

ACHIEVING A CARBON NEUTRAL ALL-ELECTRIC FUTURE

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LPEA

La Plata Electric Association, Inc.

A Touchstone Energy® Cooperative 



Why electricity?

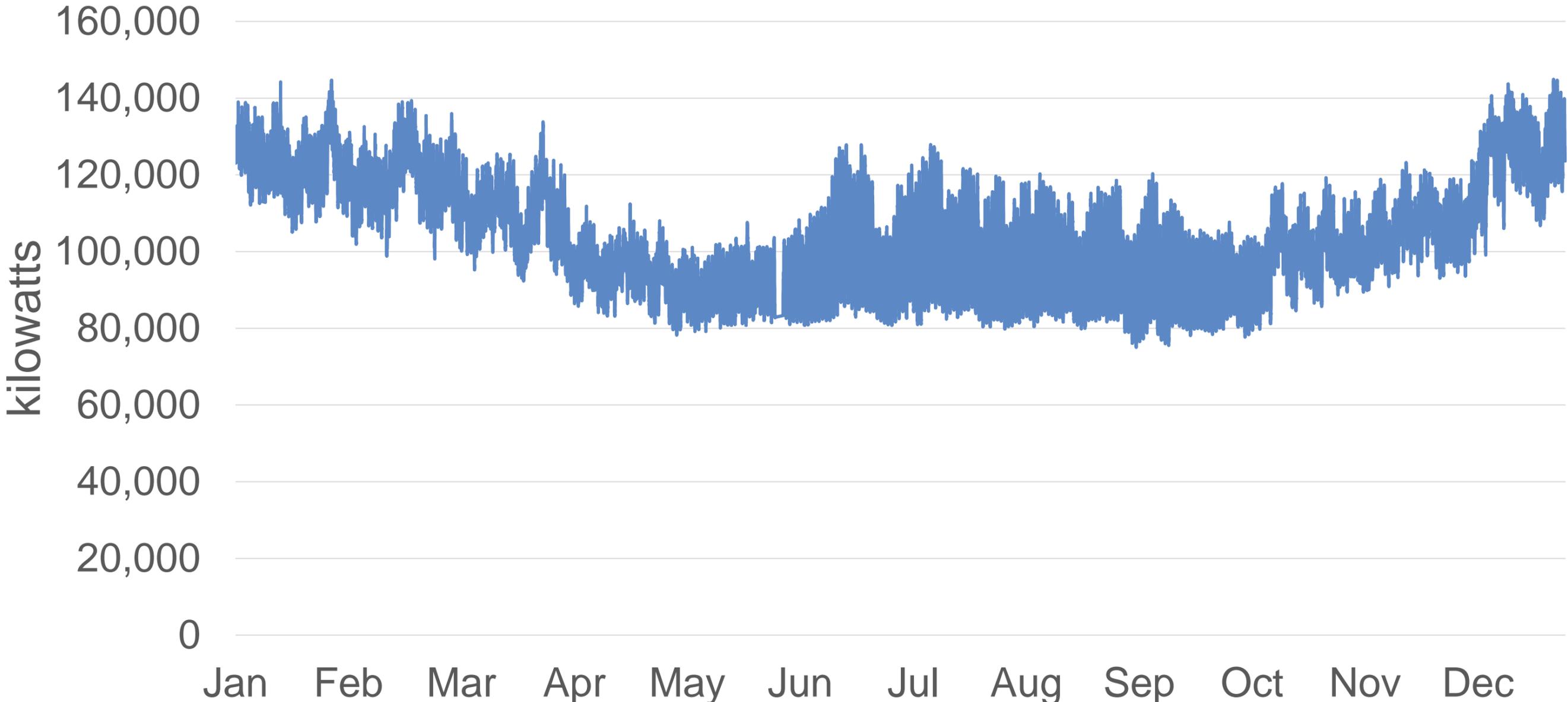
What does it mean to be carbon-free?

What does an all-electric future look like?

How can we do this?

In the electrical world, this is LPEA

Annual System Load



A landscape photograph featuring a body of water and mountains in the background. In the foreground, several stacks of balanced rocks are visible on a grassy field. The text is overlaid on a dark grey rectangular background in the upper left corner.

Electricity generation and
consumption must balance.

Power delivery works in
a real-time environment.

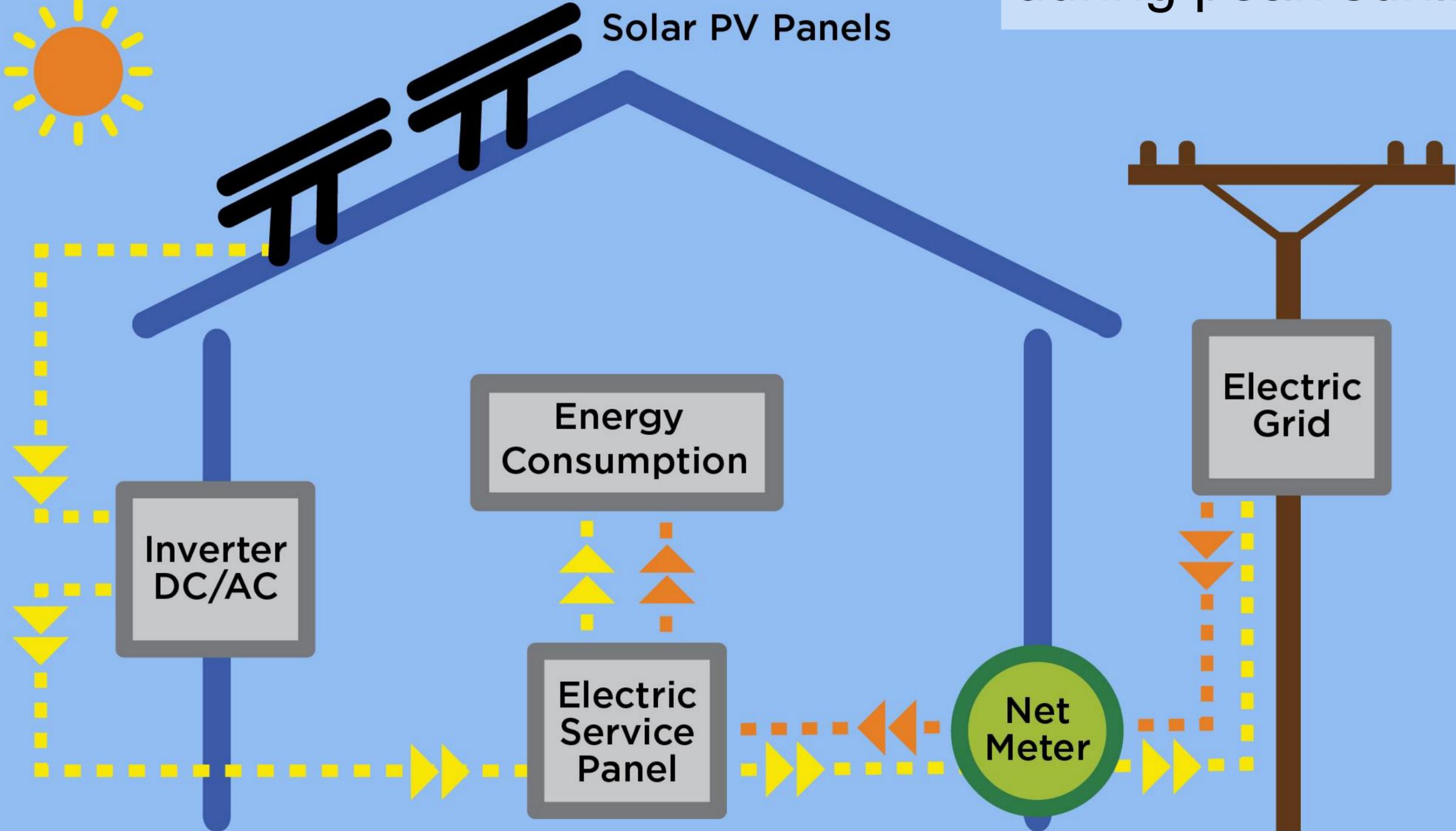
Tools in our Toolbox

- Intermittent Resources
 - Rooftop Solar
 - Community Solar (Solar Gardens)
 - Utility Scale Solar
 - Wind Power
- Firm Resources (Dispatchable Power)
 - Distributed Energy Resources (DER)
 - Energy Storage
 - Thermal Resources

