Designing Standby Rates Well

Standby Rates Workshop
Minnesota Department of Commerce
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Presentation Overview

• What is Standby Service?
  The Individual Customer and System Cost
  Standby Service Definitions

• Overarching Principles:
  Fair Compensation
  Dynamic Efficiency

• Design Considerations & Examples
• Designing Standby Rates Well
Part I: What is Standby Service?
How Do Individual Customers affect Cost of Service?

• Consider the components of full requirements service
  Local distribution service
  Poles and Wires
  Bulk Power

• How does the individual customer affect each?
Local Distribution Costs

The only distribution costs that are attributable to any particular customer are the meter and service drop, and billing costs.

The transformer must be sized to the combined load of a few customers.

The rest is sized to the combined load of many customers.
The distribution infrastructure is sized to the combined loads of all customers.

Adding (or losing) a customer does not change these costs.

They are built to deliver electricity (kWh). All customers using them should share in the cost.

If combined peak demand changes, the system design would change.
Recovery of Bulk Power Costs?

Capacity requirements are driven by peak demand.

Baseload resources are built for energy.

Transmission is mostly associated with remote (baseload and renewable) generating plant.

The size of the bulk system is driven by the combined needs of all customers.
What is Standby Service?

• Set of electric utility products for customers with on-site, non-emergency generation
• Provides for a utility backstop
• Standby Service terms are important

Determines relative economics of self-provision, utility full requirements service & purchasing competitively
Possible Components of Standby
(also called Partial Requirements Service)

- A set of retail electric products for customers with on-site, non-emergency generation
  - *Backup power* during an unplanned generator outage
  - *Maintenance power* during scheduled generator service
  - *Economic replacement power* when it costs less than on-site generation
  - *Supplemental power* – additional electricity supply for customers whose on-site generation does not meet all of their needs
  - *Delivery* associated with these energy services

15 MW gas turbine generator set at Michigan State Univ., Solar Turbines Inc.
Example of a Self-Generator’s Purchase Requirements

- Forced Outage: Backup Power
- Planned Outage: Coinciding with plant shutdown
- Planned Outage: Maintenance Power

Plant Requirement Generation
Supplemental Power
Standby Power
Part Two: Overarching Principles
Traditional Utility Perspective

• Obligation to serve means standing ready to provide backup power when generator is not producing
• Utility maintains generation reserves and T&D facilities to do that, at a cost
• Failure to recover these costs from customer-generators results in a subsidy by other customers (or loss to utility)
“Cost Causer Pays” for Standby is Complex

- Coincident outages are likely drivers of standby costs, not sum of individual customers’ generators
- Use of standby service may not coincide with peak demand of the utility facility providing the service
- Individual lines and feeders may have substantial excess capacity during coincident outages (so no incremental cost), or they may be fully utilized and facing upgrades in the near future (and this changes over time)
On the Flip Side there are Benefits

- Where delivery system is facing upgrades:
  - Distributed generation may allow deferrals, in which case benefits may *offset* costs
  - In some cases, these benefits may *exceed* costs
- Real net costs may be negligible, negative or unknown
- In some states public policy preference for less polluting energy sources is recognized as a benefit
- SO ... Cost-causer principles for standby service are complex
Fair Compensation Considerations

1. Value is a two (or more) way street
2. Consider all relevant sources of benefit and cost over the long term
3. Select & implement a valuation method
4. Cross-subsidies may flow either way
Fair Compensation ...

5. No more complicated than necessary
6. Support innovative power sector models
7. Keep incentive decision separate from rate design
8. Keep decoupling decision separate from rate design
Dynamic Efficiency Considerations

• Technology is making customer resources less expensive
• Technology is enabling customer resource participation
• Power sector institutions are evolving
• What constitutes fair compensation in a time of transition?
Part Three: Design Considerations and Examples
Design Considerations for Standby Rates

• Customer’s savings per kWh produced on-site compared to buying from the grid
• Reasonable balance between variable charges vs. contract demand or reservation charges
• Encouraging customer-generators to use electric service most efficiently and minimize costs they impose on the electric system
• Providing opportunities for customer-generators to avoid charges when they do not take service

14 MW biomass system, courtesy of MAN Diesel & Turbo North America, Inc.
• Load diversity - Generators won’t all fail at the same time or during system peak
  – Shared T&D facilities are designed to meet demand by a pool of customers, not a single customer’s needs
  – This includes assessing PV production profile in aggregate

• Demand charges
  – Daily as-used demand charges for backup power
  – Recognize on-peak vs. off-peak demand

