



Distributed Generation Challenges for Utilities and Regulators

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Policy Issues with DG

- The costs associated with utilities upgrading their distribution systems to accommodate DG
- Use of the smart grid to better exploit the benefits from DG
- Fitness of the current utility business model in a heightened DG world
- An alignment of ratemaking and other regulatory practices affecting DG with the public good
- Obstacles to utility customers and third parties in developing DG
- The financial effect on electric utilities, conceivably a possible “death spiral” outcome
- Alignment of utility objectives, utility strategies and regulatory practices
- Direct utility involvement in the DG market

Challenges Await Rooftop Solar PV

- Pressures to end or reduce subsidies
 - Utility- and community-scale solar benefits from lower costs and avoidance of individual customers making large investments upfront
 - Solar non-dispatchability reduces its value
 - “Soft costs” constitute a high percentage of total installation costs
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The open question is: How much will rooftop solar PV penetrate the electricity retail market in the years ahead?

The Smart Grid Can Benefit DG

- Time-sensitive pricing of grid services provided to the DG customer
- Time-sensitive measurement of the utility's avoided costs from DG
- Two-way communications capability
- Facilitation of multidirectional and unpredictable power flows (e.g., load balancing)
- Mitigation of voltage and frequency fluctuations (e.g., from rapid changes in supply and demand)
- Remote real-time monitoring of grid activities (e.g., loads, voltage)
- Remote and automatic control of facilities on the central grid (e.g., automatic breakers and switches)

A New Utility Business Model?

- Rationales
 - Key elements of a business model
 - Questions for regulators
 - Utility role
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Is a new utility business model needed or can utilities just tweak their current model?

Ratemaking Concerns

- Harm to utilities from lower sales given the current rate design of recovering most fixed costs through volumetric charges
- Inappropriate rates and rate design for DG and full-requirements customers
- Pricing of surplus power (e.g., the net metering rate deviates from cost-based principles like with CHP)
- Cost-shifting to full-requirements customers
- Deficient utility compensation to DG customers for the value they contribute to the utility grid
- Deficient DG customer compensation to the utility for standby and other grid services
- Uniform prices across all time periods
- Impeding progress toward meeting traditional and new regulatory objectives

Net Metering under Attack

- Disconnection of retail rates from utility avoided costs and other benefits to the utility grid
 - Contrary to PURPA principles
 - Payment of the retail price to DG customers for essentially wholesale energy
 - Failure to account for the time-dependent value of DG energy
 - Lack of a sound underlying economic rationale
 - Overall, an unfair and regressive cross-subsidy
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Net metering seems to have been implemented for convenience if for no other reason: The retail price is accurately measured with little contention, and the DG customer needs only a single meter

An Alternative to Net Metering, VOST

- What are the real cost savings (e.g., energy and capacity cost savings)?
- What benefits are pecuniary in that they represent a reallocation of benefits rather than a real benefit?
- What benefits are speculative versus definitive in nature?
- Does net metering or VOST reflect undue favoritism toward DG relative to other generation sources (including other clean energy sources) and energy efficiency?
- Are the external benefits of DG to full-requirements customers commensurate with the increased electricity rates that result from compensating DG customers?
- How should regulators treat measurable benefits (in dollars) versus difficult-to-measure and non-measurable benefits in determining utility compensation to DG customers?
- How should regulators apportion the benefits from solar between the utility, full-requirements customers, and DG customers?

Alignment of Utility Objectives, Business Strategies and Regulatory Practices

- Regulators should try to coordinate their policies on what they intend utilities to achieve with the utility business model
- That is, the utility business model and regulation should evolve together
- A key factor is aligning regulation with predetermined social priorities
- Three general regulatory approaches are mandates, oversight and incentives

Examples of Alignment

- The scope of “just and reasonable” rates has expanded to include utility services provided to DG customers as well to the benefits that those customers offer the utility grid
- In promoting renewable energy, and in particular DG, regulators could either mandate utilities to create the proper platform for integration or offer utilities an incentive for creating the platform
- Regulators could consider utility incentives to DG customers for providing ancillary services to assist the utility distributor in enhancing operations, for example by providing voltage control, reactive power support, and frequency reserve
- Regulators should eliminate all artificial barriers to DG growth
- If regulators find grid modernization or the smart grid cost-beneficial, they should consider pre-approving investments and reducing delays for cost recovery through a surcharge
- In empowering customers, regulators should consider encouraging utilities to offer new services and invest in new technologies
- In promoting DG, regulators should consider allowing direct utility involvement along with rules to prevent undue favoritism to the utility or its affiliate

The Death Spiral

- Firms face serious challenges when they try to raise prices in the face of growing competition
- A *death spiral* relates to an existential crisis whereby a firm has limited ability to raise its prices to sustain financial viability in response to adverse events (e.g., inexorable fall in demand for its product, new competitors)
- For example, continuously higher prices would motivate an increasing number of full-requirements customers to switch to DG with the subsequent effect of yet higher prices triggering more customers to migrate
- The likelihood of occurrence
 - Although a scenario of utility financial calamity is remote, it can occur under the right conditions; for example massive migration of customers to DG under current ratemaking practices
 - Industry observers exaggerated past death spiral threats and probably the same hyperbole holds for the current threat
 - Such predictions seem rigidly grounded on tacit assumptions that utilities are inert in responding to a more competitive environment
 - Instead, it seems that regulators will want to work with utilities to avoid serious financial problems while promoting efficient competition that serves the public good (e.g., consideration of new ratemaking mechanisms, a new utility business model, direct utility participation)

Should Utilities Get Directly Involved in the DG Market?

- The debate over utility involvement entails three basic questions that regulators will need to answer:
 - What are the criteria for determining whether a utility or its affiliate can participate in a market that is workably competitive?
 - If the regulator approves utility participation, what limitations should the regulator place on the utility to compete?
 - Should utility core customers pay for any of the utility investments in the non-regulated market or should utility shareholders fund these investments?

The Benefits of Utility Involvement

- Economies of scale and scope
- Stimulant for further DG growth
- Offset utility financial losses from third-party DG development

Regulatory Concerns

- Entry barrier to third-party DG
 - ✓ Cost-shifting
 - ✓ Cost-subsidization
 - ✓ Discriminatory access to the distribution grid
 - ✓ Discriminatory release of information
- A monopoly utility can leverage its position to create barriers to entry by third parties
- Regulators face the challenge of creating a “level playing field” or fair competition

Policy Options for Utility Involvement

- Does creating “fair competition” require more or less regulation?
 - This was an issue in the old telephone industry
 - A balance needs to be reached between not overburdening the incumbent utility and not discriminating against new entrants
- The “balancing test”: weighing the expected benefits of utility involvement against the potential anticompetitive effect
- *Type I* and *Type II* errors
- *Rule of reason* versus *per se* test
- Structural separation
- Codes of conduct
- Tradeoff of different efficiencies

Conclusion

- Regulators face strong pressures from interest groups to take certain actions
- Their job is to balance these interests so as to best serve the public good
- The EISPC paper provides regulators with primary information to help guide their decisions about DG and the various actions that utilities can take in its development