"Pecan Street's smart grid research is generating incredibly valuable information on how, when and on what customers use energy. It will end up as the single greatest collection of consumer energy data that has been developed in the United States."

Dr. Michael Webber, University of Texas researcher

Pecan Street Consortium

The University of Texas

Best Buy
Freescale
Intel
Landis + Gyr
LG Electronics
Oncor
Oracle
Sony
SunEdison
Texas Gas Service
Underwriters Laboratories
Whirlpool

Consumer system deployment

102 electric vehicles

Home services systems

Sony, Intel, Best Buy

Smart appliances

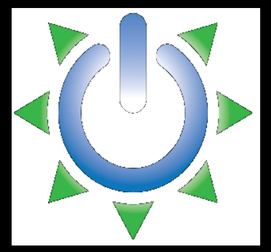
Residential PV

Pike Powers Commercialization Lab

Research, commercialization and education

- UT researchers and students
- Incubator companies
- Consortium members

Pecan Street Data



Database Stats

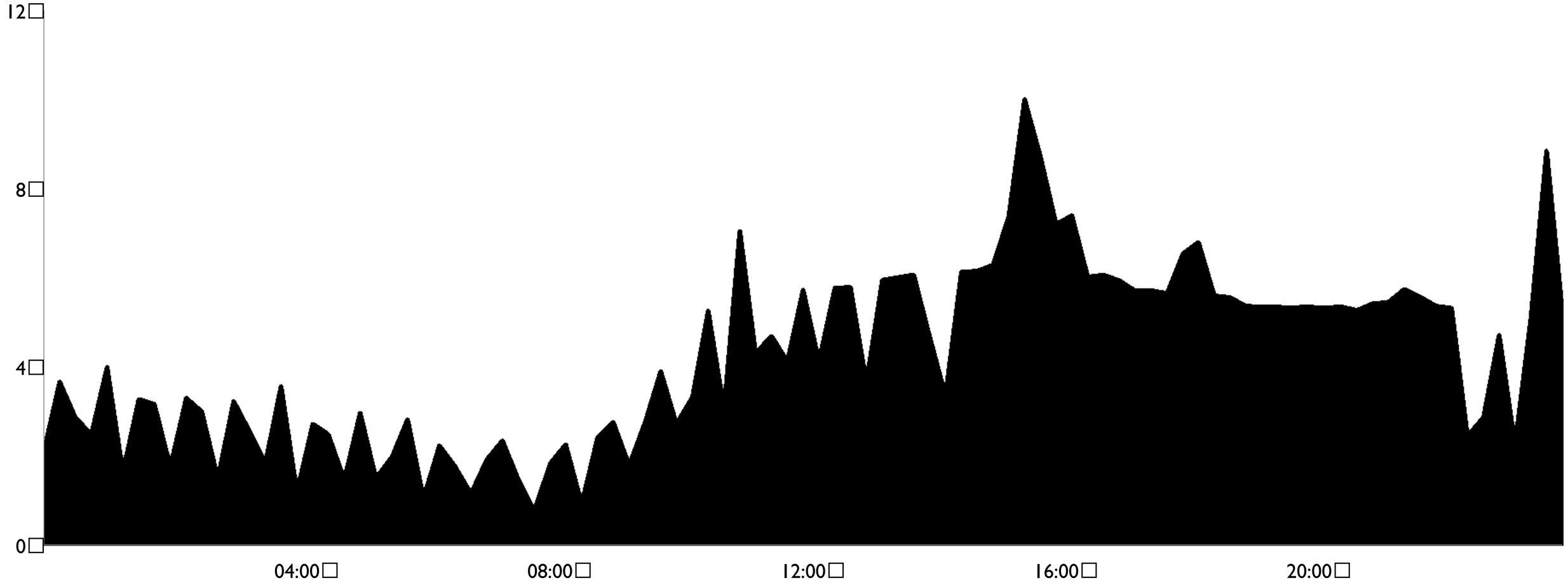
3 Billion data points

Over 200 GB

Pecan Street data for 200 homes ≈ 100,000 homes with 15-minute AMI data

Granularity Comparison

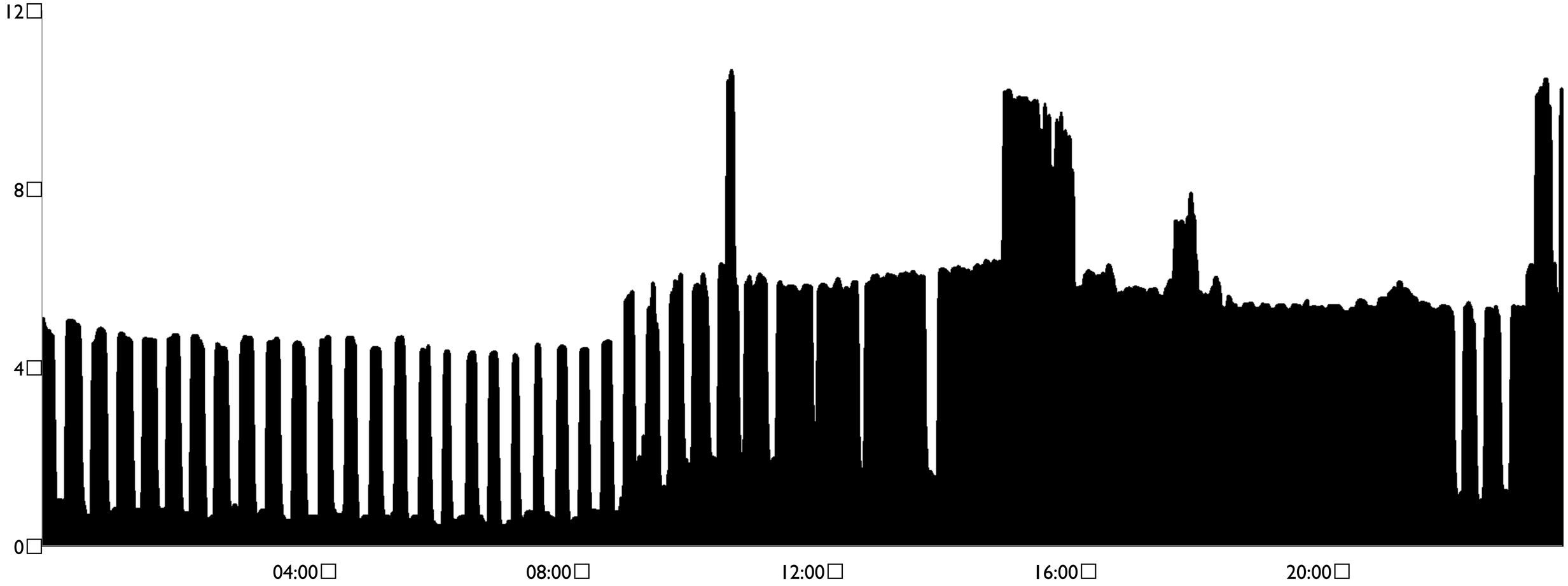
August 10, 2011: 15-minute Consumption Data (kW)



