Powering Your Home With The Sun

ISEA Solar Ambassador

PETER GORR

Introduction to Residential Solar Energy Systems
Illinois Solar Energy Association (ISEA)

ISEA’s mission is to educate and advocate for the widespread application of solar, wind and other forms of renewable energy to the people of Illinois and represents approximately 150 businesses.

- Established in 1975
- 501(c)3 charitable organization
- Membership based organization, with over 500 individual members
- Hosts the annual IL Solar Tour as part of the National Solar Tour
Our Objective Today

- Questions
- Time to Act!
- Common Solar Myths
- Intro to Solar
- Solar Makes Cents
- My Story
- Community Solar
- Steps to Solar
- Electricity in Illinois
- Our Objective Today
As of April 2018, there is currently 100 MW of solar installed in Illinois, which is currently 10% of the total energy generated. Legislation dictates that 25% of energy generation (2000 MW) by 2025 and even more by 2030 should come from solar. A graph showing the sources of electricity generation in Illinois highlights the significant role of wind power, followed by nuclear and coal. Natural gas and other sources contribute lesser amounts.
ComEd Environmental Disclosure Statement

Sept 30, 2017

Produced from known sources for the 12 months ending September 30, 2017

Average amounts of emissions and amount of Nuclear Waste per 1000 Kilowatt-hours (KWh)

<table>
<thead>
<tr>
<th>Waste Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Level Nuclear Waste</td>
<td>0.003 cubic feet</td>
</tr>
<tr>
<td>High Level Nuclear Waste</td>
<td>0.006 lbs</td>
</tr>
<tr>
<td>Sulfur Dioxide</td>
<td>0.91 lbs</td>
</tr>
<tr>
<td>Nitrogen Oxides</td>
<td>0.69 lbs</td>
</tr>
<tr>
<td>Carbon Dioxide</td>
<td>960.02 lbs</td>
</tr>
</tbody>
</table>

Hydro Power, 1%

Coal-Fired Power, 33%

Natural Gas-Fired, 26%

Nuclear Power, 36%

Wind Power, 3%

Other Resources, 1%
In 2017, average annual electricity consumption for a U.S. residential utility customer was 10,399 kilowatt hours (kWh). Every kilowatt hour of electricity produced from fossil fuels generates an average of 1.84 lbs of carbon dioxide.

In 2017, average annual electricity consumption for a U.S. residential utility customer was 10,399 kilowatt hours (kWh). Every kilowatt hour of electricity produced from fossil fuels generates an average of 1.84 lbs of carbon dioxide.
✓ Reduces carbon emissions & environmental concerns
✓ Inexhaustible energy supply
✓ Increases home value
✓ Saves money on electric bill
✓ Creates jobs
✓ Improves public health
✓ Provides national energy security
✓ Why Go Solar?
Common Myths

You can sell the excess energy you produce.

- It's too cold here; solar panels can't withstand snow, hail, winds, etc.
- Solar panels will collapse, leak, deteriorate or cause my roof to leak.
- Installing solar is expensive!
- It's too expensive!
- It will be harder to sell my house.
- You have to have a South exposure on your roof.
- You have to have a lot of sun. We don't get enough sun.
- My property will increase taxes!
Too Far North? Not Enough Sun?

Germany is a world leader in solar, yet they have less sun radiation than Alaska.
The Shift to Clean Energy Is Happening!

From power plants, under centralized command/control
to a distributed generation grid, of a "smart" connected network.

Centralized

Distributed
Solar Electricity – Photovoltaic (PV)

Primary Components

1. PV Collectors
2. Inverter/Micro-Inverter
3. Service Panel
4. Household Load
5. Electric Meter
6. Grid & Net Metering
Net Metering

How Does Net Metering Work?

- Solar rooftops convert sunlight to electricity
- Excess energy goes back to the grid
- Surplus energy produced is credited to your utility account
- Energy goes to your home
Earning Credit on the Grid!

Your bill will change, showing:

In Flow (from grid) and Out Flow (to grid) readings, showing:

Ecolab
Earning Credit on the Grid!

If more In than Out, you pay the difference. If more Out than In, you rollover the excess to the next month. Typically, rollovers can go month to month but not year to year.

ComEd Bill – March 2018

Updates

Total Amount Due  
$15.58

Thank you for your payment of $15.58 on March 12, 2018

Miscellaneous

<table>
<thead>
<tr>
<th>600</th>
<th>Actual</th>
<th>Actual</th>
<th>Actual</th>
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</thead>
<tbody>
<tr>
<td>420</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Difference: 180 LW\*
Process to Go Solar

1. Schedule a Site Evaluation
2. Choose a Contractor
3. Sign Interconnection
4. Permit completed by installer (30-60 days)
5. Material Delivery (2 weeks)
6. Installation (1-2 weeks)

Total Duration: 3-4 months to go solar!
Site Evaluation

Solar Calculator

ComEd

Your roof may be a good candidate for rooftop solar panel installation.

