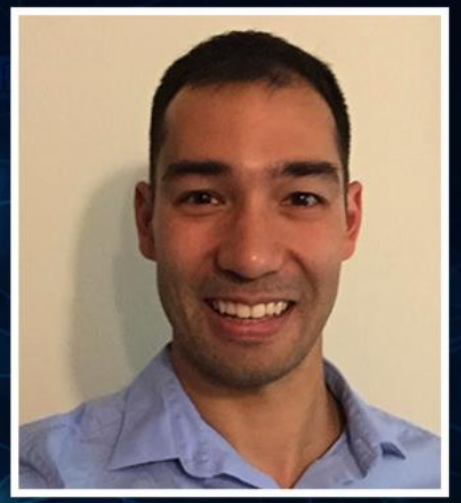
CALFLEXHUB SYMPOSIUM

RICHARD BROWN

THERESE PEFFER



DANIEL GERBER

PIERRE BULL

TRISTAN DE FRONDEVILLE

PROJECT SHOWCASE

Residential Building Technologies

KEYNOTE SPEAKERS:

Richard Brown, Research Scientist, Deputy Head of the Building Technologies Department, Berkeley Lab

Therese Peffer, Associate Director, California Institute for Energy and Environment (CIEE), UC Berkeley

Daniel Gerber, Research Scientist, Berkeley Lab

Pierre Bull, Manager, Technology Partnerships, Olivine

Tristan de Frondeville, CEO, SkyCentrics

2022

CalFlexHub

BERKELEY LAB

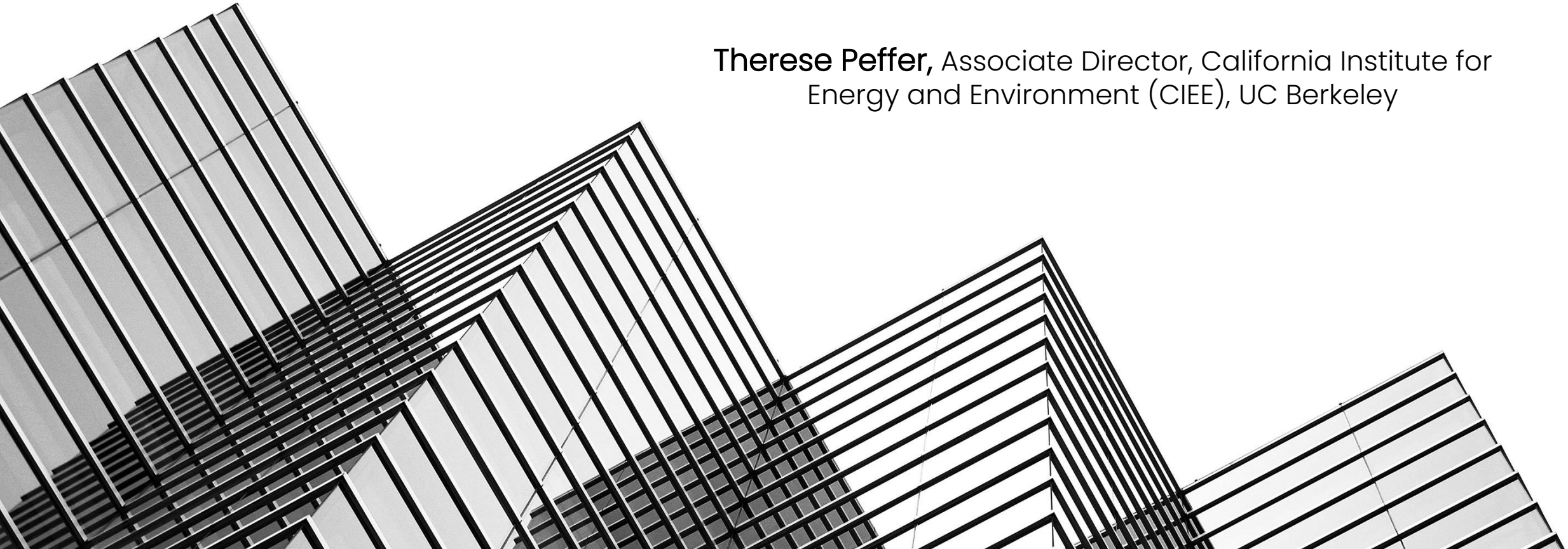
STATE OF CALIFORNIA ENERGY COMMISSION

MOMENTUM

CalFlexHub

CoolFIT: Residential Smart Fan with Integrated Thermostat

Therese Peffer, Associate Director, California Institute for Energy and Environment (CIEE), UC Berkeley

