Net Metering

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Net Metering Definition

- Net metering allows customers to use their own generation to offset their consumption over a billing period by allowing their electric meters to turn backwards when they generate electricity in excess of the their demand

Net Metering Definition

- Net metering allows for the flow of electricity both to and from the customer through a single, bi-directional meter
- Customers receive retail prices for the excess electricity they generate

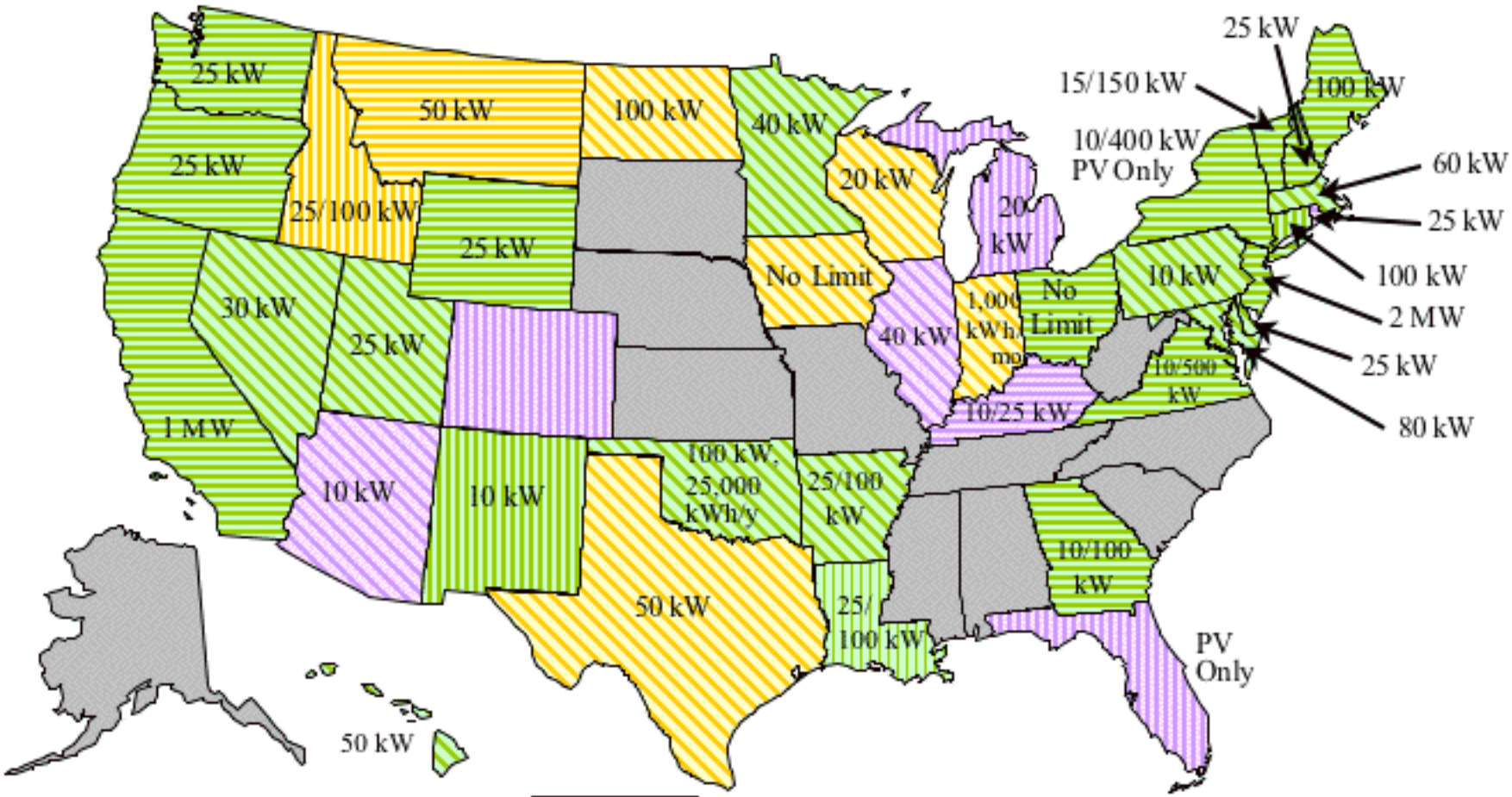
Net Billing

- A second meter is installed to measure the electricity that flows back to the utility
- The utility purchases the power measured by the second meter at an avoided cost rate
- The amount that the utility pays the customer is netted against the amount that the customer owes the utility

Reasons Cited for Allowing Net Metering

- Easy to administer – the standard electricity meter usually accurately registers the flow of electricity in both directions
- Encourages customer investment in renewable energy technologies by providing a subsidy
- Allows customers to "bank" their energy and use it a different time than it is produced giving customers more flexibility

Net Metering By State



Net Metering By State

- In states where net metering rules were adopted by state utility regulators, these rules apply only to utilities whose rates and services are regulated at the state level
- In states with net metering statutes, net metering frequently applies to all utilities

Net Metering Subsidy

- When a utility sells to the customer, the utility is selling 3 services
  - Generation
  - Transmission
  - Distribution

Net Metering Subsidy

- When a customer sells to the utility, it is only selling generation services
- Customer does not own transmission or distribution, and thus cannot properly sell these services
- Compensation calculated using the retail rate is too high for power produced by the customer

