

# GRID 3.0

## Workshop Summary

The workshop on March 26-27 in Washington DC brought together over 90 people from 50 organizations to discuss the actions that are needed to overcome the barriers for realizing that vision of Grid 3.0. This is a summary of the discussion points and thoughts stated at the workshop.

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## Themes from Workshop

The following needs were summarized from the workshop:

- Ubiquitous, low cost, reliable, resilient communications
- Clearly defined common and stable (control) business, data management, communications, and physical systems architecture
- Well defined points of interoperability with built-in security
- Reference designs (e.g. microgrid systems, distributed generation support systems)
- Regulatory jurisdictional certainty (state/feds) – also need clear metrics
- Education of the workforce
- Broad, equitable collaboration model

The remaining document captures a summary of thoughts/points made in the various discussion sessions.

## Enabling New Entrants and Innovation

- Architecture is important. Since we have some uncertainty in the business models of the future this requires that we have a flexible architecture to adapt to changes as they arise.
- We need to broaden our engineering curriculum to cover other topics such as economics.
- There needs to be an evolution of controls to handle the Distributed Energy Resources (DER) and to utilize Demand Side Management (DSM) as a dispatchable resource.
- We have a misalignment of value drivers in some cases, which hinder new entrants and innovation.

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## Impact of Technology and Flexible Resources

- There are benefits of integrated system balancing (both for centralized and distributed energy resources). The consumer behavior will change the wholesale profile with DER and the Independent System Operator (ISO) will need to balance this.
- While we have standards, we still lack interoperability, which is an impediment, and this results in higher spend on the back-end integration costs. This in turn affects generating positive business cases for modernization projects. A new project lead by SGIP & Duke on OpenFMB helps to address one aspect of this.
- The information exchange is not that complicated, we need to define it and open it up for all to use. This includes breaking down silos so information can be leveraged across traditional application towers.
- It is important that we model the system – all aspects including power systems, communications, economic optimization and control. Simulations become important in this work to test new control algorithms as we build the new system of the future.
- Using synchrophasor data, we can now observe bad behavior in a generator or detect mal-operations. This is a good example of applying technology to assist in managing the grid.
- It is important to focus on the most important and impactful projects versus trying to do everything.
- Biggest challenge is having accessible, low cost communications across regions that are wired and wireless. The communications needs to be reliable so information can be obtained during non-normal conditions.
- Industry is under invested in R&D, which affects accelerating these programs.
- Industry needs to do a better job of couching technology into business speak.

## Enhancing Reliability and Resiliency

- Voltage and Frequency ride through is a must so DER can continue to provide power rather than dropping and making things worse.
- Point of common coupling is a single point from the view of the DSO. The interface needs to be a standard interface for islanding and flow control.
- DER doesn't have to meet security requirements of the state commission, ISO, or FERC. We need to sell the value of resiliency and to bring it into an overall risk management framework that applies to all utility business processes.
- Need further work to look at safety with multiple inverters on a feeder as well as live line work with lvrt/lfrt functions in the inverter.

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- FERC doesn't have authority over DR, depending on an upcoming Supreme Court decision. NY is saying I will have Distribution System Operators and I will manage it myself in the state, but the mix and overlap is tricky.
- We should be pragmatic in our view on "interoperability;" it doesn't all have to be plug-and-play, but to improve communications among proprietary systems through translators, common semantics, etc.
- There are different gradations and ways to discuss reliability. We need to have metrics to discuss not only reliability but also security.
- It is key that we not only protect our domains and assets but we keep utility cyber security workers happy.

## Enabling New and Evolving Markets and Business Models

- Balance production and load in real time and monetize that. Platform will be coordinating all the vendors and the utility and the ISO. For now in NY, the utilities will be the DSP.
- ISO in NY has been moving to fully integrate DR in wholesale market so DR is dispatchable in the last few years. Since 2011 they have been working on a steady plan. DR is considered comparable as new gen sources. All the rules on integrated DR and reserves and capacity are now uncertain because the Supreme Court may uphold the DC Circuit Court decision that may eliminate DR participation in the wholesale market.
- With increase of DER now, net power flow can go into different directions. Now someone else can dispatch supply, which makes it not as controllable or predictable. Some demands may be subject to time varying retail rates. These changes result in more complexity for operations & markets. If the resources they thought are coming in and ISO secures capacity and the resources don't come in then the ISO could be under procuring capacity.
- There would need to be more coordination between the potential Distribution System Operator and the ISO.
- The average term of a state commissioner is a few years which means education needs to be ongoing. An example of the value of educating is the Rule21 process in California and how this process helped regulators understand the need and importance to move to smart inverters.
- Having the customer in the center and not losing focus on what they want needs to be in the forefront.
- Collaboration with third parties is key as we modernize. We have to break down the barriers.
- We need to be more aware of pricing at a localized level.
- Rate Reform – utilities have perf based rates, also look at distribution edge rates rather than building on other things
- Grid efficiency, Customer side - what do they want.

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- Planning –move away from an integrated resource plan. Come up with a resource analysis and then have utilities come up with 5-year business plans.
- Regulatory – regulators need more resources. Big hurdle in terms of education and communication. Not a top down process

## Architecting the Change

- There are different zones of architecture: Back office, Field Area Network, Customer Side System, and Physical Power System Infrastructure
- We must use standards-based interfaces and close the actionability gap of moving to standards which means being able to test.
- We must architect for flexibility and begin with the end in mind.
- There are a number of enterprise architecture approaches: BAITS, SGAM, Zachman, etc. We need to understand the business and the impacts to processes across work groups.
- Distributed versus Decentralized is talked about but what is the value proposition to the customer. We believe intelligence will need to be distributed and that analytics will take place beyond the data center.
- We must find the capital and political will to change the systems we have today. Minnesota has the E21 Initiative to help drive the change. This is not a commission order but rather a consensus process.
- People want flexibility in the Grid.
  - Rate Reform – utilities have performance based rates but also need to look at distribution edge rates rather than building on other things
  - Grid efficiency on the Customer side - what do they want?
  - Planning –move away from an integrated resource plan. Come up with a resource analysis and then have utilities come up with 5-year business plans.
  - Regulatory – regulators need more resources. Big hurdle in terms of education and communication.
- How do we evolve the public policy?
  - Role of microgrids. Who can own/operate them?
  - Role of third parties
- States like NY, CA and MN are trying to monetize the value of DER and the fair value to the Grid.

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## Evolving Industry Structure

- Minnesota's vision for the Grid of the Future is to allow consumers to interact in new ways
- We should move away from IRP planning and rather have utilities do a 5-year rolling plan
- NY wants a customer-centric utilities business model
- It is key we find ways to incorporate the interests of multiple stakeholders in a collaborative process to deal with distributed energy resources
- We need to construct a clear enough picture of the evolution of the grid to get financing for the change
- We need different prices based upon customers' needs and behaviors
- We need a metric to reward the utility and the DER owner
- Utilities should be allowed to own and operate DER if they want

## Breakout Session Summaries

Meeting participants were divided and broke out into smaller groups to discuss the topics of the sessions. The following bullets summarize thoughts/discussion points from those sessions.

- Framing clear policy on customer engagement and pricing is key.
- We need to identify the value for new entrants – value streams (solar not west or the value of storage)
- Leverage Collaboration and work to remove regulatory divide
- Need for ubiquitous communication options
- More thought around market structure at distribution – retail pricing localization
- Educating the new workforce
- Economic signaling – not necessarily real time pricing
- Addressing architecture and its many facets (business, market, technology)

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