

Net Metering and Interconnection of Solar Energy Facilities

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INTERSTATE RENEWABLE ENERGY COUNCIL

What IREC Does

- Participate in state utility commission dockets on net metering and interconnection procedures
 - Active in 18 states in the past year
 - Keyes & Fox, LLP for legal support
- Track existing state and local procedures at www.dsireusa.org
- Prepare model procedures and an interconnection guide, *Connecting to the Grid* (both available at www.irecusa.org)
- Assist with development and grading of state procedures in *Freeing the Grid* (available at www.newenergychoices.org)
- Assist with development of procedures in Solar America Cities
- Prepared “Solar ABCs” reports in 2008 on leading interconnection procedures and on the utility external disconnect switch (available at www.solarabcs.org/interconnection and [/utilitydisconnect](http://www.solarabcs.org/utilitydisconnect))
- Preparing reports in 2009 on valuation and evolution of net metering
- Primarily funded by the U.S. Dept. of Energy, so no legislative work and no advocacy regarding incentive programs, portfolio standards or subsidies

What IREC Does Not Do

- Renewable Portfolio Standard design
- Incentive program design to pay customers:
 - per Watt upon installation, or
 - per kWh for solar energy generated
- Renewable Energy Credit market design
- Evaluation of traditional generation
- Advocacy regarding renewable energy

Net Metering

Net Metering Defined

- The Energy Policy Act of 2005 required state utility commissions and larger public utilities to consider adopting net metering, defined as “service to an electric consumer under which electric energy generated by that electric consumer from an eligible on-site generating facility and delivered to the local distribution facilities may be used to offset electric energy provided by the electric utility to the electric consumer during the applicable billing period.” 16 U.S.C. 2621(d)(11).
- Put simply, net metering lets a utility customer offset part or all of the customer’s load at any given time and get a credit for any excess kWh sent to the utility.
- States legislatures, utility commissions and utilities continue to come up with alternative or more detailed definitions based on facility size, program size, type, rollover period, charges, etc.

How Net Metering Works

- Always a connection on the customer's side of the meter
- Always restricted to eligible "green" technologies
- Almost always, Renewable Energy Credits stay with the customer
- System sized to meet part or all of customer's consumption over the month (or year), but not more, with minimal or no payment for excess generation
- For solar facilities, electricity is exported to the utility during the daytime, when it is generally more valuable, in exchange for electricity at night, when it is generally less valuable
- Exports example: noon to 1:00 pm, customer generates 5 kWh, uses 3 kWh on-site, exports 2 kWh to utility
- Imports example: 9:00 to 10:00 pm, customer generates nothing, uses 2 kWh on-site, imports 2 kWh
- If there are never any exports, there's no need to net meter. In that case, generation is just offsetting consumption, like conservation.

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What It Looks Like



Puget Sound Solar – Seattle, WA



Southwest Windpower's Skystream (2.4 kW peak)



