



FLEXIBLE AND SCALABLE DEMAND RESPONSE SOLUTIONS

Electric water heater controls and software
to accelerate renewable integration and
empower underserved communities

www.ShiftedEnergy.com

For more information or a product demonstration, please visit www.shiftedenergy.com or
contact us at info@shiftedenergy.com.

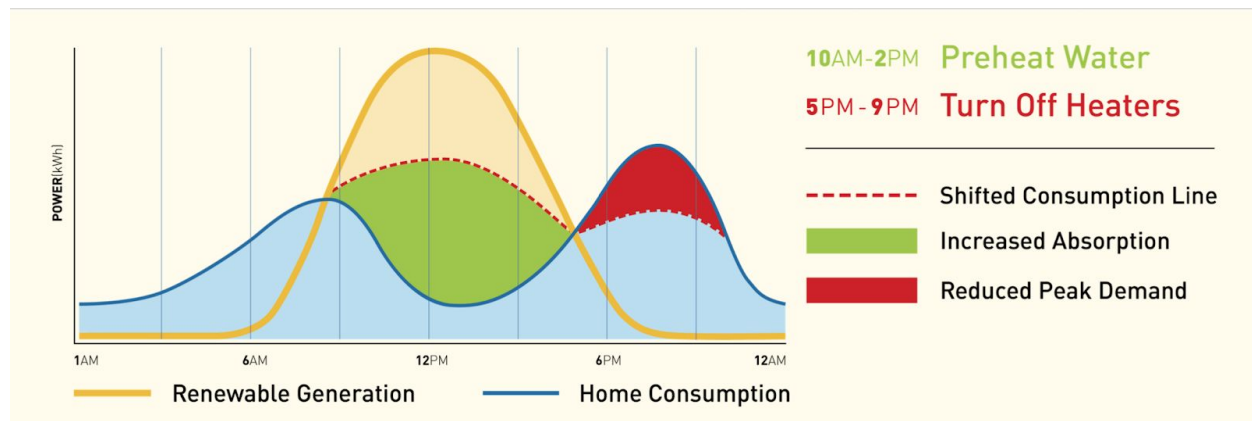
Pages 2-3

Grid-Interactive Water Heaters

A grid-interactive water heater, or “GIWH”, has smart hardware and software with two-way communication that allows remote monitoring and control. Shifted Energy’s GIWH solution provides consumers and business owners an opportunity to support renewable energy integration and potentially save money on their electric bill, simply by allowing us to occasionally alter the operation of their water heater.

Shifting Loads With Renewables

Shifted Energy’s GIWH controls carefully and intelligently shift water heater operations, so water is heated when wind or solar power are plentiful and energy consumption is reduced during system peaks. Although a single water heater is a relatively small distributed energy resource, thousands of heaters can rapidly and cost-effectively be aggregated to help shape and shed megawatts of load.



Grid Services

Grid operators can quickly leverage megawatts of real-time load control by retrofitting electric water heaters already deployed in their service territories. For example, in Hawaii the conversion of 10,000 water heaters to GIWH provides about 4 MW of load reduction, 3 MW of load build, and 3 MW of Fast Frequency Response to reduce peaks and increase the integration of more renewables. The Grid Maestro Platform provides **frequency stabilization**, as well as **frequency fluctuation detection** and deactivation to remove load within 12 cycles.

[Icons with headings: Peak Load Reduction; Emergency Demand Response; Thermal Energy Storage; Fast Frequency Response; Voltage Regulation]