Rooftop Solar Report
Review cost, payback, and more.

Find a Contractor
Download my report

10 years

Estimated Payback Period

$9,800

Estimated Cost After incentives

$20,700-$25,300

Installation Cost
Process to Go Solar

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2. Choose a Contractor
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5. Material Delivery (2 weeks)
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Total Duration: 3-4 months to go solar!
Solar Incentives

**Illinois State Incentives**
- Approx: 25-35% based on SREC $ amount
- 1 SREC = 1 MWh solar energy
- IPA pays PV system owners for “green value” of solar MWhs
- Must secure a contract to sell SRECs to IPA through IL DG-certified installer

**Federal Incentives**
- 30% unlimited Tax Credit
- Legislated through 2019, will step down gradually
- 26% unlimited Tax Credit in 2020
- 22% unlimited Tax Credit in 2021
- 10% unlimited Tax Credit in 2022
- 0% after 2022
Homeowners receive this 15 year financial incentive upfront!

This is in addition to the savings on their bill (net metering)

What is a Renewable Energy Certificate? (REC)

Homeowner installs a solar system

Solar system produces a number of MWh per year (1 MWh = 1 REC)

IPA purchases RECs for ComEd and Ameren
Future Energy Jobs Act (FEJA)

- Creates Illinois Power Agency (IPA)'s Long Term Planning Process
- $200M annually from Lines Charge
- Programs begin mid to late 2018
- New solar power to be built = nearly a 4000% increase!

Year | New Solar
--- | ---
2020 | 1,350 MW
2025 | 2,000 MW
2030 | 2,700 MW*

* Approximately 100 MW installed solar in Illinois as of April 2018
Illinois Residential Incentives

- The Illinois Power Agency will develop and publish an Adjustable Block Program schedule.

- Each block will have a price per REC identified for each system size.

- Once the RECs in one block are purchased, the next block will open.
<table>
<thead>
<tr>
<th>Category</th>
<th>Goal</th>
<th>Net Metering</th>
<th>REC</th>
<th>Adjusted Block Incentives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small DG</td>
<td>&lt;10kW AC</td>
<td>25%</td>
<td>No Change</td>
<td>Paid upfront $250/kW AC DC</td>
</tr>
<tr>
<td></td>
<td>15 Year Contract</td>
<td>Energy only</td>
<td>25%</td>
<td>IPA Discretion &gt;2MW AC</td>
</tr>
</tbody>
</table>
| Community Solar    | <2MW AC    | 25%          | 20% when energized | Paid upfront C81 = $250/kW AC DC 
<p>|                   | 15 Year Contract | No Change | 25% | IPA Discretion &gt;2MW AC |
| IPA Discretion    | &gt;2MW AC    | 25%          | No Change | Paid upfront |
| Large DG          | 10kW - 2MW AC | 20% when energized | Balance over 4 years | IPA Discretion &gt;2MW AC |
|                   | 15 Year Contract | No Change | 25% | IPA Discretion &gt;2MW AC |
|                   | n/a        | 25%          | No Change | Paid upfront |
|                   | DG Rebate  | 25%          | Goal | Category |</p>
<table>
<thead>
<tr>
<th>Block</th>
<th>MW Size</th>
<th>Size Sub-Category (kW AC)</th>
<th>REC Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1*</td>
<td>&lt;= 10 kW</td>
<td>Sub-Category (kW AC)</td>
<td>$78.70</td>
</tr>
<tr>
<td>2*</td>
<td>&lt;= 10 kW</td>
<td>Sub-Category (kW AC)</td>
<td>$78.76</td>
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<tr>
<td>3*</td>
<td>&lt;= 10 kW</td>
<td>Sub-Category (kW AC)</td>
<td>$85.10</td>
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<tr>
<td></td>
<td>10-25 kW</td>
<td>Sub-Category (kW AC)</td>
<td>$81.20</td>
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<tr>
<td></td>
<td>10-25 kW</td>
<td>Sub-Category (kW AC)</td>
<td>$85.10</td>
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</table>

