


PECAN STREET

SmartCity USA Project Planning

March 9, 2015

A woman with long, wavy brown hair and blue eyes is smiling warmly at the camera. She is wearing a dark-colored top. The background is a softly lit living room with a brick fireplace on the left, a window with blinds in the center, and a lamp with an orange shade on the right.

“Participating in Pecan Street’s research is giving me a chance to be part of a smarter way of using energy.” - Kathy Sokolic

Project Plan & Timeline

- 1: Preparation (Nov. 2014 - March. 2015)
- 2: Establish Smart City USA (April - Dec. 2015)
- 3: Integrate Multifamily Field Trial (Oct - Dec. 2016)
- 4: Operations & Analysis (On-going)

Implementation Funding

Grant	Amount	Deadline	Purpose
DCEO Residential Energy Efficiency	\$300,000	10/2015	Collect energy consumption data from 40 homes to identify opportunities for energy efficiency
DCEO Community Solar & Wind Energy Program	\$112,389	05/2015	Install 30kW of distributed generation across 10 homes
DCEO Distributed Solar & Wind Energy Program	\$249,999	04/2016	Install 90kW of distributed generation across 30 homes
Total	\$662,388		Install a total of at least 120kW of DG across 40 homes, pico-grids in 10 homes, and energy monitoring across 200 homes

Implementation Plan

Program Component	# Homes	Program Description
Home Energy Consumption Study	160	Install Rainforest Gateways in diverse group of homes to collect energy consumption data
Residential PV Field Trial	40	Provide rebates on sliding scale based upon income to incentivize installation of PV & HEMS, average 4kW/home PV array. Cluster on transformers.
Residential Picogrid Field Trial	10	Out of the 40 DG field trial participants, select 10 homes clustered on one or two transformers to receive heavy subsidy for installation of a 8kW energy storage system.
Smart City USA Total	200	Installation of a nationally unique R&D testbed for residential microgrids, and collection of regionally unique data on energy consumption in the Midwest.

Budget - Implementation (Y1)

Item	Oak Park Funded	Cost Share Funded	Total Cost	Description
Personnel	\$105,000	\$0	\$105,00	Contract to hire 1 Project Manager and 1 part-time Electrician
Equipment	\$530,400	\$264,400	\$794,800	Rebates for purchase of HEMS, PV & Energy Storage
Supplies	\$2,500	\$0	\$2,500	General supplies: printing, postage, electrician supplies
Contractual	\$0	\$211,250	\$211,250	Data management services
Total	\$637,900	\$475,650	\$1,113,550	
Availabe	\$662,388	Funding Match: 75%		
Net Available	\$24,488			



Program Operations Funding & Timeline

Grant	Amount	Deadline	Purpose
Illinois Science & Energy Innovation Foundation	\$92,300	TBA	Educate Oak Park residents & other Illinois communities on benefits of smart grid
Total	\$92,300		

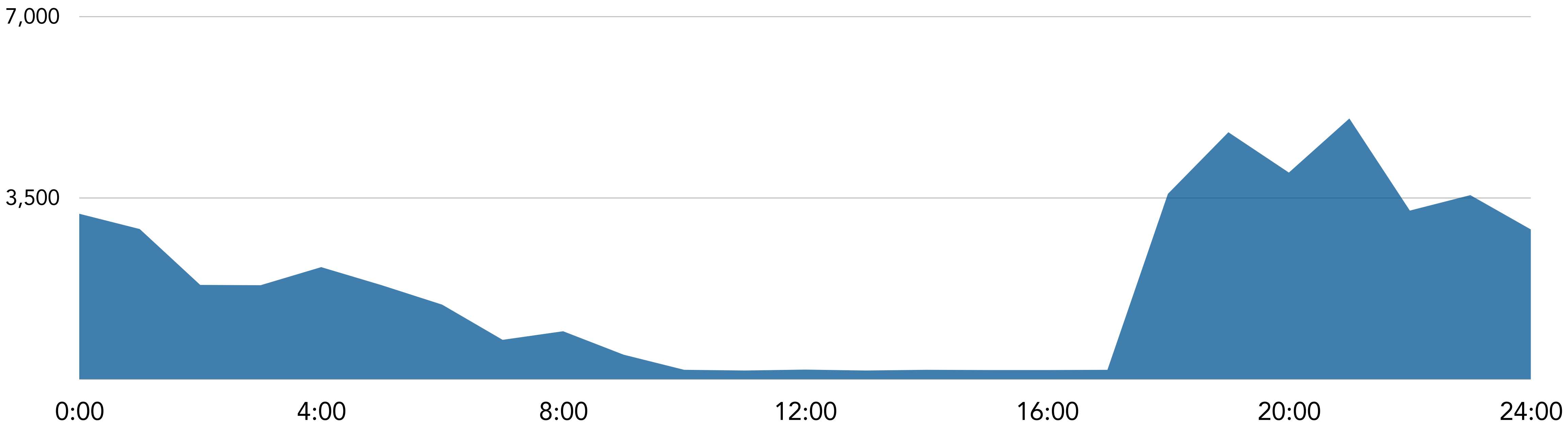
Budget - Operations (Y2 & Y3)

