

The Itron logo is a red square with the word "Itron" in white, lowercase letters. A yellow lightning bolt symbol is positioned above the letter 'o'.

Itron

Piquing Interest in Shifting Peaks

Studying the Real-World Impacts of Load Shifting

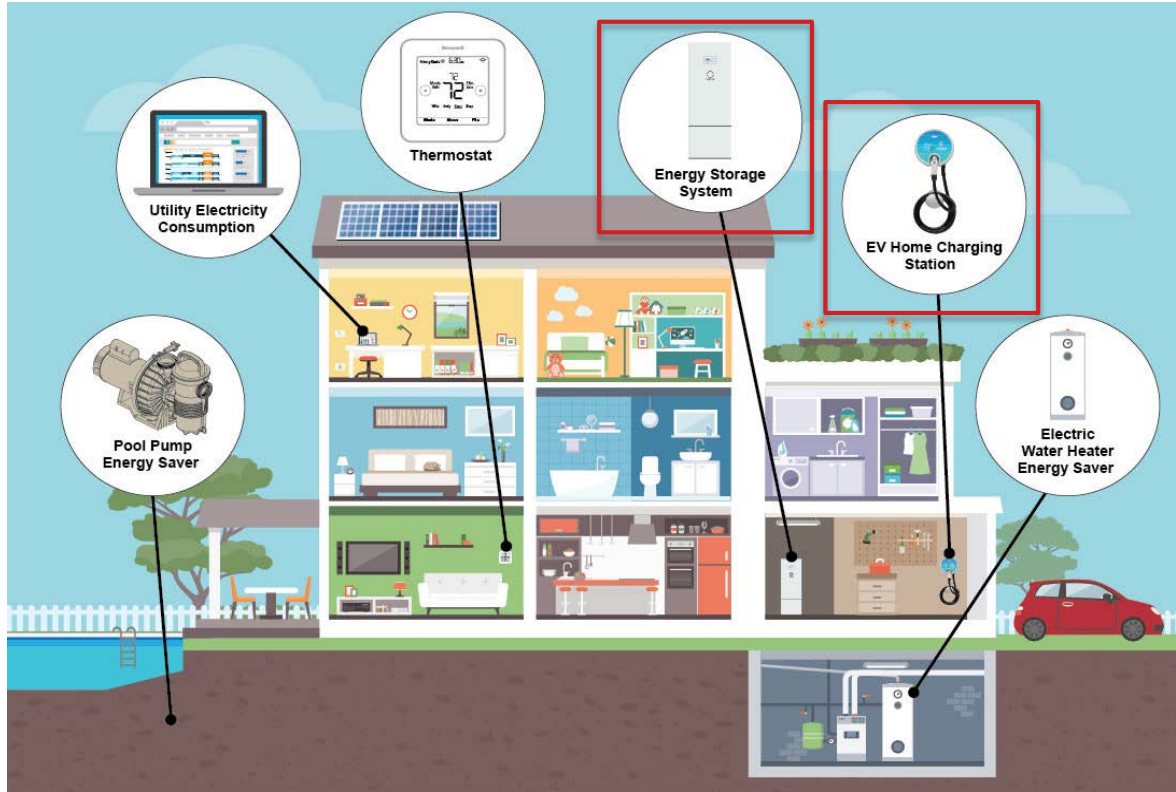
Morgan Smith, Itron
Stephan Barsun, Itron
Jean Shelton, Itron

8/20/2019



THE CHANGING ENERGY LANDSCAPE

Emerging Technologies in Residential Setting



THE SMART HOME STUDY

Using Residential Homes as a Laboratory to Study Load Shifting

- » Smart Home Study is a pilot program in SDG&E Territory
- » 100 residential homes
- » How rate structures and the adoption of BTM DERs impact the utilities and their residential customers



