



# Minnesota's Value of Solar

## Can a Northern State's New Solar Policy Defuse Distributed Generation Battles?

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**ILSR** INSTITUTE FOR  
Local Self-Reliance

# Executive Summary

In March 2014, Minnesota became the first state to adopt a “value of solar” policy. It may fundamentally change the financial relationship between electric utilities and their energy-producing customers. It may also serve as a precedent for setting a transparent, market-based price for solar energy. This report explains the origins of value of solar, the compromises made to get the policy adopted in Minnesota, and the potential impact on utilities and solar energy producers.

## The Value Of Solar Concept

The basic concept behind value of solar is that utilities should pay a transparent and market-based price for solar energy. The value of solar energy is based on:

- Avoiding the purchase of energy from other, polluting sources
- Avoiding the need to build additional power plant capacity to meet peak energy needs
- Providing energy for decades at a fixed price
- Reducing wear and tear on the electric grid, including power lines, substations, and power plants

Value of solar is not like net metering, where producing energy reduces your electricity bill just like turning off a light.

Fig. A illustrates the difference between net metering and value of solar in Minnesota. It also highlights a few key features of the adopted value of solar policy, including the 25-year contract, and the use of bill credits rather than a separate cash payment.

## Minnesota’s Value of Solar

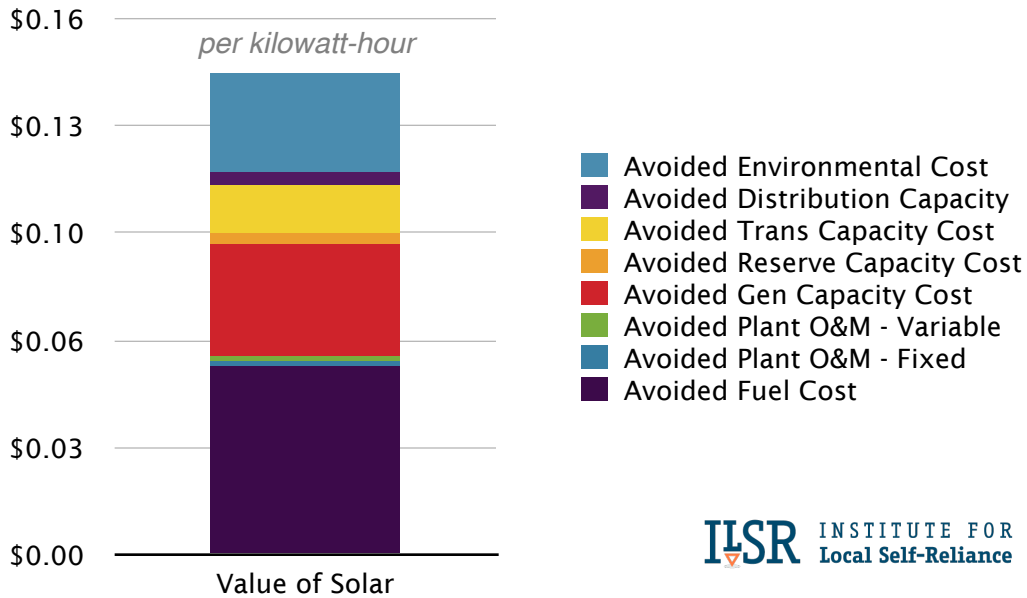
As adopted, Minnesota’s value of solar formula includes all of the basic components of the theoretical policy. The following chart (Fig. B) shows the relative value of the various components, and the total value, based on early estimates filed during the proceedings at the state’s Public Utilities Commission.

Figure A: Net Metering v. Value of Solar (As implemented in Minnesota)

Net Metering	Value of Solar
Customer earns bill credits	Customer earns bill credits
Credit value = <i>retail</i> electricity rate	Credit value = <i>value of solar</i> rate
Credit value <i>fluctuates</i> with retail price	Value of solar <i>locked in</i> on 25-year contract
Solar production cannot exceed 120% of on-site annual consumption	Solar production cannot exceed 120% of on-site annual consumption
Net excess generation <i>paid at retail rate</i> (for < 40 kilowatt) or <i>avoided cost rate</i> (for < 1 megawatt)	Net excess generation <i>forfeit to utility</i>



Figure B: Preliminary Minnesota Value of Solar (Xcel Energy)



**A Caution**

Although Minnesota’s value of solar policy is a national precedent, the adopted policy had some good elements that were lost in the legislative process, elements that other states may want to revive. The following table (Fig. C) illustrates:

Figure C: Value of Solar, Adopted v. Proposed Elements

Adopted	Proposed
Customer earns bill credits	Customer is paid for solar energy in a separate transaction
Solar production cannot exceed 120% of annual on-site consumption	Solar production is not limited by onsite consumption
Net excess generation is forfeit to utility	Customer is paid for all solar energy production, regardless of on-site electricity use
Utility chooses whether to adopt value of solar or keep net metering	Utility must offer value of solar, but customer may choose between it and net metering
Utility automatically obtains SREC, with zero compensation to customer	Solar customer retains solar renewable energy credit (SREC)



## The Impact on Utilities and Customers

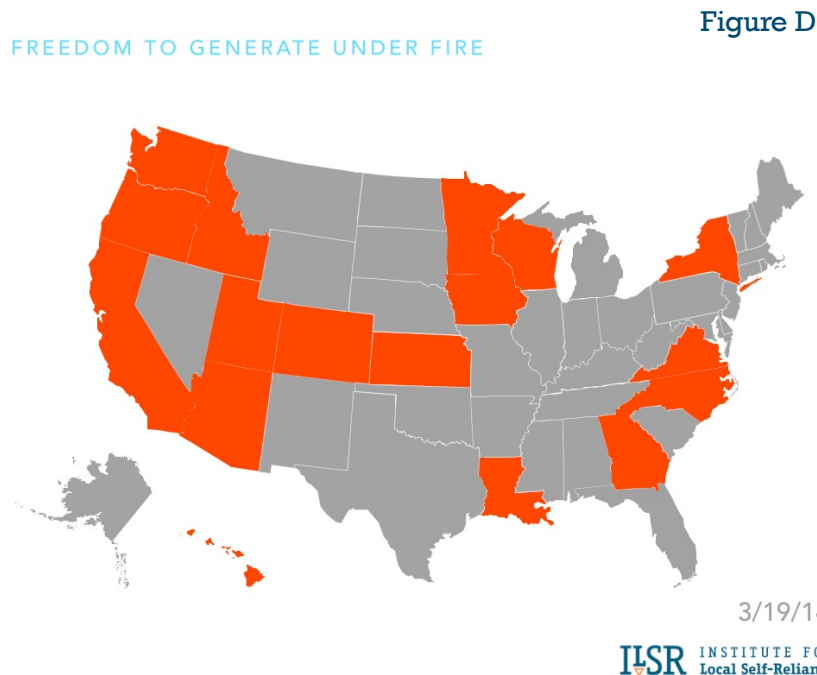
Value of solar offers something for everyone. For utility customers, a 25-year contract at a fixed price makes solar financing much easier, and as the cost of solar continues to fall, quite lucrative.

