Utility Engagement

SolSmart Advisor Training

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Introductions

The Regulatory Assistance Project (RAP) is a global NGO providing technical and policy assistance to government officials, agency staff, and others on energy and environmental issues.

- Foundation-funded; some contracts
- Non-advocacy; no interventions
Outline

• Different Types of Utilities
• Ratemaking Basics
• System Impacts of Distributed Generation
• Ideas for Engaging Utilities on Solar
  • Net Energy Metering
  • Community Solar
  • Interconnection
  • Resilience
Roles of Utilities

• Provide service to anyone who requests it
• Adhere to strict safety standards
• Adhere to reliability standards
• Provide adequate service
• Be responsive to customer needs
Investor-Owned Utilities (IOUs)

- Privately owned
- Publicly-traded (usually)
- Profit-making enterprises
- Economically regulated by state public utility commissions (PUCs)
- Examples: Duke Energy Carolinas, Mississippi Power, Dominion
Electric Membership Cooperatives

- Owned by members
- Not-for-profit
- Governed by Board of Directors elected by the members
- Less (or no) PUC oversight – varies by state
- Examples: Jackson (GA) EMC, Northern Virginia Electric Coop, SW Louisiana EMC
Public Power Utilities

• Owned by taxpayers
• Not-for-profit
• Governed by locally elected officials or their designees
• Less (or no) PUC oversight – varies by state
• Examples: Orlando (FL) Utilities Commission, City of Huntsville (AL), Nashville (TN) Electric Service
Asset Ownership

• Vertically Integrated Utilities
  • Own generation, transmission, distribution
  • Serve retail customers

• Generation & Transmission Utilities (G&Ts)
  • Own generation and transmission
  • Sell power at wholesale to other utilities
  • No (or few) retail customers

• Distribution Utilities
  • Own distribution, sometimes transmission
  • Buy power from other utilities or from markets
  • Serve retail customers
Ratemaking Basics

• “Cost of Service” approach:
  • Total costs for providing service are recovered, plus reasonable return on investment

• Regulators concerned with ‘just and reasonable’ rates
  • Sufficient but no more than necessary to cover costs and return on investment
Utility Revenue Requirement: “The Capital Bias”

Revenue Requirement (aka Cost-of-Service) = Capital Investments (Cap-ex) + Operating Expenses (Op-ex)

“Rate Base” x Rate-of-Return (Interest on Shareholders’ “Loan”)  Pass-Through, No Rate-of-Return

$1 x 10% = $1.10 $1 = $1
Throughput Incentive

Increased sales → increased utility profit

When load is served with existing facilities, costs are fixed

Creates incentive to resist measures that reduce sales (e.g. DG and EE)
Power Supply Impacts of DG

- Total electricity consumption: no change
- Total utility power supply: decrease
  - Avoided line losses
  - Customer self-supply
  - Customer excess generation
  - Could reduce utility generation or power purchases
- Peak demand/load shape/resource adequacy
- Note: Negligible impacts at low penetration
Distribution System Impacts

- At high deployment, distributed solar affects power quality, reliability, and safety on the local distribution system.
- Location specific, changes over time
- Strategies and solutions are available for avoiding & mitigating negative impacts
  - Smart inverters
  - Grid investments
  - Storage
  - EV’s and smart charging
Characterizing the Challenge for Co-ops and Munis

- Cities and counties want to grow solar development
- Hampered by utility supply limits – locked into long-term supply contracts and face slow load growth
Government Policy: A Major Influence on Solar Deployment

<table>
<thead>
<tr>
<th>Regulatory and State Policies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net Energy Metering (NEM) / Other DG Tariff Policies</td>
</tr>
<tr>
<td>IRP and Renewable Portfolio Standards (RPS)</td>
</tr>
<tr>
<td>Decoupling</td>
</tr>
<tr>
<td>Shared solar/community solar programs</td>
</tr>
<tr>
<td>Interconnection policies</td>
</tr>
<tr>
<td>Incentive regulation</td>
</tr>
</tbody>
</table>

And State and Local Action on Resilience
Net Energy Metering (NEM)

A billing mechanism that compensates residential and commercial customers for the solar power they export to the electricity grid.

