



Pecan Street Research Institute

Pike Powers Lab
and
Center for Commercialization

Data-driven insights from the nation's largest
residential energy dataset



About Pecan Street Inc.

Non-profit research and commercialization — 501(c)(3)

18 full-time employees

University-based industrial consortium

Underwriters Laboratories
San Diego Gas & Electric
NRG

Austin Energy
Texas Gas (OneOK)
PARC
Alliander
City of Boulder, CO

Dell Inc.
GM OnStar
Intel
Landis + Gyr
Schneider Electric

LG Electronics
3M
Siemens

50 Universities 15 Countries

On-peak load by customer class

5:15 pm

March 9, 2011

31,262 MW

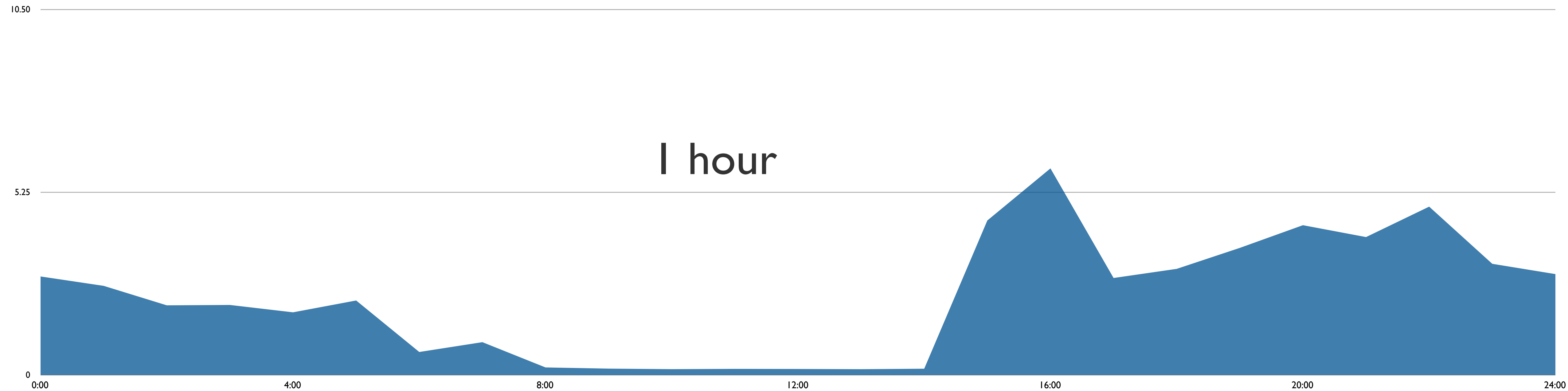
August 3, 2011

68,416 MW

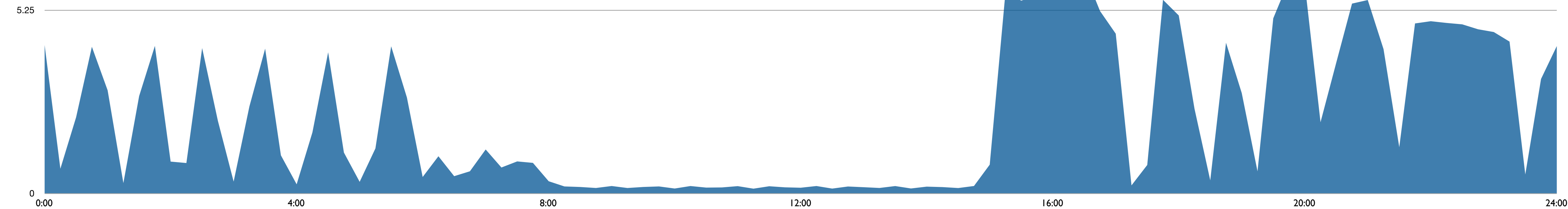


July 31, 2013 Daily electric use

1 hour



15 minutes



July 31, 2012 Whole home + electric vehicle *



Refrigerator

Microwave / toaster oven

Bathroom 1

HVAC

Living room / TV

Washer / dryer

Bedroom 2

Car

Kitchen lights

Dishwasher

Bathroom 2

Garage

Master bedroom