For utilities, the transparency of the market price means no concerns about cross-subsidies between solar customers and non-solar customers. It means a payment for solar energy uncoupled from the retail electricity price. It may also mean a potential for cost recovery on payments made to solar producers, something not allowed with net metering. In Minnesota's case, it also means free access to solar renewable energy credits, at a substantial savings compared to credit prices in states with competitive credit markets, i.e. New Jersey, Pennsylvania, etc.

*The environmental value may be the most precedent setting, because it means that when buying solar power under Minnesota's value of solar tariff, a utility is for the first time paying for the environmental harm of its fossil fuel energy generation.*

## Will Value of Solar End Battles Over Distributed Generation?

If Minnesota utilities report favorably on the value of solar, it may change the debate on other state battlegrounds over distributed generation (Fig. D).



The value of solar delivers a transparent, market-based price for solar. It solves problems for utilities and for utility customers around compensation for distributed renewable energy generation. But its ultimate success lies in whether electric utilities can be convinced that accommodation of customer-owned power generation is in their best interest, or whether any concession of their market share is a deadly threat to their economic livelihood.

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# Acknowledgments

Thanks to all my friends and colleagues in Minnesota for an incredible job in seeing this policy through from draft to approval. It wouldn't have happened without all of us.

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# Introduction

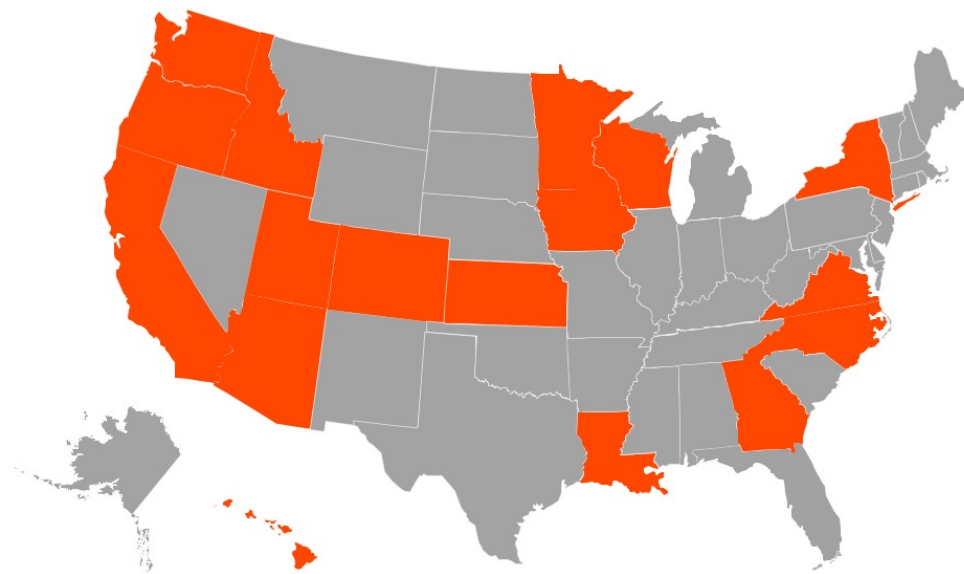
On March 12, 2014, Minnesota became the first state to give utilities and distributed solar power producers a new way to negotiate power supply contracts, a method called the “value of solar.” If adopted by utilities, it will fundamentally change the relationship between solar-producing customers and their electric utility.

Until now, producing on-site energy from a solar panel has been treated much like any other activity reducing electricity use. Energy produced from solar is subtracted from the amount of energy used each month, and the customer pays for the net amount of energy consumed. This “net metering” policy has guided the growth of distributed solar power in the United States to an astonishing 13 gigawatts (GW) by the end of 2013, made possible because of enormous reductions in the cost of on-site power generation from solar.

But net metering has become the focal point for a utility war on the democratization of the electric grid and the expansion of distributed solar. The following map (Fig. 1) illustrates the many states where utilities have sought to undermine policies and/or incentives supporting distributed renewable energy generation.<sup>1</sup>

Figure 1

FREEDOM TO GENERATE UNDER FIRE



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The potential transformation of the grid and the improving economics of self generation have utilities crying foul (or [fowl](#)) because as more and more customers use net metering, it reduces electricity sales. Combined with increasing energy efficiency and an economic downturn, this has utilities feeling that their business model is evaporating.



Utilities may feel an economic squeeze, but increasing evidence suggests that the overall economic benefits to the utility's electric grid may outweigh the loss of revenue. This benefit is not transparent because on-site power generators are typically paid based on the cost of using electricity, not the value of their energy production.<sup>2</sup>

The new value of solar policy creates a price for distributed solar energy in an effort to answer utility concerns, but also to reinforce the notion that on-site power generation benefits the customer, her neighbors, and the electric grid.

Interestingly, Minnesota's rigorous formula suggests that in crying "foul," utilities may have been crying "wolf." That's because the initial estimates of the value of solar peg it at more than the retail electricity price. In other words, Minnesota utilities have been getting a sweet deal on solar power, reaping its benefits for their ratepayers and shareholders.

*Initial estimates of the value of solar peg it at more than the retail electricity price. In other words, Minnesota utilities have been getting a sweet deal on solar power, reaping its benefits for their ratepayers and shareholders.*

Does that mean that the value of solar will be better than net metering for solar producers? For utilities? For ratepayers? Perhaps.

This brief will explain the current policy standard for distributed solar – net metering – the value of solar option, the recent development and approval of the policy in Minnesota, and the implications for the continued expansion of distributed renewable energy.



## The Old Standard: Net Metering

By the end of 2013, over 13 gigawatts (13,000 megawatts) of solar power had been installed in the U.S., largely due to a state policy called net metering. This policy mixes interconnection rules (a technical and administrative set of requirements for connecting to the grid), with economics of billing (net energy metering). Net metering policies typically make it much easier to connect a solar array to the electric grid.

Additionally, net metering is a billing policy that simply compensates solar owners for their energy generation. It spins the meter backward during the day when there is excess solar generation, for example, and forward at night when household energy consumption is higher than solar production. It treats on-site renewable energy production like any other method for reducing energy consumption, by having customers pay for their “net” energy usage (total use less on-site production) on their electricity bill.