Pecan Street Consortium

Granularity Comparison

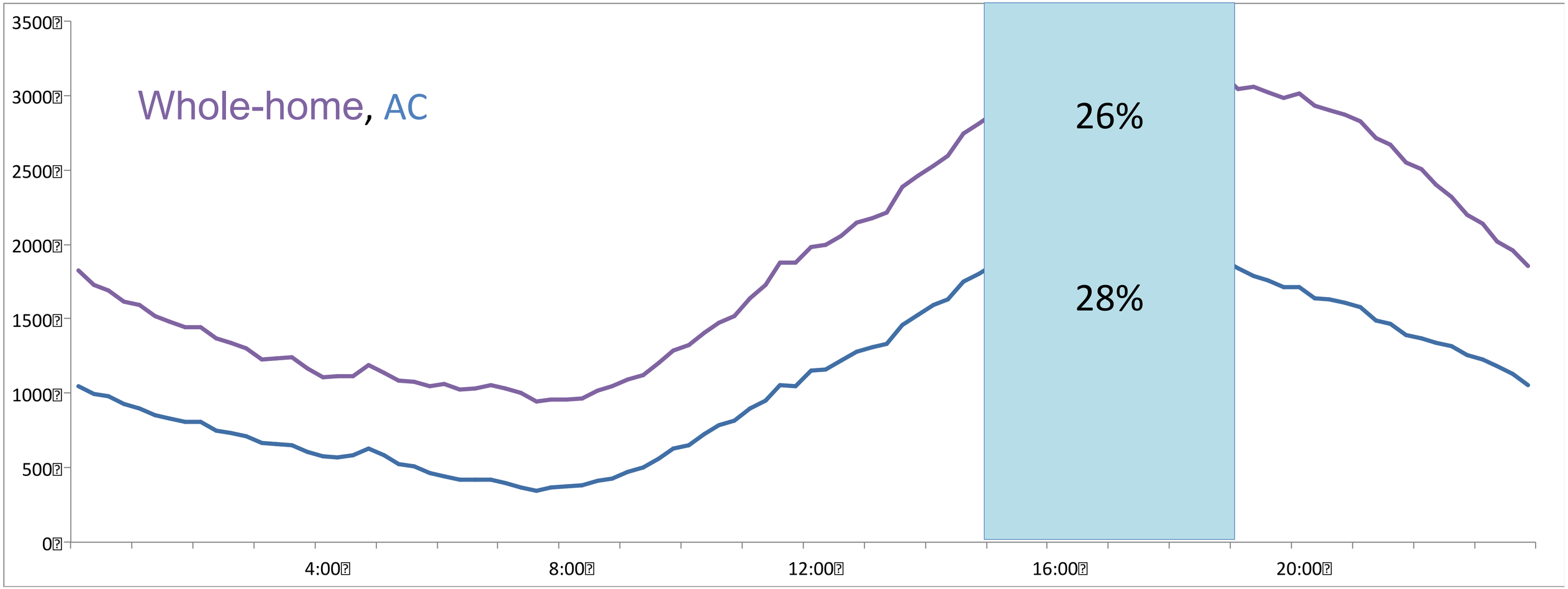
August 10, 2011: 1-minute Consumption Data (kW)



Pecan Street Consortium

August Average

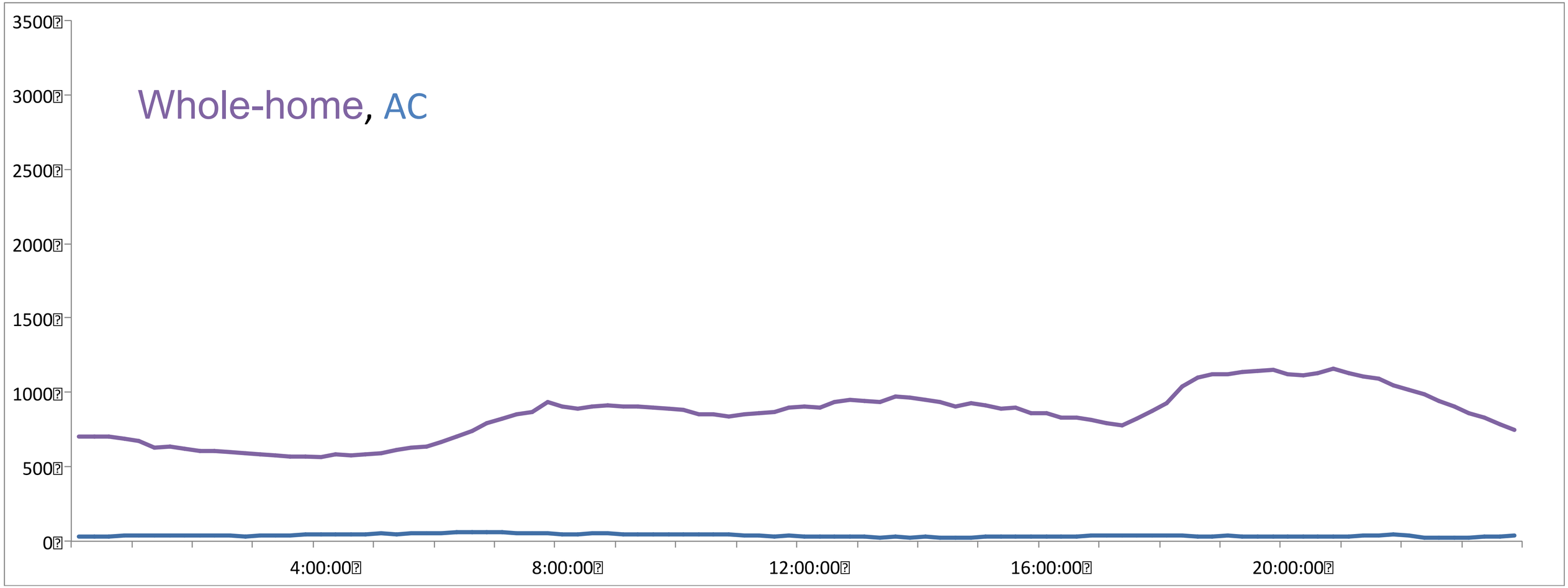
Diurnal load curve(W)



