Synapse Energy Economics, Inc.

Review of Utility Owned DG Business Models for New York

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Topics

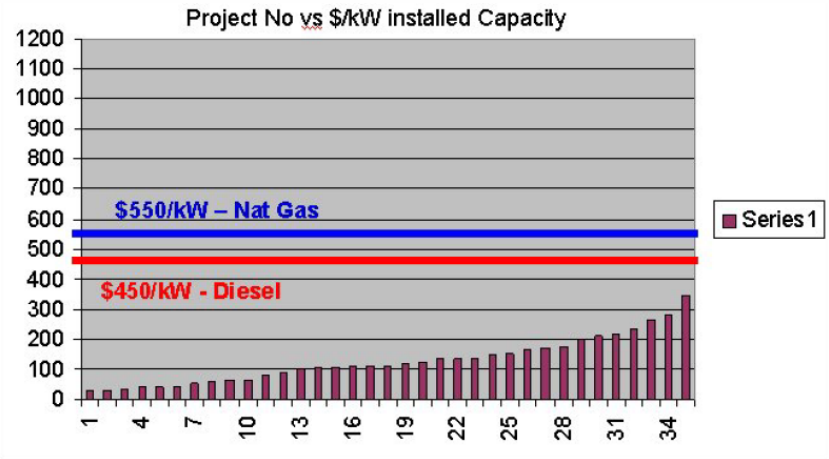
- **Case Studies**
  - Detroit Edison
  - National Grid
  - Austin Energy
- **Feasibility of Utility Owned DG for New York**
  - Utility Ownership of DG in New York
  - Issues of Detroit Edison's Mobile DG Model
  - General issues for other types of DG

Case Studies

Detroit Edison

- **Background and motivation**
  - Faced time and budget constraints in investing in T&D assets
  - can't afford to solve every 1MVA problem with traditional T&D 30MVA solution
    - Problems that may only exist for a few hours per year
    - Capacity that may not be fully utilized for several years.
  - DG is one way of delivering just-in-time and "right-sized" capacity to resolve smaller short falls while minimizing the initial capital outlay
- **DG strategy**
  - DG as temporary distribution solutions (1 to 5 years), sited along distribution circuits, at substations, and in an island mode to perform maintenance
  - partnering with customers on overloaded circuits through a premium power rate (premium power program)
  - Included DG analysis in its capital budget planning process
  - Project capital costs in the rate base
  - Cost of DG vs. cost of distribution projects per kW capacity short fall
  - Work with communities that host DG projects

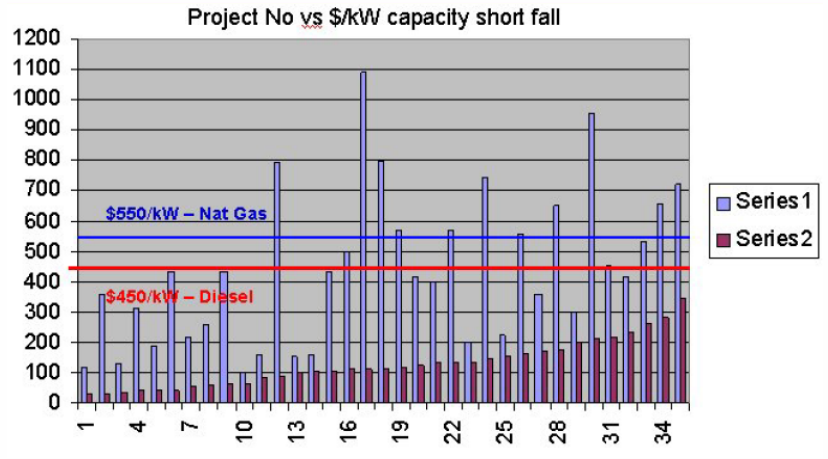
Detroit Edison (cont')



Graph represents Overload and New Business Project Not Reliability Projects.
The cost per kW for Reliability projects is typically very high.

Source: DTE Energy 2004. Detroit Edison Distributed Resources Utility Applications & Case Studies

Detroit Edison (cont')



Source: DTE Energy 2004. Detroit Edison Distributed Resources Utility Applications & Case Studies

Detroit Edison (cont')

- Three 1 MW natural gas units, two 2 MW diesel units, and one 1.5 MW dual fuel gen.
- 16 projects total. 26 MW in total.
- Use various communication technologies

Detroit Edison (cont')

Substation Applications
Temporary & Maintenance

Distribution

Circuit Applications
Emergency & Temporary

Power

Customer Partnership Applications

Source: DTE Energy 2004. Detroit Edison Distributed Resources Utility Applications & Case Studies

Detroit Edison (cont')

Grosse Ile

Detroit Edison (cont')

Collins

Detroit Edison (cont')

