

U.S. DEPARTMENT OF
ENERGY

Office of
Fossil Energy

**STUDY: OPTIONS TO FUND LARGE-
SCALE PILOT PLANTS**

2017 CSLF Mid-Year Meeting

April 30 – May 4

Abu Dhabi – United Arab Emirates

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- ***Purpose:*** To investigate options to overcome barriers to financing large pilot projects for fossil fuel-based power plants with CCS.
- ***Sponsors:*** U.S. Department of Energy, Japan's New Energy and Industrial Technology Development Organization, and the Carbon Utilization Research Council
- ***Study Lead:*** Carbon Utilization Research Council. Phase 2 Report to be completed in May 2017.
- ***Methodology:*** Multinational working groups focused on two tasks:
 - Innovative methods to finance large scale pilot projects
 - Multilateral collaboration as a financing option and effective models



November 2014 Workshop seeking private sector perspective on support for large pilot scale power projects w/CCS.



March 2016 report on lessons learned and barriers to domestic and multilateral large pilot scale projects with CCS.



April 2017 report (in draft): Concepts to overcome barriers.

- **Large pilots (10-50 MWe, \$100-500mm) are a critical step in technology development.**
- **Barriers include perception of limited market for mature technology, especially for coal systems in OECD countries; financial challenges related to high cost, relative risk, difficulty demonstrating a “persuasive business case”; and lower government priority compared to other low carbon technologies.**
- **Multilateral financial collaboration could contribute to large pilot project success. However, several key issues may substantially hinder collaboration if not mitigated in collaborative frameworks.**

- **A portfolio of policy and financial incentives is needed.**
- **Policies should facilitate permitting and environmental accommodations for large pilots. Government support of large pilot projects will almost certainly be needed. Funds might come from general tax revenues, a small carbon tax or industry fee, or regulatory proceeds (allowance sales).**
- **Financial incentives should vary depending on the nature of the project and country-specific considerations.**
- **Additional, non-traditional sources of financial support should be pursued: e.g., environmentally-purposed foundations, export credit agencies, corporate collaboratives like the Oil & Gas Climate Initiative, and “green” banks.**
- **Reduced project costs may be achievable via increased effort at the bench and small pilot scale, employing “slipstream” approaches, or possibly designing reusable test platforms.**

- **Earlier work suggests that multilateral collaboration is a potentially important component of large-pilot financing.**
- **Governments with overlapping R&D missions can find value in leveraging financial resources to support the various promising technologies in the pipeline.**
- **Resources can be pooled, redundancies eliminated, and ultimately more large-scale projects may reach successful completion.**

- **The need for substantial domestic involvement in return for a country's contribution to large pilot projects may be compelling, can complicate framework development, and will impact pilot project structure.**
- **Countries and regions have different viewpoints on fossil-based power and CCS technology development and deployment. Hence, a singular collaborative approach may not be effective. Targeted collaboration and framework development by countries with like-minded viewpoints may be an option.**
- **Development of a multilateral collaborative framework for large pilot project financing is a complex undertaking which may take several or more years. Compromises between the perfect and the achievable must be considered.**
- **Changing national priorities can adversely impact long-term projects. Multi-national funding may magnify project risk from changing priorities.**

- A. Joint planning, combined call for proposals**
- B. Joint planning, independent calls for proposals**
- C. Pooled funding in a lead government**
- D. Global Pilot Project Organization**
- E. National Test Facilities**

(Advantages and disadvantages of each model will be discussed in the Final Report).

