



# **Report on the Task Force on Utilization Options for CO<sub>2</sub>: Phase 2 Report**

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Technical Group Meeting  
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## **Purpose of Task Force**

**Identify/study the most economically promising CO<sub>2</sub> utilization options that have the potential to yield a meaningful, net reduction of CO<sub>2</sub> emissions, or facilitate the development and/or deployment of other CCS technologies.**

**Represents a snapshot in time, not a continually evolving report/document.**



# Timeline of the Task Force

- **Beijing, P.R. China, September 2011:**
  - The CSLF Charter was amended to include CO<sub>2</sub> utilization technologies.
  - Utilization Options for CO<sub>2</sub> Task Force was created. Focused on non-EOR options.
- A draft charter was developed December 2011.
- Bergen, Norway, June 2012: First meeting of task force occurred.
- Perth, Australia, October 2012: Phase 1 Report completed. Options for further evaluation in Phase 2 discussed and selected.
- Rome, April 2013: Status of progress on Phase 2 report provided.
- October 2013, Phase 2 report completed.



# Options and Report Structure

## Options Evaluated for Phase 2 Report

### Resource Recovery

*CO<sub>2</sub>-EGR*

*CO<sub>2</sub> for shale gas/oil recovery*

### Non-Consumptive

*Urea*

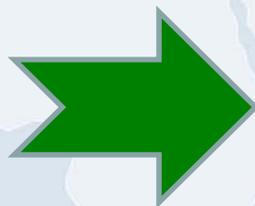
*Algal Fuels*

*Greenhouse Utilization*

*CO<sub>2</sub>-Assisted Geothermal*

### Consumptive

*Aggregate, SCM*



## General Structure of Each Chapter in Report

- Metrics
- Current State of Technology
- Economics of Technology – current and potential
- Active/Planned International Projects
- Regulatory Requirements
- Technology Advancement needs/gaps, RD&D needs
- Potential for co-production



## Messages to Policy Group

- Number of CO<sub>2</sub> utilization options available which can serve as a mechanism for deployment and commercialization of CCS.
- EOR is the most near-term utilization option. Non-EOR CO<sub>2</sub> utilization options are at varying degrees of commercial readiness and technical maturity.
- For mature options, efforts should be on demonstration projects and on the use of non-traditional feedstocks or 'polygeneration' concepts.
- Efforts that are focused on hydrocarbon recovery other than EOR, should focus on field tests.
- Efforts that are in early R&D or pilot-scale stages should focus on: addressing key techno-economic challenges; independent tests to verify the performance; and support of small, pilot-scale tests of first generation technologies and designs.
- More detailed technical, economic, and environmental analyses should be conducted.



## Recommendations

- **Urea production and greenhouse utilization**: Technically mature, focus on polygeneration and non-traditional feedstocks, demonstration projects.
- **Hydrocarbon recovery**: Focus on use as fracturing/stimulation fluid – field tests to validate technologies. Targeted R&D such as viscosity enhancers, and leverage existing industry efforts.
- **Algae to fuels and aggregate/secondary construction materials**: R&D and small pilot-scale tests to provide data. Independent tests to verify product performance.
- **CO<sub>2</sub>-assisted geothermal**: R&D on subsurface impacts, small pilot-scale tests to provide operational data.



## **Task Force Membership**

- **Mark Ackiewicz (United States, Chair)**
- **Clinton Foster (Australia)**
- **Didier Bonijoly (France)**
- **Paul Ramsak (Netherlands)**
- **Ahmed Al-Eidan (Saudi Arabia)**
- **Tony SurrIDGE (South Africa)**
- **Philip Sharman (United Kingdom)**