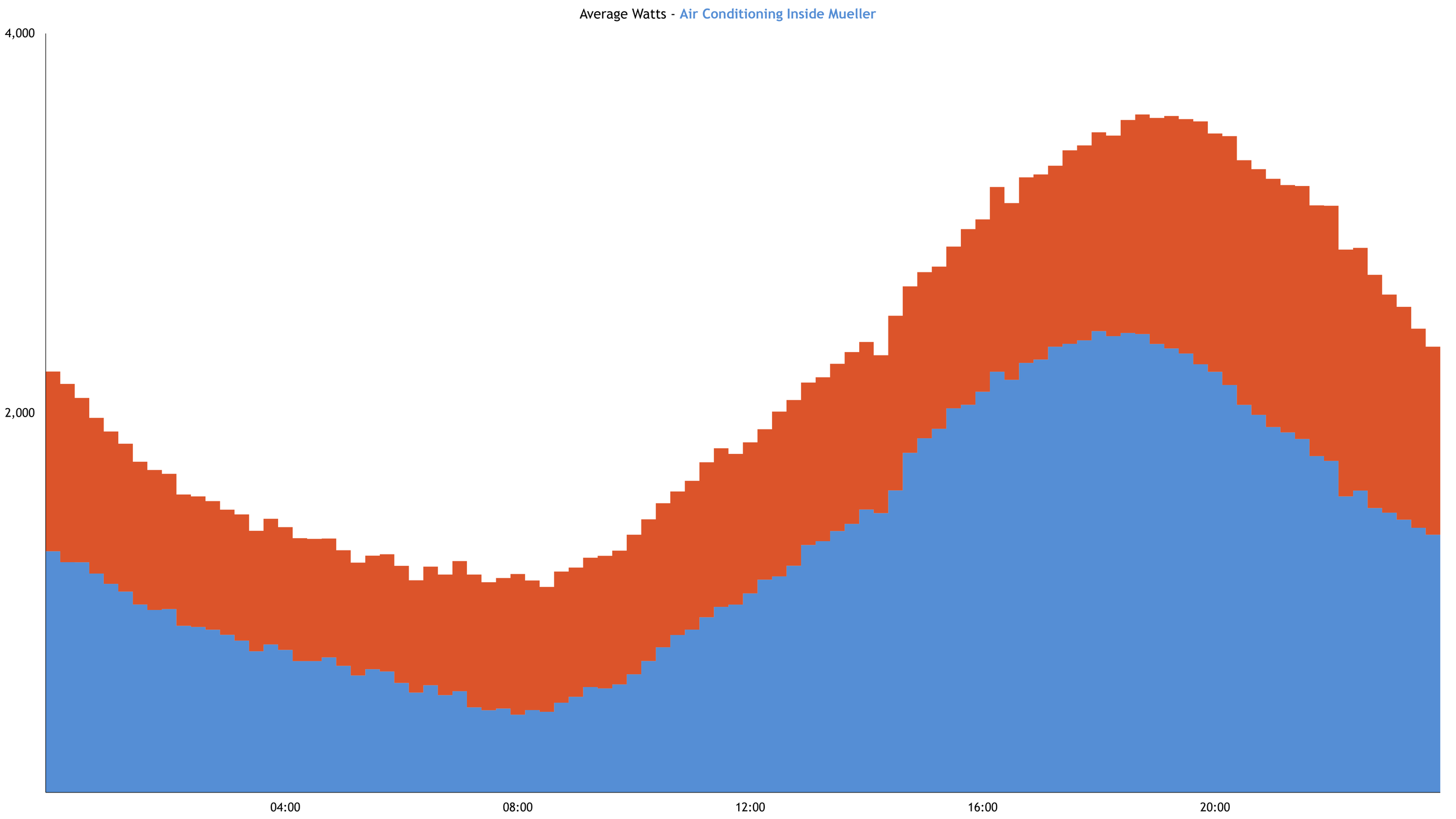
Pecan Street Consortium

January Average

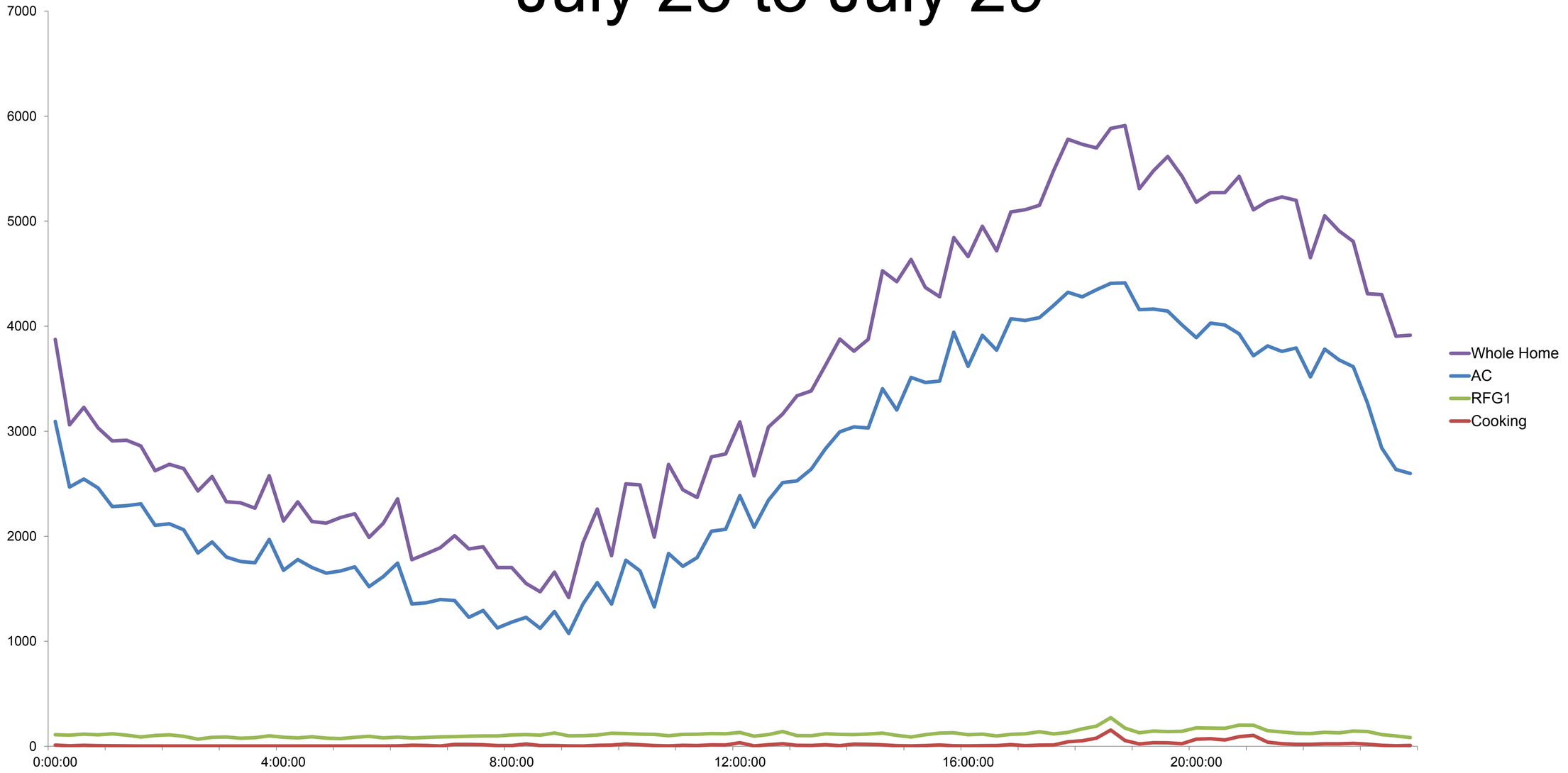
Diurnal load curve(W)