Net metering may also reduce extraneous utility charges for “backup” or “standby” power, since such services are typically already covered by a utility’s existing energy reserves. Net metering typically

allows a customer to be paid for energy they generate in excess of their own usage. In some states, like Minnesota, a customer will get paid for this “net excess generation” at the same rate they are rewarded for energy that offsets their own use. In other states, customers are paid at the utility’s much lower “avoided cost” rate, typically reflecting the utility’s cost of getting electricity from another existing power plant.

The following map from the Database for State Incentives for Renewable Energy (DSIRE), shows the net metering policies in each U.S. state (Fig. 3). The number on each state is the maximum size of project allowed under the state policy, in kilowatts (kW), and it may vary by utility or customer class, e.g. residential or commercial. A typical residential solar installation is around 5 kW, whereas a solar array on a big box retail store like IKEA is approximately 1,000 kW. The average solar array installed in the U.S. is approximately 40 kW.

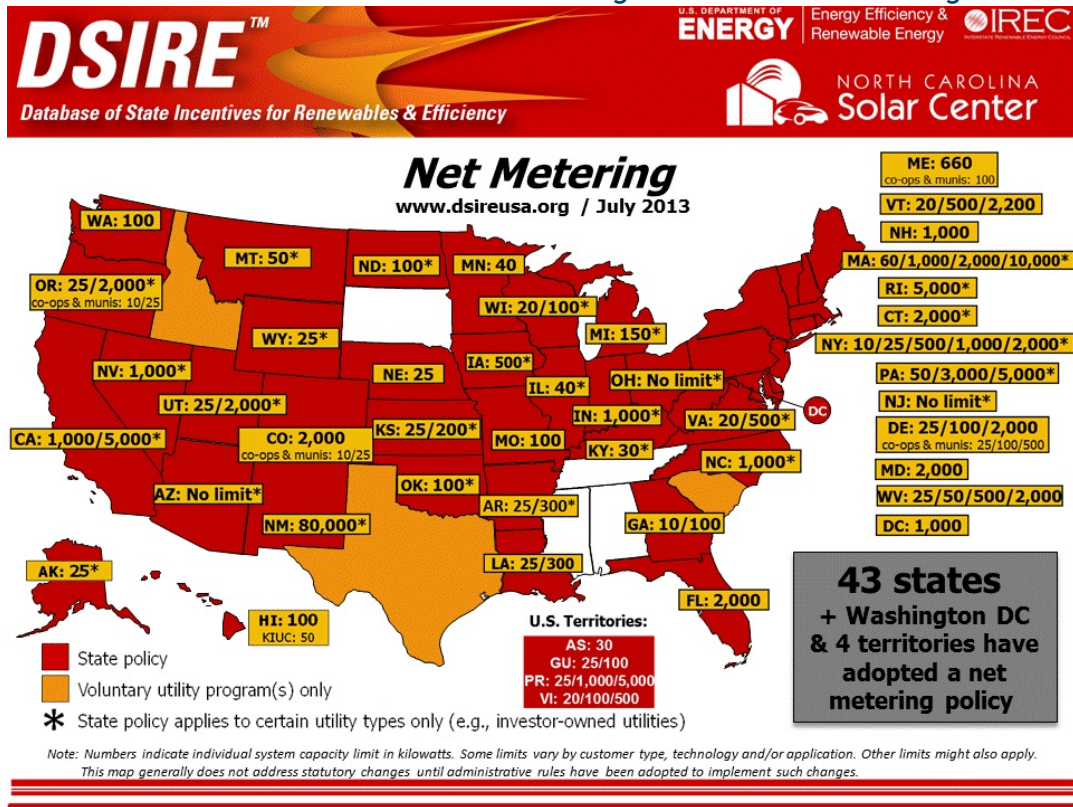
States may also cap the total amount of energy a utility must buy from net metered systems. Half of U.S. states have statutory limits, and 16 of those states cap the total energy permitted under net metering at 1% of a utility’s annual energy sales.

Figure 2: PG&E video explaining net metering



Source: PG&E, <http://www.youtube.com/watch?v=5yVgPrhvwyc>

Figure 3: State Net Metering Policies



Source: DSIRE

Net metering works best for encouraging solar if the cost of producing solar energy is close to the retail electricity price (e.g. in areas with high energy costs, abundant sunshine, or both).

Although there's plenty of evidence that power generation from net metering customers has benefits to their neighbors and the grid, utilities have raised objections to net metering as its use has grown.

In that context comes a new policy: the value of solar.

# The New Option: Value of Solar

As implemented in Minnesota, the value of solar preserves much of the simplicity of net metering (simple interconnection and minimal fees), but changes two key items: 1) the accounting method for compensating solar producers for their energy, and 2) introducing a long-term contract for the solar energy producer.

With value of solar, instead of netting the *kilowatt-hours* (kWh) consumed and produced, the customer nets the *dollars* paid for energy (at the retail electricity rate) with the dollars earned selling solar energy to the utility (at the value of solar rate). From an engineering standpoint, the two policies – net metering and value of solar – are identical. From an accounting standpoint, they differ only in the units. Net metering nets kilowatt-hours. Value of solar nets the cost of purchased energy with the value of produced solar energy.

The other major difference between value of solar and net metering is that the value of solar is locked in by a solar energy producer on a 25-year contract at the time they begin generating. Both the retail energy rate and the value of solar change over time (both could go up or down), but Minnesota’s law gives solar energy producers surety by guaranteeing their per-kilowatt-hour payment for the expected life of the solar panels. In the value of solar contract between the customer and utility, the price paid may be a fixed dollar amount (e.g. 14 cents per kWh) or it may inflate over time (with a comparable “net present” value over the 25-year period). We’ll discuss this in more detail later.

The 25-year contract is an important difference between Minnesota’s value of solar program and others (e.g. Austin) that do not offer customer a fixed price. The long-term contract and its guaranteed payment per kWh can save customers money by reducing their borrowing costs and save ratepayers by allowing utilities to lock in power purchases at a fixed price for many years.

## The Principle

The basic concept behind value of solar is that utilities should pay a transparent and market-based price for solar energy. Net metering, for all its benefits, obscures the actual value of solar energy because all compensation is based on the retail electricity price that has no relation to the value of solar power. The value of solar is meant to remedy this obscurity and base the price paid for solar on its value to the grid and its customers.