• Opportunities for customer-generators to buy backup power at market prices and avoid utility reservation charge for generation service

• Option for customer demand response or storage to mitigate all or a portion of backup charges

• Option to self-supply reserves
Elements Found in Standby Rates

• The next few slides drawn from a survey of Standby Tariffs done by NRRI

• “Electric Utility Standby Rates: Updates for Today and Tomorrow,” Tom Stanton, NRRI, July 2012
Elements Appearing in Some Tariffs

- capacity levels and demand ratchets;
- scheduled versus unscheduled use of power;
- time-varying rates;
- metering and billing;
- minimum monthly charges;
- DG compensation for generation & ancillary services to the grid;
- Generator types or size provisions;
- liability and insurance requirements;
- dispute resolution;
- Provisions specific to wires-only companies.
Demand Ratchets

• From inflexible and broad
  Based on maximum demand in the current and previous 11 months (e.g., Alliant, Connecticut Light & Power)

• To more flexible and nuanced
  Customer sets standby capacity and manages use of on-site and supplemental capacity to meet their needs (e.g., Con Ed, PG&E, Georgia Power, Pacific Power)
Time-varying Rates

• Some utilities emulate non-DG TOU rates: Consumers Energy, Georgia Power & PG&E
  At Consumers rates are based on MISO LMP
  At PG&E rates based on TOU and customer exempted from a separate standby charge
Now a Colorado Example


• Sponsored by ORNL & U.S. DOE

• Best Practice Recommendations and 5 Case Studies

http://www.raponline.org/document/download/id/7020
PSCO in Colorado

• PSCO Standby Tariffs for CHP > 10 kW
  - Transmission Standby Service (TST)
  - Primary Standby Service (PST)

• Charges
  - Monthly Service and Facilities charge
  - Interconnection charge (TST only)
  - G&T Standby Capacity Fee
  - Distribution Standby Capacity Fee (PST only)
  - Demand and Energy charges
G&T Standby Capacity Design

- Covers 1,051 hours of standby service assuming 100% capacity factor
- Above the “Grace Energy” pay for Demand at the Supplemental capacity price and pay for Energy at the energy usage charge
Opportunities for Improving Price Signals relative to Current Terms

• Currently there is no daily Demand charge
• No TOU price signals
• No recognition of load diversity
• G & T costs bundled in Reservation Fee
• Self-dispatch and market purchases to meet stand-by requirements not allowed
Potential Improvements

- Monthly standby at best FOR unit
- Daily standby demand charges
- Add option to buy back-up power from utility at market prices
- Allow load reduction plans to mitigate back-up charges
- Unbundle G&T in Reservation Fee
- Reflect load diversity on shared Distribution facilities
- Standby back-up demand charges on peak only
Improvement Effects Example

Transmission Service - Winter Season

Demand Costs

- PSCO
- RAP

Energy solutions for a changing world
A Pacific Power Example


• Prepared by ICF, RAP, Synapse and BAI for U.S. DOE
Interesting Tariff Elements

• Shared distribution facilities charge (e.g., substations and transmission facilities)
  based on 15 minute demand on-peak, no annual ratchet

• Local distribution charge (e.g., transformers and local lines)
  based on avg of 2 highest non-peak demands in 12 mos.
  Min charge is baseline but can be reduced with load curtailment plan for outages or with EE plans
More Elements

• Supplemental reserves
  Tariff provides self-supply options including an option for an approved load reduction plan

• Unscheduled outages
  based on real time prices

• Scheduled maintenance, economic replacement and unsched. outage service
  Based on daily demand
  Does not affect Base Tariff T&D charge
Part Four: Best Practices
Standby Rates Best Practices: Allocation of Utility Costs

• Generation, transmission, and distribution charges should be unbundled

• Generation reservation demand charges should be based on the utility’s cost and the forced outage rate of customers’ generators on the utility’s system

• Higher-voltage delivery charges should recognize load diversity
Standby Rates: Best Practices

• Appropriate Incentives
  Pro-rated daily demand charges
  Daily maintenance demand charges -- discounted

• Customer Options
  Interruptible standby service option
  Customers should be able to procure standby service from the open market
Questions?
About RAP

The Regulatory Assistance Project (RAP) is a global, non-profit team of experts that focuses on the long-term economic and environmental sustainability of the power and natural gas sectors. RAP has deep expertise in regulatory and market policies that:

- Promote economic efficiency
- Protect the environment
- Ensure system reliability
- Allocate system benefits fairly among all consumers

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Designing DG Tariffs Well:
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