ICETEC
ENERGY SERVICES

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Comments Regarding the State of Distributed Resources

Icetec is a technology company and an energy services company providing customized solutions for end users with load flexible assets. The Icetec technology provides co-optimization between cost saving efficiencies behind the meter, and grid synchronization or provision of services to the wholesale market.

We are fully integrated at Princeton University and Rutgers University cogeneration plants, and have begun implementation at New York University cogeneration plant, each of which is nationally recognized as a model for resiliency in their ability to continue operations in island mode through Hurricane Sandy.

We are active in PJM and in the New England ISO, and focus on providing energy and ancillary services in addition to capacity based offerings. We continue to evaluate entry in the New York ISO.

Our comments reflect our characterization of distributed energy resources (DER), that is, energy resources electrically connected to host load on the distribution network, or equivalently, behind the customer metered point of distribution.

With this context, we respectfully submit the following:

Distributed Energy Resource Classification

- Resources can broadly be classified by their core benefits to the system:
    - Renewables – provide energy free of emissions with little or no marginal cost
    - Local Generation –
        - Reliability Only Resources – local generators environmentally constrained, deployed only in emergency
        - Economic or Energy Capable – usually gas-fired, capable and permitted to respond to ISO or distribution conditions throughout the year
        - Resilient resources – capable of operating in island mode and self balancing
    - Storage –
        - Thermal energy storage (TES) provides a low cost energy resource by shifting load
        - Electric storage increasingly used in reliability applications (regulation, short term back up)

- Icetec has observed increased end user interest and increased deployment of Microgrid Systems which integrate several of these resource types into an advanced metering

network and monitoring system, and, which provides several of the core benefits listed. For example, a common configuration is the following:

  - Central natural gas-fired combined heat and power
  - Solar PV
  - Thermal Energy Storage

- This efficient, integrated approach to distributed generation provides substantial societal benefits to the transmission system, distribution system and surrounding community, all of which are tangible, some of which are easily quantifiable and some of which are not in the current market framework
  - Cost effective wholesale energy and ancillary services - where paths to entry and market based incentives exist - which reduces the energy and ancillary costs bore by loads/retail ratepayers
  - Thermally more efficient than fossil fuel on the grid by integrating heat recovery for local thermal loads (80%-90% efficiency compared to 30%-60% percent at merchant power plants)
  - Reduced Carbon footprint, increased fuel diversity
  - Reduced congestion on the transmission and distribution systems coinciding system strain
  - Resilient source of refuge to local community during periods of transmission or distribution service interruption
  - Increased reactive power capability

- Additionally, Icetec has observed significant interest in and action towards electric storage deployment among smaller load classes, including commercial and, to some extent, residential customers, particularly where avenues to participate in a robust regulation market exist

Integration with ISO/RTOs: Best Practices

- PJM and ISO-New England have undertaken significant efforts in stakeholder processes, in independent evaluation of Measurement and Verification (M&V) protocols and in internal system development to integrate dispatch-capable distributed energy resources into energy markets with bidding, clearing, and settlement processes that parallel other supply side resources and that compensate at the Local Marginal Clearing Price.

- PJM has also successfully integrated distributed energy resources into ancillary service markets. We will focus on PJM to identify best practices:
  - PJM enables DERS (behind the utility meter connected to a site load) to make hourly bids into Day-Ahead and Real-Time Energy Markets.
  - In addition, PJM enables distributed DERs to bid into hourly ancillary service markets, including synchronized reserve and regulation

        - Several DER technologies have qualified in dynamic, 10 second response regulation markets (gas turbines, batteries, electric vehicles (EVs))

    - DER qualifies as a full market participant; resource makes hourly determination of which market to enter
        - Parallel to other supply side resources, DER could provide synchronized reserve, regulation and energy in three consecutive hours of the same day.

    - The threshold for participating in these markets is 100 kW, which has enabled commercial and residential deployment of energy and ancillary capable DERs, particularly energy storage devices capable of providing regulation services.

    - In our experience, these best practices in PJM have, in part, contributed to increased rollout of DERs- particularly microgrid applications – in the PJM territory.

Barriers/Opportunities for New York ISO

- Current business rules prohibit the use of distributed energy resources (DERs) both in energy markets via the Day Ahead Demand Response Program (DADRP) and, in more advanced ancillary markets, such as regulation and synchronized reserves via the Demand Side Ancillary Service Program (DSASP), which effectively serve as a barrier for DERs to realizing market based incentives for their ability to provide grid services.

- Full integration of DERs into energy and ancillary service markets requires significant ISO and stakeholder resources, however, from our perspective, it is more than offset by the cost reduction realized by ratepayers in allowing a class of efficient resources to compete in providing energy and ancillary services.

- In addition, full integration generates market-based compensation for efficient, competitive DER applications that can respond to grid conditions, resulting in increased deployment. As penetration increases, DERs can provide local pockets of resiliency to surrounding communities, particularly to the extent that they rolled out to support critical functions.

Next Phase

- Similar to other states, in New York, current retail distribution tariffs – particularly stand by rates for end users with DER- are applied broadly with no differentially recognition in relative reliability and no recognition of the relief from congestion resulting from the DER during periods in which the distribution system is strained.

- As penetration of island or black start capable DERs increases, they have the potential to change the dynamics of contingency planning on the distribution system and transmission system.

- Our hope is that this potential, illustrated in the aftermath of Hurricane Sandy and other extreme system disturbances, provides motivation for the right group of stakeholders to evaluating a new class of tariff or stand by rates for customers with distributed energy resources which balances system costs and system benefits, and to revisit regulations around serving multiple host loads from a single distributed energy resource in extreme conditions.

- From our perspective, New York is uniquely positioned to lead the way in effectively defining this new class of resilient distributed energy resources - both in wholesale programs and retail rate classes - that appropriately recognizes the regional and societal system benefits inherent in further deployment. We see this in the commitment to bring all relevant stakeholders into the discussion forum, including NYISO and distribution system leadership, state ratemaking authorities and local community leaders, as demonstrated at the Distributed Energy Workshop (DER).