Figure 4: Net Metering v. Value of Solar  
(As implemented in Minnesota)

Net Metering	Value of Solar
Customer earns bill credits	Customer earns bill credits
Credit value = <i>retail</i> electricity rate	Credit value = <i>value of solar</i> rate
Credit value <i>fluctuates</i> with retail price	Value of solar <i>locked in</i> on 25-year contract
Solar production cannot exceed 120% of on-site annual consumption	Solar production cannot exceed 120% of on-site annual consumption
Net excess generation <i>paid at retail rate</i> (for < 40 kW) or <i>avoided cost rate</i> (for < 1MW)	Net excess generation <i>forfeit to utility</i>



The value of solar price is based on:

- Avoiding the purchase of energy from other, polluting sources
- Avoiding the need to build additional power plant capacity to meet peak energy needs
- Providing energy for decades at a fixed price
- Reducing wear and tear on the electric grid, including power lines, substations, and power plants

The value of solar concept was pioneered and popularized by Karl Rabago, then of Austin Energy, the municipal utility serving Austin, TX.<sup>3</sup> In the first two published reports on the concept, Rabago and others highlighted two reasons for pursuing the value of solar:

- Net metering causes customers to size solar arrays to their own consumption (as opposed to the size of their roof).
- Net metering can incent customers to use more energy if, as implemented in Austin, production in excess of consumption is credited at a much lower price.

The utility managers and researchers of Clean Power Research set out to design a value of solar rate that would help address these issues. It included the following benefits of solar power from the utility perspective:

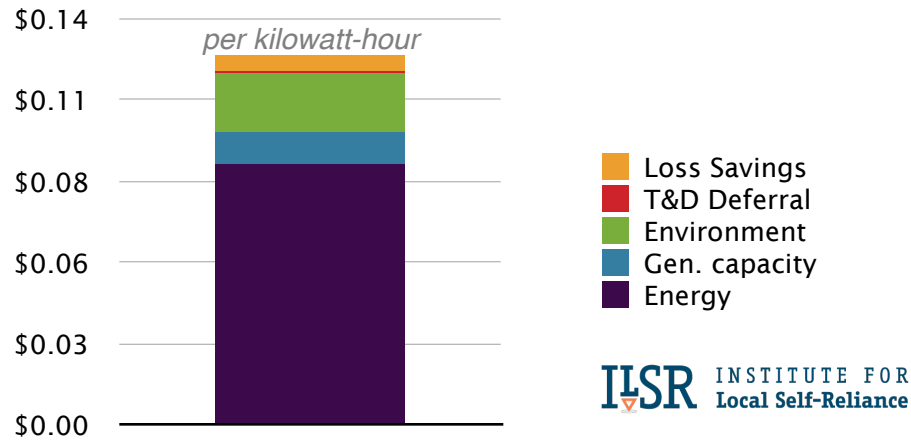
- Loss savings – reducing energy losses by producing energy near consumption, rather than transmitting power over long distances.
- Energy savings – reducing the purchase of other forms of energy, e.g. electricity from natural gas.
- Generation capacity savings – reducing the need for capacity from other power plants.
- Fuel price hedge value – the value of a known (and zero) fuel cost from solar energy, as compared to power plants using fossil fuels with volatile prices.
- Transmission and distribution capacity savings – reducing load on high-voltage transmission and low-voltage distribution portions of the electricity grid during peak periods.
- Environmental benefits – reducing pollution.

Calculating the value of solar is easier said than done, however. The complexity of these benefits explains why the adoption of the *methodology* alone in Minnesota required 6 months of research, stakeholder meetings, and deliberation by two government agencies.

The completed methodology for Minnesota's value of solar includes all of the components proposed in the original 2006 Austin study, though in some cases under different names or combinations. But the basic principle is the same.

When stacked together (literally, in the case of Figure 5), the values of solar may add up to a robust, value-based price for solar power. The chart illustrates the value of solar from the municipal utility in Austin, TX.

Figure 5. Austin Energy Value of Solar, 2013



## Minnesota’s Value of Solar Law

With the first statewide value of solar program, Minnesota’s process, methodology, and implementation are likely to become precedents for policy development in other states and municipalities. As such, some background on the policy’s origin and the process of its development are warranted.

### Background

In late 2012, reinforced by political winds in favor of solar power, the Solar Works for Minnesota coalition developed a policy package proposing a 10% solar energy standard by 2030 with a specific program (often called a feed-in tariff) to encourage the development of distributed solar (HF 773).<sup>4</sup> The intent was to dramatically expand the development of solar power, and to avoid a scenario where scope, size, and location of solar power developed under the standard would be entirely controlled by utilities.<sup>5</sup>

### Minnesota’s Solar Standard

The adopted law, including the value of solar provision, requires investor-owned utilities to obtain 1.5% of their electricity sales from solar by 2020. For more on the components of that law, see [Minnesota’s New \(Standard Offer\) Solar Energy Standard](#).

The proposed feed-in tariff program had three key elements for supporting smaller scale (1 megawatt and less) solar power generation:

- A simple, standardized contract
- A long-term, fixed price based on solar production
- A price paid for solar that is commensurate with the cost of producing energy from solar, split into a “value of solar” component (inspired by the work in Austin) and an incentive component (that would decline over time), shown in Fig. 6. In particular, the incentive component would be funded with a systems benefits charge (e.g. utility use tax).

### Originally a Feed-In Tariff

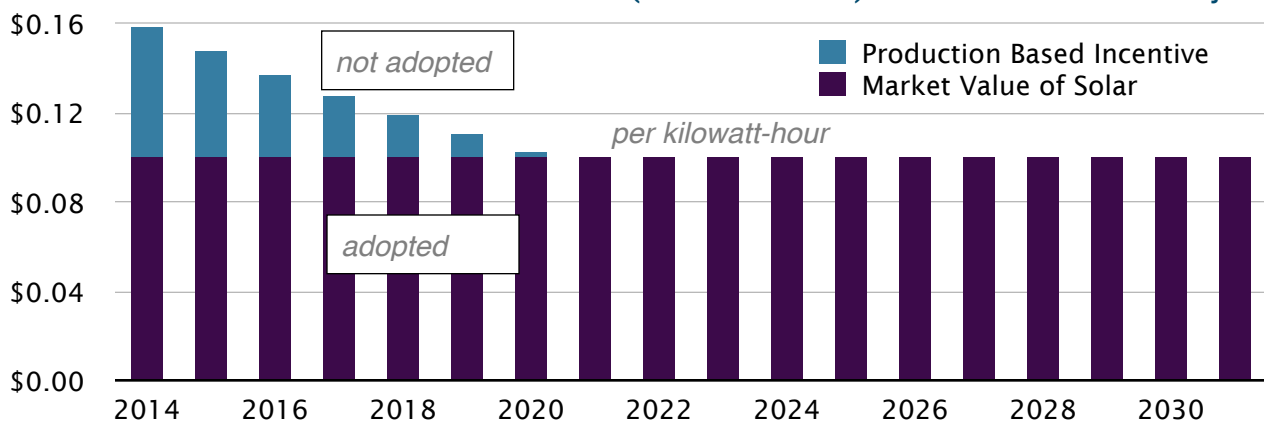
The adopted value of solar law began as a very different proposal to encourage distributed solar, a feed-in tariff with three key elements:

- A simple, standardized contract
- A long-term, fixed price based on solar production
- A price paid for solar that is commensurate with the cost of producing energy from solar

The original proposal also looked very different from net metering, with utilities asked to pay for solar energy in cash, completely separate from the utility bill. In fact, a solar producer wouldn’t even have to be a utility customer or have a utility bill.