* Measured using customer HAN device

Four Categories of Electricity Use

Always On

Thermal

Electric-gas substitute

Intentional

12.00

6.00

kW

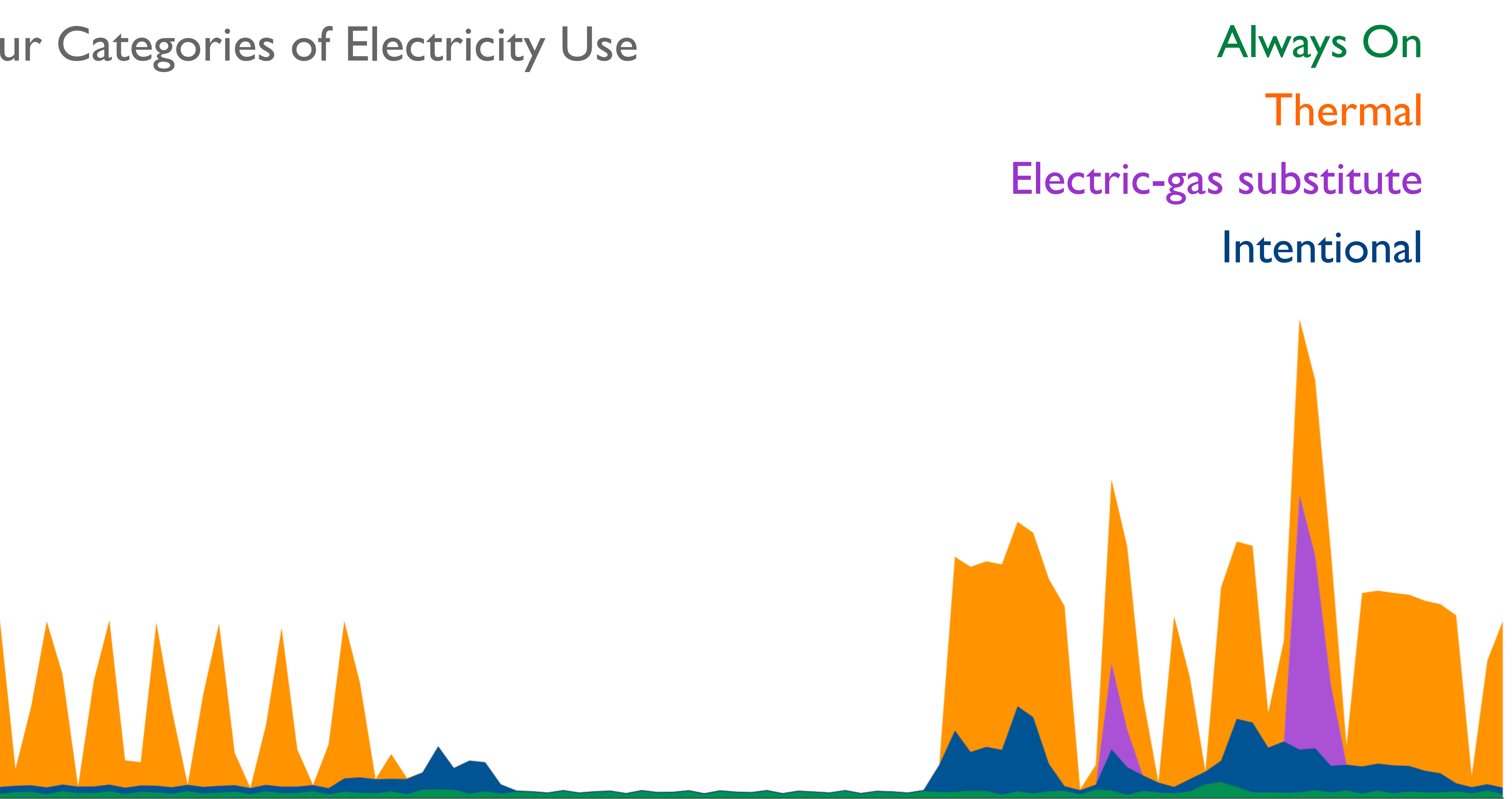
0:00

6:00

12:00

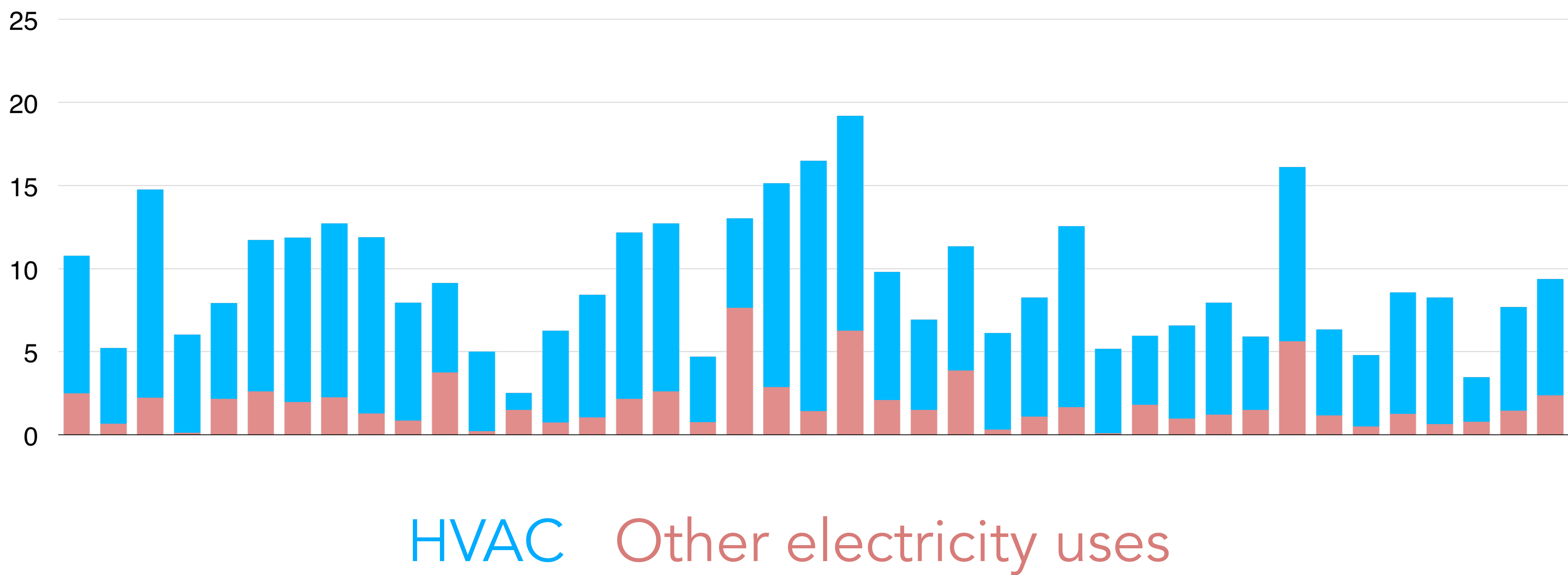
18:00

0:00

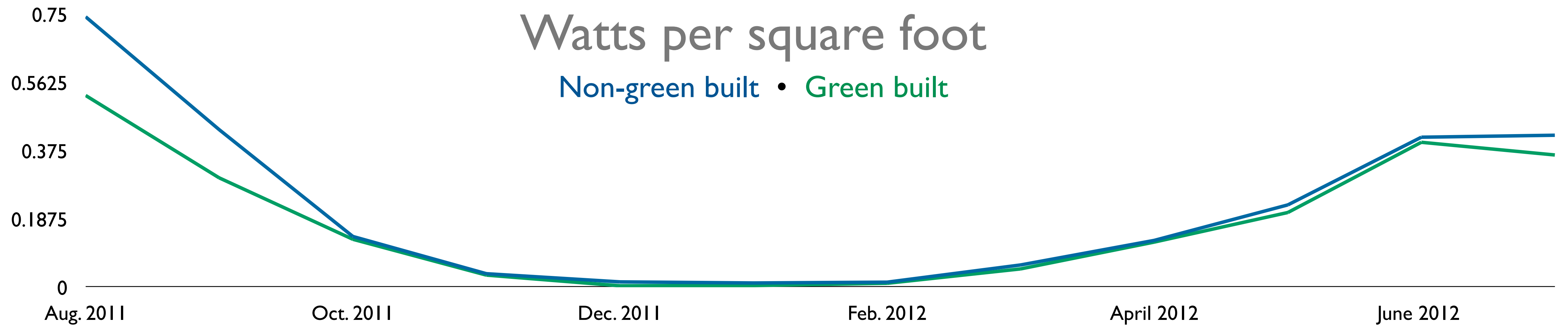


Device	Top range instantaneous loads
Electric dryer	> 6 kW
Pool pump	> 4 kW
Electric oven	+/- 3.5 kW
Air conditioner compressor	~ 1.75 - 4 kW
Electric vehicle charger (240 v)	3.3 kW