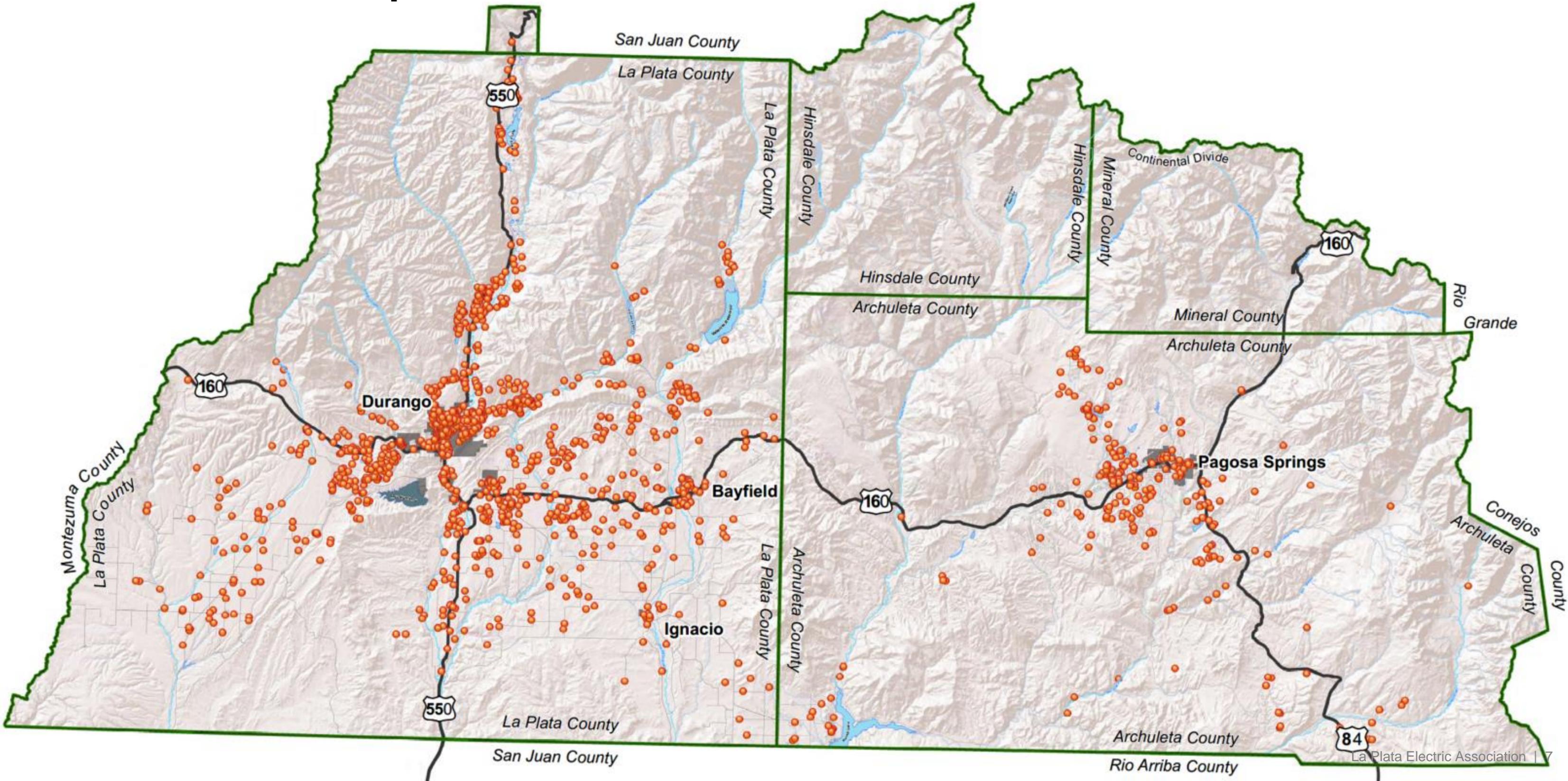


Rooftop Solar

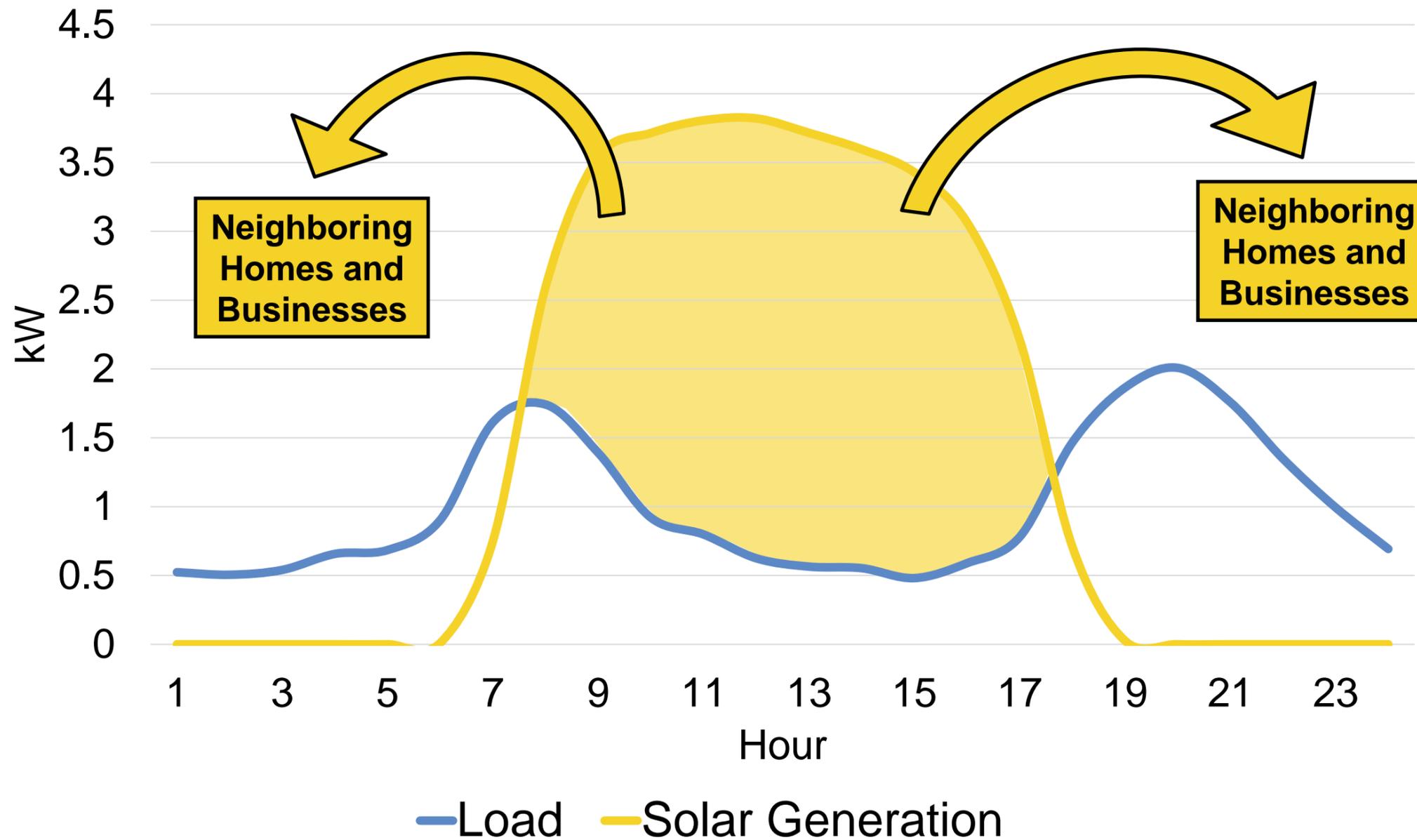
2,000 systems producing 14,000 kW of electricity during peak sunlight hours



