

# The Potential of Smart Thermostats and Other Flexible Residential Load

Energy Systems Integration Group, October 2018

# Tendril Snapshot

## COMPANY

Customer Experience  
& DSM Analytics  
Platform

## MISSION

We are building a smarter market for energy  
products & services.

## SOLUTIONS



Home Energy  
Analytics



Energy Efficiency &  
Engagement



Demand  
Management

## TENDRIL CAPABILITIES



Computer  
Science



Behavioral  
Science



Energy  
Science



Data  
Science

## CUSTOMERS



Regulated  
Utilities



Competitive  
Retailers



Data into Insights &  
Insights into Action

Demand Management is the creation of a true two-way energy optimization



# Orchestrated Energy Product Design Principles

## Comfort & User Experience

*We put the customer experience first.*

- Customer is always in control
- Doesn't supplant the native app
- Operation is invisible: customer is always comfortable

## Optimization

*We always get the right answer.*

- No heuristics or rules
- Deterministic optimization based on day-ahead forecast and real-time updates

## Dispatchable

*Day-ahead schedule and real-time dispatch.*

- Schedulable and dispatchable, just like a power plant
- Qualified to provide capacity, energy, and ancillary services
- Operate within a DERMS, ADMS,

## Aggregate

*Whole home, whole grid optimization.*

- All connected loads in the home are optimized simultaneously
- Aggregate load optimization across a circuit, substation, or balancing area

# Orchestrated Energy Solutions



Traditional DR

Dispatched only for demand response events.



Demand Response +  
Energy Efficiency (DR+)

Energy efficient operation on all days except when a demand response event is called.

