

# CUSTOMER OWNED SOLAR IN WISCONSIN

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# Customer Owned Solar in Wisconsin

- Historical Perspective
- Costs
  - Past and future
- Average size and output
- Incentives
  - utilities
  - FOE
    - Changes
  - federal
- Rate offerings
  - Changes to fixed charge
    - 3 utilities
    - Other states

# Solar In The News



This New PG&E Program Will Allow Customers to Go 100 Percent Solar



A new spin on community solar

Julie Pyper  
February 4, 2015

Solar Panels Could Add \$15,000 of Value to Your Home

Travis Hoium

Feb 9th 2015 6:00AM

SOLAR DAILY

Chances of saving with solar energy greater for Indiana farms than homes



greentechsolar:

ARTICLES: PV MODULES

PREVIOUS ARTICLE

Solar Microinverter Startups...

NEXT ARTICLE

Strong Solar Market Hates...

First Solar Hits Record 21.5% Conversion Efficiency

Obama Budget Aims to Make Solar and Wind Incentives Permanent



The administration asks to maintain the ITC and PTC as part of \$7.4 billion in renewable energy support.

Eric Weisoff | February 2, 2015

MIDWEST ENERGY NEWS

HOME

On utilities and solar, Wisconsin goes its own way

Updated on 12/03/2014 by Keri Lydensten

From Soybeans to Solar: A Community Energy Project Sprouts from Wisconsin Fields

April 15th, 2013, 18:10 PDT



Vernon co-op unveils state's first community solar project

January 16, 2013

KI Installs Largest Solar Energy Array in Wisconsin

60°

Los Angeles Times

Feb. 9, 2015

LATEST NEWS

Minority groups back energy companies fighting solar power

Thursday 13 November 2014

## The State of Wisconsin Solar: Rate Changes and Politics

# Customer Owned Solar History

- 1973 Oil Embargo drives Alternative Energy Sources
  - Solar Thermal – space and water heating
    - Add-on/ supplemental (not integrated)
    - DIY projects
    - Many unsightly
  - Solar Photovoltaic (PV)
    - Expensive - long payback
    - Low efficiency
    - Reliability concerns
    - “Off-Grid” focus
      - Batteries
      - 12 volt appliances
- 1977 US Dept. of Energy Created



# Customer Owned Solar History

- 1980 Solar Energy Conservation Act
- 1992, 2005, 2007 Energy Policy Acts
  - Promote energy conservation and renewable energy
    - Mandates and tax incentives
      - Residential ITC
- 1999 WI Act 9
  - Creates Public Benefit Fund
- 2006 WI Act 141
  - Modifies Public Benefit Fund to create Focus on Energy program
    - Investor owned utilities required to spend 1.2% of the latest 3-year average of its gross operating revenue on energy-efficiency and renewable-resource programs.
    - Solar rebates included
- 2009 American Recovery and Reinvestment Act
  - Expand Investment Tax Credit (including solar - 30%)
- 2012 PSCW Order
  - Modifies renewable energy incentives – places annual funding limit and shifts to a revolving loan fund
- 2014 Rate Cases – 3 Utilities – Net Metering/Customer Charge Changes
  - Increase monthly customer charges, reduce energy (kWh) rates, Fees for DG
    - Customer Fairness

# Harris Poll – January 2015

- 57% of Americans believe solar energy will make major contributions in 15-15 yrs.
  - 2205 US adults surveyed in October 2014
- 31% believe solar will make major contributions in 2-5 yrs.
- Solar PV (electricity) has greater confidence (41%) than solar water heating (31%) or space heating (36%).
- 37% of respondents have or are considering installing solar PV
- White House and Democrats more optimistic than Independents or Republicans
- 50% believe White House and Democrats over represent the promise of solar energy.

# Wisconsin Solar by the Numbers

- SEIA – Wisconsin
  - 164 companies are part of the solar value chain for installing solar in the state
  - These companies employ over 1800 people
  - 3 MW installed in 2013
  - 19 MW currently installed
    - Ranks 27<sup>th</sup> in nation for solar capacity
    - Enough to serve about 2800 homes
    - ~ 13,200,000 kWh/ year
  - Installed costs dropped ~34% since 2010 (nationally)
    - Dropped about 12-14% in 2013
    - Module cost about \$1.60/Watt (Wisconsin – not installed)
    - Average installed cost (residential) \$7.00/Watt in Wisconsin (WiSEO 2012)
      - Much higher than national average



