Distributed Generation: How I Learned to Stop Worrying and Love the Bomb

EEI Strategic Issues Roundtable

March 26, 2014
The bulk of NRG’s business will continue to be based around the conventional electric grid.”
“At the same time people are turning away from the grid in ever-increasing numbers.”
*David Crane*  
CEO, NRG

“Utilities are going to have to adapt or die.”
*Jon Wellinghoff*  
Former FERC Chairman

“We put a large amount of trust in future regulation. It is in the self-interest of governments to treat capital providers in a manner that will ensure the continued flow of funds to essential projects.”
*Warren Buffett*

“No less than the stability of the grid is at stake.”
*Tony Early*  
CEO, PG&E

“We do not view [a death spiral for utilities] as probable, at least for now.”
*Moody’s*

“People don’t really want to go completely off the grid…until the generation doesn’t work and then they want to come back on the grid real quick.”
*Terry Bassham*  
CEO, Great Plains Energy

“Brainstorming ways to incorporate renewable energy such as solar power into its business model Southern Company”

“The opposite [of a death spiral] is true. We are building a grid that enables and embraces technology.”
*Christopher Johns*  
President, Pacific Gas & Electric

“You can imagine a world in which distributed generation could be just another way to manage the grid.”
*Robert Hoglund*  
CFO, ConEdison

“A mortal threat to the existing utility system”
*David Crane*  
CEO, NRG

“Unlike Europe, where we had a revolution in renewables and it happened very fast with massive subsidies, we expect an evolutionary change of the utilities and power markets in the U.S. with a growing role of renewables.”
*Angie Storozynski*  
Analyst, Macquarie

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“You can imagine a world in which distributed generation could be just another way to manage the grid.”
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“…whatever you believe, it’s going to happen more drastically and aggressively. If you believe we will see some renewables, but not too much, this is what we thought in 2008. If you believe there will be no aggressive dynamic evolving, this is what we believed in 2005. We have already made the mistakes…Be more forward looking.”
*Leonard Birnbaum*  
Board of management member, E.On
## Change to the Traditional Utility Business Model

<table>
<thead>
<tr>
<th>Degree of Change</th>
<th>Timing of Change</th>
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<tr>
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<td>2014–2019</td>
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<tr>
<td>Transformative and Disruptive</td>
<td>A</td>
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<td>A Major Evolution</td>
<td>B</td>
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<td>Limited</td>
<td>C</td>
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Load Growth Can Cover a Lot of Sins

According to NERC’s 2012 Long-Term Reliability Assessment, demand growth for the summer season was at its lowest level since 1967 when NERC began reporting data. The Energy Information Administration (EIA) projects demand growth in the United States to remain below 1% for the foreseeable future.

Direct use has grown steadily since 2009. Direct use includes the self-supply of generation by commercial and industrial customers.

Anemic growth and penetration of substitutes can change the risk profile of a high fixed-cost, capex intensive business. Will allowed ROEs go up?
What Are the Primary Drivers of Self-Supply?

- **Public Policy**
  - Net metering
  - Interconnection
  - Third-party PPAs/leasing
  - RPS amounts, carveouts, and “Ts and Cs” rules
  - Self-aggregation (physical and logical)
  - Environmental costs of central station generation

- **Technology**
  - Solar PV experience curve
  - Microgrids
  - Disruptive technologies?

- **Price**
  - End-use price vs. cost of substitutes
  - Cross-price elasticity will vary with time horizon
What Are the Primary Drivers of Self-Supply? (Cont’d)

- Customer tastes and preferences
- Rate structure
  - Fixed vs. variable
  - Temporal and geospatial
  - Value of grid
  - Granularity of tariff structure
- Others?
Where jurisdictions are “better” on more drivers, they scored higher on the map.

The states that score highest are most likely to see a significant influx of distributed resources.
Implications for Utility Business Models

**Think Global, Act Global**
- High penetration of DG (combined heat & power and renewables)
- Emergence and increased penetration of microgrids
- Customers driving the "discussion"

**Think Local, Act Local**
- Continued focus on central station generation, long-haul transmission
- Technology initiatives focus on improving the existing integrated system
- May see reduced loads due to energy efficiency and distributed resources, but customers do not secede
- Utilities driving the "discussion"

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**Increasing change and complexity**

**Traditional Vertically Integrated Utility**
- Continued focus on central station generation, long-haul transmission
- Technology initiatives focus on improving the existing integrated system
- May see reduced loads due to energy efficiency and distributed resources, but customers do not secede
- Utilities driving the "discussion"

**Disaggregated Supply and Demand**
- High penetration of DG (combined heat & power and renewables)
- Emergence and increased penetration of microgrids
- Customers driving the "discussion"

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Not all utilities will face the same pressures in the same timeframe; they will focus on different types of infrastructure in the near term.
What We Are Seeing – Representative Example

Think Global, Act Global

Think Local, Act Local

Increasing change and complexity

Wires Utility A
- Scoff at non-regulated
- Owner operator of grid
- Distribution RTO
- “You got it, we connect it”

Utility B: Holding Co with Merchant Activities
- Own and operate grid
- Launch non-regulated businesses and grow non-regulated portfolio

Utility C
- Own and operate grid
- Decoupled revenues
- Own distributed generation outside of territory
- Proposing “guided” approach to localized energy resources

Utility D
- Create a view of what technologies will come when
- Launch multiple business lines

