

OPALCO Community Solar

Overview and Comparison to Rooftop Solar

What is community solar?



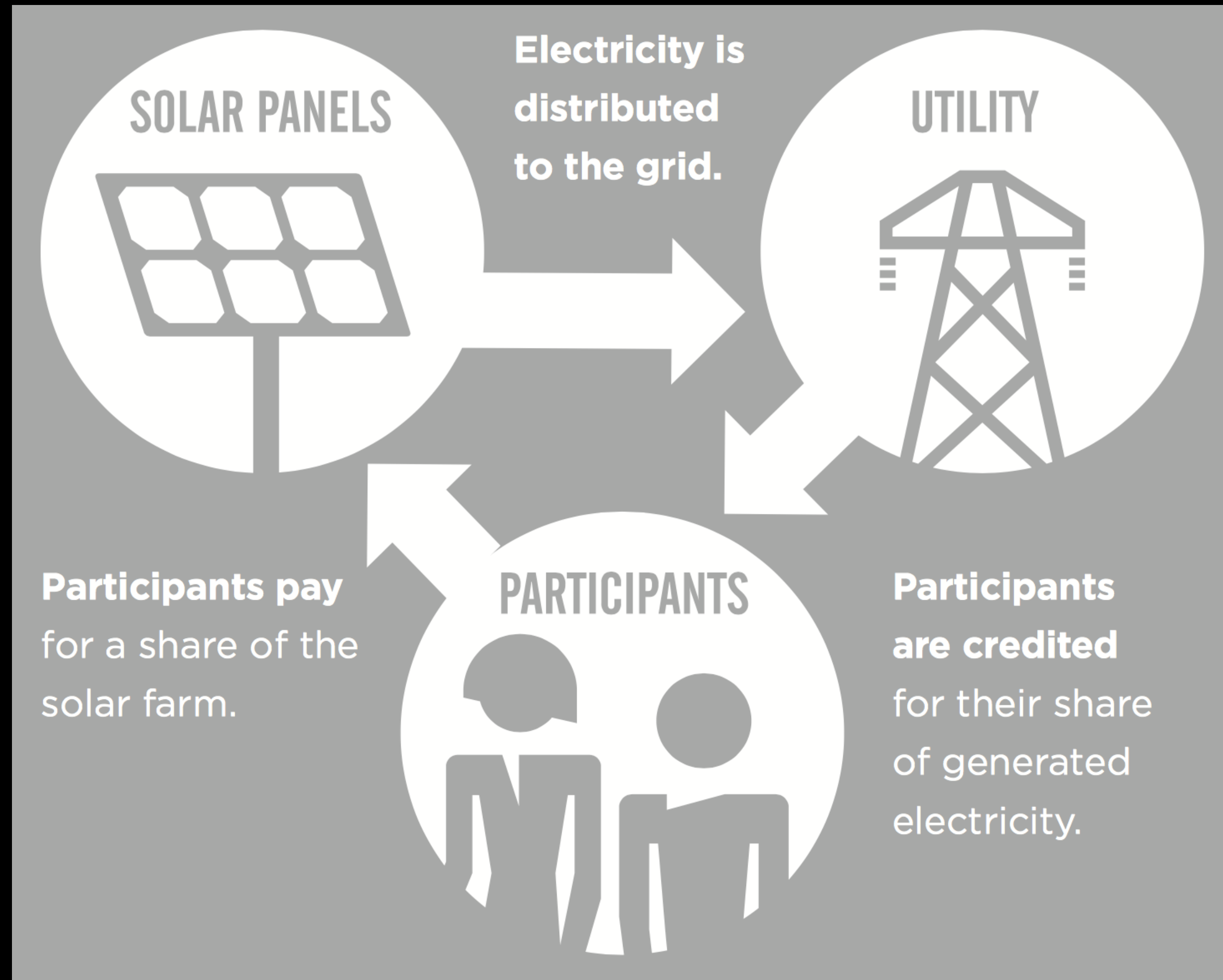
your
neighbors
panels

your
panels

*It's a community-owned solar array, **shared** by many homes and businesses, **optimally sited** to maximize sun exposure, professionally operated, maintained and insured.*

*Community solar offers an **easier** more **affordable** way for virtually anyone to go solar, without installing solar panels on their roof.*

