Example of an Effective Public Partnership Model in Fossil Energy

The Clean Coal Technology Demonstration Program

What type of program is it, and for what purpose:

- The Clean Coal Demonstration Technology (CCTD) Program demonstrates advanced new technologies that improve the environmental and efficiency performance of clean coal-based energy and power plants. These technologies are at a level of technical maturity for demonstration in a commercial setting.
- If successful, these demonstration projects would be ready for deployment in the market place in response to more stringent emissions regulations on emissions (e.g., SO2, NOx, particulates, mercury). More recently, the follow on to the CCTD has been the Clean Coal Power Initiative which, in its third round of solicitations, is focused on advanced plants with carbon capture and storage.

How is it managed and funded? What are the specifics of the program that could be models for the agency and divisions from a successful outcome perspective?
Below are some specific aspects of the CCTD program worth considering as a model for the agency. Relative to successful outcomes, the nature of technology research, development and demonstration is such that a lead time from the completion of a demonstration (typically 5 years for the first commercial entry) to the commercial deployment occurs before realizing the benefits these technology options. In some instances, changes in market conditions may impact the degree of deployment of such technologies into the market. However, clear objectives and goals of a project are a necessary condition for realizing successful outcomes.

- The management of the program is through the National Energy Technology Laboratory (decentralized management) with oversight from Fossil Energy headquarters. The program was conducted with a series of solicitations (five in all under the CCTD) each with a particular emphasis or focus on demonstrating progressively more advanced and improved technologies, such as improvements to emissions reductions, cost-effectiveness, efficiency and reliability.
- The projects within the CCTD program are structured by budget periods (phases) with set scopes and milestones that support clear objectives. These that are tracked and reported on regularly. DOE does not allow a project to proceed to the next phase until all the requirements have been satisfied within a budget period.
- The funding for CCTD is such that selected projects require a minimum of 50% cost-sharing from the participant. This is an important provision since it forces discipline on the part of the private sector side to hold to cost and schedule as since its funding is also at risk. Costs incurred are paid by both the participant and the government (a dollar for dollar approach) along the way within each budget period.
- Typically the total cost of demonstration projects run in the hundreds of millions to over a billion dollars. The average private side contribution to the CCTD

partnership was over 60%. Because of the large sums of investments involved, solicitations have been issued only when sufficient appropriated funds become available. That means it may take two appropriation cycles to accumulate sufficient funds for a solicitation. This feature has the negative effect of delaying demonstrations and limiting the number of promising concepts selected for demonstration.

- By statute no CCTD (and subsequently the Clean Coal Power Initiative) project may be selected for which the government's share of funding is not available up front. This provision allows a certain degree of certainty to the prospective bidders. This certainty is an important feature for the awarded project participant in securing project financing, vendor bids, and other agreements needed for the project to go forward. In addition, the statute while not obligating the government to increase its share of any cost growth in the project, allows the government to provide its share (up to 50%) of any total project cost growth up to a 25% limit, thus capping the government's investment.

Who participates in the partnership, and how were they recruited?

- Participants in CCTD projects are usually comprised of a private sector team from that would identify a lead participant, usually a utility or technology vendor or licensor, and other sub participants including in some cases States.
- The partnership participants are selected competitively through a DOE solicitation (technically it's called a Funding Opportunity Announcement).
- In nearly all instances, the participant's are the companies that will ultimately be responsible for deploying the technology - which adds more certainty that technology commercialization will be successful.

What sort of legal vehicle was used to create the partnership - a contract, an outside nonprofit entity, an informal arrangement with DoE, etc.?

- The legal vehicle is through a cost-shared cooperative agreement between the DOE and the participant. This is a form of financial assistance and selection is on a competitive basis. A cooperative agreement, versus a grant (another form of financial assistance whereby funding is provided for a scope of research or activity), gives the government a more significant input to how the project is structured and managed and more control over the funding than a grant. It is not a contract since the government is not procuring. It allows the DOE to advance its goals through the activities of the private sector participant which share common interests and outcomes, but for perhaps different purposes.
- In selecting project partnerships, the DOE evaluates the proposers' responses to a set of technical and business evaluation criteria. For example, required in the proposals are details of the team's technical qualifications, the experience and corporate commitment, the financial viability of the team, financing plans/commitments, any purchase agreements (e.g., power purchase agreements), acquisition plans, management plans, work breakdown structures, a

commercialization plan, i.e., how the participant plans to commercialize the technology after completion of the demonstration.

What is the management structure?

- On the DOE side, the management of the CCTD program is decentralized through the National Energy Technology Laboratory (NETL) which assigns a project team with a project manager to each project to track the progress of the projects.
- On the private side, there is a project management team with a lead project manager. The teaming structures vary by project, many of which include subcontract management agreements, and a tiered work breakdown structure.
- The management of these projects follows the project management principles of DOE Order 413.3 – Project Management for Capital Assets, although these projects are not capital assets.
- Periodic reporting and scheduled project reviews are conducted. Approval by the NETL Director or his designee is required before moving on to the next phase. Obligation of funds is approved by DOE-HQ procurement business clearance for sums over $10 million.

How is the program funded?

- The CCTD program and its successor (CCPI) are funded through annual appropriations.
- Cost sharing of 50% minimum from the participating partner is required.

What were the goals of the partnership, and how is the outcome measured?

- The goal of the CCTD program partnership was to commercialize advanced clean coal technologies with lower cost and improved environmental performance, coming out of the R&D program for commercial deployment and to set the foundation of subsequent advances in demonstrations that would build on these.
- The outcome is measured in terms of the technology deployment in CCTD and the economic benefits (cost reductions) and environmental performance (absolute emissions reductions) improvements even as coal generating capacity increased.
- For example in the 1990's the CCTD projects provided the demonstration of progressively lower cost control technology deployed for sulfur dioxide (SO2) and nitrogen oxide (NOx) emissions from coal power plants. At the outset, there was a cap and trade on SO2 that valued SO2 in the several hundred dollars/ton range. A majority of these demonstrations won awards including Power Plant of the Year Awards by Power Magazine and Air & Waste Management Association Awards by.
- Examples of the outcomes measured in the CCTD program on improvements in emissions controls systems demonstrated from CCTD in the 1990s include:

    - For SO2 controls, Southern Company estimates that through DOE's R&D and the CCTD program cost $223 million, and resulted in over 400

existing coal-fired generating units retrofitted with flue gas desulfurizers (FGDs), at one-third the cost and a savings of over $50 million through 2005, and over 7 million-ton reductions in SO2 emissions beyond what would have occurred absent the CCTD program.

- For NOx, the CCTD program resulted in over 75% of existing coal-fired units being retrofitted with low-NOx burners and selected catalytic reduction devices on 30% of the U.S. coal generating capacity, at less than half the cost it did in the 1980's, with a 25 million ton reduction in U.S. NOx emissions through 2005. This investment by DOE was about $67 million resulting in a conservatively estimated economic benefit of over $256 billion through 2005.