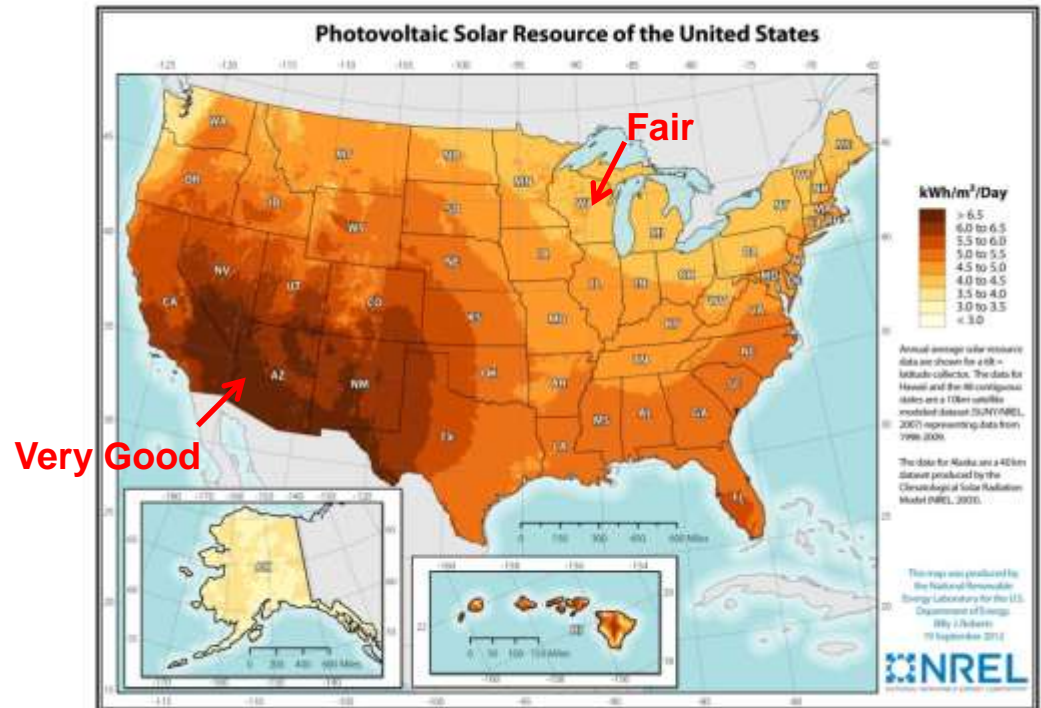
# Solar Sizes and Numbers

- New solar installations in Wisconsin
  - 2010            339
  - 2012            136
  - 2013            194
- Sizes
  - Trending; sizing more toward actual home load –vs- building excess size to shorten payback
    - Lower excess energy buyback rates (\$0.02 - \$0.04/kWh)
    - Limits on FOE rebates
  - ~ 6.36 Kw for homes
  - ~ 17.26 Kw business
  - WPS (~ 450 total net metering, also ~45 Solar ART)
    - Average = 8.9 Kw
    - range from .24 Kw to 100 Kw
    - About 25% are installed at businesses = ~46% of total net meter solar gen. capacity



# Solar Costs

- Upper Midwest is not currently a “hot” solar market
  - Solar radiance (Insolation) matters ...
  - Solar does work here but does it pay?
- Costs by Size (Lawrence Berkeley National Lab, 2013)
  - Under 10 Kw
    - **\$4.70/ Watt Installed**
  - 10 Kw to 100 Kw
    - **\$4.30/ Watt Installed**
  - Over 100 Kw – 5MW
    - **\$3.90/ Watt Installed**
- No Solar Leasing WI