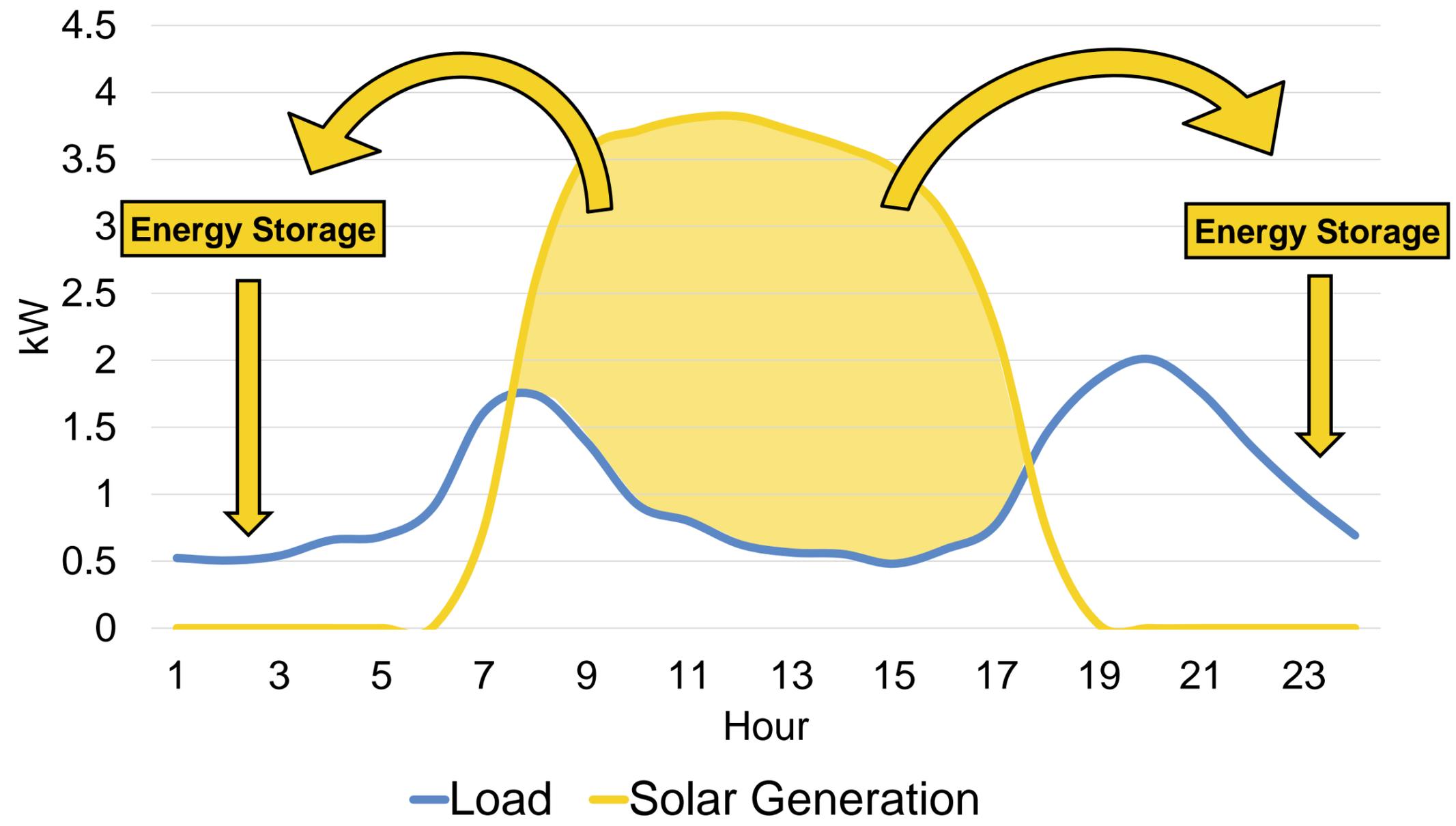
LPEA Rooftop Solar Installations



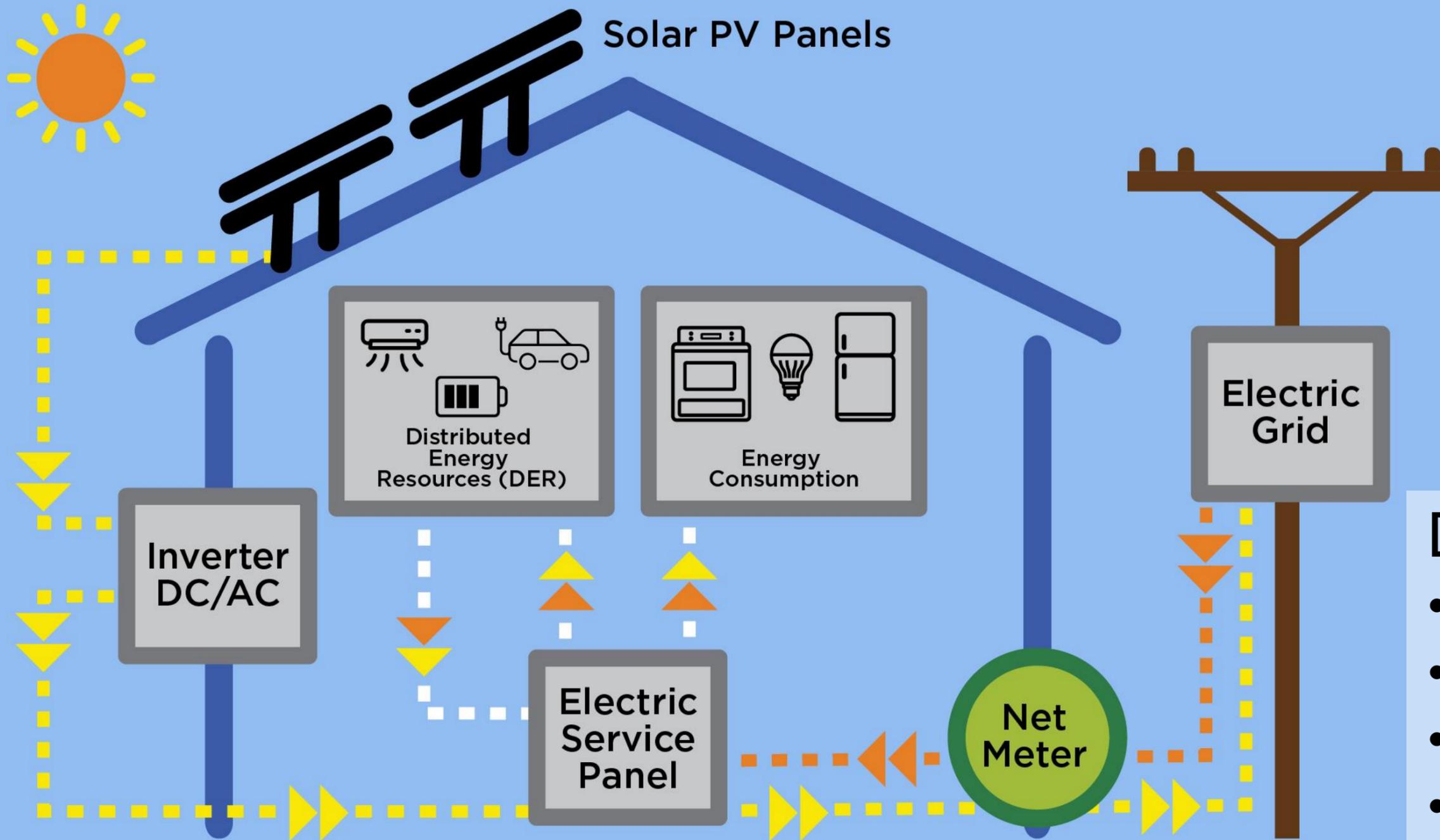
Typical Residential Loading and Rooftop Solar



