

# SHIFTED ENERGY PROVIDES ENERGY STORAGE AND SOCIAL JUSTICE WITH PARTICLE

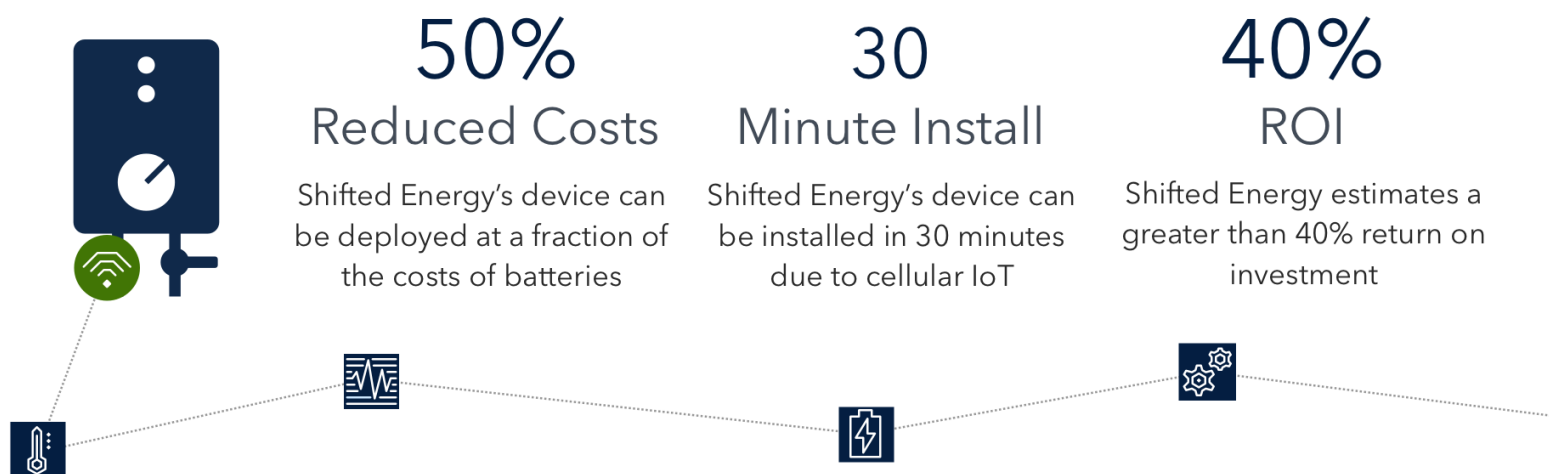
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# SHIFTED ENERGY PROVIDES ENERGY STORAGE AND SOCIAL JUSTICE

## Executive summary

Shifted Energy is transforming the way utility companies can balance the grid and integrate more renewable energy with IoT. With Particle's platform, Shifted Energy is retrofitting already deployed water heaters into energy storage units. These newly enabled demand response assets will help stabilize the electricity grid, shift loads to lower peak demand, and engage hard-to-reach communities like renters in the race towards renewable energy.



## The race towards renewable energy

The world is racing towards renewable energy sources like wind and solar, but the lack of sufficient storage capacity limits the ability to integrate intermittent power generation. At the same time, renters can't participate in renewable energy programs, because they don't have access to rooftop solar. However, with Particle's platform, Shifted Energy is changing this paradigm by converting existing water heating appliances into grid-integrated water heaters (GIWH) with real-time controls.

*"We have had zero issues working with Particle's IoT platform across continents. It just works. Not needing to worry about the renter's site allows for deployments at scale in locations that Wi-Fi only solutions just can't go."*

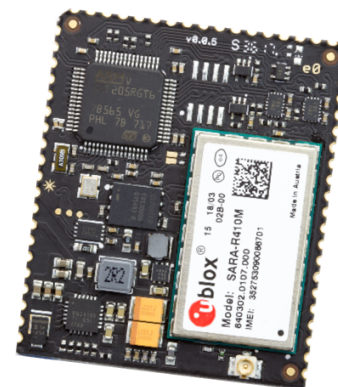
Olin Lagon  
CTO at Shifted Energy

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## Particle jumpstarts the path to production

Shifted Energy chose Particle's platform because it provided everything they needed to develop an IoT product, from device to cloud. To get up and running, Shifted Energy used **Particle's LTE E Series module** to connect their device to the Internet over cellular networks.

The E Series module already came with **a SIM card** and **data plan** out of the box, which gave them the flexibility to install their devices anywhere and remain confident that they wouldn't lose connection.



**Particle's LTE E Series**

With Particle's **development tools**, Shifted Energy could write the software that made their product tick. Features like **OTA firmware updates** allowed them to quickly send and control which devices get updates, all with a click of a button. And finally, Particle's **Device Cloud** gave them full control of their fleet. They could scale and manage the number of the devices they had out in the real world.

Particle provided Shifted Energy the **hardware, software, and network infrastructure** needed to overcome the innumerable challenges of IoT.

## The solution – Shifted Energy's Power Controller

Shifted Energy's GIWH device is connected to the utility's energy management systems through the Particle's E Series. The cost of maintaining these devices are low enough for companies to effectively engage millions of renters in grid modernization programs. Some other benefits are:



1. **LTE Cellular Connectivity** – Utilizes Particle's Global SIM with cellular coverage in over 150 countries.
2. **30 Minute Installation** – Can be mounted completely off-tank without any plumbing changes.
3. **Industry Leading IoT Security** – Utilizes Particle's industry-leading IoT security protocols.
4. **World Class Response Times** – Can measure local frequency and actuate heater relays within 12 cycles.



## IoT cellular communications streamlines installation process

Shifted Energy's solution is also designed around the benefits of IoT cellular communication thanks to the Particle E Series. Shifted Energy learned that cellular-connected devices are easier to install because they require no onsite configuration. Mass installations can be arranged with property managers instead of interacting with each individual resident, which saves a ton of time and energy.

## Energy storage and social justice for low income communities

Shifted Energy's Power Controller platform represents a new approach that integrates reliable, low-cost connectivity hardware with advanced software controls for cost-effective, rapidly scalable GIWH solutions. This is critically important for renters and other hard-to-reach communities like assisted living facilities, because it gives them a no-cost means to engage in renewable energy programs.

In September 2018, Shifted Energy deployed the first fully-integrated GIWH retrofit solution in Hawaii at Manoa Gardens, an elderly assisted living facility. The five-year program is backed by Hawaiian Electric and Hawaii Energy to demonstrate the economic viability of using GIWH devices as demand response assets to provide valuable grid services.

Through the ongoing pilot program, Shifted Energy demonstrates that its Power Controller platform responds to frequency deviations within fractions of a second. It also shifts loads to consume excess renewable energy and reduce peak demand. Importantly, an aging water heater was replaced without any intervention by Shifted Energy, and its Power Controller was able to reconfigure and commission the new tank automatically.

## Looking for more information?

For Particle and Shifted Energy, this IoT project proved immensely successful. If you're interested in developing your own IoT device, check out the following links below to get started quickly.

### Check out the Particle store



Start your IoT journey by checking out our industrial hardware on the [Particle Store](#).

### Contact our experts



Contact our team of experts at [Particle.io/sales](https://particle.io/sales) to discuss solutions development.