



# 2014 Smart Grid R&D Program Peer Review

## Project Summary

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**Project Title:** Architecture & Standards – GWAC  
Transactive Energy

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**Organization:** Pacific Northwest National Laboratory

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**Presenters:** Ron Melton

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**FY 2014 Funding (\$K):** \$475K

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### Project Objectives, Significance, and Impact

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The primary objectives of the Council's efforts are to build a community of those involved in the design, development and deployment of transactive energy systems and to create useful tools for that community. The current activities of the GridWise® Architecture Council build on the Council's previous interoperability efforts to define and advance transactive energy technology activities. The current focus on transactive energy is motivated by both the early work of the council in which transactive approaches were identified as a key element of a modernized grid and a driver for interoperability. The current efforts are also in response to current and emerging problems in end-to-end grid integration of distributed energy resources. A key activity is creation of a framework document that addresses regulatory policy, business, architectural and cyber-physical concerns. The framework activity is engaging a broad set of stakeholders to both educate the community and establish broad consensus on the possible ways transactive energy can be used in the evolution of the electric power system. The importance of this work is demonstrated by the growing involvement in the GWAC efforts of stakeholders throughout the United States and the International community.

## Technical Approach

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The Council is approaching the effort to build a transactive energy community and to create a “Transactive Energy Framework” by leveraging their previous work on Interoperability, in particular as reflected in the “Interoperability Context Setting Framework” and the well know “GWAC Stack.” The GWAC Stack has been mapped into a four layer stack for transactive energy: Policy and Regulatory concerns; Business Models and Value Creation; System Architecture and Control; and Cyber Physical Infrastructure. The intent is to define the elements of transactive energy in these four categories at a conceptual level. A key challenge is not to define or describe a specific implementation, but rather to provide a means for a common approach to describing specific implementations to facilitate discussion, comparison and evaluation of the applicability, strengths and weaknesses of each. The vehicle for capturing this information and making it available to the community for discussion and refinement is the “Transactive Energy Framework” document. The Council began with a core document that is being expanded as the engagement of stakeholders continues.

To facilitate building the community or eco-system of transactive energy the Council holds numerous workshops as a part of their face-to-face meetings and has initiated the International Conference and Workshop on Transactive Energy the second of which will be held in December 2014. The workshops and the conferences are helping to identify gaps in understanding and technology as well as the first efforts to frame a path forward. As gaps in understanding, for example among executive, regulators and policy makers, are identified the Council develops white papers, articles and other material to help engage and educate the community.

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## Technical Progress and Results

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The core “Transactive Energy Framework” was published as a draft for community input in November 2013. The Framework includes an updated definition of transactive energy and ten attributes for describing transactive energy systems. Comments have been received from a number of individuals and organizations and will be incorporated into an updated version of the document.

The Council has held workshops on transactive energy at Southern California Edison in December 2013 and PJM in March 2014. Another meeting and workshop is planned to be held at Cal-ISO in September 2014. These workshops are providing input to updating the Framework document as well as engaging the community of stakeholders. These workshops have resulted in development of a Transactive Energy Infographic and definition of six transactive energy principles (high level requirements for transactive energy systems.)

The Council is also engaging in collaborations with organizations such as the SGIP, Edison Electric Institute, and EPRI via the efforts of current and emeritus Council members.

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## Project Collaborations and Technology Transfer

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The Council signed a memorandum of understanding with the SGIP 2.0 formalizing the collaboration between the two on topics of mutual interest, such as transactive energy. The Council has informal collaborations through document reviews and participation in meetings with the Edison Electric Institute, EPRI, and Smart Grid Northwest.

Technology transfer is primarily through the workshops, webinars and publications of the Council. For example, in FY14, the Council has made presentations at SGIP meetings, the IEEE Innovative Smart Grid Technologies Conference, and at the November 2013 NARUC meeting. In addition proceedings were published for the 1<sup>st</sup> International Conference and Workshop on Transactive Energy and for the workshop on Transactive Energy Conceptual Use Cases hosted by Southern California Edison in December 2013. A webinar on smart grid interoperability was presented the India Smart Grid Forum and discussions are underway to form a GWAC affiliated group within the Australian smart grid community.