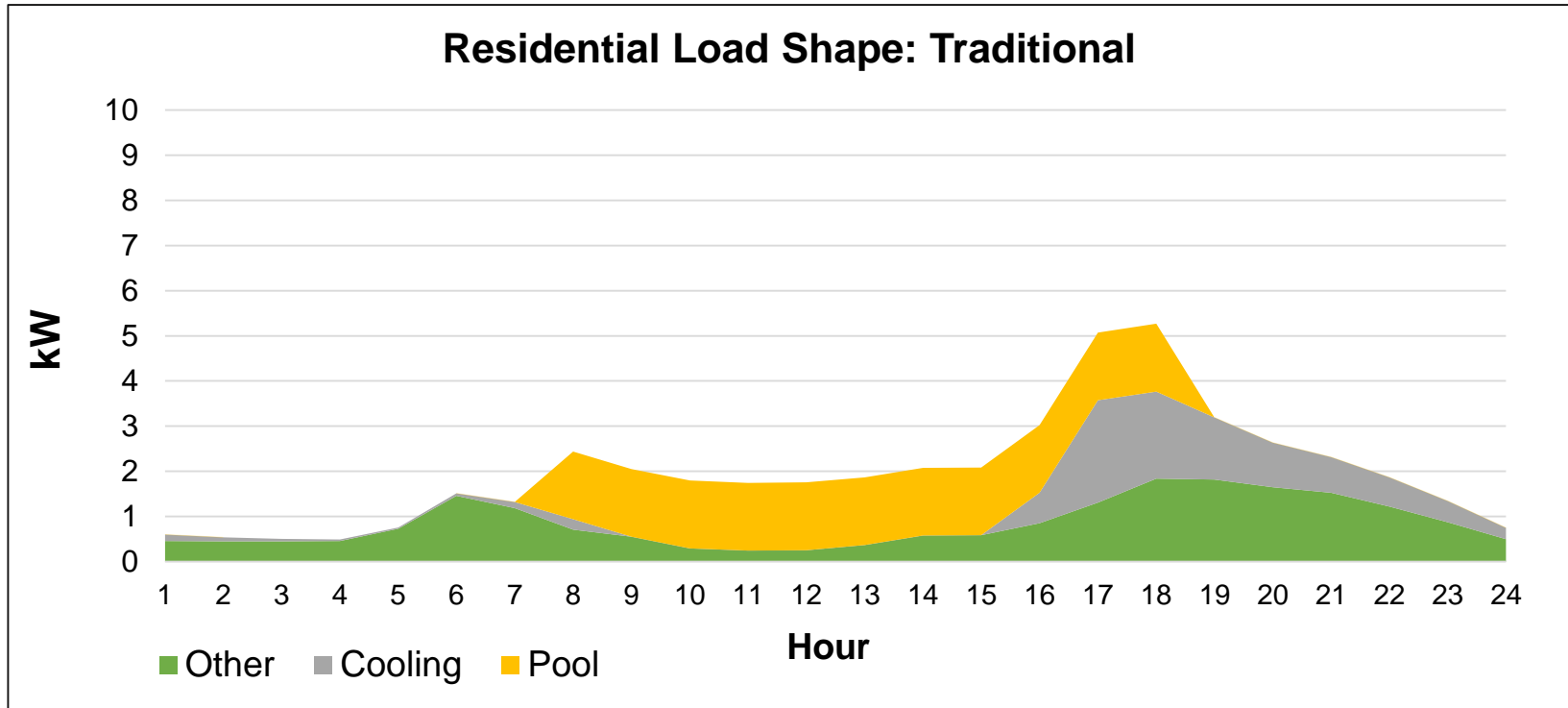
A  Sempra Energy utility



LOAD IMPACTS: GRID PERSPECTIVE

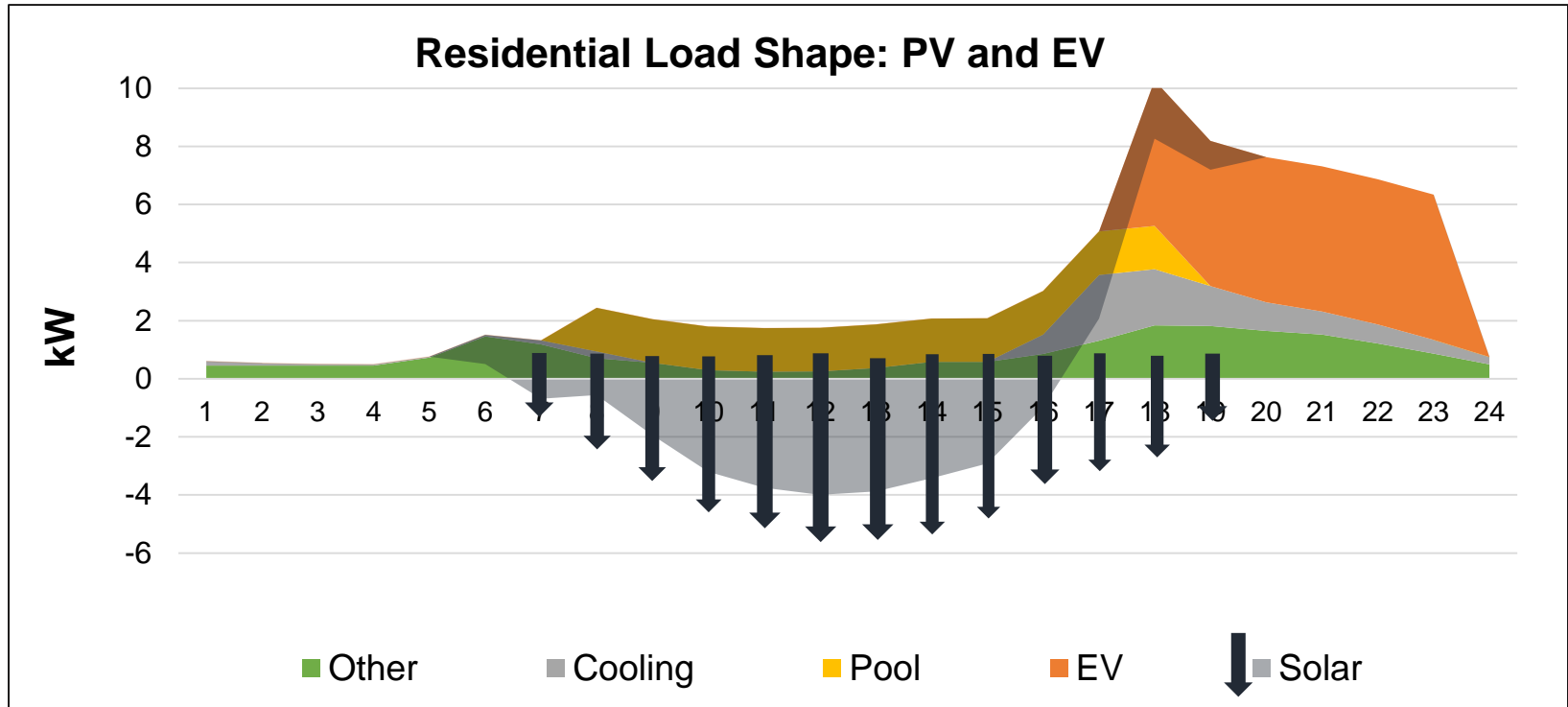
LOAD IMPACTS

DERs: Peaking the Grid



