



CSLF Task Force Report on Bioenergy with Carbon Capture and Storage (BECCS)

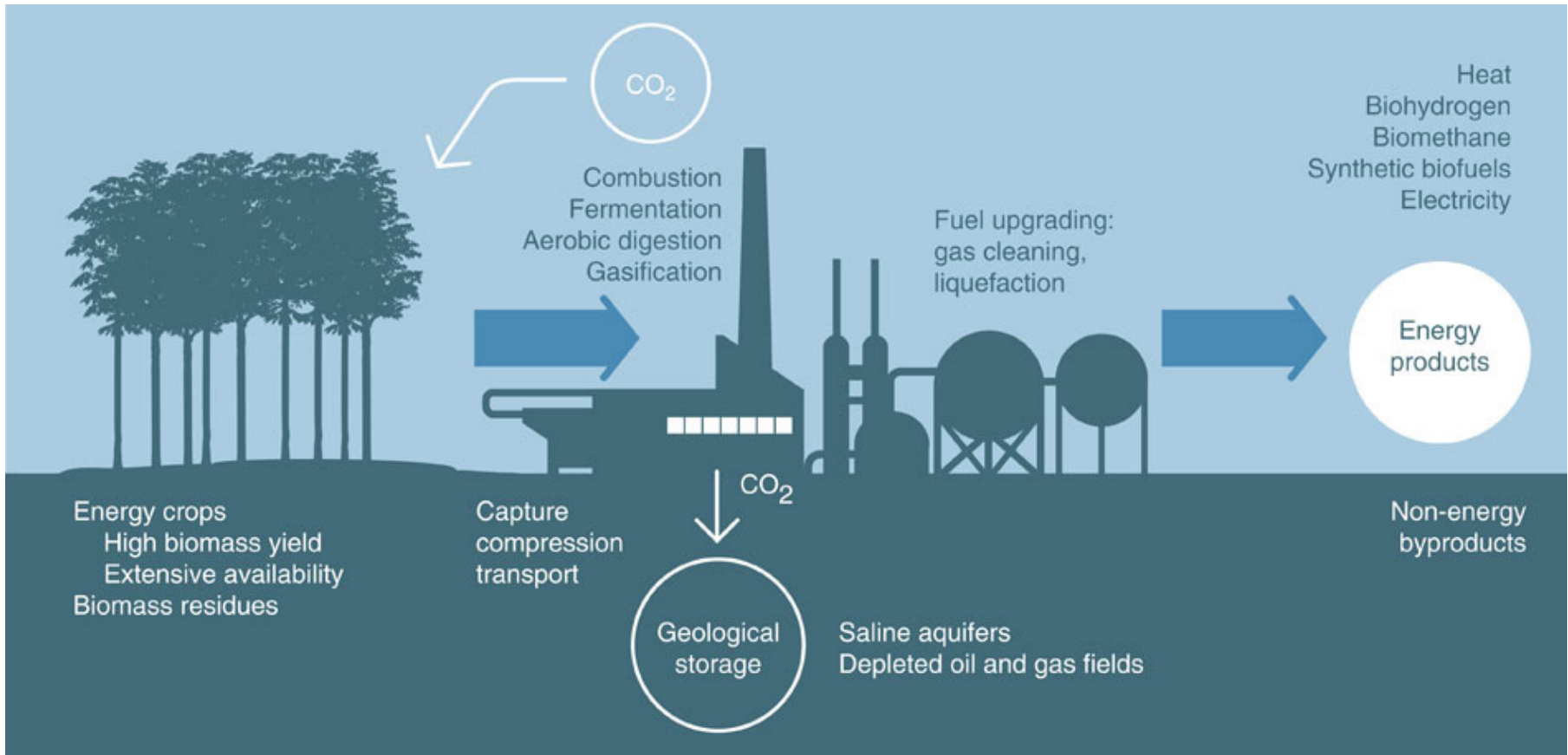
Mark Ackiewicz

CSLF Technical Group Meeting

April 23, 2018

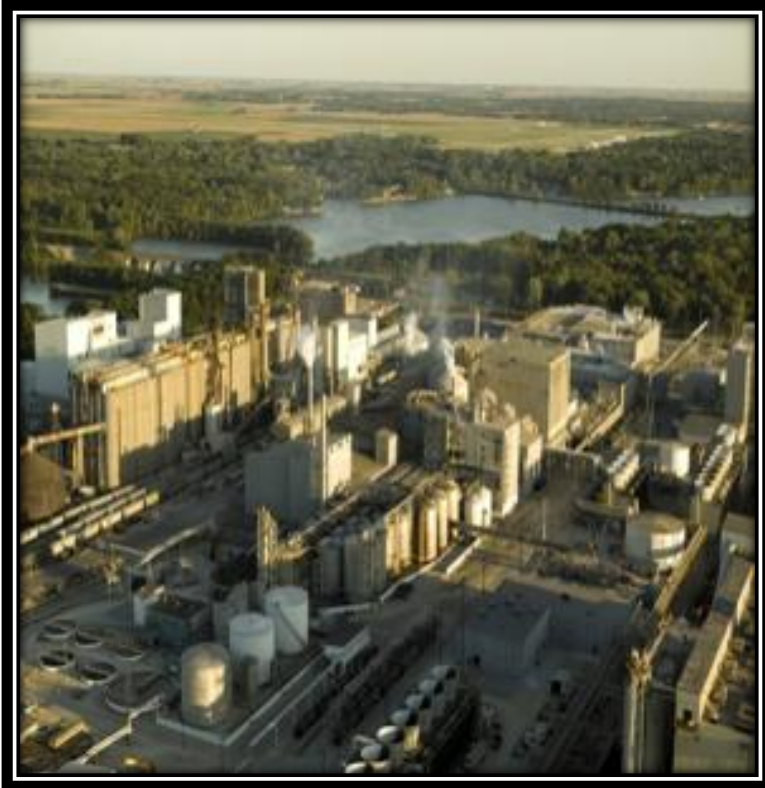
Venice, Italy

What is BECCS?



Source: (Canadell & Schulze, 2014)

An example of BECCS



**Archer Daniels Midland Company
ICCS Project
*CO₂ Capture from a Biofuel Plant***

- **Location: Decatur, IL, USA**
- **CO₂ (>99% purity) is a by-product from production of fuel-grade ethanol via anaerobic fermentation**
- **Up to 90% CO₂ capture, dehydration (via tri-ethylene glycol) & compression**
- **~900,000 tonnes CO₂ /year**
- **Sequestration in Mt. Simon Sandstone saline formation and began in 2017.**
- **Permitted Class VI well (Geologic Sequestration)**
- **Total Project: \$208 MM; DOE Share: \$141 MM (68%)**

Background



- **June 2015 Regina CSLF Meeting:** Technical Group formed ad hoc group to investigate and suggest new areas/opportunities for technical action plan.
- **November 2015 Riyadh CSLF Meeting:**
 - Ad hoc team presented findings and suggestions
 - Three new task forces formed, including BECCS
 - Members/interest: USA (chair), IEAGHG, Italy, Norway
- **2016 Meetings:**
 - Task Force updates/continue drafting
- **2017 Meetings:**
 - Task Force update
 - Draft final report
- **2018 Meeting:**
 - Final Report submitted

Report Outline



Executive Summary

1.Introduction (CSLF Purpose, Task Force Mandate, Overview of BECCS and Bio-CCS, Challenges and Benefits of BECCS)

2.Summary of Resource Assessments and Emissions Profiles (Biomass and Carbon Storage Resource Assessments, Direct GHG emissions, Indirect GHG emissions, Summary of Life Cycle Assessments, Identify Gaps in Analyses and Future Opportunities)

