DOCKETED

Docket Number:	16-EPIC-01
Project Title:	EPIC Idea Exchange
TN #:	219829
Document Title:	Modeling Tools RFC
Description:	N/A
Filer:	System
Organization:	Electrical Distribution Design, Inc.
Submitter Role:	Applicant
Submission Date:	6/21/2017 1:46:53 PM
Docketed Date:	6/21/2017

Comment Received From: john federowicz
Submitted On: 6/21/2017
Docket Number: 16-EPIC-01

Modeling Tools RFC

see attachment

Additional submitted attachment is included below.

Comments provided By Electrical Distribution Design, Inc. (www.edd-us.com)

John Federowicz, President and Robert Broadwater, Chief Technical Officer

(johnfederowicz@edd-us.com and dew@edd-us.com)

June 21, 2017

Request for Comments

Draft Solicitation on Modeling Tools to Evaluate Distributed Energy Resources (DERs) and Microgrids located behind the meter on California's Modern Distribution Systems

1. (For all groups) Are the proposed funding amounts identified in the Request for Comments (RFC) appropriate for the work requested?

   We do not understand why the solicitation has focused on specific solutions like GridLab-D? Virginia Tech and Florida State universities have a journal paper that compares GridLab-D with six other widely used power flow programs. In the paper GridLab-D could not solve any of the 10 circuits used for testing the power flow algorithms. All of the other six power flow algorithms significantly outperformed GridLab-D.

   We have a new software architecture and a new approach to analysis that is implemented across utility types (large IOU, medium-sized IOU, cooperative, municipality). Our technology offers a way for applications developed by different developers to collaborate, even when the developers do not know one another. Using this new software architecture and approach to analysis the CEC could develop solutions that build on one another, and not a set of point solutions. How do we get the CEC to take a look at our technology?

   Electrical Distribution Design, Inc. is a US-based company that has the DEW/ISM software, which meets and exceeds all items asked for in this RFC. DEW/ISM is in commercial operation at IOU's in New York, New Jersey, Maryland, Delaware, Washington, DC. It is in commercial operation in one municipal utility, Silicon Valley Power, in California. It is in operation in over 40 utility co-operatives and eventually will be in approximately 250 co-operatives in 49 states. DEW/ISM has an open-source development environment. Universities using DEW/ISM include Virginia Tech, Florida State, University of Hawaii, University of Tennessee and Clarkson University. National Laboratories include NREL, Brookhaven, Oak Ridge and Sandia. Foreign universities using DEW/ISM are in Turkey, South Korea, Egypt, India, Ethiopia and Singapore.

2. (For all groups) What are specific recommendations you can provide to improve the group descriptions of the solicitation outlined in the RFC that would result in a better evaluation of the impacts of high concentrations of DER?

   The solicitation could be improved by proposing hard problems for the bidders to solve. For instance, the capability to calculate IEEE-1453 flicker standard for high penetration PV circuits that include modeling of distribution secondary; and solving the same problem for distributed large scale PV sites that cover many acres, but are now treated as points in most modeling software. This is a problem that DEW/ISM can solve with our Cloud Motion Simulator.

   Another problem could be to take models from multiple source systems - including transmission analysis models, distribution analysis models, and GIS models - and demonstrate how a software technology can bring all of those models together into one model, and do so without writing any code. This is a problem that DEW/ISM solves.

   Another problem could be to solve a large Integrated System Model in one power flow run on a standard laptop. This is a problem that DEW/ISM can solve on a client system, Pepco Holdings, that consists of 1.9M customers, 2,248 distribution feeders, 356,000 distribution transformers, 731 MW's of DER consisting of 55,000 sites individually modeled, and an 8760 hourly load/generation model, where over 40 billion rows of AMI data are incorporated into the analysis.

3. (For all groups) Are there existing efforts that complement the groups identified in the RFC? Are there specific changes to this proposed solicitation that you would suggest to better leverage these existing efforts?

   The Group 2, the Open-Source Modeling Framework and Transition tool, is being worked on at NREL, where an API is being provided. Coordination with NREL is encouraged.