# Solar Payback

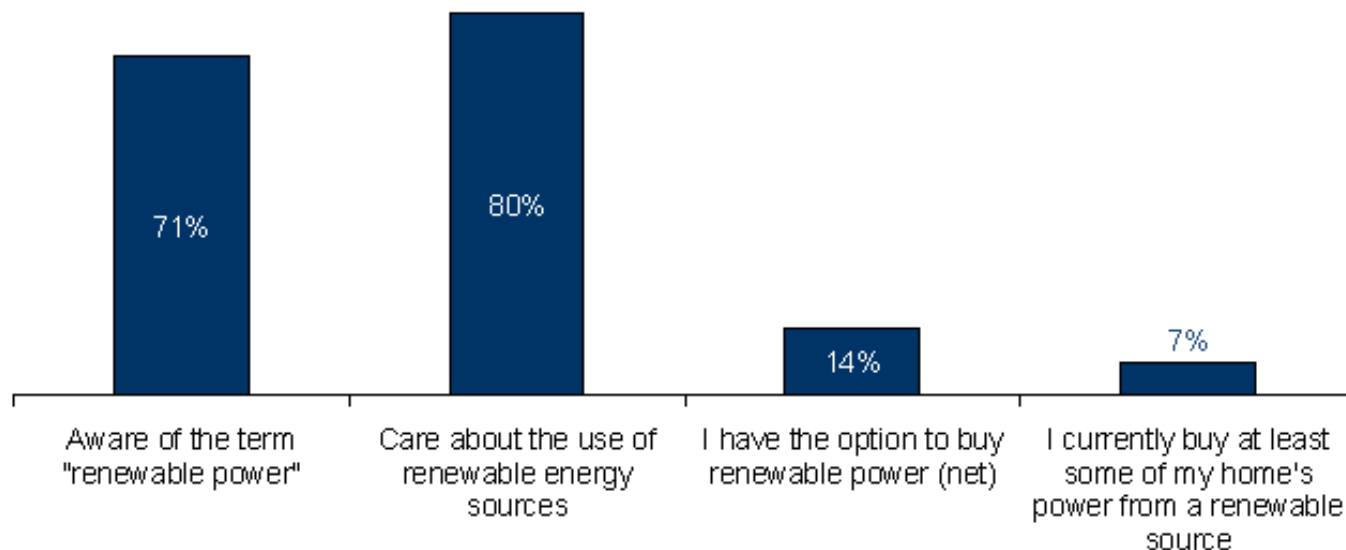
- Example:

- 6 Kw system on home @ \$4.70/ watt installed = \$28,200
- - 30% Federal Tax Credit = -\$8,460
- - WI Focus on Energy Rebate (\$600/Kw, max 4 Kw) -\$2,400
- Final cost = **\$17,340**
- \$17,340/ 20 yrs. production = \$867/yr.
  - No maintenance
- 6 Kw x 80% DC-AC eff. X 8760 hrs./yr. x .14 cap factor = 5887 kWh/yr.
  - Does not reflect reduced output over life of system
- 5887 kWh x \$0.11 = \$647.57/yr.\*
  - \* Does not include reduced price for monthly overproduction
  
- Ave home uses 600 kWh/mo. x 12 mo. = 7200 kWh/yr.
- 7200 kWh x \$0.11/kWh = \$792/yr. energy cost

- It all depends on how you want to look at.

# Community Solar

- Nearly 80% care about the use of renewable energy, but only a small percentage take action to invest in or buy it.



**Figure 12. Summary of consumer interest in renewable energy (2010 data)**

Source: 2010 LOHAS Consumer Trends Database

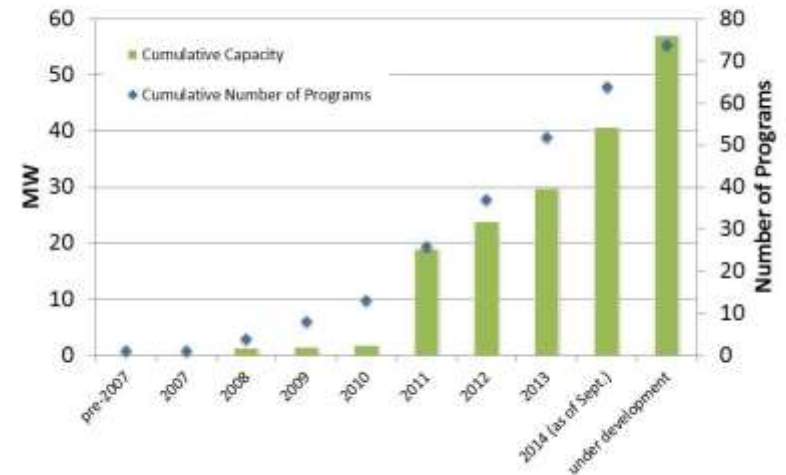
# Community Solar

- Not everyone wants or can reasonably install solar on their home (or business)
  - Wrong orientation of home/roof
  - Shading
  - Capital cost too much
  - Zoning or HOA restrictions
- Roughly 25% of all roofs suitable for solar installations
  - ~ 40% occupied by renters
- Install a large system and sell or lease shares to interested customers
  - Customer receives credit on energy bill for each share they buy or lease
  - Usually established by energy provider or in conjunction with third-party provider