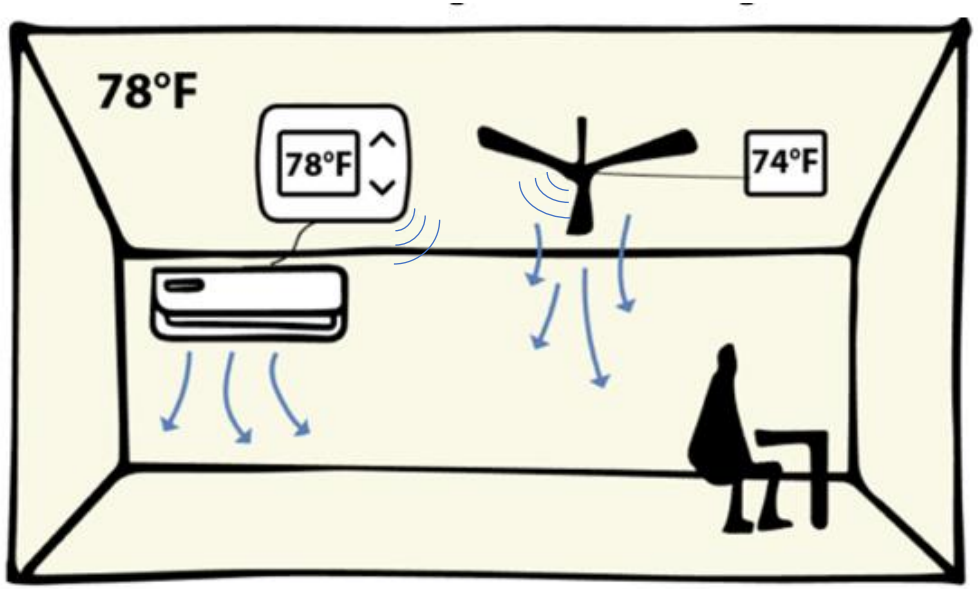


CoolFIT

Berkeley
UNIVERSITY OF CALIFORNIA

Fan Integrated with Thermostat

- Price signals received through a price client coded in Python and interacts with the thermostat in the cloud.



Lab/Test Sites:

- Center for the Built Environment Chamber
- Franco Senior Center, Stockton

CoolFIT

Berkeley
UNIVERSITY OF CALIFORNIA

Dr. Therese Peffer
Associate Director, CIEE

Dr. Hui Zhang
Research Specialist, CBE

Mr. Charlie Huizenga
Research Specialist, CBE

ciee
California Institute
for Energy and Environment

CITRIS AND THE BANATAO INSTITUTE

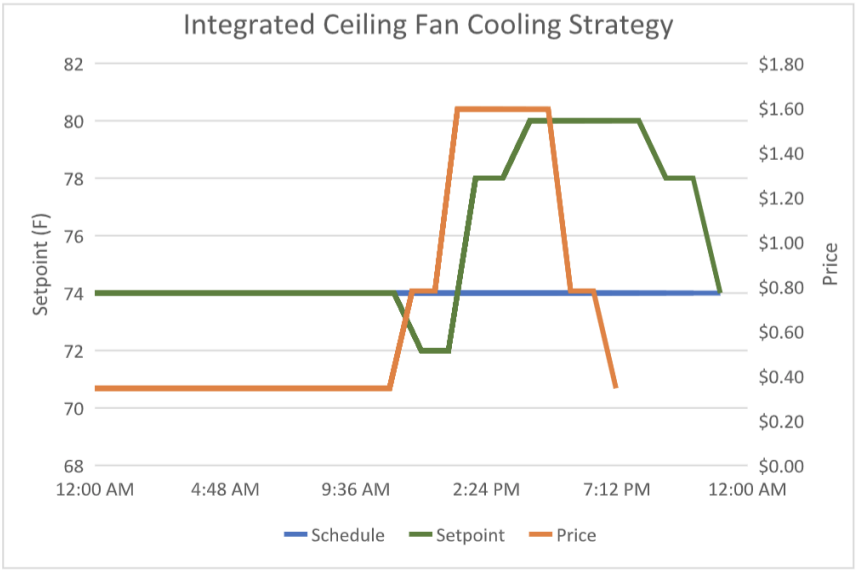
CBE
CENTER FOR THE BUILT ENVIRONMENT

CBE
CENTER FOR THE BUILT ENVIRONMENT

Contact Information: tpeffer@Berkeley.edu

Early Results/Lessons Learned

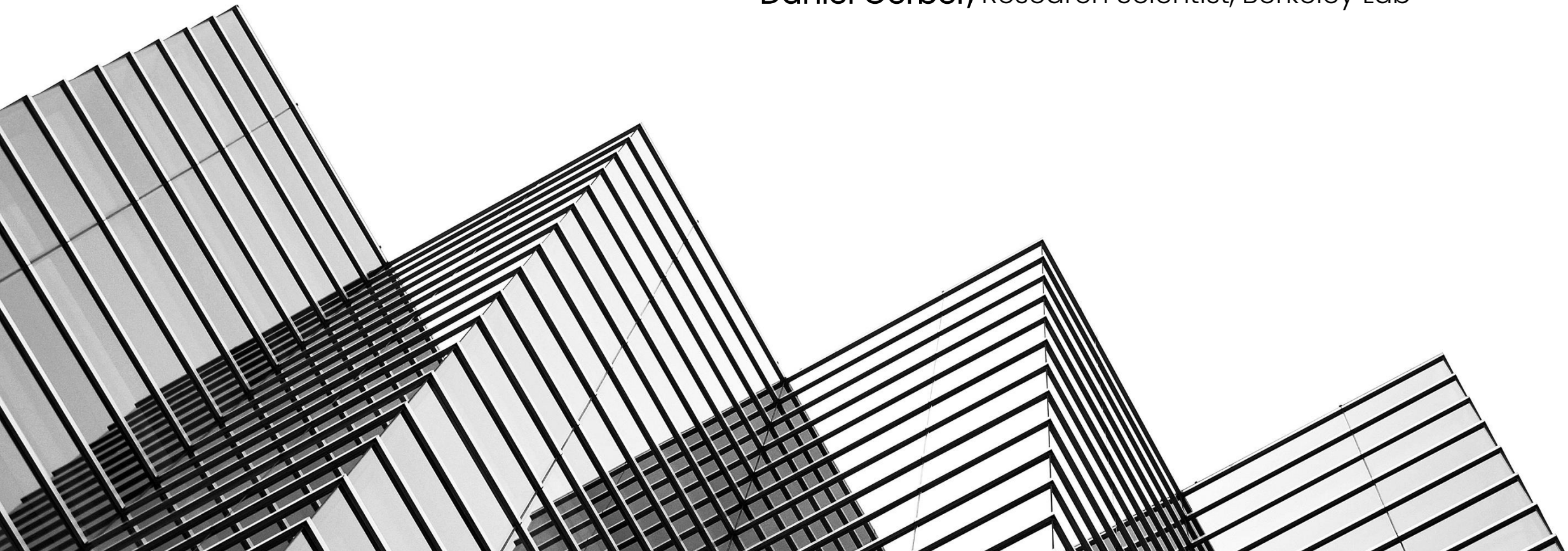
- Developed use cases
  - Shed HVAC load—Increase thermostat setpoint and turn on fan to retain comfort
  - Shift HVAC load—precool
- Develop algorithms
- Integrate with price and test in lab
- Select and visit units within field site
- Receive Human Subjects protocol approval
- Select contractor to install fans/thermostat/sensors
- Fans delivered to site