A final, and crucial, component of the original bill was that utility customers would be able to choose between value of solar or net metering, allowing them to select the most attractive option for on-site power generation (and giving utilities an incentive to be fair in their value of solar calculations).

Figure 6. Illustration of Value of Solar and Production-Based Incentive (“Feed-In Tariff”) for Commercial Solar Projects



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In the legislative process, just as the solar standard itself was dropped from 10% to 1.5% and certain utilities excluded, the original feed-in tariff concept was substantially revised. In short:

- The separate transaction for selling power was changed back to something very like net metering, including:
  - The solar producer must be a utility customer.
  - The annual output of the solar array could not exceed 120% of the on-site consumption of electricity.
  - The payment for energy produced is in the form of a bill credit, not a separate transaction.
- Unlike net metering, if the customer generates more power than they use during a year, the utility gets all the net excess power for free.
- The systems benefits charge was dropped, and incentives were only available for solar arrays 20 kW and smaller.

***Lost in the Legislature***

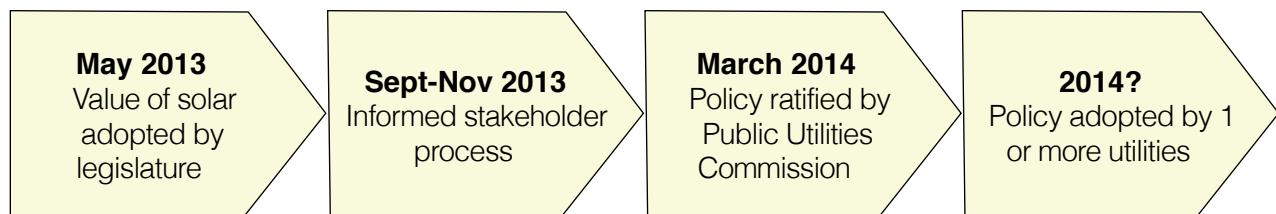
The adopted value of solar law was substantially different from the original proposal, losing any resemblance to a feed-in tariff. In the adopted version:

- A solar producer must be a utility customer, and may not produce more than 120% of on-site consumption
- Payment for energy is via bill credits, not a separate transaction
- Utility gets all net excess generation for free.
- The utility, rather than the customer, was given the choice between net metering and value of solar.

The value of solar still included most of the key value elements, however, and the direction from the legislature was quite specific:

*The distributed solar value methodology established by the department must, at a minimum, account for **the value of energy and its delivery, generation capacity, transmission capacity, transmission and distribution line losses, and environmental value.***

Figure 7. Minnesota Value of Solar Policy Timeline





The legislature also left the door open to include other values that explicitly benefitted the utility, though none of the optional items were ultimately included in the adopted methodology:

*The department may, based on known and measurable evidence of the cost or benefit of solar operation to the utility, incorporate other values into the methodology, including credit for locally manufactured or assembled energy systems, systems installed at high-value locations on the distribution grid, or other factors.*

With those legislative guidelines established (see the [authorizing legislation](#), Art. 9, Sec. 10 and following),<sup>6</sup> the value of solar policy moved to the next phase. The law stipulated that the state's Department of Commerce, Division of Energy Resources (DER), would be responsible for creating the methodology or formula for calculating the value of solar that would subsequently be used by the state's utilities, should they adopt it.

The DER opted for an informed stakeholder process, where experts from the Rocky Mountain Institute and Clean Power Research provided a wealth of information via several public meetings.<sup>7</sup> The experts provided detailed explanations of the current knowledge about the costs and benefits of distributed renewable energy and existing value of solar policies. The process was informed by local experts from think tanks, the solar industry, and utilities.

Clean Power Research developed a draft value of solar methodology by mid-November 2013 that was followed by a robust public comment period. The Department submitted its final value of solar methodology to the Minnesota Public Utilities Commission in January 2014. For more on the stakeholder process, see [ILSR's series on Minnesota's Value of Solar](#).<sup>8</sup>

### **Items of Debate**

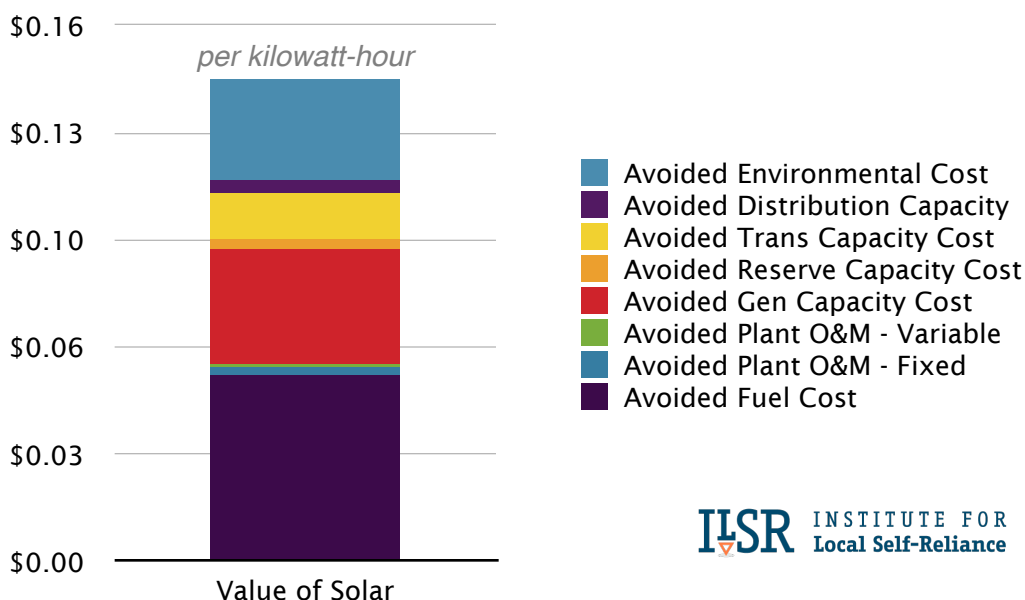
Some of the most contentious issues in the value of solar calculation ended up being the most valuable:

- **Environmental value** – in a presentation to stakeholders in October 2013, Xcel Energy claimed that there might be zero environmental value for solar despite concurrent claims that their nuclear plant would save ratepayers \$175 million over 16 years, but only because of the value of avoided carbon dioxide emissions (worth nearly \$500 million). In the end, the PUC approved using the federal social cost of carbon: \$37 per metric ton in 2015, contributing to a 3¢ per kWh environmental value.
- **Renewable Energy Credits (RECs)** – although many states have markets or policies setting a price on RECs, the DER and PUC opted not to ask utilities to pay for the RECs they receive under value of solar contracts.
- **Fuel hedge value** – Ultimately the largest portion of the value of solar, Xcel Energy testified in October 2013 that the fuel price hedge had no value, despite testifying just three days later that, when concerning its nuclear power plant, non-fossil generation (like solar...) did provide “a valuable hedge against potential increases in fossil fuel costs” which have been “extremely volatile.”

At the commission, there was additional debate on the methodology, particularly over the environmental value. Despite robust resistance from utilities, the Commission ultimately adopted the federal [social cost of carbon](#) as the core environmental cost, ensuring a robust price component in the value of solar calculation.

The adopted formula for a solar value price includes eight separate factors (shown in Fig. 8), but the largest four account for the lion’s share of the value: 25 years of avoided natural gas purchases, avoided new power plant purchases, avoided transmission capacity, and avoided environmental costs.

Figure 8: Preliminary Minnesota Value of Solar (Xcel Energy)



The value of avoided fuel cost recognizes that utilities cannot buy natural gas on long-term contracts the way they can buy fixed-price solar energy (with no fuel costs). It shifts the risk of fuel variability that utilities have previously laid on ratepayers back to utilities.

The avoided power plant generation capacity value recognizes that sufficient solar capacity allows utilities to defer peak energy investments (e.g. similar to how the Minnesota Public Utilities Commission recently ordered Xcel Energy to accept a bid from solar developer Geronimo Energy to meet new peaking energy demand).<sup>9</sup>

Avoided transmission capacity costs rewards solar for on-site energy production, saving on the cost of infrastructure and energy losses associated with long-range imports.

The environmental value may be the most precedent setting, because it means that when buying solar power under Minnesota’s value of solar tariff, a utility is for the first time paying for the environmental harm of its fossil fuel energy generation.

## Will it Work for Solar Producers?

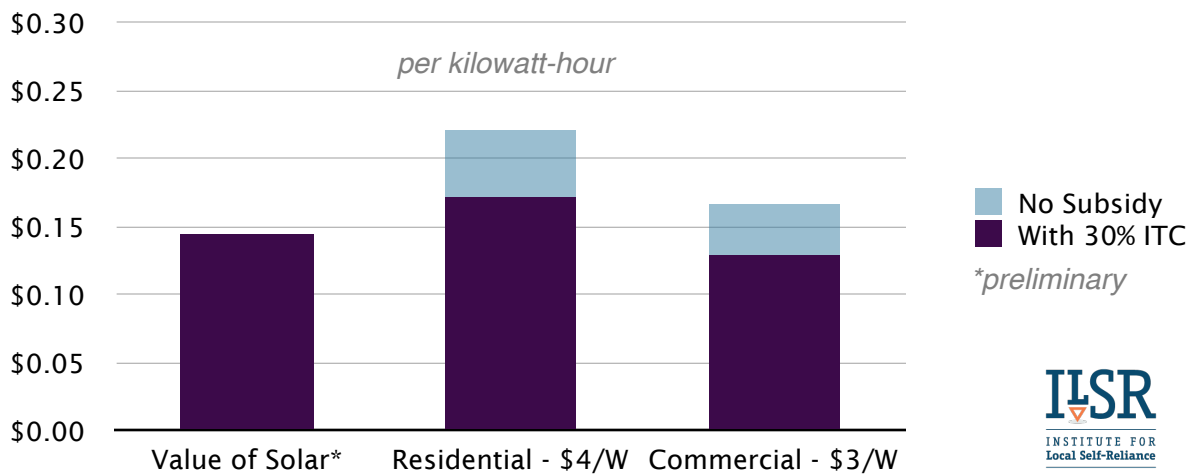
Xcel Energy, the state’s largest electric utility, shared estimations for the value of solar in its comments – an effort to reduce the value – to the Public Utilities Commission in mid-February 2014.<sup>10</sup>

The preliminary estimate of the value of solar (it won’t be formal if and until the utility actually files to offer the value of solar program) is quite robust. At 14.5¢ per kWh, the value of solar would be 3-4 times higher than the wholesale cost of energy to Minnesota utilities, and even a few cents higher than the 11.5¢ per kWh residential retail electricity rate for Xcel Energy.

It should be noted that in this filing, Xcel Energy recommended several changes to the methodology that would reduce the value of solar by half, to 7.4¢ per kWh. However, their arguments were not sustained by the Public Utilities Commission and, therefore, it’s likely that the ultimate value of solar rate will be closer to the original calculation.

This preliminary figure, 14.5¢, comes fairly close to the price needed to economically install solar in Minnesota. When spread over 25 years of production (also known as the “levelized cost of energy”), and including the federal 30% Investment Tax Credit (ITC), the cost of residential solar is a bit higher than 14.5¢ and the cost of commercial-scale solar is a bit lower. Residential projects installed at \$4/Watt will cost 17.2¢ per kWh over 25 years (and be eligible for additional state incentives). Commercial projects installed at \$3/Watt will cost 12.9¢ per kWh over 25 years (Fig. 9).

