

Collaborative Approaches for Solving 21st Century Grid Challenges

The development of distributed energy resources (DERs) and behind-the-meter energy services has introduced a number of questions and concerns in the electric power sector. Regulators and utilities must grapple with how to balance these technological advancements with concerns for reliability, safety, and other factors. Effectively addressing these challenges can be difficult and require technical expertise and input from a variety of stakeholders. Regulators in a few states are taking unique and collaborative approaches to study the complexities presented by these developing technologies.

The Wisconsin Distributed Resources Collaborative, California Smart Inverter Working Group, and Massachusetts Technical Standards Review Group are examples of these approaches. These organizations were created to bring stakeholders together to evaluate the changes these technologies present and their impacts to the electric grid. This case study looks at these three organizations to learn how and why they were created, and the role they play ensuring a safe and efficient integration of new and evolving technologies.

Massachusetts Technical Standards Review Group

Origin

In early 2012, the Massachusetts Department of Public Utilities (DPU) convened the Massachusetts Distributed Generation Working Group and tasked it with providing recommendations for improving the distributed generation (DG) interconnection process in Massachusetts¹. The working group presented its recommendations to DPU in a final report in September 2012². Among the recommendations, the working group suggested that a uniform, utility published, Technical Standards Manual for interconnection in Massachusetts be created. In addition, it was recommended that a review group be created as a formal means for all stakeholders to evaluate these technical standards. The DPU accepted these recommendations and the Massachusetts Technical Standards Review Group (TSRG) was created in 2013.

Purpose

The primary purpose of the TSRG is to participate in the development and review of changes to the uniform Technical Standards Manual for Interconnection and individual Technical Standards Manuals for each utility. When the utilities update these manuals, they are required to notify the TSRG and provide an explanation of the change. At that time, members of the TSRG may provide input and propose recommendations on changes to the technical standards.

Beyond this original prescribed role, TSRG facilitates discussions about larger interconnection trends in the DER industry across the country. For instance, the forthcoming update of Institute of Electrical and Electronics Engineers' (IEEE) Standard 1547, the predominant technical standard for interconnection requirements, has been a topic of discussion at several meetings.

Relationship to Regulatory Proceedings

Though it was created by the DPU, the TSRG only plays an advisory role in regards to technical standards development; the TSRG’s recommendations are not binding on the utilities. Following notification of changes to the Technical Standards Manuals to the TSRG and receipt of TSRG feedback, the utilities ultimately have the final say as to how the technical standards are applied.

Composition

The TSRG is made up of seven member organizations, representing government, customer, utility, and DG industry stakeholders. The “Utility” stakeholder group is composed of the four investor-owned utilities (IOUs) in Massachusetts; each utility is represented in the TSRG. The three non-utility members are appointed by the “Government/Customer” stakeholder group (one member) or the “DG Industry” stakeholder group (two members). The entities that currently make up each TSRG stakeholder group, from which the seven TSRG members may be drawn, are shown in Table 1 below. The group’s bylaws require that the two DG Industry-appointed members represent different technology areas (e.g. solar and combined heat and power) and that their organizations be actively engaged in DG interconnection in Massachusetts. If an organization no longer wishes to participate, they can be replaced by a new organization. Changes to the group must be done in consultation of the Massachusetts Department of Energy Resources.

| Table 1: TSRG Stakeholder Groups ³ | | |
|--|---|--|
| Utilities | Government/Customer | DG Industry |
| Western Massachusetts Electric Company | Harvard Energy and Utilities | Solar Energy Industries Association |
| NSTAR Electric Company | Massachusetts Clean Energy Center | Solar Energy Business Association of New England |
| Fitchburg Gas and Electric Light Company (d/b/a Unitil) | Cape and Vineyard Electric Cooperative/Cape Light Compact | Northeast Clean Heat and Power Initiative |
| Massachusetts Electric Company and Nantucket Electric Company (each d/b/a National Grid) | City of Boston (Chief of Energy and Environment) | United States Clean Heat and Power Association |

Each individual representative of a member organization is required to be an engineer with electric systems and DG interconnection experience. The TSRG is led by a Chair, appointed by the utility members, and a Vice Chair, appointed by the non-utility members, with each holding a one year term.

