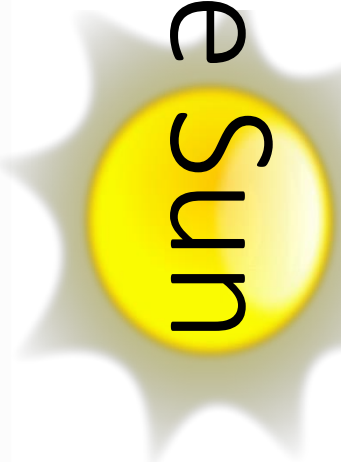




iseea

illinois solar
energy association

Powering Your Home With The Sun



Introduction to Residential Solar Energy Systems

PETER GORR

ISEA Solar Ambassador



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

- Established in 1975
- 501(c)3 charitable organization
- Membership based organization, with over 500 individual members and represents approximately 150 businesses
- Hosts the annual IL Solar Tour as part of the National Solar Tour



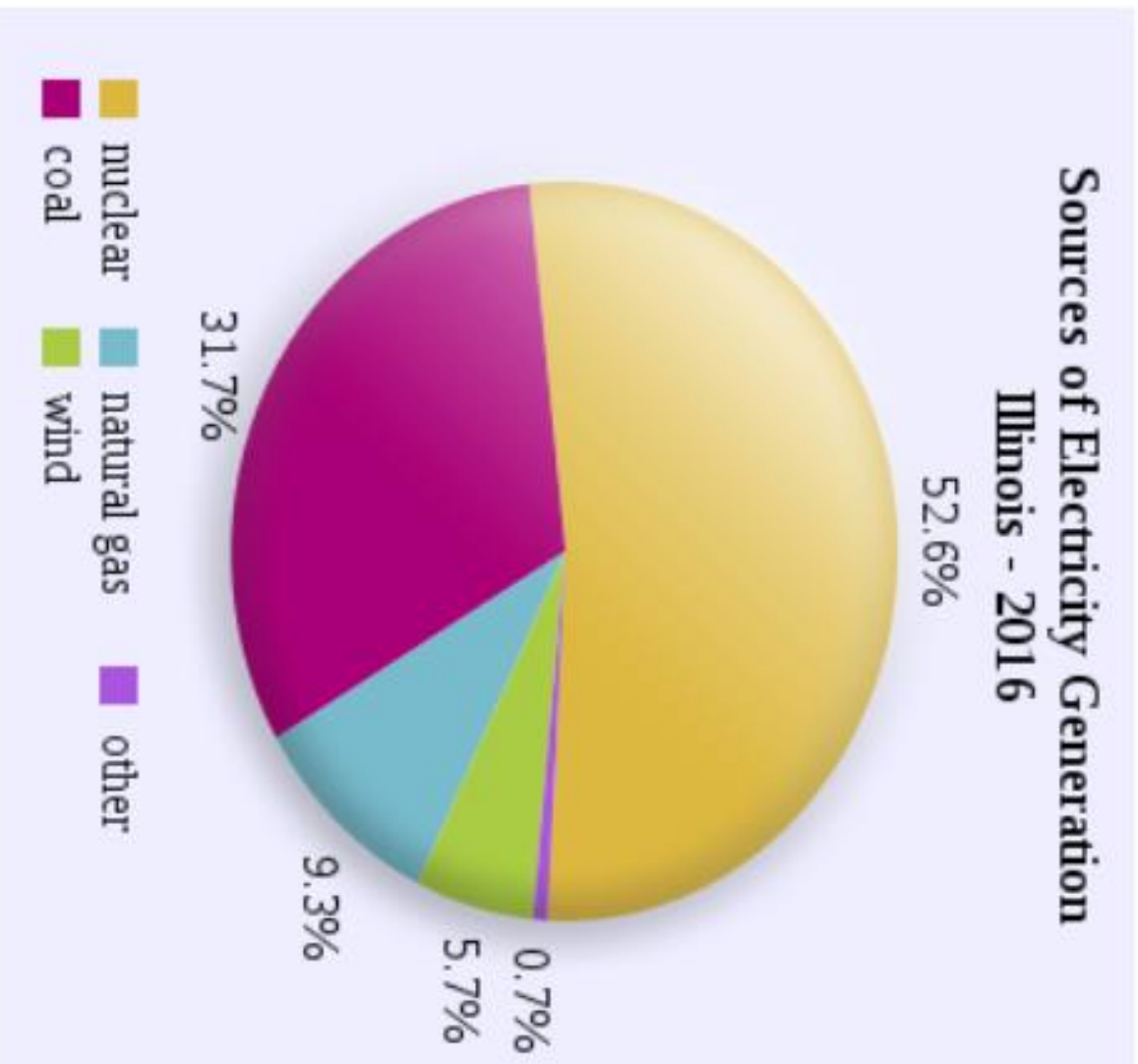
Our Objective Today



- ☀ Electricity in Illinois
- ☀ Common Solar Myths
- ☀ Intro to Solar
- ☀ Solar Makes Cents
- ☀ Steps to Solar
- ☀ My Story
- ☀ Community Solar
- ☀ Time to Act!
- ☀ Questions



Illinois Electricity Generation

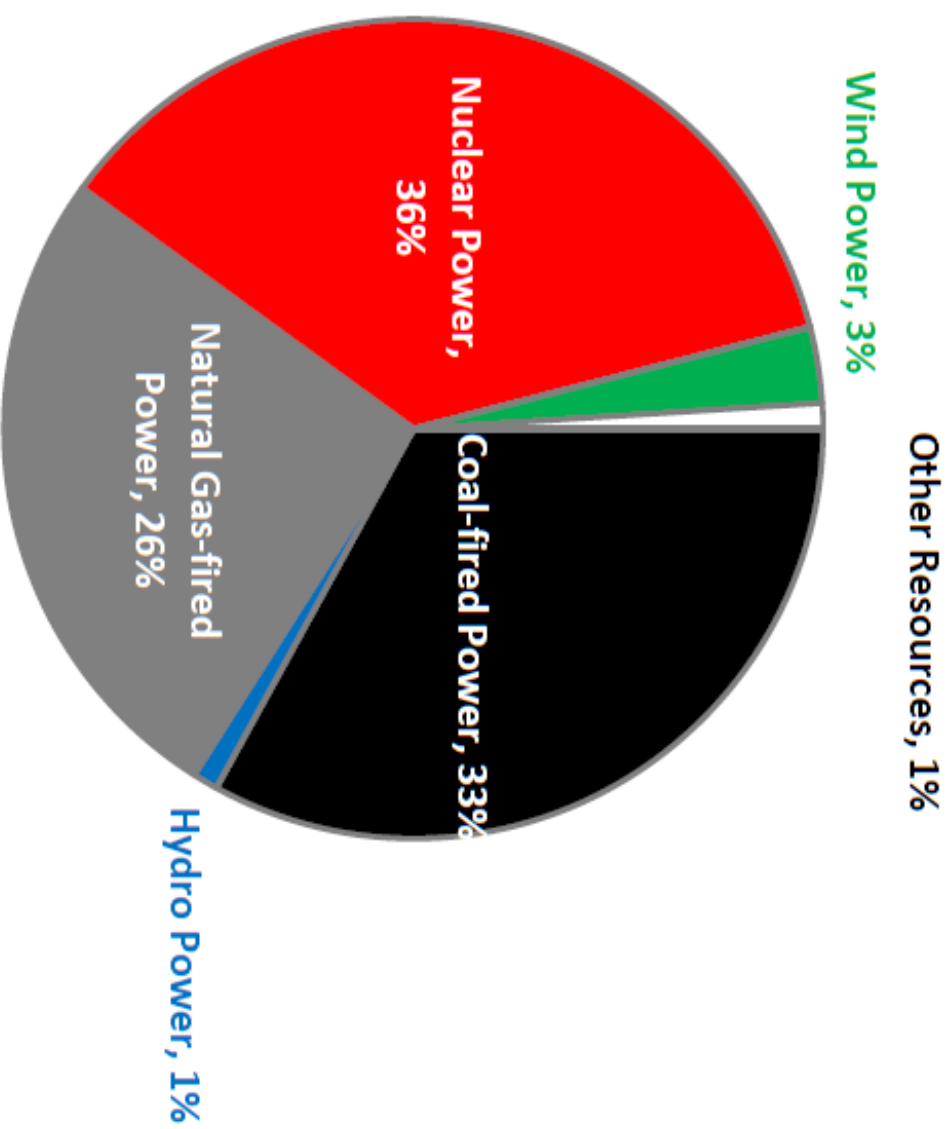


- As of April 2018, there is currently 100 MW of solar installed in Illinois
- Legislation dictates 25% of energy generation (2000 MW) to be from solar by 2025 and even more by 2030



ComEd Environmental Disclosure Statement

Sept 30, 2017

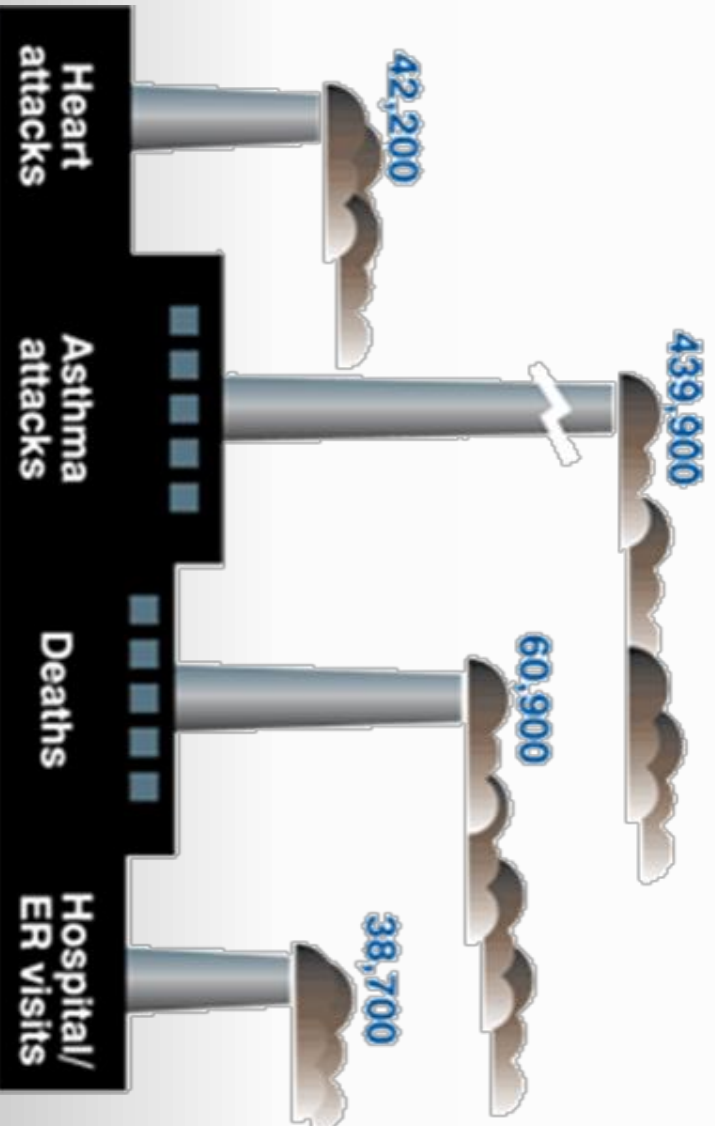


Average Amounts of Emissions¹ and Amount of Nuclear Waste² per 1000 kilowatt-hours (kWh)
Produced from Known Sources for the 12 months ending September 30, 2017

