

# Solar Power, Energy Storage, Saving the World, and You

Or - how to save a buck and feel good about  
yourself in the process

1. Reasons for going solar
2. Cost of solar
3. Disadvantages of solar (and their remedies)
4. Calculate the cost of solar for you
5. Question and Answer period



# 1. Reasons for going solar

## A. The Good of Humanity and all Species

Greenhouse Gases (ex. CO<sub>2</sub>) absorb heat

CO<sub>2</sub> is a byproduct of all fossil fuel combustion

Atmospheric CO<sub>2</sub> concentration 420 ppm in 2022

up from 390 ppm 2010 (~ 2.5ppm/year)

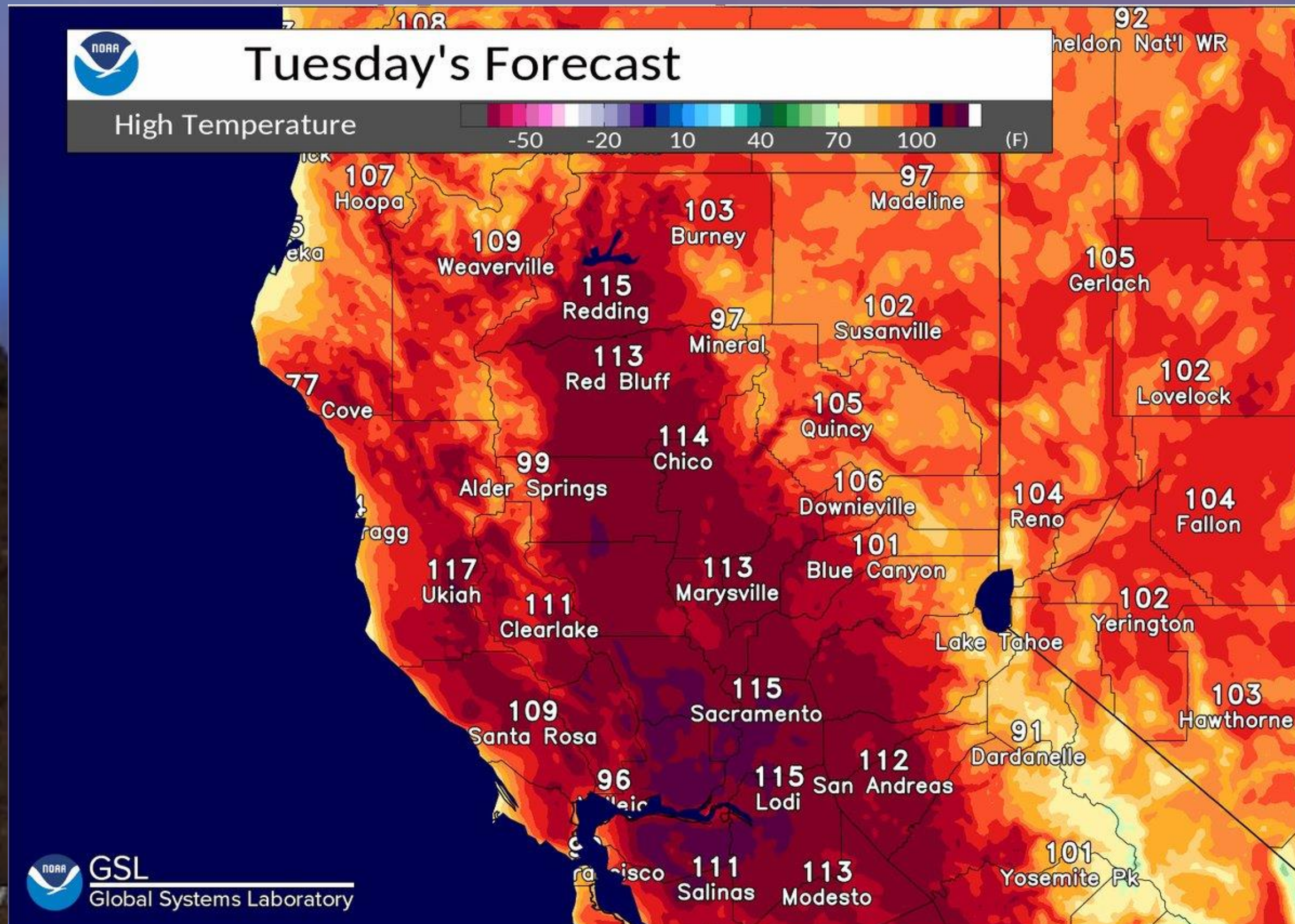
Average global temperature up ~2°F since 1880

### Heat waves

### Extreme weather



### Drought



# B. Petro-dictatorship

**Bloomberg**

US Edition

• Live Now Markets Technology **Politics** Wealth Pursuits Opinion Businessweek Equality Green City

**Politics**

## Biden Expects More Saudi Oil After Trip to Kingdom

- Saudis committed to balancing global oil market: White House
- US sees 'further steps in the coming weeks' on oil supply



## Blood for oil: Meet the world's worst leaders selling dirty energy to Europe

The EU wants to wean itself off fossil fuels from Russia. The other options aren't great.