Process

The TSRG meets semi-annually to discuss the uniform and individual Technical Standards Manuals developed by the utilities. These meetings are open to the public, who can participate as observers, and the meeting minutes and other materials are made publically available via the TSRG’s website⁴.

California Smart Inverter Working Group

Origin

In September 2011, the California Public Utilities Commission (CPUC) initiated a Distributed Interconnection Proceeding with the goal of improving the rules and regulations governing the interconnection of generation and storage. Roughly a year later, in September 2012, a scoping memo in the proceeding identified the need to examine smart inverter functionalities and their potential impact on interconnection. In response, the Smart Inverter Working Group (SIWG) was announced in February 2013 through collaboration between CPUC and California Energy Commission (CEC) staff as a way to involve stakeholders in the examination of smart inverter capabilities and in the development of recommendations for their use.⁵

Purpose/Topic Areas (more on the three phases, findings/efforts)

In its initial form, the SIWG sought to produce a technical evaluation of advanced inverter functions which could improve the “safety, reliability and efficiency of Distributed Generation (DG) interconnected to the distribution grid.”⁶ In its first year, this broad goal was more narrowly defined as developing technical recommendations in three distinct phases: (1) autonomous functions, (2) communications protocols, and (3) advanced functions.

Relationship to Regulatory Proceedings

While the SIWG arose in parallel to a CPUC proceeding, was noticed to participants from the interconnection proceeding’s email list, and benefitted from coordination efforts of both the CPUC and CEC, the CPUC’s ruling of June 11, 2013 explicitly states that “[t]he working group was not established under the auspices of the Commission.”⁷ Instead, its meetings and process largely existed outside of formal regulatory channels. SIWG’s interactions with the ongoing interconnection proceeding occurred when the CPUC saw fit to publicize and invite comment on SIWG work products. This happened on multiple occasions including in June 2013 for the white paper on “Candidate DER Capabilities,”⁸ and in January 2014 for the Phase I recommendations on autonomous functions⁹. In addition, SIWG’s Phase I recommendations, finalized in December 2014, were adopted as utility requirements for the Rule 21 tariff changes.

Given the momentum created at the start of the SIWG and the successful incorporation of Phase I recommendations into utility tariffs, the CPUC has adopted a less formal approach to the incorporation of Phase 2 (communications standards) and Phase 3 (advanced function) findings into utility tariffs. Rather than filing as joint proposals within the interconnection proceeding, the changes incorporating Phase 2 and 3 recommendations were directed to the utilities to be filed as advice letters.¹⁰ SIWG presented the recommendations for the third and final phase in March 2017. Currently the group is revising the language and timelines that the utilities will abide by while drafting their tariffs.

Composition

In general, SIWG does not have a formal structure or member obligations, though the development of the Phase I Recommendations on Autonomous Functions were more formally facilitated by a consultant hired by the CPU and CEC. A CPUC decision described the SIWG as consisting of “engineers, industry, regulators and advocacy groups, and has functioned as a consensus building process.”¹¹ SIWG currently has over 300 individual members, including representatives from DER companies, utilities, national labs, and government. Members even include utilities and regulators from different states within the US. Jeffery Kwan, the CPUC representative for SIWG, stated that meetings generally have about 15-20 regular participants, with attendance varying based on interest in current discussion topics.

Process

While the CPUC and CEC play an active role in SIWG, the organization’s activities are driven by the collective members. Meetings currently take place on a weekly basis, but this has historically fluctuated based on the group’s needs. According to Kwan, meetings are very free-form with topics of discussion developing based on the needs of the current phase. The strong connection SIWG has to regulation likely helps to maintain engagement of key stakeholders such as the California IOUs. Kwan stated that the relationships built between the members since the group’s inception have been critical to ensuring meetings are collaborative in nature. Like any group that has stakeholders with differing priorities, SIWG does face contentious issues, but these relationships help participants approach discussions from a cooperative state of mind.