CalFlexHub

Flexible Loads for Low-Power Electrification

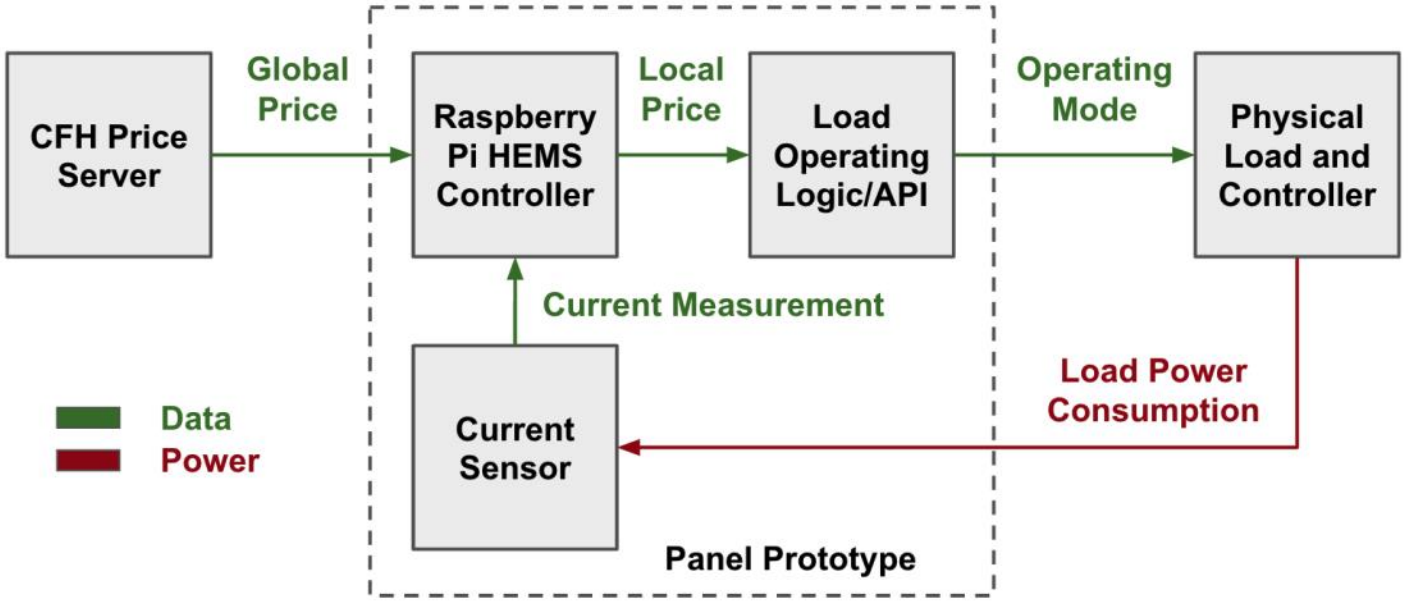
Daniel Gerber, Research Scientist, Berkeley Lab



A6: Flexible Loads for Low-Power Electrification

Full home electrification often requires a costly panel/service upgrade. This project develops a controller to shift/shed loads and avoid overloading existing panels.