* Estimate

SREC pricing announced June 4, 2018 by The Illinois Power Agency

Rural Co-ops and Munis in MISO (American, MidAmerican, Mt. Carmel, and
Group A) and Rural Co-ops and Munis in PJM (Comed, and Residual Blocks)
To Learn More and/or Find an Approved Contractor

http://illinoisabp.com/
My Story
Production & Usage

kwh

Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov  Dec

Production

Usage
Production & Usage

Deficits
Production & Usage Surplus
Deficits
Surpluses
Have surplus match deficit
Goal
Production & Usage
kwh
<table>
<thead>
<tr>
<th>Month</th>
<th>Production (kWh)</th>
<th>Usage (kWh)</th>
<th>Net (kWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jul</td>
<td>888</td>
<td>1106</td>
<td>-218</td>
</tr>
<tr>
<td>Aug</td>
<td>725</td>
<td>1063</td>
<td>-338</td>
</tr>
<tr>
<td>Sep</td>
<td>644</td>
<td>837</td>
<td>193</td>
</tr>
<tr>
<td>Oct</td>
<td>522</td>
<td>674</td>
<td>-152</td>
</tr>
<tr>
<td>Nov</td>
<td>459</td>
<td>588</td>
<td>-129</td>
</tr>
<tr>
<td>Dec</td>
<td>323</td>
<td>405</td>
<td>-82</td>
</tr>
<tr>
<td>Jan</td>
<td>296</td>
<td>377</td>
<td>-71</td>
</tr>
<tr>
<td>Feb</td>
<td>269</td>
<td>349</td>
<td>-80</td>
</tr>
<tr>
<td>Mar</td>
<td>241</td>
<td>322</td>
<td>-81</td>
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<tr>
<td>Apr</td>
<td>214</td>
<td>303</td>
<td>-90</td>
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<tr>
<td>May</td>
<td>187</td>
<td>269</td>
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</tr>
<tr>
<td>Jun</td>
<td>160</td>
<td>231</td>
<td>-71</td>
</tr>
<tr>
<td>Total</td>
<td>8660</td>
<td>9276</td>
<td>-616</td>
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</tbody>
</table>

% 93%

Kilowatt Hours (kWh)

My Production & Usage
Does Solar Make Cents?

System detail
- 28 240w Panels (6.72kw)
- 28 Micro Inverters
- Communications Gateway
- Roof Mounted
- Installed Cost: $46,200

Permitting process
- Std Building Permit ($428)
- Required Engineer’s Calculations Report ($750)
- Total Cost: $1,178
- ComEd Interconnection & Net Metering application
- Cost: $50

Cost: $550
Financial Detail - 2011

Savings: over $21,000
25 year electricity supply value: $35,000

I am paying a fixed rate of 6.8¢ vs 10¢ (now) to 25¢ (in 25 years)

Total Cost:

$ 47,428 (6.72kw)
$ 14,028 (State Rebate)
$ 14,228 (Fed Tax Credit)
$ 5,650 (sREC Sales)

Total:

$ 13,522

$ 5,650
Financial Details - 2017
<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Cost:</td>
<td>$ 27,455</td>
</tr>
<tr>
<td>Fed Tax Credit:</td>
<td>$ 8,237</td>
</tr>
<tr>
<td>sREC Sales:</td>
<td>$ 9,678</td>
</tr>
<tr>
<td>Total:</td>
<td>$ 9,540</td>
</tr>
<tr>
<td>Fixed rate of 4.2¢ vs 11¢ (now) to 28.2¢ (in 25 years)</td>
<td>$ 29,000</td>
</tr>
<tr>
<td>25 year electricity supply value:</td>
<td>$ 38,500</td>
</tr>
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</table>
Community Solar is a solar PV installation that provides energy, financial benefits, or both to members or "subscribers" through a voluntary program. It isn't built on your own roof, but rather in your community. Solar energy is produced by a solar panel plant and becomes net metering credits, which are added to your electric bill.
Community solar often refers to large-scale solar facilities shared by individual community members. Participating members receive credits on their electricity bills for their portion of the power produced, so suited for customers that can’t install service, as the entities they’re located near the entities they do not have to be. Systems do not have to be located near the entities they produce, portion of the power electricity bills for their receive credits on their participating members shared by individual to large-scale solar facilities.

Community Solar - Solar Garden or Farm

Community Solar - Solar Garden or Farm

http://www.solarinthecommunity.com
More Solar News

➢ Solsmart
  ✓ S. Barrington – Solsmart GOLD
  ✓ Deer Park – pursuing Solsmart

➢ Solarize Chicagoland
Join ISEA and become an active advocate

Focus on Energy Efficiency

Perform home energy audit

Cut energy usage to minimum

Change your source of electricity generation

Install Solar

Subscribe to Community Solar (solarinthecommunity.com)

Select Clean Renewables (pluginnillinois.org)

Vote Climate Change Issue

Actively Support Clean Energy Policies

Thank you for FEJA!!

Time to Act!!
For more information visit

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www.illinoissolar.org