



[DER](#), [Grid Scale](#), [News](#), [Rooftop](#), [Solar](#), [Storage](#), [Vehicle to grid](#)

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As the patterns of our lives shift in response to COVID-19, our energy profiles are shifting, too. Overall, electricity demand has decreased and is expected to remain lower as commercial buildings, factories and other large electricity users slow or stop operations. Residential use, on the other hand, is expected to rise as we shelter in place. On March 12, Bloomberg claimed [“Every day’s a weekend.”](#) But it’s a weekend day when people stay inside Zooming, streaming and gaming.

Pecan Street has been monitoring electricity use and generation from hundreds of homes in our research network for nearly a decade. Many of these homes have rooftop solar and electric vehicles, and we’ve been measuring each home’s total energy use as well as use from individual circuits, like heating/cooling, EV charging, refrigerator, etc.

So we decided to take a look at how our participants’ energy profile has changed since COVID-19 sent everyone home. The charts here include energy data from 113 homes in our research network. All of the homes are located in a neighborhood in Austin, TX. 74 of the homes have rooftop solar. 50 of them have Level 2 electric vehicle chargers. We selected homes for which we have data from at least three previous Marches, so we can see how trends differ given the range of weather patterns we experience in Texas in the Spring.

Check back here frequently for additional snapshots and analysis — we’ll be adding new charts as we complete them. And be sure to review the methodology and other notes at the end of this post.

Here’s what we found.

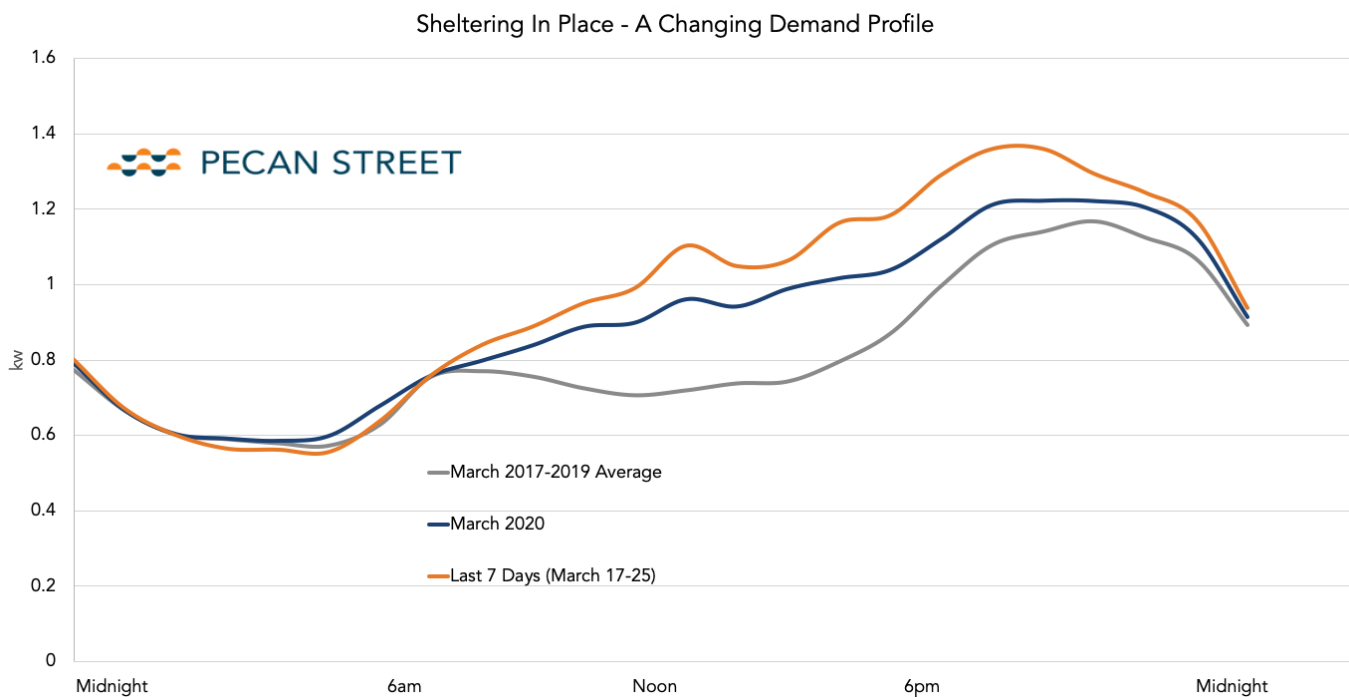
Total Residential Demand Is Up All Day Long

