MADRI Working Group Meeting #32

Advanced Distributed Generation
An Advocate's Perspective

January 30, 2014

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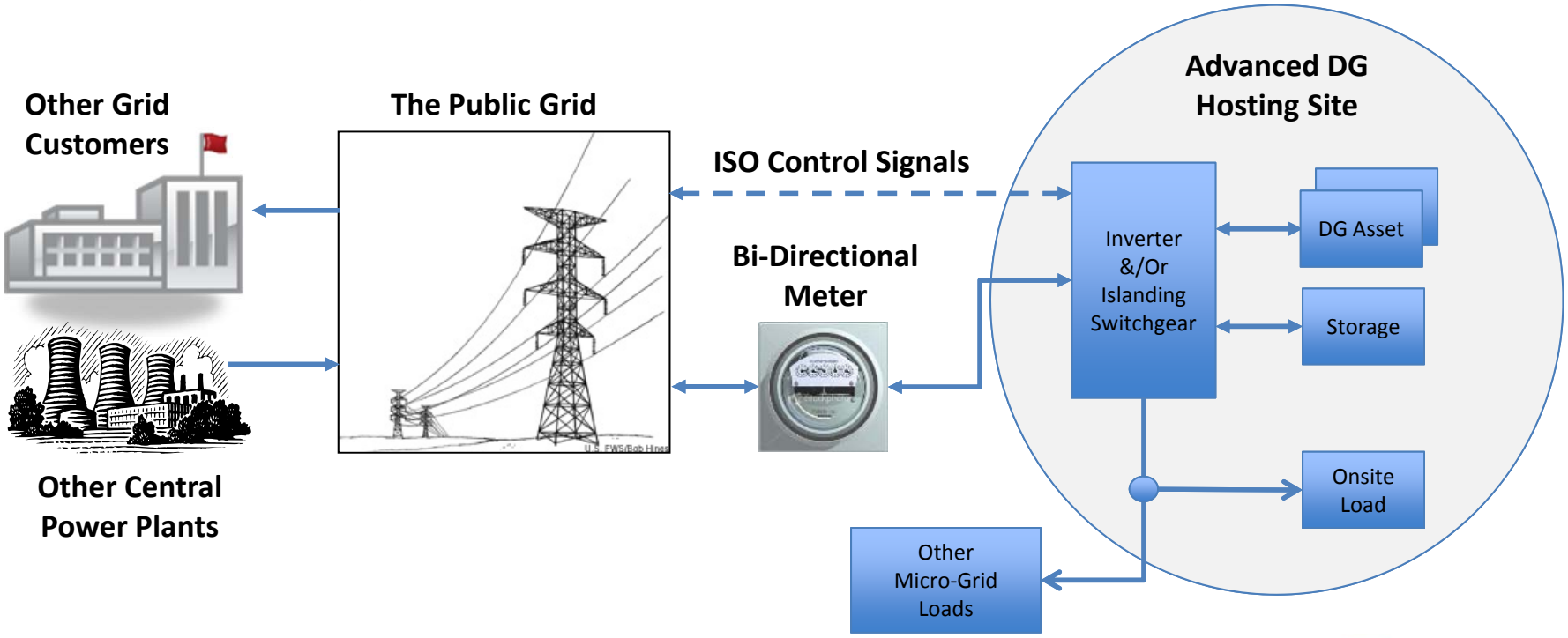
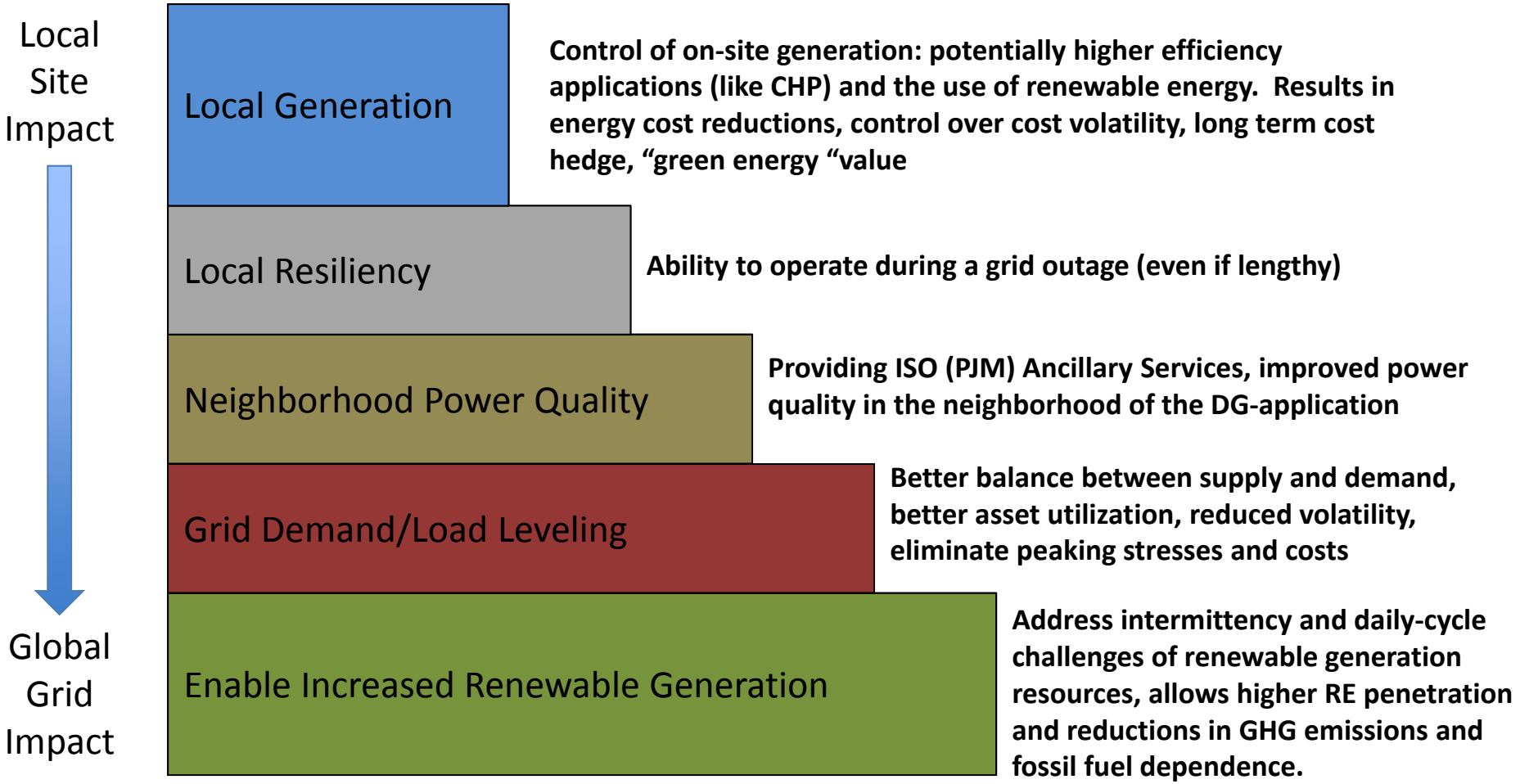
Taking The DG Advocate's Perspective

