CUSTOMER OWNED SOLAR IN WISCONSIN

Michael R Moore
Sr. Renewable & Product Services Consultant
Wisconsin Public Service

MREC 2-19-2015
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

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

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

KI Installs Largest Solar Energy Array in Wisconsin

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)
    • DYI 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
  - 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 27th 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 (WiSECO 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 Resource Map](image)
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 maintence
- 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 – 1st one
    - Sold out quickly ~ 2 weeks
    - 3rd party - CEC
    - 305 Kw
    - 1001 panels – 2 acres
    - $71/panel Rebate from Vernon
    - $600/ panel
      - 1st yr saving ~$35
      - +17 yr payback
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 3rd 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

- [https://www.midwestreenew.org/](https://www.midwestreenew.org/)