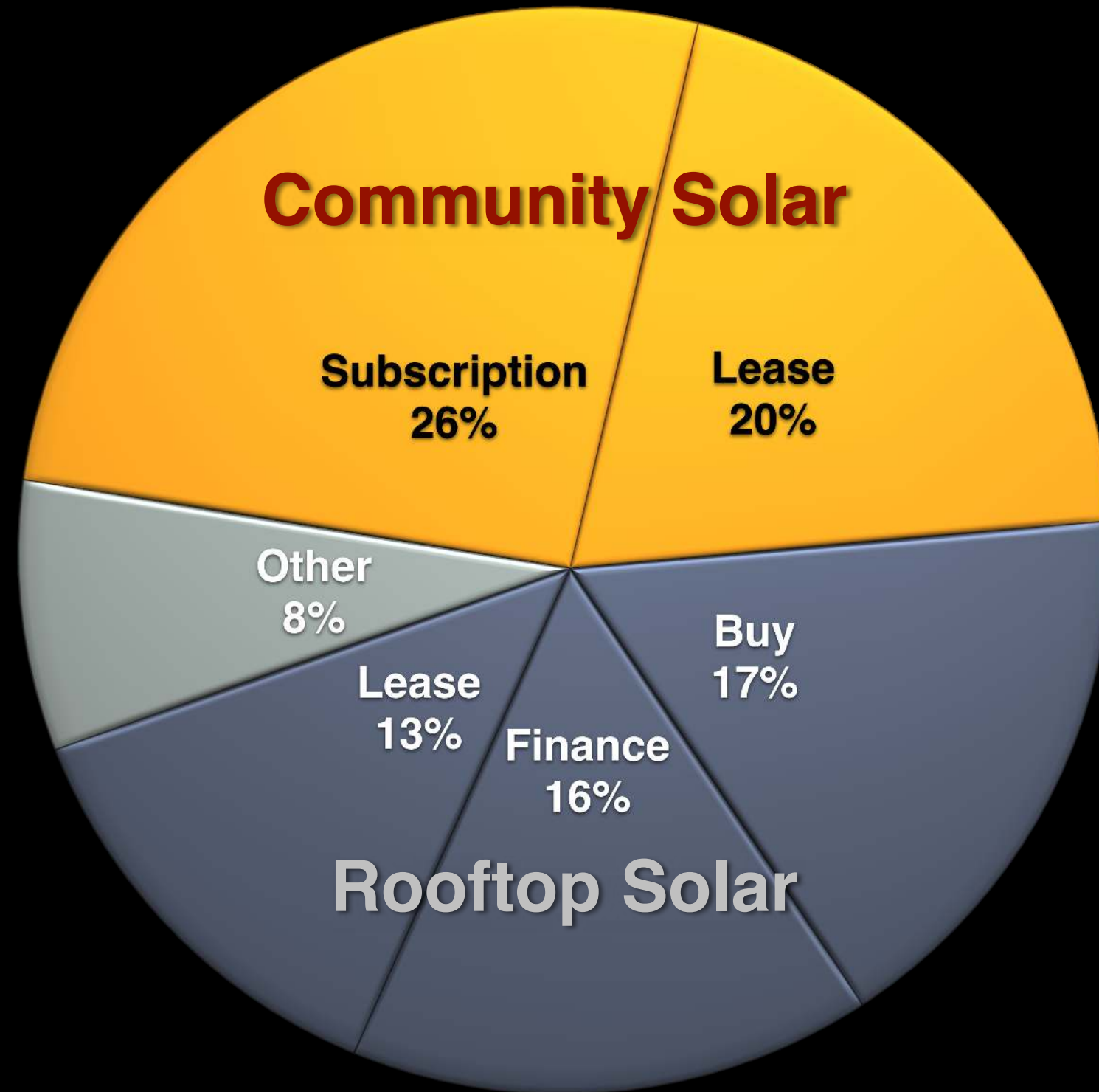
How does it work?



*You buy a **share** of the solar array.*

*Electricity generated by your share of the array is **credited** to your OPALCO bill.*

US Homeowner Solar Survey



*While rooftop and community solar are of equal interest to homeowners, community solar is appealing to people who want to **lower their electric bill, start small and have no maintenance.***

When considering community versus rooftop solar approaches, the **top two** preferences were for community solar **subscription** and **lease** programs.

The #1 reason homeowners consider solar

“I want to lower my monthly energy costs.”

Community Solar: Simple, Easy, More Affordable...

What are community solar benefits compared to rooftop solar?

✓ Simple

- we maintain and operate it
- no maintenance, cleaning, permitting, rooftop issues,...
- no modifications to your home, roof or shade trees

✓ Easy

- start small, as small as a portion of a single panel
- works for homes, businesses, renters,...
- easily transferred if you sell your home or move

✓ More Affordable

- economy of scale - community array is 40 times larger than typical rooftop array
- produce 10 to 15 percent more than typical rooftop systems

*Community solar offers an **easier** more **affordable** way for virtually anyone to go solar, without installing solar panels on their roof.*

While many co-op members are interested in solar energy, only about 27% of residential rooftops are **suitable** for hosting a solar array, and many members want to preserve their **shade trees**.

Even if the sun is good, many people **rent**, don't want the solar array to effect the home **aesthetic**, want to **start small**, or can't afford the **upfront costs** of rooftop solar.

Community Solar: Tree Friendly

With climate change, shade trees become increasingly important.