LOAD IMPACTS

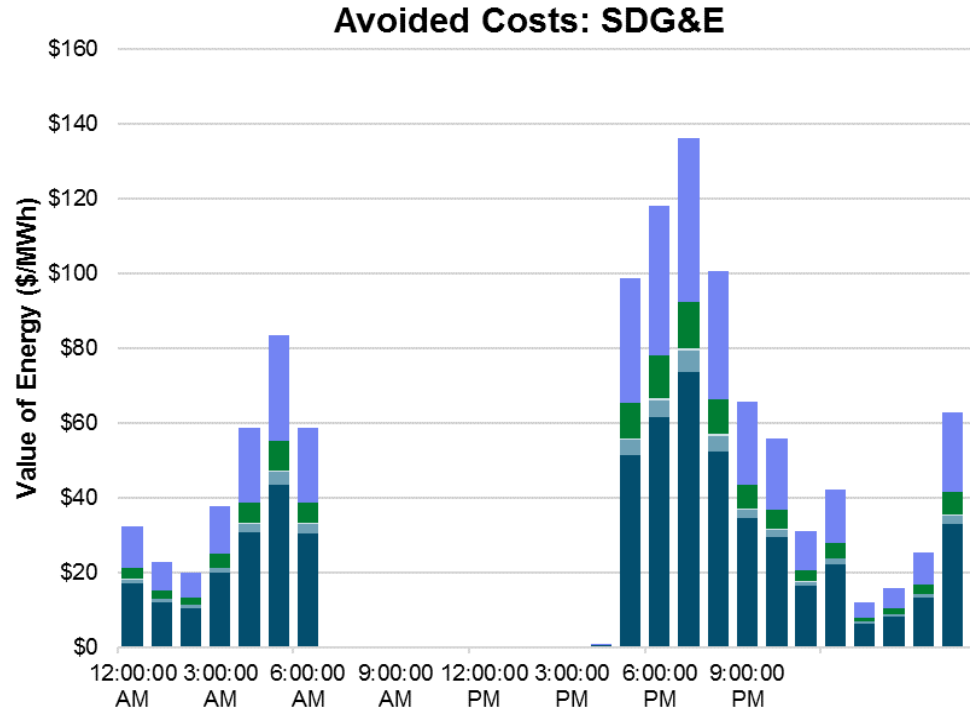
DERs: Peaking the Grid



LOAD IMPACTS

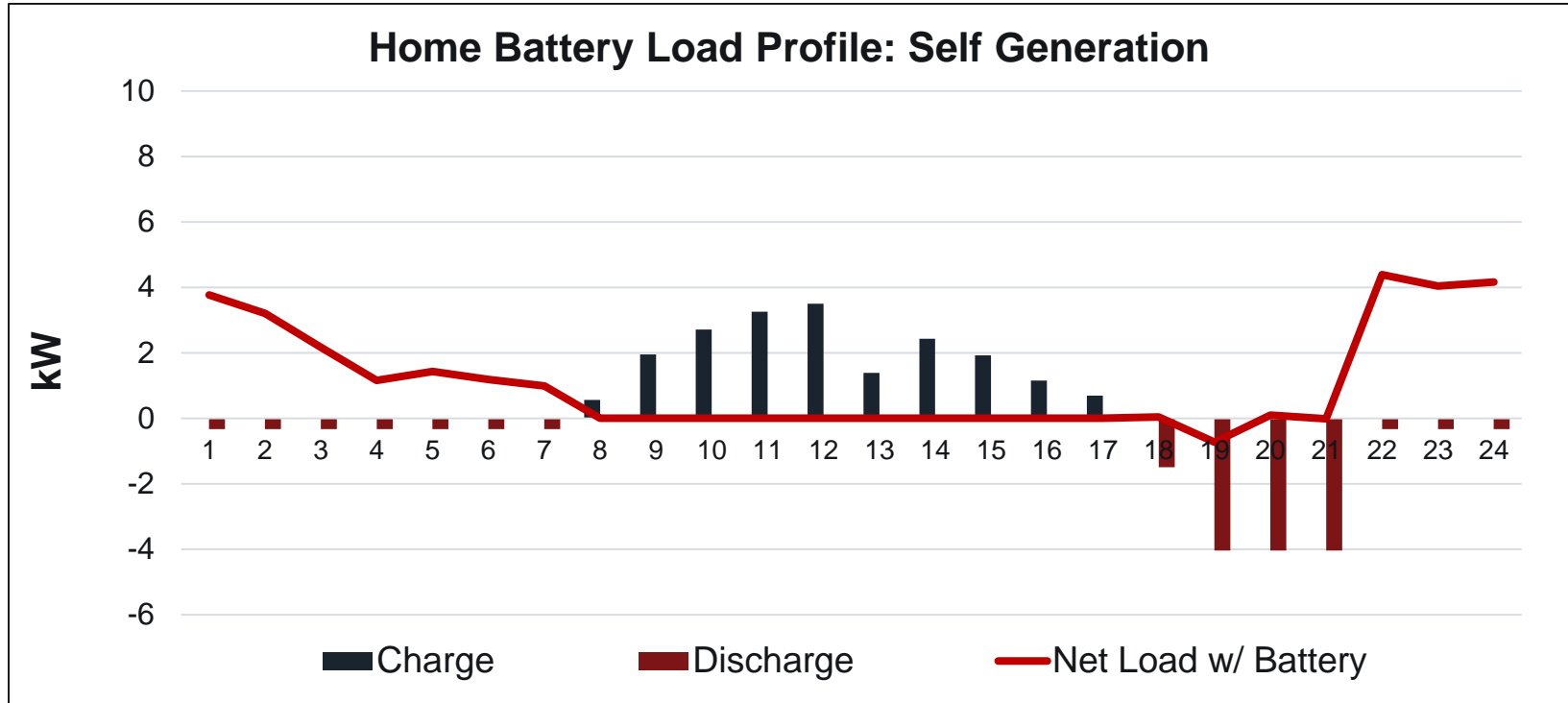
Costs to the Utility

- » SDG&E NEM agreements favorable to customer
 - Buys energy from customer at retail rates
- » During high generation hours avoided costs can be \$0
- » SDG&E benefits from customers storing their excess PV generation