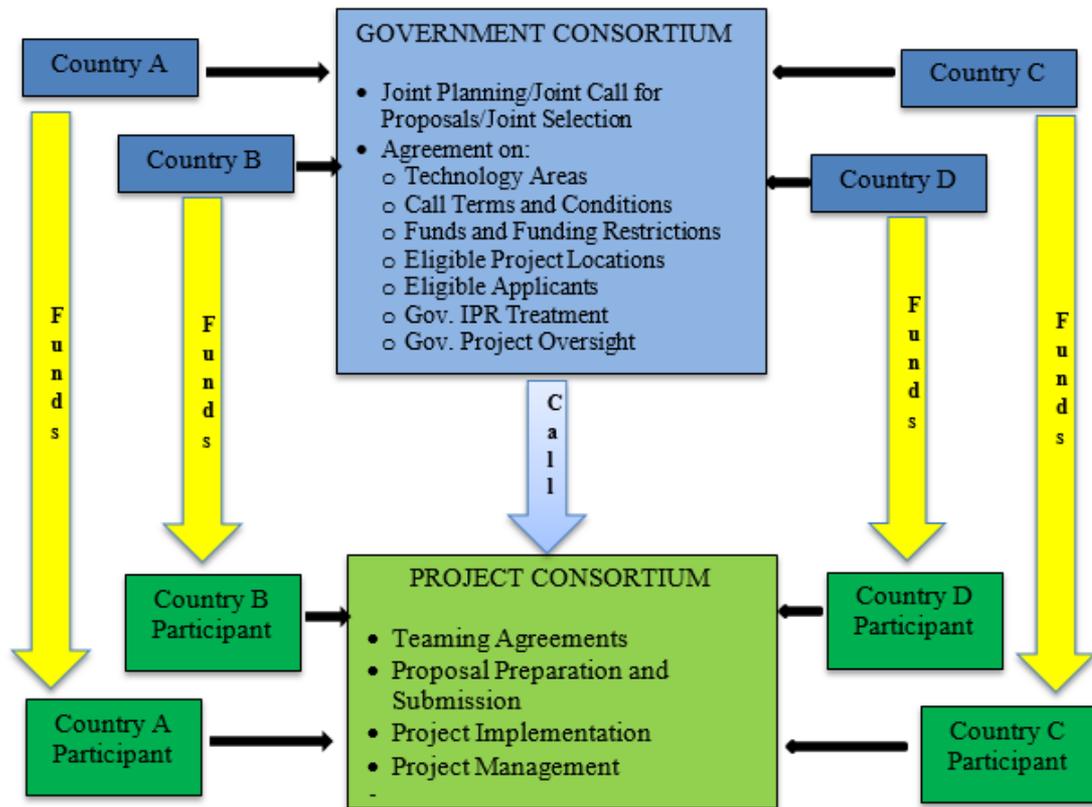


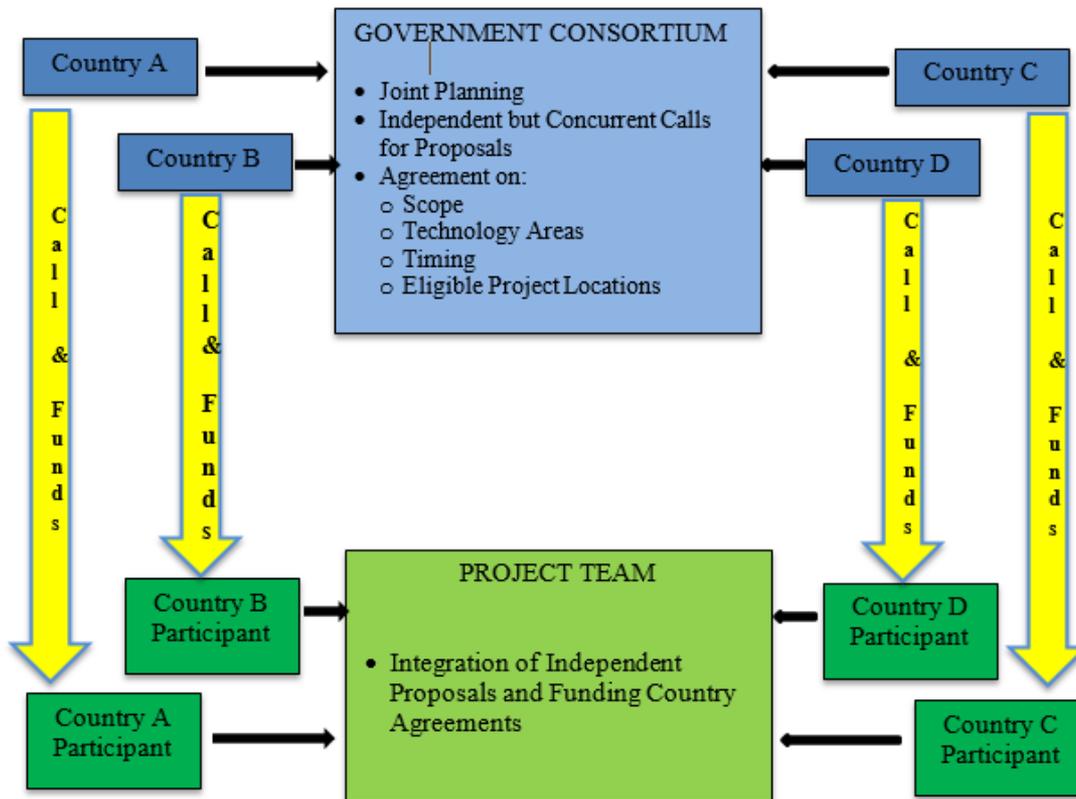
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