



Acadia Center

Advancing the Clean Energy Future

Using Residential Load Control To Help Integrate Renewables

ACEEE Intelligent Efficiency Conference

December 6, 2016

Austin, TX

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Center



Overview

- This study explores policy considerations associated with using energy efficiency programs to deploy Active Load Management (ALM);
and,
- Examines the potential of intra-day load shifting to better align a home's consumption with daily solar PV output;
 - and, of course,
 - Provides recommendations for policy makers and efficiency program administrators.

Creating a Policy Framework

Product Classification

Category	Degree of Impact to Customer	Description of Application
1	Minimal	Not readily apparent to customers and have no loss of services provided
2	Low	Customer might see changes, but no loss of service
3	Medium	More visible to customers and moderate change or loss of service
4	High	Visible to customers and loss of service

Delivery Mechanism

- There are many possibilities for getting ALM products to customers and connecting them in a way that can respond to grid needs.
- **Transaction costs for the products included in this study need to be low for the economics to work.**
- All of the products included in this study are part of some energy efficiency programs around the country.

Compensating Participants

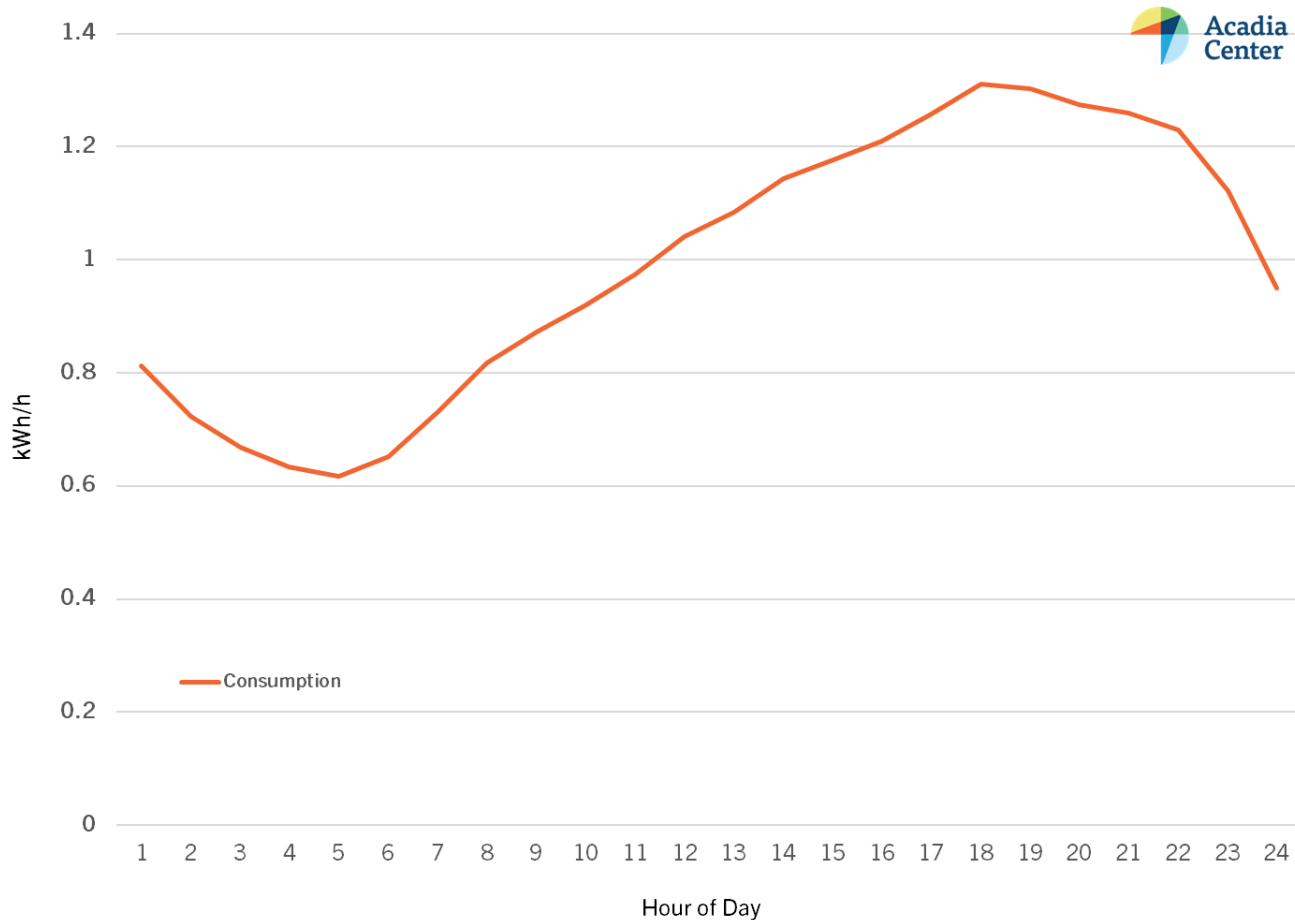
- Need to first consider revenue sources:
 - Energy and capacity markets
 - Value of avoided generation infrastructure and/or fuel
 - Value to the grid (both T&D) as a non-wires alternative
- Range of compensation options:
 - Paid full value of participation by a program administrator
 - Amount paid determined by market, similar to how EE rebates are set
 - Condition of an EE product rebate