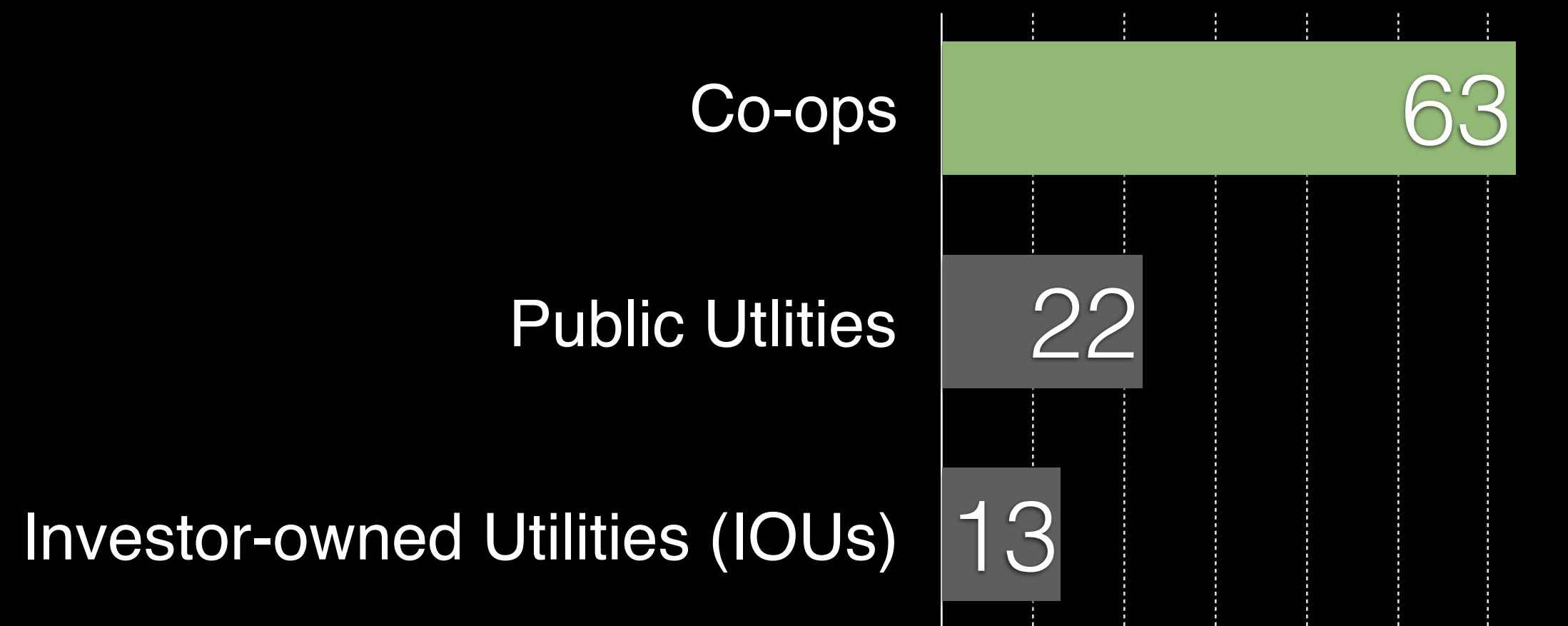
OPALCO installs its community solar arrays in existing open areas, with optimal solar exposure, minimizing impact to trees and forests.

Global warming means hotter summers. Direct sun can significantly heat homes and businesses.

Shade trees help keep you more comfortable in the summer, through passive cooling. This can save 25 to 40 percent of energy used for air conditioning.

Electric Co-ops Are Leading The Way

Community Solar Projects



Electric co-ops such as OPALCO were formed to serve rural communities, providing member-owned nonprofit services that help the community prosper.

How much will you save on your annual electric cost?

When you buy a share of the Community Solar array, the cost and the credit on your electric bill depend on how many watts of the array you buy. Here are some typical numbers to help you calculate how much you would save on your electric bill.

You can buy a share of the community array in **75 watt units**.

The cost is **\$150 per unit (\$2 per watt)**

Over the 20 year life of the Community Solar program, each **unit** would generate over **1,640 kWh** of solar energy, credited to your bill.

At current rates, that's a total of about **\$226** credited to your bill **over 20 years, per unit**. As rates go up, the credit goes up too.

That includes about 4 to 5 years of a WA state production incentive. And we take care of all the maintenance, cleaning, and repairs. **Care-free!**

