It’s Not Easy Being Green

Fall 2025 1st Alternate Tuesdays 3-4:30 PM, Shapiro AB

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Coordinator: Susan Hanna

Home Rooftop Solar Panels

Tuesday, September 9, 2025

This class will be a discussion of Rooftop Solar systems from the point of view of numerous disciplines: Economics, Climate Science, Engineering, Sociology, Politics, and more.

As an example, let's look at my rooftop solar system, mostly because I have its data.

Your Mileage May Vary.

Economics (1):

The solar system produces enough energy per year to reduce electricity purchases to zero for home consumption (including charging an electric car).

Economics (2):

Purchasing that power (in 2025) without Solar would cost about $2,500 per year.

The solar system cost $11,000 before the 30 percent tax credit, so it cost $7,700 after the credit.

Return on Investment is $7,700 / $2,500 per year which is <4 years.

Climate Science:

In California in 2024 average CO2 emissions per MegawattHour of Electricity generated was 0.012 metric tons.

The system generates about 6 MegawattHours per year so the CO2 reduction is about 0.072 metric tons per year.

Product Lifetime Costs:

Each 365-watt panel costs about $145 to $185 to manufacture.

Each panel uses roughly 0.436 metric tons of CO2 equivalent during manufacturing.

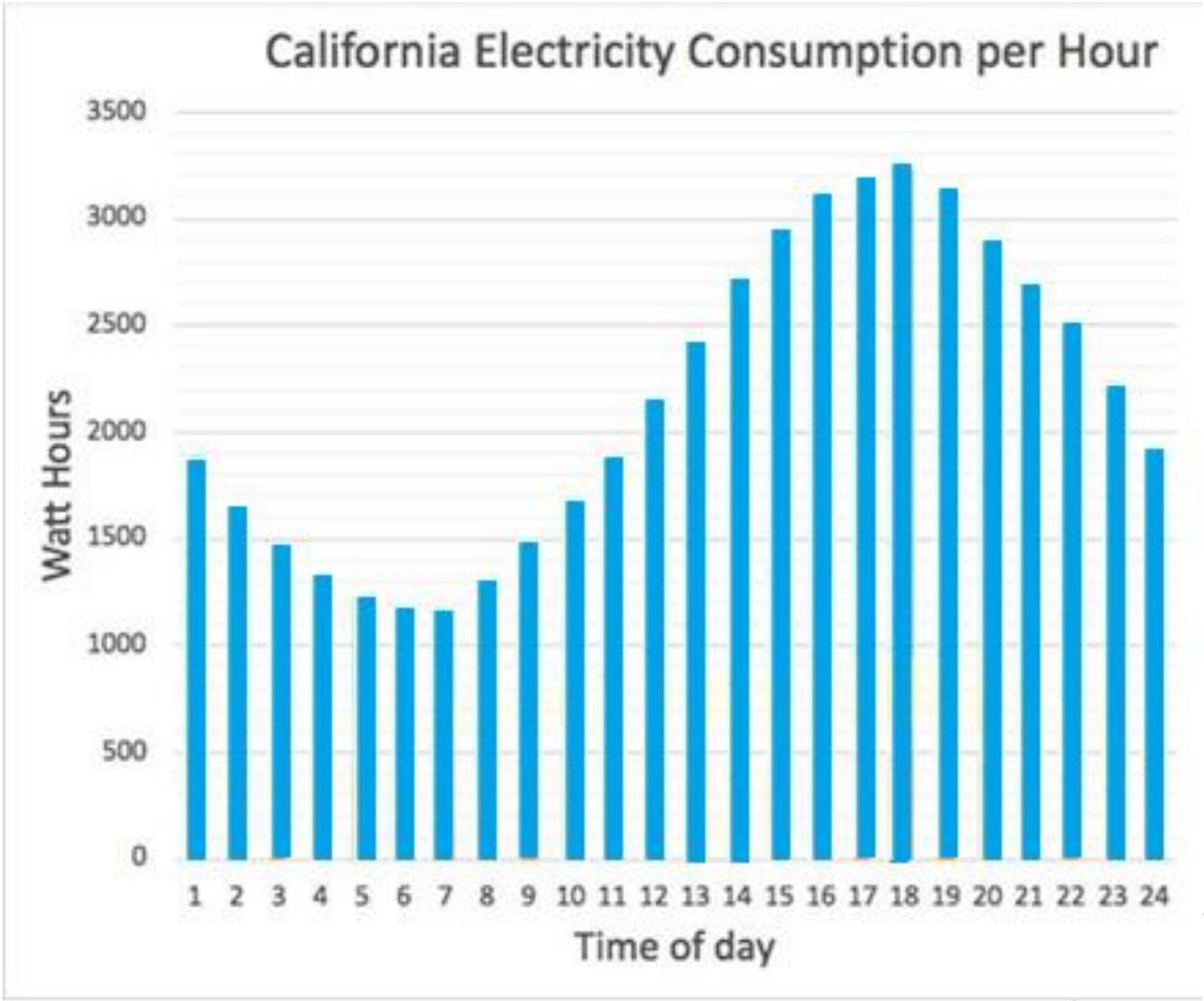
Recycling costs $30 to $40 per panel.

Engineering (1):

Rick's system consists of ten 365 watt DC panels, each with a dedicated DC to AC microinverter under the panel.

Engineering (2):

There is no storage in the system, so generation in excess of current consumption is sold to the grid.The excess production during the day and excess consumption in the evening is a challenge to the electric grid’s need to have equal production and consumption at all times.


California Electricity Consumption per Hour
Watt Hours
3500
3000
2500
2000
1500
1000
500
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Time of day

Sociology:

How do the neighbors feel about rooftop solar?

Maybe they think it's ugly.

Maybe they think it's being good for the environment.

Politics:

(Let's be gentle with each other on the Politics)

If you believe government should stay out of the subsidy business, then eliminating the Federal energy tax credit makes sense.

But, then again, should the government continue subsidizing the oil and gas industry?

Other relevant disciplines to consider?

Questions and Comments?