- **Whose Perspective Are We Representing?**
  - Advanced DG host sites/customers
  - All customers that benefit from, and help pay for, Advanced DG
  - The DG Industry and market participants
  - The strategic goals of the state



The Advanced DG Benefit Portfolio



Control of on-site generation: potentially higher efficiency applications (like CHP) and the use of renewable energy. Results in energy cost reductions, control over cost volatility, long term cost hedge, "green energy "value

Ability to operate during a grid outage (even if lengthy)

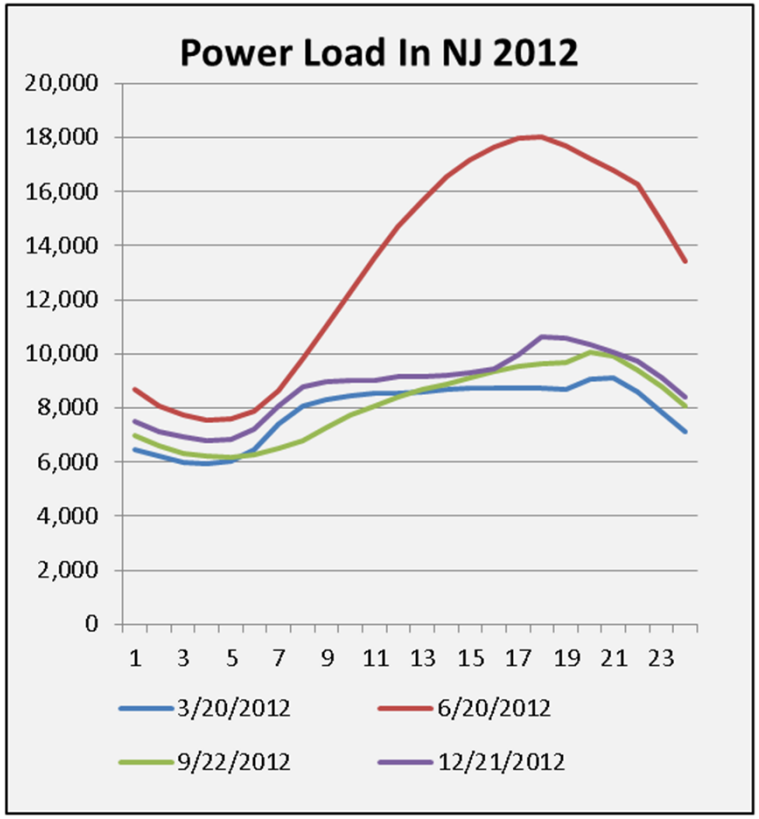
Providing ISO (PJM) Ancillary Services, improved power quality in the neighborhood of the DG-application

Better balance between supply and demand, better asset utilization, reduced volatility, eliminate peaking stresses and costs

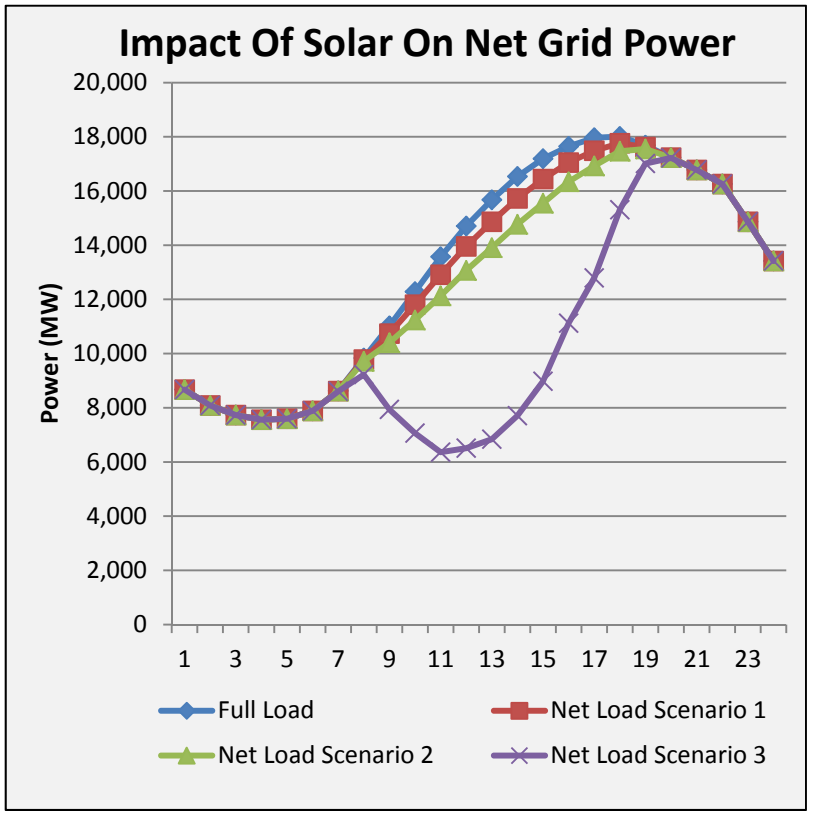
Address intermittency and daily-cycle challenges of renewable generation resources, allows higher RE penetration and reductions in GHG emissions and fossil fuel dependence.

