

Circuit-level Energy Monitoring of a Multifamily Residential Community

Project Summary

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DCsix Technologies

Barry Bambury – barry.bambury@Dcsixtechnologies.com

Jonathan Sandham – jonathan.sandham@dcsixtechnologies.com

EPRI

Eoin McCormack – emccormack@epri.com

Southern California Edison

Mark Martinez – Mark.S.Martinez@sce.com

Anthony James – AnthonyN.James@sce.com



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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.



Mosaic Gardens at Willowbrook
61-Unit Affordable Multifamily Residential Complex

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

2/3/4G
or WiFi

Non-intrusive CT and VT clamps

CT Clamps

Data communicated wirelessly on a secure VPN

Real-time Consumption

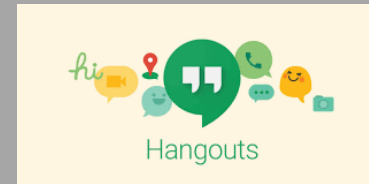


Secure Network



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

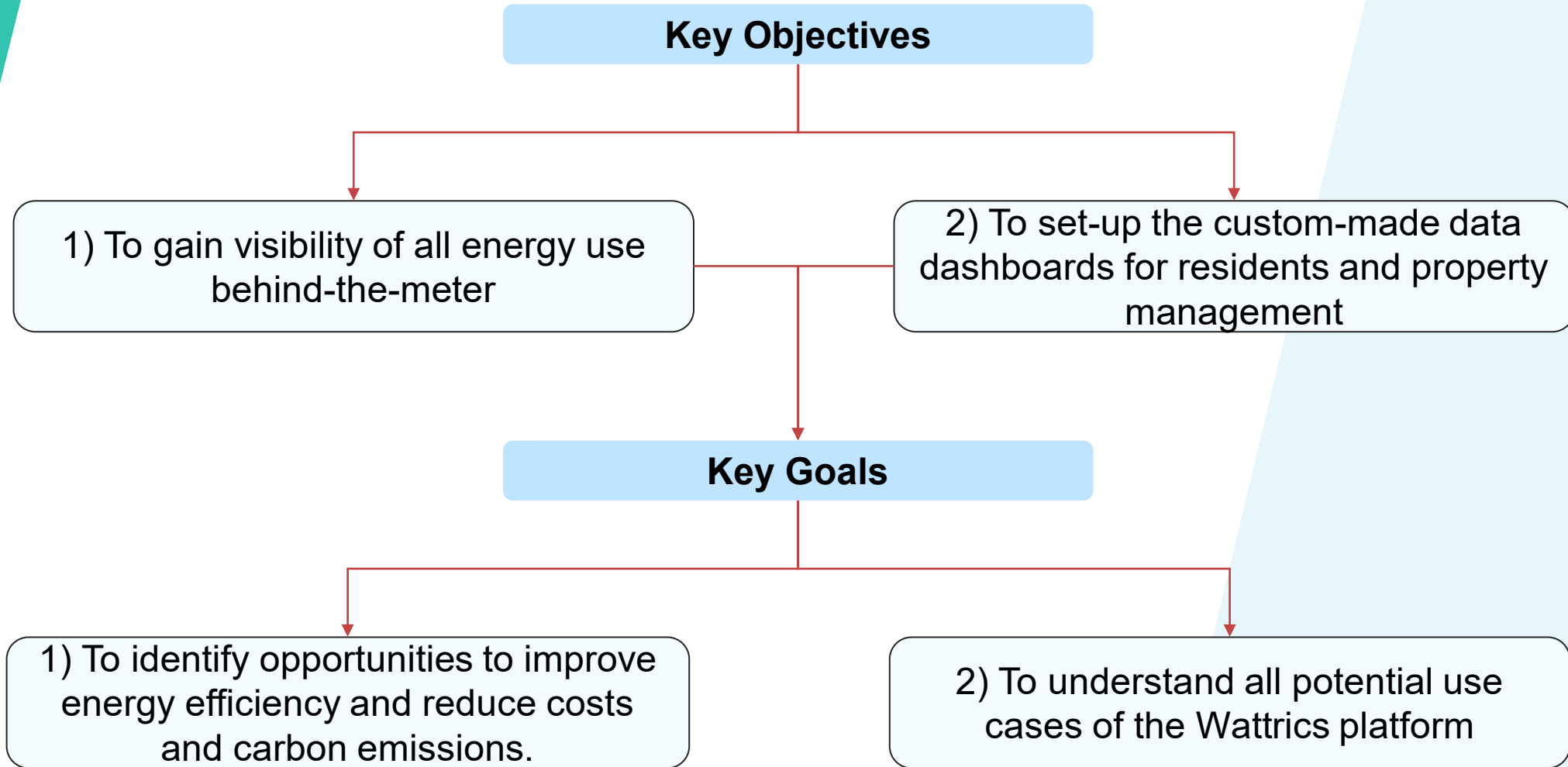


Identify targeted
services



Optimisation

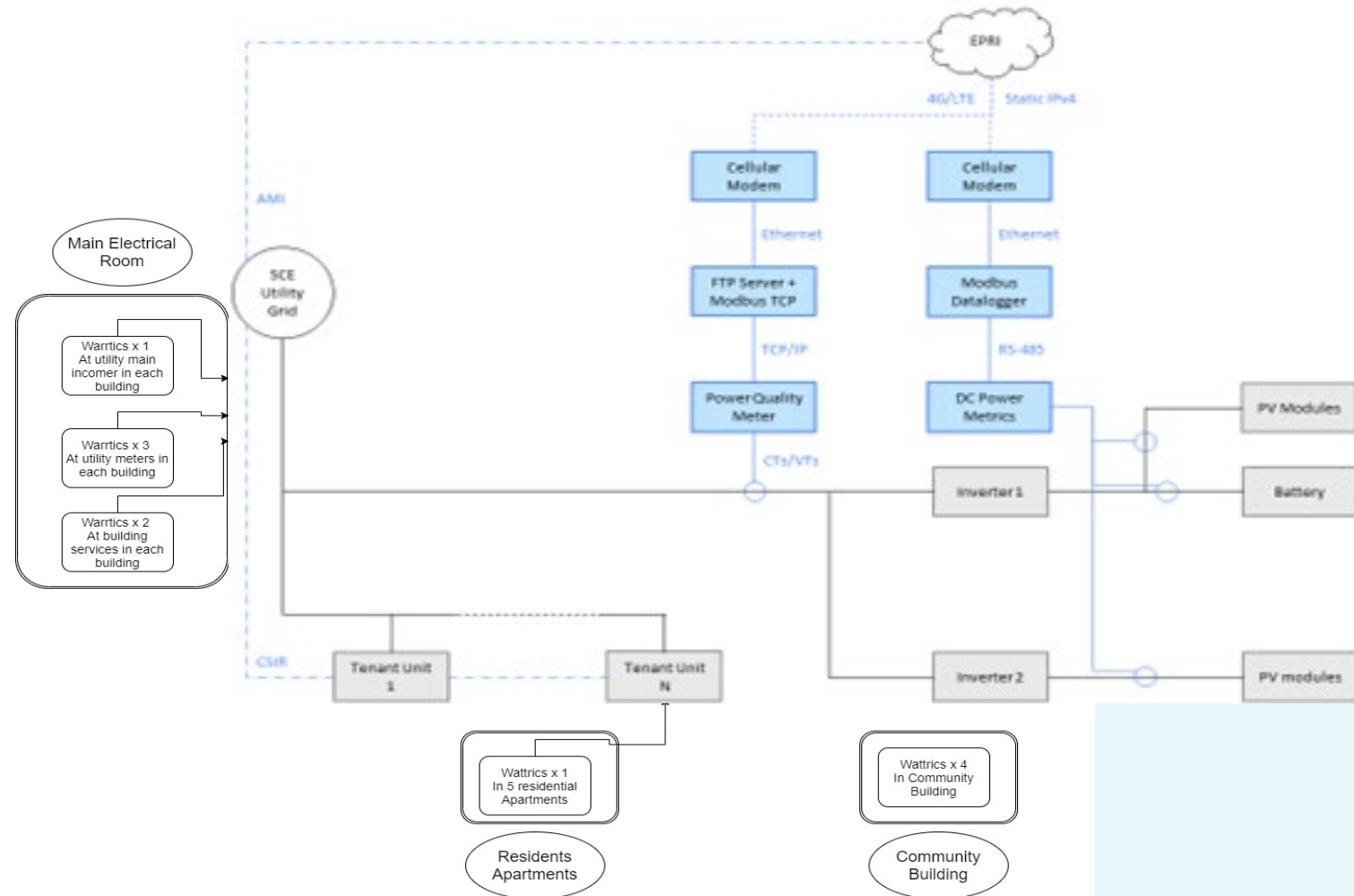
Project Scope



What was done?