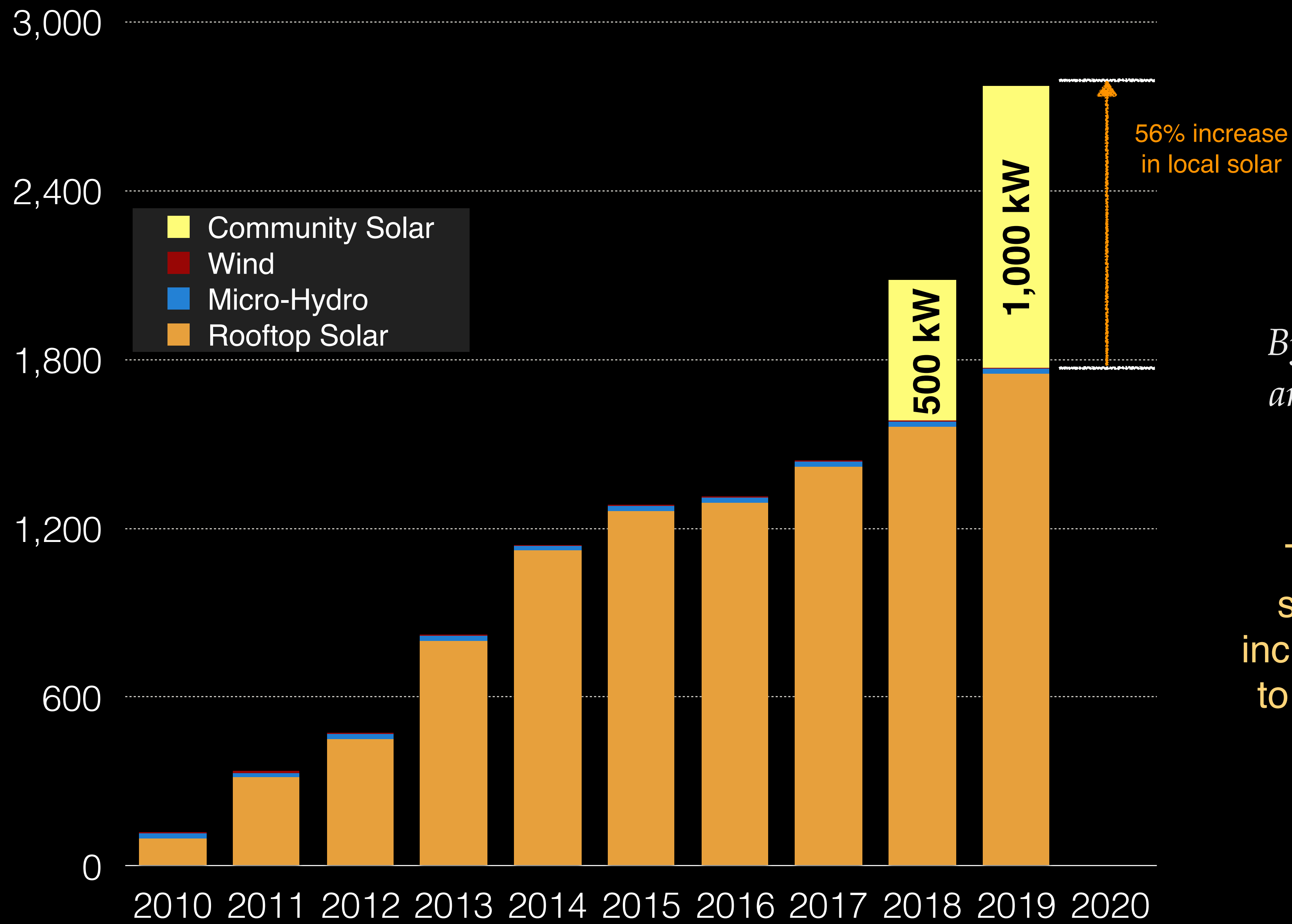
Solar production varies with the seasons - more in sunny summer months, less in winter gray winter months. So the monthly kWh production credited to you bill will vary too.

How does community solar fit into the big picture?

*Most of our electric energy comes from **hydro** from BPA.
But it is slowly becoming more expensive. Local energy
resources like **energy efficiency, storage, solar, wind, tidal,**
and **biochar** are slowly becoming cheaper. In the next few
years, as local renewables reach “**Grid Parity**,” local
renewables share of the energy pie will accelerate rapidly.*

The next few slides show how community solar
is part of a bigger picture, and where our energy
comes from, now and in the future.

Local Solar, Wind, and Micro-Hydro Power Capacity (kW)



By 2019, the OPALCO community solar arrays will increase local solar energy by about 58%.

The next two slides shows how the share of local renewable energy will increase dramatically as prices continue to fall and become comparable to low-cost BPA hydro.

We call that point “grid parity.”

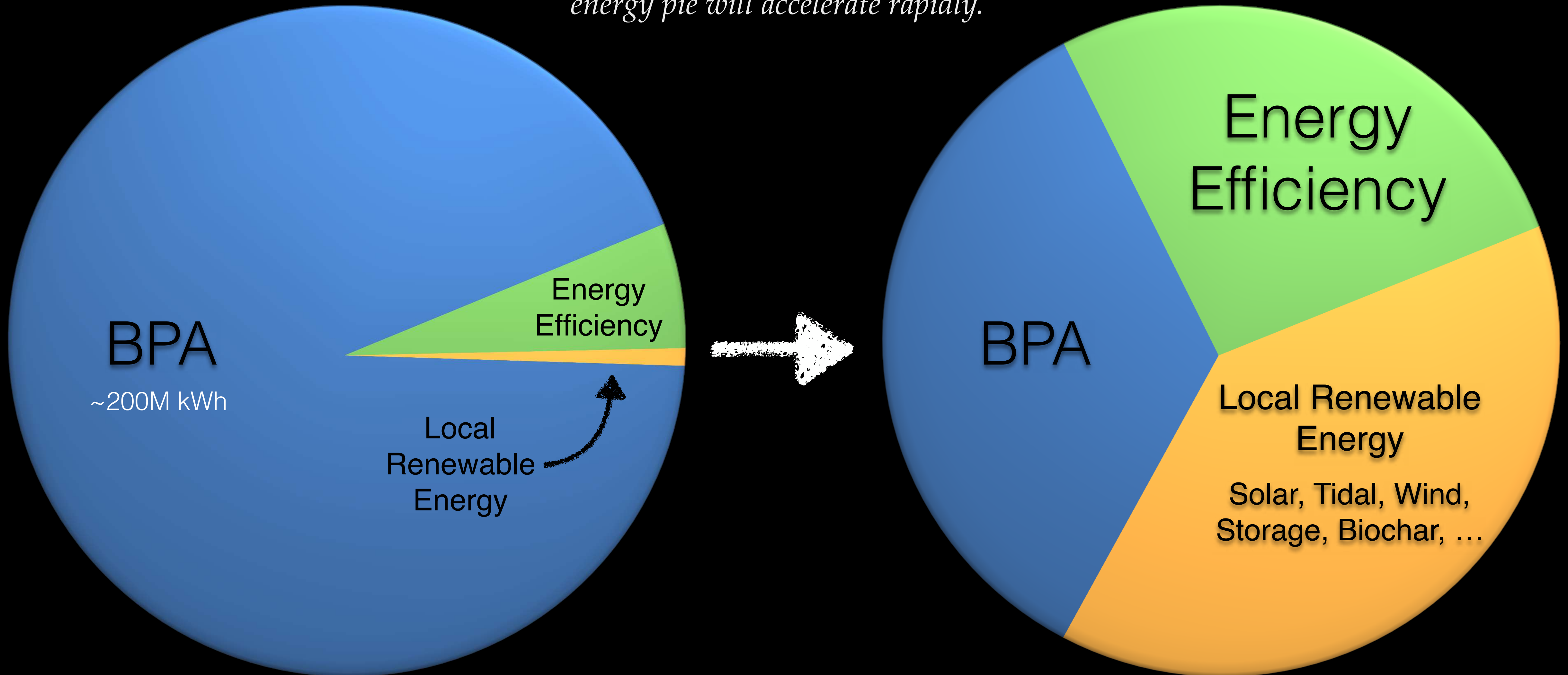
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OPALCO Energy Resources