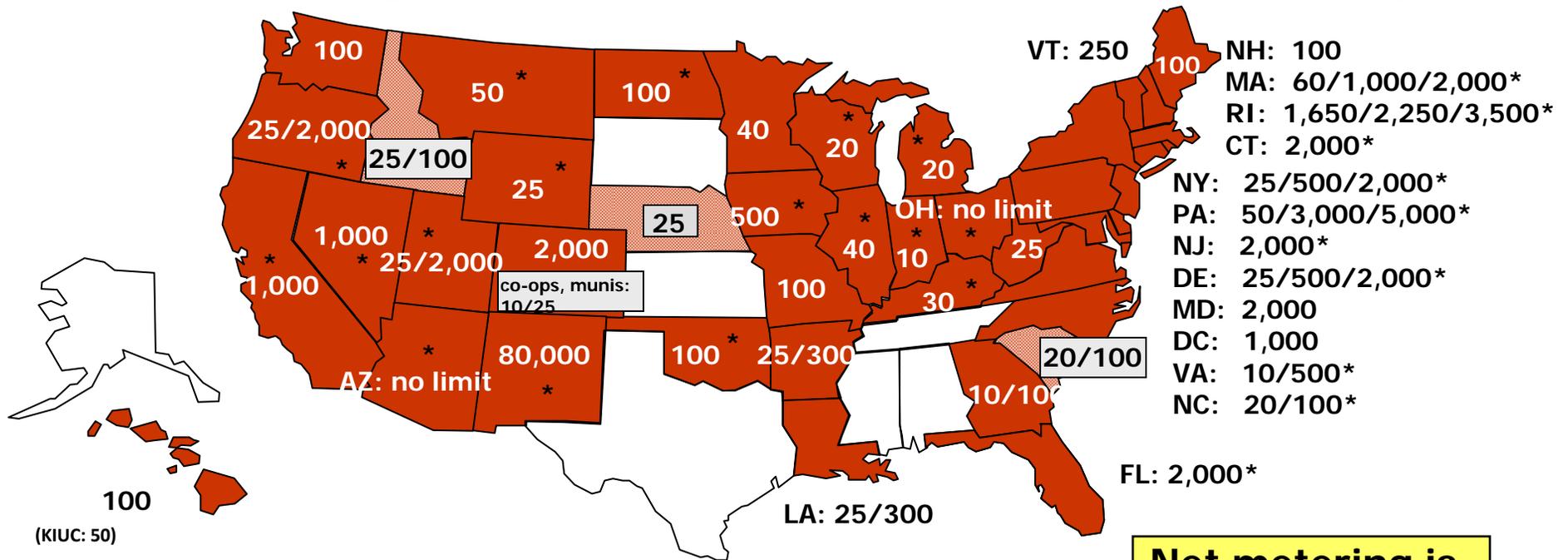
EI Solutions, CA, 233 kW

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Where Net Metering Is Offered (facility size limits in kilowatts)