Aggregator

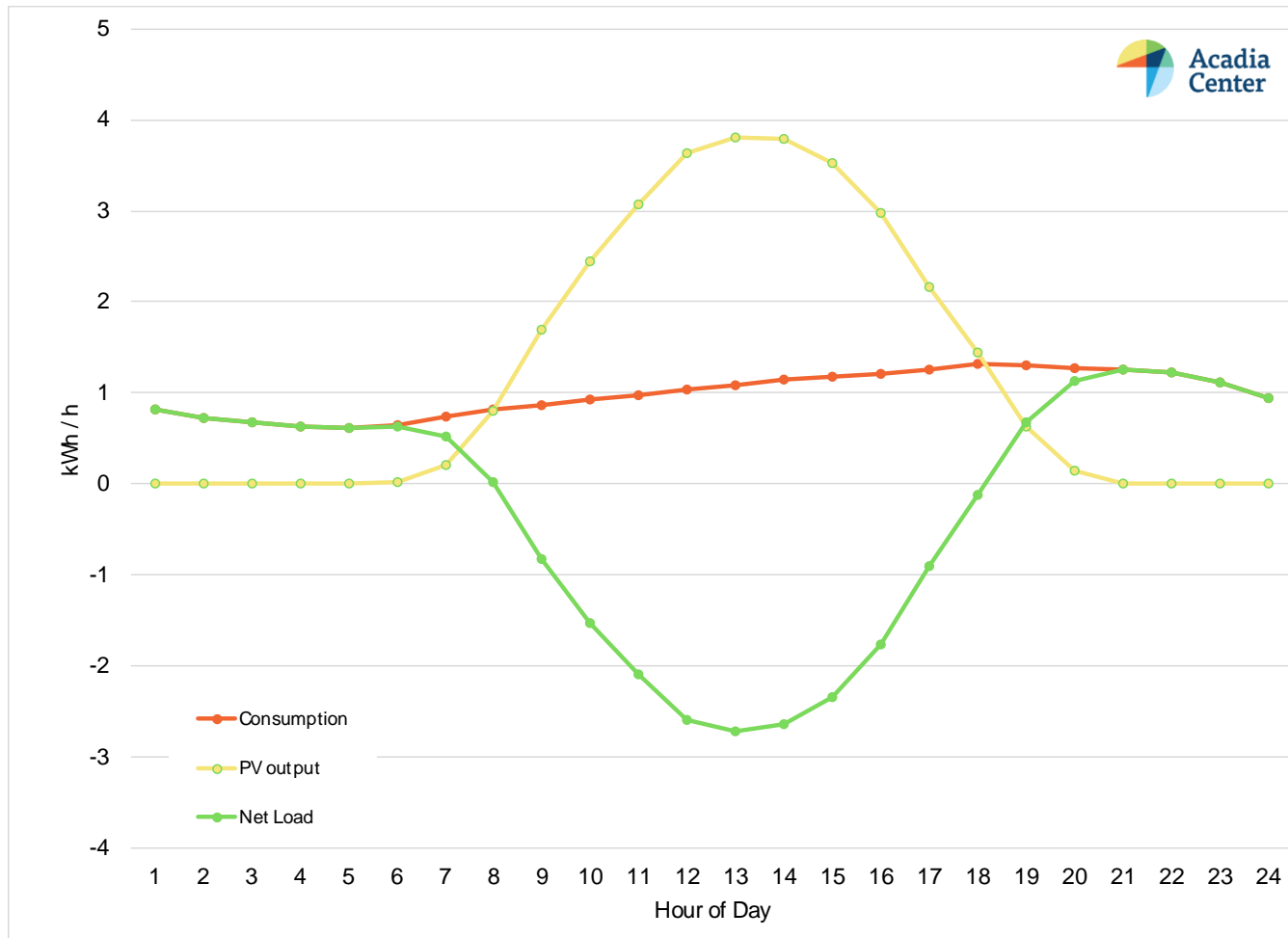
- Utility efficiency program administrator seems like the most obvious choice for the role, and there are a number of associated benefits.
- Other options that should be considered include:
 - **For-profit third party administrator;**
 - **Non-profit third-party** – e.g. third-party EE program administrators like Efficiency Vermont or a “Sustainable Energy Utility” tasked with providing non-infrastructure solutions; and,
 - **No aggregator** – customers instead respond to more granular rate structures.

