

Technology Innovation Project



Project Brief

TIP 421: EPRI P204 - Advanced Buildings

Context

This program's focus is the building as the point of integration of customer technologies and as the point of delivery for utility customer programs. Core research areas are building decarbonization, flexible buildings, building data analytics, and healthy, affordable buildings. Research spans how technologies are integrated, applied and aggregated within advanced buildings; tools that can accelerate customer programs and services; how customers connect to the utility; and implications of these technologies and design methodologies for building codes and standards.

The program collaborates with multiple EPRI programs including energy efficiency, customer behavior, electrification, energy storage, information and communication technology, cyber security, sustainability and air quality. Its focus is downstream of these individual technology or customer research programs—that is, on the integration and application of technologies in buildings. It will serve as the home for research on connected customer devices, how connected customers can be better engaged, understood and served by utilities, with active and close engagement from the customer behavior program and information and communications technology programs.

Furthermore, the program addresses the role of building codes in the transition towards an electricity system with more renewables by investigating topics related to technology readiness within the context of IECC, ASHRAE 90.1, Title 24 Part 6, and other building codes.

2020 Key Activities

This year the program will focus on these activities:

- Developing pathways and technology needs for building decarbonization and electrification.
- Understanding the gaps and real potential of buildings to provide flexibility.
- Develop market intelligence on sustainability targets for large portfolio customers, cities and states that will impact both the need for energy and flexibility for energy utilities.
- Develop modeling techniques and methodologies for advanced integrated high performance buildings, smart communities and cities.

- Develop application guides for implementation of emerging technologies in advanced buildings.
- Work with state level and national building codes and standards efforts to inform the impact and integration of emerging energy technologies in advanced buildings.
- Conduct research into enhancing energy affordability and quality of life for low income customers.
- Support collation of research and activities around improving connectivity and access to connected devices for utility customers.

Why It Matters

Membership in this program allows BPA to gain a better awareness of industry and government collaborative efforts.

A core component of “Decarbonization” relies on implementing extensive and deep energy efficiency measures. This is a direct value to BPA. Core elements of EPRI's Decarbonization effort are focused in core BPA research areas of HVAC, hot water and weatherization in Multi Family buildings.

Goals and Objectives

The program builds on the large body of related research being conducted by EPRI in integrated high-performance buildings and smart, resilient communities through government and supplemental projects. These include customer-centric demonstrations and deployments that focus on the application and integration of emerging technologies, and evaluating the actual operations of high performance communities.

Deliverables

- Empirical evidence, performance data, recommendations, and best practices to inform utility conservation measure development and improvement.
- First US field demonstration for monoblock HVAC equipment in MF buildings. This technology is widely used overseas and of interest to BPA.
 - Explore solutions to known and established EE tenant vs owner cost/benefit barrier in MF buildings.
 - Field demonstration for Central CO₂ HPWH in Multifamily buildings.

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Project Start Date: January, 2020

Project End Date: December, 2020

Links

[EPRI Program 204: Advanced Buildings](#)

Leverage

BPA's contributions are leveraged at a ratio of 13:1. This annual membership provides BPA access to reports and results of EPRI projects.

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EPRI Program 204 Research Portfolio - 2020

Smart Homes and Connected Customers: In collaboration with EPRI's Information, Communications, and Cyber Security (ICCS) research team, these projects will address technical barriers to smart buildings, customer perception and adoption of connected devices and opportunities for services and customer engagement:

- P204.004: Low Income Programs and Utility Opportunities to Enhance Energy Affordability
- P204.006: Addressing Challenges in Customer Connectivity: Long Term Persistence to Advance Utility Programs Advanced Building Design, Modeling & Analytics: These projects will examine energy modeling and design of high performance buildings and analyze advanced energy technologies' impact on load shapes and grid impacts.
- P204.001: Modeling and Designing High Performance Buildings
- P204.002: Zero Net Energy and Sustainable Communities: Integrating Generation and Storage in High Performance Buildings

Advanced Building Design, Modeling & Analytics: These projects will examine energy modeling and design of high performance buildings and analyze advanced energy technologies' impact on load shapes and grid impacts.

- P204.001: Modeling and Designing High Performance Buildings
- P204.002: Zero Net Energy and Sustainable Communities: Integrating Generation and Storage in High Performance Buildings

Building Standards and Codes: This project focuses on topical issues related to building standards such as European Standards for Near Zero Buildings and IECC, building sustainability ratings, and technology readiness for building codes.

- P204.003: Enabling Building Codes and Standards

Environmental Impact of Buildings: This research will help EPRI members better understand the environmental impact of buildings, such as the decarbonization impact of building design and indoor air quality in buildings.

- P204.005: Environmental Impacts of Advanced Buildings and Communities

