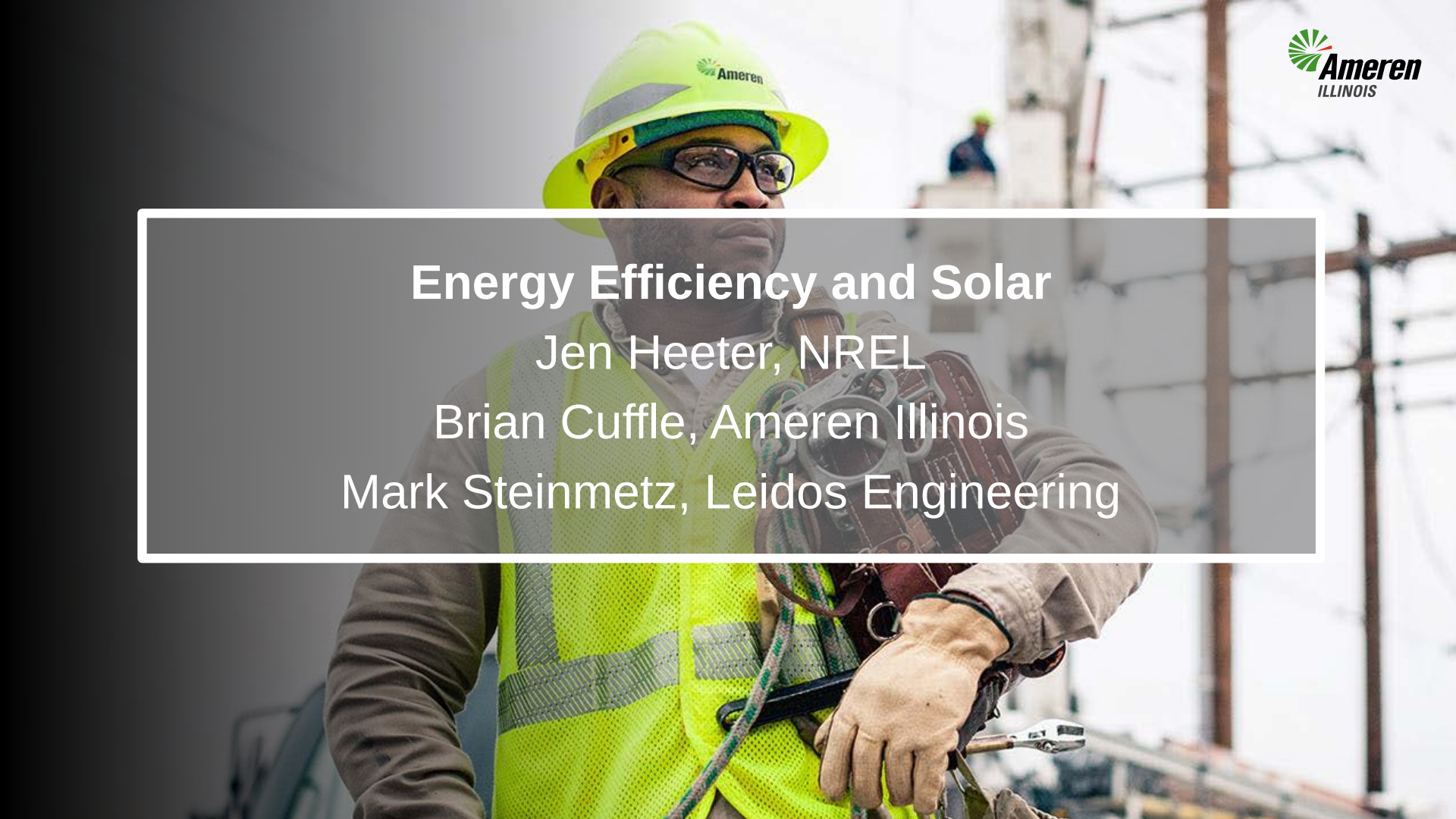


Energy Efficiency and Solar

Jen Heeter, NREL
Brian Cuffle, Ameren Illinois
Mark Steinmetz, Leidos Engineering

Ameren Illinois Energy Efficiency Programs: COVID-19

***AmerenIllinois**Savings.com/COVID-19*

***AmerenIllinois**Savings.com/Recovery*

AmerenIllinois.com/Recovery

- Resources on appropriate PPE
- Links to webinars with information on COVID-19
- Apply for Financial Assistance
- Explore Payment Options

For more information on financial assistance, contact Ameren Illinois at 1.800.755.5000.