DG Communication and Control Technology

Location	DR Equipment	Manufacturer	Fuel	Local Control Protocol	Communication Media
Adair	ENI 1000	Deutz	Nat. Gas	Modbus	Broadband Satellite
Redford	ENI 150	DTECH GM 9.1LIC	Nat. Gas	Modbus	Broadband Cable
Western Wayne	2 X ENI 150, 1 X ENI 75	DTECH GM 9.1LIC	Nat. Gas	Modbus	Broadband Satellite
DTECH Farmington Hills	ENI 75	DTECH GM 9.1LIC	Nat. Gas	Modbus	Ethernet
Southfield	Siemens Solar Cell	Siemens	Solar	Modbus	Phone Line
Lum	ZBB/SANDI Flow Battery	ZBB	Flow Battery	Modbus	Phone Line
Union Lake	ENR 2000	Cummins	Diesel	LonWorks	Cable modem

Source: Ed Jakubiak 2004. "Aggregating Distributed Generation to Participate in the Energy Market" presented at EEI Fall TD&M Conference Methods & Procedures Working Group
October 10-13, 2004

National Grid's solar generation program in MA

- **Policy background**
  - MA Green Communities Act of 2008 allows utility ownership of solar PV, limited up to 50 MW per company
  - State RPS targets15% by 2020, solar target of 400 MW
- **Ngrid solar generation program**
  - First phase: utility owned projects on facilities owned by the company or its affiliates.
  - Second phase: utility owned projects on customer property
  - Third phase: financial offerings to customer owned PV projects

National Grid's solar generation program in MA (cont')

- **Overview of the first phase**
  - Five projects, totaling 5 MW at $31 million (estimated)
  - One project will be integrated with the Congestion Relief Pilot project in Everett and will allow Ngrid to study the effects of PV as a % of the load carrying capacity of a distribution feeder
  - Another project in Revere will allow Ngrid to evaluate the impact on a substation and contingency loading issues.
  - Solar Cost Adjustment Provision (SCAP) Tariff
    - Costs minus revenues from sales of energy, capacity, and RECs will be recovered in rates
    - Regular ROR
    - Annual adjustment

National Grid's solar generation program in MA (cont')

- **Benefits**
  - Testing PV's ability to relieve load on distribution system
  - Helping meet state's RPS goal
  - Large scale, lower prices for the system
  - A lower rate of return than private rates of return
  - (for the first phase) eliminated the time negotiating with other parties and the cost associated with the use of properties by others

Austin Energy's Dell Children's Medical Center

- **Background and motivation**
  - The hospital was interested in obtaining LEED certification and contacted AE
  - AE is interested in clean energy and wanted to test CHP system on its own
  - Improve relationships with the customers
  - Provide more reliability
- **CHP system at Dell Children's Medical Center in Central Texas**
  - Austin Energy (AE) built a 4.3 MW CT system (Mercury 50) with a HRSG and an absorption chiller in 2006. Also AE installed a 1.5 MW diesel backup gen.
  - Extremely reliable with one back up gen and two grid feeds from two separate substations
  - Provide heating, cooling and electricity
  - Become part of LEED Platinum certification (first LEED Platinum certified hospital in the world)
  - Contracted out for engineering, procurement and construction service to Burns & McDonnell
  - Received a DOE grant

Austin Energy's Dell Children's Medical Center (cont')

- **Benefit**
  - Securing a long term contract with the hospital
  - The hospital saved $8 million capital outlay by outsourcing power, heating and chilled water needs to Austin Energy.
  - Hospital enjoys reliable power
  - Lower emission foot print
- **Project management and regulatory issues**
  - Connection to the grid was not difficult
  - Spent significant amounts of time in the entire process of building the plant
  - Allocation of fuel and equipment, power production vs. non power production, operating cost accounting,
  - Requires around the clock staffing
  - Exposure to fluctuating gas prices (large portion of operating cost)
  - Actually experienced a few outages due to switching problems between feeders.

Feasibility of Utility Ownership of DG in New York

Utility Ownership of DG in New York

- The NY electric industry restructuring order in 1996 resulted in divesture of utility generation assets (Case 94-E-0952)
- NY DG pilot program between 2002 and 2004 allowed utilities to bid in their projects in the program (for supporting T&D grid)
- NYPSC order on April 2, 2010 on customer sited RE in the downstate (Case 03-E-0188)
  - PSC staff previously proposed utility ownership of PV. OR&E showed interests in owning PV.
  - PSC denied utility ownership of PV while recognizing utilities' key role for integrating RE in the best sites to support the system.
  - However, it also mentioned that PSC may revisit this issue in case it does not see sufficient RE investment in the area.

Unfair Competition? Benefits?

- **Cons:**
  - Utilities are shielded from the market competition force. Just and reasonable investment guarantees stable revenue.
  - This utility advantage may chill the interest of market participants
- **Mitigating the anti-competitive risk**
  - DG projects could be limited to a certain capacity limit and location
  - Utilities could contract out to third parties the development, design, construction and maintenance service of DG projects.
  - Utilities can utilize their own property for siting certain types of DG projects
- **Pros:**
  - Utilities can identify the most beneficial sites and system sizes for their network.
  - Utilities become more familiar with DG interconnection issues, which may result in establishing better interconnection standards for DG
  - Large scale projects will help increase DG penetration and may reduce DG price (especially PV) in the market
  - Utility large scale project could lower costs because of the scale, a lower rate of return, and a longer term financing terms. This would benefit not just utilities but also consumers
  - Straightforward aggregation of RECs for RPS compliance for RE DG.
  - Control over the DG system for grid integration and line worker safety.
  - Siting DG on utilities' unused property will minimize transaction costs and lease payment

Issues of Detroit Edison's Mobile DG Model

- Poor to very poor image of mobile DG (diesel gen)
- Tool to address budget and time constraints & load growth uncertainty
- Emissions
- Noise & Space
- Mobile DG vs. Demand Response

Poor to Very Poor Bad image?