Wisconsin Distributed Resources Collaborative

Origins

The Wisconsin Distributed Resources Collaborative (WIDRC) was created in 2004 as the state’s interconnection standards, commonly referred to as PSC 119, were being developed. At the time, a small group of stakeholders were developing accompanying guidelines for the implementation of the rules found in PSC 119. Having interacted for a period of month on interconnection standards (and years on prior topics), the group decided to form WIDRC to provide a more open venue to discuss the development of a DR market in Wisconsin.

Topic Areas/Purpose

WIDRC is a nonprofit organization that focuses on facilitating and promoting distributed resources (DR) in Wisconsin. The group has taken on numerous topics over the years, from advanced renewable energy tariffs and generator business models in the late 2000’s to anaerobic digesters and other CHP technologies in the early 2010’s. The group is currently reexamining the interconnection standards found in PSC 119 and held interconnection forums in 2016 and 2017 to bring together utilities and DG developers to discuss pain points in the interconnection process. With each topic, WIDRC typically plays the roles of educator and facilitator, researching and disseminating information on a particular topic to group members and then providing a venue for subsequent conversation and discussion.

Relationship to Regulatory Proceedings

WIDRC is not focused on a particular topic within distributed generation, nor is it associated with a particular regulatory proceeding. Instead, the group acts in an advisory fashion in terms of policy and standards development. While the Wisconsin Public Service Commission (PSC) is a member of WIDRC, it is a non-voting Advisory Member. This allows WIDRC to support DR technology growth while limiting potential conflicts of interest or influences from the political environment. Meanwhile, the PSC can remain aware of stakeholder priorities and trends in the industry.

Composition

WIDRC's members are currently made up of industry, regulatory, and academic participants that are interested in DR growth in Wisconsin. WIDRC members can be either a Supporting Member, with voting privileges, or an Advisory Member, without voting privileges. Supporting Members are required to pay annual dues, ranging from \$250 to \$1,000 based on their organization's size; Advisory Members are not required to pay dues¹². The dues are used to support the group's operations. WIDRC is governed by a steering committee. The steering committee is made up of 7 individuals, all of whom are required to be WI residents and Supporting Members of WIDRC. These individuals are elected by WIDRC's Supporting Members and serve a 2 year term¹³. An executive committee is elected among the steering committee members to manage WIDRC's operations.

Process

These members meet quarterly to continue dialogue about ongoing developments within the DR industry, and to study various barriers through working groups. WIDRC currently has five working groups, seen in Table 2 below. These working groups investigate several issues related to their topic area including technical requirements, commercial requirements and business practices, siting, applied research and development and associated data collection, and education and communications. Information and findings from these working groups is disseminated through mediums such as white papers and presentations, and is publically available via WIDRC's website¹⁴. In addition, WIDRC provides support to projects and conferences through donations and sponsorships.

| Table 2: WIDRC Working Groups |
|-------------------------------|
| Electric Tariffs |
| Gas Interconnection |
| Business Model Development |
| Education |
| Local Integration Planning |

Lessons from Collaborative Working Groups

Simplifying the histories of the three profiled working groups, we arrive at the following comparison, as shown in Table __ below. We find that all three working groups arose from a specific regulatory process, and a WIDRC member told us that these opportunities can provide the impetus needed to launch a formal group. That is, the value of such a group (and the willpower to establish one) may be much less evident in a relative regulatory vacuum.