Our first snapshot was conducted on March 26 and includes data from March 1-25. For

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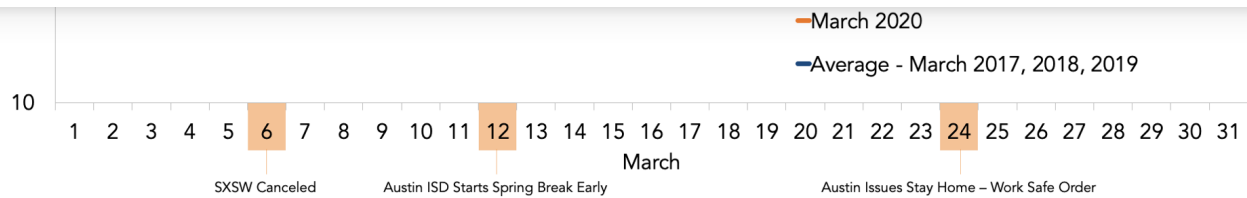


We then examined demand over the course of the month. We had some warm spells during March (we'll address that below), but overall, demand is up visibly compared to previous Marches, and it increased throughout the month as more announcements were made and more people stayed home.

Whole Home - Average Energy Demand, March 2020

35

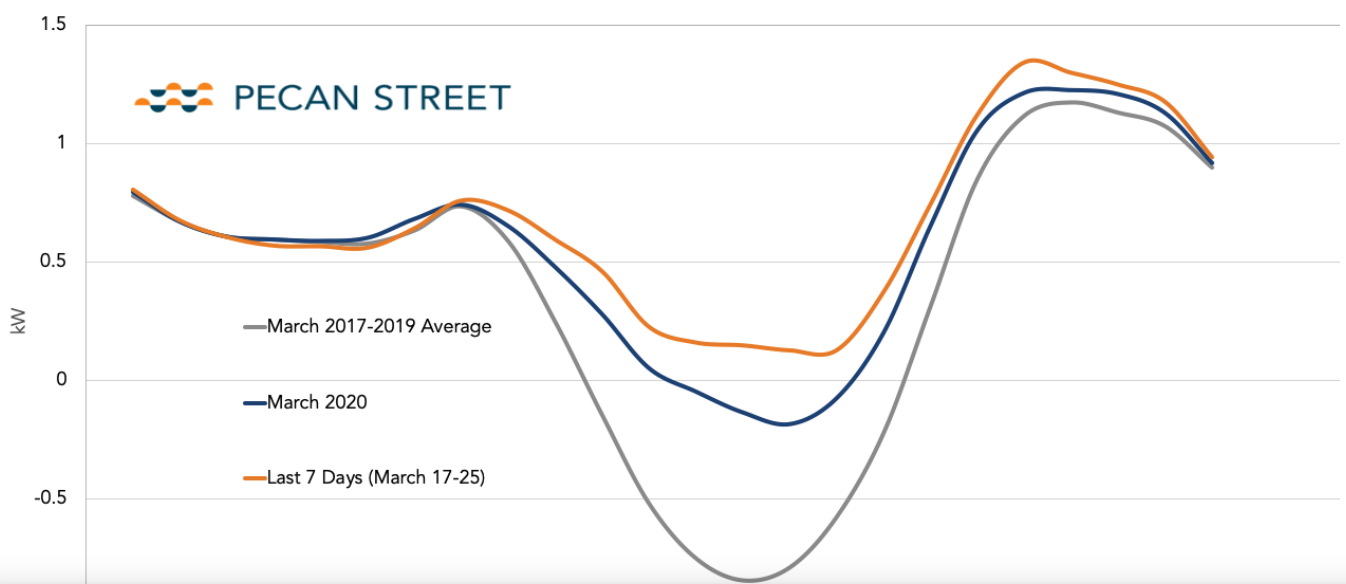
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COVID-19 is changing the duck curve

One of our network's most unique qualities is its high penetration of rooftop solar. In Austin, March is one of the months that solar customers significantly recoup on their investment. Solar production is very high and energy use is fairly low, so they "sell" a lot of energy back to the grid. That's not the case this March. Though individual homes experienced brief periods of negative demand and sent power back to the grid, on average, the curve of our blended homes shifted upward with less of that energy going back to the grid. The solar homes in the analysis are using every kW of electricity they produce during the day. This snapshot includes data from March 1-25.

