Appendix D: SOFC Subject Matter Expert Template (for Project-Specific Reviews) with Instructions

The following instructions were delivered via email:

Dear Subject Matter Expert:

You are receiving this note because you or your employer has been contracted as a Subject Matter Expert (SME) by Leonardo Technologies Inc. (LTI) to perform a technical evaluation of a number of individual projects under the Department of Energy's Solid Oxide Fuel Cell (SOFC) program. Other SMEs have also been similarly assigned a number of other projects under the SOFC program so that the entire portfolio may be evaluated. You are receiving this information to provide you with additional background on the evaluation and its methodology, and to provide you with a template in order to standardize response formats such that project evaluations may be aggregated to draw conclusions about the overall program.

Background

The DOE Office of Clean Coal and Carbon Management (OCCCM), through the Division of Advanced Energy Systems (FE-221), is conducting an evaluation of RD&D projects that have addressed, or are currently addressing, the technical issues facing the commercialization of SOFC technologies. The final result will be an assessment of the activities undertaken or currently underway and the development of a comprehensive understanding of the status of the program. The parties conducting this evaluation in accordance with BPA DE-FE0022594, Call 3, and Technical Directive 13 are:

- T.J. (Lakis) Mountziaris, Ph.D., Program Director, Process Systems, Reaction Engineering, and Molecular Thermodynamics, with the National Science Foundation; and,
- The EOP Group is federal agency consulting and evaluation firm that has been retained to by DOE.

The approach is essentially two-fold. First, four SME's, such as yourself, have agreed to act as Lead Reviewer for up to twelve projects each and report back using the attached template, and also to act as a Secondary Review for up to twelve additional projects. Second, The EOP Group will aggregate the findings from all SME reports (as well as other resources) and develop a draft report on the overall program for submission to DOE.

Context

Projects are categorized based on their scope of work into "Key Technology Areas." The effectiveness of these categories, as well as the relevance of projects to their designated Key Technology Area will be included in this evaluation. Descriptions of the program mission statement and classification categories are listed on the NETL website and are also provided below:

SOFC Program Mission Statement:

The mission of the DOE FE Solid Oxide Fuel Cell (SOFC) program is to enable the efficient generation of low-cost electricity for:

- Second-generation natural gas–fueled SOFC distributed generation (DG) systems and modular, coal-fueled systems; and,
- Transformational coal or natural gas–fueled utility-scale systems with carbon capture and sequestration. The addition of carbon capture to the exiting fuel stream is essential for maintaining the green profile for these systems.

Program Key Technology Areas:

Cell Development**:** The components of the SOFC - the anode, cathode and electrolyte – are the primary research emphasis of this key technology. The electrochemical performance, durability, and reliability of the solid oxide fuel cell are key determinants in establishing the technical and economic viability of SOFC Power Systems.

Core Technology**:** Projects in the Core Technology portfolio focus on interconnects and seals, identify and mitigate stack-related degradation, develop computational tools and models, and conduct laboratory- and bench-scale testing to improve the reliability, robustness, endurance, and cost of stacks and Balance of Plant (BOP) components, respectively.

Systems Development**:** Project participants (Industry Teams) are independently developing unique and proprietary SOGC technology suitable for either syngas- or natural gas fueled applications. The Industry Teams are responsible for the design and manufacture of the fuel cells, integration of cells hardware development, manufacturing process development, commercialization of the technology, and market penetration.

Instructions

Based on your preferences, you have been designated as a Lead Reviewer for either 11 or 12 projects, and also you have been designated a Secondary review for another 11 or 12 projects. **Please see the attached spreadsheet listing your assignments** wherein "L" is for Lead Reviewer and "S" is for Secondary Reviewer.

For projects where you are designated as Lead Reviewer, we are asking that you use only publicly available documents to evaluate each project on certain factors such as scientific methodology, feasibility, specified goals, goals completed, general achievements, and contribution to achieving the overall mission statement of the SOFC program. To do so, you will be provided with a link to a database of documents pertaining to each project including the Statement of Project Objectives (SOPO), Funding Opportunity Announcements (FOA), and the final report or latest annual report, as applicable. Please use **only** the information contained in that database in conjunction with your technical expertise and experience to fill out one template per project assigned to you (blank template attached). We ask that you **do not** directly contact the Principal Investigators or their staff members for personal interviews.

There are some projects for which we have been unable to compile documentation. We are working with DOE staff to complete the database and will keep you informed. But, for now, if you are the Lead Reviewer for a project that is missing documentation, we ask that you focus on the other projects on your list while we complete the database.

Please use this link to access the database: https://drive.google.com/open?id=1g2U6-tkRF58UUom81D2dsudSzYStdGur

You will also receive an invitation via a separate email providing you access to the database. Please let us know if you do not receive that invitation or have any problems accessing the database.

The attached template is provided to help standardize and quantify the evaluations of these programs. It provides an opportunity for you to expand on your responses and suggest improvements. Your input is highly valued and we thank you for participation. Lead Reviewer ***templates are due by January 18, 2019*** and should be submitted to James Parkhurst at The EOP Group via email by COB (contact information is listed below).

