

Net Metering & Interconnection -- the Foundation for Solar Energy on the Grid

Christopher Cook
IREC Connecting to the Grid and
Net Metering Specialist

E3 Energy Services, LLC
www.E3Energy.com

NARUC Winter Meeting
Feb. 14, 2005



INTERSTATE RENEWABLE ENERGY COUNCIL

Net Metering and Interconnection

- **Net Metering** is an economic arrangement (tariff). No engineering.
- NM is a policy typically reserved for generation technologies regulators decide to promote.
- **Interconnection** is a technical/engineering issue -- allows parallel operation.

NARUC Winter Meeting
Feb. 14, 2005



INTERSTATE RENEWABLE ENERGY COUNCIL

Net Metering Fundamentals

- Must be interconnected w/ **export** to be able to net meter
- Single meter 1:1 ratio kWh basis at retail (all customer classes)
- Other customers consume at retail
- Admin costs for dual metering are lose-lose

NARUC Winter Meeting
Feb. 14, 2005



INTERSTATE RENEWABLE ENERGY COUNCIL

Net Metering - customer economics

- Small customers (2kW) might “net meter” 100 kWh per month = **\$8.00**
- Large customers likely will also “net meter” a very small percentage
 - generator size for these typically much smaller than load (*but they still need NM*)

NARUC Winter Meeting
Feb. 14, 2005



INTERSTATE RENEWABLE ENERGY COUNCIL

Net Metering - utility regulatory economics

- Concerns about lost revenues - cross subsidies
 - impact is small if small % cap on NM
 - @ 1% of peak load rate impact is about 20 cents/customer per month **without** benefits
 - added benefits from peak load reduction, distribution, fuel diversity, environmental savings 20¢/customer/month

NARUC Winter Meeting
Feb. 14, 2005



INTERSTATE RENEWABLE ENERGY COUNCIL

Utility regulatory economics - cont.

- Utility would like to pay avoided cost
 - typically 1/4 to 1/3 of retail
- Cost to recover differential too high
 - 8\$ EXAMPLE @ retail is \$2 to \$2.64 at avoided cost
 - savings to utility of \$5.36 to \$6 per month
- BUT to recover need: separate meter, separate account, monthly check writing

NARUC Winter Meeting
Feb. 14, 2005



Utility regulatory economics - cont.

- If net metered customer must pay for 2 meter cost - unless $< \$2/\text{month}$, they lose
- If utility must absorb costs - unless less than $\$5-6/\text{month}$ they lose
- If other ratepayers pay, they lose
- Avoid the LOSE-LOSE-LOSE

NARUC Winter Meeting
Feb. 14, 2005



INTERSTATE RENEWABLE ENERGY COUNCIL

Net Metering - Key Issues for Solar

- 1 to 2MW needed to grow solar busn.
 - CA, NJ, PA
- No charges, fees etc. -- must be treated like similar customers w/o generation
 - the 4 neighboring customers example
- Customer owns RECs - no basis for taking

NARUC Winter Meeting
Feb. 14, 2005



INTERSTATE RENEWABLE ENERGY COUNCIL

NM -- Academic issues

- Retail competition
- Consider rate impacts at 5%
- Max loading on grid (15-25%)
- Distribution avoided cost calculation
- Totally net-metered system -- *put on agenda for Winter '06*

NARUC Winter Meeting
Feb. 14, 2005



INTERSTATE RENEWABLE ENERGY COUNCIL

Interconnection

- Engineering issue - generator must synchronize with the grid
- New national tech standards developed
 - IEEE 1547 (expansion of IEEE-929)
 - model interconnection rules at FERC (consensus), NARUC, IREC
- Comprehensive state rules in TX, CA, NY, MA, NJ

NARUC Winter Meeting
Feb. 14, 2005



INTERSTATE RENEWABLE ENERGY COUNCIL

Interconnection

- Breakpoints:
 - 10 kW inverter - simplest “plug and play”
 - found in MA, NJ, FERC, IREC
 - 2MW minimal to no grid impact
 - 15% limit on ckt load
 - allows export and all time operation
 - 20 MW - simplified version of large generator rules

NARUC Winter Meeting
Feb. 14, 2005



INTERSTATE RENEWABLE ENERGY COUNCIL

Interconnection - Agreements

- Need standard form agreement and application
- Installers/developers prefer similar or identical form across the state -- svc. territory boundaries foreign
- NARUC model IA good (FERC bad)

NARUC Winter Meeting
Feb. 14, 2005



INTERSTATE RENEWABLE ENERGY COUNCIL

Interconnection - solar issues

- Need national standards for manufacturers
 - present scenario of 34 different state rules will always be a barrier
 - consider certified installers (NABCEP)
- High speed inverter based equipment is safe
 - ~15000 connected 100% safe
- No additional equipment (no external disconnect - thanks PGE, AK and NJ)

NARUC Winter Meeting
Feb. 14, 2005



INTERSTATE RENEWABLE ENERGY COUNCIL

Int. Agreement issues for solar

- No added insurance - typical customer insurance must be adequate
- Quick/simple dispute resolution is needed -- technical knowledge of dist/trans grid + no bias

NARUC Winter Meeting
Feb. 14, 2005



INTERSTATE RENEWABLE ENERGY COUNCIL

Thank you

*Sign up to receive IREC's
monthly Interconnection
Newsletter at:*

z z z 1luhfxvd1ruj

NARUC Winter Meeting
Feb. 14, 2005



INTERSTATE RENEWABLE ENERGY COUNCIL