

Tesla Talk with Tesla Tim

On February 28th I had 3 Tesla Powerwall battery storage units installed in our home. Now it is April 1st, I have a month worth of data collected, and I thought it would be interesting to share my experiences so far.

I purchased the Tesla Powerwall battery storage units through the same company that installed my 48 solar panels over 4 years ago, ICON Solar. I was very please with the solar panel installation and support, so I was not surprised with the great job they did installing the Powerwall's.

I had the Powerwall's installed to provide complete home backup incase of a power outage. This meant that the main power feed from the grid (AEP) had to be moved from my home breaker box to a panel referred to as a Gateway. The function of the Gateway is to disconnect the Solar and Battery power from the grid (AEP) when there is a power outage. The Solar and Battery power will still supply the house but not be allowed to feed back to the grid (AEP). This keeps people working on the powerlines safe.

The Powerwall's have 3 modes. Two of the modes you can select, and the third mode is automated. The modes are:

1. Backup Only – In this mode the Powerwall's are only used to provide power if there is a power outage.
2. Self-Powered – In this mode power stored in the battery will be used to power the house when solar power is not available. You can set the amount of power to reserve for backing up your home. The non-reserved power will be used to power the home. An example would be, you reserve 75% of the battery for back-up.

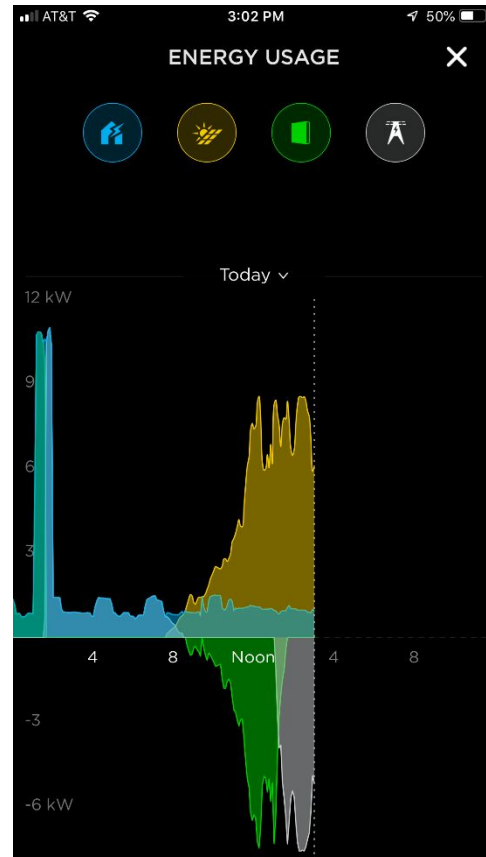
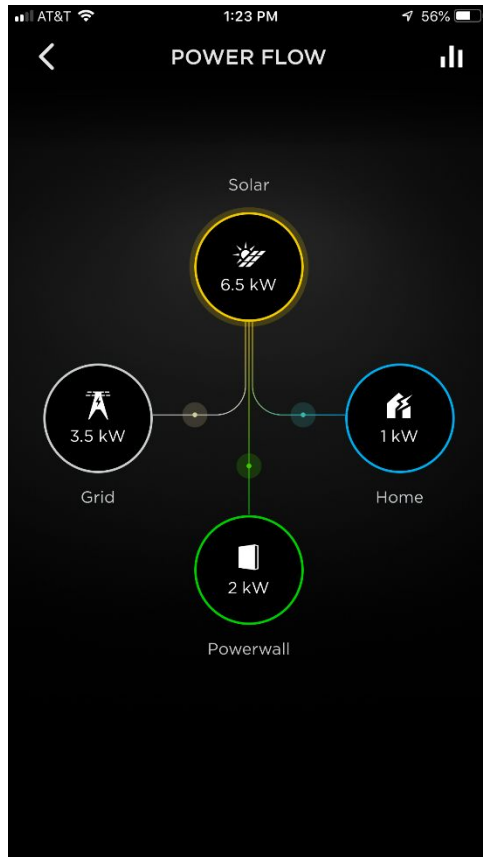
As the sun goes down in the evening and the solar panels are not able to provide the power to run your home then the Powerwall's would start to provide power until 25% of their capacity is depleted. Once the Powerwall's have used the 25%, if the sun is not up and the solar panels are not producing power, then power from the grid would be used until the sun comes up and the solar panels started producing power.

3. Storm Watch – If a storm is approaching and a storm watch or warning is issued for your location and you are using the Self Powered mode then the Powerwall's will go into Storm Watch mode. In this mode the Powerwall's will charge to 100% to provide back-up power incase of an outage during the storm. Once the storm has passed the power walls will then return to normal operation.

You use the Tesla App on your phone to change the settings. The app also lets you monitor the system. You can see where power is coming from to power your home. There are also charts and data. I have been recording the data daily for the last month in a spreadsheet.

Below are a couple of the screens that show how the system is functioning. The first picture show that the solar panels (in yellow) are producing 6.5 kW of power. This is supplying 1 kW to the house (in blue), 2 kW to charge the Powerwall's (in green), and 3.5 kW to the grid (in white. The second picture charts the usage during the day. You can see where our Tesla Model X started charging around 1:00 am, the solar panels started producing around 7:30 am, the Powerwall's started charging around 8:30 am and finished around 1:30 pm, and finally power from the grid stopped around 8:30 am and being pushed to the

grid around 1:00 pm. Of course, the blue shows that the house is never without power.