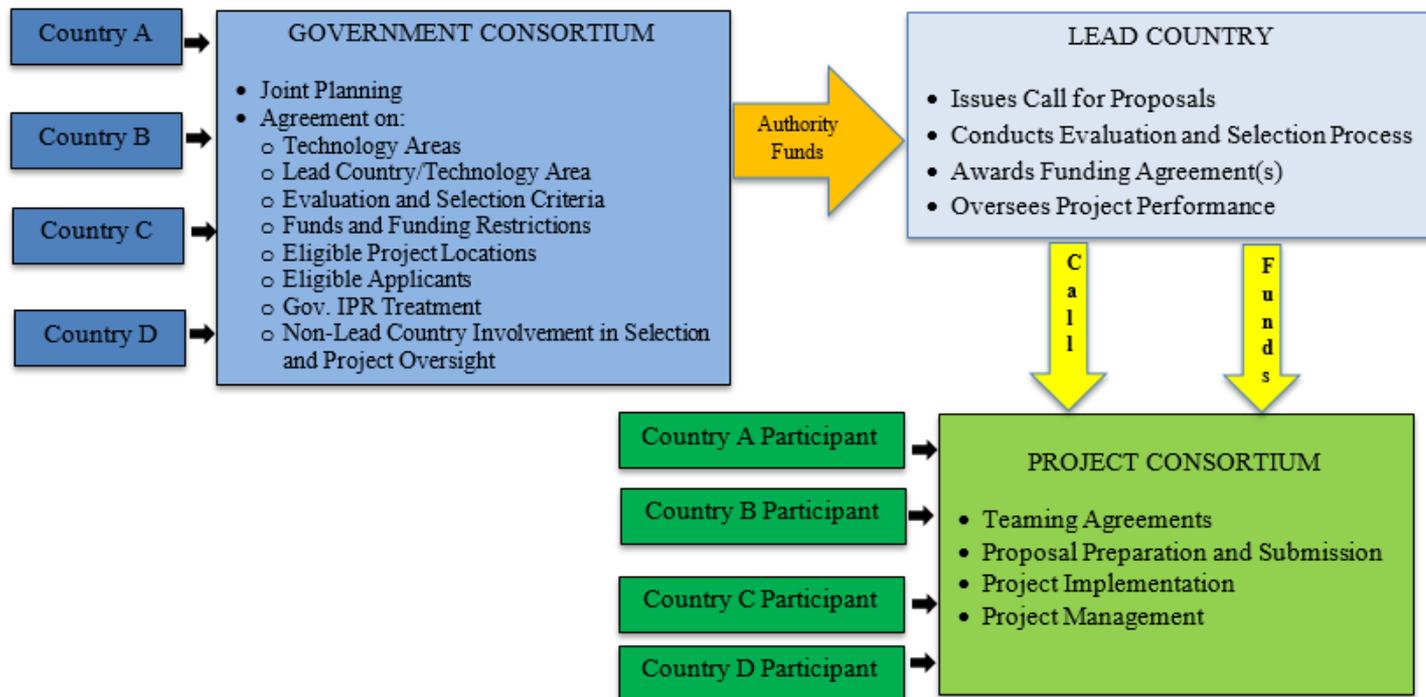
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Questions?