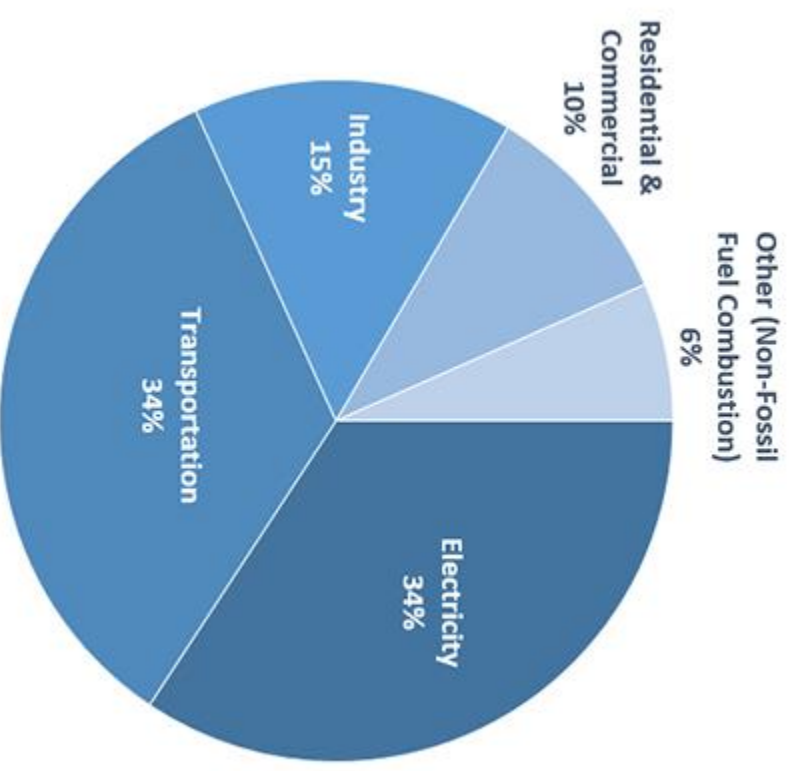
Carbon dioxide	960.02 lbs.
Nitrogen oxides	0.69 lbs.
Sulfur dioxide	0.91 lbs.
High level nuclear waste	0.006 lbs.
Low level nuclear waste	0.0003 cubic feet

Traditional Energy Emissions

- ✓ 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.



2016 U.S. Carbon Dioxide Emissions, By Source



U.S. Environmental Protection Agency (2018). Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2016

Why Go Solar?



- ✓ Reduces carbon emissions & environmental concerns
- ✓ Provides national energy security
- ✓ Improves public health
- ✓ Creates jobs
- ✓ Saves money on electric bill
- ✓ Increases home value
- ✓ Inexhaustible energy supply



Common Myths

You can sell the excess energy you produce



"You have to have a south exposure on your roof."

We don't get enough sun.

It will be harder to sell my house.

It's too expensive!

Installing solar will increase my property taxes!

Solar panels will cause my roof to leak, deteriorate or collapse.

It's too cold here; solar panels can't withstand snow, hail, winds, & sleet.

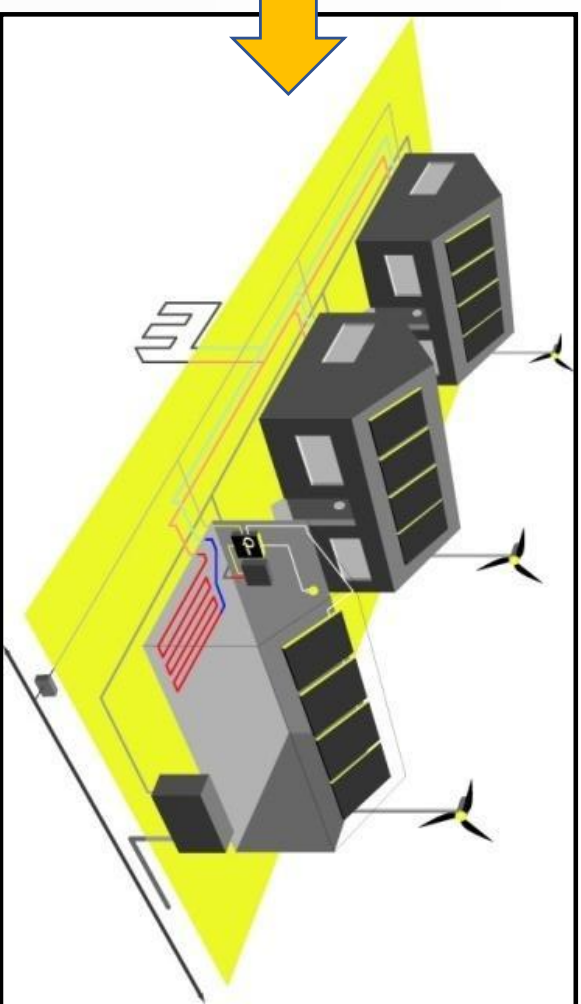


The Shift to Clean Energy is Happening!

Centralized



Distributed

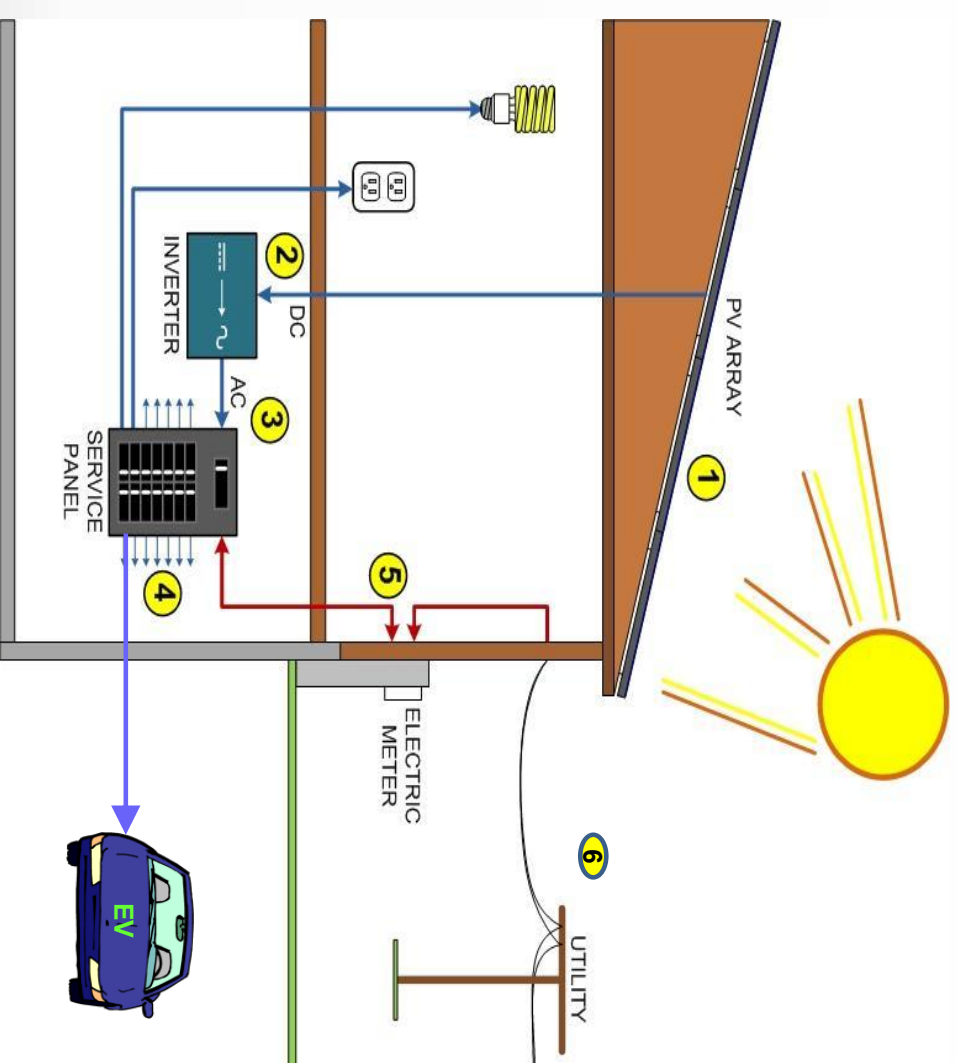


From power plants, under
centralized
command/control

To a distributed generation
grid, of a “*smart*”
connected network



Solar Electricity – Photovoltaic (PV)



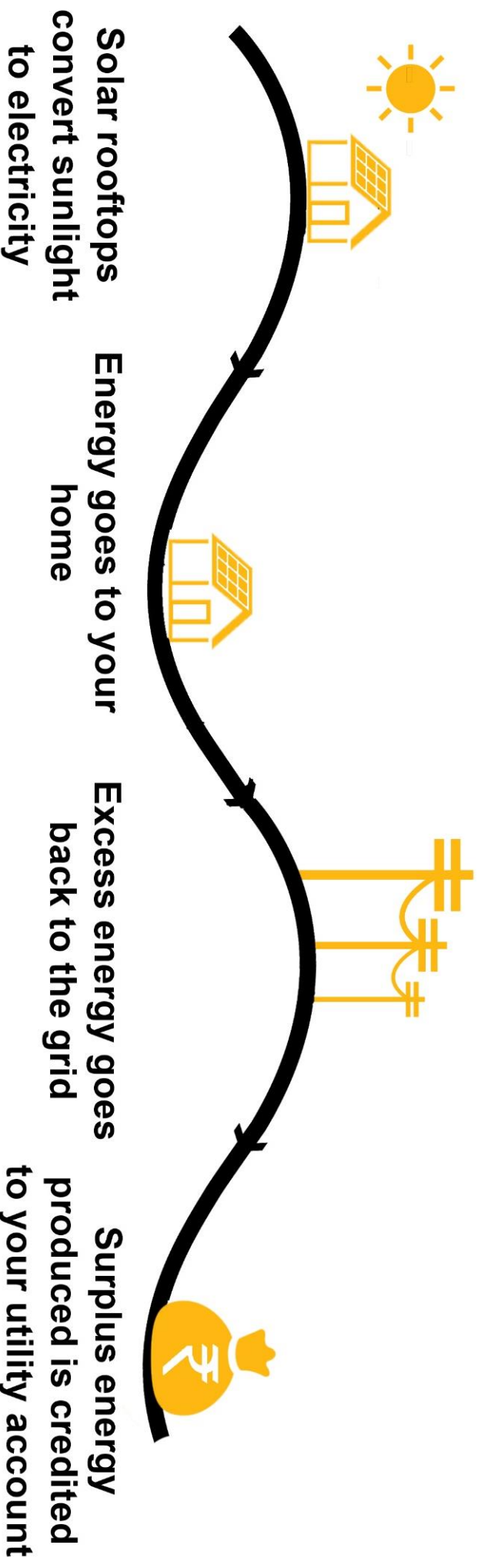
- ## Primary Components
1. PV Collectors
 2. Inverter/Micro-Inverter
 3. Service Panel
 4. Household Load
 5. Electric Meter
 6. Grid & Net Metering



Net Metering



How Does Net Metering Work?



Earning Credit on the Grid!

