Circuit-level Energy Monitoring of a Multifamily Residential Community

Project Summary
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About the Need

Utilities, grid operators, and researchers need to better understand how, where, and why electricity is being used behind-the-meter in buildings to understand:

• How customers engage with ToU rates or behavioral DR
• Strengthen forecasts of load and flexibility capacity
• Verify energy savings of Demand Side Management (DSM) programs.

Customers desire a better understanding of their own energy use and the options available to them to manage and reduce energy costs and carbon emissions.
About the Opportunity

Opportunity:

To demonstrate the value of DCsix’s circuit-level energy monitoring and cloud-based data analytics platform (Wattrics) to:

• Provide reliable and granular data on how electricity is used behind-the-meter.

• To assess opportunities for behavioral adjustments or technology options to reduce energy costs and carbon emissions.

• To engage customers and management with insightful data visualizations to improve their understanding of how to manage and reduce their energy consumption.

Mosaic Gardens at Willowbrook
61-Unit Affordable Multifamily Residential Complex
About the Technology

Wattrics dashboard engages and educates customers with targeted data insights

- Each Wattrics unit monitors up to 14 circuits
- Capacity to store data locally
- Non-intrusive CT and VT clamps
- Data communicated wirelessly on a secure VPN

2/3/4G or WiFi

Real-time Consumption

Secure Network

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About the Technology

Presentation to Multiple Parties and Channels

Google Cloud
Highly Scalable, Cloud storage

Accurate, Robust Monitoring

Secure, Resilient Communications
About the Technology

- Simple Installation
- Monitor usage
- Reliable and accurate
- Highlight opportunities
- Quantify value and savings
- Track RoI
- Empower customer
- Identify targeted services
- Optimisation
Project Scope

Key Objectives

1) To gain visibility of all energy use behind-the-meter

2) To set-up the custom-made data dashboards for residents and property management

Key Goals

1) To identify opportunities to improve energy efficiency and reduce costs and carbon emissions.

2) To understand all potential use cases of the Wattrics platform.
What was done?

Coordinated with LINC Housing to sign-up residents from the community

Installed Wattrics units behind the utility meter in the community building, both residential buildings, and within 5 resident apartments
What was done?

The team configured the secure communication network.
What was done?

- Identified potential use-cases for the Wattrics platform in different settings
- Identified opportunities to model cost effective solutions to improve energy efficiency and reduce costs and carbon emission
- Set-up Data Dashboards for the community level and residential apartments with targeted data insights
Opportunities Identified could lead to multiple benefits for all stakeholders

Property Owner/Management

Modelling Technology Solutions

Reducing Emissions

CO₂

Improved local Air Quality

Empowering customer to be Energy conscious

Lower energy use and costs

Residents and Local Community
Challenges/Lessons Learned?

- Community has received significant efficiency improvements to date
  - No ‘low hanging fruit’ measures left
- Learning curve configuring communication network in first US deployment
  - Highlighted value in the ability to locally store and upload data when connection regained
- Panel size in US bigger than in the EU
  - Cleaner install as units kept inside panels
  - More than 14 circuits in resident apartments – future deployments will focus on high usage circuits and aggregate remaining

Main electrical room panel with 2xWattrics units monitoring all sub-circuits
Opportunities Identified at Willowbrook

**Planned Next steps**

Identified opportunities to reduce carbon emission from water heating on site, options will require further analysis when the data set grows:

- Modelling and evaluation of the potential performance and payback to recover waste heat from HVAC units.
- Assess if solar and battery control strategy could be optimized for greater on-site utilisation of generated energy for water heating.

Data to be shared with various stakeholders involved with the ongoing CEC advanced energy community project on-site (e.g., EPRI, SCE, OhmConnect, Energyscope, Gridscape)

- Improve energy management and the ability to optimize energy use and control strategies.

Data monitored by DCSix’s Wattrics devices will be shared with EPRIs DSIRP database.
Opportunities Identified at Willowbrook

Potential follow-on work

The reliable visibility of energy use behind-the-meter that the Wattrics Platform provides can enable:

- Verification of performance and payback of technologies installed on site e.g., Solar array, batteries, DC microgrid with LED lighting
- Analysis and optimization of the solar and battery control strategies
- Verification of actual load drop from OhmConnect behavioural DR
- Test if access to targeted data insights on the Wattrics Dashboard influences how customers respond to behavioural DR or Time of Use rates
- Test customer segments to influence utility program offerings
- Enhanced projection of load and flexibility capacity in multifamily communities

One of the installed Wattrics units monitoring the main incoming power lines using 400A CT’s
Opportunities and Use cases identified

**Potential follow-on work**

- Install Wattrics in other multifamily communities with more ‘low hanging fruit’ and less efficiency measures already deployed
  - To determine true potential for energy savings in multifamily settings

- Install Wattrics in Agricultural settings to build upon DCsix Technologies experience deploying in Irish dairy farms.
  - Potential to improve energy efficiency with heat recovery solutions, and help farmers to understand, manage, and reduce energy costs

- Install Wattrics units in other commercial or industrial facilities to assist with energy management and advise on efficiency and cost improvements
Our Team

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Empowering customers and communities transition to a low carbon society