LOAD IMPACTS

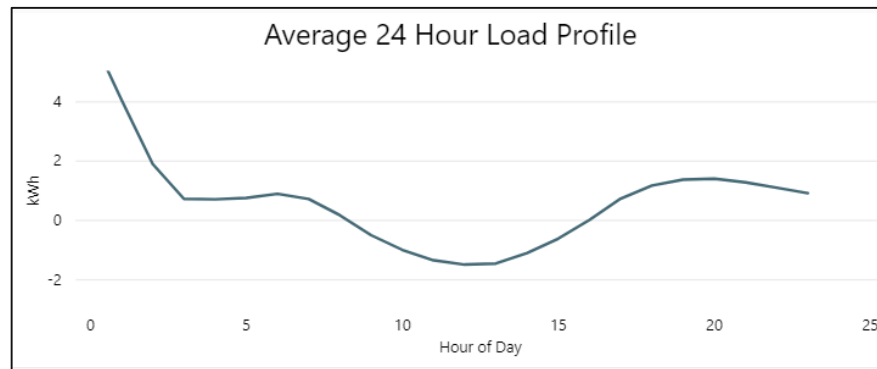
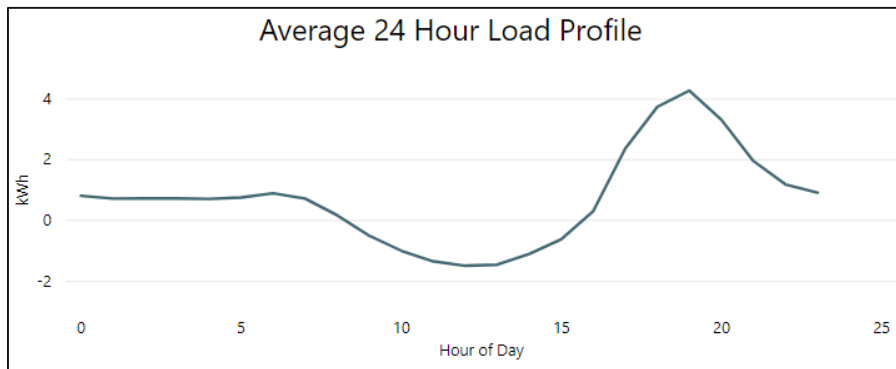
DERs: Shifting the Peak—Home Storage



LOAD IMPACTS

DERs: Shifting the Peak—Electric Vehicle Charging

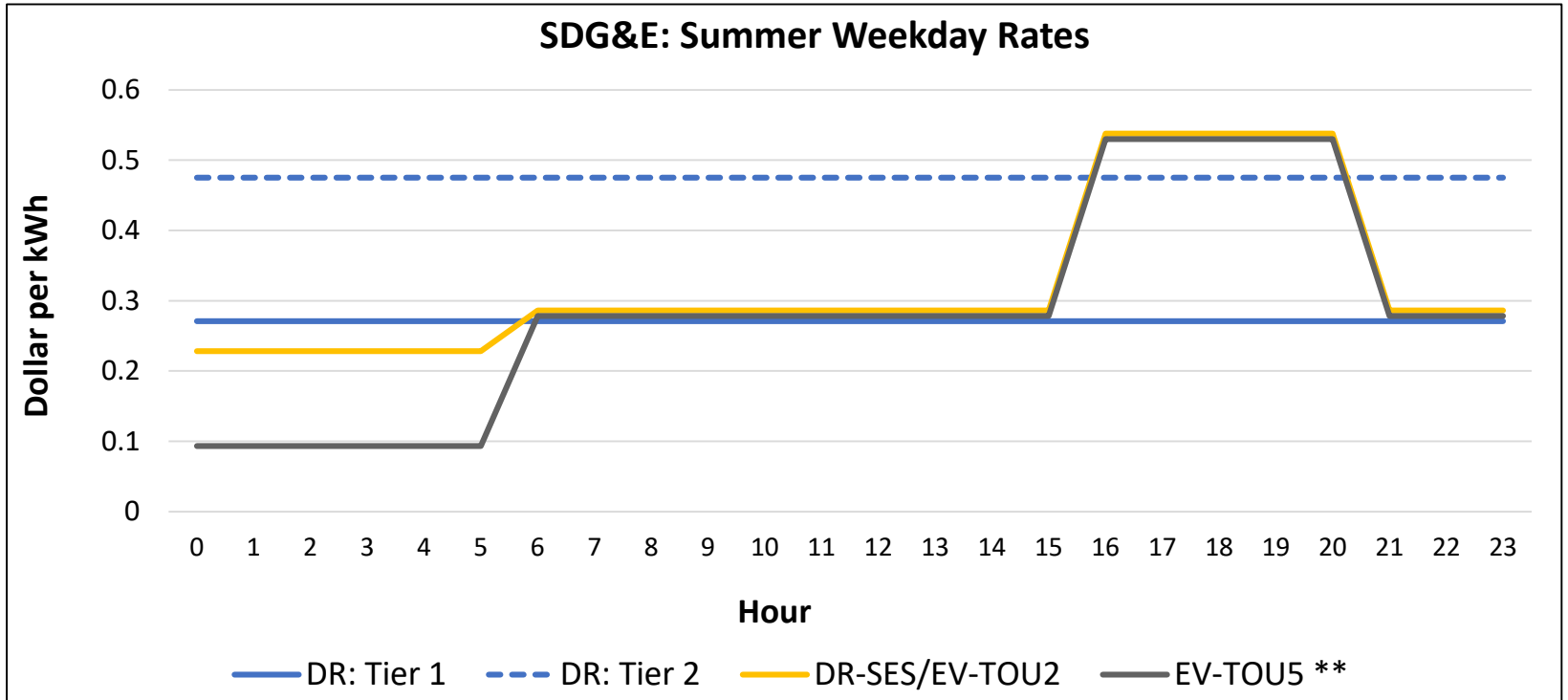
» Smart electric vehicle charging to reduce evening peak