Item	Oak Park Funded	Cost Share Funded	Total Cost	Description
Personnel	\$226,013	\$0	\$226,013	On-going Project Manager and Electrician, 5% annual increase
Equipment	\$0	\$0	\$0	No anticipated equipment purchases
Supplies	\$5,000	\$0	\$5,000	General supplies: printing, postage, electrician supplies
Contractual	\$60,000	\$325,500	\$385,500	\$60k for pricing & behavioral trials interface. Data management services
Total	\$291,013	\$325,500	\$616,513	
Available	\$92,300	Funding Match: 112%		
Net Available	-\$198,713			

Project Management Plan

Home Energy Consumption Study

Summer day Daily electric use (watts): 1-hour interval smart meter

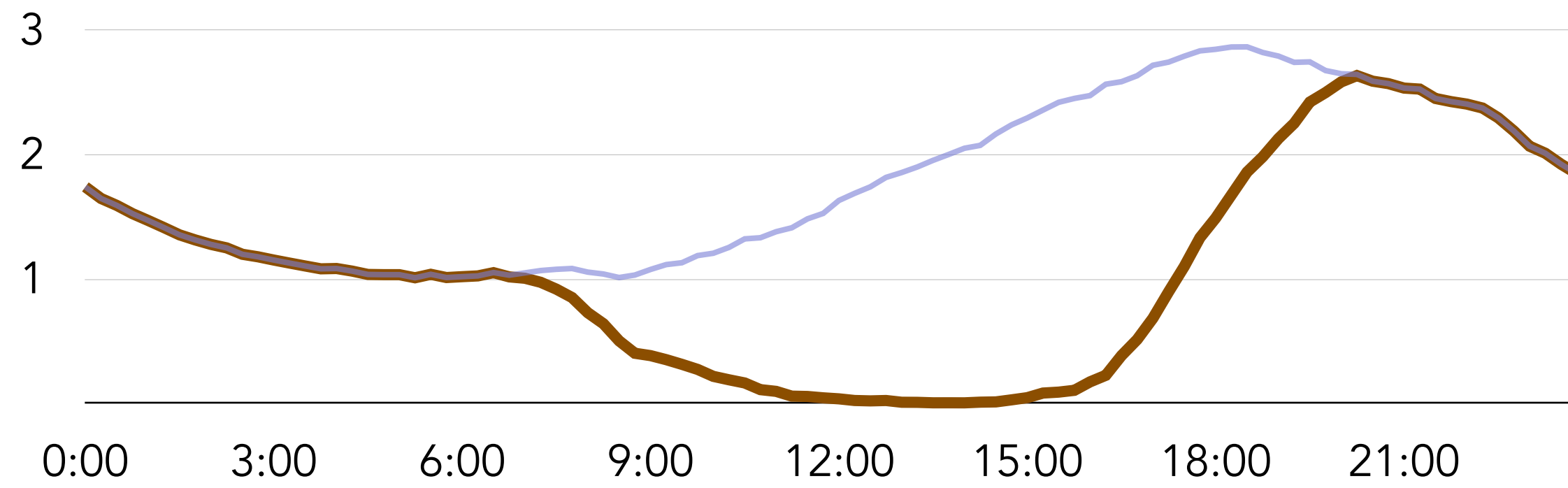


Source: Pecan Street

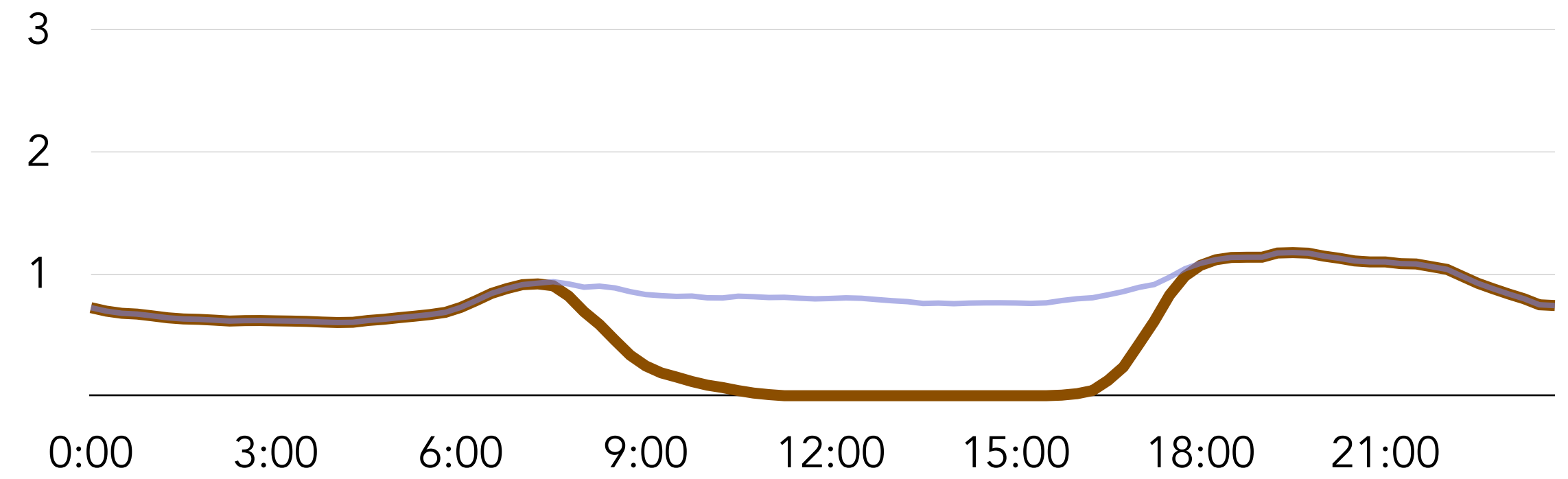
Project Management Plan

Residential PV Program Design

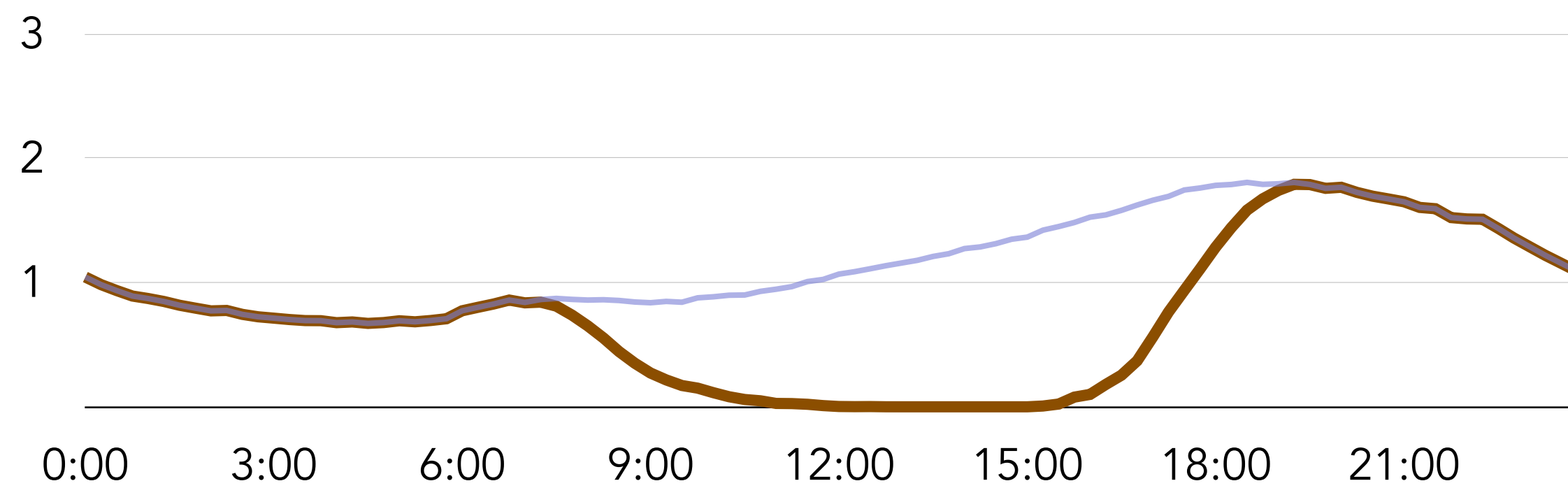
Impact of PV on demand from grid - Austin