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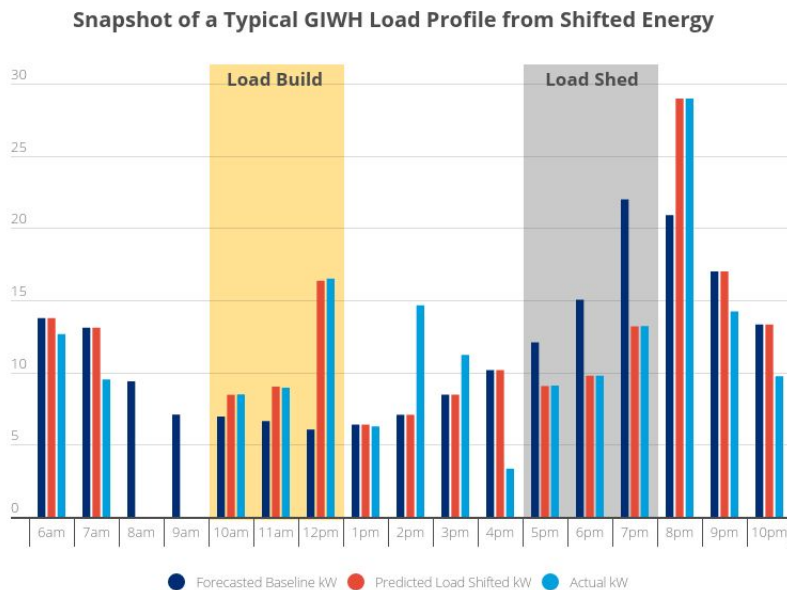
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Proven Technology

[suggested graphic: Single device on heater, aggregated building, cloud-based analysis running vertical along page to align with text]

Grid Maestro Software

Shifted Energy's cloud-based **Grid Maestro** software platform uses machine learning to analyze each water heater's electrical data, forecast future energy consumption, aggregate forecasts for the entire fleet, and optimize resource dispatch to maximize the amount of grid service capacity and minimize adverse impacts to families' access to hot water.



Source: Shifted Energy, 2019

Tempo Controller

To enable GIWH services, our innovative off-tank **Tempo** controller simply splices into the water heater's electrical line anywhere between the tank and circuit breaker. It does not require any tank-mounted sensors or plumbing, and installation only takes about 20 minutes.

[[cons with headings: Off-tank; Integrated Cellular IoT; Revenue-Grade Data]]

[[Callout Box]]

HECO Case Study

Shifted Energy is deploying a 2.5 MW virtual power plant to Hawaiian Electric Company through a Grid Services Purchase Agreement. Up to 2,400 GIWH controllers in predominantly rental and underserved multi-family buildings across Oahu and Maui will provide fast frequency response, load build, and load shed to Hawaiian Electric through 2025.

Quote from Rich or Yoh ([From SEPA article](#))

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Features

Easy Installation

- Retrofit on any electric water heater
- Completely off-tank; no plumbing required
- < 20-minute installation

Seamless Communications

- Integrated cellular (3G/LTE) chip & antenna
- Pre-configured access in 100+ countries
- Over-the-air commissioning and firmware upgrades
- Customizable API and web portal for easy integration

World-class Security

- SSL/TLS/Encryption for cloud-to-cloud
- DTLS for device-to-cloud

Accurate, Granular Data

- Up to 5-min telemetry includes energy, grid service capacity and forecasts, and historical data
- Real-time monitoring of current, voltage, and frequency at revenue-grade precision
- Automatic maintenance alerts including potential leads
- Machine learning forecasts for four-day-ahead energy consumption and grid service at 15-minute intervals
- Customized, automated reports for simple measurement and verification



Specifications

Enclosure

- Weather Resistant Housing made of injection molded PET plastic
- Dimensions: 6.63" x 4.68" x 2.37" (168.4mm x 118.9mm x 60.2mm)
- Weight: 8.5oz (241g)

Operating Range

- 32°F to 122°F (0°C to 50°C)
- 5 - 95% relative humidity, non-condensing

Electrical Input

- Electric resistance water heater: 208/240 VAC, 50/60 Hz
- Heat pump water heater: Contact us for brand-specific compatibility

Power Consumption

- 0.75W

Relay Rating

- Integrated 240VAC, 30A, 100,000+ Cycles

Safety Certifications

- UL60730-2-11A, UL 69730-1:2016, IEC 60730-2-11, CSA E60730-1:2015
- FCC Declaration of Conformity

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