

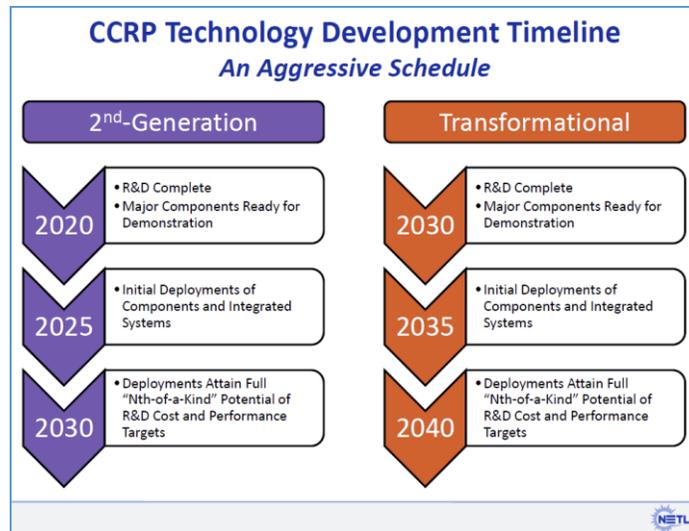


>> FOSSIL FORWARD

Revitalizing CCS: Bringing Scale & Speed to CCS Deployment

Chapter E – Gap Analysis

Capture & Transformational Technologies – Federal and international carbon management objectives will require widespread deployment of CCUS by the 2030s. This means technologies must be ready for commercial deployment a decade prior to have the desired impact. DOE’s goals for greenfield CCUS and companion “transformational” technologies have evolved in the last decade, wherein 2nd generation technologies in 2020-25 are targeted to capture CO₂ at ~\$40/tonne, and transformational technologies <\$40/tonne by 2030-35. All costs are for NOAK plants. FOAK plants by their nature will cost more than NOAK, but DOE’s program has no mechanism to assist FOAK units, meaning these units will not get built and therefore neither will NOAK plants. Nor is there any plan to fund demonstrations of 2nd generation. Thus, DOE’s current program will fall short.



DOE’s CO₂ Capture Research Timeline

Transportation – DOE has conducted analyses and produced a transport cost model. Currently there are >3000 miles of commercial CO₂ pipelines in the US that have successfully been operating for decades. However, public perception, which can impact siting and permitting, is still an issue.

Storage & Utilization – Once captured, there must be a place to store or use CO₂. While DOE is working on some promising reuse applications, it will be difficult to find products requiring the amount of CO₂ that will be captured. Thus, efforts on storage must be enhanced in order to meet overall CO₂ reduction goals. DOE has the best CO₂ storage program in with world; but in its current form it is insufficient to reach the targets. A large risk is the development cost of a site to ensure its geologic acceptability, which takes ~3 years and ~\$100 million. A greater number of large-scale CO₂ storage projects are needed. Further, DOE should increase its storage goals by three to five times, and assess and address the issues that lead to cancellation of several previous projects before another round of demonstrations are commenced. Consideration should be given to establishing a program to certify at least one reservoir in each of the seven regions of DOE’s RCSP program. DOE should continue and enhance its efforts regarding CO₂ EOR and possible use in “residual oil zones.”

International Collaborations – DOE has already taken important steps to form international partnerships and collaborative groups, but more are needed. As DOE’s budget alone is insufficient to commercialize CCS, its international efforts must be augmented. As CO₂ has global impact, it does not matter where it is captured/stored, thus, some storage demonstrations could potentially be conducted collaboratively in other countries at lower cost, with the technology and knowledge applied later in the U.S. and worldwide. A significant challenge will be the development of a strong Intellectual Property (IP) strategy, for which DOE has already laid much of the groundwork.

Workforce Issues & Public Acceptance – Both adequately trained workforce needs—including trained permitting personnel—and public perception remain problematic for CCUS deployment. DOE can address these by holding workshops for state and federal regulators to introduce them to DOE’s projects and goals, track record of existing CO₂ pipelines, etc. to help build capacity and better educate the public. Further, DOE should consider establishing a “University CCUS Systems Research” program ala its successful University Turbine Systems Research program, which sponsors R&D at universities and places engineering students in internships with U.S. companies, efforts which would help “prime the pump” in development of the required CCUS-trained workforce.

QER – The Quadrennial Energy Review is a four year effort, with certain topics begun in 2014. It is recommended that the infrastructure needs for a comprehensive, nationwide CCUS system be considered in the 2015 or 2016 segment of the QER.

Creative Financing – No federal funding for commercial scale CCS/CCUS demonstrations has been available since FY 2009. Further, the existing DOE loan guarantee program is not addressing the true financial obstacles and therefore has few takers – rendering it insufficient to meet the goals. Consequently, there is a need for more creative financing options. DOE should consider the United Kingdom’s model, “contract for difference,” to assist commercial scale CCS projects. This mechanism covers the difference between the market price for electricity received by a power plant implementing CCS and the plant’s actual (higher on FOAK) cost to generate electricity. Another model to review and consider is the 2012 National Enhanced Oil Recovery Initiative (NEORI) that proposes the use of competitively awarded federal production tax credit for companies that capture CO₂ and sell it for use in EOR. Additionally, rate recovery, feed-in tariffs, grants and tax free debt financing should also be evaluated for their potential to expedite CCS/CCUS deployment.

Key Findings

- The current DOE CCS/CCUS program does not include any budget or plan to fund demonstrations of 2nd generation CO₂ capture technologies, which are needed to foster ultimate widespread deployment by the 2030s. Thus, the 2nd generation needs to be operating in ~2020-2025, meaning that financial commitments must be made imminently (2015-16).
- Concomitantly, DOE should continue to sponsor early stage R&D on needed transformational technologies for CO₂ capture and improved compression.
- DOE’s CO₂ storage program (presently the best in the world) in its current form will not be sufficient to reach the desired endpoint. The goal should be to have 5-10 GW of CCUS projects operating by 2025. The program should address the significant risk a CCUS developer faces in finding and developing a suitable storage site in a timely/economic fashion by helping to identify and certify at least one reservoir, subject to specific criteria, in each of the seven Regional Carbon Sequestration Program regions.
- CO₂ emissions are a global problem requiring global solutions. DOE has taken important steps to form international collaborations, but more will be needed.
- In recent past, no federal funding has been made available for commercial scale demonstrations, and the DOE loan guarantee program for CCS/CCUS is conceptually flawed, generally not used, and therefore will not move these projects forward. More creative financing approaches must be offered.

<http://www.nationalcoalcouncil.org/studies/2015/Fossil-Forward-Revitalizing-CCS-NCC-Approved-Study.pdf>

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