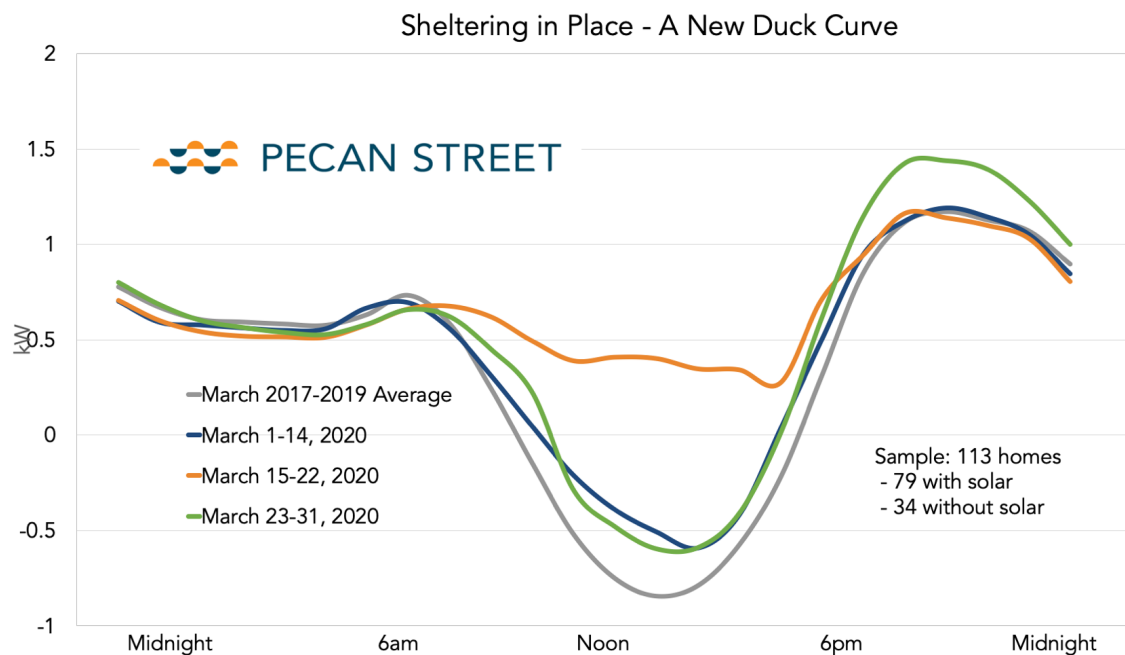
Sheltering in Place - A New Duck Curve



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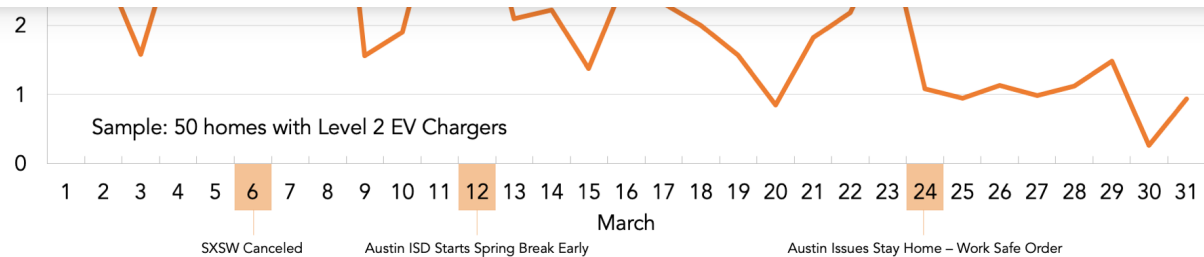
EV Chargers are getting a rest

Not surprisingly, demand for EV charging is way down since Austinites started staying home. Demand dropped considerably once Austin ISD closed early for Spring Break (March 12) and Mayor Adler signed the Stay Home – Work Safe order (March 24).