Typical Residential Loading and Rooftop Solar with Batteries

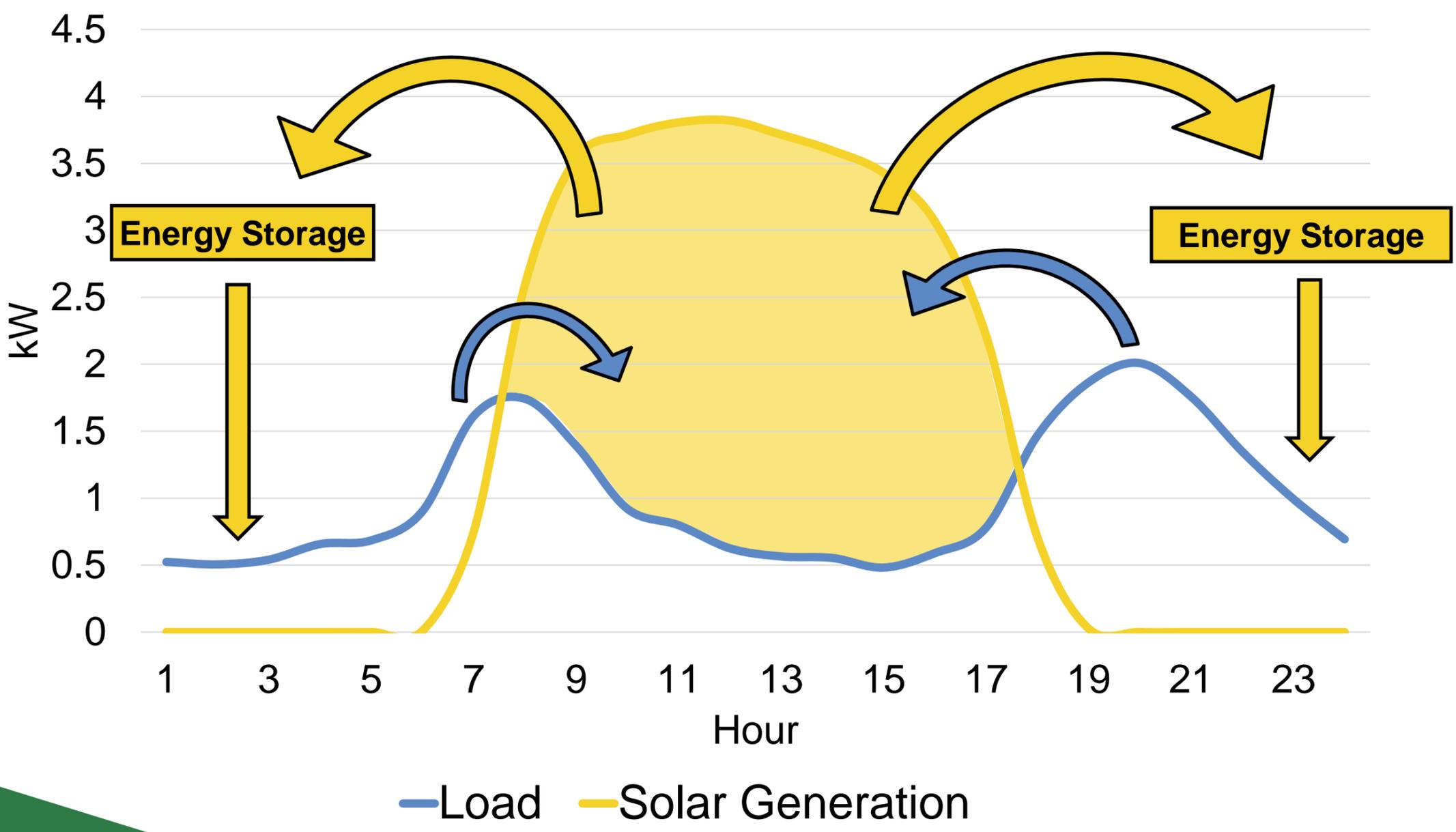


Distributed Energy Resources (DER)



- DER Control Platform:**
- Water heaters
 - Smart thermostats
 - EV charging
 - Energy Storage