- *Controller receives CFH price via WiFi and creates a local price for attached loads based on remaining panel capacity*



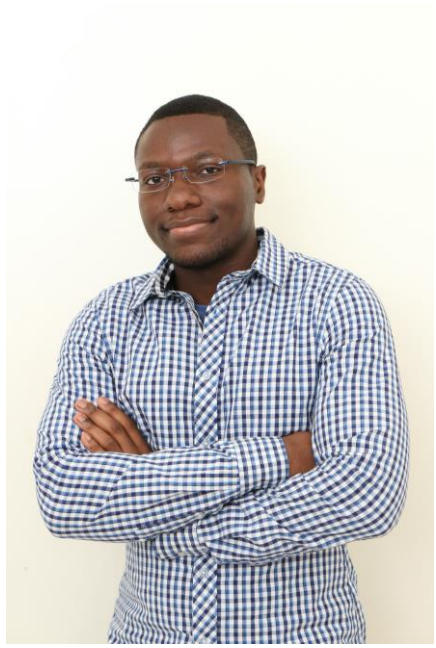
Lab/Test Site(s):

Connected Devices Laboratory

A6: Flexible Loads for Low-Power Electrification

Daniel Gerber
dgerb@lbl.gov
Research Scientist

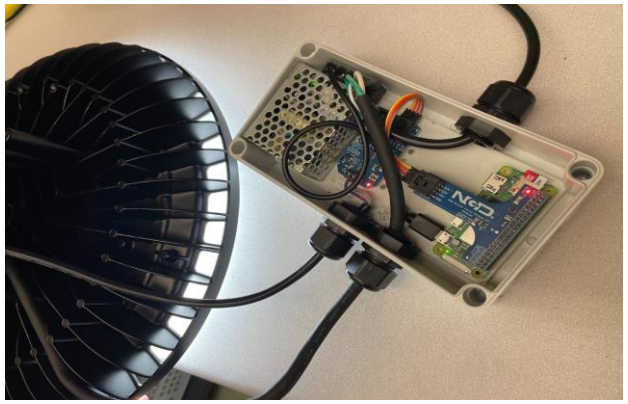
Anand Prakash
akprakash@lbl.gov
Senior Scientific Engineering Associate

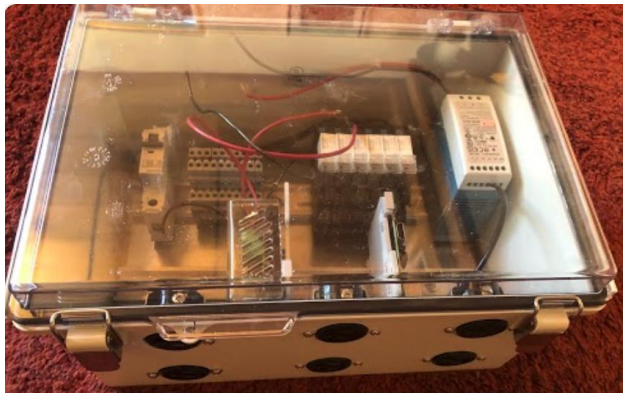


Kenny Chundu
kchundu@lbl.gov
LBNL SULI Intern

Early Results/Lessons Learned

- Cycle 1: Built the flexible loads for bench-scale panel demonstration: space heater, LED flood lights, fans
- Learned that most smart loads are not open API, meaning that eventual integration of certain products may be a challenge
- Cycle 2: Developing the flexible panel and algorithm for calculating local price and controlling loads





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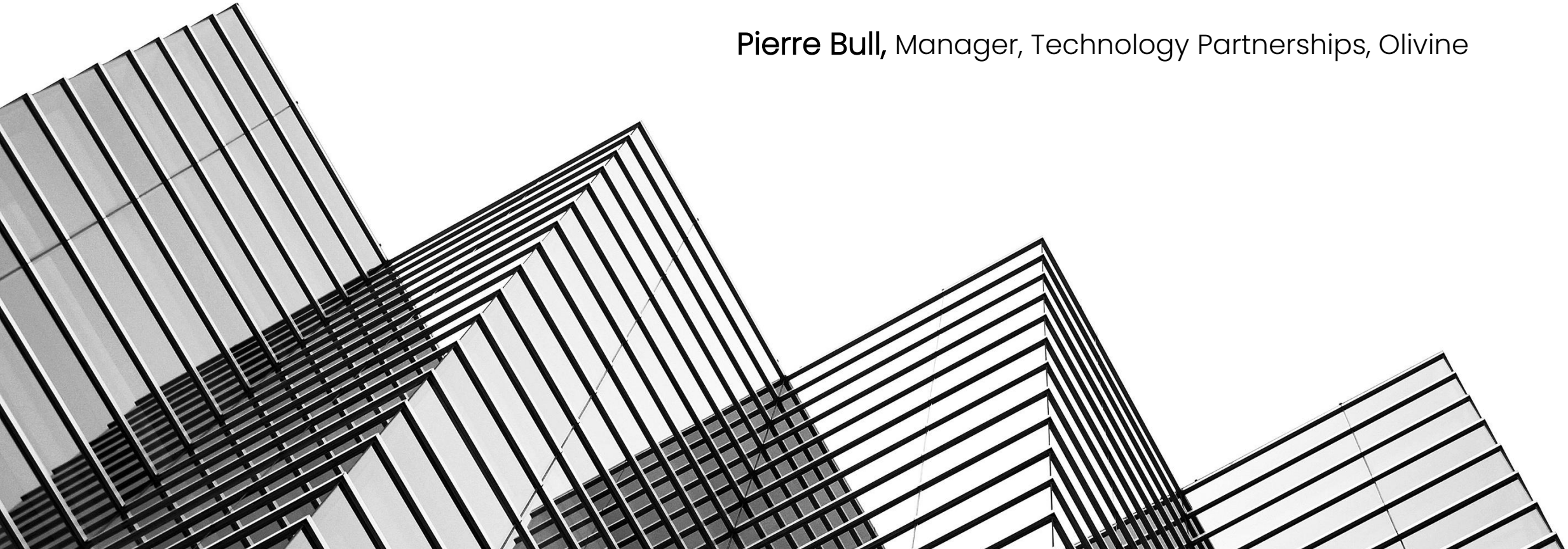
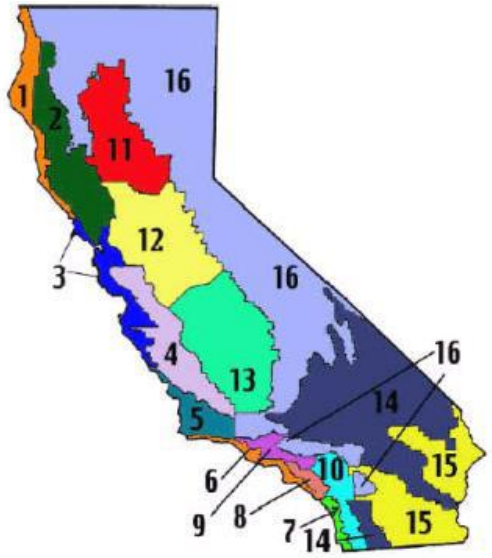
Control and Coordination of Distributed Flexible Loads – Ecobee Smart Thermostats