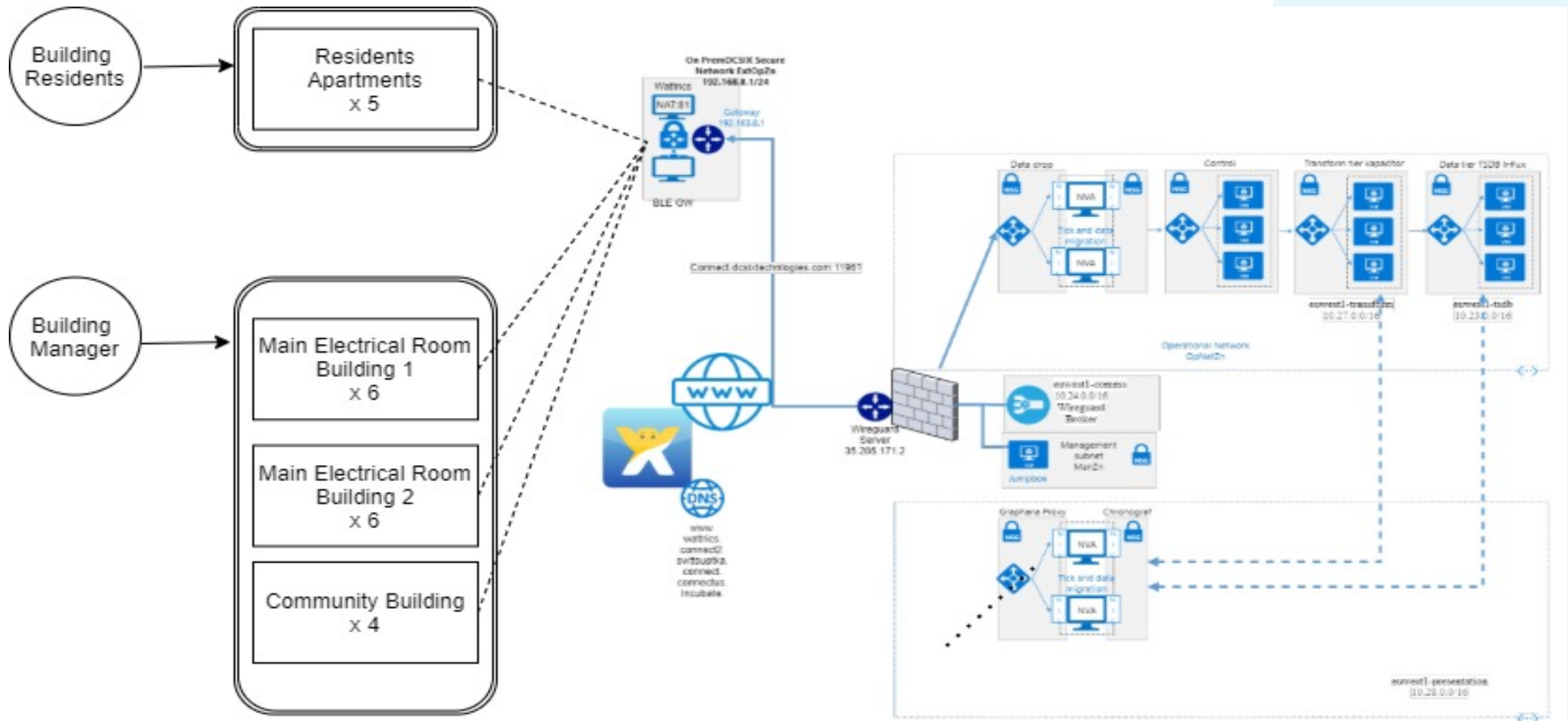


Coordinated with LINC Housing to sign-up residents from the community



Installed Warrtcs units behind the utility meter in the community building, both residential buildings, and within 5 resident apartments

What was done?