Tool for address budget and time constraints & load growth uncertainty

- Utilities have budget and time constraints. Sometimes not all distribution problems can be solved on time.
- Projected load growth may not be materialized, especially now with aggressive EE goal
- Even built, a new distribution system may not be fully utilized for many years

Issues of the Mobile DG Model: Emission

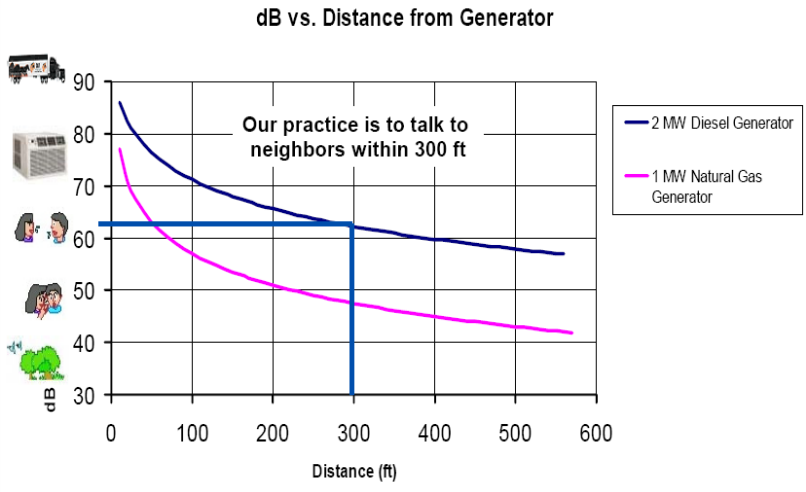
- **Emission rates of diesel and NG engines and emission regulation**

	NOx rate from generation (lb/MWh)*	NOx rate under the current regulation (lb/MWh)**	Proposed regulation for new DR resources (lb/MWh)***
Diesel engine	20 - 50		
Diesel engine with SCR	1.9 - 3.4		
NG engine	0.096 - 1.25	6.79	3.5

Source:
* US EPA 2008. Catalog of CHP Technologies; Manufacturers of Emission Controls Association 2009. Case Studies Of Stationary Reciprocating Diesel Engine Retrofit Projects;
** N.Y. Comp. Codes R. & Regs. tit. 6, § 227-2.4
*** DEP Draft DG regulation

- **Emission control technology**
  - SCR is very expensive: up to $250,000 additional capital cost, assuming a nominal 1 to 2 MW unit and not including site-specific installation costs.

Issues of the Mobile DG Model: Noise & Space



Issues of the Mobile DG Model: Mobile DG vs. Demand Response

- NY already has effective demand response and EE programs for distribution load relief, but mobile DG can play a role.
  - A mobile DG unit owned by a utility can be in the 1 MW to 2 MW range, can operate reliable
  - A mobile DG unit can be located effectively to mitigate specific distribution problems if there is enough space available away from residents
  - A mobile DG has to be parked outside and stay at one stop for one or more peak demand seasons
- Where a utility finds DR and EE resources are insufficient or not reliable enough for distribution support, it could explore a mobile DG option

General issues for other types of DG

- Utility owning PV and CHP
  - Selling energy from DG is not difficult since utilities do not have to bid prices
  - Having long term contracts with customers is a plus
  - However, utilities in New York are currently not allowed to own PV based on the April 2 PSC order on RPS. The order is thought to imply any utility ownership of RE and CHP are not allowed.
- Owning CHP
  - More time consuming to find right customers with right electricity and heat load profiles at right spots
  - Selling heat and/or chilled water to customers is a totally new business to a electric distribution company
  - High risk for risk averse utilities
    - Fluctuating fuel price
    - A customer may leave the site (e.g., due to bankruptcy) and it is not an easy task to use the same CHP in other sites.

Key Finding

- Some possibility to enhance existing DR programs for distribution support with the mobile DG model
  - helpful when EE and DR resources are not sufficient or reliable for D support and/or when a utility doesn't have sufficient time and budget to upgrade D projects
  - Diesel DG is not feasible based on NY air regulations, but NG DG is feasible
  - Finding space for DG is challenging, but is not impossible
- There are ways to mitigate anti-competitive risks of utility DG models
- Utility DG models provide some benefits to utilities, consumers, and market players
- Utility owned PV is not viable for the moment in NY, but could play a role in the future
- Utility owned CHP is the least feasible and attractive option. CHP is best suited for non-utilities.

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