Analysis of Potential

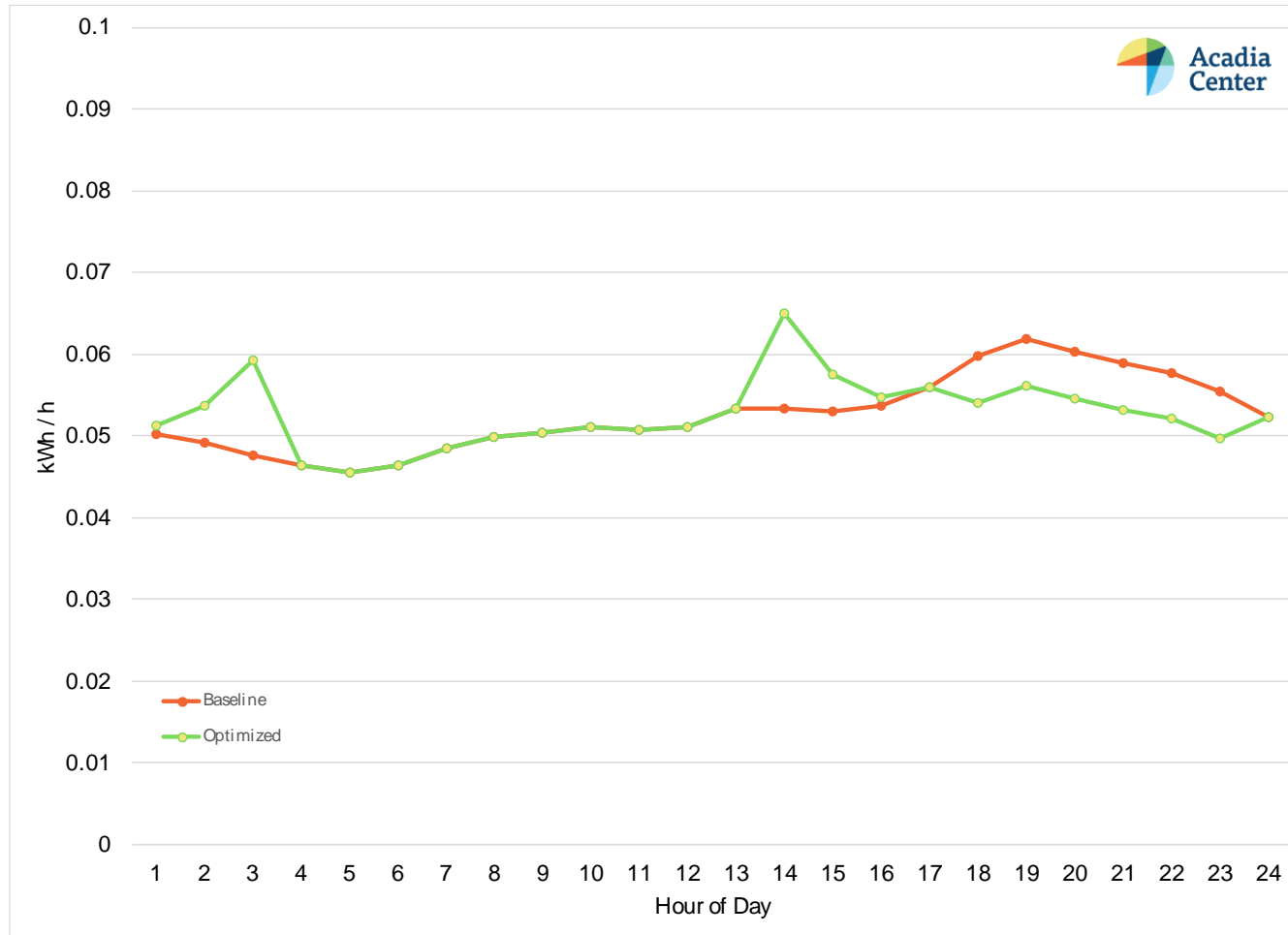
Load Profile for a Single Home