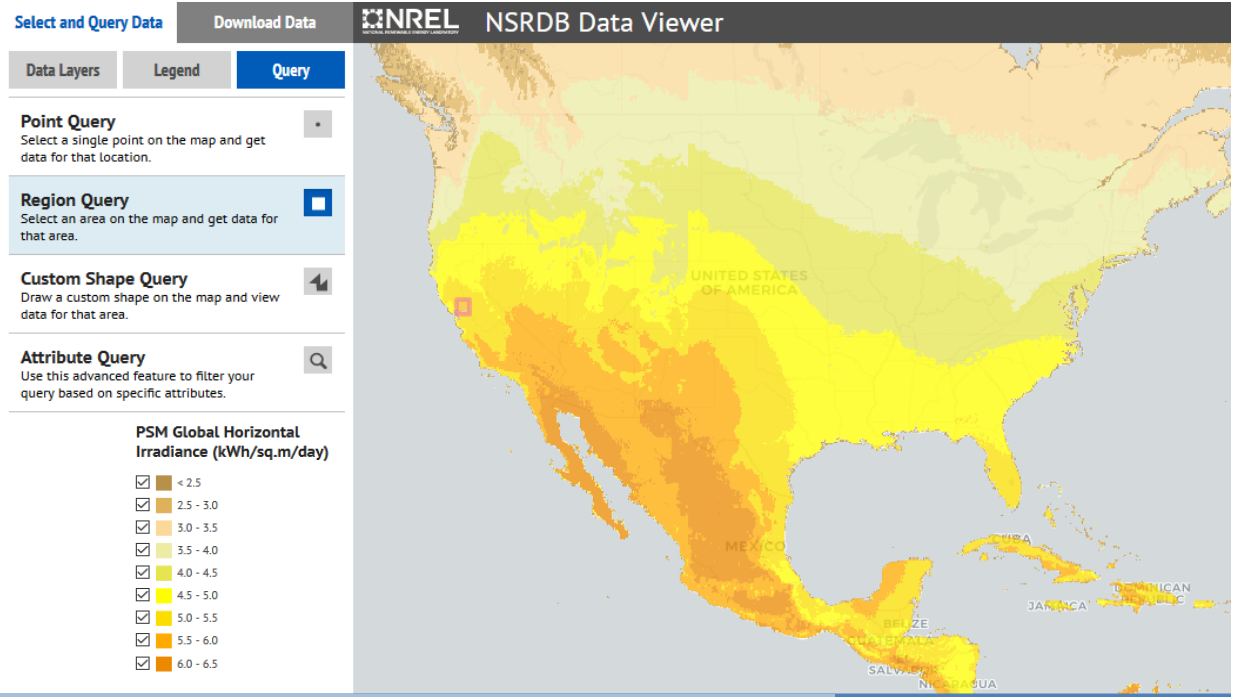
LEARNING OBJECTIVES

- Understand the different factors that impact the technical and economic potential of a PV project
- Understand the steps of the PV screening process
- Understand available tools

Drivers of PV Project Potential

WILL PV WORK FOR YOUR SITE?

SOLAR RESOURCE



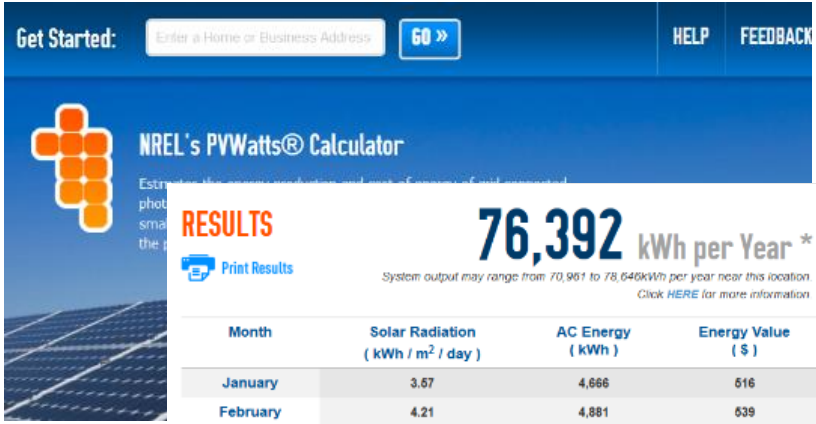
Where can I view my solar resource?

NSRDB Viewer

SOLAR RESOURCE

- PVWatts uses solar resource data and energy production models to estimate energy production from PV systems in a given location
- Users enter their location and PV system size in a simple interface

PVwatts
http://pvwatts.nrel.gov/



RESULTS

Print Results

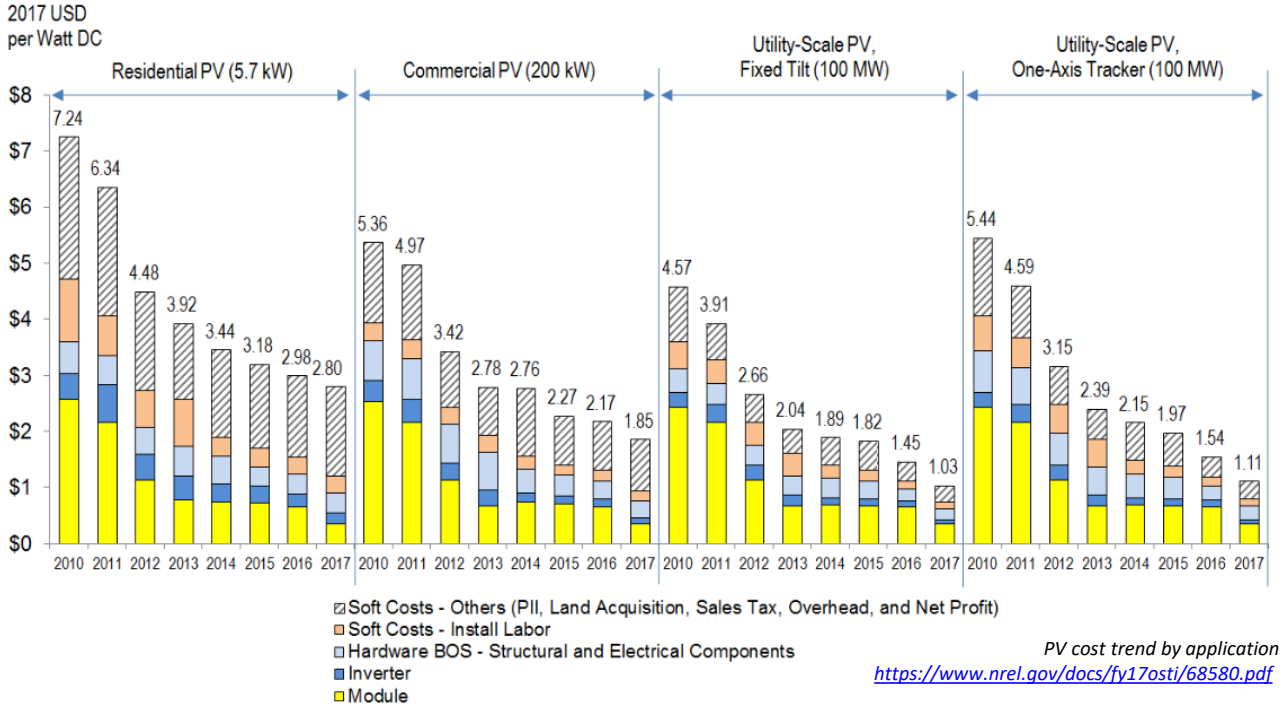
76,392 kWh per Year *

System output may range from 70,961 to 78,646kWh per year near this location.
Click HERE for more information.