Electric vehicle charger (120 v)	1.44 kW
Air handler (HVAC)	+/- 0.8 kW

Peak demand reduction options (kWh)



Thermal



Source: Pecan Street Research Institute



Correlations and findings

Compared to green built homes

Non-retrofitted homes used

38 percent more

electricity for cooling

(per square foot)



Correlations and findings

Compared to retrofitted homes

Non-retrofitted homes used

29 percent more

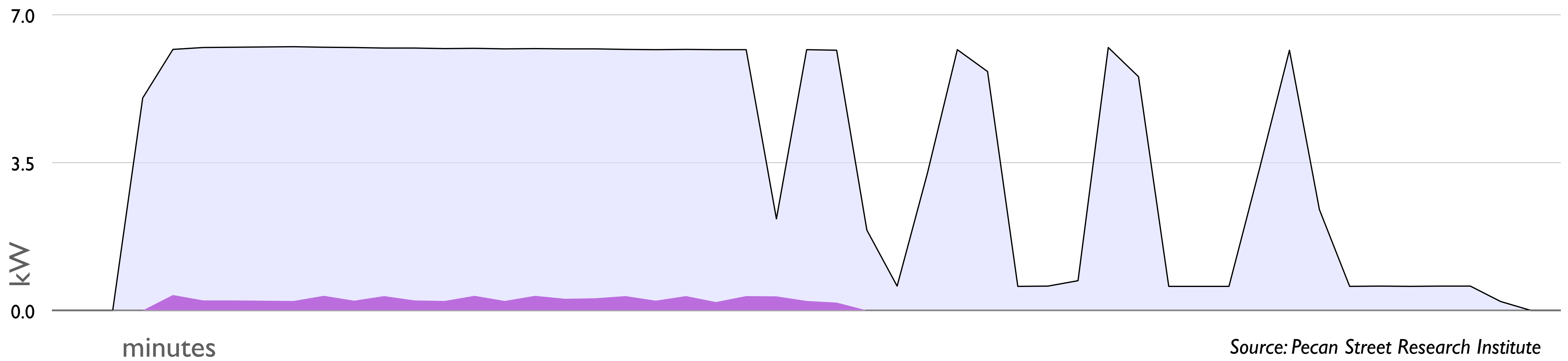
electricity for cooling

(per square foot)