For projects where you have been designated as a Secondary Reviewer, you will be provided with a copy of the Lead Reviewer's completed template (once it is complete) and asked to comment on it. Secondary Reviewer comments should be **submitted to James Parkhurst by January 25, 2019.**

SOFC Subject Matter Expert Template

DOE FE-221 SOLID OXIDE FUEL CELL GRANT RECIPIENT EVALUATION QUESTIONNAIRE	
Project Award No.:	
Title:	
Key Tech. Area:	
Reviewer:	
E-mail:	
Phone:	
Institution:	
Documents and Information used for Evaluation:	☐Statement of Project Objectives (SOPO) ☐Funding Opportunity Announcement (FOA) ☐Final Report ☐Annual Report (please specify date): ☐Other documents or sources (please list):

Survey

#	Questions	Response
Section 1: Principal Investigator's Approach and Execution		
1.1	The project builds on previous work within the SOFC program.	__ Agree __ Somewhat Agree __ Neutral __ Somewhat Disagree __ Disagree
Please explain your answer(500 words or less):		
1.2	The project has completed or is on track to complete the established goals as stated on the SOPO.	__ Agree __ Somewhat Agree __ Neutral __ Somewhat Disagree __ Disagree
Please explain your answer(500 words or less):		
1.3	The tasks established in SOPO were completed or are in the process of being completed.	__ Agree __ Somewhat Agree __ Neutral __ Somewhat Disagree __ Disagree
Please explain your answer(500 words or less):		
1.4	The work conducted was consistent with DOE's goals as outline in the FOA.	__ Agree __ Somewhat Agree __ Neutral __ Somewhat Disagree __ Disagree
Please explain your answer(500 words or less):		
1.5	The scientific conclusions are supported by the data presented.	__ Agree __ Somewhat Agree __ Neutral __ Somewhat Disagree __ Disagree

Please explain your answer(500 words or less):		
1.6	The performer's scientific approach for completing project tasks was the best course of action given the scope, budget, and timeframe.	__ Agree __ Somewhat Agree __ Neutral __ Somewhat Disagree __ Disagree
Please explain your answer (500 words or less): (I.E. different assumption you would recommend, more or less simulations prior to experimentation, etc.)		
1.7	The final report/most recent annual report documents project achievements and results in a manner that is useful to commercialization and progressing scientific thought.	__ Agree __ Somewhat Agree __ Neutral __ Somewhat Disagree __ Disagree
Please explain your answer(500 words or less):		
1.8	The final results and/or findings are relevant to other SOFC projects.	__ Agree __ Somewhat Agree __ Neutral __ Somewhat Disagree __ Disagree
Please explain your answer(500 words or less):		
Section 2: Project Selection and Relevance		
2.1	The project directly contributes to the Commercialization of SOFCs.	__ Agree __ Somewhat Agree __ Neutral __ Somewhat Disagree __ Disagree
Please explain your answer(500 words or less):		
2.2	The project goals established in FOA directly contribute to achieving the mission statement of the SOFC Program.	__ Agree __ Somewhat Agree __ Neutral

		__ Somewhat Disagree __ Disagree
Please explain your answer(500 words or less):		
2.3	The performer selected is/was the best entity for this project based on the scope of work outline in the FOA.	__ Agree __ Somewhat Agree __ Neutral __ Somewhat Disagree __ Disagree
Please explain your answer(500 words or less):		
2.4	The research conducted for this project would not have been conducted without federal funding and assistance.	__ Agree __ Somewhat Agree __ Neutral __ Somewhat Disagree __ Disagree
Please explain your answer(500 words or less):		
2.5	The timeline established in the FOA is/was feasible for achieving project goals.	__ Agree __ Somewhat Agree __ Neutral __ Somewhat Disagree __ Disagree
Please explain your answer(500 words or less):		
2.6	Funding is/was appropriate for achieving stated goals in the time frame outlined in the FOA.	__ Agree __ Somewhat Agree __ Neutral __ Somewhat Disagree __ Disagree
Please explain your answer(500 words or less):		
2.7	The project's key technology area is an appropriate form of classification.	__ Agree __ Somewhat Agree __ Neutral __ Somewhat Disagree __ Disagree

Please explain your answer(500 words or less):		
Section 3: Reviewer Recommendations		
3.1	This project was a good use of federal funds.	__ Agree __ Somewhat Agree __ Neutral __ Somewhat Disagree __ Disagree
Please explain your answer(500 words or less):		
3.2	I do not have any conflicts of interests that would influence or compromise my ability to evaluate this project.	__ Agree __ Somewhat Agree __ Neutral __ Somewhat Disagree __ Disagree
Please explain your answer(500 words or less):		
3.3	The Key Technology Area(s) associated with this project is appropriate for this project.	__ Agree __ Somewhat Agree __ Neutral __ Somewhat Disagree __ Disagree
Please explain your answer(500 words or less):		
3.4	In terms of scientific approach, what would you have done differently?	
Please explain your answer(500 words or less):		
3.5	Please list your background experience(s) that are directly related to solid oxide fuel cells:	

Please explain your answer(500 words or less):		
3.6	Please provide any other comments or concerns related to this project:	
Please explain your answer(500 words or less):		