Pierre Bull, Manager, Technology Partnerships, Olivine

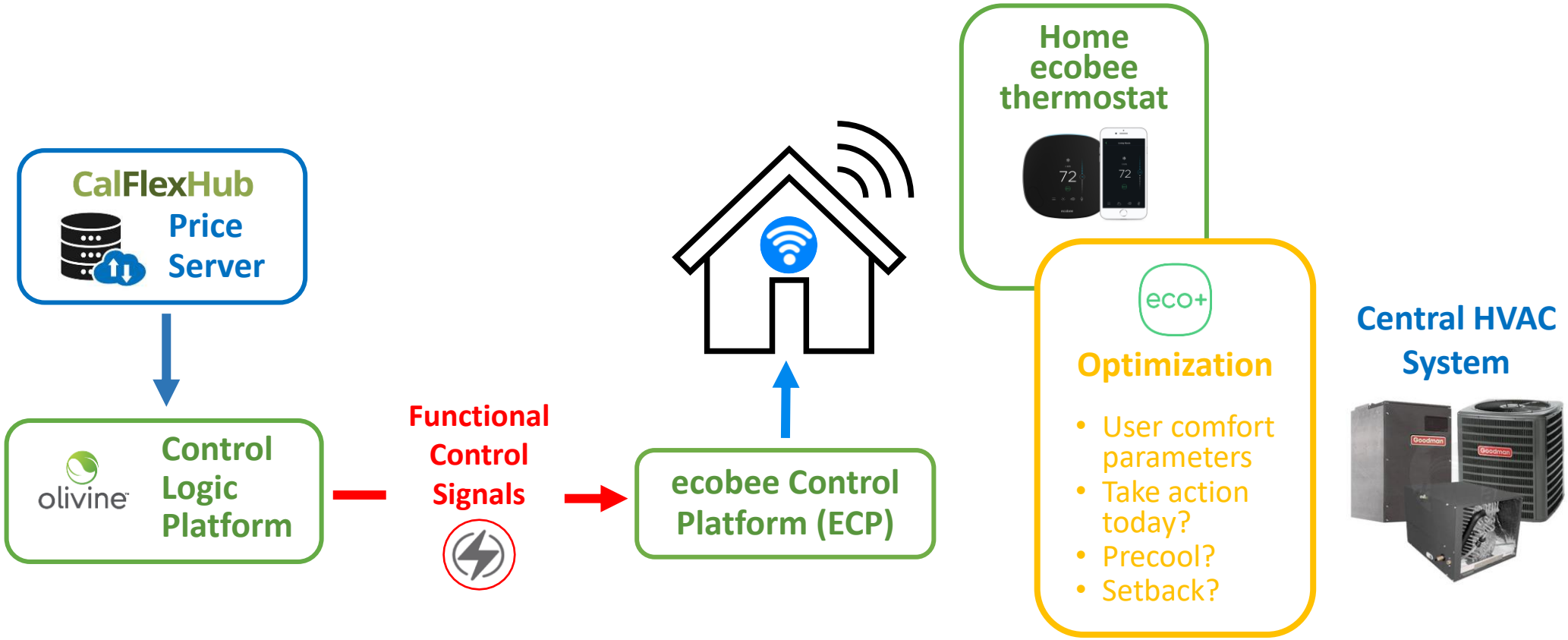


Title	(T12A.1) Control and Coordination of Distributed Flexible Loads – Ecobee Smart Thermostats
Team	olivine (Pierre Bull, Joe Bourg, Felipe Godinez, Forrest Csulak)

- 20 single-family residences with central air conditioning
- PG&E Service Territory
- Mostly comprised of Fresno, Sacramento Metropolitan Region, and Inland East Bay Area (Climate Zones 11, 12 and 13)
- Site Components
  - Ecobee **smart thermostat** (“ecobee 3 lite” model)
  - Ecobee **mobile app**
  - “**eco +**” feature enabled
  - Access to run-time and indoor temperature records (Ecobee Control Platform, **ECP**)