RATE IMPACTS: CUSTOMER PERSPECTIVE

SDG&E RATES

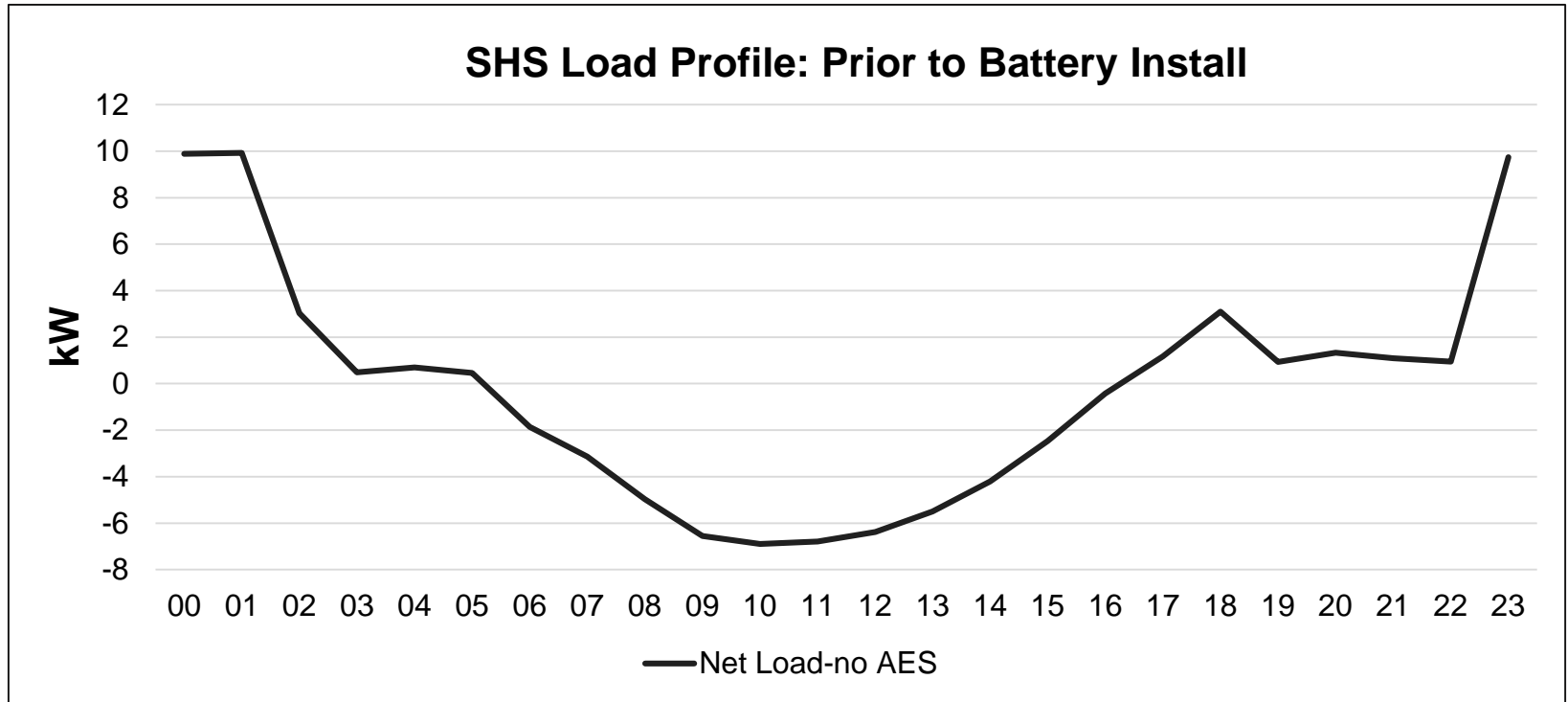
Available rates to SHS participants