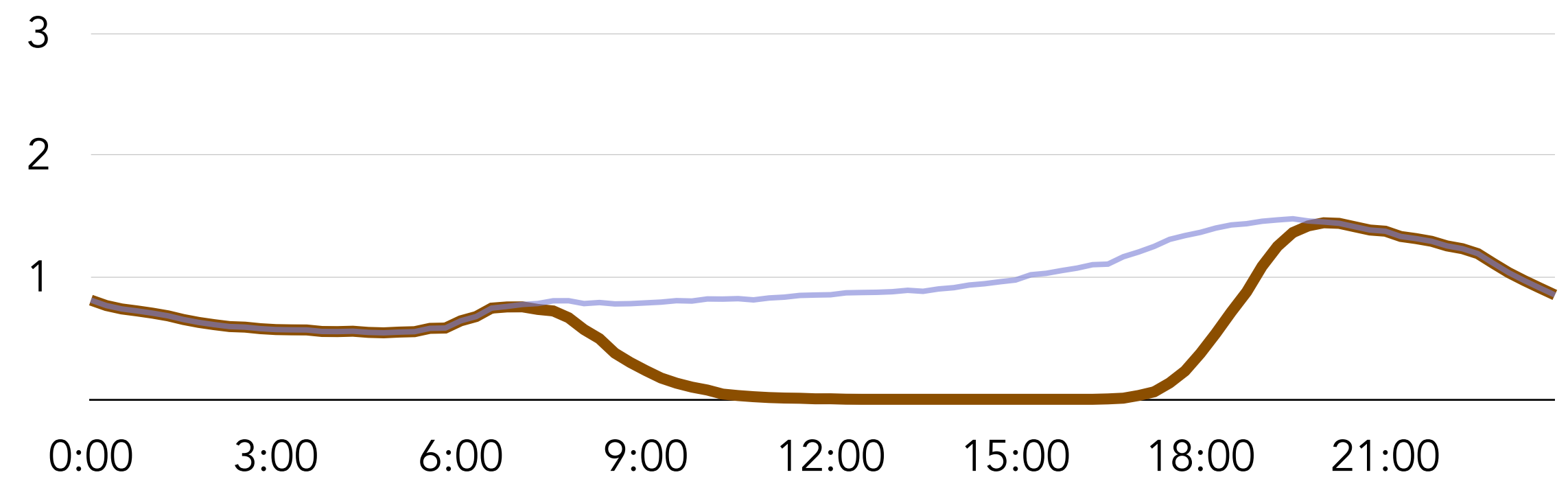
Summer



Winter



Fall

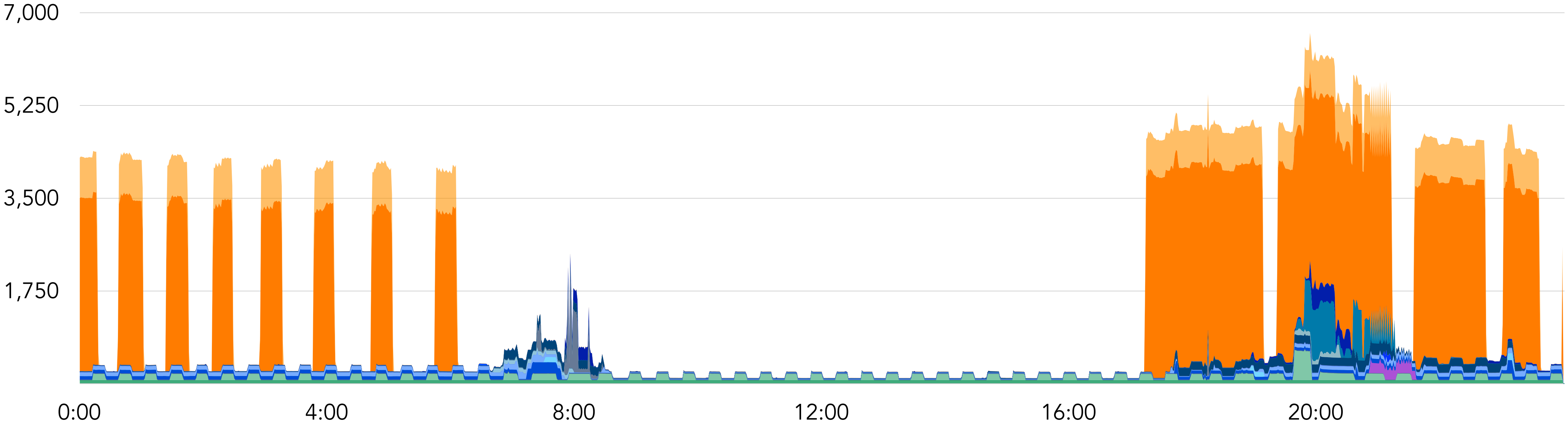


Spring

Source: Pecan Street

Home electricity use (kW) and grid demand with solar panels

Summer day Daily electric use (watts): Home Energy Monitoring Systems

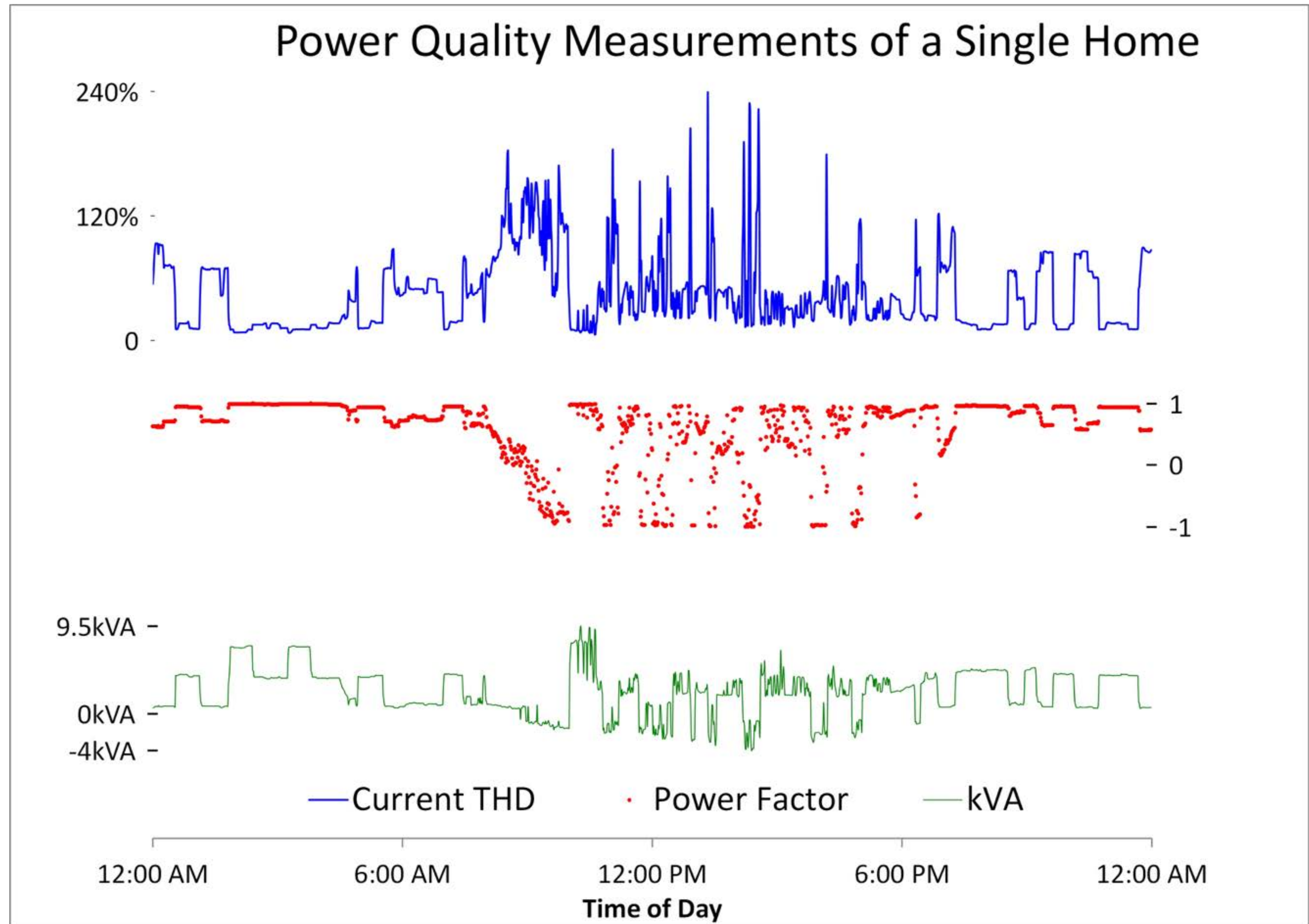


Source: Pecan Street

- Other
- Master bedroom
- General Lights 1
- Dishwasher
- HVAC air handler
- Living Room Always On
- Bathroom 1
- Microwave, toaster oven, coffee machine (KSAC 2)
- Living Room
- Refrigerator (KSAC 1)
- Bedroom 2
- Kitchen lights (Kitchen1)
- Garage
- Dryer
- Bathroom 2
- Washer
- HVAC compressor