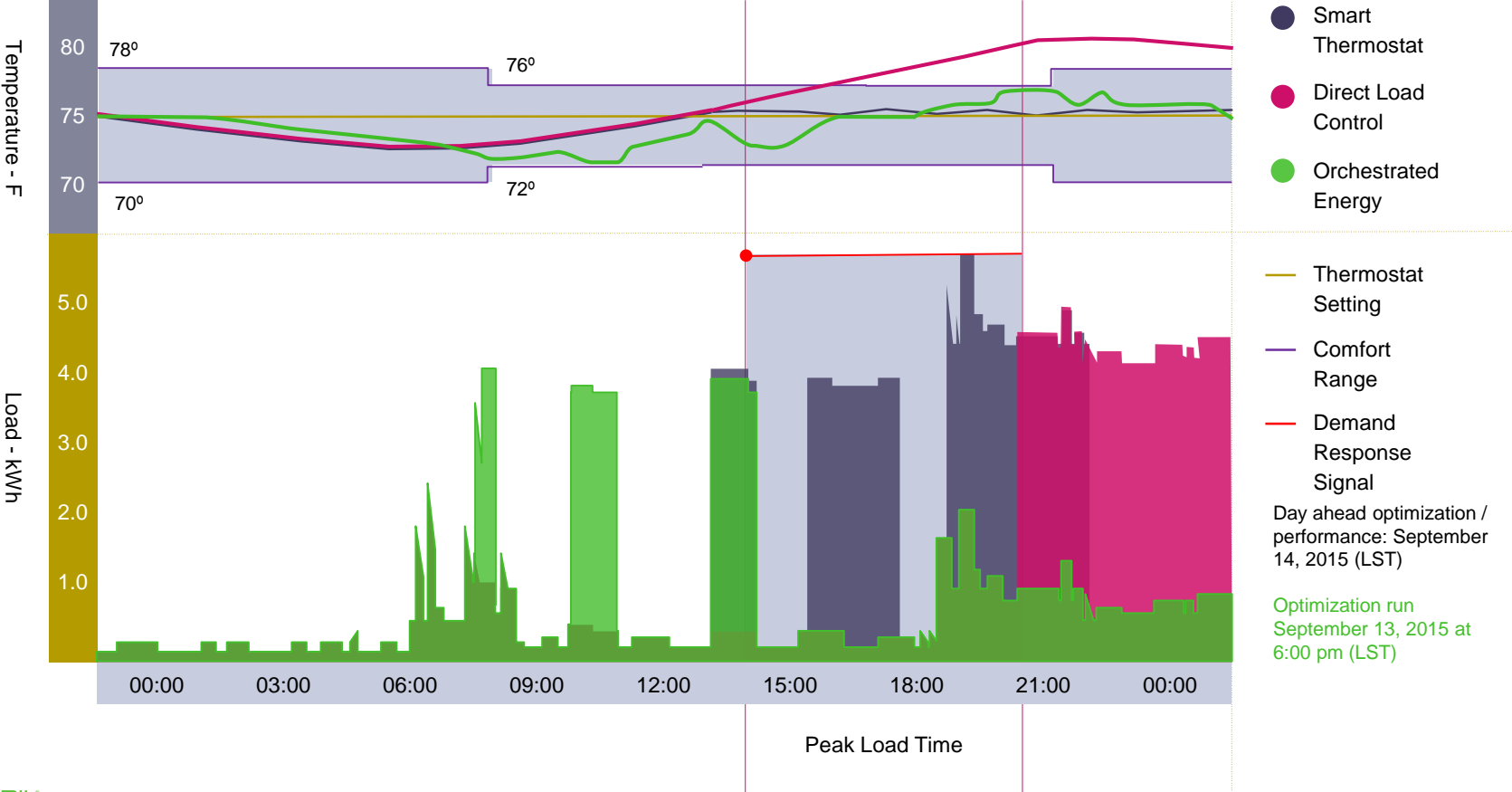


Continuous Demand  
Management (CDM)

Continuous demand management is signal-based optimization, e.g. TOU rate, distribution cost of operation.

# How OE Operates

ORCHESTRATED ENERGY



Day ahead optimization / performance: September 14, 2015 (LST)

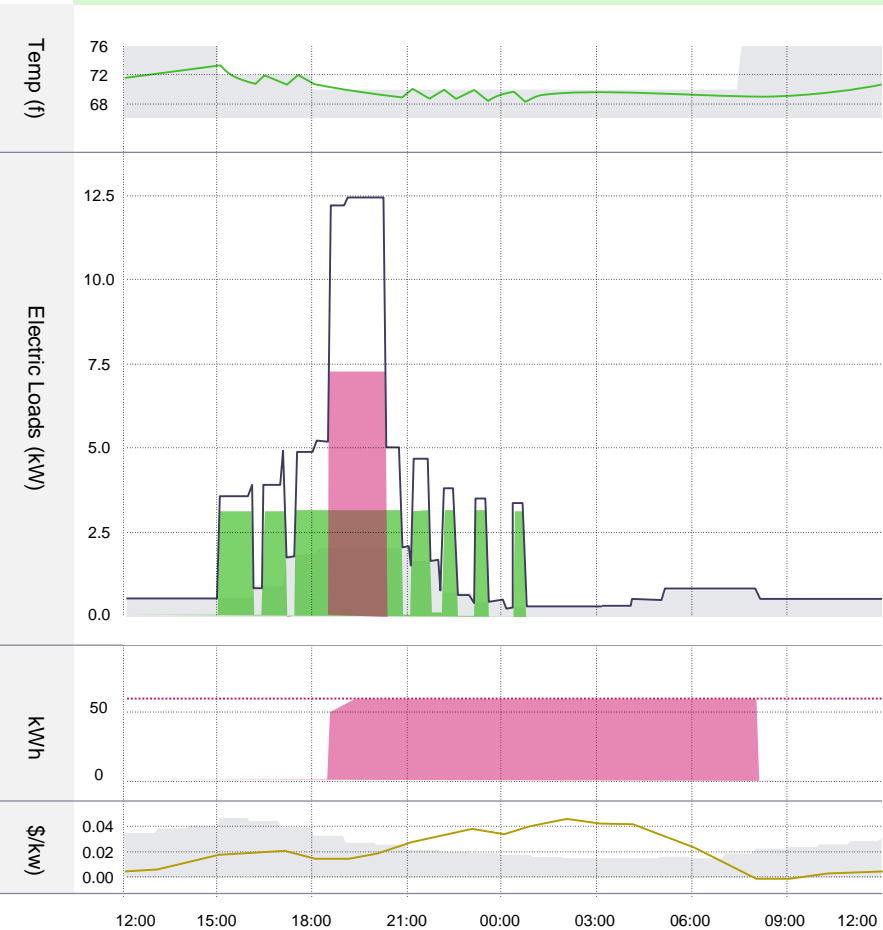
Optimization run September 13, 2015 at 6:00 pm (LST)



# We are building towards a virtual power plant



## Without Orchestrated Energy



## With Orchestrated Energy



- Indoor Temperature
- Comfort Bands
- Net Load
- Baseload
- HVAC
- EV
- - - EV Battery Capacity
- EV Battery State of Charge
- Buyrate
- Wind



## Obstacles to Continuous Load Management

### Immature Sector

- + Lack of accepted standards
- + Unfamiliarity of technologies and differentiation
- + Tendency for risk-aversion (need for pilots)

### Utility Business Model

- + Typically earning a return on physical assets only

### Wholesale Market Rules

- + Lack of access for imperfect resources
- + No value for load flexibility
- + A bidding market only for supply