ComEd Bill – March 2018



METER INFORMATION							
Read Dates	Meter Number	Load Type	Reading Type	Previous	Present	Difference	Multiplier Usage
2/21-3/22		I/O w/ Flow Thru	KWh From Grid	Actual	Actual		420
2/21-3/22		I/O w/ Flow Thru	KWh To Grid	Actual	Actual		600

CHARGE DETAILS				
Residential - Single 2/21/18 - 3/22/18 (29 Days)				
SUPPLY				
Electricity Supply Charge	420 KWh X 0.05844	\$24.54		
Transmission Services Charge	420 KWh X 0.01351	\$5.67		
Purchased Electricity Adjustment		-\$1.25		
Net Metering Credit - Supply	420 KWh X -0.06898	-\$28.97		
		-\$0.01		
DELIVERY - ComEd				
Customer Charge		\$10.87		
Standard Metering Charge		\$4.64		
Distribution Facilities Charge	420 KWh X 0.03181	\$13.36		
IL Electricity Distribution Charge	420 KWh X 0.00121	\$0.51		
Net Metering Credit - Delivery	420 KWh X -0.03302	-\$13.87		
		\$15.51		
TAXES & FEES				
Environmental Cost Recovery Adj	420 KWh X 0.00048	\$0.20		
Renewable Portfolio Standard	420 KWh X 0.00189	\$0.79		
Zero Emission Standard	420 KWh X 0.00195	\$0.82		
Energy Efficiency Programs	420 KWh X 0.00015	\$0.06		
Franchise Cost	\$14.92 X 0.60600%	\$0.09		
Net Metering Credit - Other	420 KWh X -0.00447	-\$1.88		
Service Period Total				\$15.58

MISCELLANEOUS			
Net Metering Excess Gen - Rollover	180 KWh		
Thank you for your payment of \$85.88 on March 12, 2018			
Total Amount Due			\$15.58

UPDATES

ComEd

- IT'S A SNAP - GET THE APPI ComEd's free app now. Offers fingerprint login, account alerts & notifications, and easy pay options on smartphones and tablets. Download the new app today at ComEd.com/App
- ILLINOIS COMMERCE COMMISSION CONSUMER DIVISION: (800-524-0795): The Consumer Services Division is available to help resolve disputes with ComEd. However, customers should contact ComEd before seeking assistance from the ICC.

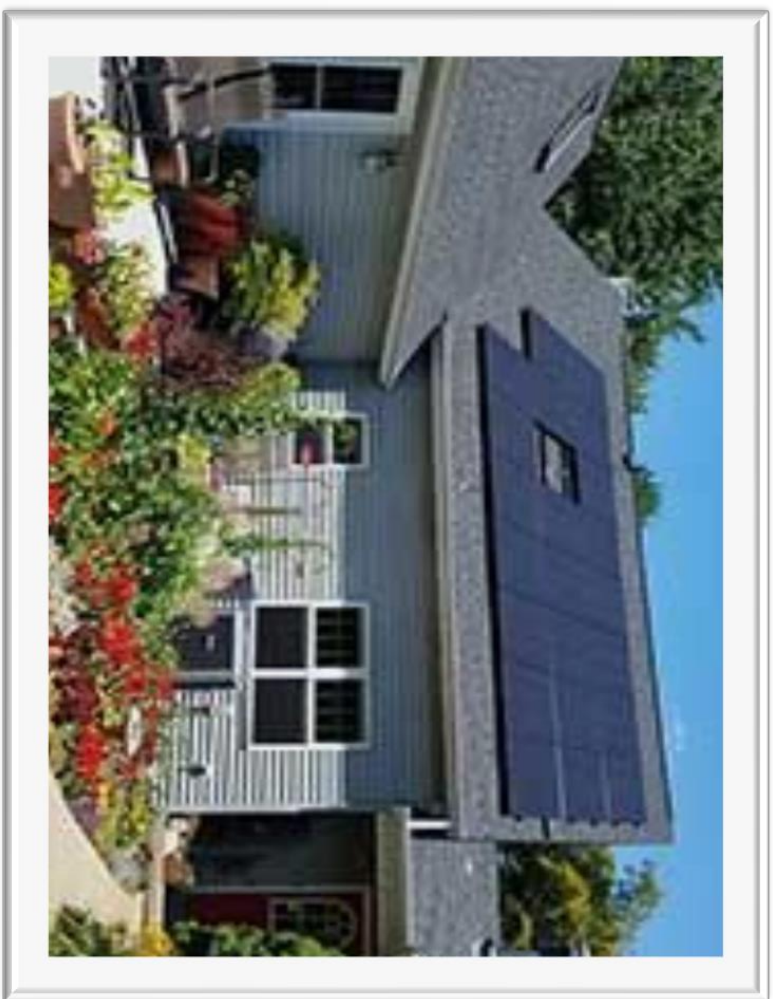
Your bill will change, showing: **In Flow (from grid)** and **Out Flow (to grid)** readings



Process to Go Solar



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



Total Duration: 3-4 months to go solar!





Site Evaluation

ComEd Solar Calculator



Rooftop Solar Report

Review cost, payback, and more.

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

Why?



ESTIMATED UPFRONT INSTALLATION COST
\$20,700-\$25,300

Why?



ESTIMATED COST AFTER INCENTIVES
\$9,800

Why?



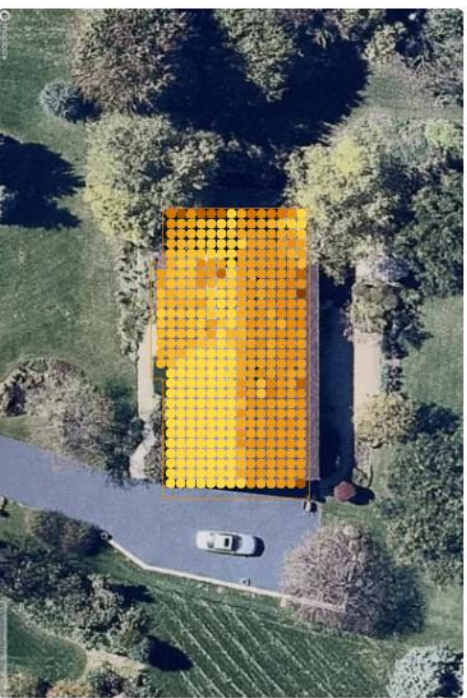
ESTIMATED PAYBACK PERIOD
10 years

Why?

[Find a Contractor](#)

[Download My Report](#)

Street Address
408 Bramble Ln, Deer Park, IL 60010



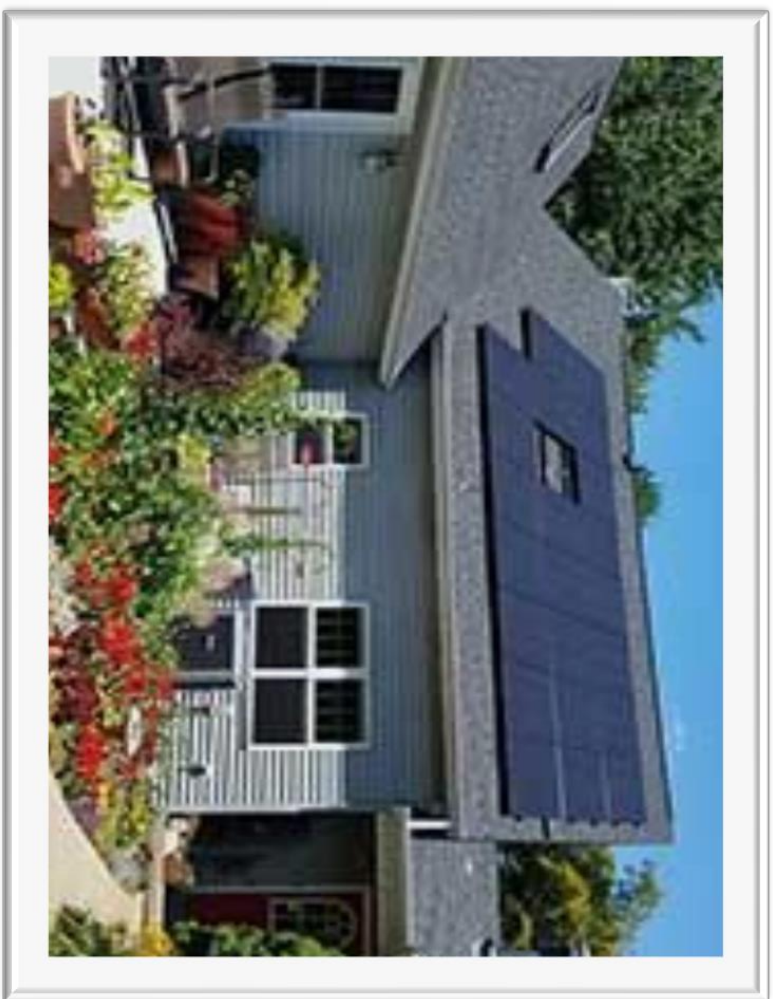
© Mapbox, County of Lake, IL, Mapbox, DigitalGlobe



Process to Go Solar



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- Material Delivery (2 weeks)
- Installation (1-2 weeks)



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

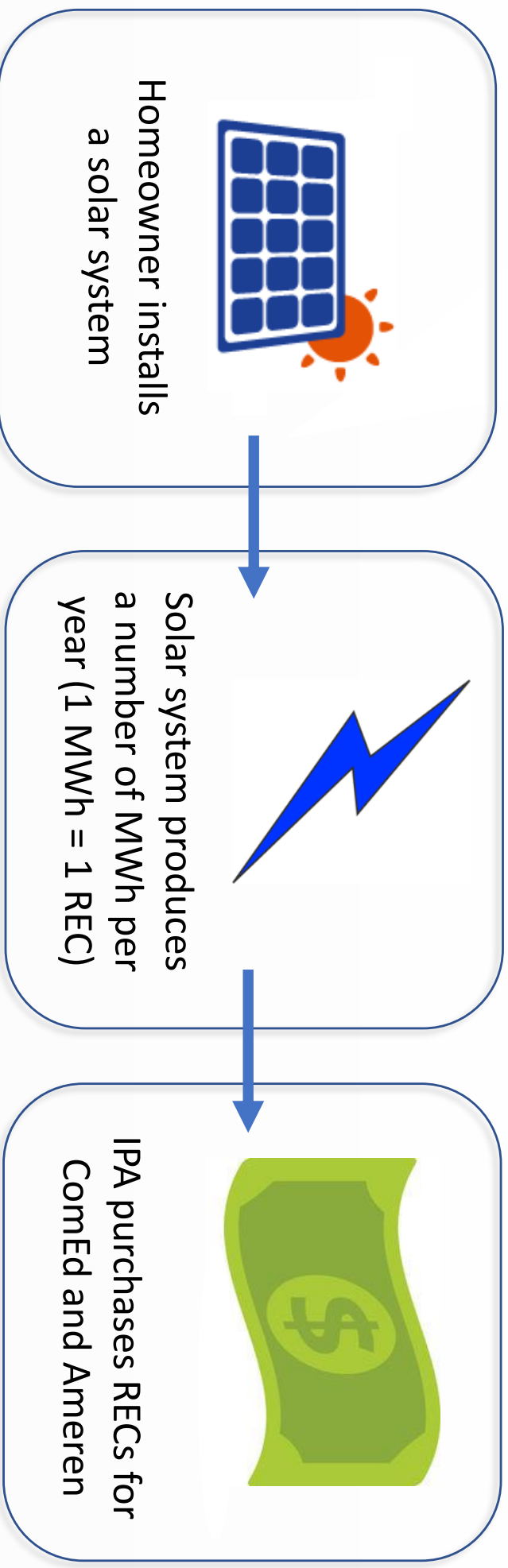


Federal Incentives

- 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



What is a Renewable Energy Certificate? (REC)



Homeowners receive this 15 year financial incentive upfront!

