

**Fusion Energy for Power Production: Status Assessment, Identification  
of Challenges and Strategic Plan for Commercialization**  
**March 2011**

**Phase I.** Status Assessment and Identification of Challenges

Objective: For each of the most significant fusion power initiatives, develop a timeline to achieve an electric power production facility and identify the major obstacles/challenges to overcome to achieve that goal. Utilize existing public information to select a target number of six to seven initiatives for evaluation.

Task 1. Form an industry Oversight Committee (OC) for the project and obtain agreement on: 1) the scope/ approach for the activity, 2) membership in the Advisory Committee (AC) to the OC, 3) membership in the Technical Assessment Committee (TAC) and 4) EPRI being the Program Manager for the project. Establish project communication network, select the (six to seven) fusion initiatives to be evaluated and secure participation by representatives of the selected initiatives in the project (December 2010 – January 2011 ).

Currently identified OC members include:

- Mike Wallace, Chairman (Constellation)
- Peter Barbee (PG&E)
- Ashok Bhatnagar (TVA)
- Don Brandt (Pinnacle West)
- Dave Christian (Dominion)
- Joe Donahue (Progress Energy) - ?
- Gene Grecheck (Dominion)
- Steve Kuczynski (Exelon)
- Rick Kuester (We Energies)

Currently identified AC members include:

- Tom Christopher (NPPA Consulting)
- Andrew Kadak (Exponent)
- Tom Mulford, Program Manager (EPRI)
- Mike Sellman (Sellman Consulting)
- Joe Turnage (Constellation)

Task 2. Conduct a two to three day workshop where representatives of each of the (six to seven) selected fusion initiatives will make presentations to members of the AC and the

TAC. The presentations will identify projected timelines and obstacles/challenges to overcome for each of the technologies in a non-proprietary manner. In advance of the workshop, EPRI and the AC members will conduct a briefing with each the technology participants to ensure presentation consistency and ensure that the goals of the workshop are met. Initial perceptions from the workshop will be communicated to the OC members (April 2011).

Task 3. EPRI will work with the AC and the TAC members to analyze the information from the workshop to determine the fusion technology that is most likely to succeed on the shortest timeline. Conclusions from this more detailed assessment will be reviewed with the OC members and their agreement with the results will be obtained (April – June 2011).

Task 4. With input from the TAC, EPRI and the AC members will prepare a draft report that documents the elements and conclusions of Phase I of the project. This draft report will be transmitted to the OC members for their review and a face-to-face meeting between the OC and the AC will be conducted to review the report conclusions and resolve any comments. Additionally, each participating fusion technology will be given the opportunity to review and comment on the report content that relates to their technology (June – August 2011).

Task 5. Incorporate any comments from the OC member review meeting and the fusion technology representatives into the draft report and publish a final Phase I report. The final Phase I report will identify the fusion technology that is most likely to succeed on the shortest timeline and make appropriate recommendations related to proceeding with Phase II of the project – developing a strategic plan (or roadmap) for commercialization of fusion energy for power production using the selected fusion technology as a model (October 2011).

Funding Source for Phase I: EPRI Technology Innovation (TI) Program

Schedule for Phase I: December 2010 – December 2011

## **Phase II:** Develop Strategic Plan for Commercialization

Objective: Based on the most promising fusion technology identified in Phase I, develop a Strategic Plan (Roadmap) for commercializing fusion energy for power production. Although the Plan will address the specific aspects of the selected technology, the goal is that other fusion technologies will be able to use this Plan, as applicable, as a template for commercializing their technologies at the appropriate time.

It is envisioned that the Plan will address (as a minimum) the following elements:

- Remaining technical challenges needing solutions for the fusion technology
- Operating utility (or user) requirements for power production from fusion energy
- Regulatory licensing approach for fusion energy
- Vendors potentially interested in obtaining a commercial license for use of the fusion technology for power production
- Potential funding sources and the optimum organizational structure to move fusion energy from research to commercial power production
- Approach to achieve political support and public acceptance of fusion energy for commercial power production
- Others (as identified)

Before Phase II is complete, planning for a Phase III will be developed and put in place. It is envisioned that Phase III will be a government/industry consortium to implement the Phase II Strategic Plan. Included in Phase III will be: 1) development of a top tier utility requirements document (URD) for fusion energy power production, 2) completion of the first-of-a-kind-engineering (FOAKE) activities to complete the power production design, 3) activities to complete regulatory licensing of the design (Design Certification) and application for and issuance of a combined construction and operating license (COL) from the regulatory licensing authority, and 4) construction and operation of a full-scale fusion energy power production demonstration plant.

Specific Tasks: TBD

Budget for Phase II: TBD

Funding Source(s) for Phase II: EPRI TI, U.S. DOE and U.S. and International Utility Cofunding

Schedule for Phase II: December 2011 – December 2012