   There is an industry solution from EDD that exists for model format conversions, referred to as a Data Mapper, where maps between different modeling formats (stored in databases) can be created with a GUI (that is, no programming required). The advantage of the Data Mapper approach over the NREL approach is that new modeling formats can be developed and incorporated into the model conversion framework without having to write code. One advantage of the Data Mapper is that it can convert between models based on edge-edge graphs and models based on edge-node graphs.

NYSERDA's support of our new approach to modeling and analysis is demonstrating significant dividends. Coordination with NYSERDA is encouraged.

4. (For groups 2, 3, and 4) Should it be required that all source code generated as a result of this solicitation be hosted on a public open-source developers site such as GitHub?

   Placing the source code on an open source site will result in there being as many versions of the source code, as there are people that download the source code. This need not be the case. An open, documented software architecture is needed, and in the long run is more important than the code itself. As a software engineer I would rather have the architectural documentation than the code. From the documentation I can maintain, extend, test, and even entirely rebuild from scratch the source code. I cannot easily do these things if I just have the code. A documented software architecture can result in a community of developers that can build reliability together. Open source as currently practiced does not provide architectural documentation. It should be noted that there is no software documentation in the public domain for GridLab-D.

5. (For all groups) Are there suggestions to better complement the needs associated with CPUC proceedings related to modeling, distributed renewable generation, electric vehicles, the use of Smart Grid Technologies, and Distribution Resource Planning?

   Electrical Distribution Design (EDD) has developed the DEW/ISM (Distributed Engineering Workstation/Integrated System Model) commercial software that meets and exceeds the California modeling needs for DER, EV, Smart Grid and Distribution Resource Planning. The software is in commercial use at one municipal utility in California, Silicon Valley Power at the City of Santa Clara.

   The software is in commercial operation at two New York State utilities, Orange & Rockland Utilities and Central Hudson Gas & Electric. The New York State Energy Research Development Authority (NYSERDA) has awarded multiple projects related to DEW/ISM modeling and that includes current projects to fully automate the DER Interconnection process at both utilities where a full DER Assessment engineering study is automatically performed for every interconnection request.

   The software is in commercial production at Pepco Holdings Incorporated, which is a multi-utility Exelon company that serves Washington DC, and portions of New Jersey, Maryland and Delaware. The ISM implementation at PHI includes: 1.9M metered customers in the ISM model with 8,760 hourly loads; a load/gen database that back-casts solar contribution for 55,000 PV sites and net metered accounts; 356,000 distribution transformers with secondary modeled and 49 downtown networks

modeled. Hosting capacity is run on 2,248 radial feeders, and the DER Interconnection process is fully automated with a front-end portal and queue manager.

The National Information Solutions Cooperative, an IT cooperative, is providing DEW/ISM in a cloud environment to over 30 of their utility clients. Ultimately DEW/ISM will be used by up to 250 member co-ops of NISC. NISC is a minority investor in EDD.

The DEW/ISM software includes a Graphical User Interface that has similar look and feel as a GIS system. Clients have as much, and often more, detail in their ISM than found in their GIS systems.

DEW/ISM includes an open source development environment that can be used to write applications that run against the ISM. A sample list of research organizations includes: NREL, Oak Ridge NL, Brookhaven NL, Virginia Tech, Florida State, University of Hawaii, Clarkson University, Hawaii Natural Energy Institute, and universities/researchers from South Korea, Turkey, India, Ethiopia, Egypt, and Singapore.

DEW/ISM includes a Business Intelligence functionality that is provided via clients intra-net, or in the case of NISC via the inter-net. DEW-BI leverages the fact that the ISM is the one-place that brings together all of the data elements required for engineering and operating analysis and support. These include the system topology, customer load, engineering characteristics of system components and all measurements taken on the system.

DEW/ISM has a Microgrid controller application as part of the software package. DEW/ISM models any DER including storage, solar, wind, demand response, EV, biomass, rotating machines, and others.