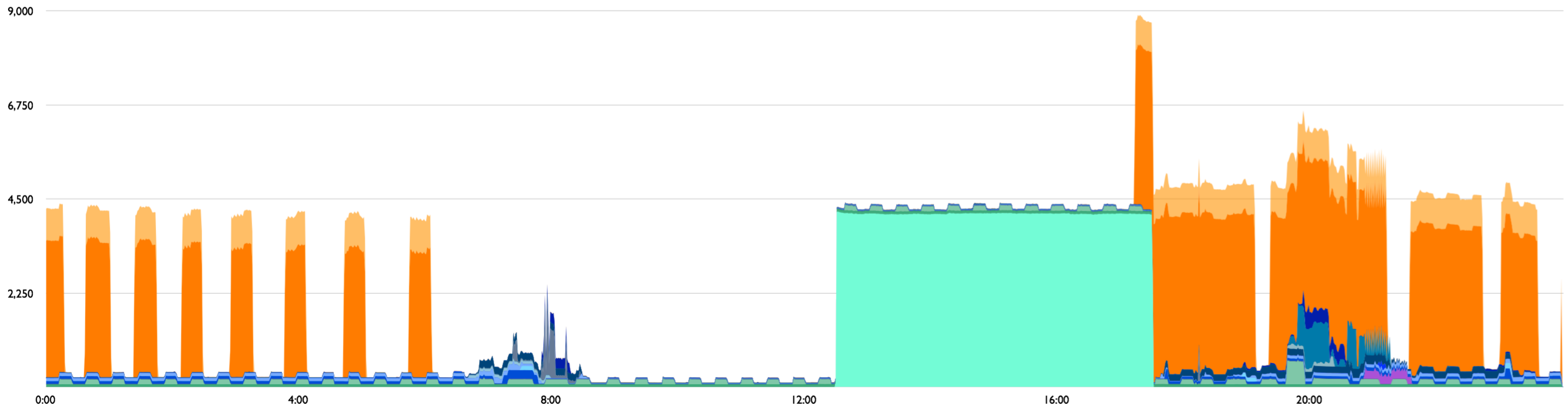
Electricity used for a load of laundry – gas and electric dryers