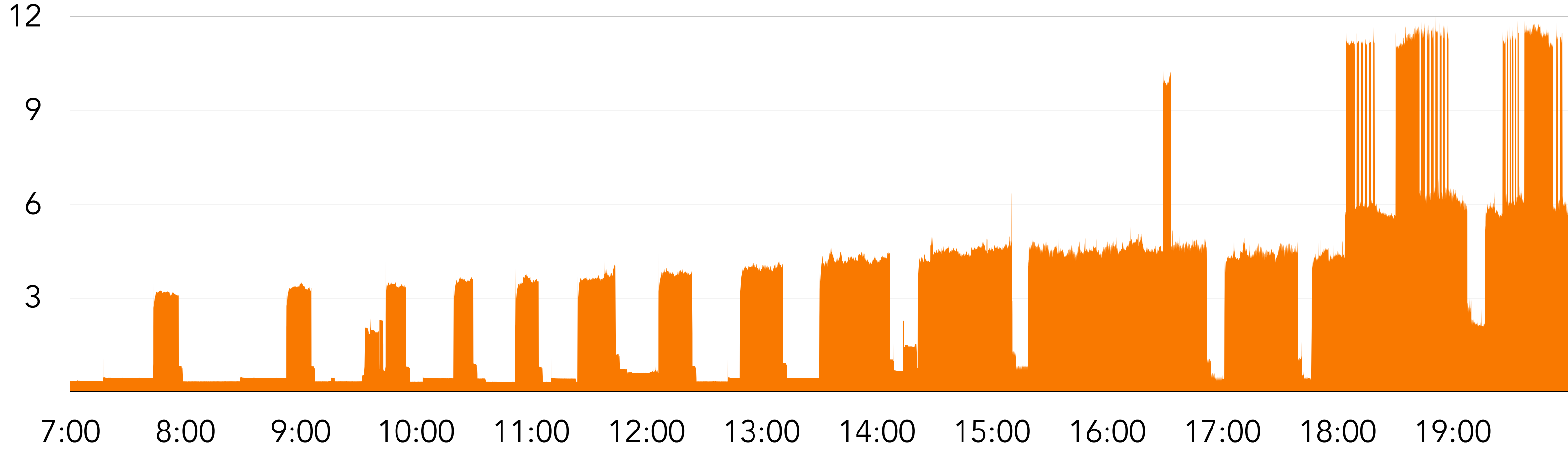
Single Home Power Quality



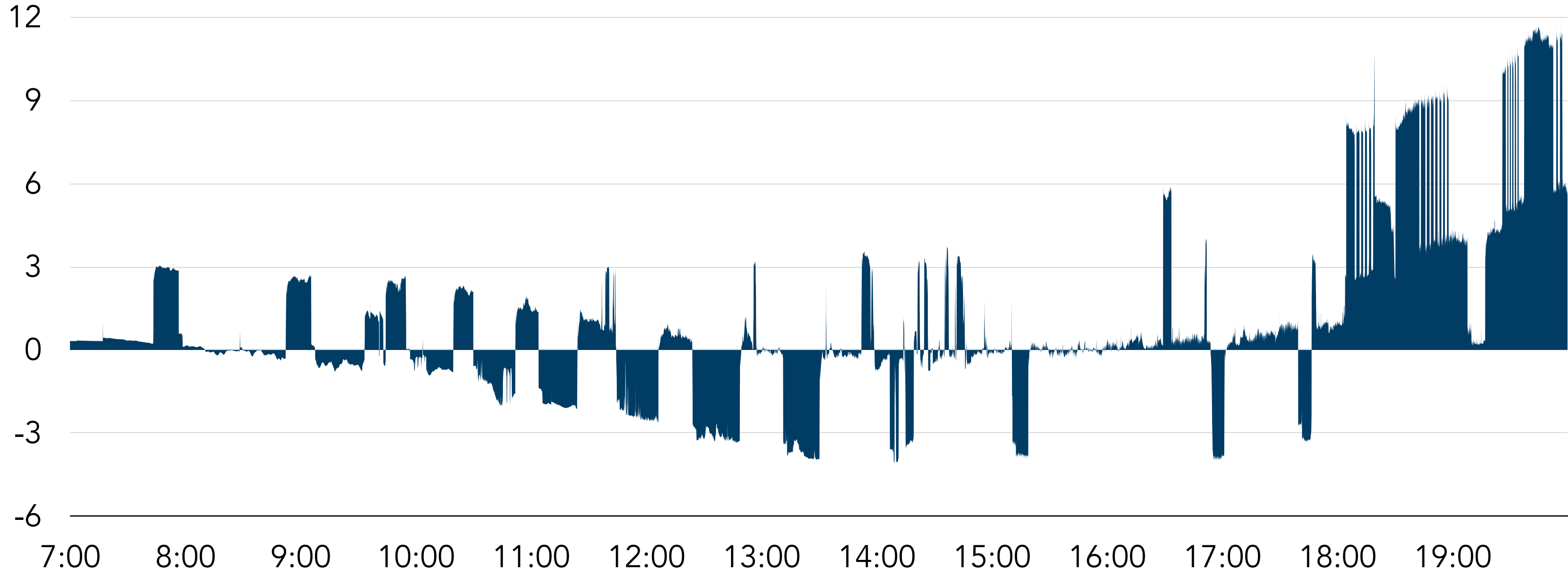
Project Management Plan

Residential Pico-Grid Program Design

What it's like to serve a home with solar panels