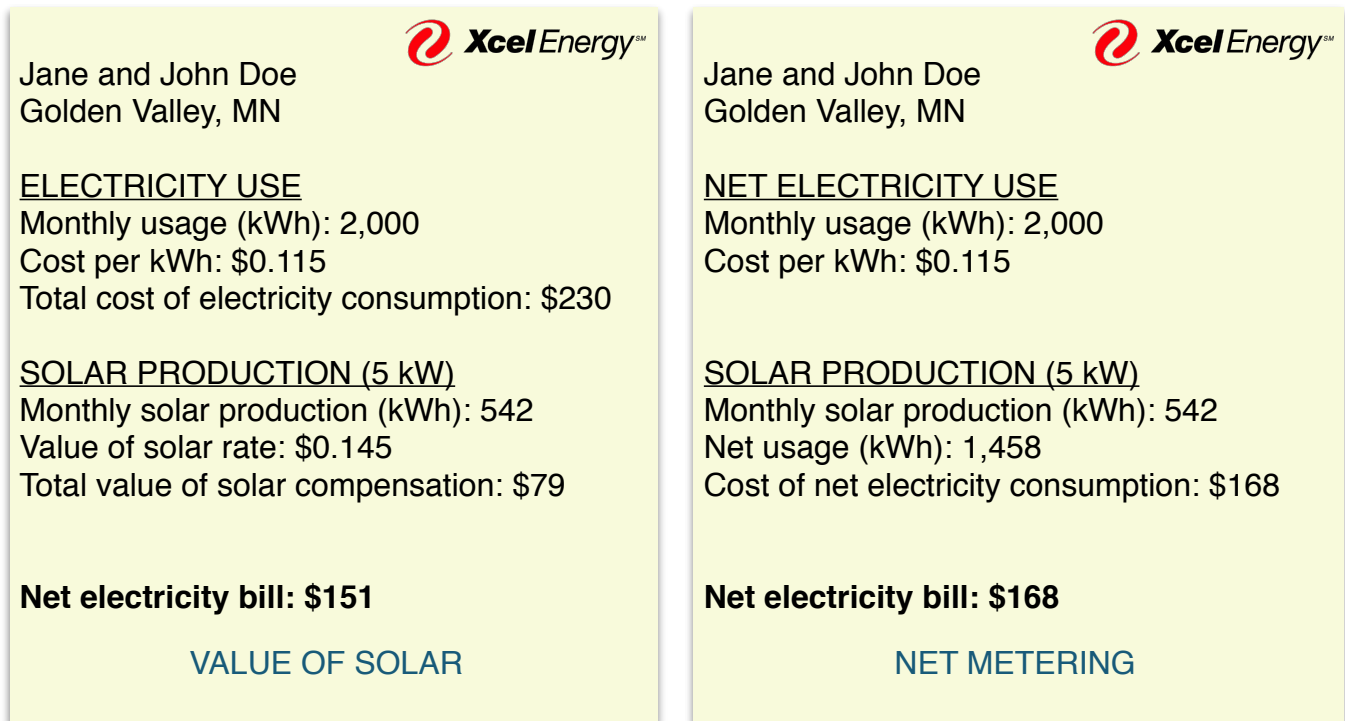
Figure 9. Preliminary Minnesota Value of Solar Energy & 25-Year Levelized Cost of Solar



Let’s examine a particular example contrasting the economics of the estimated value of solar with net metering (Fig. 10).

John and Jane Doe decide to install a 5 kW solar PV system onto their Golden Valley, MN, ranch-style home. Before their solar PV system went online, John and Jane were spending, on average, \$230 per month for electricity. Lets see what their bills look like under the new value of solar and the old net metering:

Figure 10. Simplified Comparison of Value of Solar and Net Metering for Xcel MN Customer



In other words, the value of solar will be an improvement over net metering from the consumer’s perspective, at least in the short run, and – with federal incentives – make residential and commercial solar cost-effective.

### Will it Work for Utilities?

The crucial remaining issue is whether Minnesota utilities will adopt value of solar in place of net metering. Recall that during the legislative session, utilities successfully lobbied that they, and not customers, should have the choice to offer the value of solar policy. Thus, unless a utility files to offer the value of solar, it will continue to operate under the existing net metering law.

A preliminary analysis suggests that the value of solar may cost the utility slightly more in the short run than net metering for a residential solar array, but quite a bit less in the long run.

Fig. 11 shows that a representative residential customer with a 5 kW solar array, as in our previous example, would net an extra \$200 bill credit this year (2014) with the value of solar than they would using net metering.

Within five years, however – based on recent utility rate inflation of 4-5% per year – the premium falls to just \$12. Over the life of the value of solar contract, 25 years, the net present value (5% discount rate) of compensation for solar production is \$3,000 less under value of solar than under net metering.

Figure 11. Annual Bill Credit – Market Value of Solar v. Net Metering

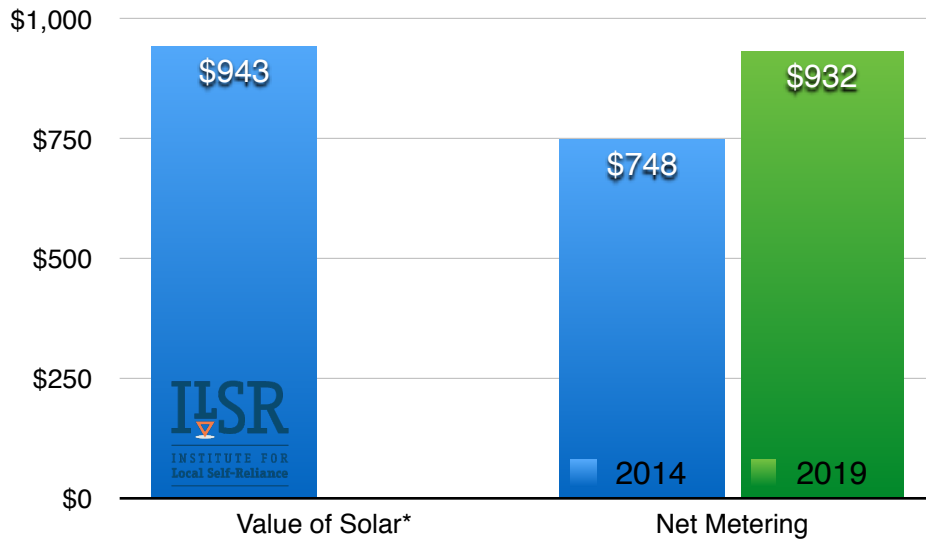
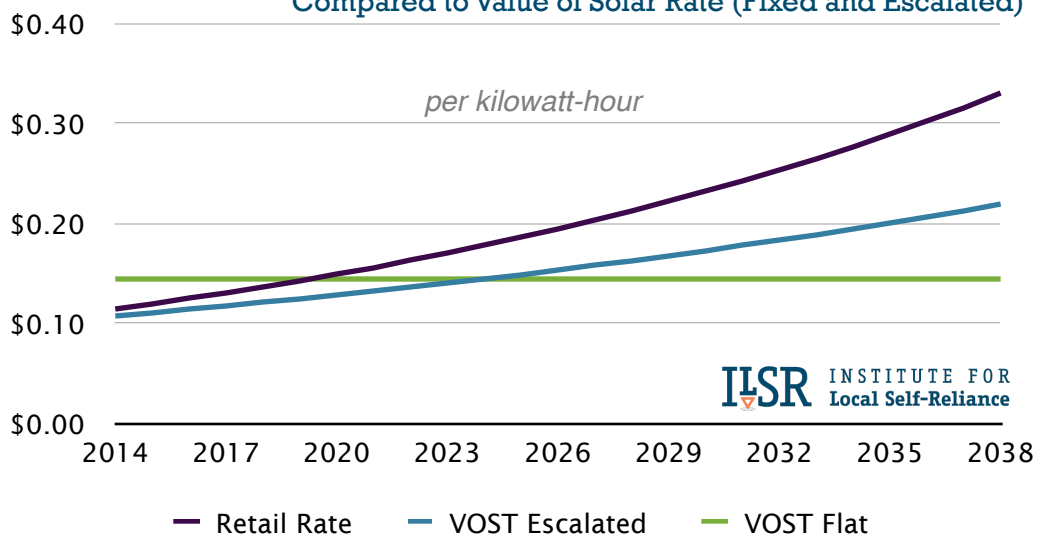