Vladimir Putin's brutal invasion of Ukraine means EU leaders are spending the summer cozying up to presidents, and the odd crown prince | Source photos by Getty Images and EPA



Image tweeted by @BarAndazAbadani

# 1. Reasons for going solar

**The Mercury News**

NEWS > CRIME AND PUBLIC SAFETY > CRASHES AND DISASTERS • News

## PG&E electricity and gas bills are slated to jump 9% in early 2022

Average PG&E monthly bills are due to top \$220

## C. To save \$

\$220/month X 12 months X 10 years  
= \$26,400

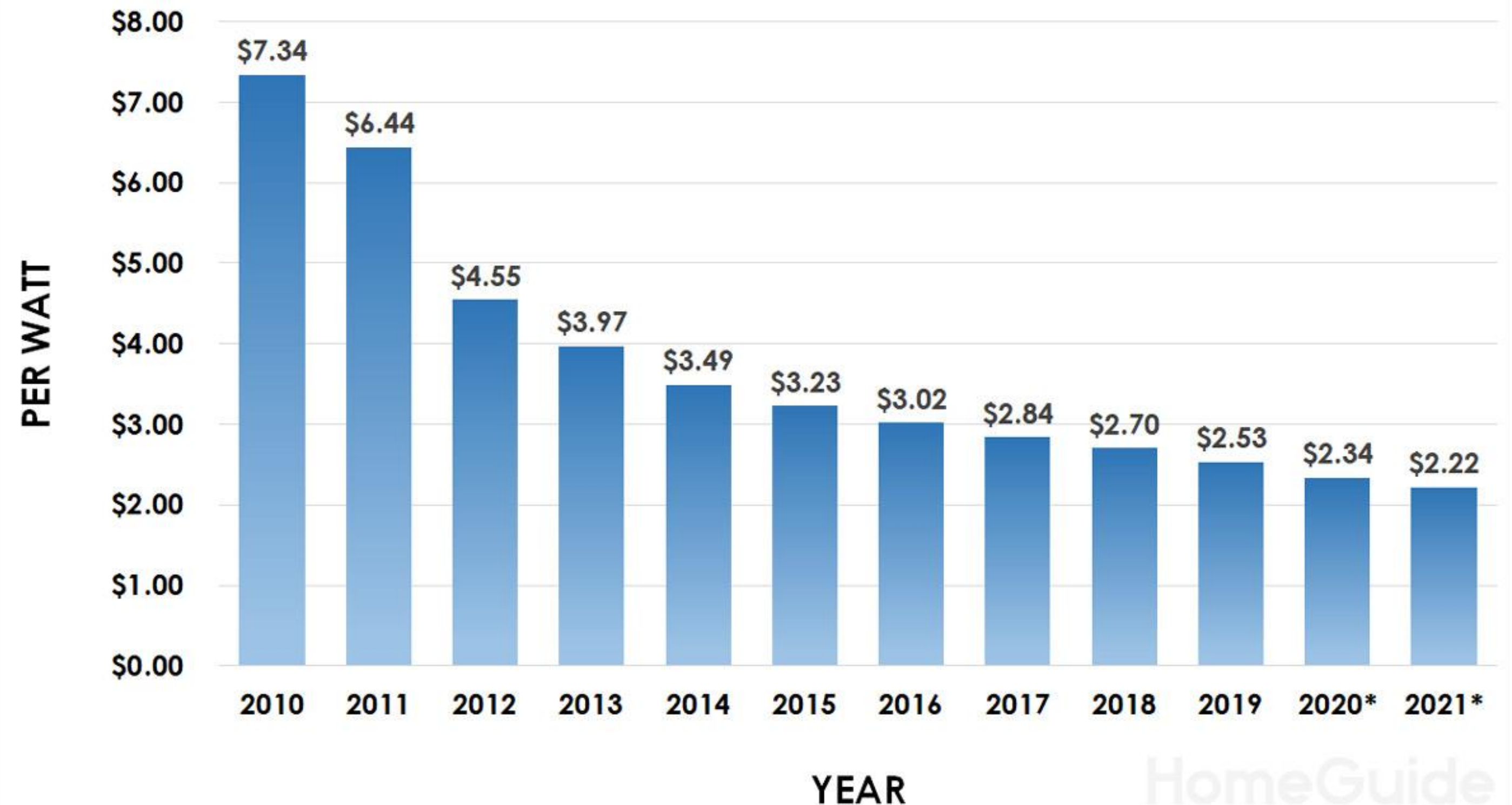
Every 4 years PG&E “reassess”  
(read *increases*) what they charge  
customers for energy

12 PV panel, 4.8kW system (25 year  
warranty)

*and* a 13kWh battery (10 year  
warranty) less government tax  
credits and rebates = \$19500

Solar is *by far* the cheapest source  
of energy. ***By far!***

COST OF SOLAR PANELS OVER TIME



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## 2. Cost of solar

1. Average cost per kWh in California = \$0.2143 or ~ \$214/month or ~\$2600/year
  - Increases every 4 years (up 7% from 2020)
  - Never ends (you will pay every month, forever)
2. Average cost per watt for Solar = \$2.68/watt or ~\$1000 for a 400w panel
  - 1 time investment (or you could invest and not change your budget)
  - Panels last >25 years
  - Government Incentives (tax credits, rebates) decrease price
  - Quantity of Incentives is income and location dependent (think equity)