SUSTAINABLE JERSEY CERTIFIED
A Better Tomorrow, One Community at a Time

Advanced DG: Improving Grid Operation



NO STORAGE SCENARIO



Scenario 1:
(Current Solar Base)
1.1 GW Solar
1.9% Of Energy
7.0% Of Power

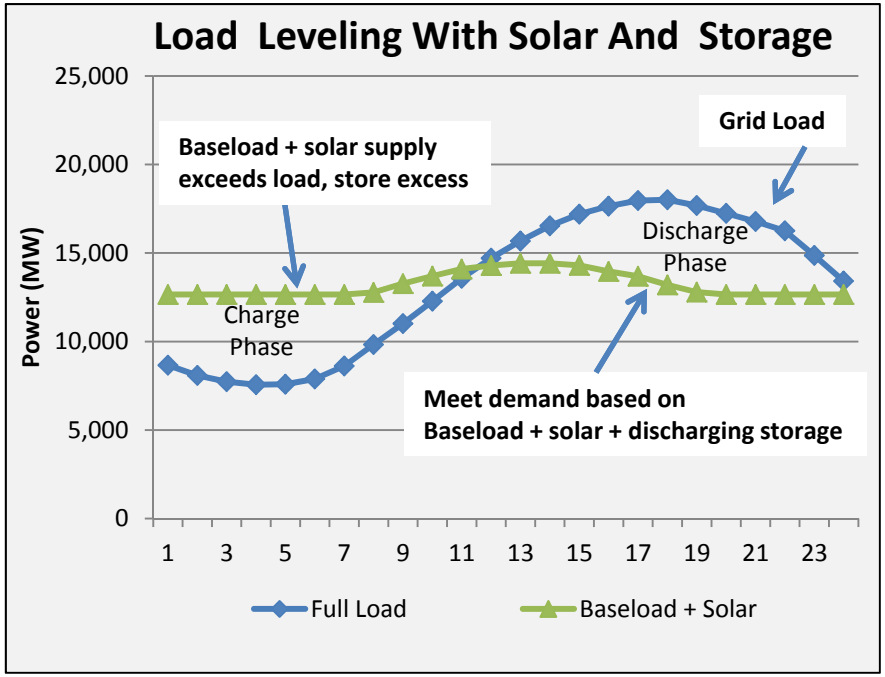
Scenario 2:
(2028 S-RPS Goal)
2.4 GW Solar
4.1% Of Energy
15.3% Of Power

Scenario 3:
(Hypothetical)
12.0 GW Solar
20.6% Of Energy
76.6% Of Power

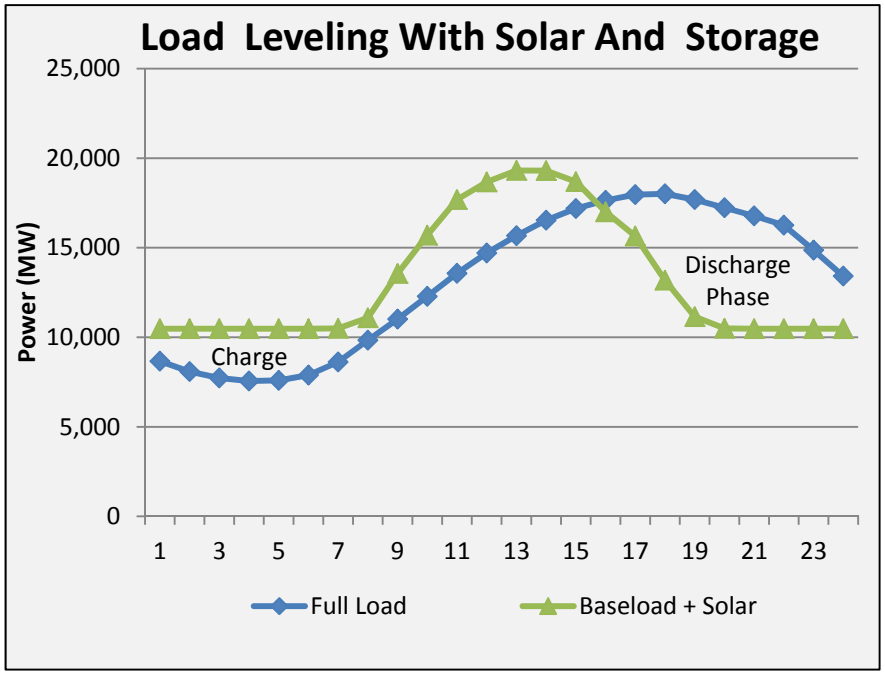
Source: PJM Data for NJ statewide, Actuals 2012

A Thought Experiment In Advanced DG

12.7GW Of Baseload And 2.4 GW OF Solar (RPS Goal) W/ 40 GWhrs Active Storage



10.5 GW Of Baseload And 12.0 GW OF Solar (Hypothetical) W/ 40 GWhrs Storage



Central Asset Capacity Factor – WITHOUT Storage: ~73%
Central Asset Capacity Factor – WITH Storage: ~95%

} Capacity Factors For A Peak Summer Day

Note: Capacity factor for the rest of the year (without storage) will be lower (~45%).