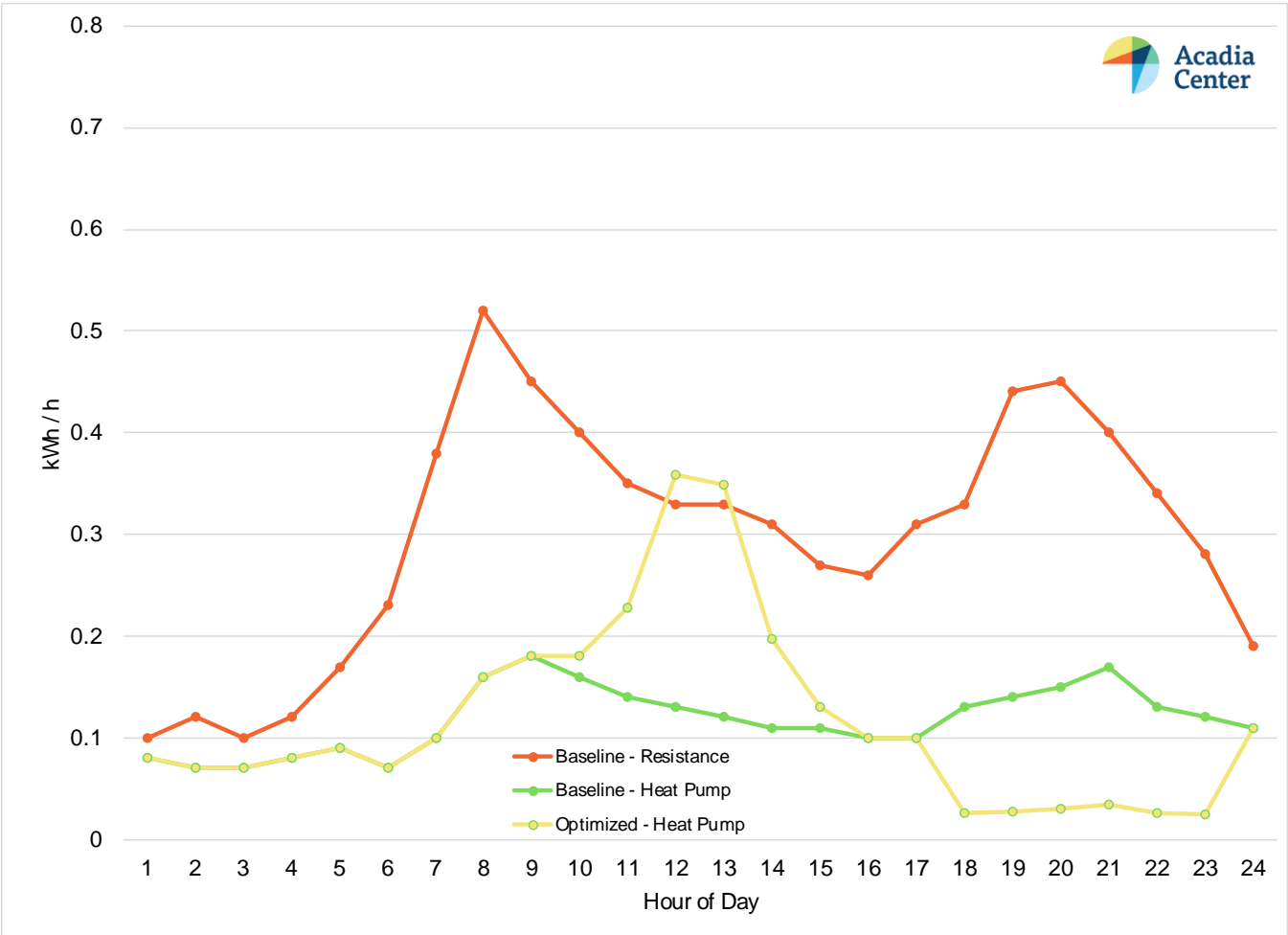
Load Profile for a Single Home with Solar PV