How ecobee Thermostats Respond to CalFlexHub Price Signals



Early Results

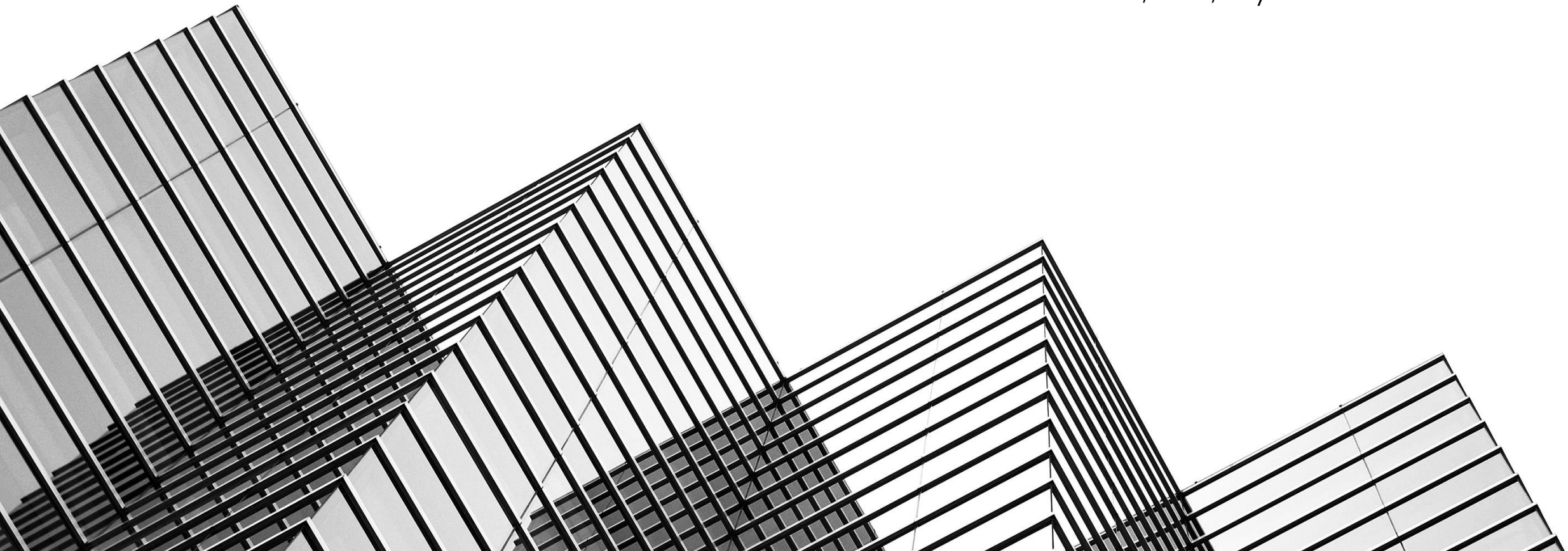
Functional Test and First Testing Period completed in October

- Tested for evening load shed over 7 consecutive days
  - Based on Summer Large Differential TOU (“SummerLD-TOU”) rate
  - Late October (minimal A/C load)
- ecobee’s **eco +** thermostat software command feature functioned as expected
  - Precool of 2-4 degrees turned on one hour prior to load shed event window
  - Event window set points were set up to 4 degrees F above original set point for 2-hours

CalFlexHub

Residential Flexible Pool Pump Controls

Tristan De Frondeville, CEO, SkyCentrics



Pool Pump Control

CEO

CTO

Contact Information: info@skycentrics.com 415.962.1500

Pentair Pool Pumps (IntelliConnect 2)