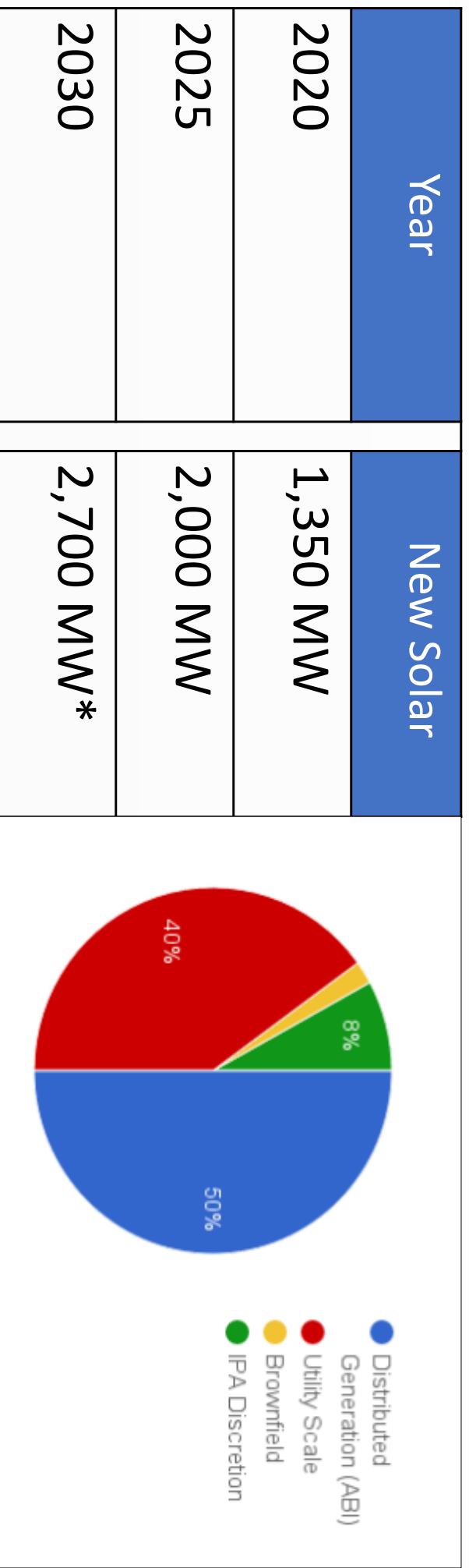
This is in addition to the saving on their bill (net metering)





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!



* 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





Adjustable Block Incentives - Summary

Category	Goal	Net Metering	REC	DG Rebate
Small DG <10kW AC	25%	No Change	15 Year Contract Paid upfront	n/a
Large DG 10kW – 2MW AC	25%	No Change	15 Year Contract 20% when energized Balance over 4 Years	C&I = \$250/kW DC Paid upfront
Community Solar <2MW AC	25%	Energy only	15 Year Contract 20% when energized Balance over 4 Years	\$250/kW DC Paid upfront
IPA Discretion <2MW AC	25%	Based on Category	Based on Category	Based on Category





ABP – Residential Blocks

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

Group A (Ameren, MidAmerican, Mt. Carmel, and Rural Co-Ops and Munis in MISO)				Group B (ComEd, and Rural Co-Ops and Munis in PJM)			
Block	MW Size	Size Sub-Category (kW AC)	REC Price (\$/REC)	Block	MW Size	Size Sub-Category (kW AC)	REC Price
1	22	<= 10 kW	\$85.10	1	52	<= 10 kW	\$72.97
	--	> 10-25 kW	\$78.70		--	> 10-25 kW	\$73.23
2*	22	<= 10 kW	\$79.18	2*	52	<= 10 kW	\$71.07
	--	> 10-25 kW	\$71.76		--	> 10-25 kW	\$64.88
3*	5.5	<= 10 kW	\$76.02	3*	12	<= 10 kW	\$68.23
	--	> 10-25 kW	\$68.89		--	> 10-25 kW	\$62.28

* Estimate





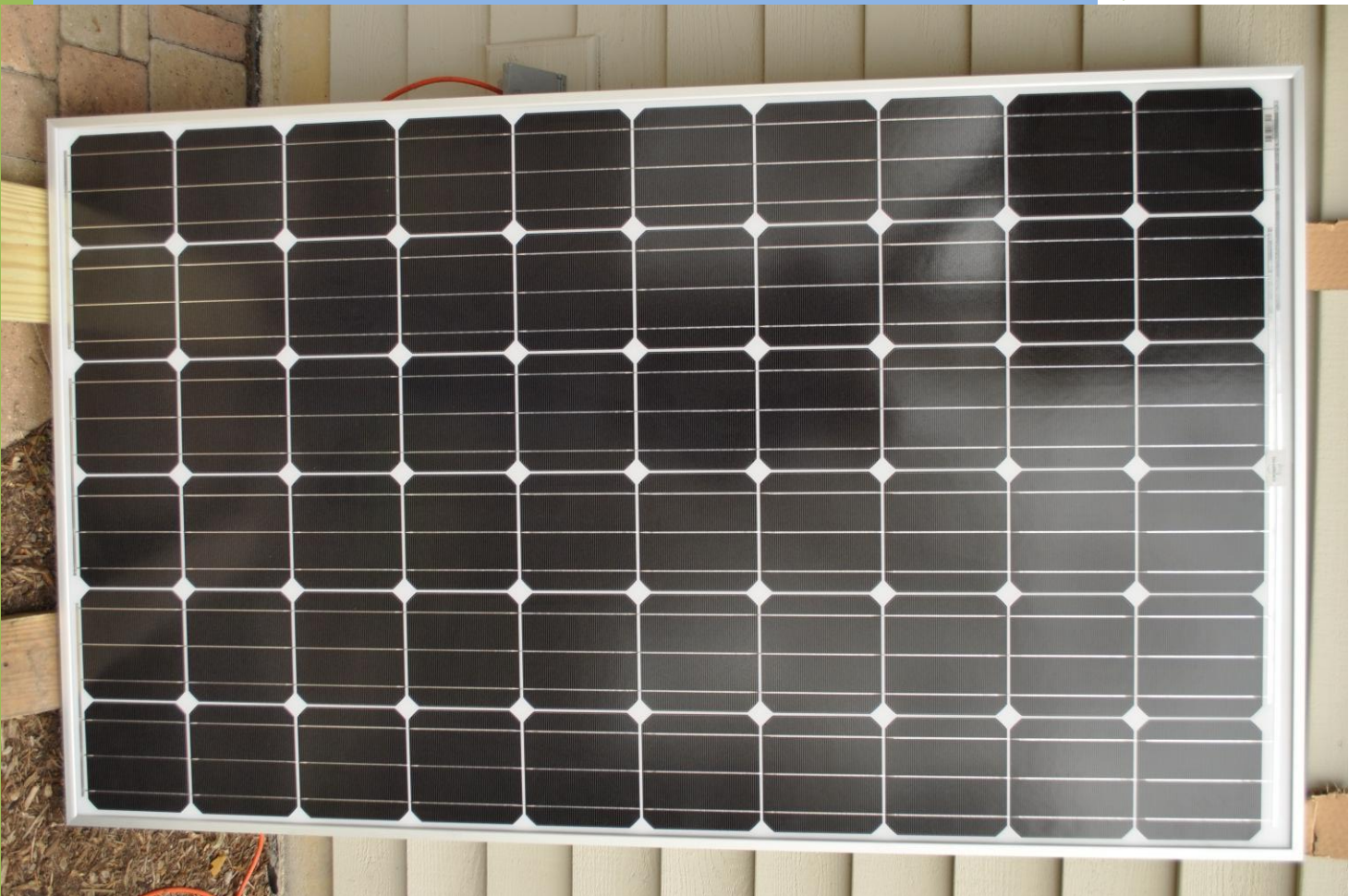
To Learn More and/or Find an Approved Contractor