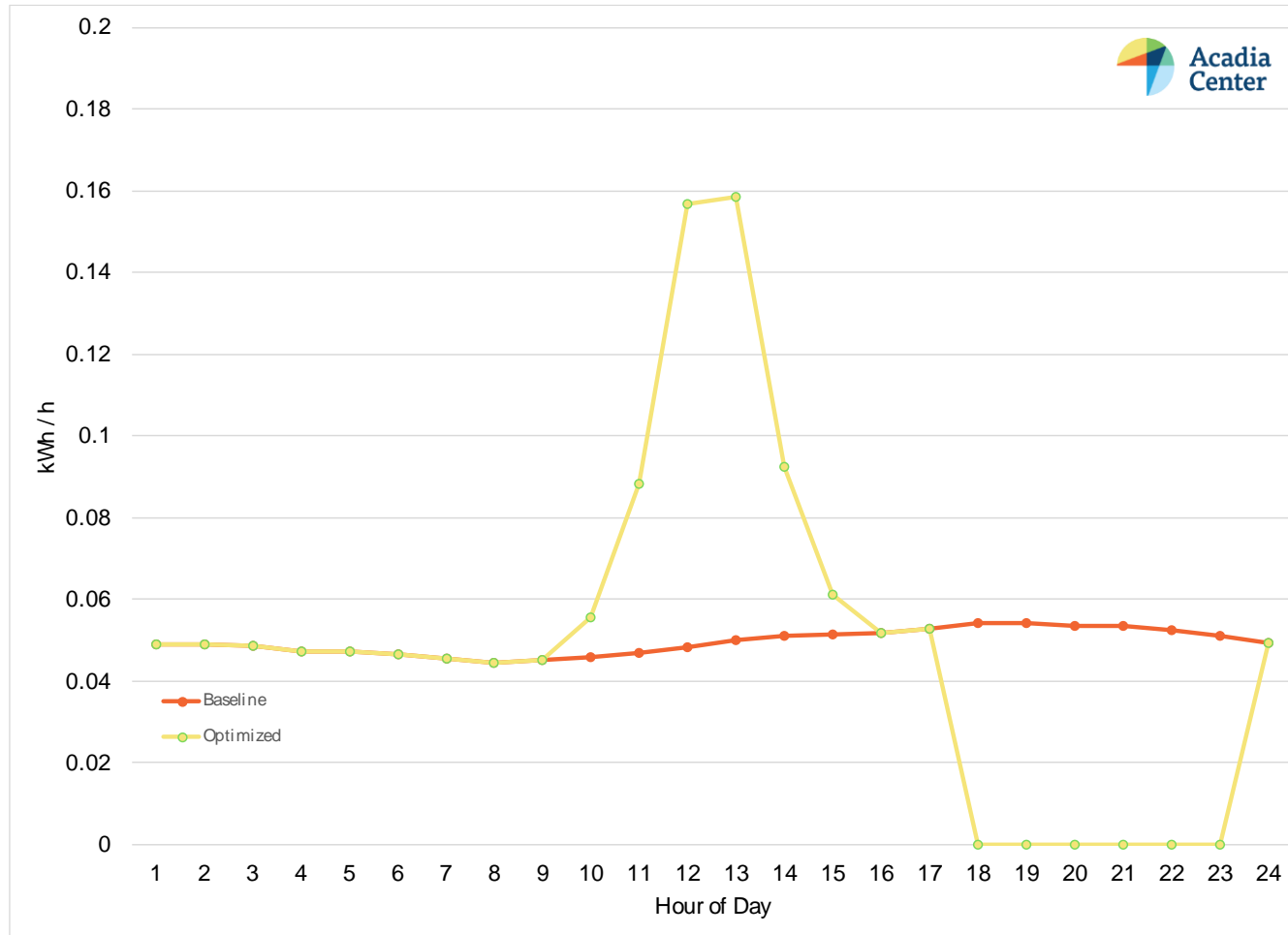
Refrigerator



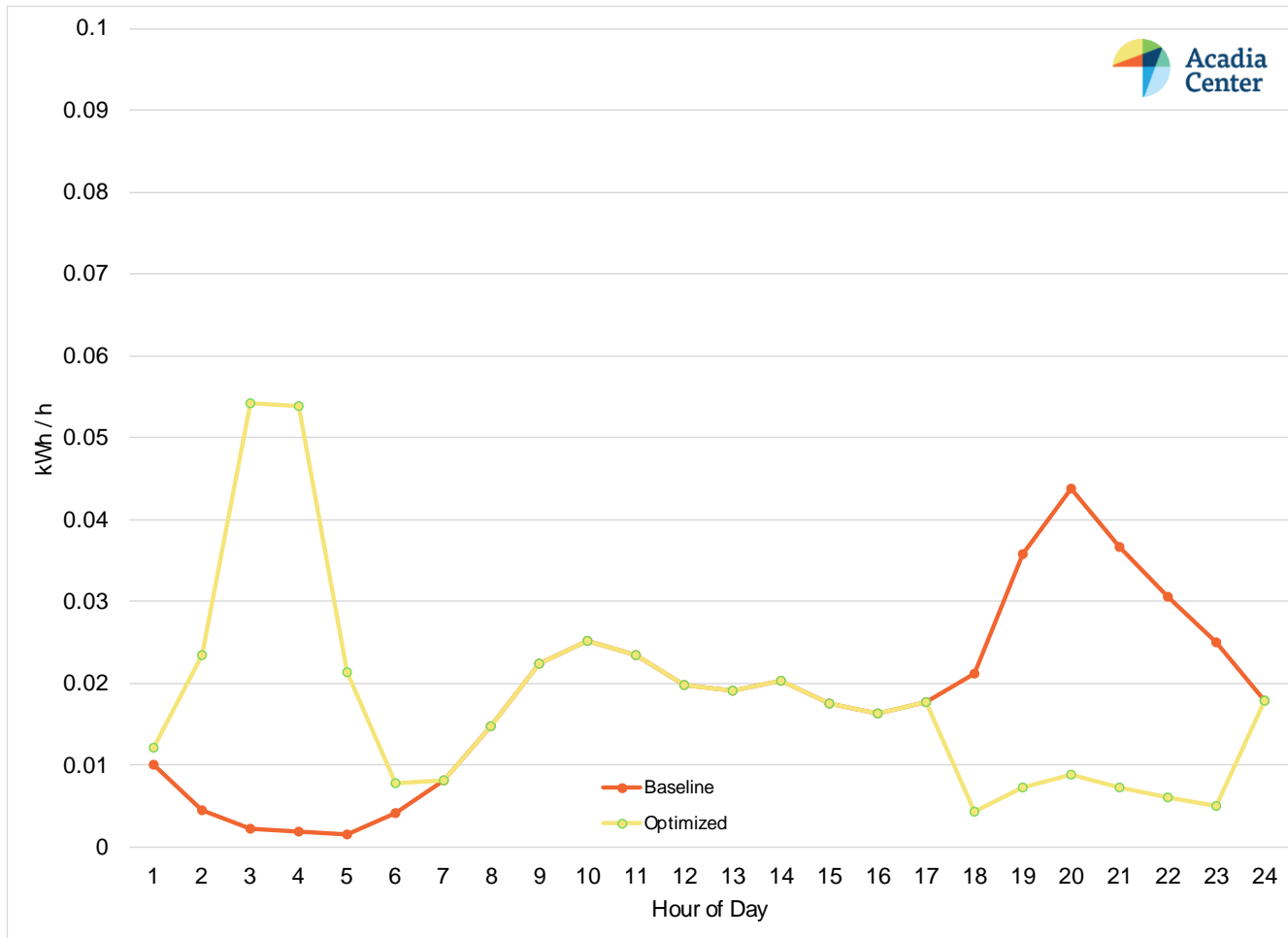
Hot Water Heaters



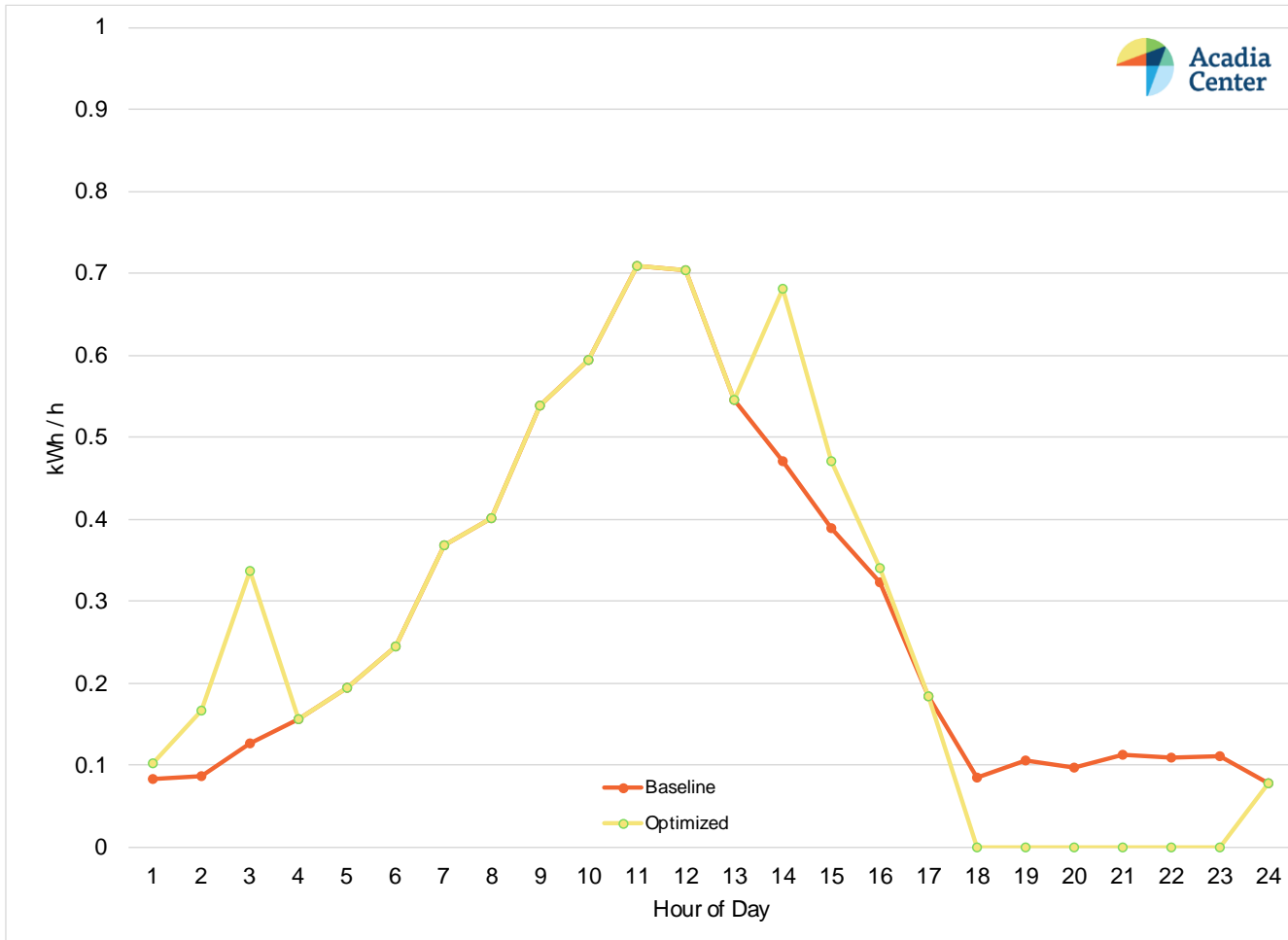
Freezer



Dishwasher

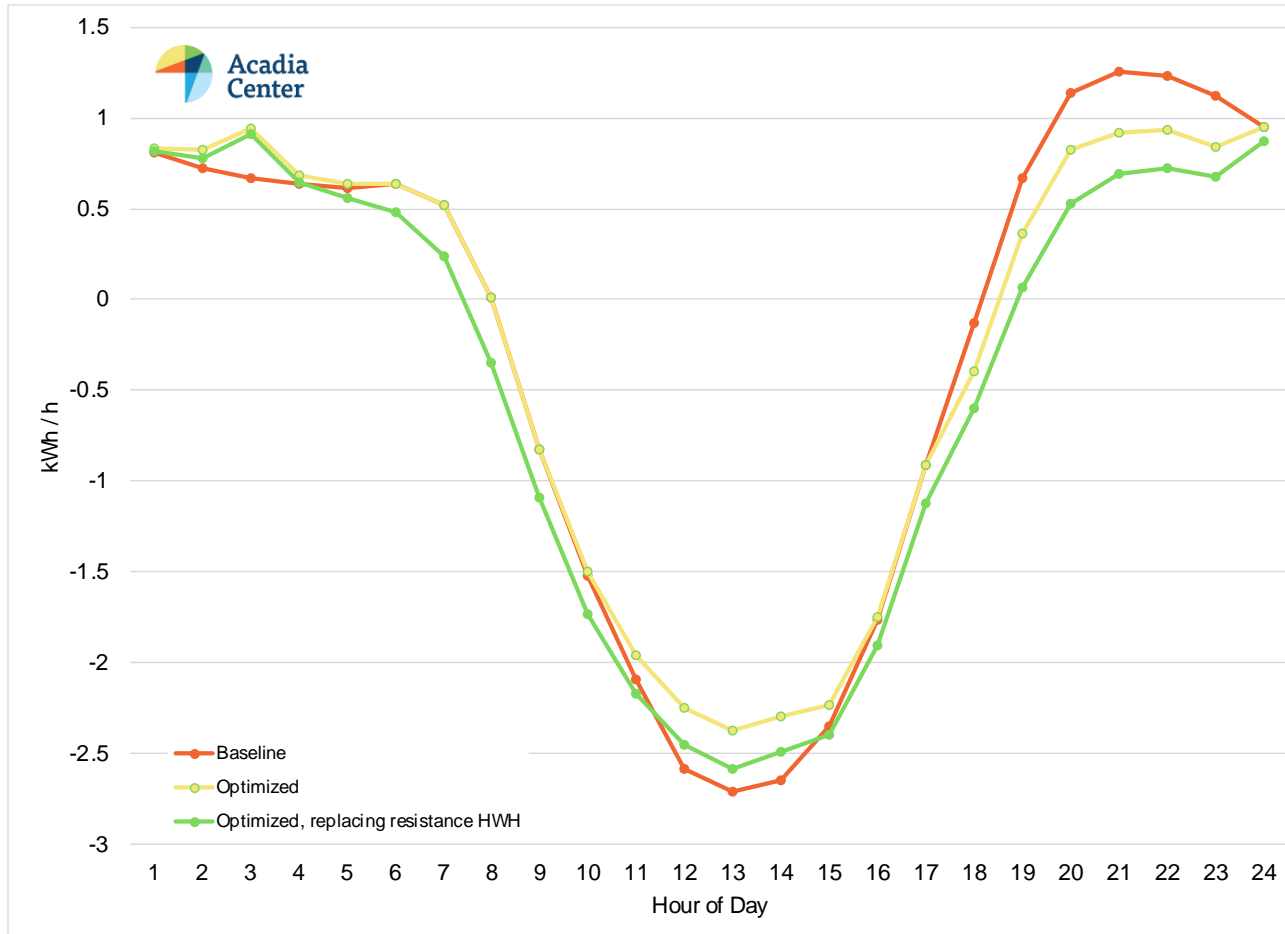


Pool Pump