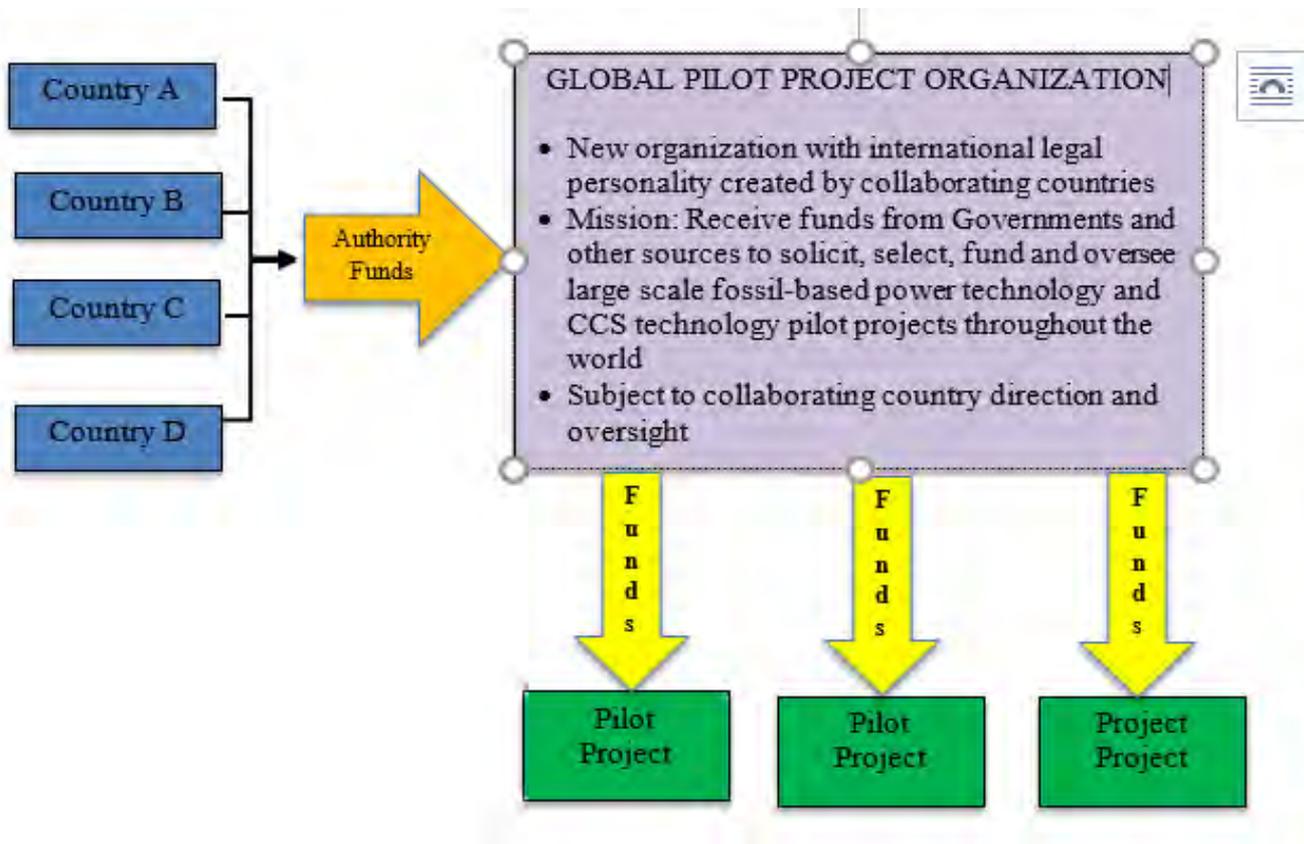
**ADDITIONAL SLIDES
POTENTIAL MODELS CONSIDERED**







Option D - Global Pilot Project Organization.



Option E – National Test Facilities