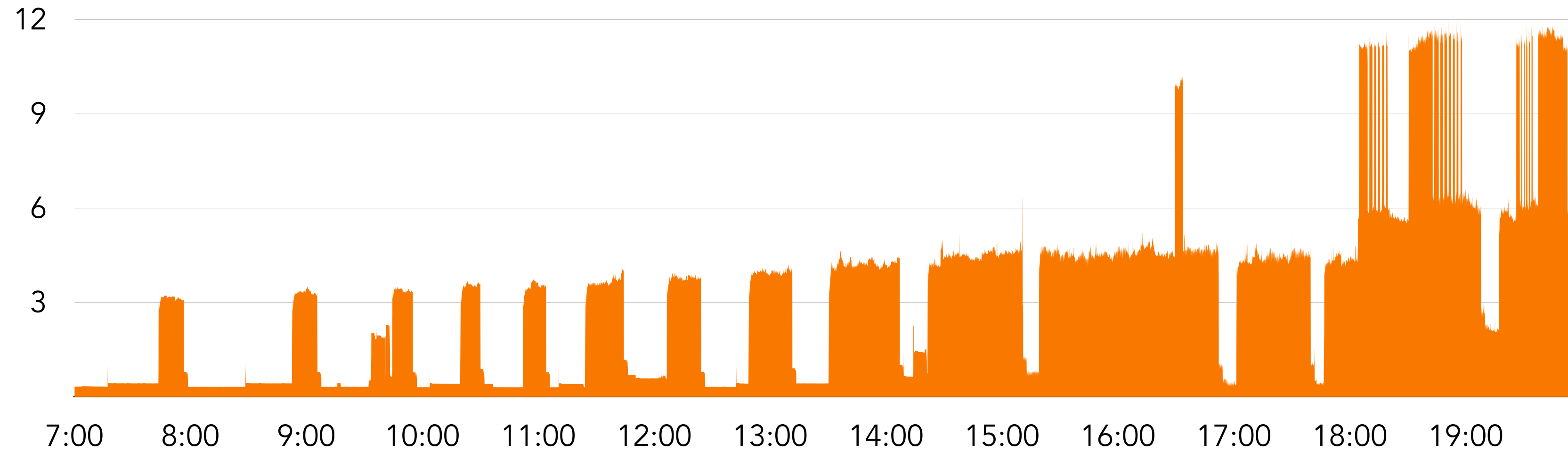
Home demand



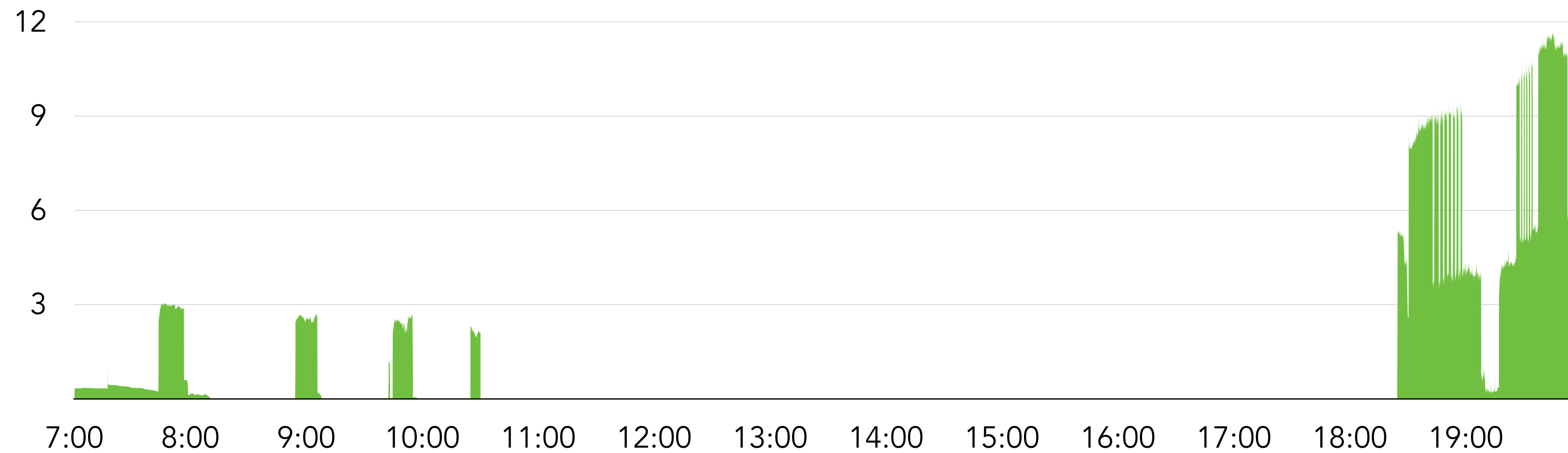
Net demand with PV

Source: Pecan Street

What if a battery were added to a solar PV system?