** Includes flat \$16/month charge

CUSTOMER LOAD PROFILE

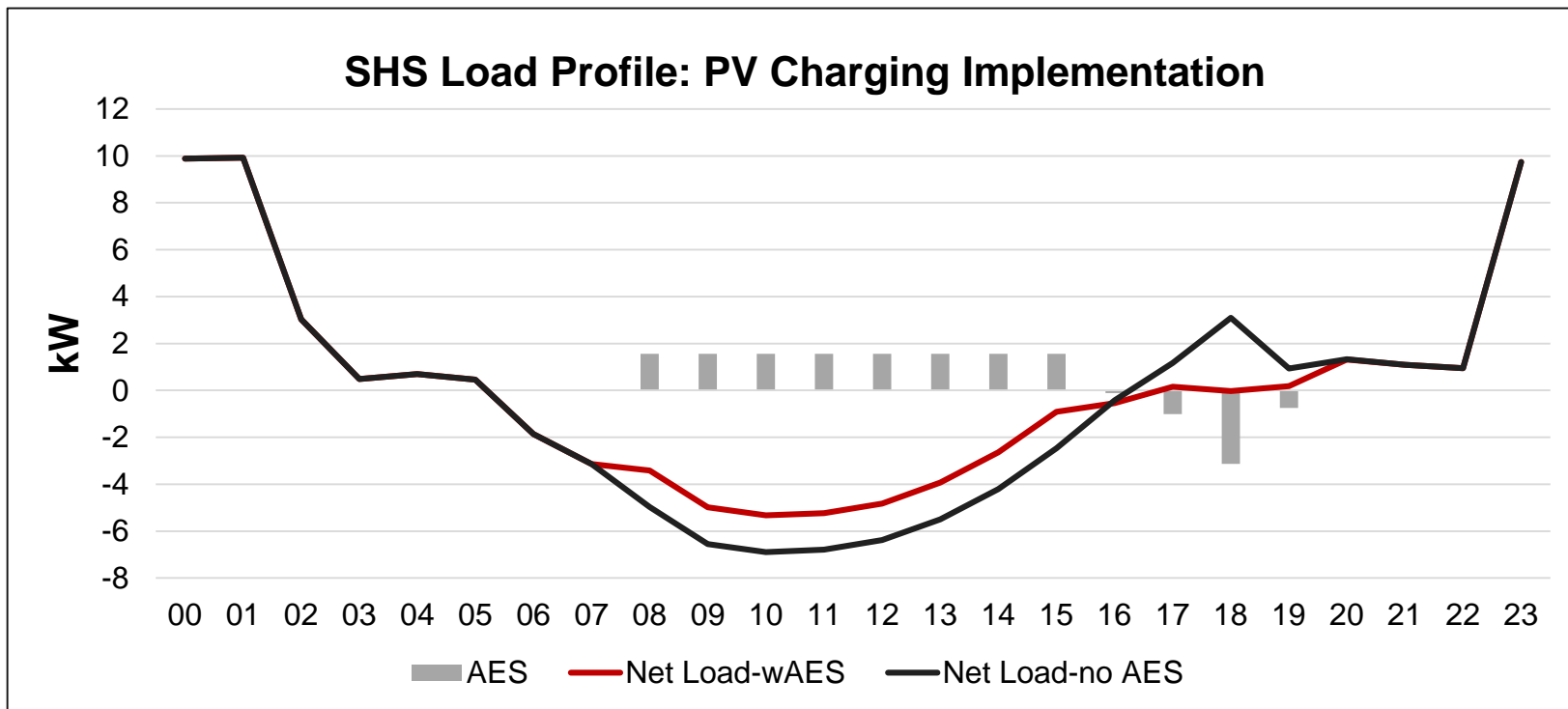
Storing excess PV generation, reduces evening load