### 3. Upshot

- Solar will ultimately *decrease* your energy cost

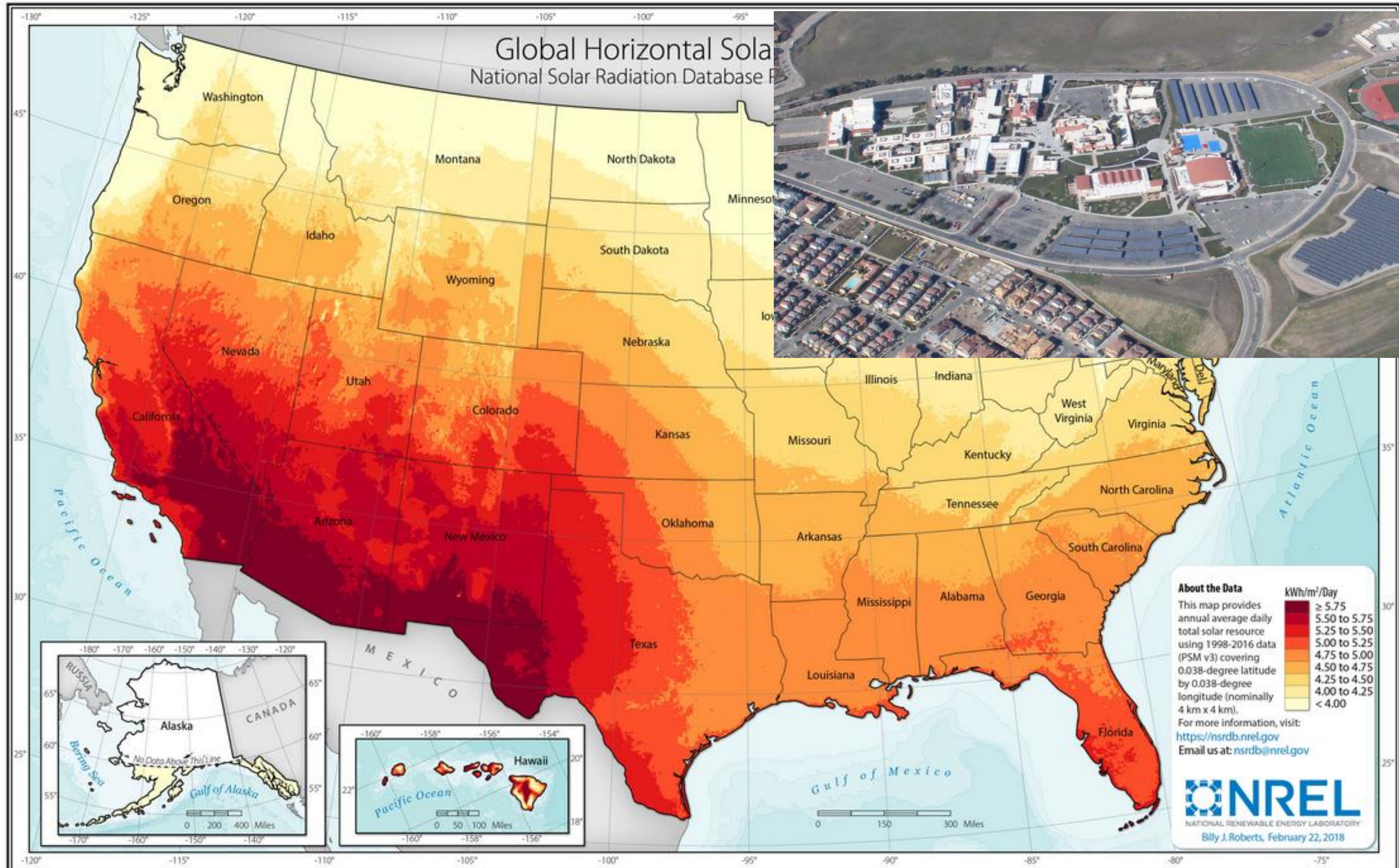
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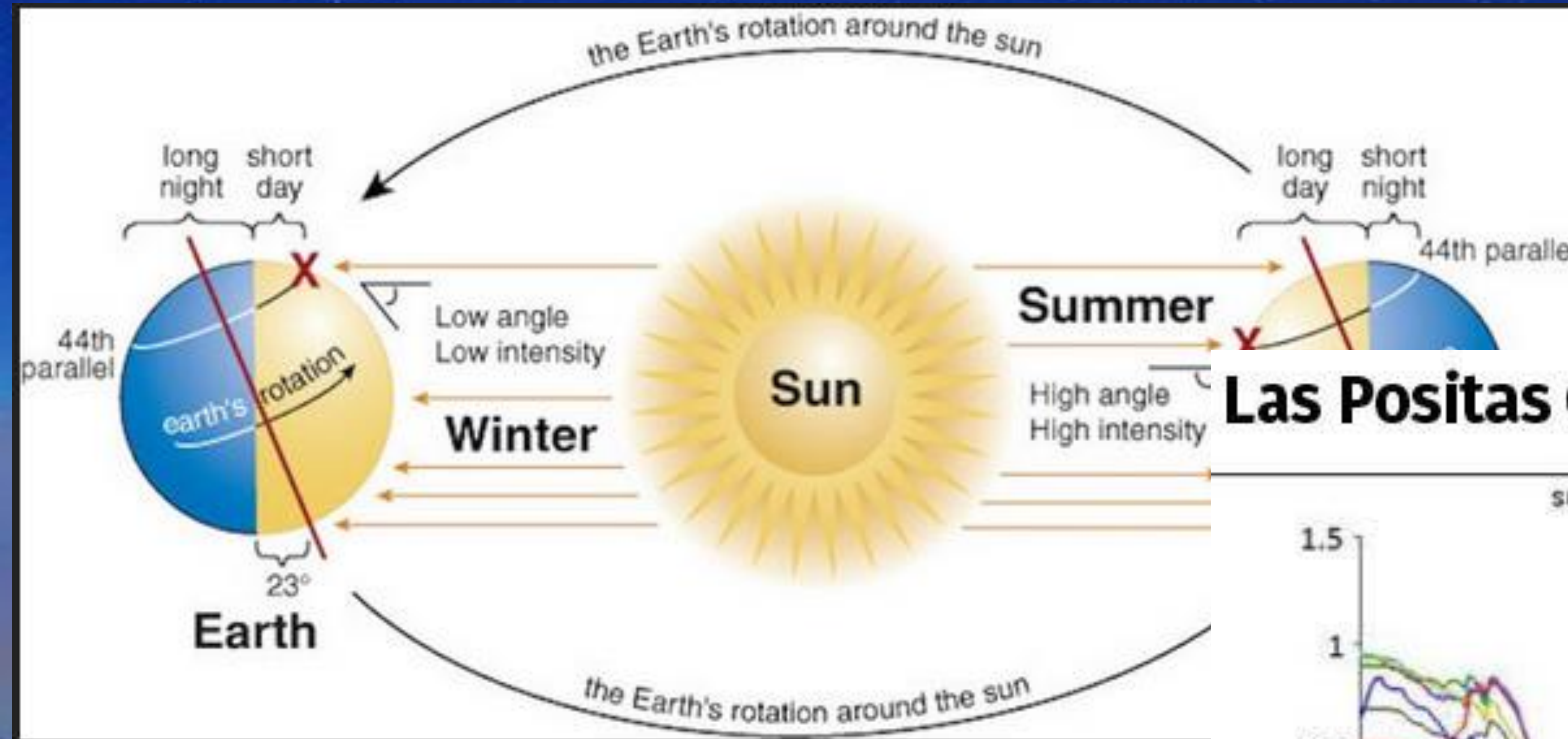
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# 3. Disadvantages of solar (and their remedies)