Pecan Street Consortium

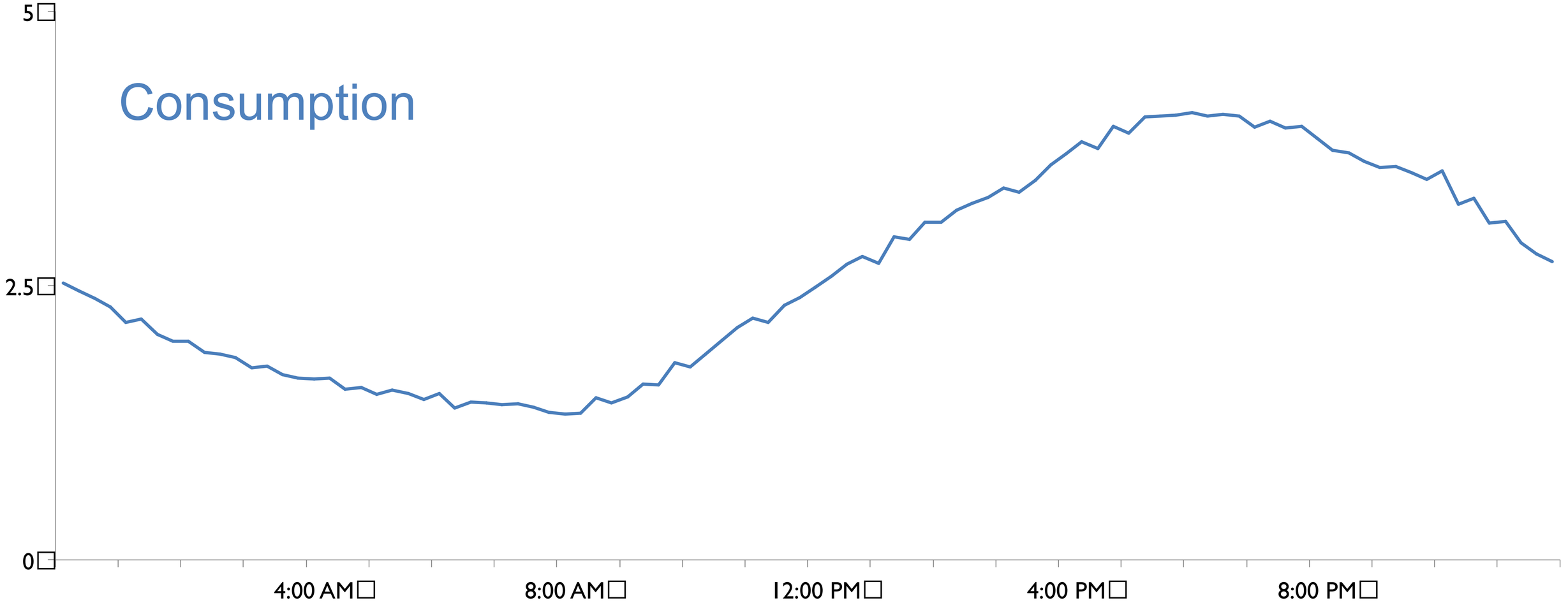

Average Watts - Air Conditioning Inside Mueller
4,000
2,000
04:00
08:00
12:00
16:00
20:00

Average Daily Load Curve:
July 23 to July 29



August average

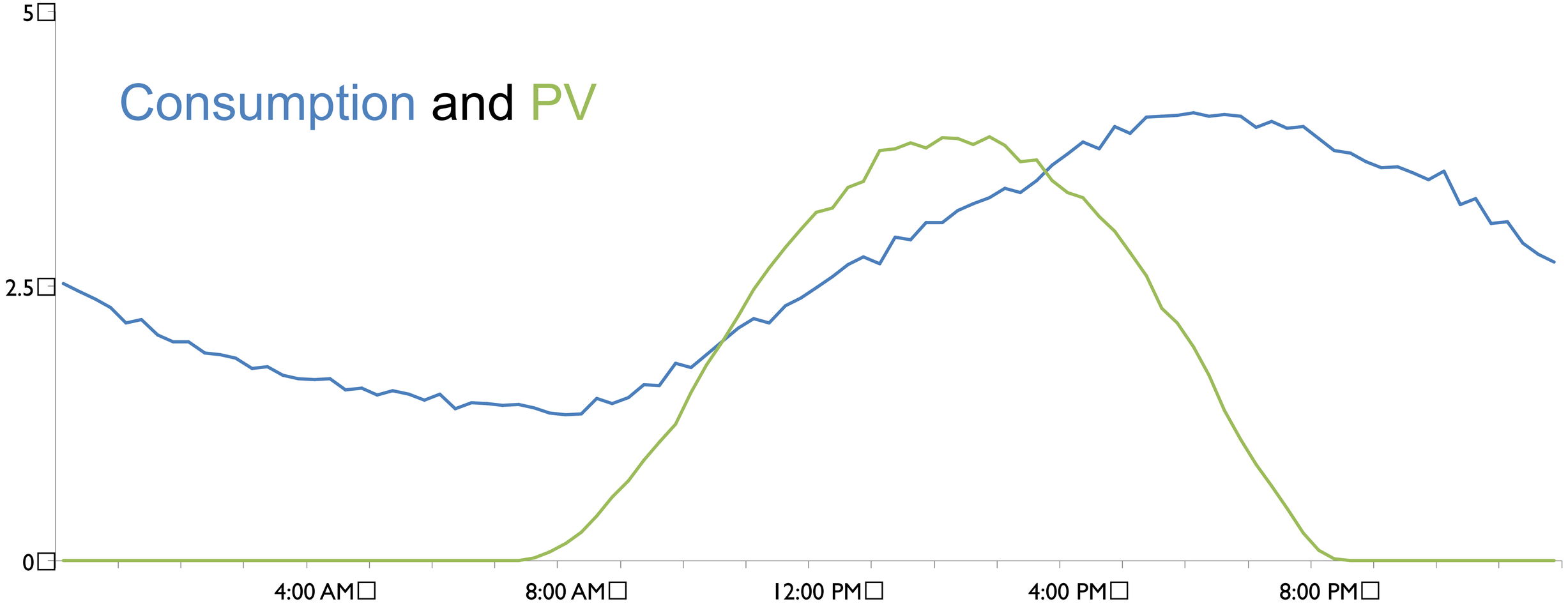
Whole-home electricity usage (kW)