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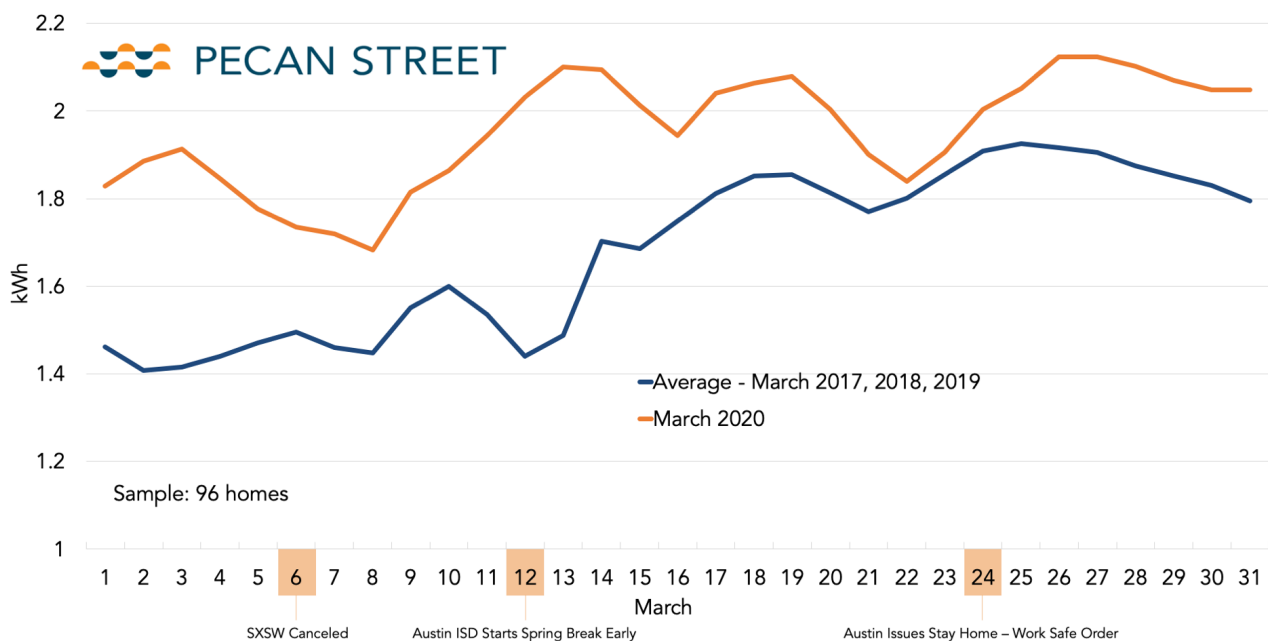
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Refrigerators are working overtime

If you think you're spending a lot of time in front of an open refrigerator, you're probably right. Today's refrigerators are much more efficient than older models, and the homes in our research network have newer-than-average models. Even so, demand is up considerably. Frequent opening and closing isn't the only possible culprit, however. Families are likely storing leftovers more than usual; putting warm leftovers in the fridge kicks the appliance into overdrive.

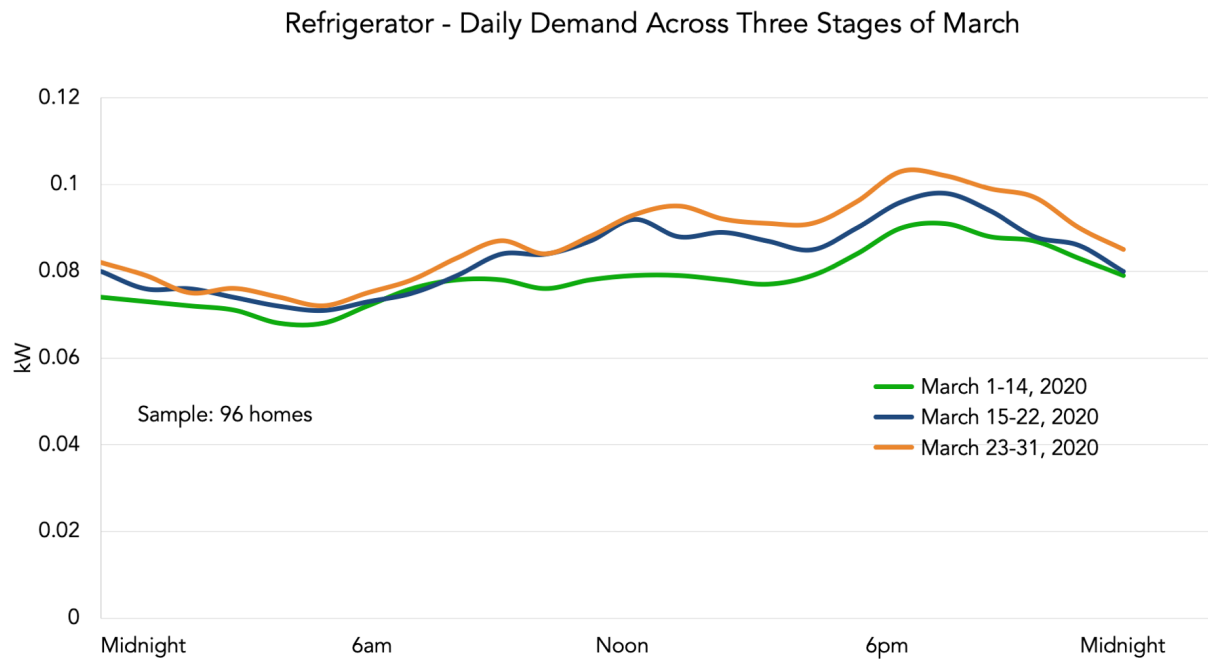
Refrigerator - Average Daily Demand, March 2020