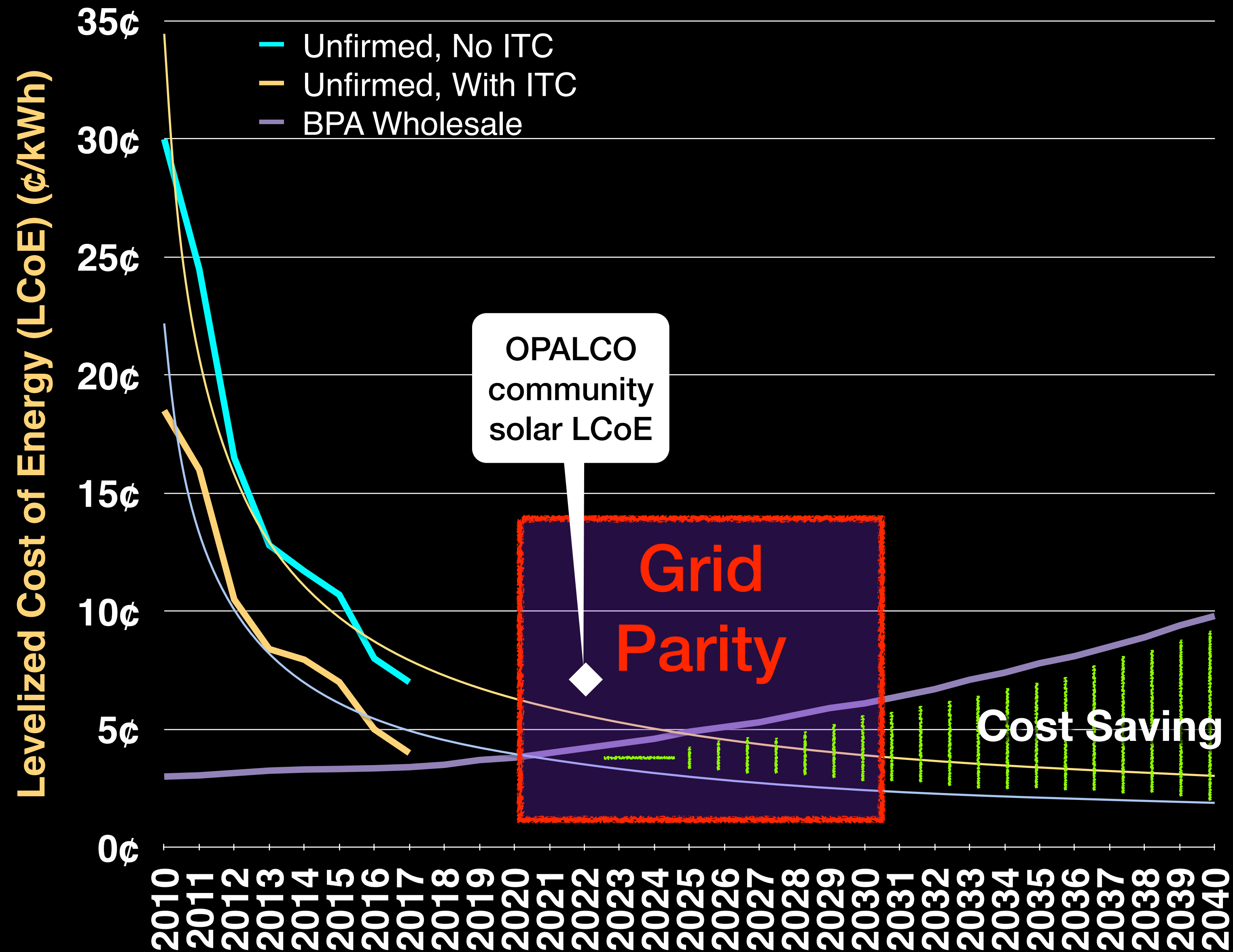
2018

In the next few years, as local renewables reach “grid parity,” their share of the energy pie will accelerate rapidly.