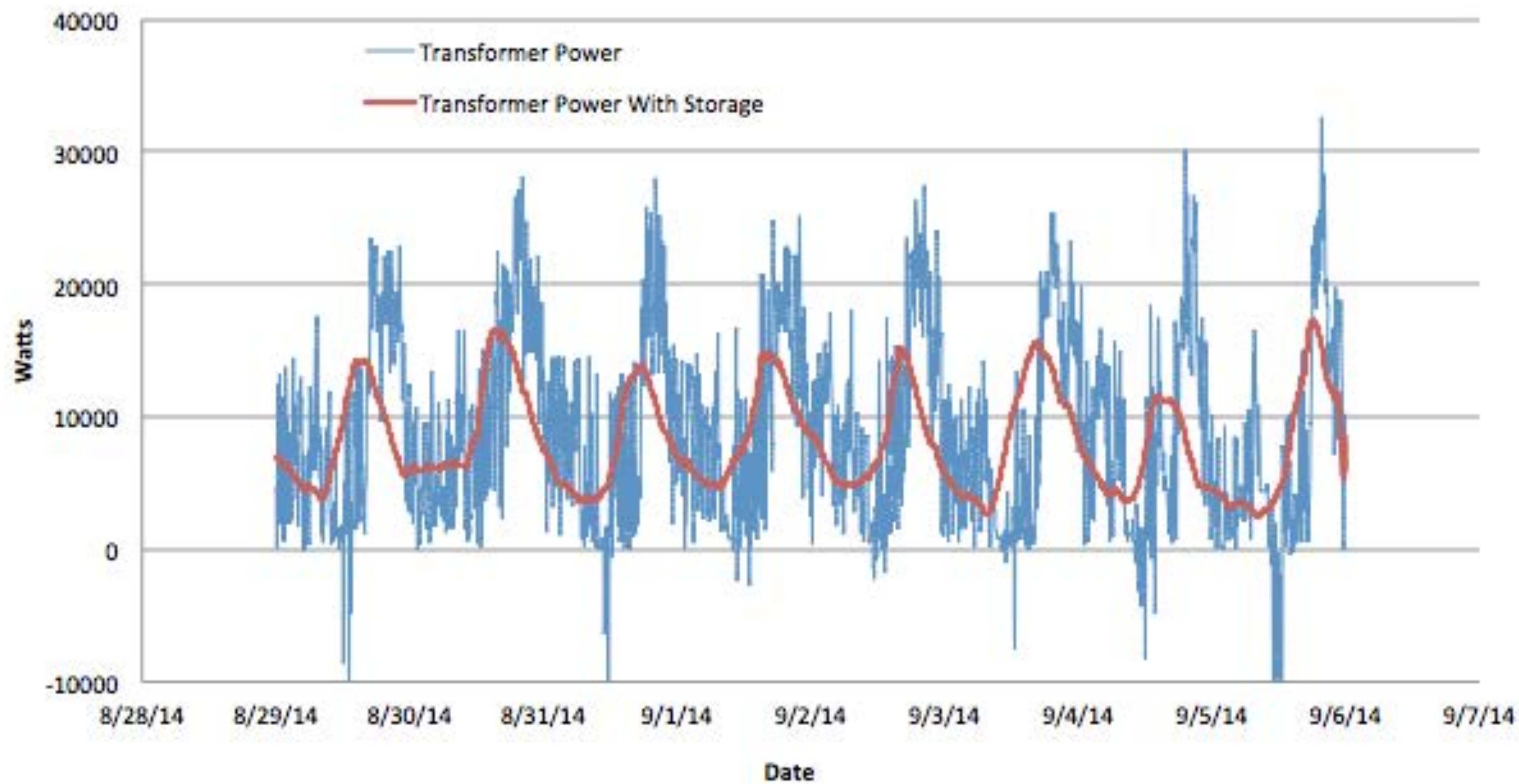


Home demand



Grid demand with
PV + 5 kWh battery

Transformer Power With and Without Storage



Project Management Plan

Data Management



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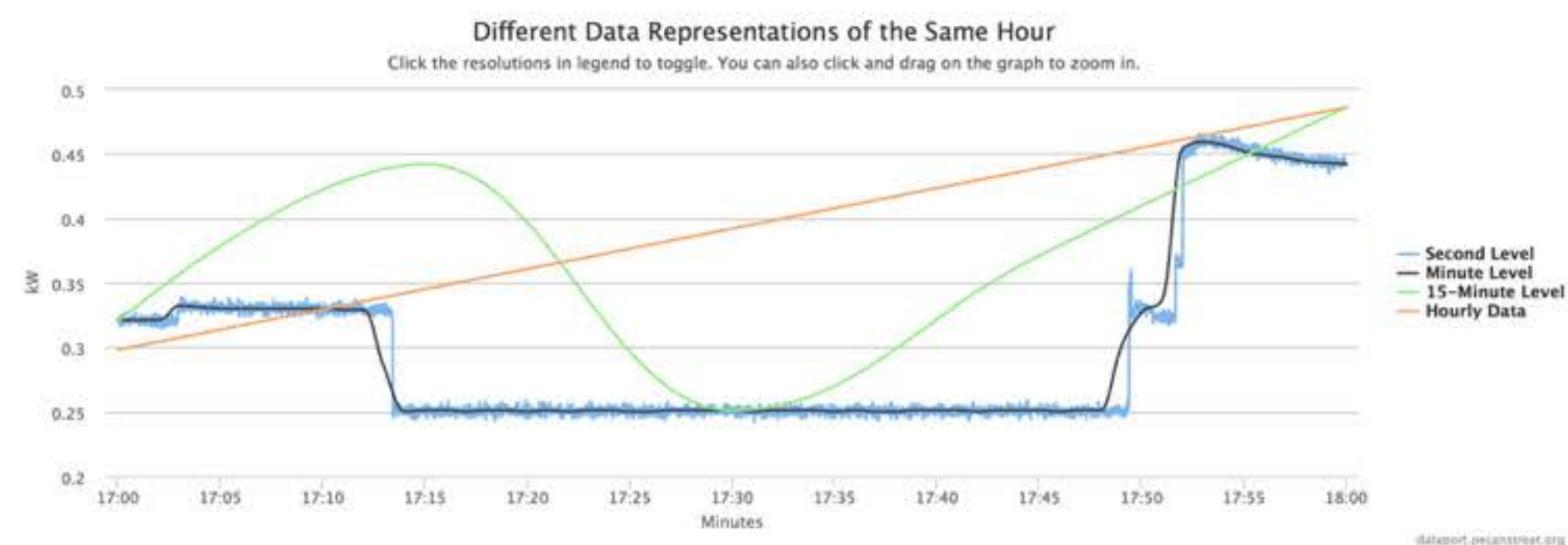
Dataport is divided into two main sections, both of which are accessible from the main navigation. The Knowledge Base houses reports and data visualizations developed by Pecan Street and other researchers, as well as industry job postings and the Pecan Street's blog posts. The Data section includes details about Pecan Street's data and allows researchers to query Pecan Street's energy database, create custom visualizations and download datasets. You can also bookmark this page -- new visualizations and reports will be posted here first.

If you have any questions, please email us at info@pecanstreet.org.



Featured Visualization: Granularity Matters

This visualization illustrates how different levels of detail (frequency of measurement) affect the "story" that energy data can tell. Comparing the 15-minute and one-hour data that is considered the standard in energy research with one-minute and 15-second data, which are available within Pecan Street's research network, this visualization includes "whole home" data. Pecan Street's research methodology allows individual circuits to be monitored. [View this and other visualizations](#) performed by Pecan Street staff, or [make your own](#) with our data.



Discussion