Grid-Wide Benefits Of Advanced DG

- **Advanced DG Hosting Site Realizes Direct Benefits From Investment:**
  - Local control over energy supply
  - Energy cost reduction, both KWhr and demand (KW) charges
  - Reductions in cost volatility, hedges on future cost increases
  - Local resiliency benefits (during an outage)
  - "Green Energy" benefits

The previous examples were based on solar, but similar results accrue from any DG technology (with storage)

- **THAT SAME INVESTMENT Delivers Benefits To The Grid Overall:**
  - Community resiliency benefits (during an outage)
  - Improved neighborhood power quality (through ancillary services)
  - Load leveling fundamentally improves baseload generation asset profile:
    - ✓ Less power needed (11-13GW rather than 18GW), use cleanest/most-efficient plants
    - ✓ No additional plant development needed in the state
    - ✓ Assets can achieve higher capacity factors (should mean lower kwhr-costs)
    - ✓ Assets can operate at optimum set-points (higher efficiency could lower kwhr-costs)
  - Peaking strains on overall system reduced (especially transmission), imports reduced
  - Enables increased use of renewable assets without grid harm
    - ✓ Reduced GHG emissions
    - ✓ Reduced fossil-fuel dependence

Market Development Needs For Advance DG?

- **What is needed for Advanced DG solutions to emerge?**
  - Basic technology innovation
  - Regulatory permission and flexibility, and clear, stable, and consistent processes
  - Project finance and credit support
  - A level playing economic playing field, and long term investment surety
  - Market Development:
    - ✓ Building awareness and education, support services
    - ✓ Commercial infrastructure
    - ✓ Early success stories and showcases
    - ✓ Best practice development and deployment
    - ✓ Barrier identification and resolution
    - ✓ Maturing industry capability

Advanced DG: Addressing The Conundrum

- **The Conundrum:**
  - The Grid is undergoing disruptive, technology-driven change
  - Those changes result in less KWhr-volume to hosting sites, and a shift of fixed-costs to other grid customers that raises a question of cost-sharing **fairness**.
  - The Genie can't be put back in the bottle – profound changes need to be accommodated without risking operational viability of the energy infrastructure

- **But It Is Also True That:**
  - Advanced DG applications are delivering services and benefits TO THE ENTIRE GRID
  - Those benefits are desirable, and need to be properly incentivized
  - New interconnection methods (like Net-Metering) are modern alternatives to the traditional utility paradigm where shared benefits are supported by shared costs
  - We need to make sure that our regulatory treatment of Advanced DG is consistent with other architecture changes with similar impacts (efficiency for example)
  - There are also risks: some policy decisions may actually hasten advanced DG adoption, without allowing the accrual of grid-wide benefits

Advanced DG: Addressing The Conundrum

- **Concepts For Addressing The Conundrum:**
  - These issues are about Market Transformation, not just regulatory change
  - What we do NOW may be different than what we do LATER
  - We may need to treat customers differently, depending on the role they play
  - The role of regulated entities will likely change; what are the opportunities for them to embrace these changes and expand their business even as they shrink in other areas
  - New investments are needed in the grid, and cost sharing (and risk mitigation) are still needed and useful, but the WAY that cost sharing is done may be different than in the past
  - Some of the problems arise from mis-alignment between where costs and benefits flow
  - Generating power close to the point of use accomplishes part of the distribution function, and that should be factored into economic considerations
  - DG systems should probably pay for their use of distribution facilities, but based on a comprehensive model that **fairly evaluates all costs and benefits**, and **at the right time** given that these are emerging technologies that we want to incentivize
  - Whatever the changes are, a proper transition environment will be critical

Conclusions

- **Conclusions:**
  - The deployment of Advanced DG results from fundamentally new technologies and grid architectures, emerging in response to new needs (resiliency, GHG reduction, cost reductions).
  - As a result, new players are now participating in the market, resulting in profound changes in roles and responsibilities (and business models).
  - The primary question is whether our policy choices, particularly in interconnection rules and rate design, make that transition efficient, cost effective, non-disruptive, and equitable. Or Not.

- **This will be a challenging transition, with no easy answers, but the benefits that are likely to result from these new architectures make the effort worthwhile!**