2035

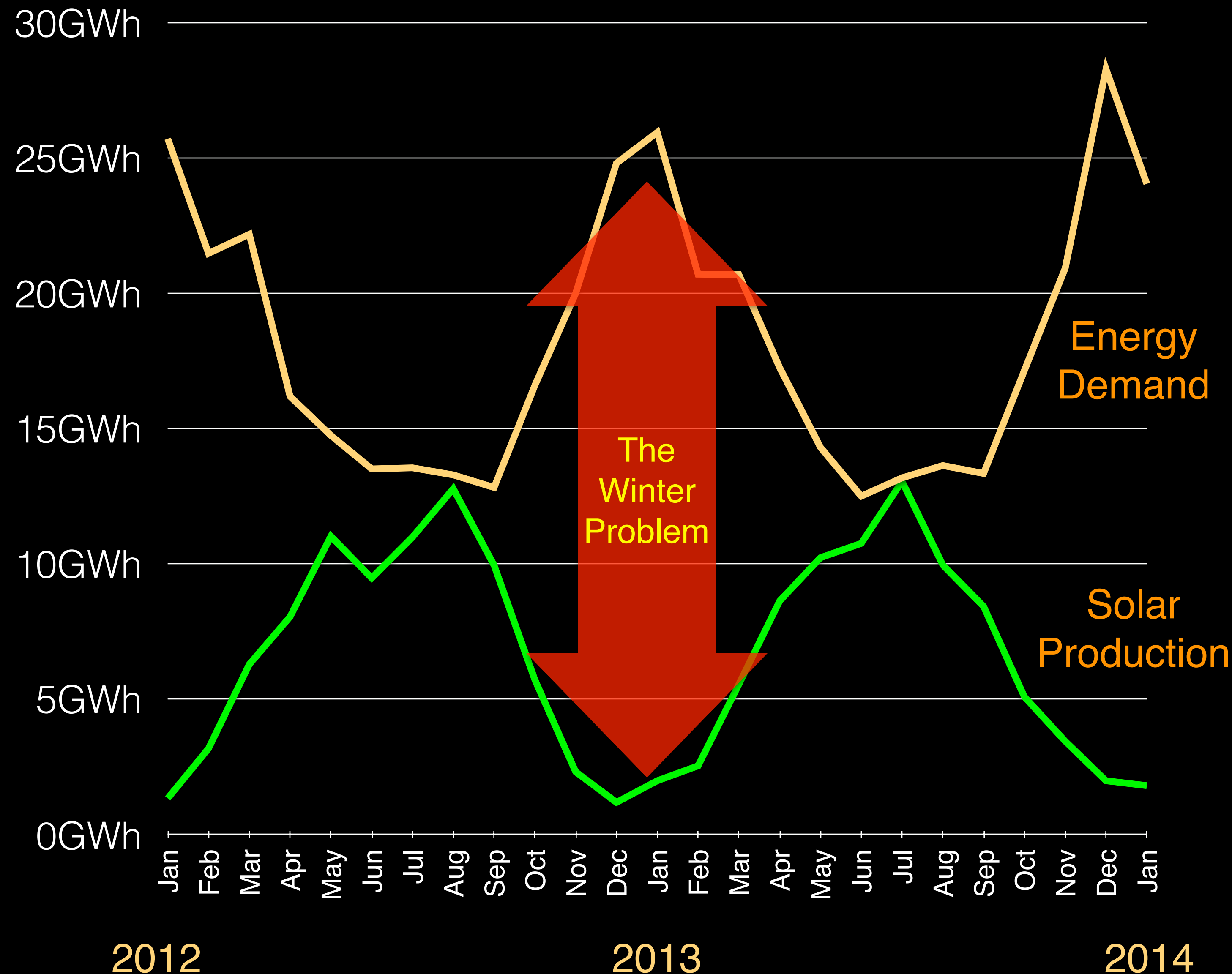


Utility Scale Levelized Cost of Energy: Grid Parity



Energy efficiency is the lowest cost resource. Low-cost BPA hydro is slowly becoming more expensive. Local energy resources like storage, solar, wind, and tidal, are slowly becoming cheaper.

What if every home in the county had solar? The Winter Problem



Assuming each home had good sun, and had a 7.5 kW array, solar would only meet about 38% of the county electric load, due to limitations of sun in the Northwest.

- In winter, load doubles, but solar decreases by 80%
- But, with climate change...
 - ♦ Winters are warming and summers are too
 - ♦ There will be reduced need for winter heat and increased need for summer air conditioning
 - ♦ Snowpack is decreasing, which means less hydro flow in summer, which could mean lower hydro production and higher hydro costs in summer when big cities have increased air conditioning load.
 - ♦ Solar can help fill the gap from reduced summer hydro
- ♦ And, increasing local renewable energy such as solar, wind and tidal helps increase local energy and economic resilience.

