



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CCP2 Technology program: Capture

Priority	Technology	Application
Near term	SEWGS	Pre
	BIT	Post
Mid term priority	Chemical Looping	Oxy Firing & Pre
	HMR	Pre
Long term Priority	Novel Technologies	Pre & Post
	Membranes	Pre
Others	Gasification	Pre & Post
	Advanced SMR	



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CCP2 Technology program: SMV

- Establish long-term well bore integrity
- Develop cost-effective monitoring in wells
- Technical criteria and procedures for secure abandonment and transfer
- Participate in Geological storage field demos sharing SMV tools, experience and learning



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CCP2 Technology program: Policy

- Update survey of existing policies, regulations, and incentives that impact or benefit CO₂ capture, injection and storage in geologic formations
- Continue network monitoring function and share information about proposed regulations, policies, and incentives that can affect CCS. Identify potential opportunities to inform the debate on CCS
- Participate in international forums to discuss the formulations of policies and incentives in CCS technology
- Comment on significant proposed policies and incentives in CCS technology – developing key policy related messages in support of creating favorable conditions for technology and commercial development



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CCP2 Technology program: Communications

- Coordinate CCP key messages from technology programs
- Coordinate international forums for outreach and engagement with industry, NGO's and opinion leaders
- Publish and produce project information in multimedia formats
- Communicate project status and updates
- Coordinate publication of project final results



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CCP2 Breaking the technology mould

- Engage a wider group of participants
- Shopping the world for best technology providers
- Stage-gate process for continuous high grading
- Integrating the capture and storage picture
- Technology development orientated at near-to-medium term application
- Engaging key stakeholders, governments and NGO's
- Independent advisory board consisting of world class experts
- Understanding how CCS technology can add additional value
- **Enabling a new paradigm – Breaking the link between fossil fuel use and emissions of CO₂ – a material option**



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Summary & concluding remarks

- CCP2 has transitioned successfully from CCP1
- Capture technology development will reduce cost and uncertainty around performance
- SMV will focus on developing long term well integrity, monitoring and abandonment criteria
- Driving technology towards demonstration
- Making CCS technology cost competitive with other low or no carbon energy alternatives
- Forming international public private partnerships



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