<http://illinoisabp.com/>



My Story





SOLARWORLD
240 Watt









Communications Gateway



192.168.1.105 +web
25150 10kWh 28





my system

Palatine, IL 52°F

Normal

28 Inverters

Reports

Settings

Installed by
Solar Service Inc

Overview

Power Production

2.31kW

Today's Peak: 2.01 kW

Today's Energy

1.74kWh

Past 7 Days

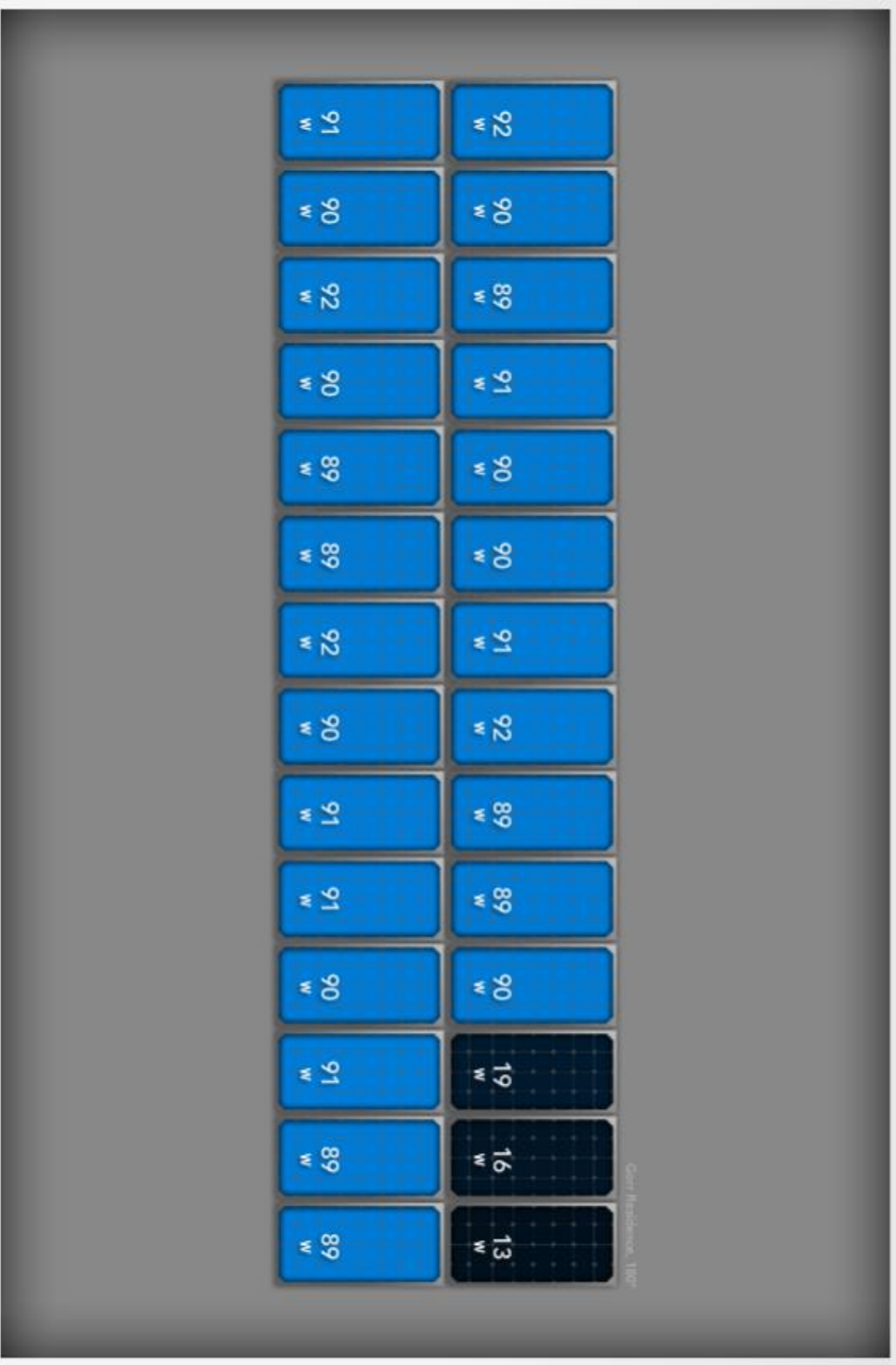
162kWh

This Month's Energy

37.2kWh

Lifetime Energy

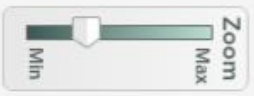
348kWh



Client Reference: 1187

09:47

02 May 11
GMT-0500





my system

Palatine, IL | 55°F



Normal | 28 Inverters



Reports



Settings

Installed by
Solar Service Inc

Overview

Power Production

5.57kW

Today's Peak: 5.57 kW

Today's Energy

16.7kWh

Past 7 Days

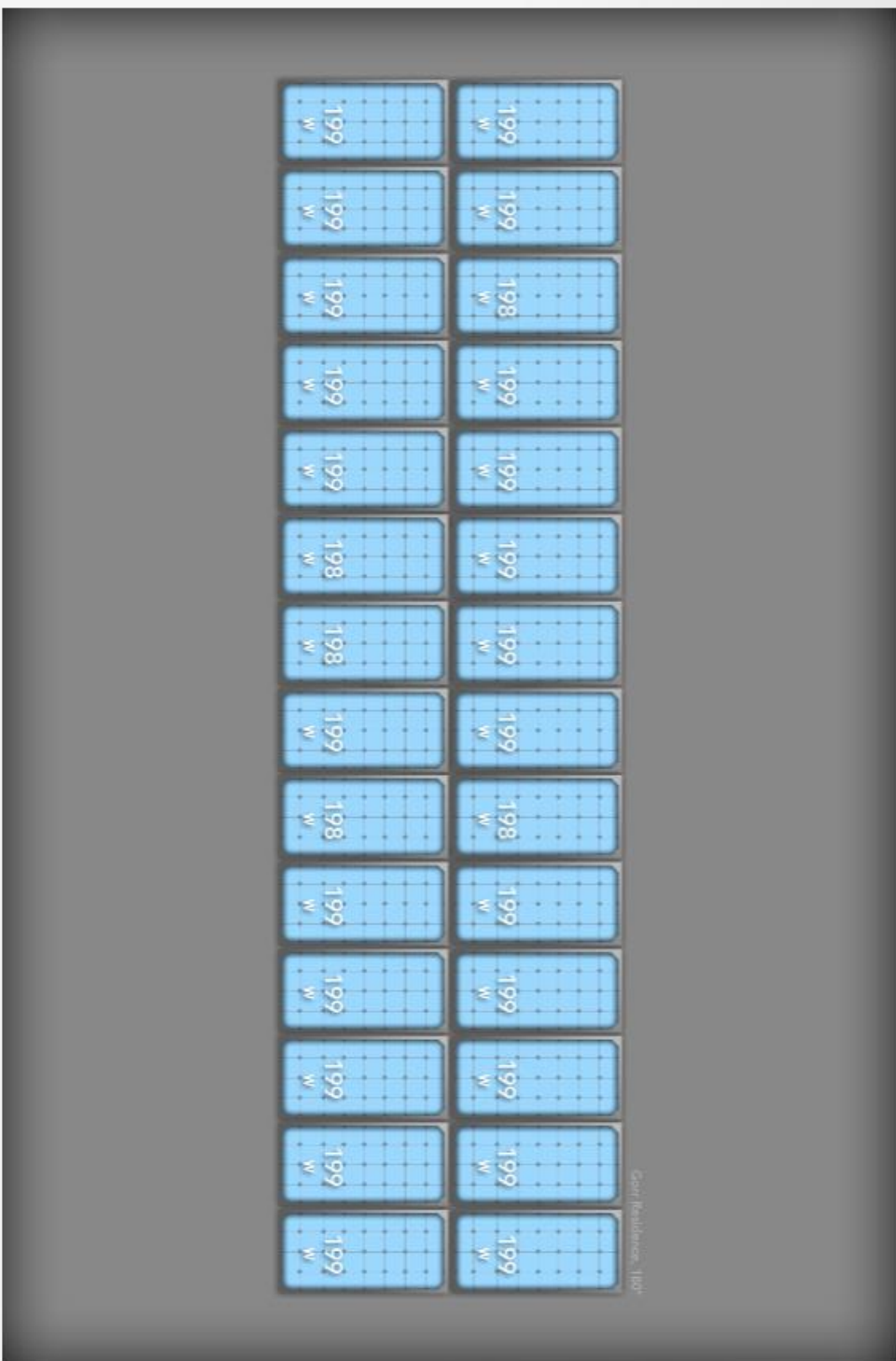
127kWh

This Month's Energy

241kWh

Lifetime Energy

241kWh



12:17
29 Apr 11
GMT-0500



Graphs

Lifetime

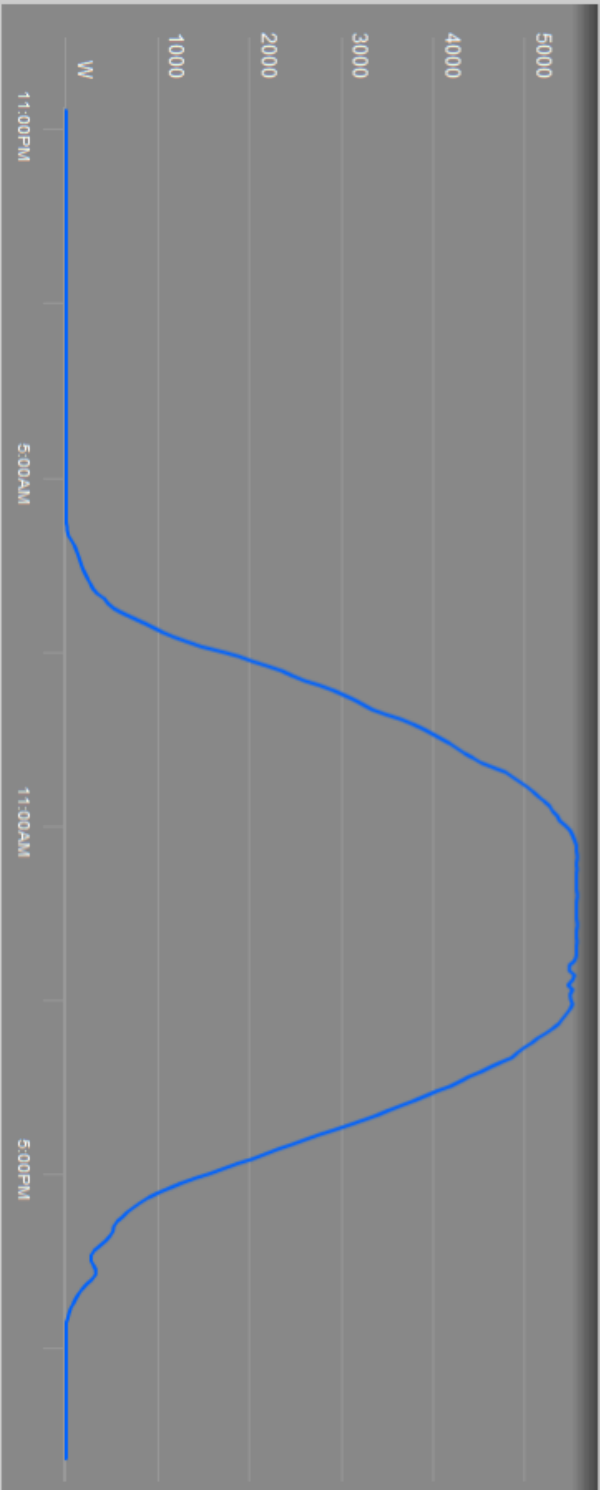
12 months

8 weeks

4 weeks

7 days

24 hours



Thu Apr 28 2011 10:36PM - Fri Apr 29 2011 10:18PM CDT Total Energy = 42.5 kWh

Power Produced
and
 None

Environmental Benefits to Date

Energy Produced:

241 kWh

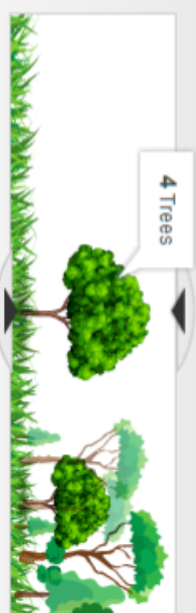
You could power the following for 1 day:



Carbon Offset:

367 lbs

You have offset the equivalent of:



Graphs

Lifetime

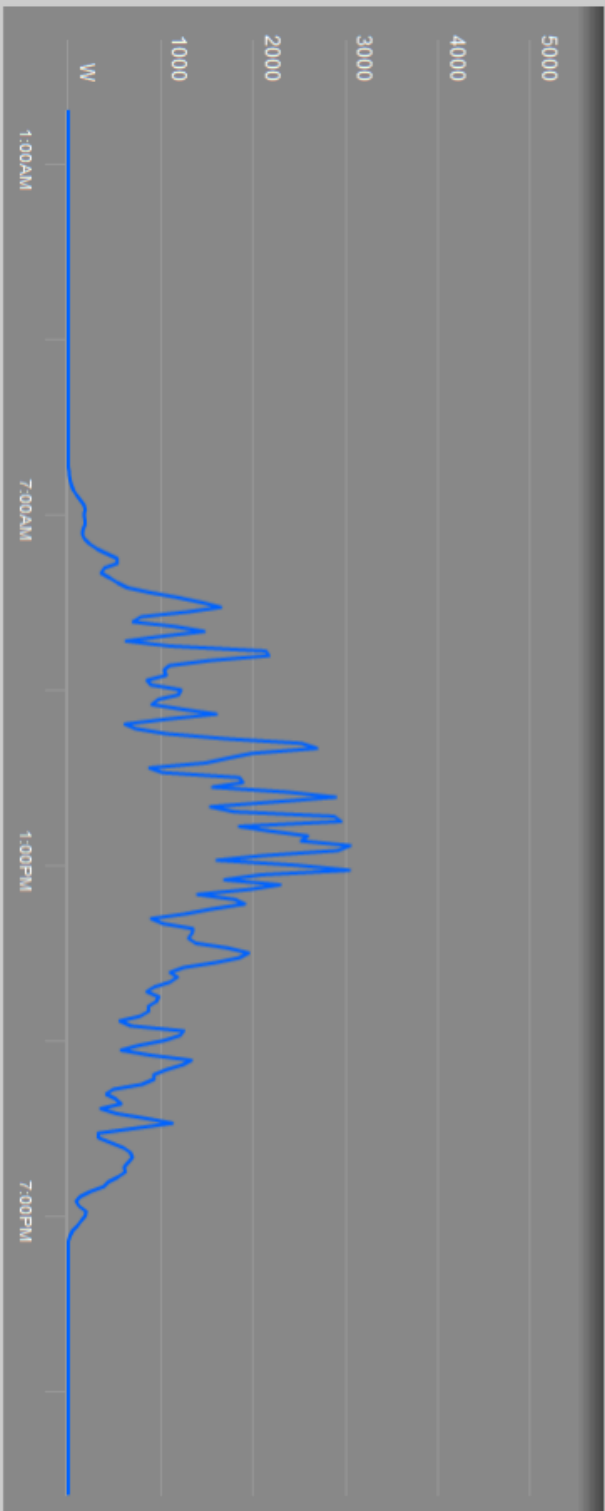
12 months

8 weeks

4 weeks

7 days

24 hours



Thu Apr 28 2011 0:04AM - Thu Apr 28 2011 11:47PM CDT

Total Energy = 14.0 kWh

Power Produced and None

Environmental Benefits to Date

Energy Produced:

241 kWh

You could power the following for 1 day:

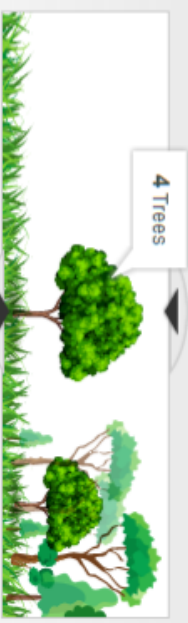


8 Houses

Carbon Offset:

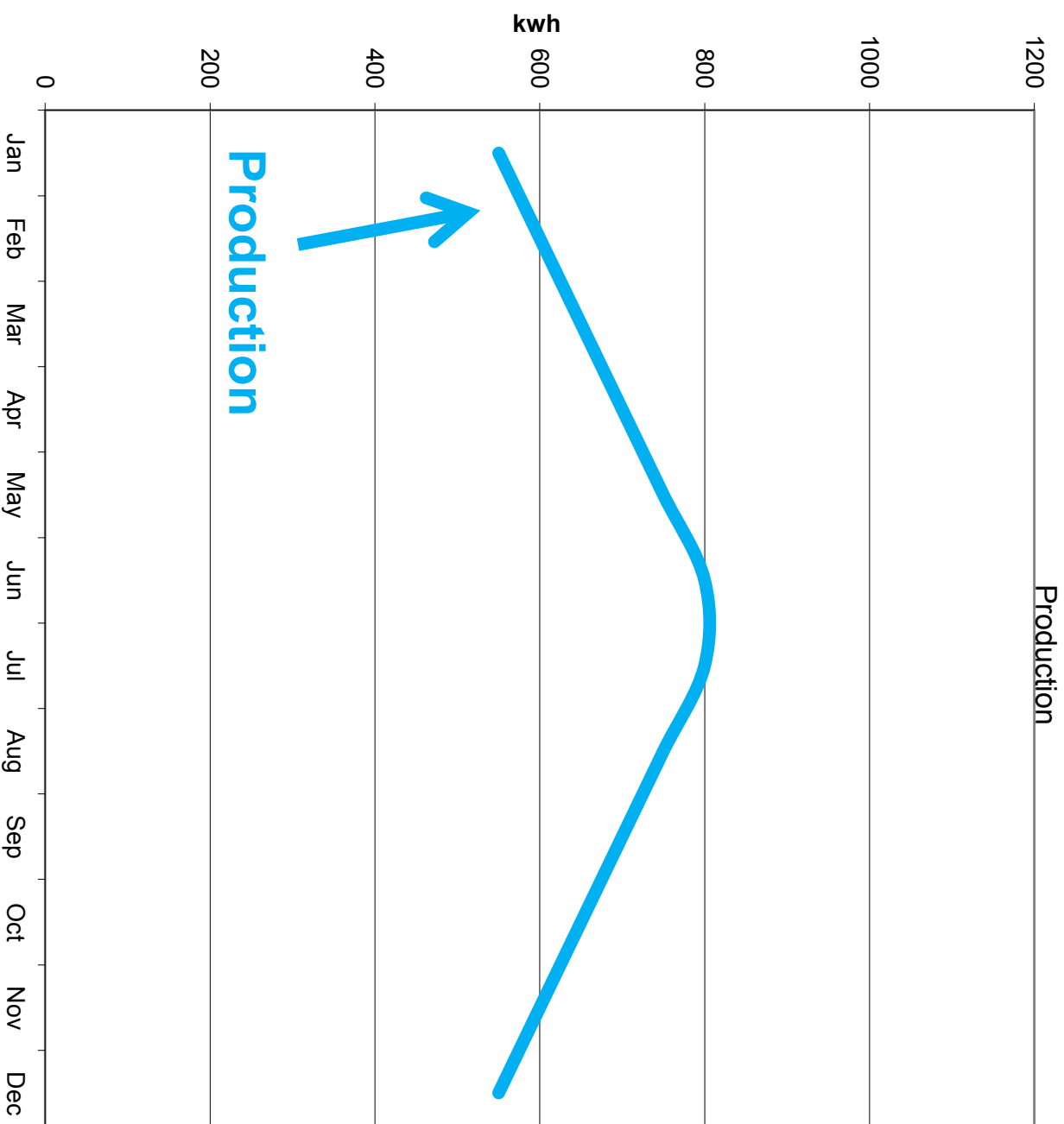
367 lbs

You have offset the equivalent of:

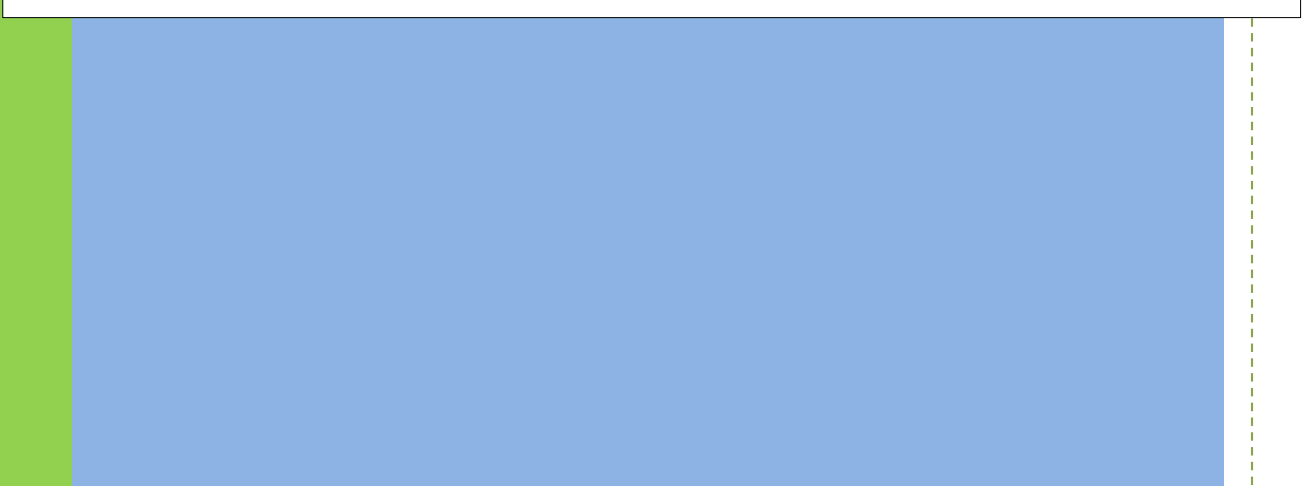
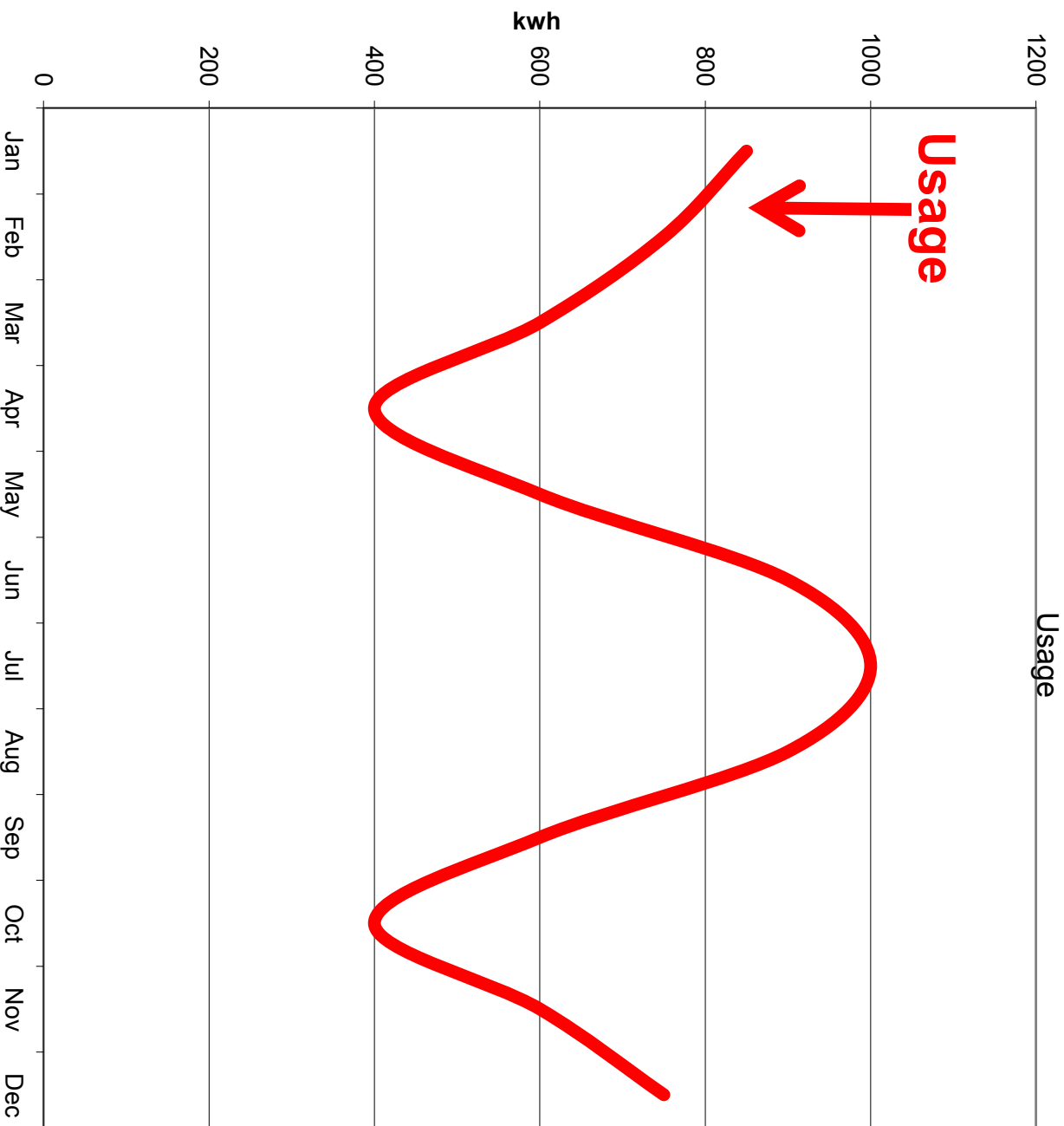