Appendix

The following slides provide additional data showing detailed cost analysis of community solar, cost of various forms of energy, and benefits of community solar in making us more resilient to outages.

How much will you save on your annual electric cost?

example comparison of typical community solar and rooftop solar economics

pay up-front for the cost of the array

Array Type:	Community	Community	Community	Rooftop
Array Size (DC watts):	225	1,200	5,000	5,000
cost per watt	\$2.00	\$2.00	\$2.00	\$2.25
total system cost	\$450	\$2,400	\$10,000	\$11,250
annual production (kWh)	247	1,317	5,488	5,250
annual bill credit	\$25	\$133	\$553	\$529
total 20 year kWh credit	\$497	\$2,653	\$11,053	\$10,574
total WA production credit	\$178	\$948	\$3,951	\$3,780
20 year net value of solar	\$225	\$1,201	\$5,004	\$3,104

WA kWh solar production credits

annual credit	\$40	\$211	\$878	\$840
total 4.5 year credit	\$178	\$948	\$3,951	\$3,780

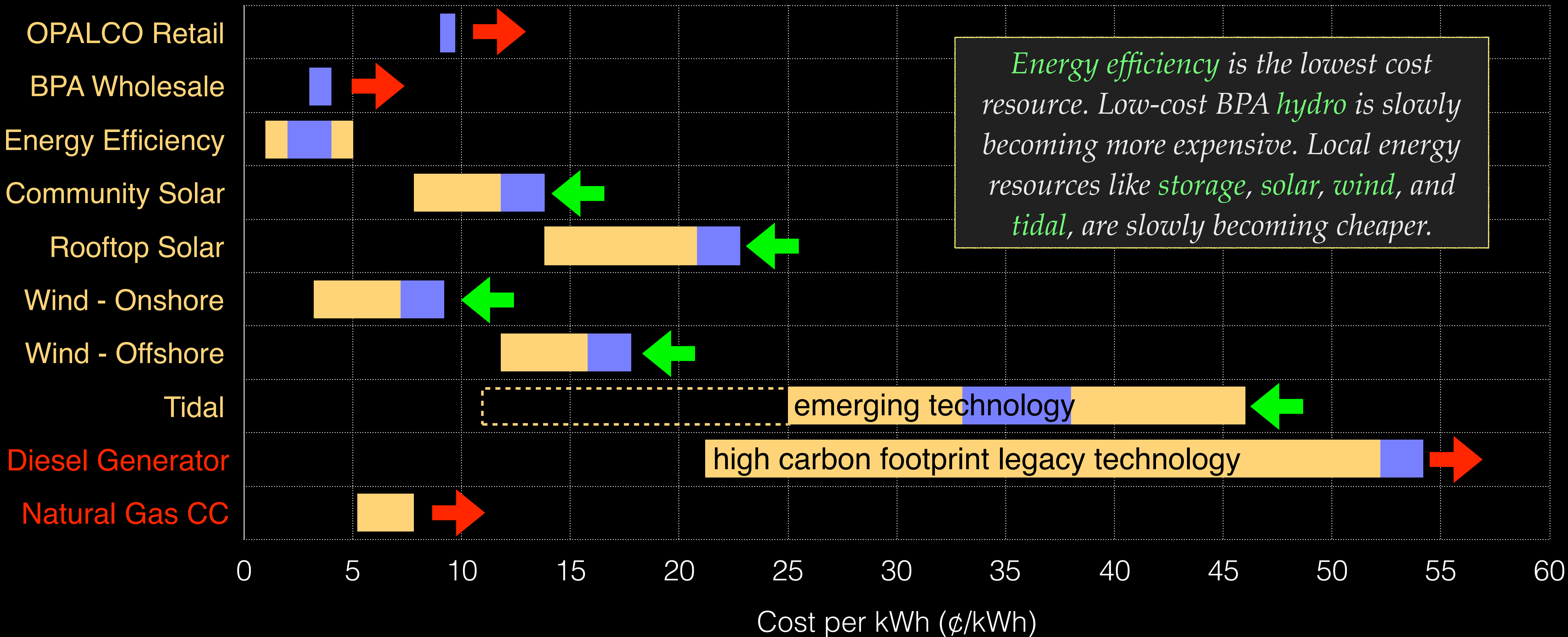
Up-Front Cost Notes

- We only compare community to rooftop solar for a 5,000 watt array. Smaller arrays are not cost-effective for rooftop solar installers. The price per watt becomes too high, to cover labor and inverter costs.
- For small array shares less than 3,000 watts, community solar is especially cost effective, compared to rooftop solar.
- Community solar kWh production is higher than rooftop solar due to better solar siting, cleaning and maintenance.
- Rooftop cost per watt assumes a 30% Investment Tax Credit (ITC). Check with your tax accountant to confirm that you qualify.
- For both community solar and rooftop solar, the WA solar production credit assumes 16¢ per kWh for first 4 to 5 years . The credit may be up to 8 years, or until 50% of project cost is recovered.