DSIRE: www.dsireusa.org

February 2009

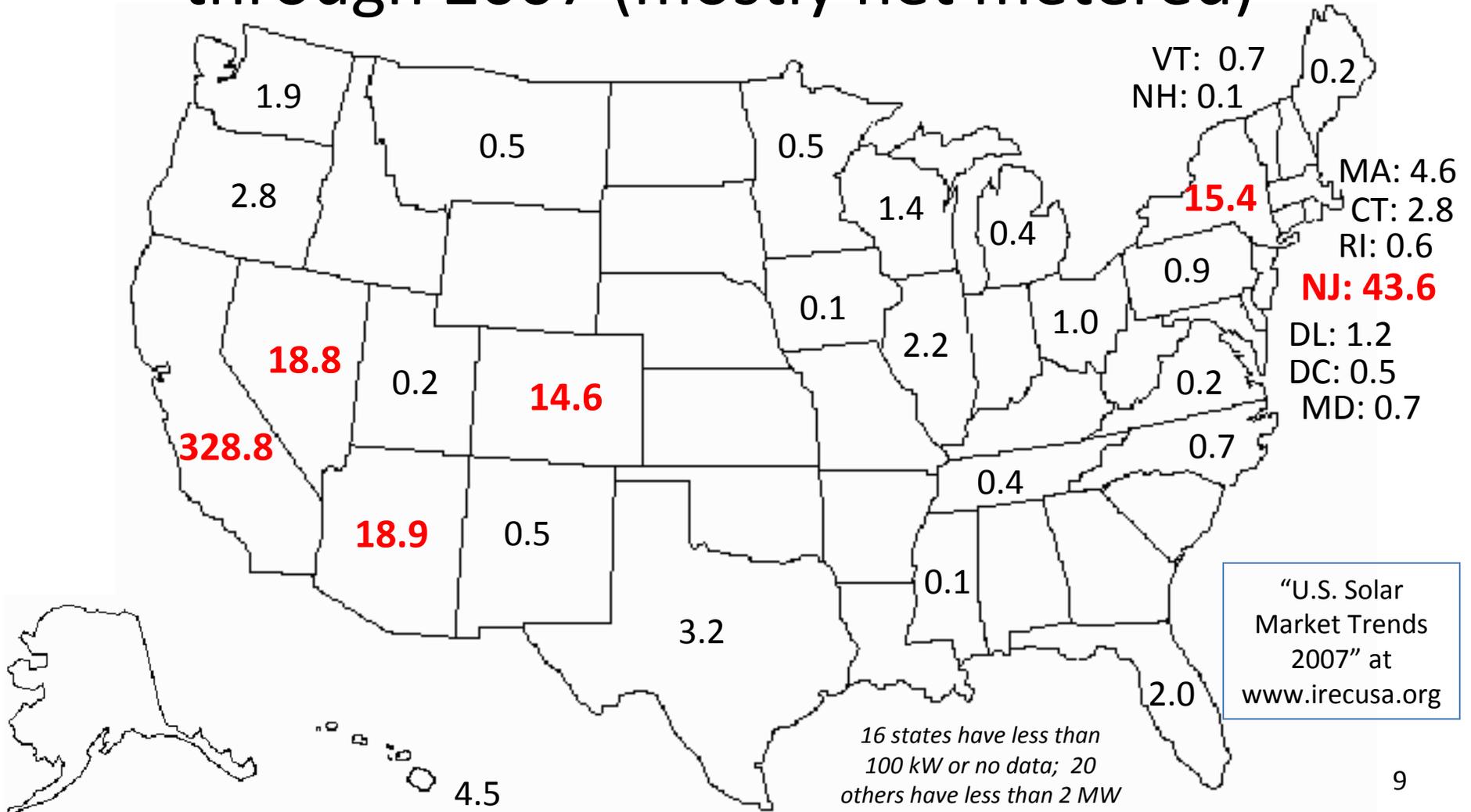


- State-wide net metering for all utility types
- ★ State-wide net metering for certain utility types only (e.g., investor-owned utilities)
- Net metering offered voluntarily by one or more individual utilities

Net metering is available in 43 states + D.C.

Note: Numbers indicate individual system size limit in kilowatts (kW). Some states' limits vary by customer type, technology and/or system application; this is the case when multiple numbers appear for one state. Other limits may also apply. For complete details, see 8 www.dsireusa.org.

475 MW of Grid-Connected Solar PV through 2007 (mostly net metered)



The Major Issues

- Caps on facility size
 - 26 states cap at 100 kW or less
 - Where cap is higher, three quarters of capacity is non-residential
- Caps on aggregate enrollment
 - 24 states cap at 1% of utility peak load or less
 - Not an immediate issue outside of California, but important
- Monthly or standby charges
 - Only 11 states have “safe harbor” prohibition of charges
 - A few have standby or monthly charges that erase a facility’s value
- Third party ownership limitation
 - Nearly half of capacity in California owned by third parties
 - In states that restrict third party ownership, market potential is halved
- Insurance Requirements
 - Generally in interconnection rules, but can appear in net metering rule
 - Special insurance generally not available for small facilities

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Other Important Issues

- **Metering**
 - Only need one meter that spins both ways
 - Extra meter for production or exports adds cost
 - Even if utility pays, extra meters add to program cost for installation and monitoring, jeopardizing the program's future
- **Rollover of excess generation**
 - Roll excess kWh to next month to net over seasons and vacations
 - Almost all commercial facilities are not sized to offset all load, and most residential facilities aren't either, so rollover is not logically an issue for most people
 - However, there seems to be a growing interest in completely offsetting load, but people will undersize if they see the possibility of selling power at low rates to their utility
- **Valuation of excess generation**
 - At end of year, some states allow "avoided cost" payment for excess generation, but customers would prefer payment at their retail rate
 - Utilities resist retail rate payment based on federal avoided cost cap for "QF" purchases
 - States without rollover generally provide for avoided cost payment at month-end
- **Community Solar**
 - Lots of interest in facilities owned by multiple parties, but hard to structure

Interconnection Procedures



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Interconnection Procedures

- The hot issues of the past year
 - system size limitations (1MW, 10MW, 20 MW, or unlimited)
 - insurance requirements
 - interconnection to spot and area networks
 - starting point for development of procedures
 - utility external disconnect switch
- Other important issues
 - timelines and certainty
 - cost – application fees, studies, certainty
 - technical screens
 - standard form agreements
 - dispute resolution procedures

System Size Limitations

- Jurisdictional issue – want to avoid system size caps that result in no applicable procedures for a given size
- FERC procedures apply to most transmission line interconnections and certain smaller interconnections
- Many state and local procedures capped at system sizes below one MW, though interconnection of larger systems feasible under state jurisdiction
 - up to 10 MW feasible to higher voltage distribution lines
 - larger systems offsetting demand and not exporting may be feasible
 - a “Qualifying Facility” (up to 80 MW) selling exclusively to utility to which it is interconnecting can typically use state procedures, though interconnecting to FERC-jurisdictional line
- IREC procedures capped at 10 MW, though best approach is to have uncapped state procedures