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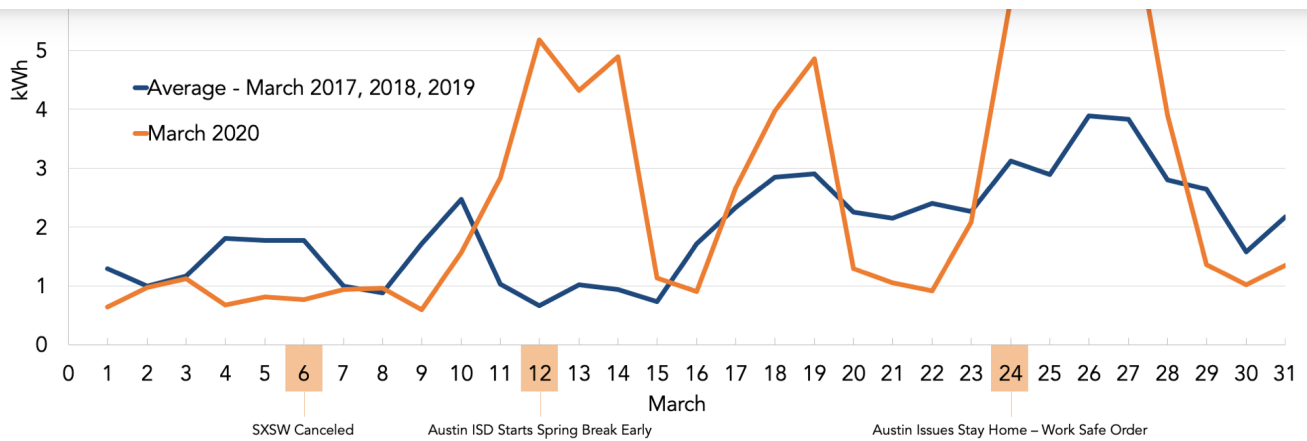
HVAC – Families are keeping their cool. Literally.

Energy demand in Austin is heavily influenced by air conditioning, and not just during our brutal summers. Even in March, temperature swings can produce significant spikes in energy use. So, comparisons with previous Marches can be difficult. That said, here's the daily

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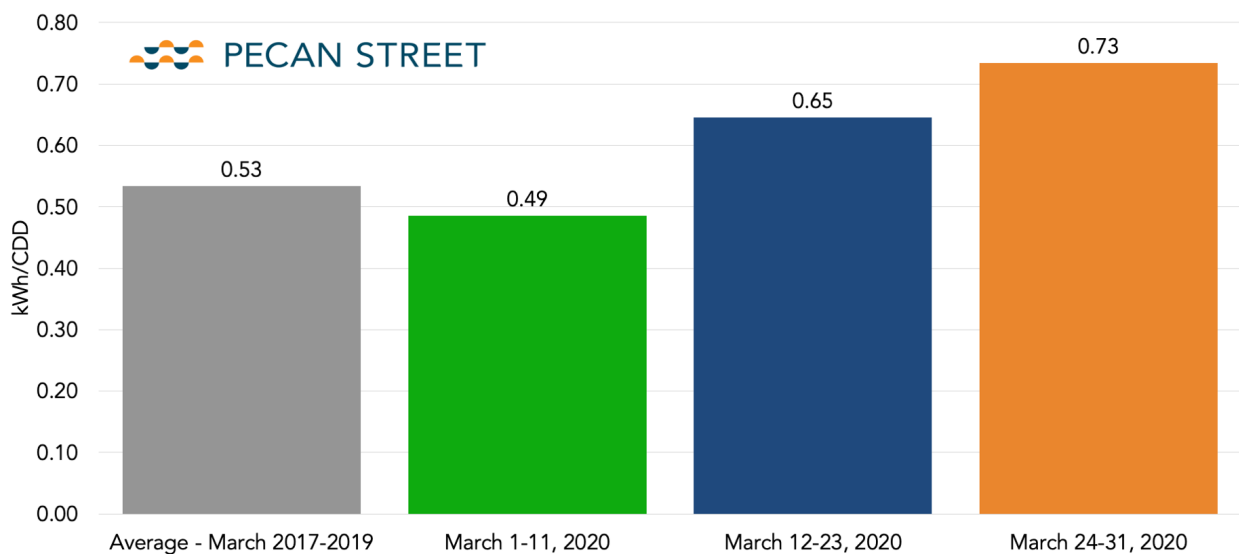
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We used kWh of HVAC demand per Cooling Degree Days (CDD) to account for weather variances. A CDD is the number of degrees that the outside temperature averages over a target temperature for a day. The more Cooling Degree Days, the more likely someone is to run their air conditioner. We used the fairly standard 65 degrees for our calculations. Even after accounting for weather swings, residents are using about 40% more electricity to cool their homes.