Unsubsidized Levelized Cost of Energy Sources

Cost Range: = US = SJC (actual, or estimated due to NW capacity factor or fuel costs)

Cost Trend: = Inflation = Deflation

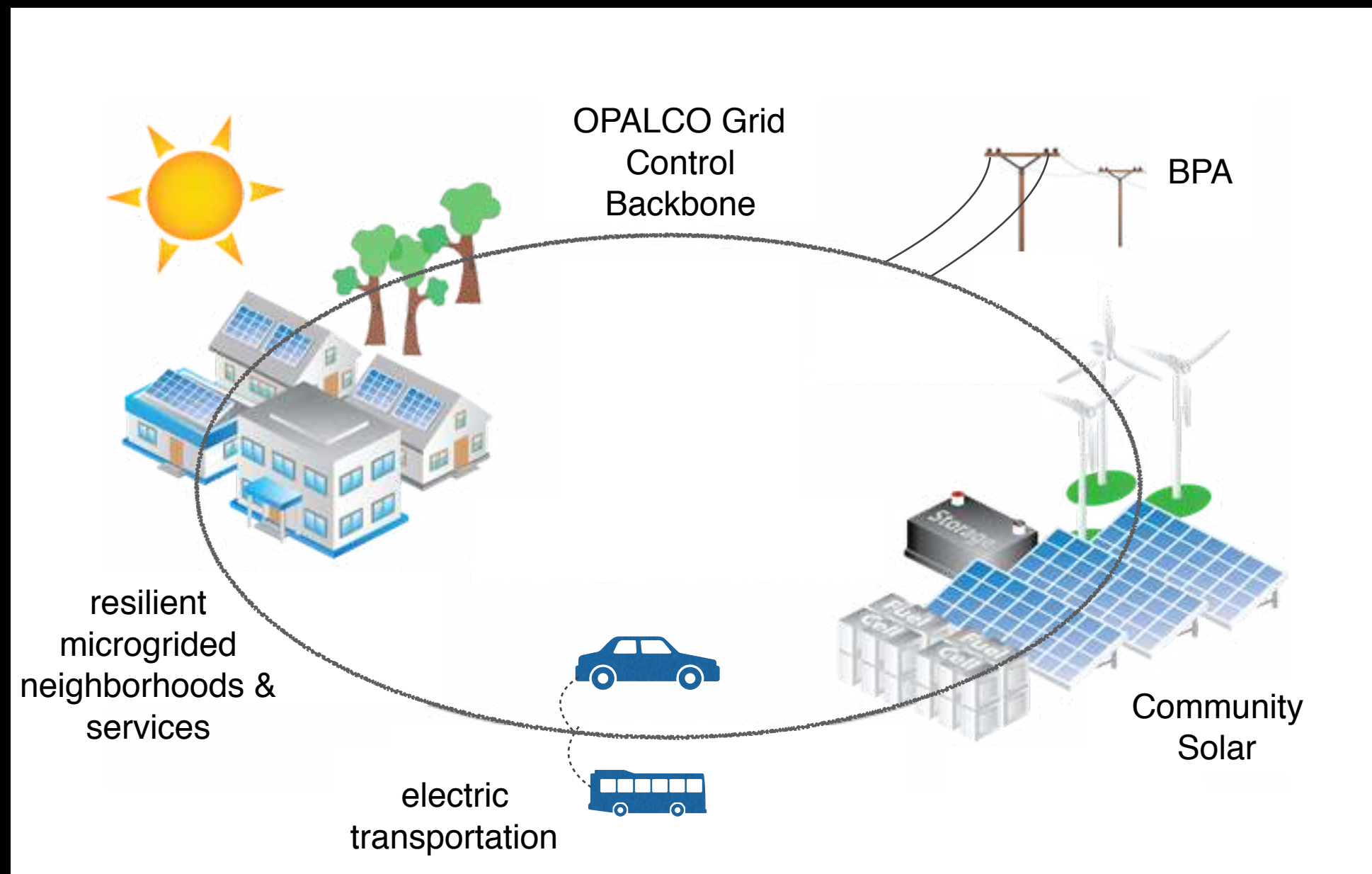


*Energy efficiency is the lowest cost resource. Low-cost BPA **hydro** is slowly becoming more expensive. Local energy resources like **storage**, **solar**, **wind**, and **tidal**, are slowly becoming cheaper.*

Community Solar Benefits All Community Members

Though the community solar program and system are paid for by the participants, this project benefits the whole community.

The community solar array is being paired with a utility-scale battery to provide four important functions that help reduce costs of energy and operation of grid. The battery, in addition to conditioning the intermittent output of the solar array (due to variations in cloud cover), helps...



- **Reduce BPA energy costs**
 - improves load shape
 - improves load factor
 - reduces spikes in peak demand
 - reduces submarine cable transmission losses
- **Reduce submarine cable system component wear and tear**
 - balancing capacitance and reactance in the transmission system
 - reducing peak demand pulses that can heat the expensive submarine cable
 - reduce cable connector heating, extending component life
- **Increase reliability of grid through “micro-gridding” the solar and battery system**
 - and helps stabilize the grid as distributed intermittent rooftop solar increases

This first system will serve as a template for expansion of local renewable energy and storage around the grid, especially in town centers, using the solar powered battery backup in case of emergencies, to support critical community functions like first responders, medical centers, grocery stores and disaster support facilities.