



PECI®

Community Energy People

Realizing the Potential of

# Grid Edge Technology

*Grid edge technologies are transforming grid functionality, the way customers interact with energy, and how utilities plan for the future. It is imperative for retail energy suppliers to engage customers, leverage customer interactions and establish a business model that's mutually beneficial. End user adoption of Internet of Things (IoT) technologies and applications are creating interactive physical and virtual assets within homes, which have great potential to provide value beyond simple energy savings to both the grid and to individual customers. The opportunity exists to determine and assess these values as well as to monetize and recover cost from them. Ultimately, these technologies will improve power delivery and increase reliability, security, and asset utilization. Understanding and capturing the values they create will help open up new services and business models.*



## Project Objectives

- Evaluate grid service aggregation methods for stacking values and monetizing multiple transmission, distribution, and behind-the-meter values
- Market test financing/leasing, warranty, and servicing offers.
- Quantify the value created by device management and controls
- Identify the regulatory value and requirements for verifying and monetizing aggregated energy, storage, and demand response services.

## Introducing the Project

The Project will act as a testbed to demonstrate the benefits of integrated grid edge technology for utilities and consumers. Using heat pump water heaters (HPWH) as an initial demonstration technology. The Project will offer demand response and storage services to the grid while supporting delivery on energy efficiency targets. With this model, energy providers will have a platform to test revenue generation from customer leasing, installation fees, warranty, and maintenance offers. This approach will shift the transaction from product purchases to the delivery of hot water as a service. The Project is designed to accelerate market adoption of products with energy efficiency, storage, and demand response synergies. Additionally, the platform's market transformation approach will bolster regional supply chain involvement and use existing local contractor, customer, and energy provider relationships to initiate and amplify customer participation and satisfaction.

Target customers for The Project are residential households and commercial building owners with their own meter and an existing electric water heater. Energy providers will help customers reduce expenses and conserve energy by actively operating customer devices to produce savings and generate revenue.

## How Does It Work?

### 1 Recruit

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- Contact customers and sell HPWH as a service proposition.

### 2 Install

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- Complete HPWH installations using enabling device controls that provide data collection and report functionality, resulting in comprehensive data analysis.

### 3 Assess

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- Evaluate methods for deployment of valuable ancillary grid services.
- Determine the viability of grid edge technologies as an energy provider service platform.

### 4 Test

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- Pilot new delivery and operating strategies for grid edge technologies through a financing/leasing, warranty, and servicing offer.

### 5 Analyze

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- Determine whether device management opportunities can successfully estimate and capture transactional values that: optimize capital allocation; improve grid operations; enhance customer engagement; establish innovative revenue generating business models; inform the regulatory paradigm; and support the shift towards a distributed, decentralized, and transactive grid.
- Design an analytical framework for quantifying all costs and benefits from replacing conventional water heaters with HPWHs.

# Value for Consumers and Suppliers

## End Users

Participation in The Project will help consumers conserve energy and reduce costs. Consumers will benefit from energy efficiency incentives, personalized experience and control, predictive and preventative maintenance servicing and warranty services, and updates and dashboards that visualize the service and financial performance of the arrangement for the customer.

## Market Delivery Chain

A shift from retail product sales toward services and platforms has a strong value proposition to market partners. Manufacturers, contractors, distributors, and retailers will benefit from sustainable and reliable streams of revenues that will arise from new product and service offerings, value-added services, and improved customer relationships that allow them to become integral players in the IoT economy.

## Overcoming Barriers

The Project implementation plan is designed to overcome both customer and energy provider concerns. An attractive financing offering will facilitate customers' participation and The Project will manage any initial maintenance or warranty issues. For energy providers, The Project will handle most of the activities of the financing offer, such as funding and closing loans/leases, managing financial risks, managing repayment and defaults, and providing customer support. The project will also enable the regulatory separation generally required for non-utility services and income.

## Who We Are

PECI is a leader in the development of energy efficiency program techniques, successful at creating new business opportunities and penetrating hard-to-reach markets. The company is focused on promoting local energy solutions relevant to changing industry conditions.