Month	Solar Radiation (kWh / m² / day)	AC Energy (kWh)	Energy Value ($)
January	3.57	4,666	516
February	4.21	4,881	539
March	5.61	7,108	785
April	6.15	7,342	811
May	6.46	7,791	861
June	6.74	7,671	848
July	6.60	7,578	837
August	6.44	7,397	817
September	5.99	6,791	750
October	4.99	6,044	668
November	3.80	4,692	518
December	3.38	4,431	490
Annual	5.33	76,392	$ 8,440

Where can I estimate energy production from PV?

PV COSTS



PV cost trend by application
https://www.nrel.gov/docs/fy17osti/68580.pdf

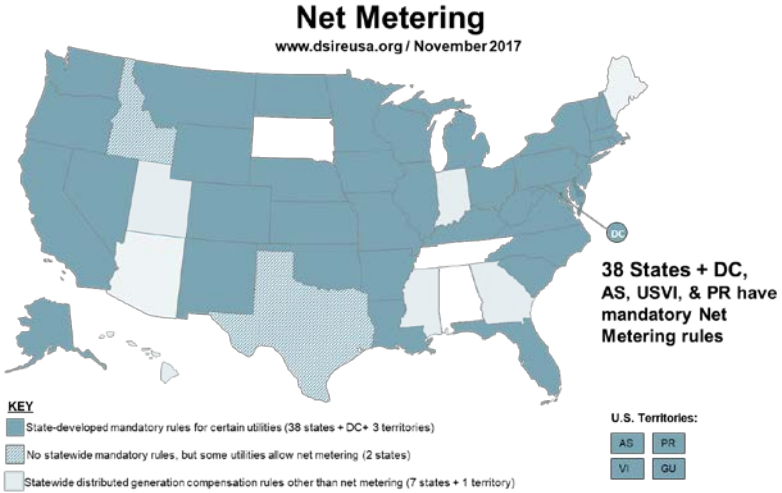
Annual Technology Baseline

Where can I find information about installed PV costs?

INCENTIVES

Incentive Type	How they work	Unit
Capacity	Based on the total installed size of the system	$/kW
Production	Based on electricity production	$/kWh
Net metering	Credit if generation exceeds load	kW

DSIRE



Where can I find information about installed PV incentives?

SPACE AVAILABLE FOR PV

Google Project Sunroof

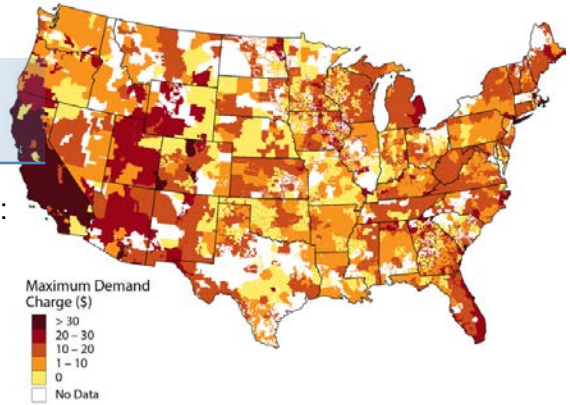
Where can I find information about how much PV I can install?

Utility Cost and Structure

Bill Component	How it's billed	How PV can help
Energy Charges	Amount of kWh consumed (can vary by time of day)	PV can reduce the kWh purchased
Demand Charges	Based on highest demand (kW)of the month	PV can reduce the kW if production coincides with monthly peak
Fixed Charges	Fixed cost per month	PV cannot offset these