Fig. 12 shows how locking in the value of solar on a 25-year contract is likely to save the utility money compared to residential net metering, whether the value of solar rate is fixed or paid with an inflation escalator (with a comparable 25-year net present value). The top line shows the payment rate for energy generated under net metering, the second line is the rate paid on an escalating value of solar contract, and the flat line is the rate paid under a fixed value of solar (that has an equivalent 25-year net present value to the second line).

Not only that, utilities lock in the market value of solar when signing a 25-year contract, not bad for a business rocked by volatile fuel prices.

Figure 12. Projected Net Metering Rate (Residential) Compared to Value of Solar Rate (Fixed and Escalated)



Finally, it may be that, due to the different nature of the transaction, a utility may be allowed some measure of cost recovery for solar energy purchased via the value of solar. This question will be addressed and answered when a utility first files to offer the policy.

## Who Wins?

In theory, everyone is a winner if utilities adopt Minnesota's value of solar. In the near term, solar energy producers (especially commercial businesses) will get a better price than they have under net metering. In the long term, the cost of solar will fall (perhaps significantly) below the market-based value, and the 25-year, fixed price contract will help small scale producers secure financing.

Utilities should also come out ahead. Over the 25-year life of solar projects, they will pay less for solar energy than under net metering. Furthermore, greater amounts of solar on the grid will (over time) erode the market price for solar energy.

Utilities also get a sweet deal on renewable energy credits. Under net metering policy (in Minnesota), the generator of solar energy keeps the renewable energy credits. But under value of solar, they are automatically (and without compensation to the generator) transferred to the utility.

The market value of solar should also be a victory for ratepayers. First, it's transparent and without subsidy. In fact, it removes hidden subsidies for polluting fossil fuel generation. Ratepayers also get to purchase this renewable resource based on its value to the grid and not an awkward and obscure retail price proxy.

### ***What the REC?***

The value of solar law requires the renewable energy credit associated with each megawatt-hour (MWh) of solar generation to be transferred to the utility, but is silent on a value.

Minnesota utilities have argued that the law intends that value to be zero, despite robust prices for solar renewable energy credits (REC) on other states:

### **Solar REC Price (\$ per MWh)**

Maryland - \$140  
Massachusetts - \$235  
New Jersey - \$138  
Ohio - \$22  
Pennsylvania - \$24  
DC - \$480

*Prices from [SRECTrade.com](http://SRECTrade.com) (Dec. 2013)*

## What's Next?

The hope is that value of solar can help defuse many of the state policy battles in progress over distributed generation. As shown in Fig. 1 (page 2) from the introduction, local power generation policy is under attack by utilities in many states.

If Minnesota utilities adopt the approved value of solar methodology and see it as a success, then it may encourage utilities in other states to support the option. Similarly, if solar and distributed generation advocates in other states see value of solar as a successful tool for growing on-site power generation, they'll be willing to come to terms with utilities.

The key to success is not just the policy, however, but the process of adoption and implementation. Minnesota's value of solar wasn't without significant controversy, and key provisions in the original law (e.g. customer choice) were lost before the process of setting the methodology. Even some of the enacted options (e.g. local economic development benefit) were left out of the approved methodology. Other states may find that these components are essential to getting all parties to approve of the value of solar.

Additionally, Minnesota had a very robust stakeholder process that was led by a very competent government agency and guided by two superb teams of experts from Clean Power Research and Rocky Mountain Institute. Without a similar process and expertise in another state, the process may not result in a similar level of buy-in. (Indeed, at this report's publication date, no utility had yet filed for value of solar in Minnesota).

Ultimately, value of solar is a promising policy opportunity, a way to address concerns of utilities and distributed renewable energy advocates with a transparent and robust market price. We'll see if it lives up to the promise.



# Endnotes

<sup>1</sup> Farrell, John. Distributed Renewable Energy Under Fire. (Institute for Local Self-Reliance, 3/19/14). Accessed 3/21/14 at <http://bit.ly/1eZNiGq>.

<sup>2</sup> A Review of Solar PV Benefit and Cost Studies. (Rocky Mountain Institute eLab, April 2013). Accessed 3/21/14 at <http://bit.ly/1eZNENq>.

<sup>3</sup> *Karl was joined in this by Leslie Libby and Tim Harvey of Austin Energy and his future colleagues at Clean Power Research including Benjamin L. Norris and Thomas E. Hoff.*

<sup>4</sup> HF 773. Accessed 3/21/14 at [https://www.revisor.mn.gov/bills/text.php?number=HF773&version=0&session=ls88&session\\_year=2013&session\\_number=0](https://www.revisor.mn.gov/bills/text.php?number=HF773&version=0&session=ls88&session_year=2013&session_number=0).

<sup>5</sup> *ILSR Director of Democratic Energy played a lead role in Solar Works for Minnesota coalition that developed the solar legislation.*

<sup>6</sup> HF 729 - <http://bit.ly/1iwFn8b>

<sup>7</sup> Value of Solar Tariff Methodology. (MN Department of Commerce, 2013). Accessed 3/21/14 at <http://bit.ly/1eZTbU4>.

<sup>8</sup> *Concluding with this post:*

Farrell, John. Could Minnesota's "Value of Solar" Make Everyone a Winner? (Institute for Local Self-Reliance, 3/13/14). Accessed 3/21/14 at <http://bit.ly/1eZTJlw>.

<sup>9</sup> Haugen, Dan. In bid against gas, Minnesota regulators say solar can proceed. (Midwest Energy News, 3/27/14). Accessed 3/28/14 at <http://bit.ly/1mb8b6n>.

<sup>10</sup> Comments, Value of Solar Methodology, Docket No. E999/M-14-65. (Xcel Energy, 2/13/14). Accessed 3/21/14 at <http://cl.ly/3z293S061G3H>.