Next Generation Distribution System Platform (DSPx) Project

Background

Many states are pursuing transformative energy policy goals to reduce carbon emissions and improve market signals that will satisfy the prevailing customer expectations of clean, affordable and reliable energy resources. One of the key areas of focus is the integration of distributed energy resources (DERs) into grid operations and planning.

The Department of Energy's Office of Electricity Delivery and Energy Reliability (DOE-OE) in collaboration with the California Public Utilities Commission and the New York Public Service Commission is developing a comprehensive set of functional requirements for a next generation distribution system platform (DSPx) to enable the full participation of DERs in the provision of electricity services. The project intends to engage key stakeholders to obtain a critical review of its efforts and aspires to provide guidance for the development of future planning, operations and market tools needed to support DSPx implementation. The project is drawing from a range of technical documents, policy papers, and thought pieces surrounding the modernization of the grid.

The DSPx project is designed to address key issues that commonly present barriers for technology development and adoption. The first phase of the effort seeks to develop functional requirements of a DSPx that can accommodate a range of operational and market structure paradigms. We envision follow-on phases (Phases 2 and 3) that involve working with the industry, the regulatory community, and national laboratories to advance the identified DSPx functionalities, and to develop and implement the tools required for an effective DSPx.

Players

The DSPx project is a collaborative effort that includes participants from a range of policy, industry, and technical backgrounds. Participants are classified in three main groups:

- **Core Team**: Technical experts on grid modernization efforts. Implements the DSPx project including conducting research, gaining input from key stakeholders, and developing DOE DSPx work products.
- **Steering Group:** State Public Commissions. Sets direction and objectives for the DSPx project.
- **Subject Matter Experts (SMEs)/ Technical Advisors**: Industry experts representing buyers or commercial developers of grid technologies. Provide subject matter expertise and industry knowledge to offer input and feedback towards the DSPx process and work products.

Scope

Phase I of the DSPx project will be developed over the course of the next two months. The DSPx Core Team will be synthesizing a wide range of documentation from existing policy proceedings, industry papers, and technical reports to identify grid modernization requirements along the below framework classified in the following five tasks:

Task 1 - Defining Functional scope: The Core Team will be identifying key state grid modernization policy objectives (e.g., CA, NY, DC, MN, HI) and related system attributes based on policy papers and Steering Group input. A framework of functional scope will be developed to inform the required DSPx capabilities and architectural process models and functional requirements along a Planning, Operations, and Markets structure.

*Note: L6 falls outside of DOE DSPx Scope

Task 2 - Develop Reference architectural views and process models: The Core Team will be identifying existing relevant architectures and process models suitable for DSPx as well as classifying systemic issues, constraints and use case scenarios along the Planning, Operations, and Markets functional structure. The outcome of this task will be a high-level report distilling various architecture views and discussing architectural issues and approaches for an inter-related set of relevant structures (i.e., industry, market, operations, electric system, control and coordination and communications).

Task 3 – Develop reference functional elements: The Core Team will be identifying requisite capabilities drawing from objectives and attributes identified in Task 1, including inputs from the SME sessions. These capabilities will derive the functions and elements needed to support the development of DSPx for Planning, Operations, and Markets structure; including cross-cutting functional requirements.

Task 4 – DSPx market assessment: The Core Team will survey current DSPx technology development including commercial and research from institutions and academia. The market assessment will identify the gaps between existing technologies and the needed DSPx functional requirements to address market opportunities within the US and other countries. As a result, the DSPx capability/functionality gap mitigation plan will be develop.

Task 5 – Develop phase 2 & 3 plans: The Core Team will develop a Phase 2 & 3 project plans with scope, schedule, resources and budget proposal. Phase 2 will consist on applied research and development collaboration with industry and national laboratories to advance the identified DSPx functionalities. Afterwards, Phase 3 will focus on implementation to further de-risking DSPx technology adoption by utilities and distributed market participants.

Overall, the DSPx effort will be accomplished through:

1. Refinement of the policy objectives and high-level functional attributes for DSPx employing grid architecture with CA, NY, DC, MN, & HI
2. Creating a reference development roadmap linked to CA, NY & DC's timing objectives and an assessment of current related industry product development activity
3. Developing referenceable core functional requirements with stakeholders and industry developers (including ARPA-e projects)
4. Facilitate knowledge sharing among states, national labs, ARPA-e and a broader set of industry players toward commercial development of the DSPx tools and technologies
5. Facilitate support for technology and tools testing at national laboratories
6. Facilitate commercial adoption by industry through supporting demonstrations, identification of market barriers and recommended mitigations for states, and industry education.

Schedule

During Phase I of the DSPx project will continue until December 2016. The Core Team will be developing work products along Tasks 1 through Task 5 according to the below schedule. There will be SME workshop sessions scheduled until the end of October. The results from Phase I will provide important input for the development of DSPx related tools, systems, and the following phases.

Task	August			September				October				November				December		
	12-Aug	19-Aug	26-Aug	9-Sep	16-Sep	23-Sep	30-Sep	7-Oct	14-Oct	21-Oct	28-Oct	4-Nov	11-Nov	18-Nov	25-Nov	2-Dec	9-Dec	16-Dec
1		■	■	■	■													
2		■	■	■	■	■	■	■	■	■	■	■						
3		■	■	■	■	■	■	■	■	■	■	■						
4												■	■	■	■	■	■	■
5													■	■	■	■	■	■
Engagement								▧	▧	▧	▧	▧	▧	▧	▧	▧	▧	▧