



LWR Integrated Energy Systems Interface Technology Development & Demonstration

Funding Opportunity DE-FOA-0001817

PI: Dave Gerren, *FirstEnergy Solutions Corp (DBNPS)*

Collaborators: *FES* – Ray Lieb, Robert Garber, Alan Scheanwald; *INL* – Bruce Halbert, Richard Boardman, Mayank Panwar, Cristian Rabiti; *APS* – Michael Green, Jeff Brown; *Xcel Energy* – Patrick Burke, Marc Anderson, Molly Strasser

Program: Advanced Reactor Development

ABSTRACT:

The principle objective is to carry out planning, design, testing, demonstration, and evaluation of a scalable hydrogen generation pilot plant connected to light-water reactor (LWR) power plant. The expected result of this project is to have a fully-functional operating hydrogen generation skid that has been integrated into the normal operating routine of a nuclear power plant. In addition, a detailed report will be developed after operating data has been accumulated that will highlight the technical feasibility and economic viability of this hybrid system. This report will ultimately be used by other utilities that operate nuclear power facilities for large-scale commercialization (i.e. hundreds of Megawatts).

Track I of the proposed project will perform technical economic assessments for the Arizona Public Service Company (APS) and Xcel Energy Inc. These assessments will offer summaries of the economic data and will be used to develop proposals and support the technical and financial feasibility of hybrid operations (i.e. integration of hydrogen generation facility). This information, along with pre-front-end engineering design input from the collaborating utilities will be used to produce an investor-grade report stating the business case for undertaking similar projects to implement hydrogen generation hybrid operation at other LWR power plants. These two inputs will be used to decide on whether the project should be duplicated by the collaborating utilities.

Track II of the proposed project will install a low temperature electrolysis (LTE) hydrogen generation pilot plant unit at Davis-Besse Nuclear Power Station (DBNPS). Major interfaces required for LWR hybrid operations (e.g. dynamic controls to apportion power output between the electrical grid and LTE unit) are to be developed, tested, and refined in this project.

This project will promote development and commercialization of hydrogen technology, help with domestic fuel diversity initiatives, and strengthen a sustainable national energy economy. Additionally, this project will plan, develop, and test a potential technological solution to improve the long-term economic value of nuclear plants in regions challenged by low priced natural gas and renewable electric generation. The use of hybrid systems can preserve the benefits of nuclear plants, including grid stability and carbon-free energy while creating a market-based solution in response to increasing low-cost power as well as variable renewable energy supplies. This aligns with the purpose of Title VIII of the Energy Policy Act of 2005 and will help to ensure America's security and prosperity by addressing its energy, environmental, and nuclear challenges through transformative science and technology solutions.