What are you seeing?
## What Others Are Doing

<table>
<thead>
<tr>
<th>Type of Utility Involvement</th>
<th>Utility Example</th>
<th>Benefits</th>
<th>Challenges</th>
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<tbody>
<tr>
<td>Indirect (e.g., finance), outside of service territory</td>
<td>PG&amp;E, Duke</td>
<td>Allows for participation in growing market and potential ROI through direct (energy revenues, RECs) and indirect benefits (tax credits, diversification)</td>
<td>Technologies and regulations of outside service territory may not provide adequate knowledge transfer for future service territory installs</td>
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<tr>
<td>Own/operate, outside of service territory</td>
<td>NextEra, Duke, ConEd</td>
<td>Facilitates an understanding of technology and market considerations</td>
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<td>Provide “green” options to customers</td>
<td>Dominion, Duke</td>
<td>Provides opportunity to gain first-hand knowledge of how to maximize resource value</td>
<td>Requires larger investment in capital and resources to acquire and manage</td>
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<tr>
<td>Own/operate, inside of service territory</td>
<td>Dominion, Salt River Project</td>
<td>Understanding technology may provide ancillary benefits (e.g., voltage regulation)</td>
<td>Needs to be coordinated with other facets of the company</td>
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**Choices are different, inside vs. outside service territory.**
### Implications for Utilities

#### What Should Utilities Be Thinking About?

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<tr>
<th>Area of Concern</th>
<th>Implications</th>
<th>For Consideration</th>
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<tr>
<td>Strategy</td>
<td>■ The utility will face competition and loss of revenue</td>
<td>■ The utility needs to consider which businesses it wants to be in</td>
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<td>■ Alternative business opportunities may exist</td>
<td>■ Is there an opportunity to become the “single point of contact” to the customer?</td>
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<td>■ Are there other lines of business the utility should enter?</td>
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<tr>
<td>Regulatory</td>
<td>■ Utility loads will decline with the influx of resources; the existing rate construct may be insufficient to address declining demand growth and customer self-supply</td>
<td>■ Consider rate decoupling, riders, and other rate strategies to protect revenues today</td>
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<td>■ Open the dialogue with the regulator on changes to the business model and the “value of the grid”</td>
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<td>■ Consider further bifurcation of customers and rate classes</td>
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<td>Financial</td>
<td>■ Customers are using less electricity or self-supplying</td>
<td>■ Clarify approach to net metering</td>
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<td>■ Consider new growth strategies (electrification of infrastructure, EV)</td>
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<td>Real-Time Operations</td>
<td>■ Operators will be challenged to see and operate new resources connected to the grid</td>
<td>■ Consider expanded, more granular visualization tools</td>
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<td>■ Determine how coordination with non-utility entities that operate assets should work</td>
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<td>■ Protocols dictating the availability of resources may become important if they are to be relied upon by operations</td>
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Any utility assessing its strategic alternatives should start with a review of the likely impacts and timing in its service territory.
## Implications for Utilities

What Should Utilities Be Thinking About? (Cont’d)

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<td>System Planning</td>
<td>- Traditional utilities plan for central station generation, long-haul transmission—planning paradigm is changing</td>
<td>- Models need to account for new resources (load forecasting, capex)</td>
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<td>- Location and time are now important variables and need to be considered both in transmission and distribution</td>
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<td>- Consider “no regrets” investments</td>
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<td>Customers</td>
<td>- Customers may have various new “energy providers”</td>
<td>- The utility will be called upon to interconnect to various entities; the roles and responsibilities in that interface need to be clear</td>
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<td></td>
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<td>- Customers may require additional types of service</td>
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<td>Stakeholder Management</td>
<td>- A strategy to manage all stakeholders (including customers will be critical)</td>
<td>- The utility needs to manage and communicate to all stakeholders (customers, regulators, other “energy provider”) through this transition</td>
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<td>- This approach should be coordinated with the strategic, financial, and operational strategies set out above</td>
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Implications for Utilities

Considerations for Incorporating Alternative Resources

Safeguard Regulatory Compact
- Eliminate net metering equity issues
- Immunize returns vs. flat to declining energy consumption
- Protect franchise rights by limiting:
  - Virtual net metering
  - Self-aggregation across customers and geography
- Create grid reliability focused interconnection and operating protocols for alternative resources
- Create flexible tariffs to serve customers seeking differentiated services (e.g., microgrids)

Market Test/Pilot Alternative Resources
- Establish precedent for inclusion in rate base in territory
- Understand markets
  - In territory
  - Outside territory
- Learn best operating algorithms
- Apply “true” pricing principles
  - Perform market experiments
  - Differentiate pricing

Define Adjustments to Operating Model
- Develop experience with new technologies and their interactions with existing infrastructure
- Leverage experiences with resources to:
  - Develop visualization and modeling tools
  - Identify reliability issues and advantages
  - Develop SCADA and other tools to manage and leverage dispersed resources
  - Develop operating and maintenance protocols
- Learn to plan for new types of resources
  - Load forecasting
  - System planning
  - System design

Define Adjustments to Business Model
- Revisit utility business model
- Consider a range of adjustments (not mutually exclusive)
- Stress test choices under alternate market evolution scenarios

Distribution RTO and Wires Businesses

Own and Operate Distributed Resources

Maintain New Market Beach Head and Operating Controls

Informed Status Quo
Contact Us

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