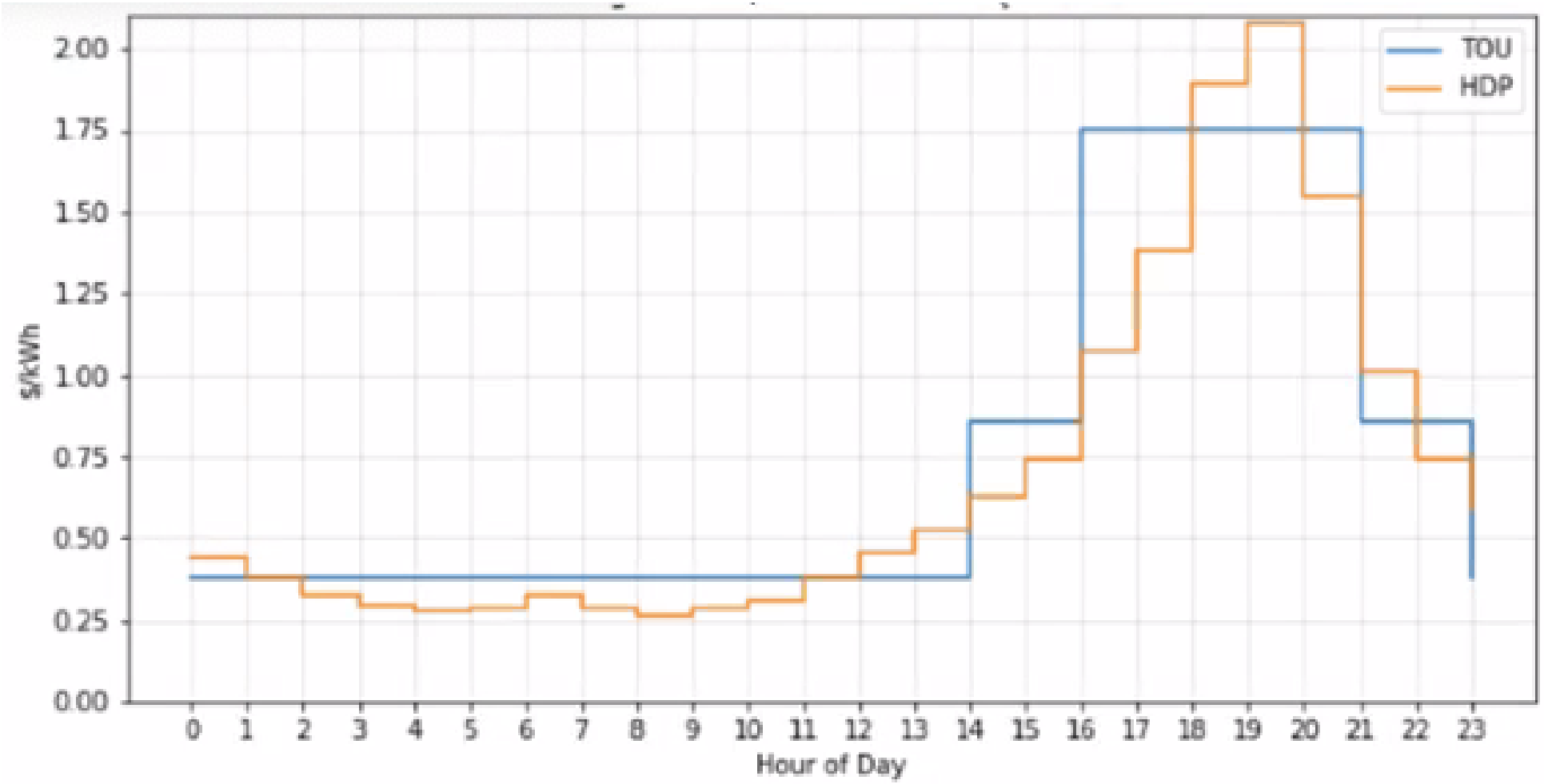
Control Pool Pumps by a CTA-2045 EcoPort controller

- *Price/GHG Signal from CFH Price Server and MIDAS*
- *Translate to an "Action Shape"*
- *Stored in the CTA-2045 EcoPort module*
- *VERY DYNAMIC*