Utility Rate Database
https://openei.org/wiki/Utility_Rate_Database

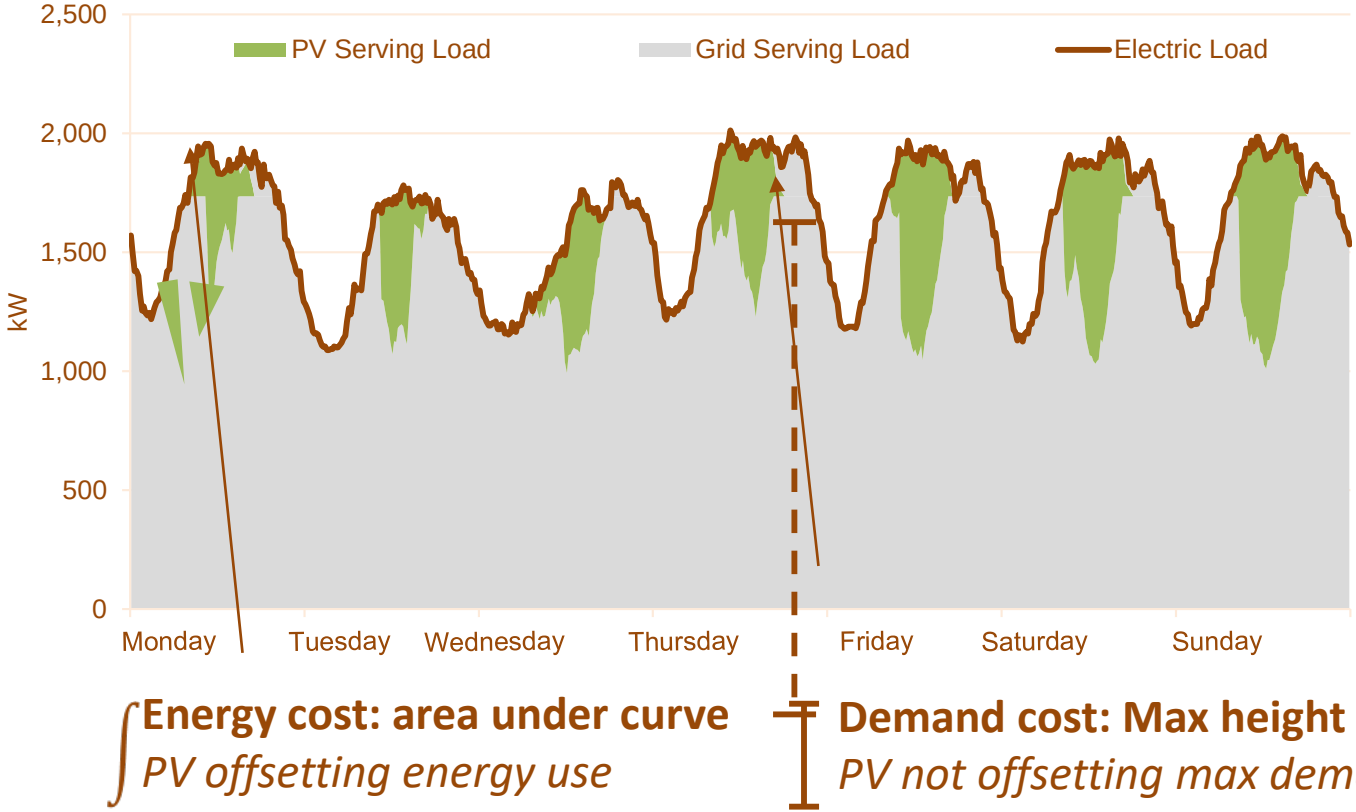
Other types of charges include:
- Minimum charge
- Departing load charge
- Standby charge



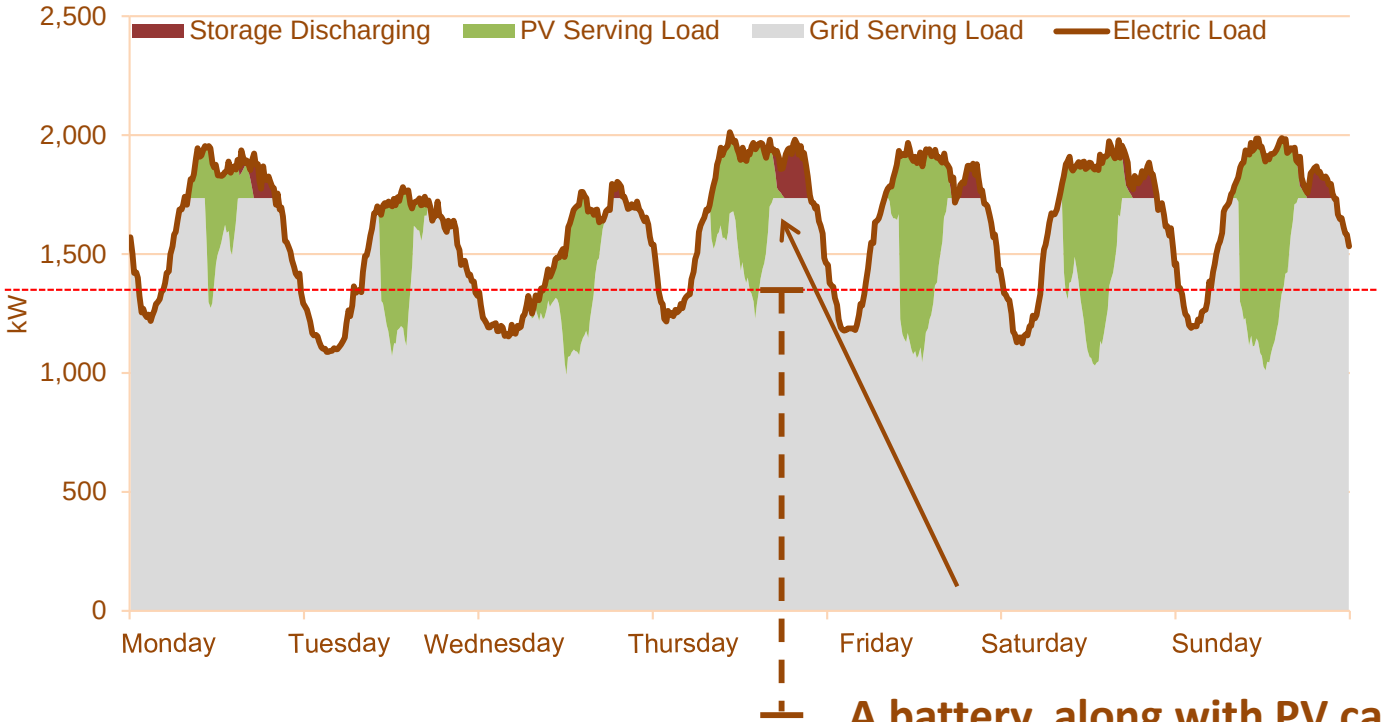
Maximum demand charge rates by utility service territory
https://www.nrel.gov/docs/fy17osti/68963.pdf

Where can I find information about my utility rate?