# Community Solar Growing

- 75 active projects (National)
- 26 states
- Wisconsin
  - Vernon Coop – 1<sup>st</sup> one
    - Sold out quickly ~ 2 weeks
    - 3<sup>rd</sup> party - CEC
    - 305 Kw
    - 1001 panels – 2 acres
    - \$71/panel Rebate from Vernon
    - \$600/ panel
      - 1<sup>st</sup> yr saving ~\$35
        - +17 yr payback

## Growth in Shared Solar Programs



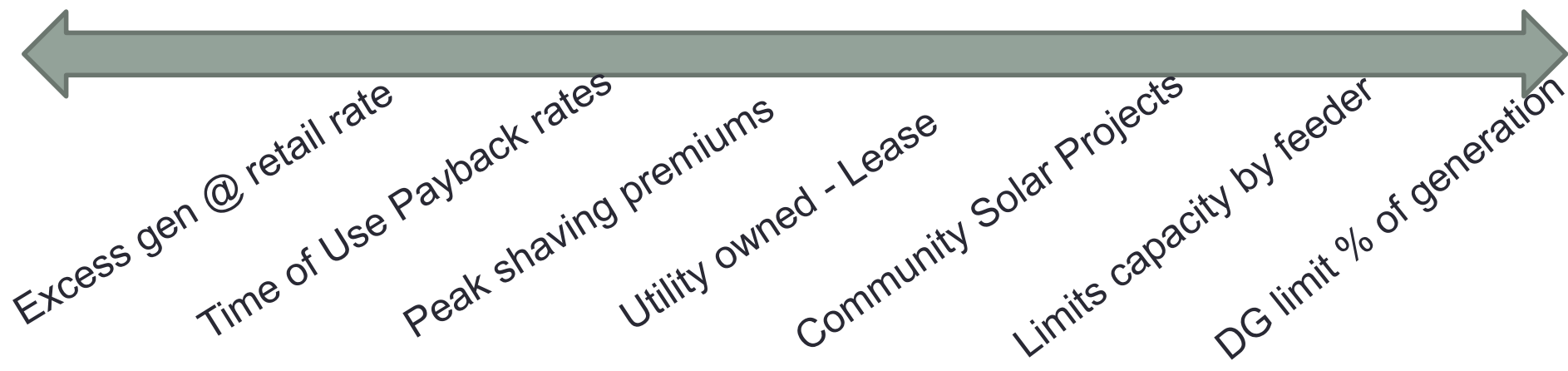
Reference: Heeter 2014

# Net Metering Rates

- Rate options vary widely
- IOU and REC very different requirements
- Industry flux – extreme perspectives, both ways

Feed in tariff @ retail +  
Low Customer Charge  
Carry over of excess balance  
True up once a year

Excess generation at avoided cost  
Special monthly fee for DG  
Customer charge reflects true costs  
No carry over of excess generation  
Limits 3<sup>rd</sup> party install agreements



# Net Metering – 3 Recent Rate Cases

- WPS
  - 20 KW limit
  - Excess generation paid at 45% on-peak, 55% off-peak (based LMP average for most recent Nov-Oct period) + transmission credit of \$0.00831/kWh
  - Netted monthly
  - 2015 All customers including net metering
    - Customer charge = \$19.00/month
    - Energy rate = \$0.10267/kWh
- MG&E
  - 100 Kw limit
  - Netted monthly
  - Excess generation paid at \$0.04127/kWh (TOU provision)
    - Grid connection and customer service charge = \$0.62466/day (~\$18.74/mo.)
    - Distribution service charge = \$0.03425/kWh
    - Energy rate = \$0.10708 summer \$0.09581 winter
- WE
  - Existing customers (prior to 10-17-14) grandfathered to 2024
  - 300 KW Limit (opens 1-1-2016)
  - Requires second meter
  - Excess generation paid at \$0.04245/kWh (TOU provision)
  - Netted monthly
    - Demand Charge (generator) = \$3.794/Kw/mo.
    - Customer charge = \$0.56202/day (~\$16.86/mo.)
    - Energy rate = \$0.13111/kWh



# List of References

- [http://rredc.nrel.gov/solar/old\\_data/nsrdb/1961-1990/redbook/atlas/](http://rredc.nrel.gov/solar/old_data/nsrdb/1961-1990/redbook/atlas/)
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