## Key Project Leaders

### The PECI Management Team

- **Phil Welker**—Executive Director
- **Tanya Barham**—Director of Operations and Product Development
- **Micha Ramsey**—Senior Product Development and Project Management
- **Jeff Cole**—Senior Product Development and Project Manager

### Technical Specialty Team

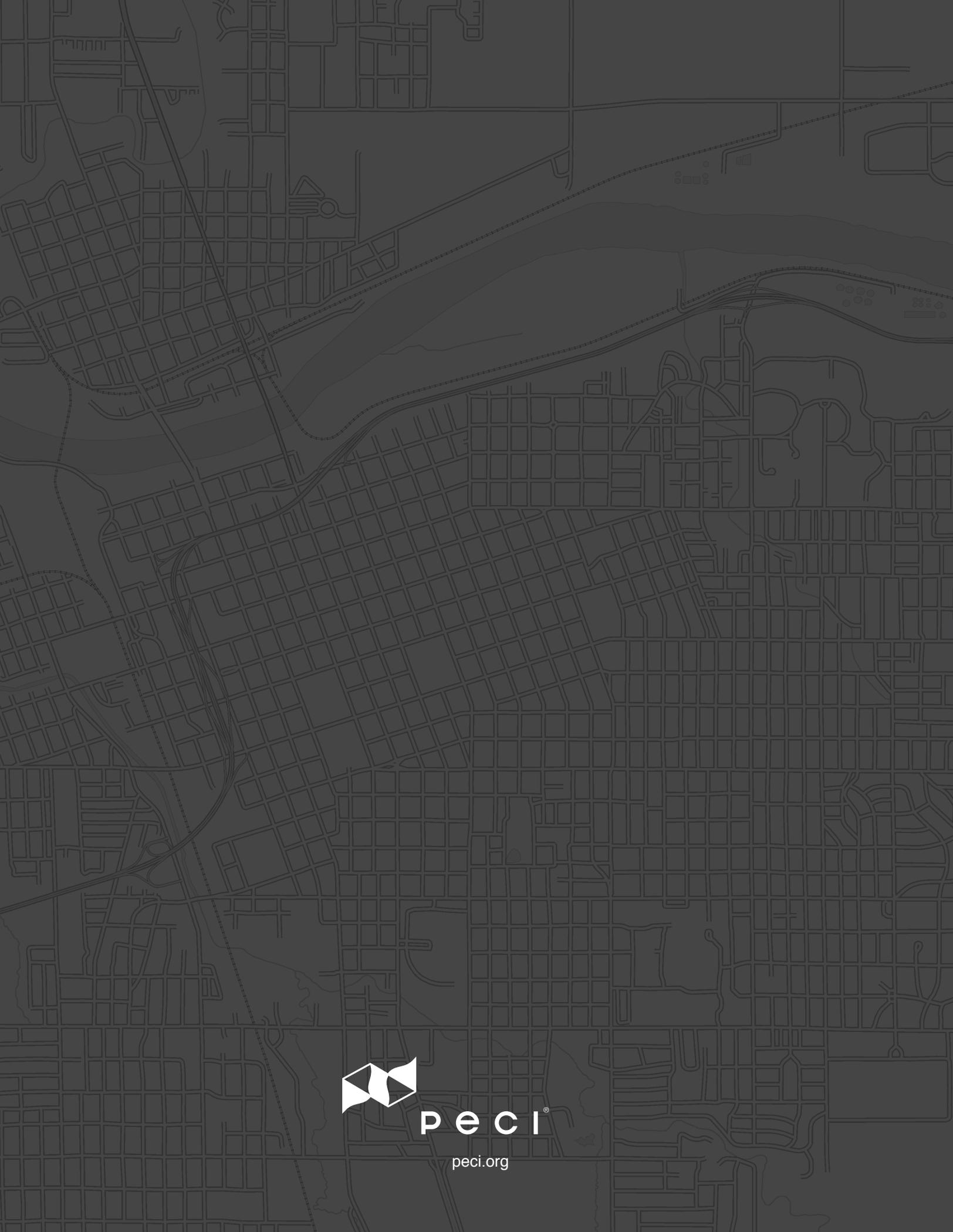
- **Ken Dragoon**—Principal at Flink Consulting, energy and demand savings analysis
- **Alexis Allan & Selena Bell Heise**—Partners at Brio, project design, recruitment and utility collaboration support

*PECI also retains several other data, technical and marketing specialty contractors.*

## Contact

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