Typical Residential Loading and Rooftop Solar with Distributed Energy Resources

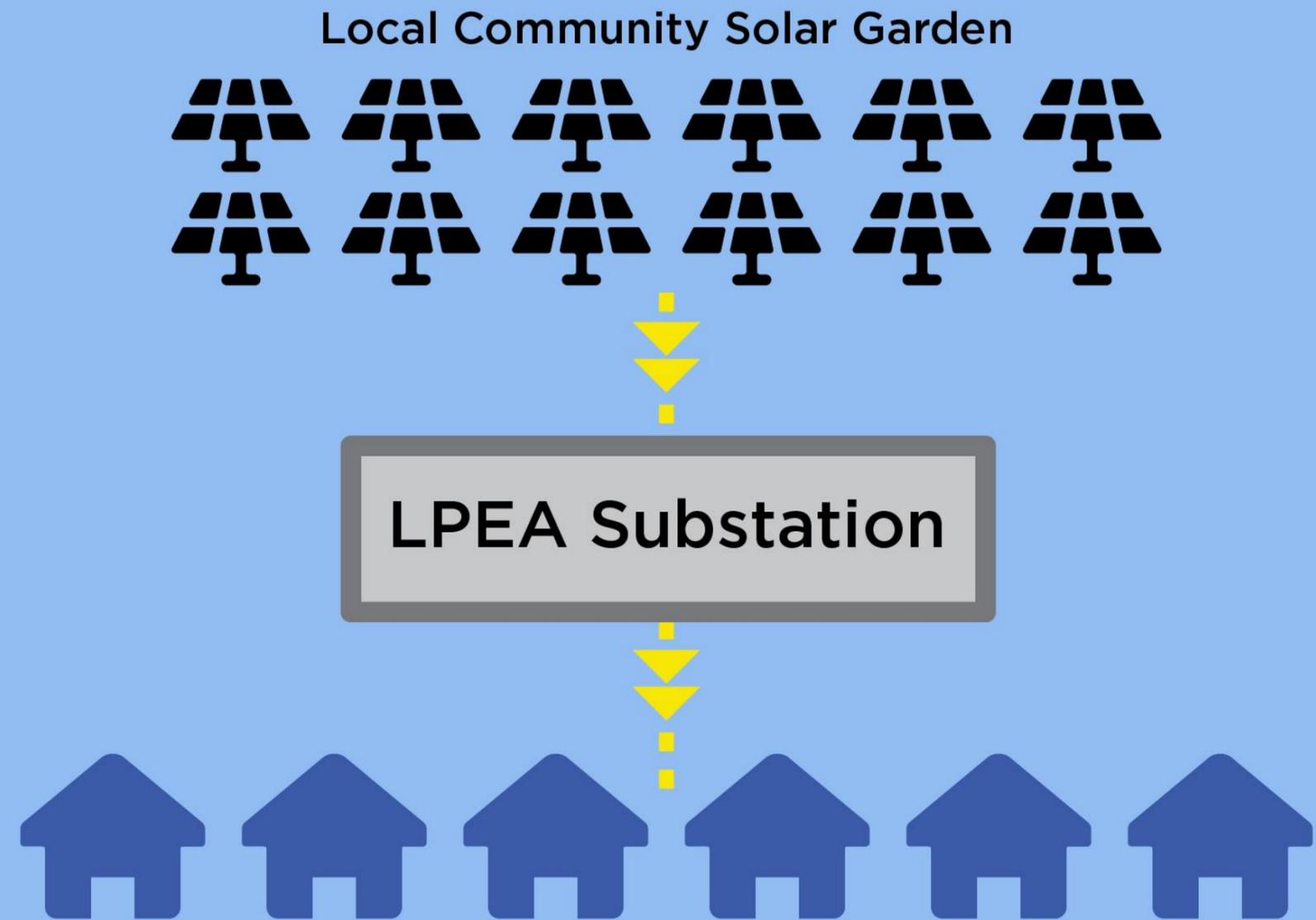
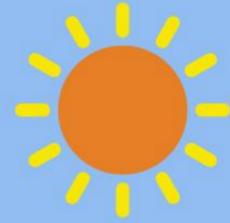


- DER Control Platform:**
- Water heaters
 - Smart thermostats
 - EV charging
 - Energy Storage

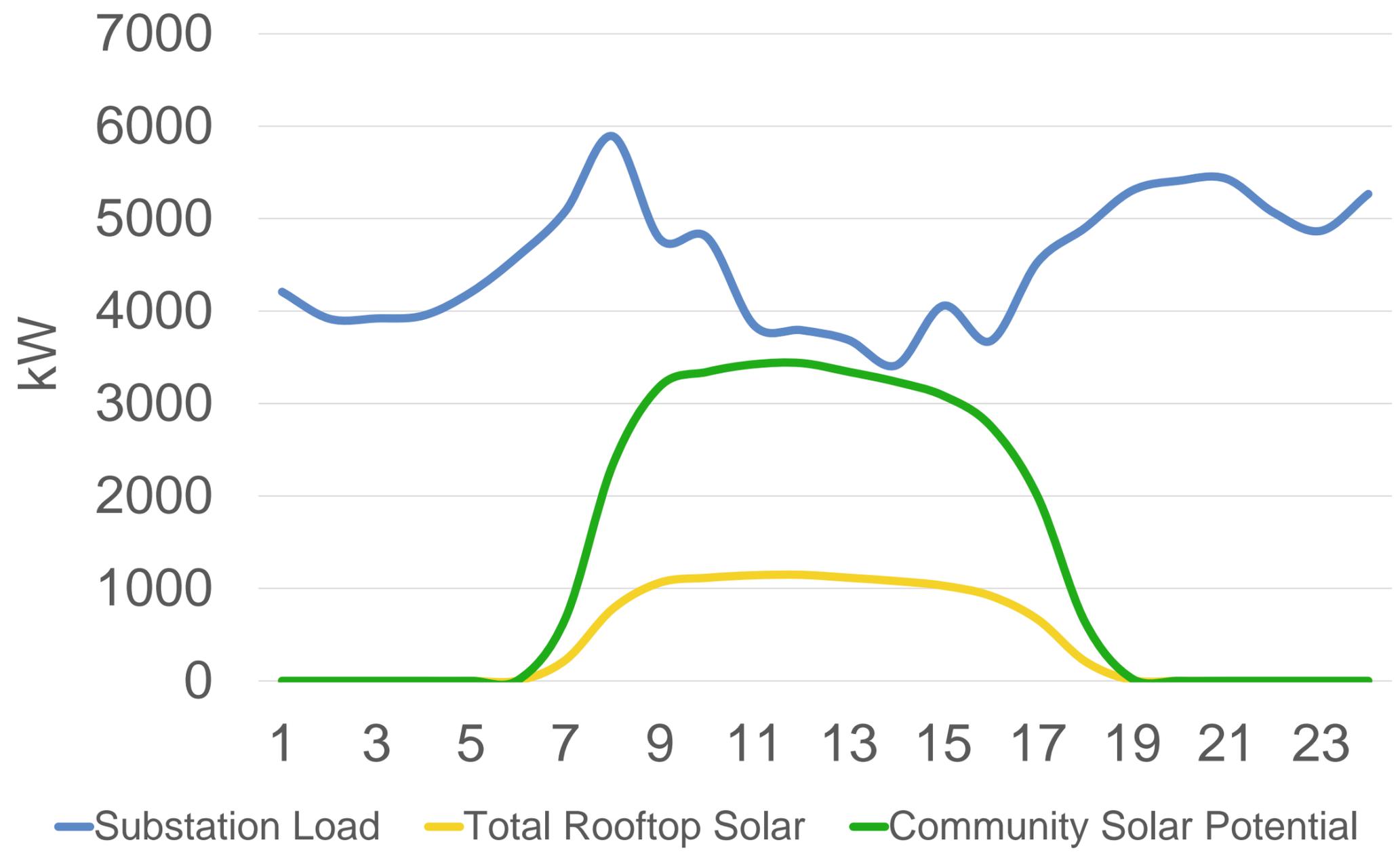
Community Solar Gardens

Larger systems = Better economies of scale

- Allows for more effective distribution
- Another avenue to members to participate in renewables
- Current Stats
 - 4 solar gardens established in 2015
 - Totaling 350 kW
 - Fully subscribed