Despite the commonalities of their origins, the express purpose of each group varies widely, from general education and engagement to the development of specific technical recommendations. Similarly, the relationship to regulatory processes differs greatly, with WIDRC having the loosest connection and the SIWG the closest. It is interesting that the group most closely related to a regulatory proceeding, the SIWG, has the most informal approach to membership and process. It may be the case that the narrowly-scoped purpose of the group (coupled with California’s leading role in distributed generation) have made the value of participation relatively self-evident. The compositions of both the TSRG and WIDRC have been more rigorously established, which is helpful for maintaining continuity in their more broadly defined missions.

| | TSRG | SIWG | WIDRC |
|----------------------|--|---|---|
| Year Founded | 2013 | 2013 | 2004 |
| Origin of Group | Created by DPU to review technical standards manual changes | Initiated in parallel to CPUC interconnection proceeding | Created out of the development of guidelines for PSC 119 implementation |
| Purpose | Review technical standards changes; prepare stakeholders for emerging topics | Develop recommendations for interconnection tariff changes to enable smart inverter functions | Convene utilities and renewable energy generators to discuss topics related to DG |
| Relationship to Reg. | Provides non-binding feedback on changes to technical standards manual, operates independent of formal proceedings | Work products were officially entered into record through CPUC decision, recommendations made requirements for utility tariff filings | PSC participates as a non-voting Advisory member. Topics under consideration may relate to proceedings before PSC but no formal linkage |
| Composition | Seven members: four utility reps, two from DG industry, one gov/customer rep | Open to all participants (including out-of-state), over 300 individuals on mailing list | Open to DR industry participants in WI. Led by a steering committee, with members choosing level of involvement |
| Process | Semi-annual meetings for members, agendas and presentation published on DPU website | Meetings as needed for current topic or priority. Occasional major workshops. Materials generally recorded on joint CPUC/CEC website. | Quarterly in-person meetings, which may include presentations and site visits to tour facilities. Materials published to WIDRC website. |

The Value of Collaborative Working Groups

The electric power sector is changing at an unprecedented pace. This transformation has created a number of difficult questions and challenges to be dealt within the industry. Working groups such as WIDRC, SIWG, and TSRG have proven to be helpful to stakeholders in addressing some of these issues.

Such groups provide a venue for industry participants to discuss existing and potential complexities. By taking a proactive approach to address challenges, these groups help guide the expansion of DERs in a way that mitigates negative impacts.

These working groups can be structured in a variety of ways. They can be strongly tied to regulatory efforts and supply direct recommendations, as with the SIWG, or provide an official means for stakeholders to provide oversight and feedback, as with the TSRG. The purpose and goals of the working groups can vary as well. For instance, WIDRC chooses to take a broad look at DR development in its entirety, while SIWG focuses on one small piece of the puzzle. Regardless of purpose or structure, these groups harness the expertise and perspectives of participants to move the industry in a positive direction.

As the electric grid continues to evolve, regulators, utilities, and other stakeholders in every state will be required to address emerging challenges. Should they see fit, states can use WIDRC, SIWG, and TSRG as examples to construct similar organizations to tackle such challenges. In addition to learning from the form of these groups, the content created and disseminated by existing groups can be built on and adapted to apply in different states, regions, or regulatory structures. As more groups such as these emerge, each one will be able to draw upon the past work of peer groups in other states, speeding the process of distributed generation adoption.

¹<http://massdg.raabassociates.org/Articles/DPU%2011-75-E-3-13-13.pdf>

²<http://massdg.raabassociates.org/Articles/Final%20MA%20DG%20WG%20Report%209-14-12.pdf>

³https://drive.google.com/file/d/0B836U49Yrh_QYW5vNGITR2xrMUK/view

⁴<https://sites.google.com/site/massdgic/home/interconnection/technical-standards-review-group>

⁵ Timeline from http://www.sirfn.net/wp-content/uploads/2015/06/california_smart_inverter_working_group.pdf

⁶<http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M066/K203/66203866.PDF>

⁷<http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M066/K203/66203866.PDF>

⁸<http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M066/K203/66203866.PDF>

⁹<http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M087/K821/87821977.PDF>

¹⁰<http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M164/K376/164376491.pdf>

¹¹<http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M066/K203/66203866.PDF>

¹²<http://www.wisconsindr.org/CollabPapers/MembershipFormWIDRC.doc>

¹³<http://www.wisconsindr.org/CollabPapers/BYLAWS9.doc>

¹⁴<http://www.wisconsindr.org/links.html>