Example: Energy Savings from PV Generation



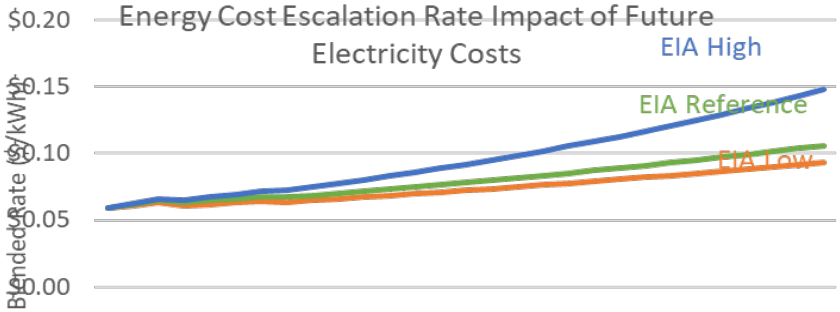
Example: Demand Savings from Battery Storage



A battery, along with PV can be used to lower demand costs

Financial Parameters

Parameter		Impacts on PV
Inflation Rate	General expected inflation rate	Future O&M costs
Utility Cost Escalation Rate	How electricity costs are expected to change	Costs that PV is offsetting
Discount Rate	Cost of money	Financing costs



$0.093/kWh-$0.152/kWh

EIA

Where can I find information about my financial parameters?

PV SCREENING STEPS

1. Define goals of analysis

2. Collect and review data

- Start with readily available data
- Obtain more detailed data if project appears feasible

3. Run analysis

Iterative process

- Adjust data and analysis goals if needed
- Run additional iterations to refine analysis

4. Identify sites for more in-depth assessment

TOOLS YOU CAN USE

PV analysis tools take into account the factors that impact project potential

Publicly available tools can be used to gauge initial potential, optimize system sizing & refine project economics

	Expertise and Effort needed	Required Inputs	Key Outputs
Distributed Generation Screening Maps	Low	• Location	• Map interface with geospatial layers • High-level economics
PVWatts Calculator	Low	• Location • System configuration	• PV energy generation (no economics)
REopt Lite Web Tool	Medium	• Location • Energy Consumption • Rate tariff	• Optimized system size and dispatch • High-level economics
System Advisor Model (SAM)	High	• Energy Consumption • Rate tariff • Detailed system configuration • Financing inputs	• Detailed technology performance • Detailed economic modeling

Thank you!

“DER”

Community Solar/Distributed Generation

Brian Cuffle, Ameren Illinois

ICC IL ADMIN CODE

Part 466 and Part 467 of the ICC IL Admin Code

- All Parallel Generation Interconnections must follow these rules
- PowerClerk – Applications Tool
- RenewablesIllinois@ameren.com

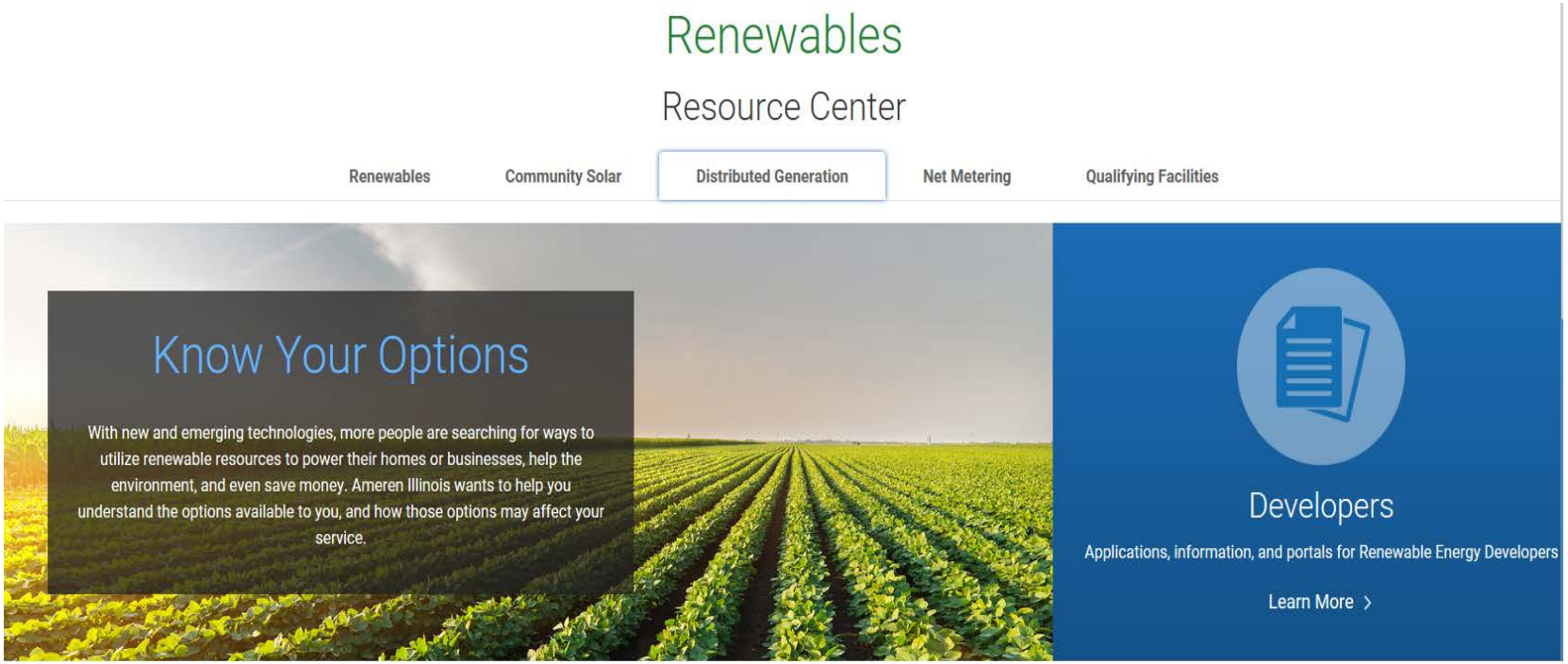
AMEREN ILLINOIS RENEWABLES

Renewables

Ameren Illinois wants to help you understand the options available to you, and how those options may affect your service.