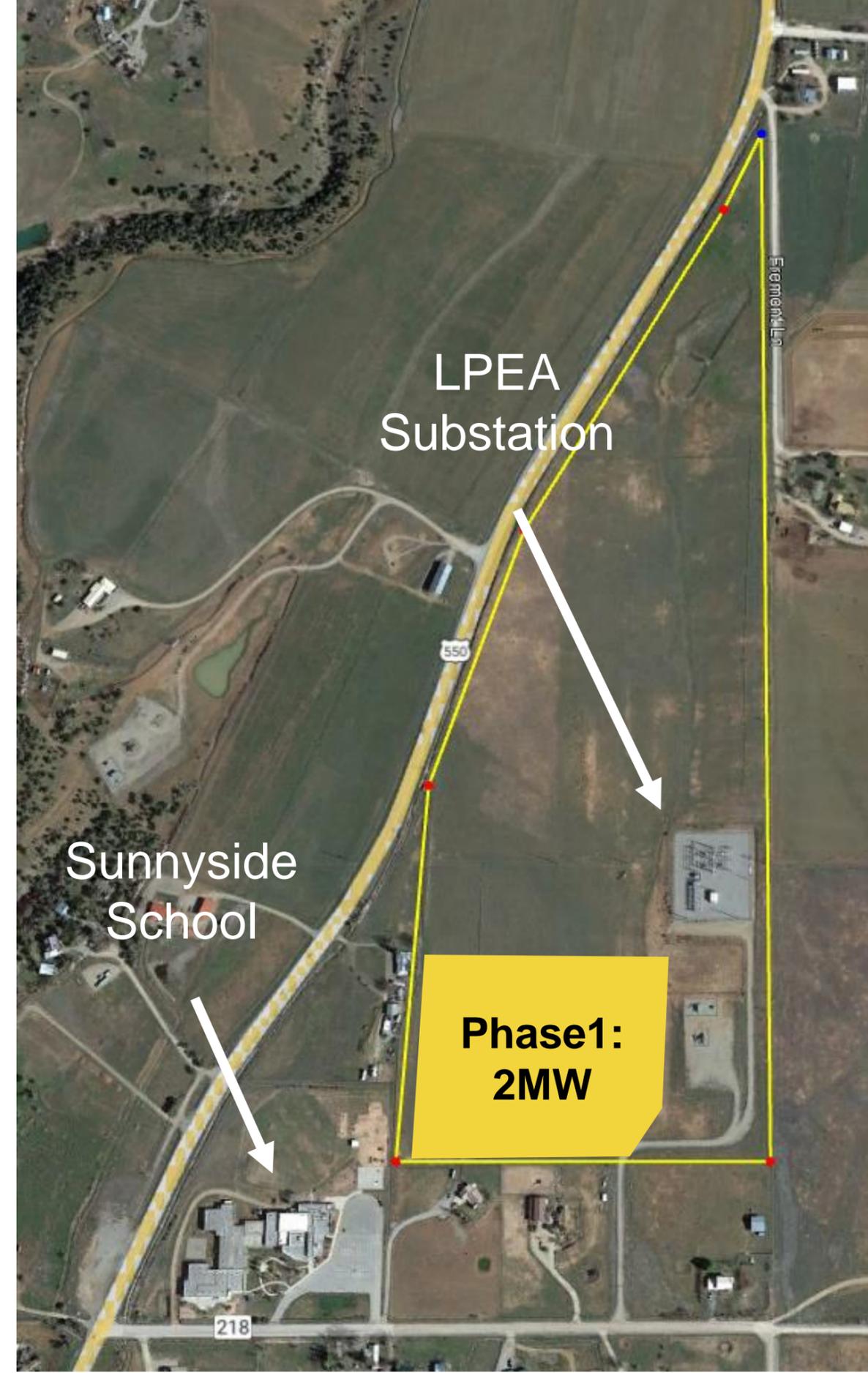
Typical Substation Loading and Community Solar



Sunnyside Community Solar Garden

Announcing the creation of a new 2MW solar garden

- LPEA recently acquired 54 acres
- Ideal interconnection point
- In collaboration with **Fort Lewis College** to enable their Solar Park research facility
- Phased approach
- RFP to be released May 1st
- Targeting **Local Installers**

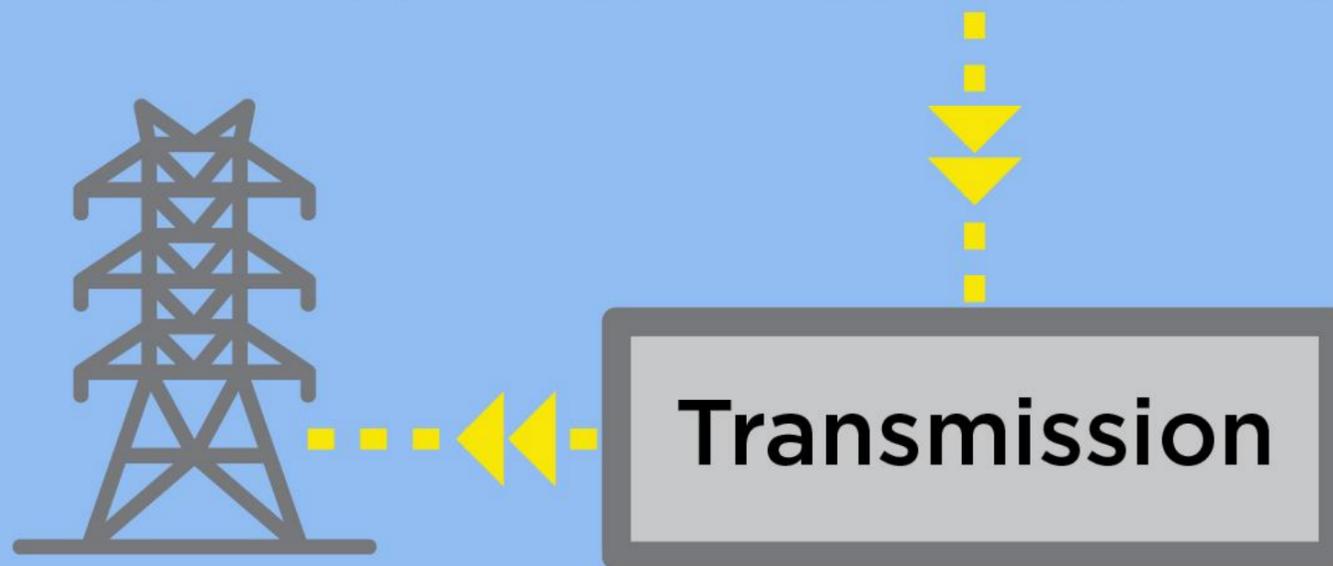
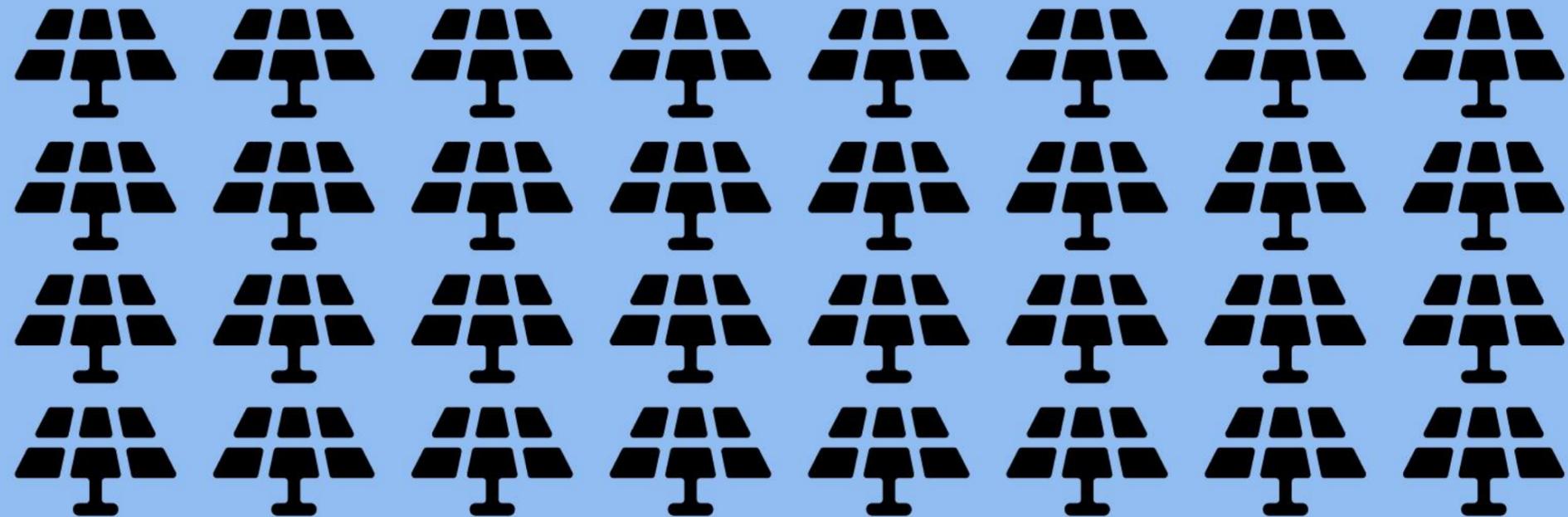