4 Trees

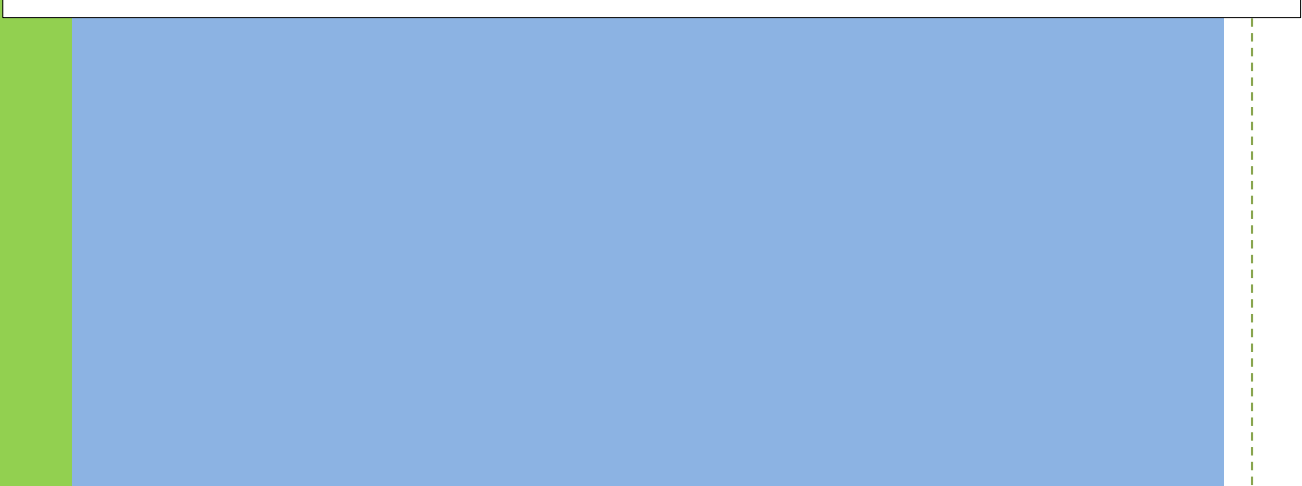
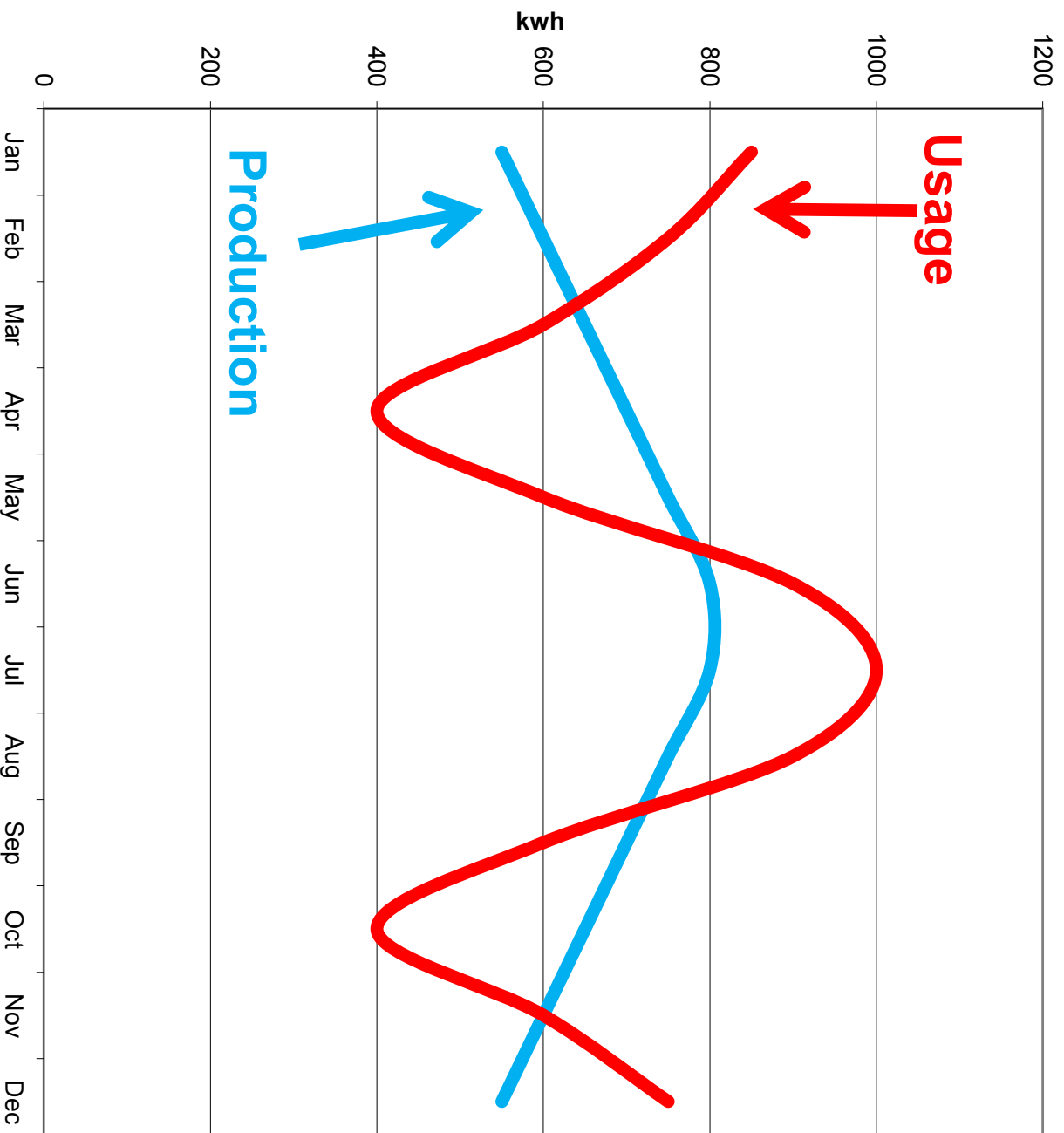
Production & Usage