Pecan Street Consortium

August average

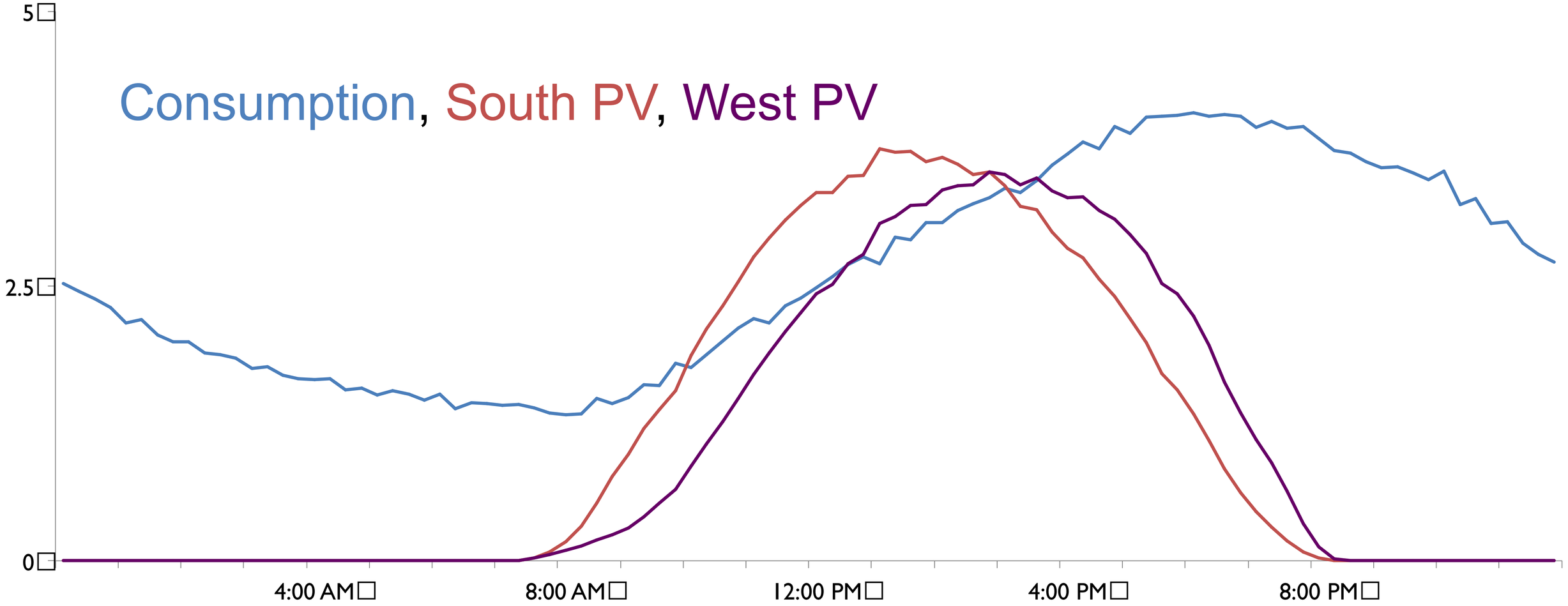
Whole-home electricity usage and generation (kW)



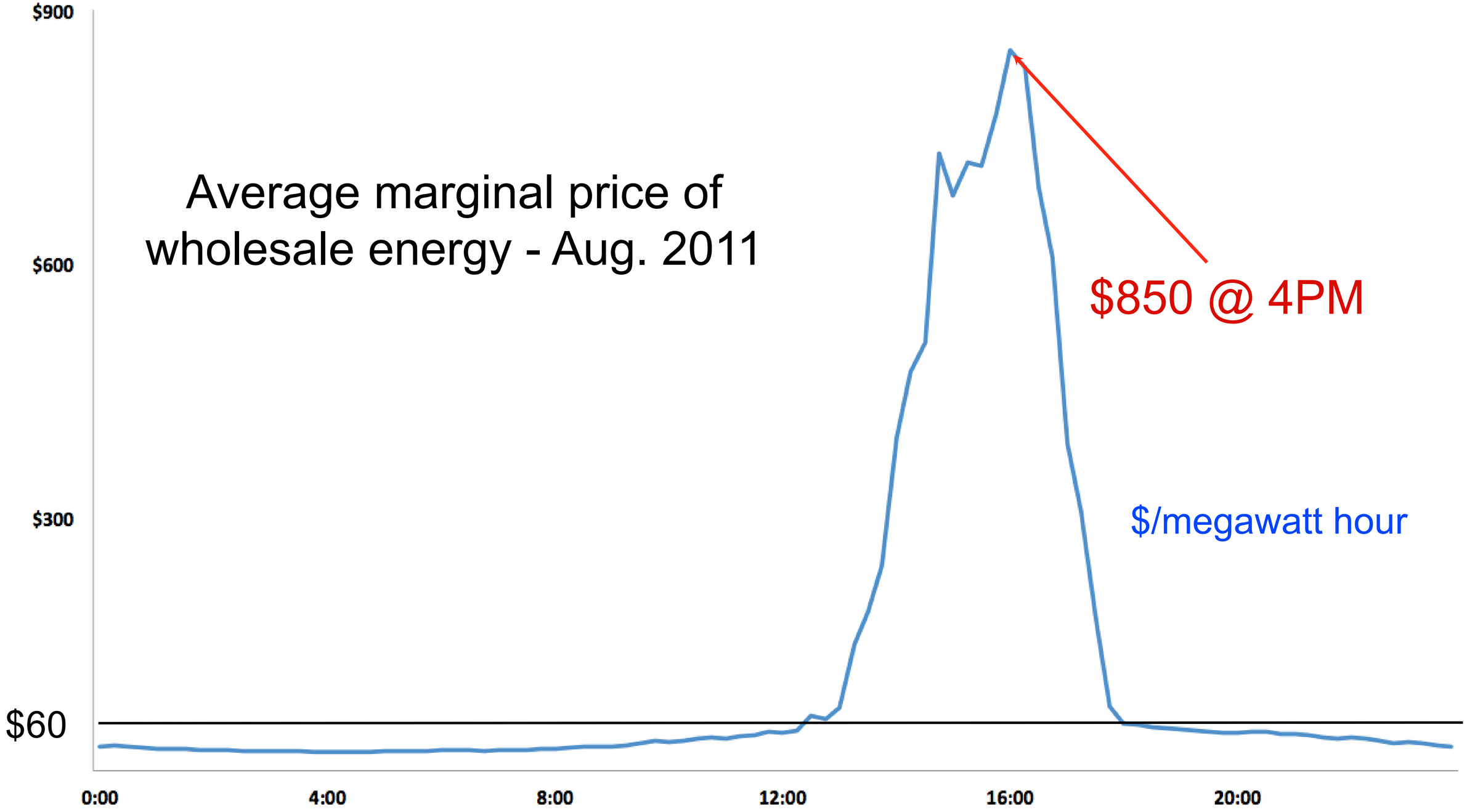
Pecan Street Consortium

August average

Whole-home usage and modeled generation(kW)