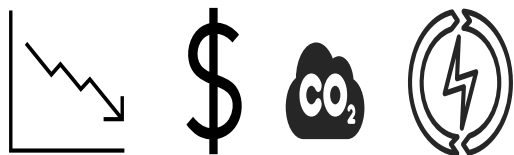


The team configured the secure communication network

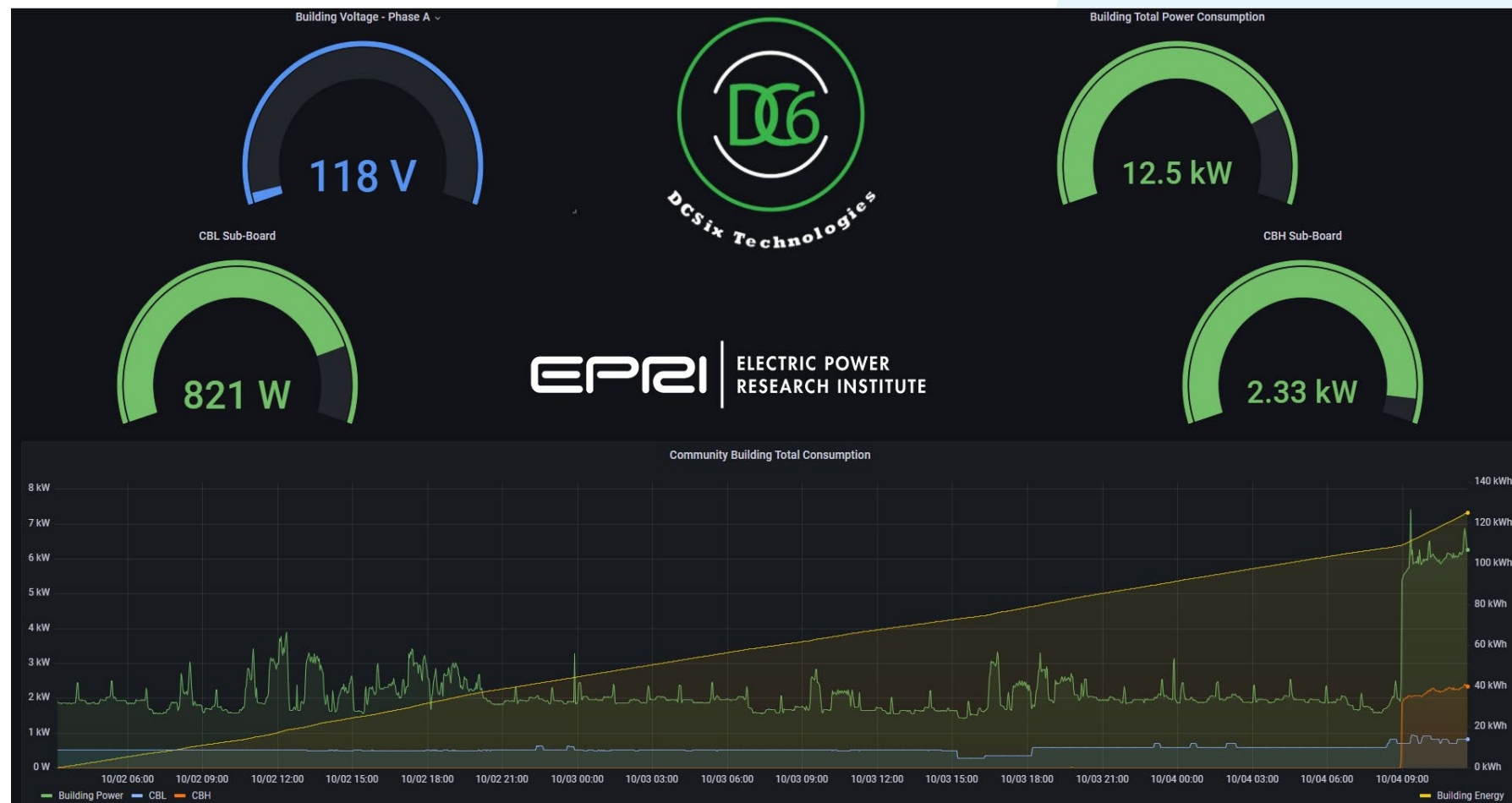
What was done?