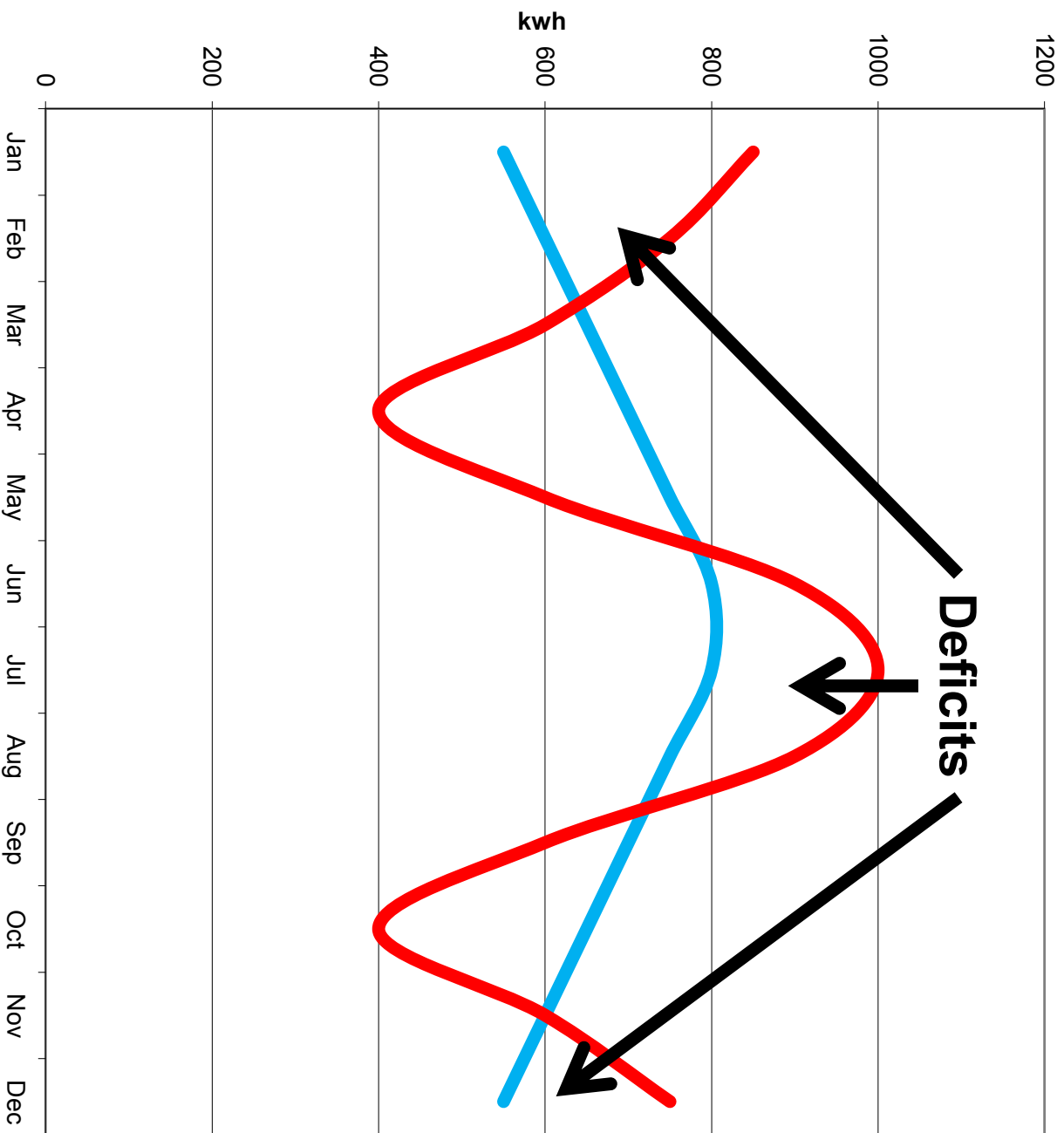
Production & Usage



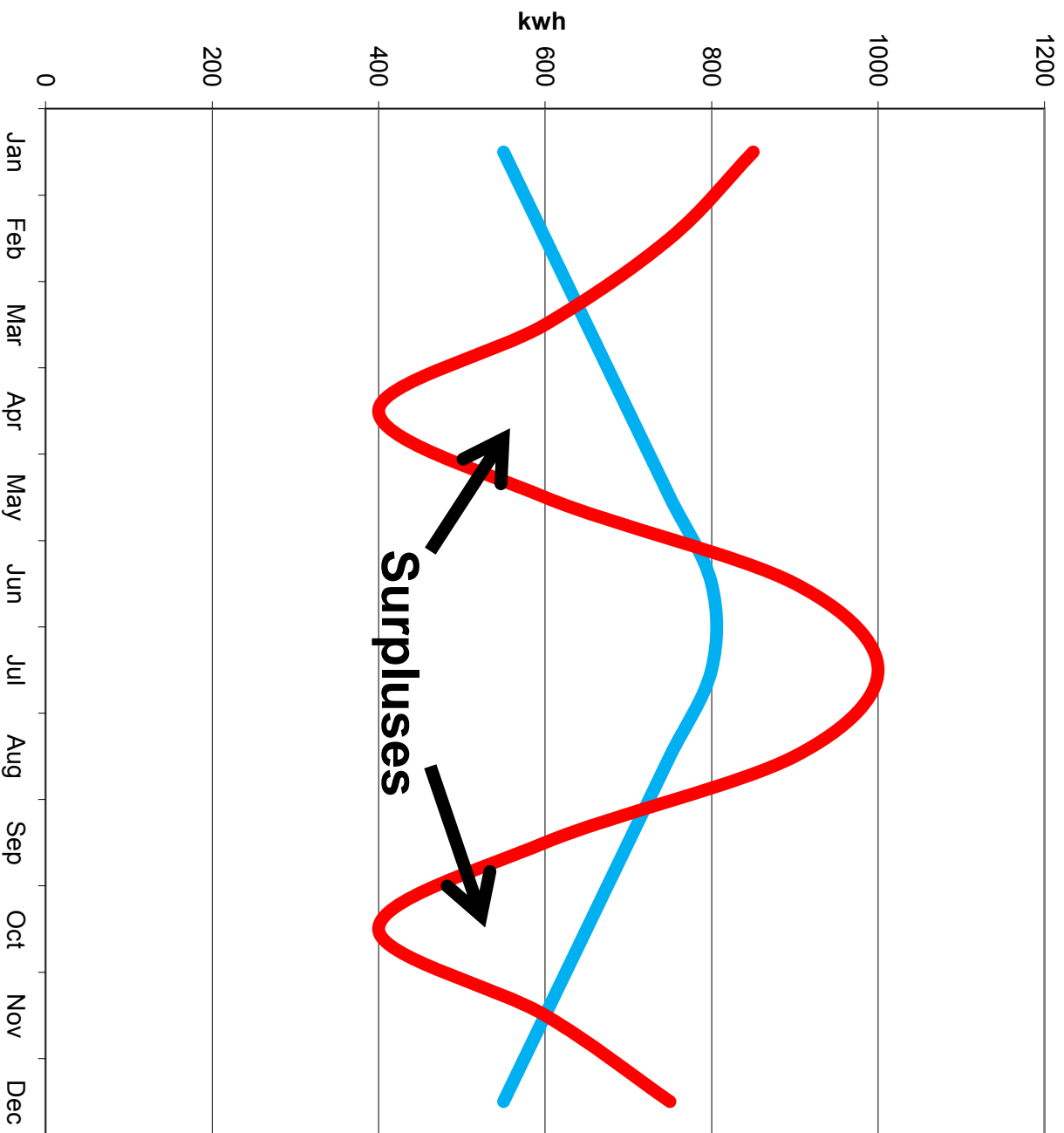
Production & Usage



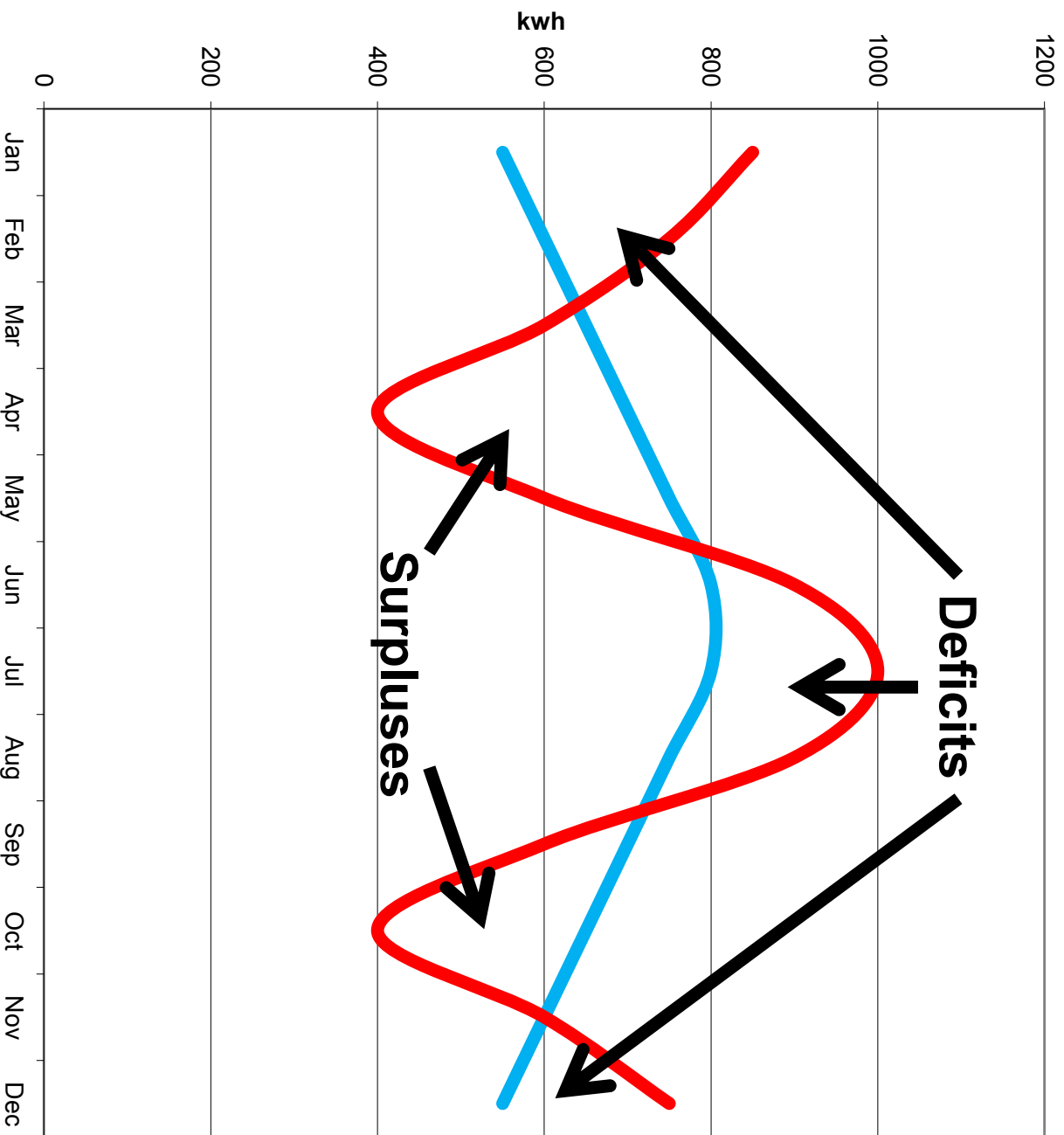
Production & Usage



Production & Usage



Production & Usage



GOAL
Have
surplus
match
deficit

My Production & Usage



Kilowatt Hours (kWh)			
	<u>Production</u>	<u>Usage</u>	<u>Net</u>
Jul	888	1106	-218
Aug	725	1063	-338
Sep	850	837	13
Oct	788	866	-78
Nov	522	666	-144
Dec	459	674	-215
Jan	531	839	-308
Feb	588	701	-113
Mar	664	567	97
Apr	855	522	333
May	775	604	171
Jun	1015	831	184
Total	8660	9276	-616
	93%		

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**



Financial Detail - 2011



Total Cost:	\$ 47,428 (6.72kw)
- Fed Tax Credit:	\$ 14,228
- State Rebate:	\$ 14,028
- SREC Sales:	<u>\$ 5,650</u>
Total:	\$ 13,522

I am paying a fixed rate of **6.8¢**
vs **10¢** (now) to **25.6¢** (in 25 years)

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

Financial Detail - 2017



Financial Detail - 2017



Financial Detail - 2017



Total Cost:	\$ 27,455 (6.93kw)
- Fed Tax Credit:	\$ 8,237
- SREC Sales:	<u>\$ 9,678</u>
Total:	\$ 9,540

Fixed rate of **4.2¢**

vs **11¢** (now) to **28.2¢** (in 25 years)

25 year electricity supply value: **\$ 38,500**

Savings: \$29,000



What is Community Solar?

Community Solar is a solar PV installation that provides energy, financial benefits, or both to members or "subscribers" through a voluntary program.

Community Solar isn't built on your own roof, but rather in your community.

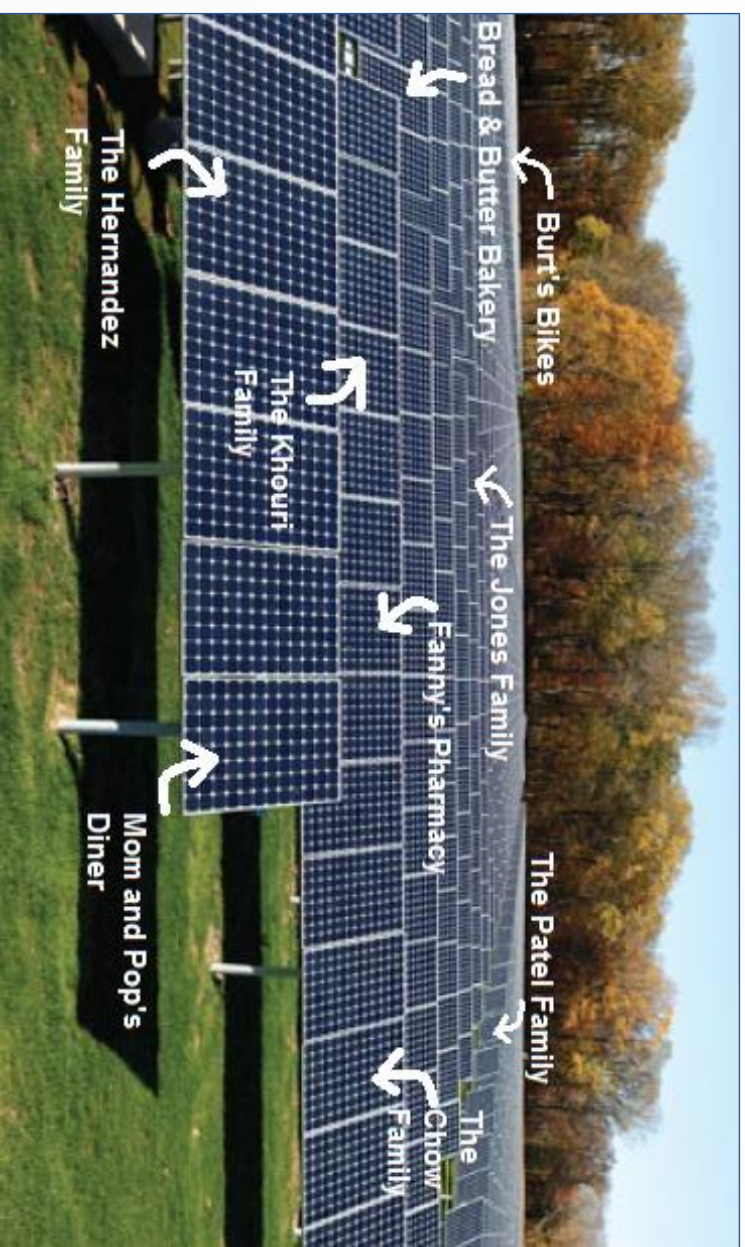
Saving money with community solar & Virtual Net Metering (VNM)



Community Solar - Solar Garden or Farm



- 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
- Systems do not have to be located near the entities they service, so suited for customers that can't install solar on their roof or property



<http://www.solarinthecommunity.com/>



More Solar News



- *Solsmart*
 - ✓ S. Barrington – Solsmart GOLD
 - ✓ Deer Park – pursuing Solsmart
- *Solarize Chicagoland*

Solar “Group Buy” that can provide additional savings. Administered by Citizens Utility Board (CUB). bit.ly/chi-solarize

Time to Act!



- ✔ 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 (PluginIllinois.org)
- ✔ Vote Climate Change issue
- ✔ Actively Support Clean Energy Policies
 - ✔ Thank you for FEJA!!



illinois solar
energy association

For more information visit

www.illinoissolar.org

peter.gorr@illinoissolar.org