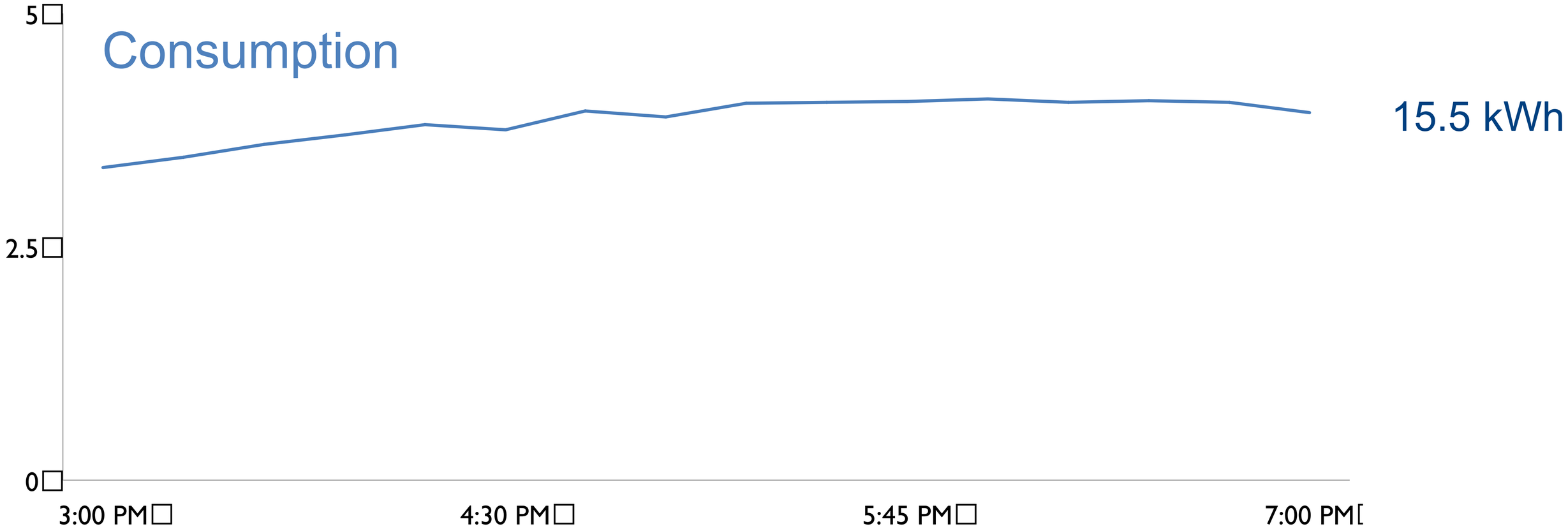


Pecan Street Consortium


Average marginal price of wholesale energy - Aug. 2011
$900
$600
$300
$60
$850 @ 4PM
$/megawatt hour
0:00
4:00
8:00
12:00
16:00
20:00

August average

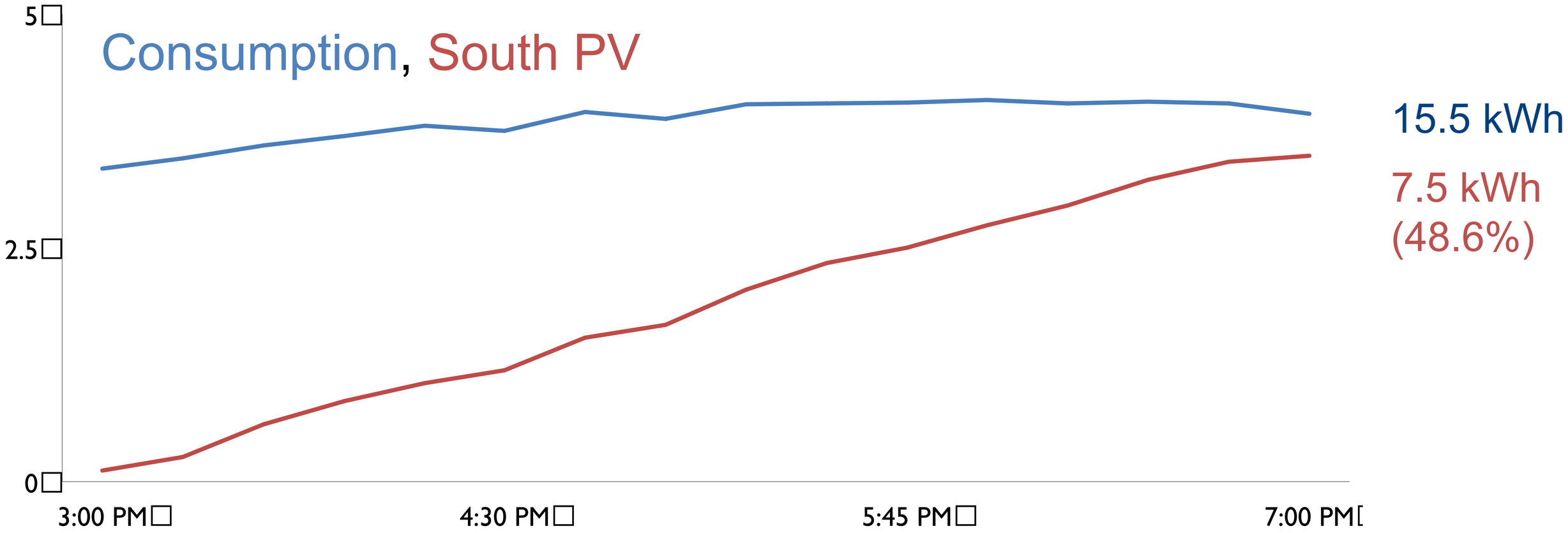
Peak consumption from grid (kW)



Pecan Street Consortium

August average

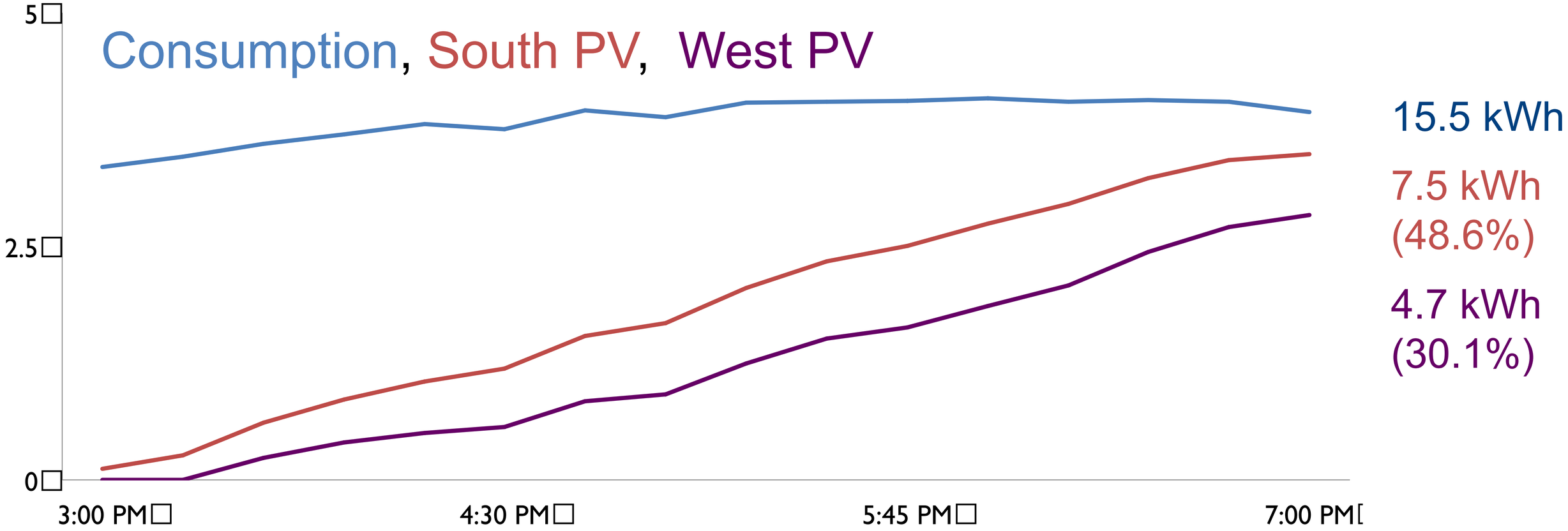
Peak consumption from grid (kW)