Learn More >

AMEREN ILLINOIS RENEWABLES



Additional Needed Documents:

- Installer Certification
- Certificate of Completion
- Interconnection Applications Tool. Currently only for Pre-Applications and Level 1 (up to 25 kW) applications.
- Standard Distribution Generation Interconnection Agreement
- Level 1 Interconnection Application Guide
- Register a New PowerClerk Account Guide
- Click here to view FAQs and more Interconnection information provided as part of an Illinois Commerce Commission Staff-initiated workshop.
- Blank W-9 Form
- Illinois Distributed Generation Rebate Application Please note that netting of delivery service charges and taxes ceases once a Distributed Generation rebate is received.

AMEREN ILLINOIS STATISTICS

April 1, 2008 to February 1, 2016

- 469 total net metering customers with 2999.169 kw load
- 366 residential customers with 1985.274 connected
- 103 non-residential customers with 1013.895 kW connected

AMEREN ILLINOIS STATISTICS

April 1, 2008 to January 1, 2020

- 2886 total net metering customers with 46063.5 kw load
- 2328 residential customers with 22,200.56 kW connected
- 558 non-residential customers with 23862.94 kW connected

AMEREN ILLINOIS STATISTICS

April 1, 2008 to August 1, 2020

- 4256 total net metering customers with 83568.66 kw load
- 3450 residential customers with 33098.5 kW connected
- 806 non-residential customers with 50470.16kW connected

AMEREN ILLINOIS STATISTICS

Last 5 years numbers:

- 2019 - 1373
- 2018 – 506
- 2017 – 308
- 2016 – 169
- 2015 – 96

INCREASED INSTALLATIONS

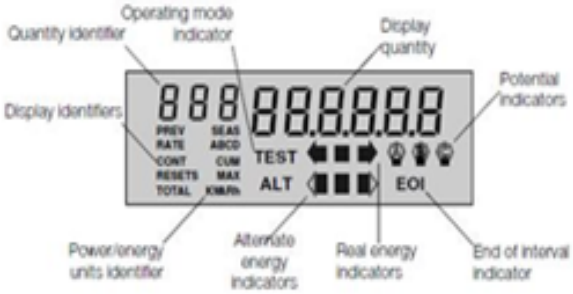
Main reason for more installations?

- Illinois REC program
  - FEJA Law
    - Community Solar
    - Smart Inverter Rebate

NET METERING

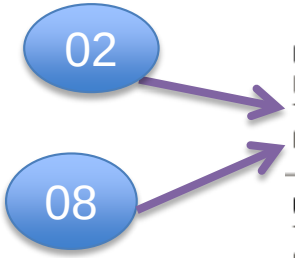
Normal Behind The Meter – Net Metering

Distributed Generation Meter Display



KWH	Dial	02
On Pk KWH	Dial	03
On Pk KW	Dial	04
Off PK KW	Dial	05
KWH OUT	Dial	08

BILLING WITHOUT CARRYOVER



Electric Meter Read for 09/19/2019 - 10/22/2019 (33 days)

READ TYPE	METER NUMBER	CURRENT METER READ	PREVIOUS METER READ	READ DIFFERENCE	MULTIPLIER	USAGE
Total kWh	72049851	1206.0000 Actual	0.0000 Actual	1206.0000	1.0000	1206.0000
kWh Out	72049851	935.0000 Actual	0.0000 Actual	935.0000	1.0000	935.0000

Usage Summary

Total kWh	1206.0000	Summer kWh	402.0000
Non-Summer kWh	804.0000	On-Site Excess Gen kWh	-935.0000
Delivery Net Total kWh	271.0000	Del Prior Carryovr Gen	0.0000
Delivery Net Billable kWh	271.0000	Delivery Carryovr Gen kWh	0.0000
Del Net Summer kWh	90.0000	Del Net Non-Summer kWh	181.0000
Supply Net Total kWh	271.0000	Supply Prior Carryovr Gen	0.0000
Supply Net Billable kWh	271.0000	Supply Carryover Gen kWh	0.0000
Supply Net Summer kWh	90.0000	Supply Net NonSummer kWh	181.0000

BILLING WITHOUT CARRYOVER

Net Metering-Method A/C-Non-TOU

	CHARGE DESCRIPTION	USAGE	UNIT	RATE	CHARGE
Electric Delivery	Customer Charge				$8.06
Ameren Illinois	Meter Charge				$5.74
DS-1 Residential Delivery	Distribution Delivery Charge Summer	90.00	kWh	@ $ 0.05121000	$4.61
Service	Distribution Delivery Charge Non-Summer	181.00	kWh	@ $ 0.02997000	$5.42
				Electric Delivery	**$23.83**
Electric Supply	Purchased Electric Summer	90.00	kWh	@ $ 0.03329000	$3.00
Ameren Illinois	Purchased Elec Non-Summer 0-800 kWh	181.00	kWh	@ $ 0.03485000	$6.31
BGS-1 Basic Generation	Purchased Electricity Adjustment	271.00	kWh	@ $-0.00291665	$-0.79
Service	Supply Cost Adjustment	271.00	kWh	@ $ 0.00058664	$0.16
	Transmission Service Charge	271.00	kWh	@ $ 0.01172000	$3.17
				Electric Supply	**$11.85**
Taxes and Other Fees	Clean Energy Assistance Charge	271.00	kWh	@ $ 0.00176000	$0.48
	Renewable Energy Adjustment	271.00	kWh	@ $ 0.00181000	$0.49
	EDT Cost Recovery	271.00	kWh	@ $ 0.00128820	$0.35
	Energy Efficiency Programs Charge	271.00	kWh	@ $ 0.00115000	$0.31
	Spaulding Municipal Tax				$0.85
	Illinois State Electricity Excise Tax				$0.89
				Total Tax Related Fees	**$3.37**
				Total Electric Charges	**$39.05**