Insurance Requirements

- No known insurance claims for utility damages with over 50,000 solar installations in the U.S.
- Homeowner's insurance covers typical net metered systems
- Special insurance not readily or affordably available for residential systems
- Difficult to arrange for larger systems, though feasible for project developers
- Many states do not allow insurance requirement at all
- Potential for utility damages minute for small systems (NM and IL require insurance only for large systems)
- Naming of utility as an "additional insured" is an unnecessary hurdle and impractical for homeowners

Spot and Area Network Interconnection

- Networks are typically supplied from multiple dedicated primary feeders and designed to prevent simultaneous feeder outages so that loads on networks can still be served even when a particular feeder is inoperative
- Networks provide high reliability and are used in many central business districts (area networks) and in some specialized applications such as corporate campuses, malls, etc. (spot networks)
- Flows from distributed generation through network protectors may cause problems
- Non-exporting systems are potential solution
- About 3% of U.S. load is on networks, but they are great potential users of distributed generation
- Under review in IEEE 1547.6, New York City, Solar Cities

Starting Point for Development of Interconnection Procedures

- Report funded by Solar America Board for Codes and Standards (available by mid-Oct. at www.solarabcs.org)
- Compares leading distributed generation interconnection procedures used as models by state regulators:
 - FERC's Small Generator Interconnection Procedures
 - California's Rule 21
 - MADRI's Model Small Generator Interconnection Procedures (Mid-Atlantic Demand Resource Initiative - PJM Interconnection, PJM state utility commissions and federal agencies)
 - IREC Model Interconnection Standards

Utility External Disconnect Switch



Utility External Disconnect Switch

- Function of stopping flow to the electric grid when the grid is down is already provided by inverters
- Disconnect switch not required by IEEE 1547
- Duplicative of National Electric Code requirements
- In practice, the switch is not used for emergency and maintenance switching
- States removing the requirement, especially for smaller systems (NY just banned requirement for < 25 kW)
- If required, utilities should have procedures to assure consistent use of the switches

Interconnection Timelines and Certainty

- Time for notice of application receipt
 - FERC rules say three days
 - best practice is to allow online/instant notice
- Time for notice of complete application
 - FERC rules say ten days from receipt
 - best practice is less time or automated
- Time for review of application
 - FERC rules say 15 days for up to 2 MW systems
 - shorter period feasible for small systems
- Witness test
 - FERC rules say five day notice, which is reasonable
- Study processes – typically no timelines, but some outer bound would be helpful

Interconnection Costs: Application Fees, Study Fees and Certainty

- Application fees for 10 kW systems or less
 - FERC uses \$100 fee, higher than most states
 - Processing costs eat most of fee, so several states have no fee
 - No casual filers to deter with nominal fee
- Application fees for 10 kW to 2 MW systems
 - FERC uses a flat \$500 fee
 - Many states use a sliding scale such as \$50 + \$1/kW
- Study fees for complicated or larger systems
 - Often open-ended at customer cost (deters applicants)
 - Caps would add certainty; could use sliding scale
 - IREC uses maximum engineering rate
- California has no costs for most net metered systems

Interconnection Technical Screens

- FERC screens widely adopted – need review given familiarity with solar since 2005
- 15% of line section peak load is first and most significant screen
 - needs exemption for non-exporting systems
 - could use higher percentage for solar systems
 - Need study of grid impacts if line section load is exceeded by generation
- Need short list of screens for small systems

Standard Form Agreements for Interconnection

- FERC and successful state procedures have standard form agreements
- Without standard form agreements, utilities have little incentive to negotiate and attorneys may be necessary to assure state procedures are followed and customer is being treated fairly
- Some provisions carry through from procedures, but others may only be in agreements, such as indemnity, rights of access, notification, assignment and dispute resolution
- Want to avoid potential for utilities to add provisions not found in state procedures

Dispute Resolution Procedures

- Potential disputes often relate to small technical matters; fast and inexpensive resolution of such matters worth the risk of error
- Good faith discussions between parties are useful if timeline is short
- Technical master assigned by state utility commission can be used for minor technical disputes
- Utility commission procedures may be functional, but often involve weeks or months of delay
- Non-binding processes add potential for delay and significant cost, and still may wind up in court; want binding arbitration with cap on maximum legal fees that can be awarded

Questions?

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