



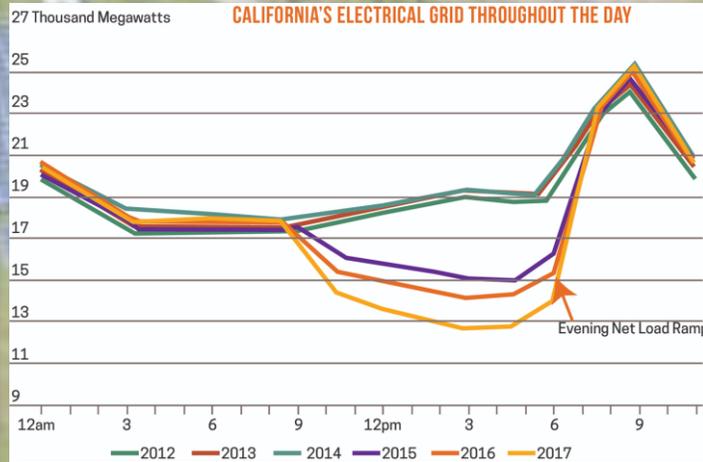
The Heat Wave Controller: Enabling existing water heaters as thermal batteries

The Problem

Water heaters account for up to 40% of homeowner's energy cost, representing one of the largest problems to solve for home energy use. A significant problem exists in renewable energy--power peak usage and energy production times are mismatched. Photovoltaic systems make the most energy during the middle of the day when homeowners have all but completely ramped down their power usage.

The problem with current PV systems boils down to interconnection issues. Regulations, costs, and time associated with tying into the grid dissuades many potential customers. PV systems are also typically expensive, averaging over \$15,000 per household, making consumer entry into the market difficult.

<https://cpowerenergymanagement.com/has-california-finally-solved-the-duck-curve/>



The power generated by renewable energy and power grid utility demands can be graphed into what is known as the duck curve (shown above).

Our Solution

The Heat Wave Controller accepts DC current directly from a small, dedicated PV panel array and outputs a Pulse-width modulated (PWM) AC signal. This signal is capable of powering a standard electric water heater resistive element, avoiding the conversion loss of a typical DC to standard-AC inverter, without needing to tie into the grid. The Heat Wave Controller can also work in conjunction with household AC power without the interconnection issues, if the user desires. We plan to have the system available to the consumer at less than \$3,000, including the controller, solar panels, and installation costs. In states with high electricity costs, this amounts to a payback savings in just 3 years.

	Heat Wave Controller System	Thermal Solar Water Heater	Grid-tied Electric Water Heater	Battery Storage System
Installation Cost	✓	✗	✓	✗
Off-Grid Operation	✓	✓	✗	✓



In collaboration with



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Plan

- ✓ Schematic design
- ✓ Prototype board build



Ready! Phase

- Market Research
- Networking
- Prototype Testing
- Redesign