BILLING WITHOUT CARRYOVER

Electric Meter Read for 04/22/2019 - 05/22/2019 (30 days)

READ TYPE	METER NUMBER	CURRENT METER READ	PREVIOUS METER READ	READ DIFFERENCE	MULTIPLIER	USAGE
Total kWh	72049851	727.0000 Actual	0.0000 Actual	727.0000	1.0000	727.0000
kWh Out	72049851	845.0000 Actual	0.0000 Actual	845.0000	1.0000	845.0000

Usage Summary

Total kWh	727.0000	Non-Summer kWh	727.0000
On-Site Excess Gen kWh	-845.0000	Delivery Net Total kWh	-118.0000
Del Prior Carryovr Gen	0.0000	Delivery Net Billable kWh	0.0000
Delivery Carryovr Gen kWh	-118.0000	Supply Net Total kWh	-118.0000
Supply Prior Carryovr Gen	0.0000	Supply Net Billable kWh	0.0000
Supply Carryover Gen kWh	-118.0000		

Net Metering-Method A/C-Non-TOU

	CHARGE DESCRIPTION	USAGE	UNIT	RATE	CHARGE
Electric Delivery Ameren Illinois DS-1 Residential Delivery Service	Customer Charge				$8.20
	Meter Charge				$5.74
				Electric Delivery	**$13.94**
Electric Supply Ameren Illinois BGS-1 Basic Generation Service	Purchased Electricity Adjustment	0.00	kWh	@ $-0.00178399	$0.00
				Electric Supply	**$0.00**
				Total Electric Charges	**$13.94**

Questions?

Brian Cuffle, Ameren Illinois

bcuffle@ameren.com

1.217.535.5073

Energy Efficiency Programs

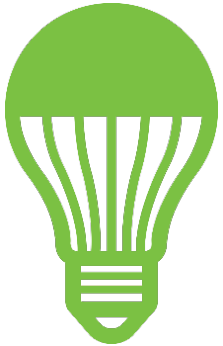
Benefits of doing of Energy Efficiency Upgrades when Considering Renewable Systems

- Reduces your energy demand and usage
- Saving energy is less expensive than producing energy
- Energy efficiency can potentially reduce your system size and lower your initial system cost
- Energy efficiency projects typically have a faster payback
- Enhanced quality or processes in most cases
- Increased life cycles and lower maintenance cost on equipment
- Lowered usage regardless of the energy source

Ameren Illinois Energy Efficiency Program

Some common energy efficiency opportunities are:

- Replace your existing lighting with LEDs
- Upgrade your HVAC Systems
- Optimize Compressed Air or Chiller Systems
- Consider Custom Projects or Process improvements
- Cash incentives from the Ameren Illinois Energy Efficiency Program
  - Lower project costs
  - Quicker ROI



Business Program Incentives

Lighting

Compressed Air

Custom*

Heating & Cooling (HVAC)

Steam Traps

Retro Commissioning*

Variable Frequency Drives

Specialty Equipment

New Construction*

* Requires Pre-Approval

Lighting

LED's use 80% less energy and last 25X longer!

Standard Program

- Based on watts reduced
- Application
- Additional bonuses may apply
- No quantity limit

Online Store

- Specialty bulbs
- Smart thermostats
- Quantity limits
- Free shipping

Instant Incentives

- Purchase from distributer
- No paperwork involved
- Up to **80%** off retail
- No quantity limit

Instant INCENTIVES from Ameren Illinois

Small Business Direct Install

- FREE Lighting Assessment - NO Obligation
- Incentives Include:
  - Lighting (Interior & Exterior)
  - LED Tubes
  - LED Fixtures
- Installation performed by an Ameren Illinois Program Ally
- Additional Ameren Illinois Business Program Incentives may help you save even more!

Small Business Program in 2019

Energy Analyzer

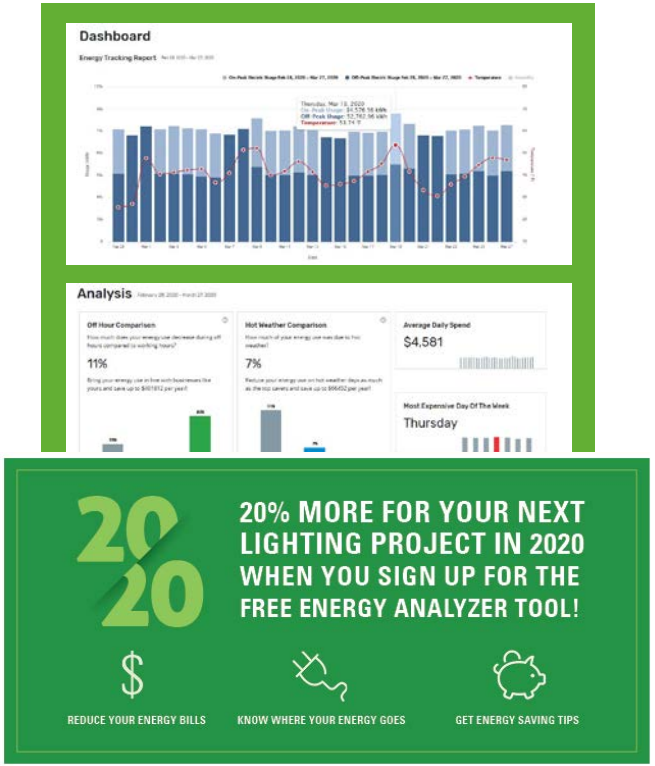
With the Ameren Illinois Energy Efficiency Program, you can now manage your energy usage online!