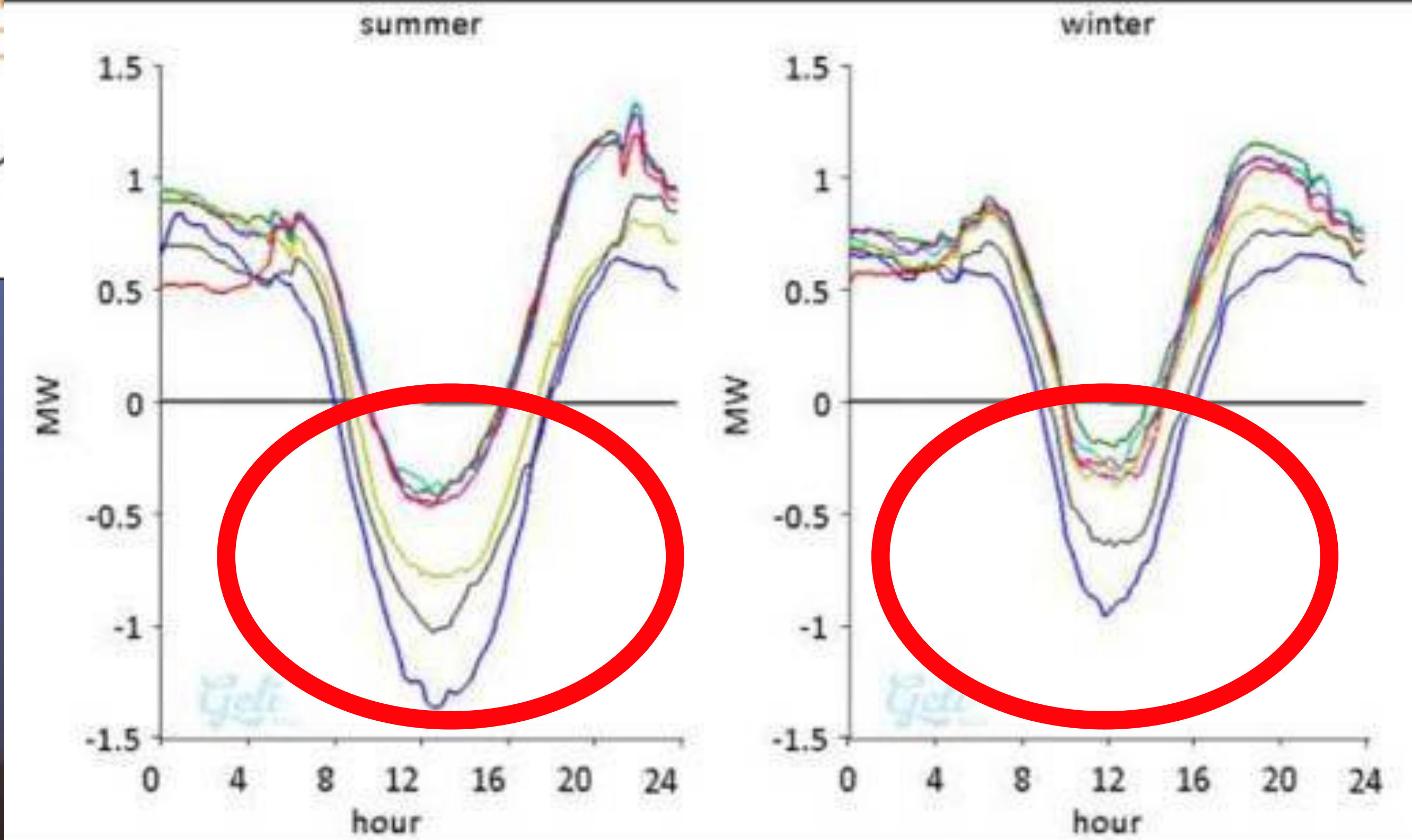




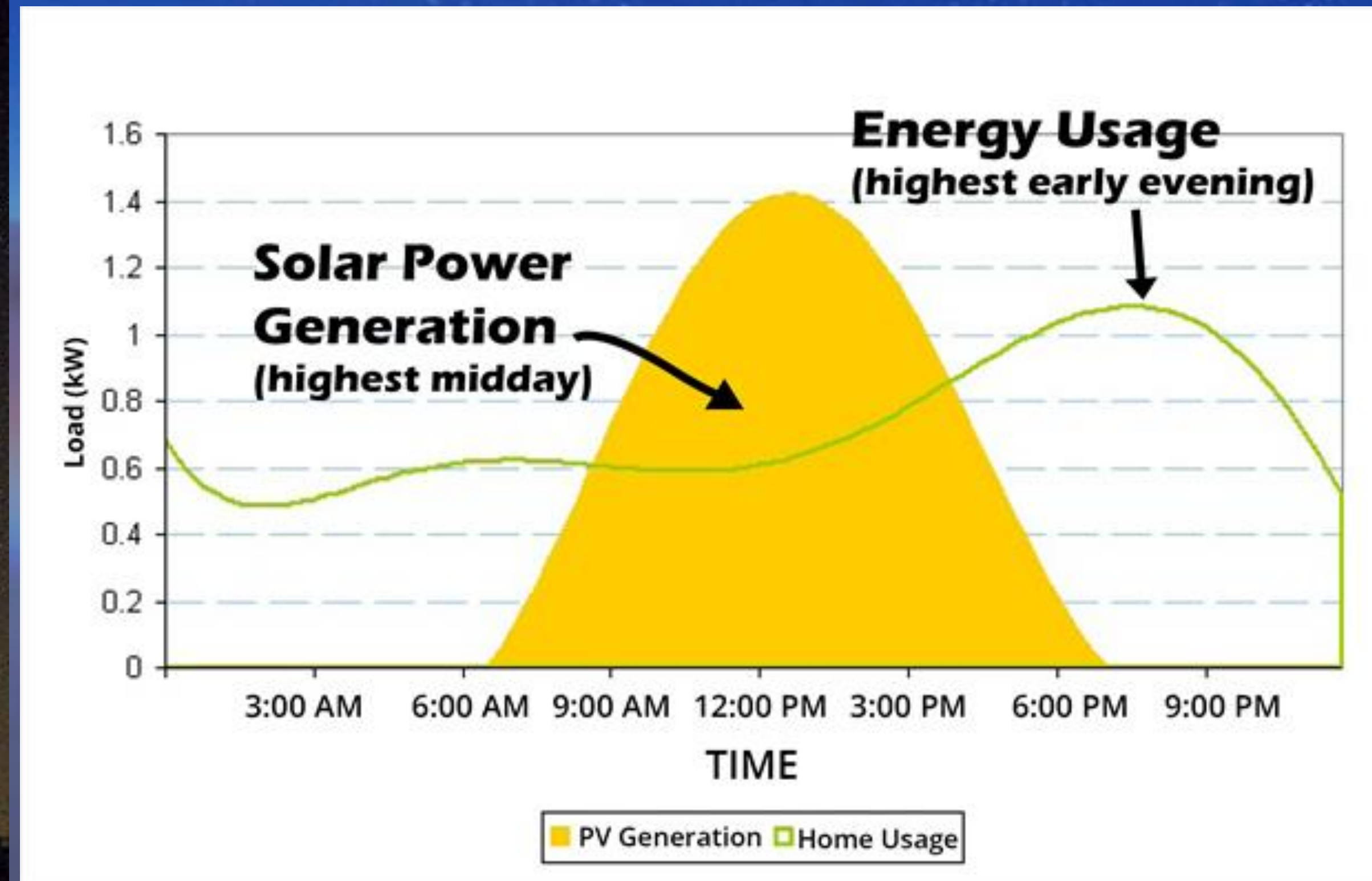
# 3. Disadvantages of solar (and their remedies)