Electric dryer 38 ¢

Gas dryer 6 ¢

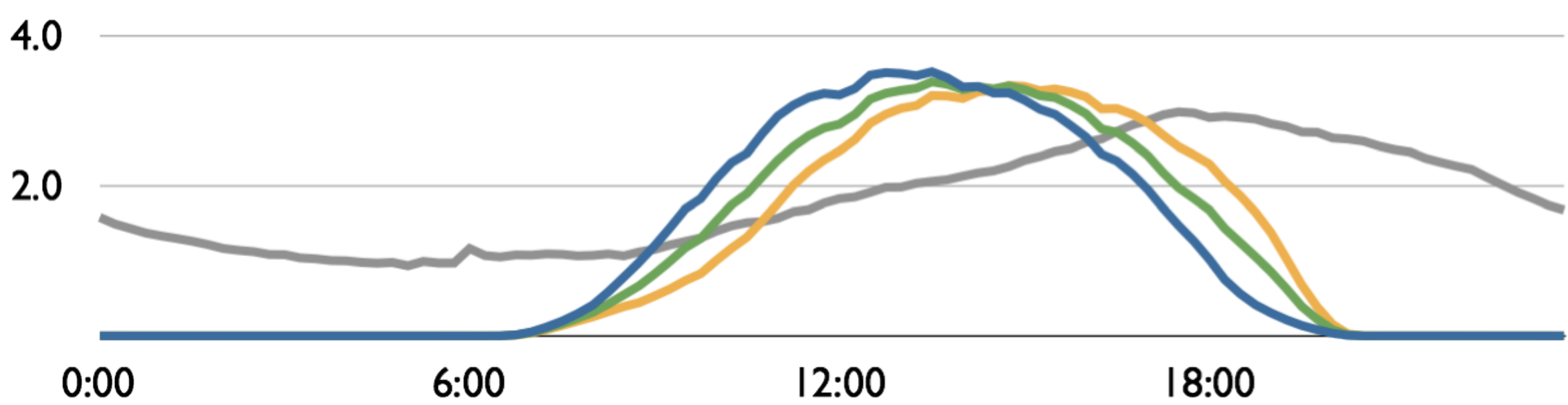


July 2013 Summer day •

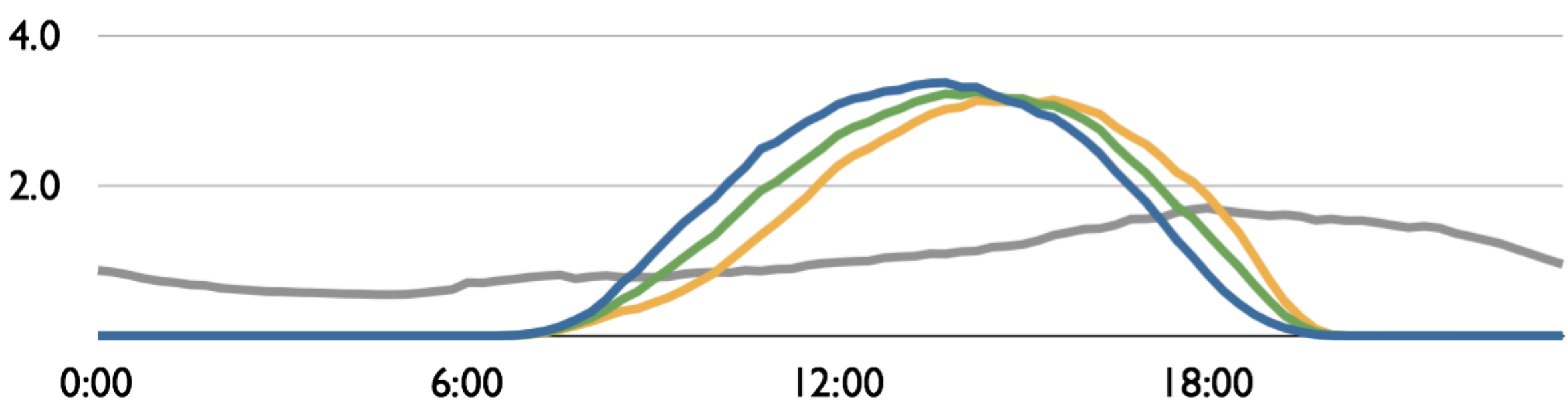


Source: Pecan Street Research Institute

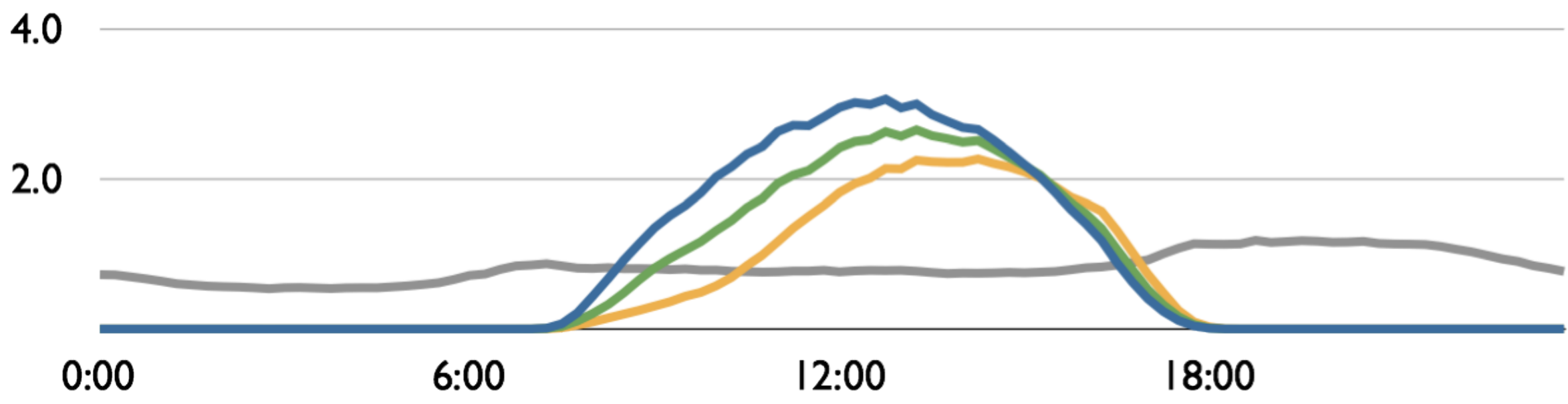
Solar PV generation by season



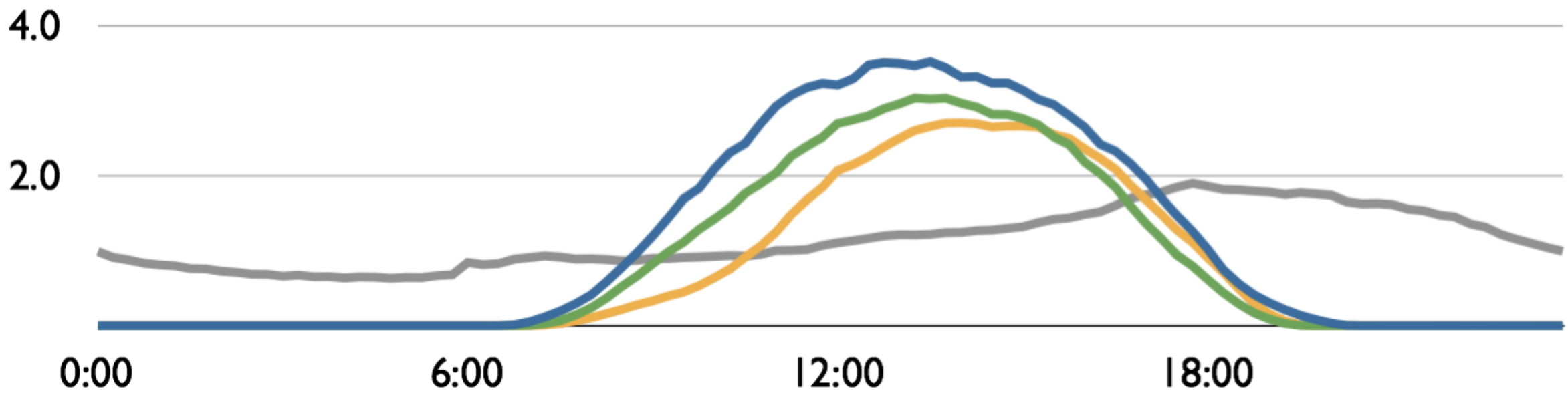
Summer



Spring



Winter



Fall

West South Southwest Home use

Peak demand reduction from rooftop solar PV

West facing PV	65 percent
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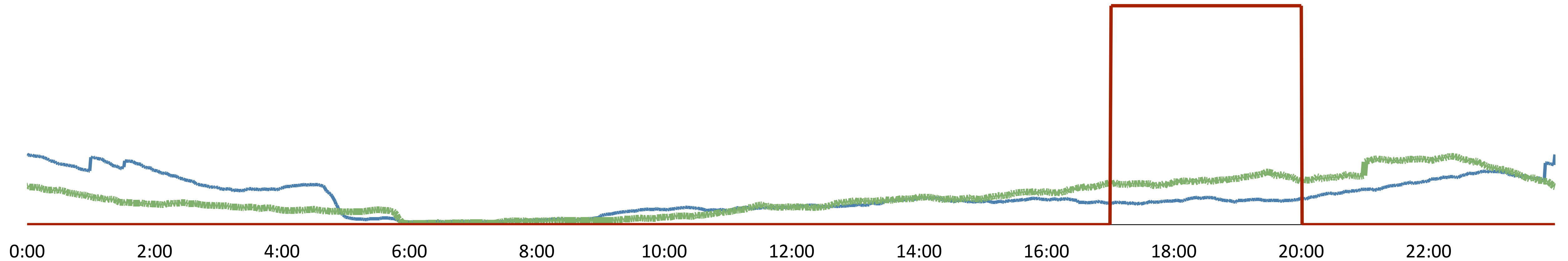
West + South	57 percent
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South	54 percent
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Peak hours: Use in home vs. sent back to grid

	<u>In-home</u>	<u>Back to grid</u>
West facing PV	84 percent	16 percent
West + South	80 percent	20 percent
South	78 percent	22 percent

When do people charge their cars?



Source: Pecan Street Research Institute

- Pricing Trial percent
- Not pricing trial percent
- Model percent

Pecan Street services and data for utilities

When and on what appliances do my customers use electricity?

How can I improve customer marketing and outreach?

What messages and technologies will reduce peak?

What is the impact of dense EV and PV on my grid?

How many and where are the electric cars located?



Questions?

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