- Most commonly used tariff design for customers with behind-the-meter PV
  - More than 90% of all U.S. rooftop PV, and nearly all residential PV systems
- More than 40 states have adopted some form of a NEM policy
- NEM policies vary widely by state, notably with respect to
  - The **amount of credit awarded to customers** for net excess generation in a billing period.
  - The amount of time that the credit is valid
Community Solar

An arrangement in which customers subscribe to or own shares of an off-site PV array and are compensated (e.g., on-bill credit) for the electric production of their portion of the PV system.

Source: Smart Electric Power Alliance (SEPA)
Interconnection Policies

The technical and administrative linking of a generator to the utility grid. The interconnection process is a series of required steps that verify a (PV) system’s compliance to utility technical and administrative requirements.

- Adherent to state-level standards
- Efforts underway to streamline the interconnection process
  - Online portals, simplified forms, stipulated fees/timelines
- Utility main concerns and objectives
  1. Safety
  2. Reliability
  3. Exported power is measurable; required voltage, frequency, and power quality are met
  4. Only certified equipment is used
Collaborative Planning for Resiliency

Some cities and counties are building microgrids that support local grid resiliency. Many of these projects include solar energy resources. The US military is developing solar-based microgrids to ensure energy security and continued operation during emergencies and prolonged outages.

• Notable examples:
  • Buffalo
  • Salt Lake City
  • Military Bases
A Few Key Advantages of Using Solar for Emergencies/Resilience

✓ Increasingly cost-effective compared to diesel-fueled backup generators
✓ Not dependent on fuel storage or functioning fuel delivery supply chain following a disaster
✓ Minimal maintenance required
✓ Generates electricity and can provide grid services during routine (non-emergency) operations
✓ Partnership opportunities for host, utility, and third parties to share benefits and minimize costs
Positioning Utilities for an End Goal

Transitioning from a passive player ...

Passive Player → Trusted Energy Partner

...to a proactive partner with solar customers and developers

Note: Adapted from the Smart Electric Power Alliance (SEPA)
What are the steps for devising a solar development strategy collaboratively with your utility?

- **Step 1**: Perform a resource situation analysis
- **Step 2**: Articulate community wants
- **Step 3**: Assess the short-term
- **Step 4**: Assess the long term
- **Step 5**: Build a collaborative tactical plan

For more information: [www.solsmart.org](http://www.solsmart.org)
Step 1: Perform a Resource Situation Analysis

• What is the utility’s load forecast and resource portfolio?
• How much of the utility’s near-term need is fulfilled by existing contracts?
• How will the utility’s need change over time?
Step 2: Articulate Community Wants

• What are the core drivers of community aspiration?
  o Sustainability, resiliency, employment/economic growth
  o What does success look like?

• Who wants to help?
  o Local businesses
  o Non-profits - churches and community organizations
  o Individuals, households and multi-family communities

• How does solar contribute?
Case Study: Fort Collins

- Ft Collins Utilities (FCU) motivated to meet customer desires for sustainability
- Local residents expressed interest in community solar
- Steering committee formed to assess options, potential risks and rewards.
- FCU opted to partner with 3rd party vendor

For more information: http://www.fortcollinscommunitysolar.com
Concluding Thoughts

What collaborative strategies can be pursued with your utility to encourage PV development in a manner that provides mutual benefit?

Remember – think about the constraints and incentives facing the utility

Strategies:
1. Perform a resource situation analysis
2. Articulate community wants
3. Assess the short term
4. Assess the long term
5. Build a collaborative tactical plan

Tactical Ideas:
- Net Energy Metering
- Community solar
- Interconnection
- Microgrids for resiliency
Other Resources

- [https://solarresilient.org/](https://solarresilient.org/)

Estimates the required rating and physical size of PV and storage to provide power during an outage. Determine equipment sizing before embarking on detailed studies.

- [http://www.solarprojectbuilder.org/](http://www.solarprojectbuilder.org/)

Online tool for universities, municipalities, businesses to simulate long-term financial forecasting of PV deployment. Validate potential projects, compare proposals, become familiar with financing structures.
About RAP

The Regulatory Assistance Project (RAP)® is an independent, non-partisan, non-governmental organization dedicated to accelerating the transition to a clean, reliable, and efficient energy future.

Learn more about our work at raponline.org

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