## Las Positas College Power Demand by Season



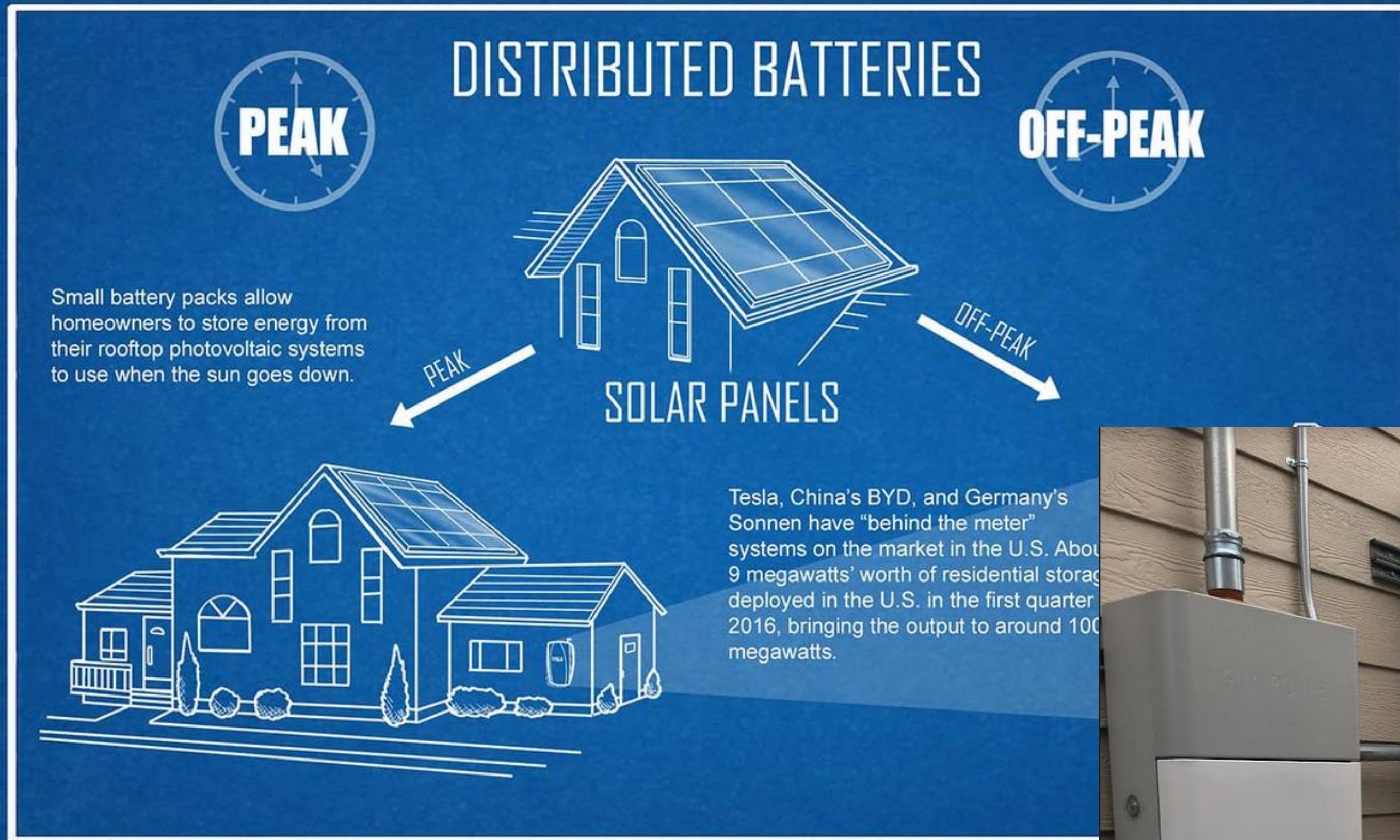
### 3. Disadvantages of solar (and their remedies)



Batteries!

# Solar Energy Storage - Batteries

Average battery cost ~\$15000



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# Tax Credits! Rebates! Payments for Excess Energy!

Purchasing Solar Panels, Energy Storage Systems:

**Tax Credits** - Reduce the amount of federal or state tax you owe. Currently all PV, and, separately, all energy storage systems are eligible for [30% credit from the federal government](#).

**Rebates** - Money direct to you. Usually with the idea that you will immediately give it to the company you purchased the system from.