Residential homes in Southern CA Edison territory

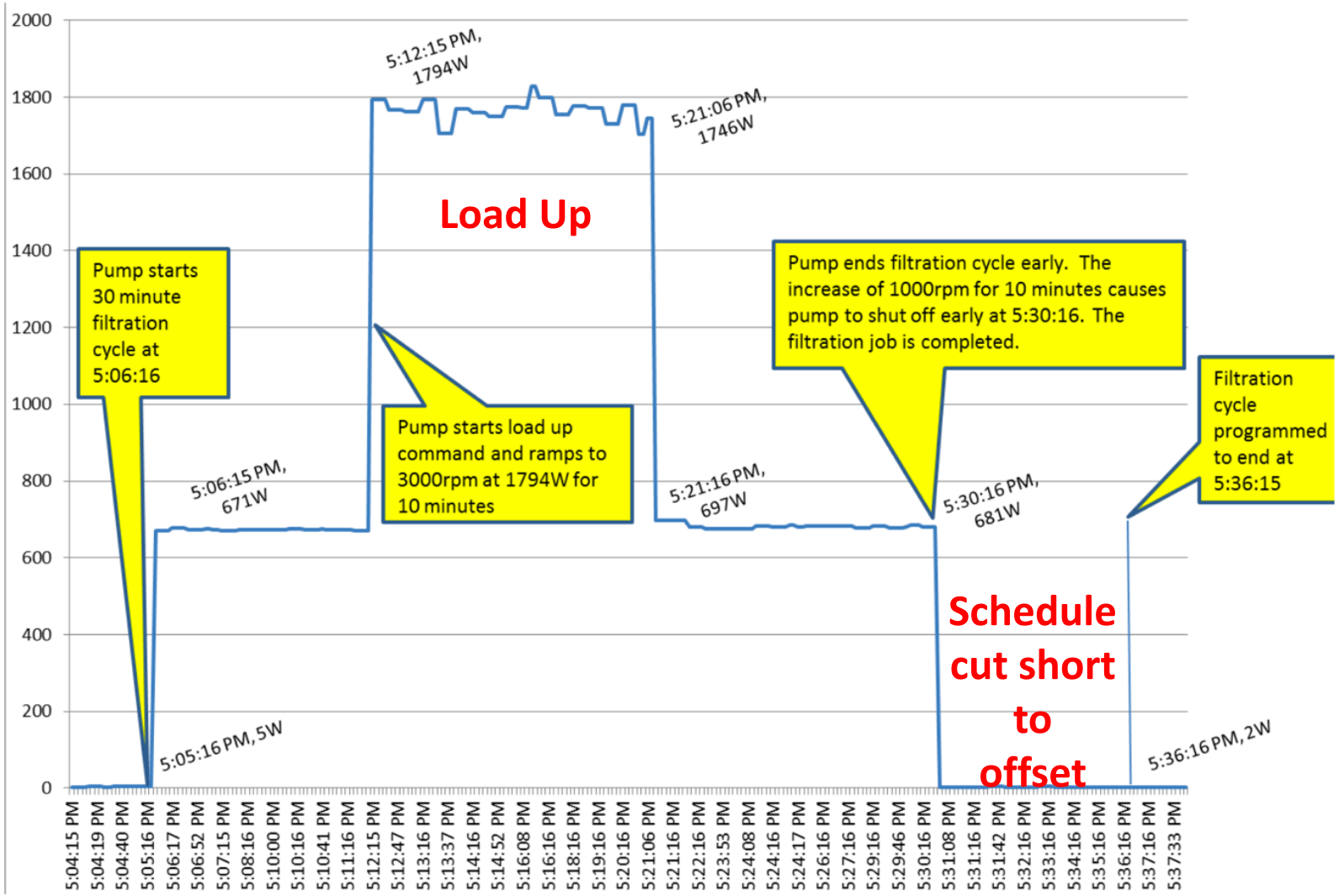
Action Plan based on HDP

SkyCentrics



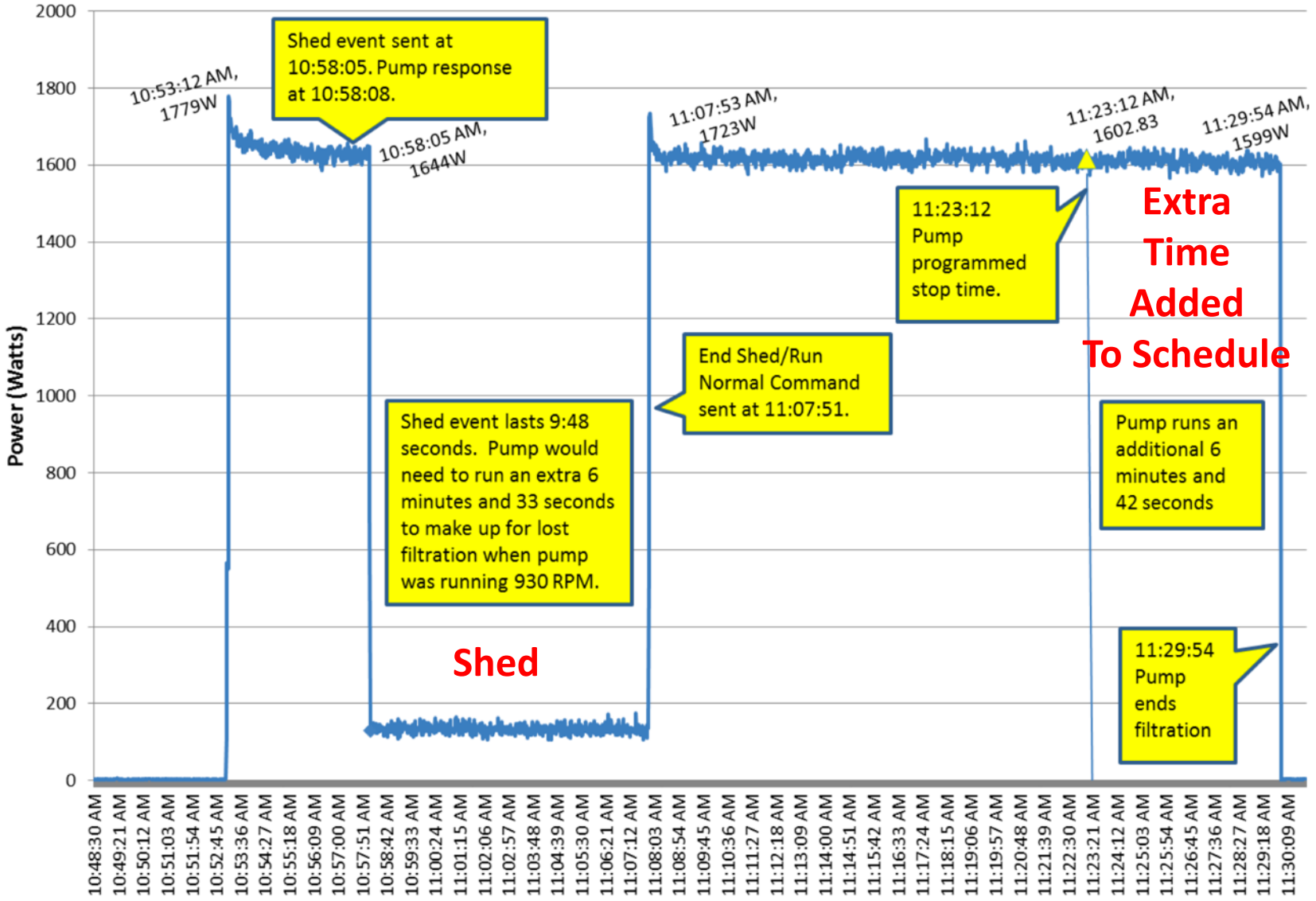
SMART pool pump control

SkyCentrics



SMART pool pump control

SkyCentrics



Pool Pump Controllers are in CA now

SkyCentrics

- IntelliConnect v1 – OpenADR
- IntelliConnect v2 – OpenADR & CTA-2045 EcoPort

ECOPORT

openADR™ 2.0b CERTIFIED