CUSTOMER LOAD PROFILE

Storing excess PV generation, reducing evening load

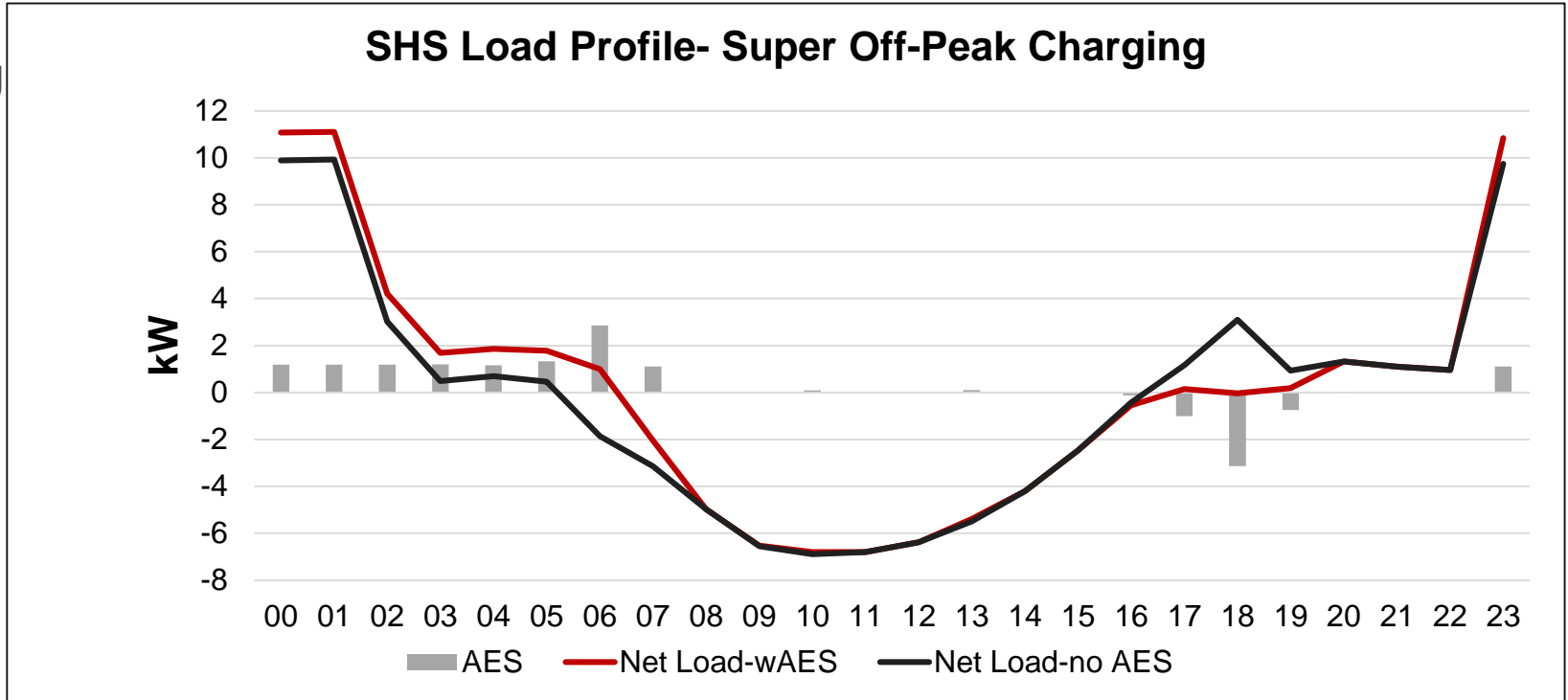
Increasing costs by 17%



CUSTOMER LOAD PROFILE

Storing super off-peak energy, reducing evening load

Decreasing costs by 11%



BARRIERS TO LOAD SHIFTING

Beyond the customer cost perspective

» EV Charging

- Do not charge at home often
- Inflexible charging schedule
- Multiple EVs

» AES Implementation

- AES requires energy to operate
 - Larger differential in on-peak and off-peak pricing required to use AES
- Expensive equipment

CONCLUSION

FINDINGS AND NEXT STEPS

Smart Home Study and beyond

- » Can effectively shift customer load to reduce customer bills
- » Utility benefits v. customer benefits
 - Can be misaligned under current rate schedules
- » Dynamic pricing
 - Smart Home Study to implement two 3-week experiment in optimizing to day-ahead LMP (locational marginal pricing)

Continued research required to understand how BTM DERs will continue to reshape the grid.

Questions?

For further questions contact:

Morgan Smith Morgan.Smith@ltron.com or

Stephan Barsun Stephan.Barsun@ltron.com

THANK YOU



Strategic Analytics Group

12348 Highbluff Dr, Suite 210

San Diego, CA 92130

www.itron.com