Net Metering Subsidy

- Net metering represents a subsidy to customers with generators that qualify for net metering
- This subsidy is paid by customers who do not qualify for net metering
- This is a subsidy from those who can afford generators to those who can’t

Net Metering Subsidy

- If a single meter is used and the meter runs both forward and backward, the subsidy to net metering consists of:
  - Distribution demand charge
  - Transmission demand charge
  - Likely a portion of the purchased power demand charge

Unit Costs from Cost of Service

		Residential Class
Purchased Power		
Purchased Power Demand per kWh	$	0.027
Purchased Power Energy per kWh	$	0.024
Total Purchased Power per kWh	$	0.051
Distribution Demand		
Distribution Demand per kWh	$	0.012
Distribution Demand Margin per kWh	$	0.008
Total Distribution Demand per kWh	$	0.020
Distribution Customer		
Distribution Customer per Customer per Month	$	20.84
Distribution Customer Margin per Customer per Month	$	4.83
Total Distribution Customer per Customer per Month	$	25.67

Payment of Demand Component

- Could pay the full purchased power demand per kWh
  - This is more than is economically justified and still represents some subsidy to the customer
  - For example, 2.7 ¢ / kWh
- Calculate CP demand charge and pay for on-peak kW production
  - $1,091,302 / 95,007 CP kW-mos. = $11.49/CP kW-mo.

Payment of Demand Component

- Use the following formula:

$$\frac{\text{(CP Demand Charge) * (On-Peak Probability)}}{\text{(Hours in the month) * (Capacity Factor)}}$$

For example,

($11.49 * 0.1) / (730 * 0.3) = $0.0053 / kWh

Net Metering Subsidy

- Net metering provides a subsidy for:
  - Wind
  - Solar
  - Micro-hydro technologies
  - Landfill gas
  - Biomass
  - Methane digesters

Net Metering Subsidy

- “The retail price of electricity is typically several times greater than the avoided cost of electricity. Net metering is a potentially crucial method of obtaining customer acceptance. So long as the installed PV capacity billed on a net basis is small, the effective subsidy provided by the utility is not likely to affect utility system economics.”

  Renewable Energy Annual 1996, Energy Information Administration, Office of Coal, Nuclear, Electric and Alternate Fuels, U.S. Department of Energy

Net Metering Questions

- For which technologies is net metering available?
- Is there a limit on the size of the generator?
- Which customer classes are allowed to utilize net metering?
- Is there a limit on overall enrollment?

Net Metering Questions

- How is any net excess treated?
- Which utilities are required to offer net metering?
  - Investor Owned Utilities?
  - Rural Electric Cooperatives?

How is Net Excess Treated?

- Purchased by utility at avoided cost rate
- Purchased at retail rate for renewables and avoided cost rate for non-renewables
- Purchased at average retail utility energy rate
- Purchased at utility's unbundled generation rate

How is Net Excess Treated?

- Purchased at spot energy market rate
- Credit for is given on the next bill
  - Granted to utility at end of 12 month billing cycle
  - No expiration

Limit on Overall Enrollment?

- A number of states include a limit on overall enrollment
- Limits between 0.1% and 1% of utility's peak demand
- Ensures that the subsidy does not significantly damage a utility's financial condition and keeps the subsidy on other customers to a reasonable level

Net Metering Provisions of the New Energy Act

- Sec. 1251- “Each electric utility shall make available upon request net metering service to any electric customer that the electric utility serves.”
- Each state regulatory authority and each non-regulated electric utility shall commence consideration in 2 years
- Complete consideration in 3 years

Dealing With the Subsidy

- Minimize the potential economic damage caused by the subsidy
- Eliminate the subsidy by unbundling rates and developing a cost based net metering program

Minimize the Damage

- Limited to residential and small general service customers
- Cap generator size at 10 kW nameplate rating
- Capacity available for net metering is capped at 0.1% of peak demand
- Minimum of $100,000 liability insurance
- Utility not required to pay consumer
- Credits against future charges but utility retains unused credits if customer discontinues net metering
- Must meet interconnection standards

Interconnection Standards

- IEEE 1547-2003, “IEEE Standard for Interconnecting Distributed Resources with Electric Power Systems” (IEEE 1547)
- Current version of ANSI/NFPA 70, “National Electrical Code” (NEC)
- Any other applicable local building codes
- The interconnection must be inspected by local code officials prior to its operation to ensure compliance with applicable local codes

Cost Based Net Metering

- Develop a rate to eliminate the subsidy
- Unbundle retail rate
- 2 Meter set up with cooperative paying for the “out” meter

Cost Based Net Metering

- Customer buys from the coop at full retail rate
- Customer is paid by the coop at avoided cost as required in Sec. 210 of PURPA for power that the customer produces
  - Energy component of the unbundled retail rate
  - May be some payment for demand component

Cost Based Net Metering

- Net the payment to the customer from the charge to the customer
- If an amount is owed to the customer, is this paid in cash or is a credit accrued against future bills?
- Coops must “consider” net metering under EPA2005 but are not required to pay full retail price to customer
- However, state law may require this

Minimizing the Negative Impacts of Net Metering Using Rate Design

- If net metering is required, it is essential that cooperatives have a customer charge that fully reflects customer related costs
  - Typically between $20 and $35 per customer per month depending on the number of customers per mile of line
- Any margins or fixed costs included in the energy charge may not be recovered