3.Commercial Status of BECCS Technology Deployment (Planned and Existing Projects, Projects in Operation, Government Programs, Market Drivers for BECCS Deployments, Barriers to Large-scale BECCS Demonstration and Deployment)

4.Overview of BECCS Technology Options and Pathways (Power Generation, Fuels and Chemicals Production, Industrial sources, Summary of Economic Analyses, Summary of Technical Challenges and R&D Opportunities)

5.Findings and Recommendations

REFERENCES

Barriers



- Technical – Coupling CCS with biomass feedstock combustion and conversion challenges
- Economics
- Resource limitations
- Policy and regulation
- Supply chain development

Recommendations



Topic	Recommendation
Biomass Feedstocks	R&D to develop and identify feedstocks that require limited processing Optimize water use and carbon footprint Monitor feedstock availability on regional basis
Technology	Improve pre-treatment processes (densification, dehydration, pelletization) Develop and identify technologies with lower costs and energy penalty
Analyses	Develop a common framework for lifecycle assessment to facilitate accurate accounting of BECCS carbon footprint
Outreach and Communications	Inform policy makers with respect to the benefits of BECCS market opportunities Build trust with public and local communities Stronger collaboration between stakeholders of the CCUS, bioenergy, and BECCS industries
Financing	Incentivising the double benefit of BECCS

Acknowledgements



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This report represents a review of the current status and potential for Bioenergy with Carbon Capture and Storage and does not necessarily represent the views of individual contributors or their respective employers.

Link to Final Report:

https://www.cslforum.org/cslf/sites/default/files/documents/Publications/BECCS_Task_Force_Report_2018-04-04.pdf