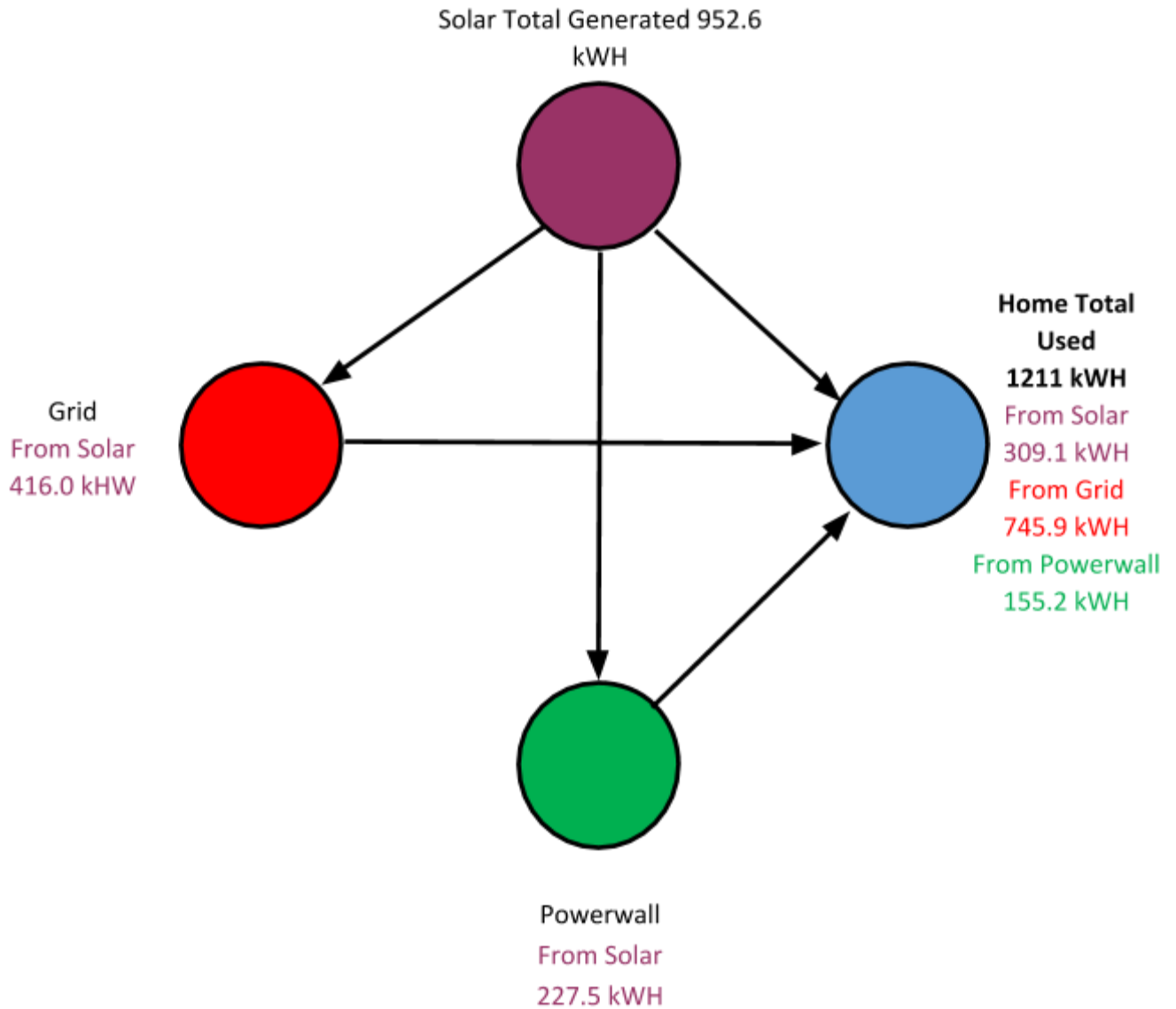


I have our Powerwall's set to Self-Powered and have been decreasing the reserved amount every 5 days. I am looking for the best setting for providing power and leaving battery for back-up. My current setting is 65%. At this setting, on a nice sunny day, I go off grid around 8:30 am and do not pull any power from the grid until the about 1:30 am the next day. So, I am only pulling power from the grid for about 6 hours out of every 24.

For those that like numbers, our home used 1211 kWh in March. The solar panels generated 952.6 kWh with 416 kWh being pushed to the

grid and 227.5 kWh used to charge the Powerwall's. The Powerwall's provided 155.2 kWh. From the grid we pulled 745.9 kWh.

Here is a drawing that illustrates the power flow:



So, what do the numbers mean? AEP provided 745.9 kWh and we sent back to AEP 416.0 kWh. AEP bills us for the difference which is 329.9 kWh. It took 1211.0 kWh to run everything in our house, but we are

only going to pay AEP for 329.9 kWh. We pay \$0.05446 per kWh which equals **\$17.97** + Taxes and other fees. Our bill runs from mid-March to mid-April. Our March bill, with only about 2 weeks with the Powerwall's, went from a 4-year average of \$143 to \$89. The April bill 4-year average is \$82 so I am guessing it will be \$20 to \$30.

In summary, we have found the solar panels with the addition of the Powerwall's to get us closer to achieving self-sustainability with solar and stored solar power.

Tim Freidenberger
Tesla Model X owner