This **FREE** online tool allows you to:

Save - Get energy savings tips to help identify energy efficiency opportunities

Gain Insight - Learn where your business uses the most energy

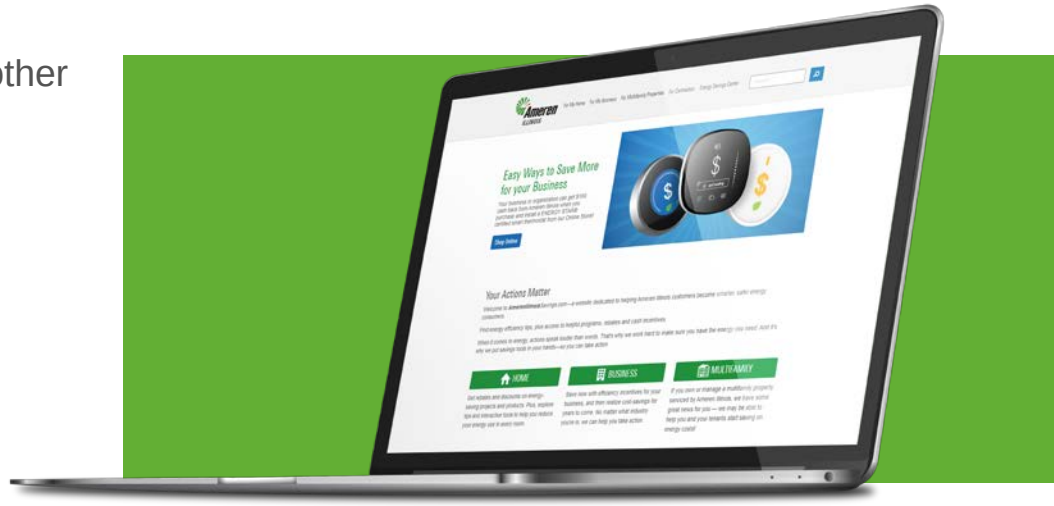
Collaborate - Share energy savings recommendations with co-workers



Register for **FREE** today at ***AmerenIllinois**Savings.com/Engage*

AmerenIllinoisSavings.com

- Website always has the most up-to-date information on incentives
- Find applications, application guides, and other necessary forms
- View videos, case studies, and other educational content
- Program contact information
- Monthly newsletter

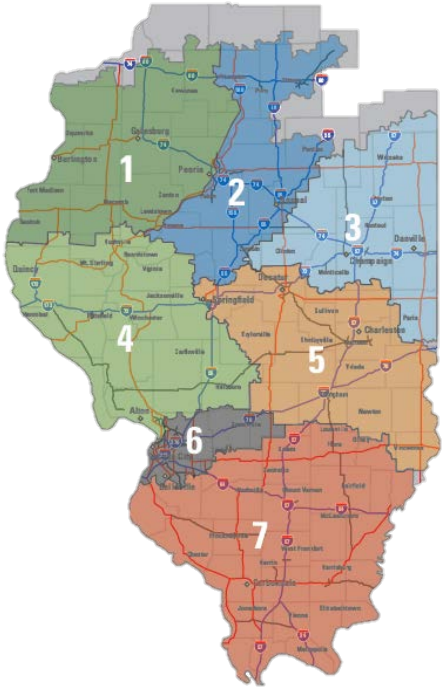


Business Online Store

- ***AmerenIllinois****Savings.com/OnlineStore*
- ***Must be an Ameren Illinois electric non-residential customer***
- LED bulbs, occupancy sensors, and advanced power strips
- LED bulbs starting at $1.00!
- **Smart Thermostats – SMART2020**
- **FREE** Shipping!

Ameren Illinois Energy Advisors

- Free site walk-throughs and consultations
- Assist customers by locating energy efficiency needs
- Assist with application process
- Project consultation
- To request a **FREE** Energy Consultation
  - **1.866.800.0747**
  - ***AmerenIllinois**Savings.com*



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Program Allies

- Contractors who have registered and received training from Ameren Illinois
- Familiar with application forms and processes
- Help customers complete energy efficiency projects
- Illinois Commerce Commission certified
- Look for a Program Ally by visiting ***AmerenIllinois****Savings.com* and click on “Find a Contractor”
- Interested in becoming a Program Ally?
  - “For Contractors” tab of the website

The 2020 Ameren Illinois

Business Symposium

VIRTUAL

OCT. 21 & 22 ⋮ VIRTUAL

Attend this 2-day VIRTUAL event where you will:

- Be the first to learn about our newest Energy Efficiency Program offerings and cash incentives to move your projects forward
- Attend up to 9 breakout sessions designed to help you learn how to implement energy-saving ideas
- Receive a bonus coupon, up to 15%, potentially worth thousands in additional incentive dollars
- Interact with Program Staff and Program Allies who can answer your questions

Register Now!

***AmerenIllinois**Savings.com/Symposium*

Discover why thousands of customers have turned to this award-winning event for energy-saving solutions.

- Connect with trusted energy professionals
- Gain additional financial incentives
- Move your next energy efficiency project forward

Keynote Speaker

Dr. Nora Wang

Pacific Northwest National Laboratory

Sharing insights about “Energy Efficiency, Healthy Buildings, and Productive Employees”

Residential Incentives

*AmerenIllinois*Savings.com/For My Home

Lighting

Smart Thermostats

Home Efficiency

Heating & Cooling

Appliance Recycling

Multifamily Properties

QUESTIONS?

AmerenIllinoisSavings.com