Utility Scale Renewables

- Connected to Bulk Electric System
- Regional resource needing redundant paths
- Geographical smoothing



Utility Scale Solar



Solar Availability

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
2	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
3	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
4	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
5	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
6	0%	0%	0%	0%	2%	3%	1%	0%	0%	0%	0%	0%
7	0%	0%	0%	7%	26%	38%	27%	12%	3%	0%	0%	0%
8	0%	3%	19%	39%	59%	72%	64%	47%	38%	20%	4%	0%
9	11%	37%	49%	57%	69%	81%	76%	65%	65%	56%	37%	15%
10	36%	63%	60%	65%	69%	84%	79%	69%	73%	62%	52%	41%
11	46%	69%	62%	68%	67%	82%	79%	73%	70%	62%	49%	46%
12	48%	70%	60%	69%	71%	76%	76%	70%	67%	63%	45%	46%
13	45%	67%	57%	73%	65%	69%	70%	67%	68%	65%	43%	45%
14	45%	66%	59%	68%	59%	64%	61%	64%	68%	67%	47%	47%
15	46%	68%	60%	62%	59%	54%	55%	52%	64%	68%	48%	49%
16	46%	64%	56%	59%	52%	48%	48%	41%	62%	67%	47%	44%
17	31%	50%	49%	53%	50%	48%	46%	33%	54%	51%	23%	16%
18	3%	14%	27%	42%	45%	45%	39%	26%	29%	11%	1%	0%
19	0%	0%	2%	10%	20%	26%	25%	10%	3%	0%	0%	0%
20	0%	0%	0%	0%	1%	4%	3%	0%	0%	0%	0%	0%
21	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
22	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
23	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
24	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%



Wind Availability

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	81%	71%	71%	99%	85%	87%	89%	71%	100%	96%	76%	74%
2	82%	67%	71%	100%	88%	84%	84%	69%	100%	100%	76%	71%
3	82%	66%	73%	100%	83%	82%	86%	68%	98%	100%	75%	75%
4	81%	69%	74%	100%	72%	70%	81%	69%	89%	97%	70%	76%
5	75%	66%	75%	100%	73%	66%	70%	65%	84%	87%	76%	75%
6	69%	66%	68%	99%	69%	69%	60%	61%	79%	80%	78%	71%
7	64%	61%	69%	90%	59%	66%	51%	55%	76%	77%	73%	69%
8	65%	57%	62%	79%	49%	55%	40%	41%	66%	72%	72%	69%
9	63%	47%	52%	73%	50%	55%	39%	41%	58%	60%	69%	64%
10	51%	36%	49%	77%	48%	54%	44%	43%	60%	62%	63%	57%
11	40%	35%	50%	82%	46%	53%	44%	39%	63%	64%	66%	51%
12	39%	39%	56%	84%	49%	50%	44%	39%	66%	61%	68%	59%
13	45%	44%	59%	83%	62%	51%	44%	39%	66%	64%	67%	66%
14	48%	53%	60%	74%	64%	56%	45%	42%	68%	66%	67%	65%
15	54%	57%	68%	56%	63%	58%	48%	45%	70%	68%	68%	59%
16	55%	61%	70%	56%	72%	60%	56%	51%	78%	64%	64%	57%
17	56%	69%	72%	59%	71%	67%	65%	61%	80%	64%	67%	55%
18	57%	71%	73%	66%	74%	69%	71%	65%	79%	70%	67%	63%
19	63%	76%	75%	73%	85%	72%	82%	66%	86%	80%	72%	68%
20	67%	82%	82%	74%	93%	79%	100%	79%	100%	89%	79%	61%
21	76%	83%	89%	79%	90%	96%	100%	89%	100%	91%	85%	64%
22	80%	79%	86%	84%	92%	91%	100%	82%	100%	90%	87%	66%
23	83%	77%	82%	87%	84%	91%	99%	79%	100%	92%	86%	73%
24	83%	76%	73%	92%	73%	89%	97%	78%	100%	92%	82%	74%