HVAC Demand Per Cooling Degree Day



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- We examined a subset of our participants that have been part of our network for several years and favored homes with rooftop solar and EVs so we could capture how those technologies contributed to any changes.
- Our calculations include a total of 113 homes. 74 of them have rooftop solar. 50 of them have Level 2 EV chargers.
- In each of these homes, our sensor equipment measures demand (and for solar, generation) as frequently as every second.
- All homes are located in one neighborhood in Austin, Texas.
- For several of the comparisons, we examined the average demand throughout day (kW) and for each day of the month (kWh). For historic comparison, we averaged the figures from previous Marches (2017, 2018 and 2019).

Details about March 2020 in Austin Texas

- All of the homes included in these analyses are part of Pecan Street's research network and are located in Austin, Texas.
- Austin experienced one of the country's first high-profile COVID-related cancelations when SXSW was called off on March 6.
- Spring Break for many Central Texas school districts was March 16-20. Austin Independent School District canceled all classes on March 12, the last day before Spring Break, and has closed all school buildings and facilities until May.
- March weather in Austin is extremely varied. March 2020 included dramatic swings of cool (60s) and warm (low 90s) high temperatures the entire month. Pecan Street's analysis of HVAC demand will account for this variation

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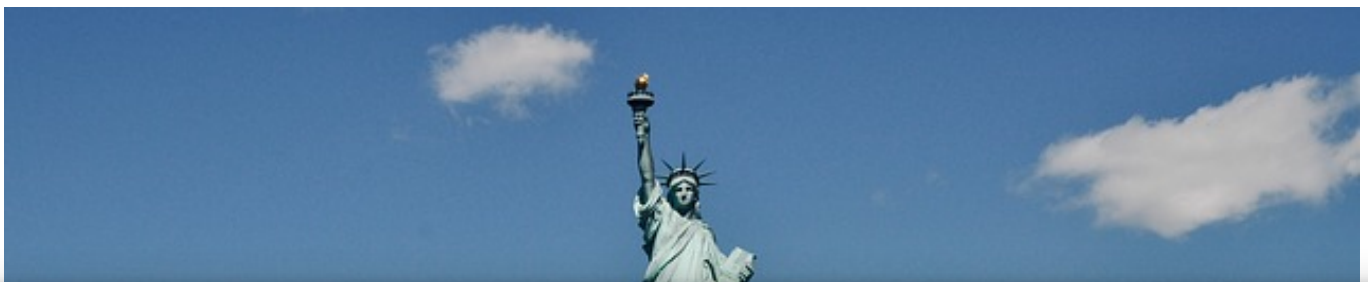


Chef Technology Officer, Pecan Street Lab

Scott leads activities and electrical research at the Pecan Street Lab. He worked at a thin film CIGS solar module manufacturer where he led module packaging, performance, certification and reliability efforts. Prior efforts include work in the military, medical, consumer and oil industries developing power supplies, precision measurement equipment and inductive heating technologies. Scott received his B.S.E.E. from The University of Texas at Austin with undergraduate specializations in both communications systems and power distribution. Scott was awarded the 2015 Outstanding Engineering Award for “transforming the world’s understanding of consumer and community electricity usage” by the the IEEE Power Engineering Society Central Texas Chapter. He is also a contributing author to Transmission & Distribution World Magazine.

[View all posts by Scott Hinson](#)

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