## Self-Generation Incentive Program (SGIP)

Energy Storage Rebates for  
Your Home **Available NOW!**

### Am I eligible for SGIP rebates?

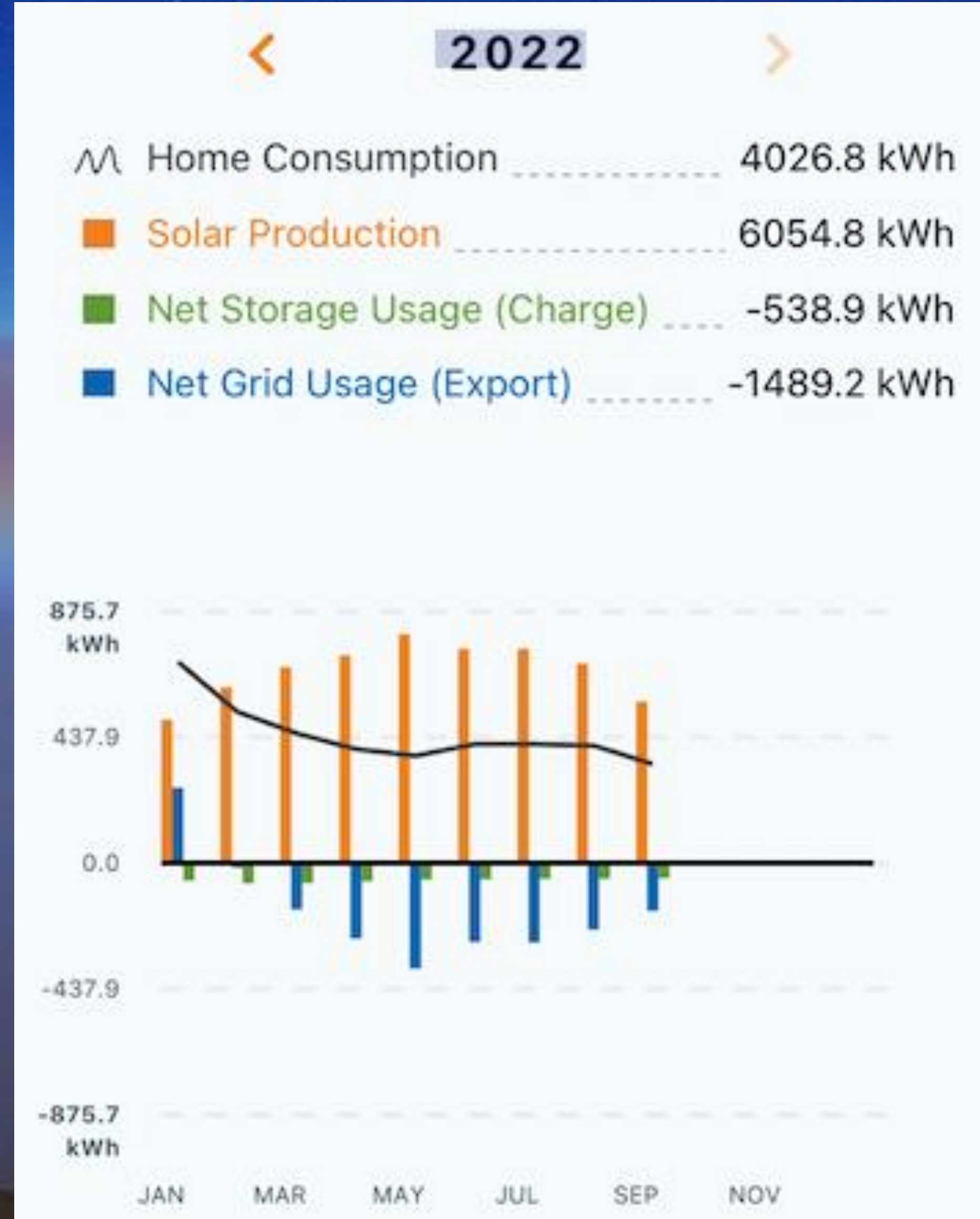
Any residential customer of Pacific Gas and Electric Company (PG&E), Southern California Edison (SCE), Southern California Gas Company (SoCalGas), or San Diego Gas & Electric (SDG&E) is eligible for a General Market SGIP rebate of approximately \$250/kilowatt-hour, which means

the rebate covers approximately 25 percent of the cost of an average energy storage system.

In addition to this **General Market** rebate, there are two additional categories of higher SGIP rebates for residential customers: **Equity** and **Equity Resiliency**.

**Payments for excess energy generated** - Some energy providers will pay you for the excess energy you generate and export to the grid. PG&E, SCE, SDG&E will pay you between 2-3 cents per kWh through [CA - Net Energy Metering](#).

# Testimonial Time!



Energy Mix for 2022:



Solar Energy	6,054.8 kWh
Home Usage	4,026.8 kWh

Made \$103!