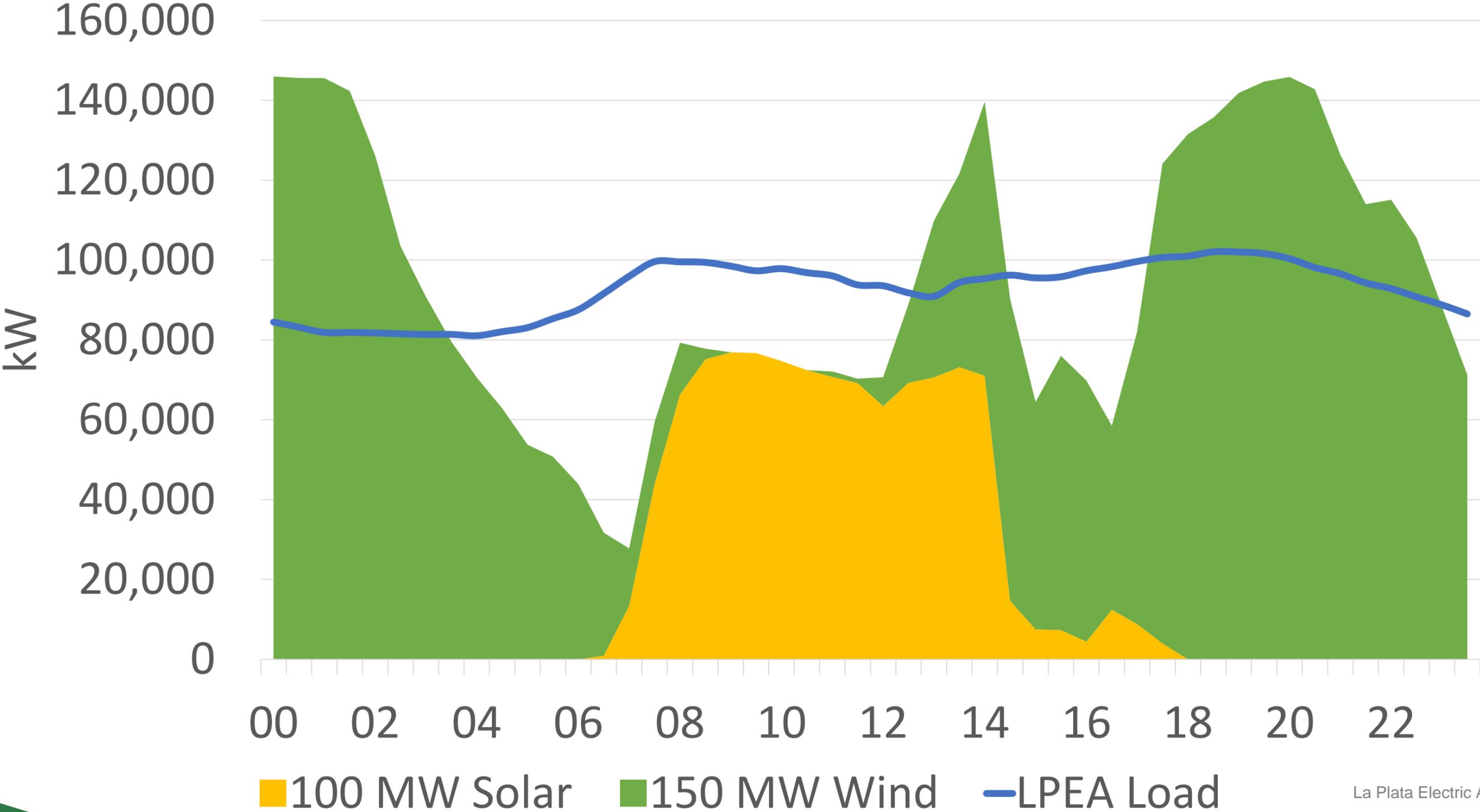


Three Parts Wind, Two Parts Solar

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	81%	71%	71%	99%	85%	87%	89%	71%	100%	96%	76%	74%
2	82%	67%	71%	100%	88%	84%	84%	69%	100%	100%	76%	71%
3	82%	66%	73%	100%	83%	82%	86%	68%	98%	100%	75%	75%
4	81%	69%	74%	100%	72%	70%	81%	69%	89%	97%	70%	76%
5	75%	66%	75%	100%	73%	66%	70%	65%	84%	87%	76%	75%
6	69%	66%	68%	99%	70%	72%	61%	61%	79%	80%	78%	71%
7	64%	61%	69%	96%	85%	100%	79%	67%	80%	77%	73%	69%
8	66%	60%	81%	100%	100%	100%	100%	88%	100%	92%	76%	69%
9	74%	84%	100%	100%	100%	100%	100%	100%	100%	100%	100%	79%
10	87%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	98%
11	86%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	97%
12	87%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
13	90%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
14	93%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
15	100%	100%	100%	100%	100%	100%	100%	96%	100%	100%	100%	100%
16	100%	100%	100%	100%	100%	100%	100%	92%	100%	100%	100%	100%
17	87%	100%	100%	100%	100%	100%	100%	94%	100%	100%	89%	71%
18	61%	85%	100%	100%	100%	100%	100%	91%	100%	81%	68%	63%
19	63%	77%	77%	83%	100%	98%	100%	76%	89%	80%	72%	68%
20	67%	82%	82%	74%	94%	83%	100%	79%	100%	89%	79%	61%
21	76%	83%	89%	79%	90%	96%	100%	89%	100%	91%	85%	64%
22	80%	79%	86%	84%	92%	91%	100%	82%	100%	90%	87%	66%
23	83%	77%	82%	87%	84%	91%	99%	79%	100%	92%	86%	73%
24	83%	76%	73%	92%	73%	89%	97%	78%	100%	92%	82%	74%

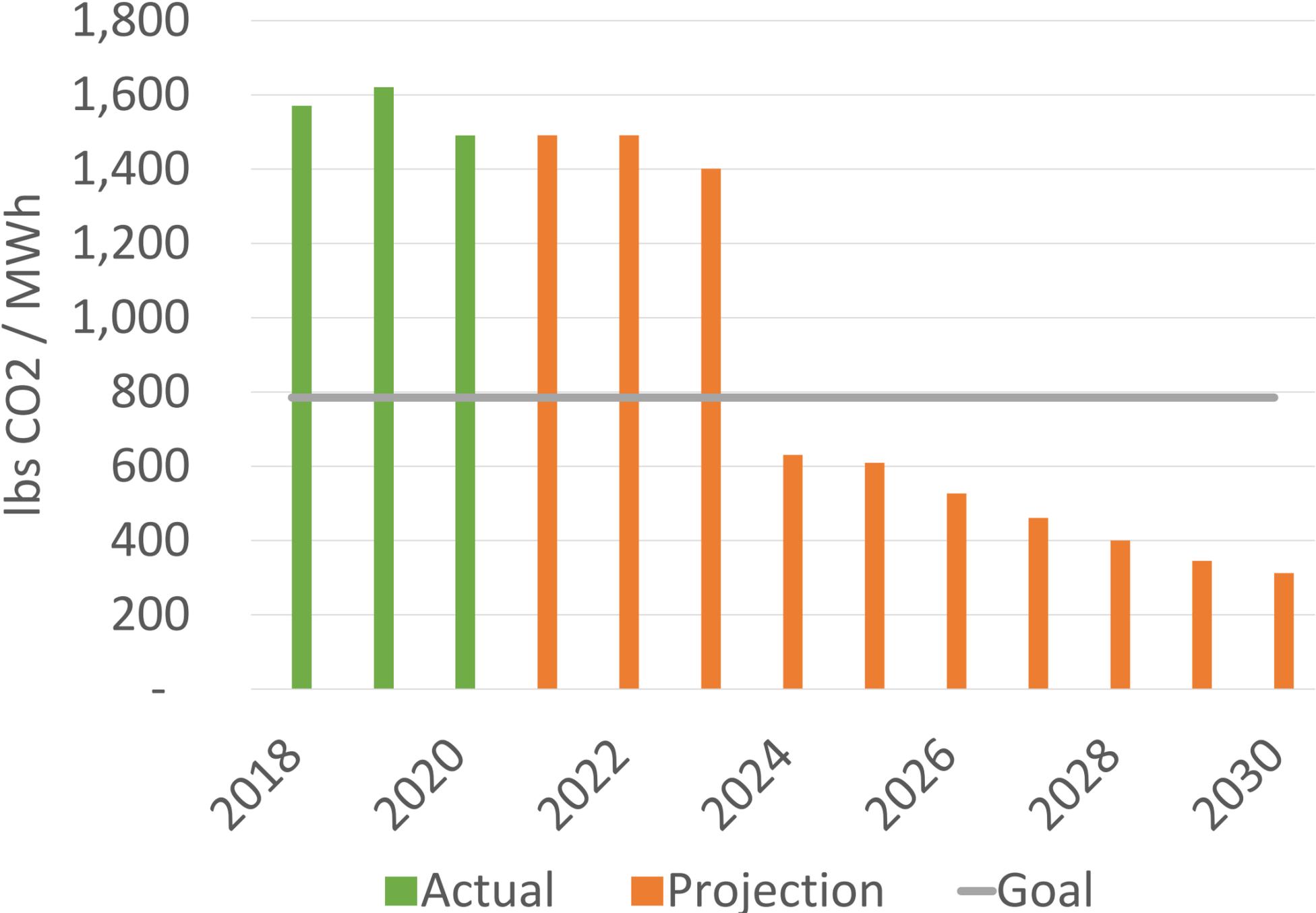


Serving LPEA's Real-Time Load



LPEA Actual and Projected Carbon Emissions

“LPEA will strive to reduce its carbon footprint by 50% from 2018 levels by year 2030...”



OUR RECIPE

Rooftop Solar +
Community Solar +
Utility Solar +
Wind Energy +
Energy Storage +
Distributed Energy Resources =

CARBON-NEUTRAL

ALL ELECTRIC FUTURE



THANK YOU!

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