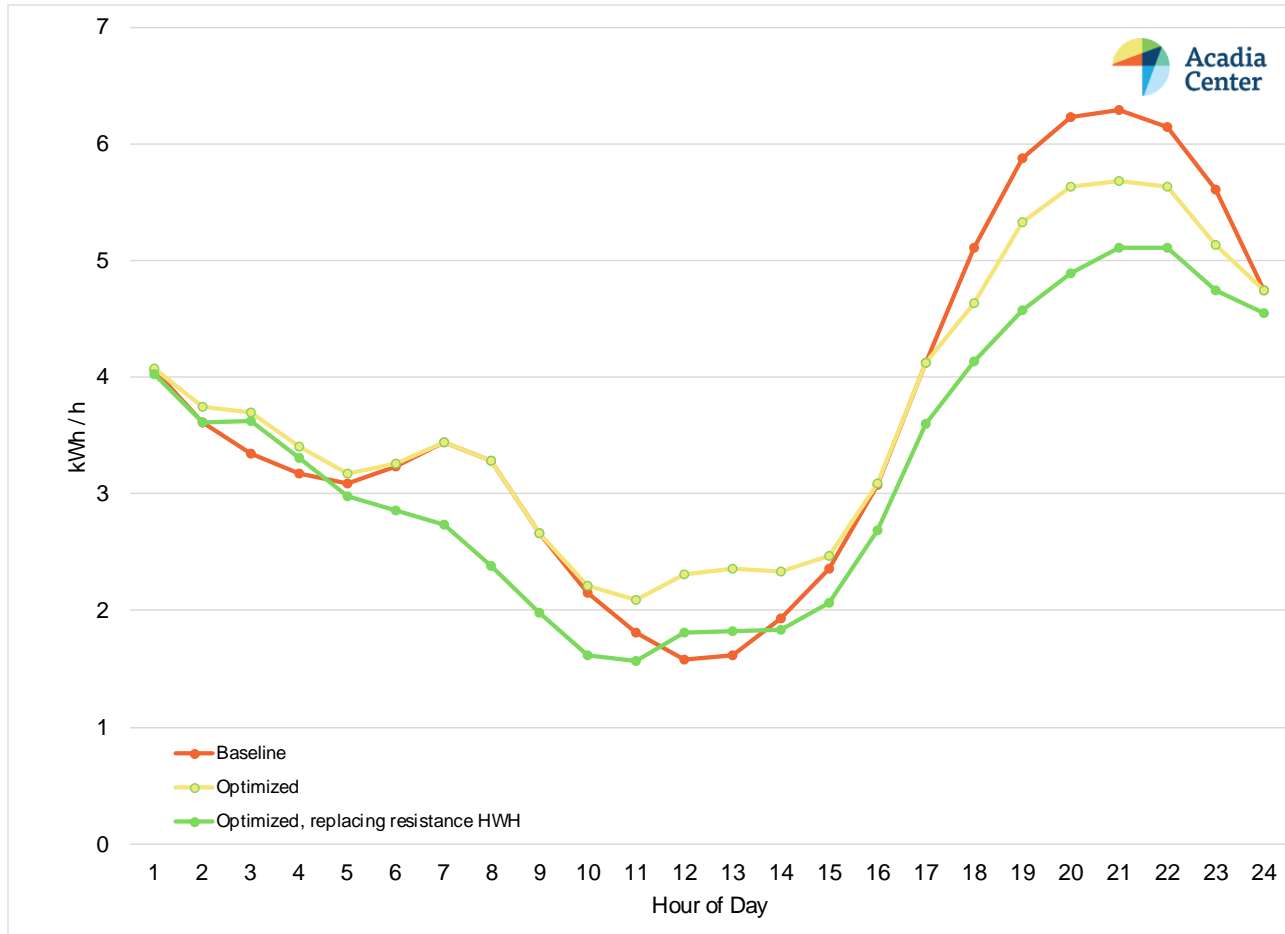


Results & Recommendations

Combined Impact of Optimizing Use of All Five Products – Single Home w/ALM



Combined Impact – Five Homes w/ALM; one w/solar PV



Recommendations

- ALM can play a role in integrating renewables and optimizing the use of grid infrastructure.
- More work is needed to better understand value of peak load reductions to generation, transmission, and distribution costs.
- **Avoid lost opportunities.** We should no longer be incentivizing products that are not ALM capable when communicating / controllable versions are available at reasonable cost.
- ALM programs can create an opportunity to start or further integrate EE and renewable programs.

Contact Information

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