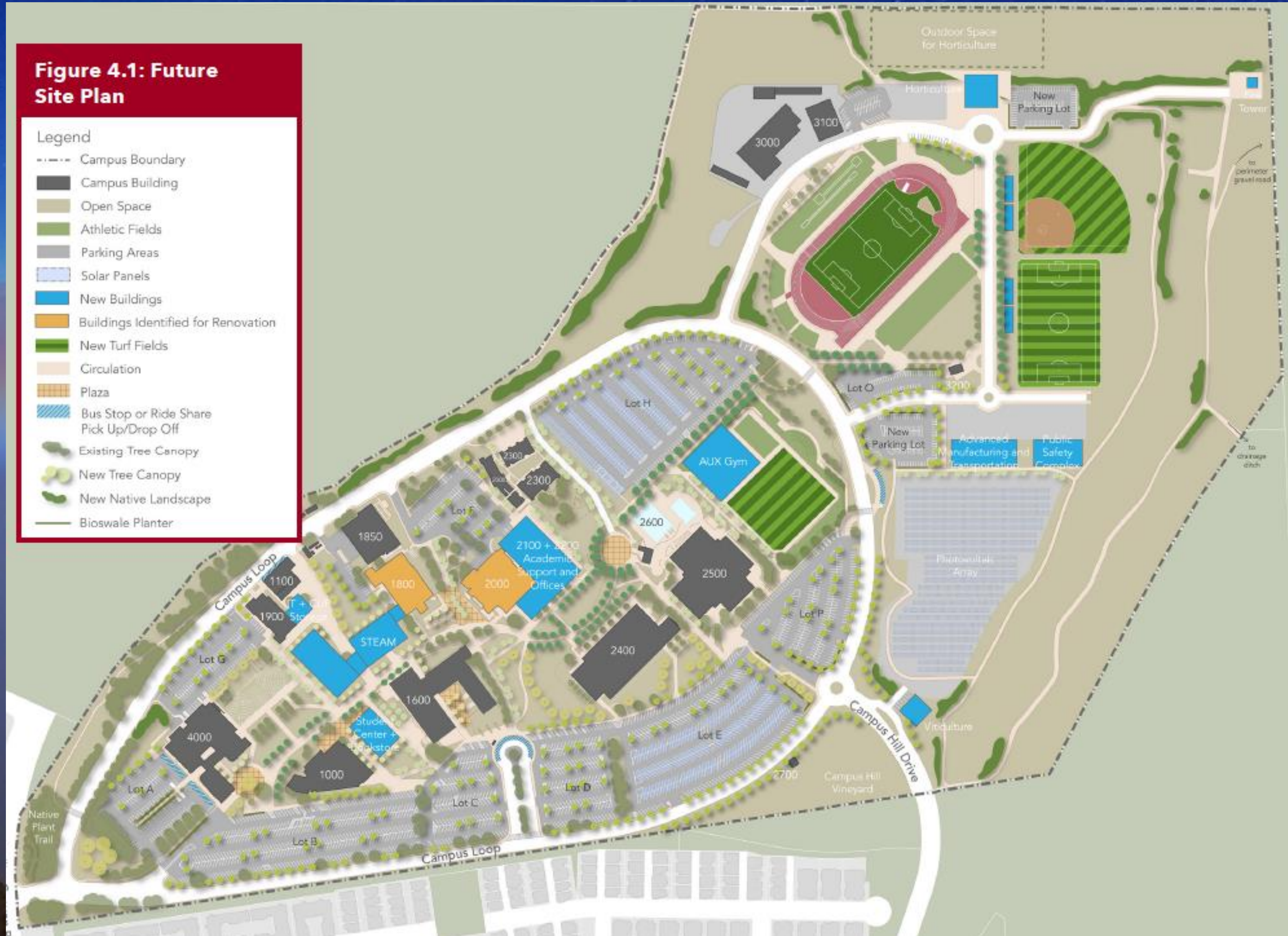
# Solar and Batteries for New STEAM building?

Makes building energy self-sufficient

Excess energy can be stored or transferred to the community via PG&E

Energy made and stored can be used to offset operational costs in lean years freeing up funds to assist other programs.

PG&E pays electricity generators, further offsetting costs



## Steps to calculating the cost of your solar energy system

1. Calculate your average energy requirement per month over 3 months.
2. Divide the monthly average by 30 days, then divide by 24 hours to get energy used per hour (kWh/hour)
3. ***Ex. Average home use = 900kWh/month x 1month/30days x 1day/24hours = 1.25kWh/hour. Multiply your hourly energy need by 1000 to get watt hours per hour: 1.25kWh/hour x 1000W/1kW = 1250Wh/hour***
4. Assume 5 hours peak sunlight (more or less depending where you live and season)
5. ***Ex. 5 hr x 1250Wh/hour = 6250W (size of system needed)***
6. Size of system needed x \$2.68/watt = cost for system



# Steps to calculating the cost of your solar energy system

7. Subtract 30% tax credit = net cost of system
8. Solar panels last >25 years. Take your average monthly energy cost from y
9. Multiply that cost by 12 months and then by 25 years. Compare it to the so
10. Bonus: Assume \$15000 for 13kWh storage battery (between \$10000 - \$20
11. Less 30% Fed. tax credit and 13kWh x \$250/kWh rebate from PG&E ~\$72
12. Rest assured you will never be caught in a blackout again :-)

# Steps to calculating the cost of your solar energy system

Worried about the up front costs?

Of course! This is close to the cost of a small new car.

However, these companies know that. And they want your business.

I went with SunPower. I had to put \$1000 up front and then didn't pay a dime until the system was working.

My payments for the system were *less than my monthly PG&E payments without the solar panels!*

In other words, I actually *decreased the amount of money I was spending every month!*