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

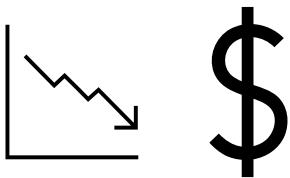
Opportunities Identified could lead to multiple benefits for all stakeholders



Property Owner/Management



Modelling Technology Solutions



Lower energy use and costs



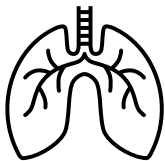
Projections of Load and Flexibility



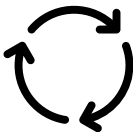
Electric Utilities



Reducing Emissions



Improved local Air Quality



Testing Customer Programs



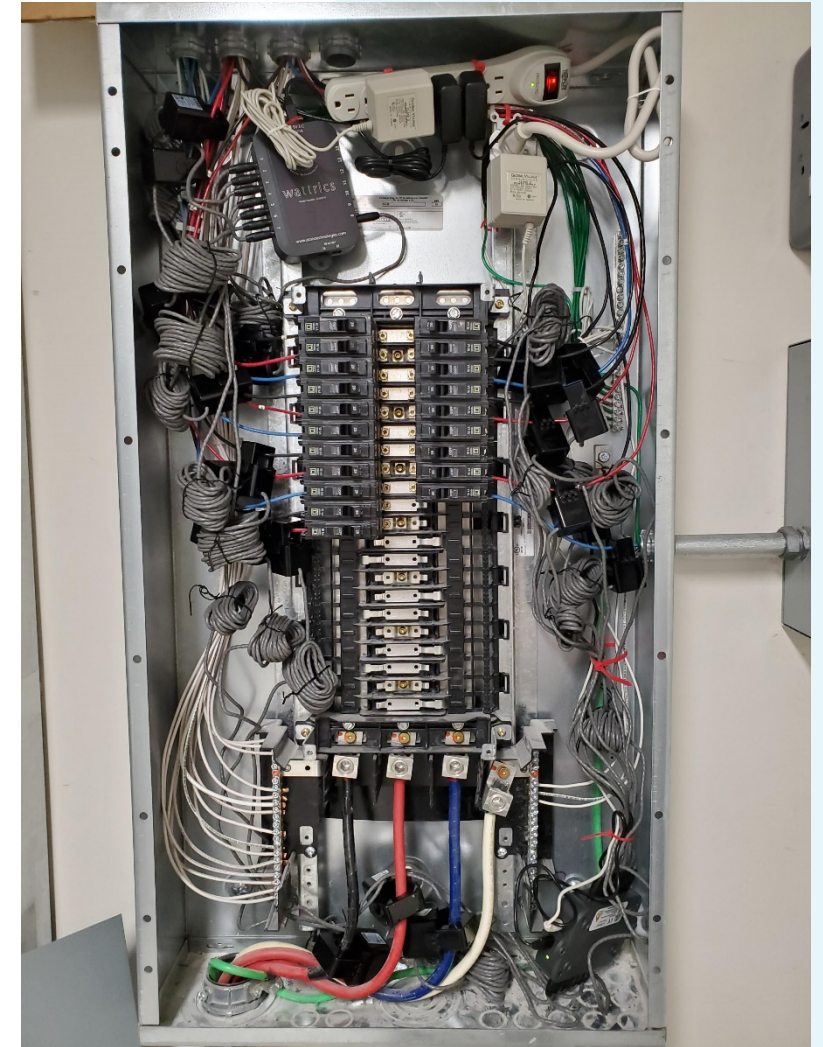
Residents and Local Community



Empowering customer to be Energy conscious

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

Planned Next steps

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

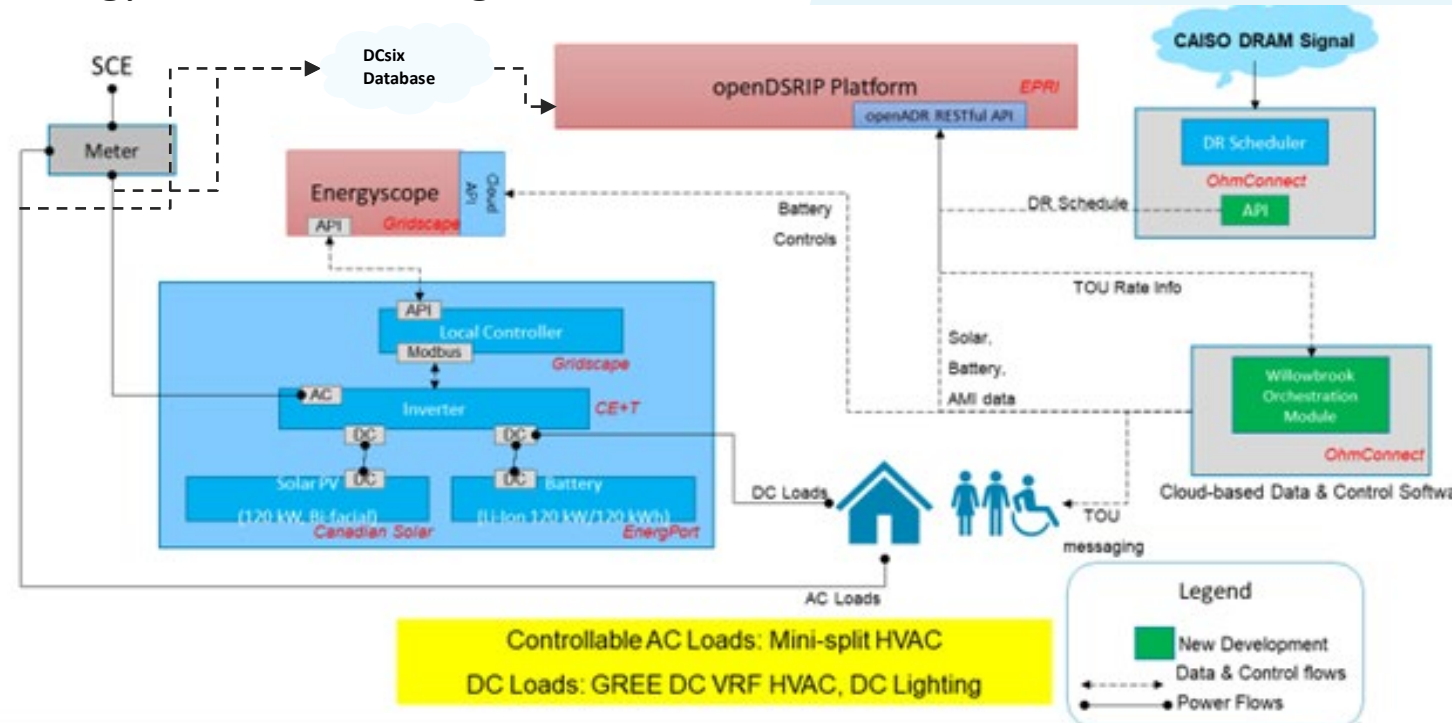
- Modelling and evaluation of the potential performance and payback to recover waste heat from HVAC units.
- Assess if solar and battery control strategy could be optimized for greater on-site utilisation of generated energy for water heating.



HVAC units and the bi-facial solar array at Willowbrook

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 shred with EPRIs DSRIP 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

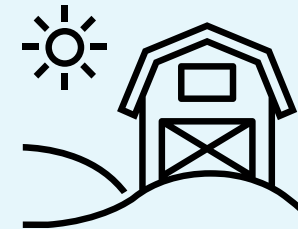
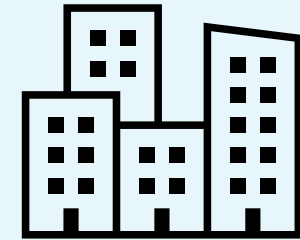


One of the installed Wattrics units monitoring the main incoming power lines using 400A CT's

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

Utility Representative:

Mark Martinez, Senior Portfolio Manager, Emerging Markets and Technology Program

Mark.S.Martinez@sce.com

Startup Representative:

Barry Bambury, Operations Manager, DCsix Technologies

barry.bambury@Dcsixtechnologies.com

EPRI Representative:

Eoin McCormack, Engineer/Scientist I, Advanced Buildings

emccormack@epri.com