Pecan Street Consortium

August average

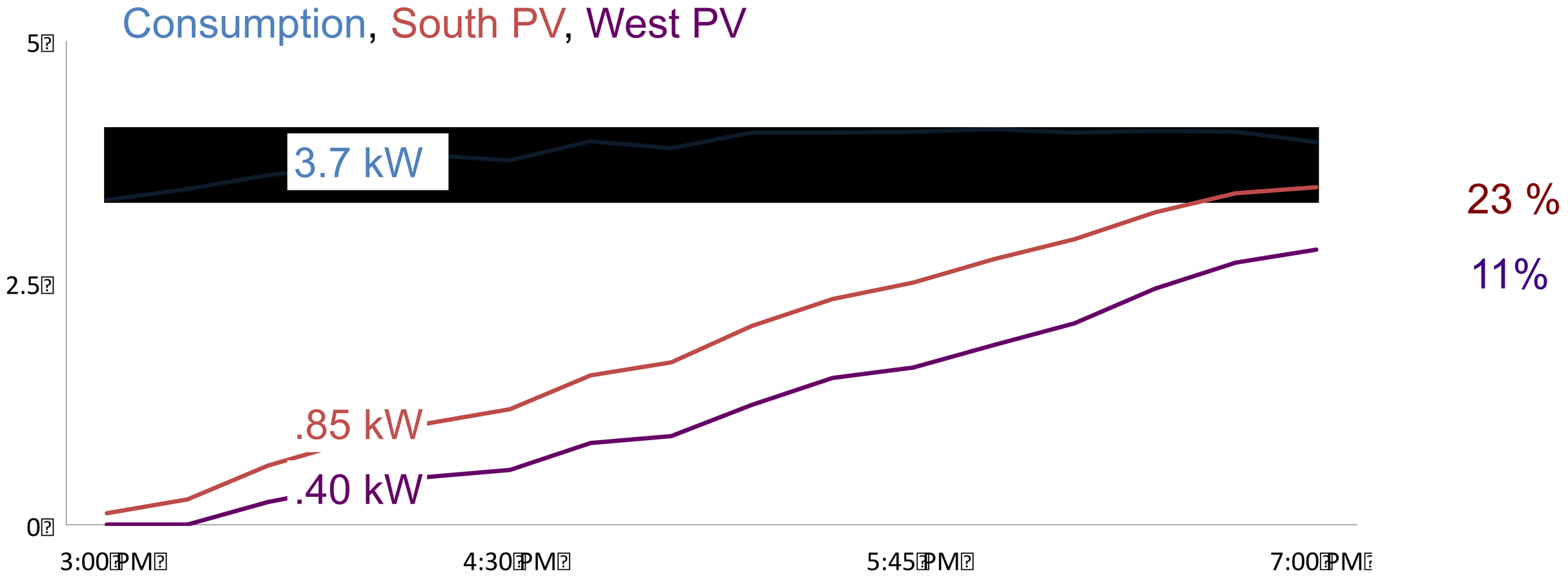
Peak consumption from grid (kW)



Pecan Street Consortium

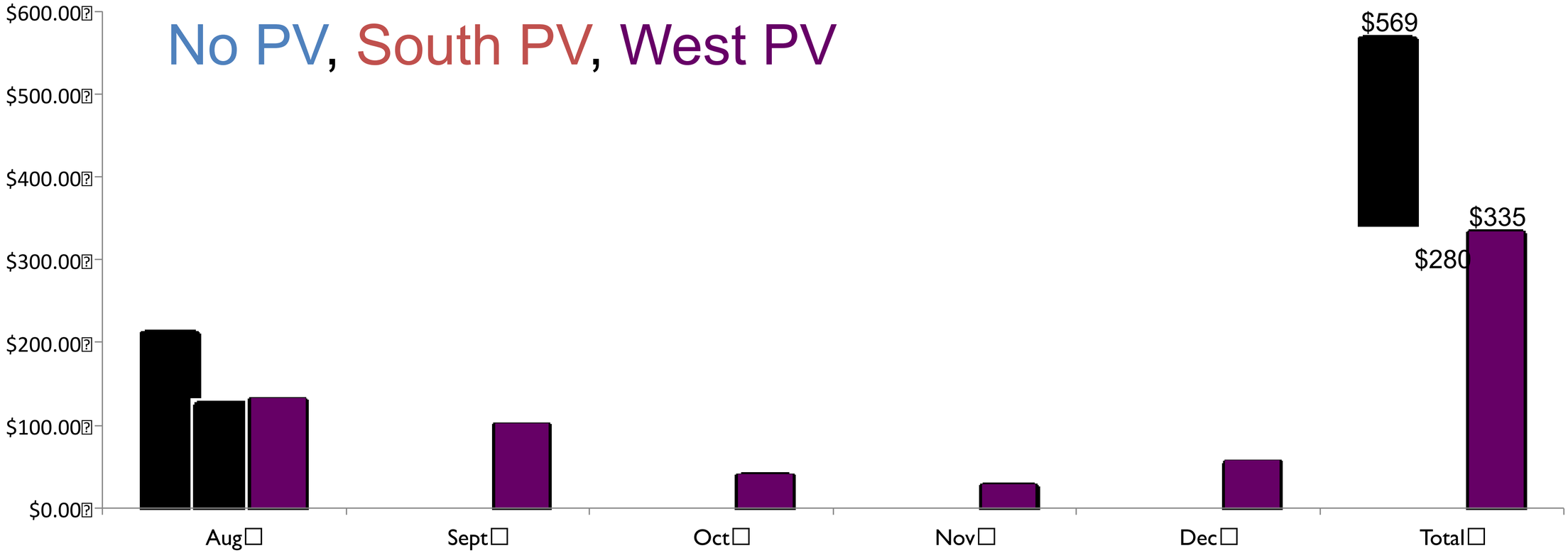
August average

Peak consumption from grid (kW)



Flat Rate

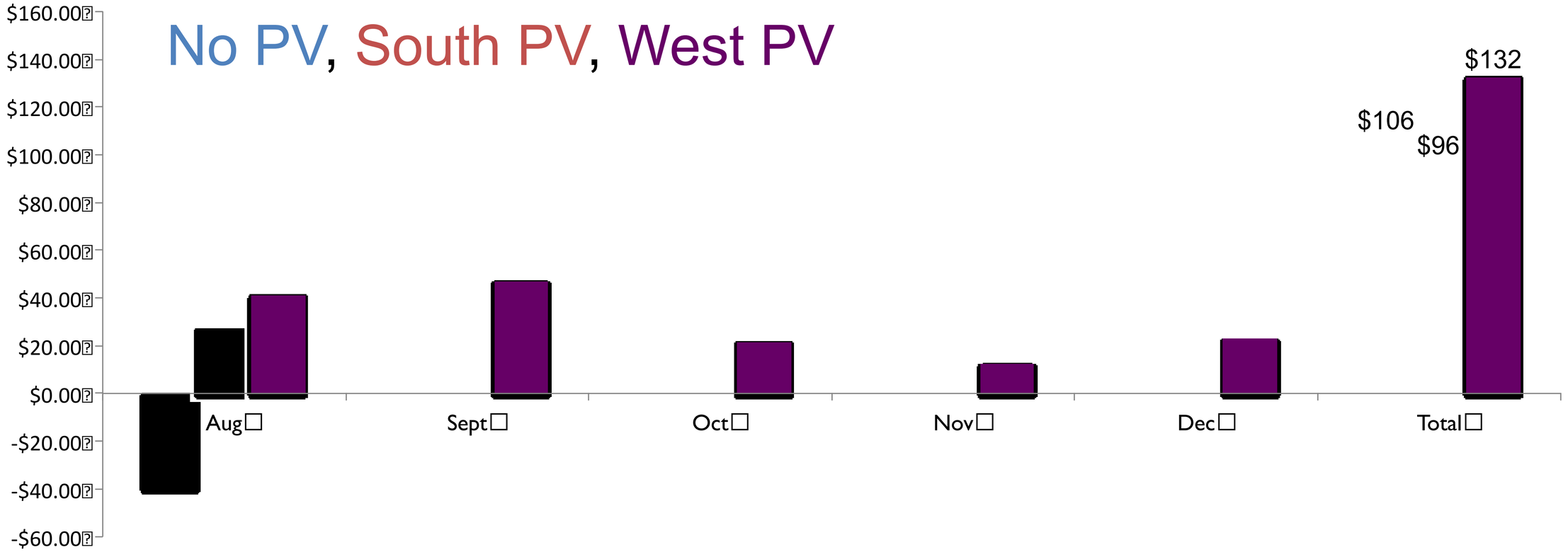
Price Implications: Customer Bill



Pecan Street Consortium

Flat Rate

Price Implications: Utility Profitability



Pecan Street Consortium

Roadmap

Home apps

Demand aggregation

Smart appliances

Ductless, zonal AC – control individual rooms

Rooftop solar PV

Vehicle charging in customer premises

Natural gas grid

Apartment building microgrids

Home healthcare

Behavior data analytics

3 ways new technologies enter market

Sustaining innovation

Within existing market and delivery structure

Boeing 787, plasma TV

Regulatory fiat

Policy mandates

Smoke alarm, corn ethanol

Disruptive innovation

New customers or consumption occasions

Transistor radio, mobile phone, Japanese photocopiers

Economic growth potential

Sustaining innovation	Moderate, incremental
Regulatory fiat	Moderate or negative
Disruptive innovation	Significant

Sustaining innovations

How deployed	Within existing market and delivery structure
Customers	Most demanding customers in industry
What they'll pay for	Improvements to incumbent systems along metrics they value Capability*: software upgrades* Ethical
Winning companies	Incumbents

Disruptive innovations

iPhone and App Store

disruptive to –

GPS services

Calculator makers

Map makers

Camera companies

Stopwatch makers

CD and DVD manufacturers

Video camera companies

Compass makers

Large software companies

Phone companies

Factors in rate of adoption

Time

Differences in receptiveness to innovation

What problem / need is solved?

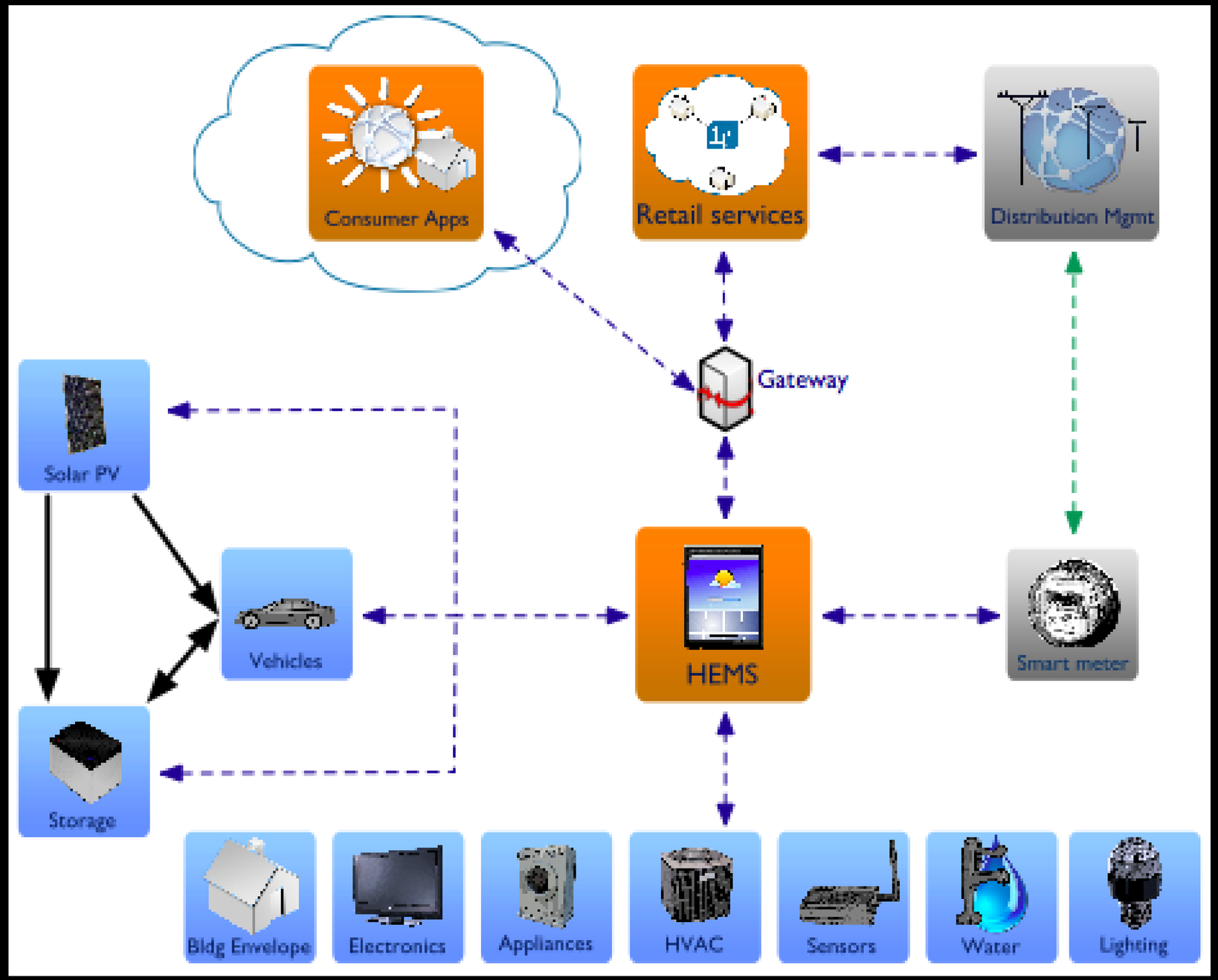
Whose problem is it?

Compatability

Complexity

Observability

Roadmap


Consumer Apps
Retail services
Distribution Mgmt
Gateway
Solar PV
Vehicles
HEMS
Smart meter
Storage
Bldg Envelope
Electronics
Appliances
HVAC
Sensors
Water
Lighting