

# Program 204 Newsletter – July 2023

## UPCOMING EVENTS

### WEBCASTS

**P204-2024 Portfolio Launch** | August 17, 2023 | 3-4 pm |

Link to register [here](#).

**CBIG (Community Buildings Interest Group) Webcast Series** | Last week of August | This Webcast will be focusing on “Integration of Electric Vehicle Charging Infrastructure to Commercial Buildings”. The webcast will feature guest speaker Omkar Ghatpande of NREL and a member of EPRI’s Electric Transportation Program (P18). The exact date and time will be announced in the upcoming weeks.

### EPRI MEETINGS

**Fall Advisory and Sector Council Meetings-** Indianapolis, IN | September 11-14, 2023 | event page [here](#).

**EPRI Electrification 2024-** Savannah, GA | March 12-14, 2024 | Link to register [here](#).

### INDUSTRY MEETINGS

**California Building Electrification Summit-** Sacramento, CA | October 10-11, 2023 | Registration link with the summit agenda will be announced in the upcoming weeks.

**2023 Decarbonization Conference For The Built Environment-** Washington DC | October 25-27, 2023 | More Information [here](#).

**ASHRAE Winter Conference and AHR Expo-** Chicago, IL | January 20-24, 2024 | More information [here](#).

**DistributeCH-** Orlando, FL | February 26-29, 2024 | More information [here](#).

DEAR P204 MEMBER ADVISORS,

Hope you’re enjoying a pleasant summer, staying healthy, cool, and safe! It’s been a busy summer for the P204 team with many demonstration projects and the base projects underway.

We look forward to seeing you at Indianapolis advisory in September, to share our project findings and insights, as well as get your feedback on the priorities for 2024 and ahead.

Continuing the momentum from February advisory, we have organized a joint session with Programs 170 and Program 182 on the Monday afternoon, and a tour of the Lucas Oil Stadium on Tuesday afternoon.

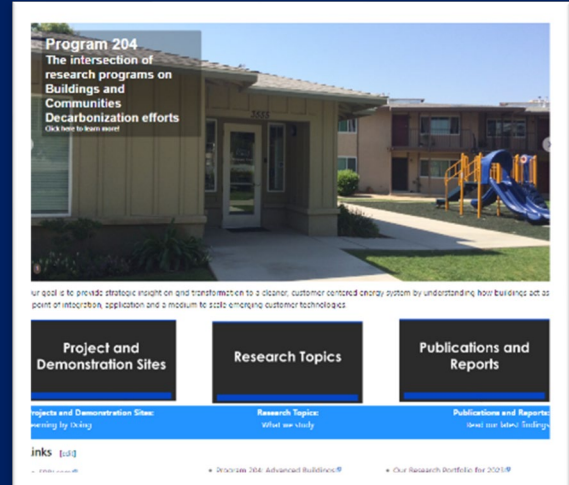
As always, we look forward to your feedback and welcome exciting research ideas and projects to advance residential and commercial buildings and communities.

With kind regards,  
Sara Beaini, PhD  
Program Manager  
Advanced Buildings & Communities



## BUILDINGS.EPRI.COM WEBSITE LAUNCH

P204 has officially launched [buildings.epri.com](https://buildings.epri.com), a website focused to provide information on buildings related research at EPRI. The website is designed to enable simple navigation of our broad ranging work. Accordingly, members will be able to peruse P204's portfolio, organized by themes, approaches, building typologies, and target audiences. The website links seamlessly to our list of publications and reports. For further questions regarding the website, please reach out to [Mazen Daher](#) and [Herb Yaptinchay](#).



## P204 PROGRAM NEWS

### Midyear Webcast | June 7, 2023

The team provided an update on the 2023 research activities within 204. Thank you for joining us for an engaging discussion about the midyear updates! Please click [here](#) for post meeting materials.

### Financing Mechanisms and Utility Customer Programs Webcast | June 7, 2023

During the Midyear Webcast, **Agatha Kazdan** provided a deep dive into a recent deliverable titled "Equitably Financing Building Decarbonization Measures: Actionable Strategies for Utilities". This provided recommendations of actionable strategies for utilities to equitably finance building decarbonization by examining the following questions: What is the case for decarbonizing buildings from an end-user, utility, and societal perspective? What are the emerging financing mechanisms, business models, and engagement approaches to advance equitable decarbonization? And what are their respective benefits and challenges? What metrics can improve assessments of programs and policies? This report deliverable was published last year and can be reviewed [here](#). The webcast presentation is also attached [here](#) on slides 25-36.

### APR Launch | August 17, 2023 | 3-4 pm ET

Join us for the P204 – 2024 program launch webcast. This webcast will summarize our research significance to industry needs and highlight important portfolio changes, as well as key supplemental projects, for 2024. The link to register is [here](#). We look forward to seeing you all there!

### Mark your calendar for "Building Electrification Summit – Clean and Healthy Homes for All" | October 10-11 2023 | Sacramento, CA

Join EPRI for a two-day summit, co-hosted by the California Energy Commission (CEC), exploring affordable, reliable, and equitable pathways to electrifying buildings. The summit will take place on October 10-11, 2023, in Sacramento, CA at the California Natural Resources Agency headquarters. Special emphasis will be on publicly funded building decarbonization programs for low-to-moderate income customers. Each day includes 3 plenary sessions and 4 breakout sessions (2 tracks in parallel). There will be an evening reception on the first day and poster sessions/networking throughout both days. Registration link with the summit agenda will be announced in the upcoming weeks.

## PEOPLE HIGHLIGHTS

**Mazen Daher** joined P204 in October 2022 as an Engineer/Scientist II. Mazen supports building systems analysis and modeling activities, and aids in developing analytical approaches for advanced energy community demonstrations and assessments. His primary area of expertise is the analysis of data from live demonstrations and energy simulations, spanning multiple subsystems such as HVAC, water heating, and plug loads. Prior to joining EPRI, Mazen was a Research and Development Engineer at the UC Davis Western Cooling Efficiency Center, where he supported whole building energy modeling projects studying the long-term techno-economic and environmental implications of energy efficiency and electrification measures in commercial buildings. Mazen holds a master's degree in Mechanical and Aerospace Engineering from the University of California, Davis, and bachelor's degree in Mechanical Engineering from the American University of Beirut. In his free time, he enjoys hiking, road trips, playing guitar, and reading history books.





## IN THE NEWS

[US Residential Heat Pump Sales Pass Gas Furnaces](#)

[Project to Convert Offices to Apartments](#)

[World's First Near Zero Carbon 3D-Printed Homes Constructed](#)

[Solar-Powered 'Microgrids' Coming to San Diego Public Buildings](#)

[Hotsat-1 Satellite Launched to Identify Energy Inefficient Buildings](#)

[Seattle Mayor Introduces New Building Emissions Performance Standard](#)

[DOE Rolls out \\$200M for Grid Investments; California will use \\$67.5M for Storage, Resilience](#)

[Chicago is "Sinking" due to "Subsurface Heat Islands"](#)

## RESEARCH HIGHLIGHTS

### Centralized Water Heating System Electrification in Affordable Housing

Program 204 is currently conducting analysis on the field demonstration of a centralized heat pump water heater system in a 192-unit affordable multifamily community in San Marcos, California built in 1987. Prior to the retrofit, the community's hot water needs were served by a seventeen centralized gas boiler system. EPRI partnered with National Community Renaissance, a non-profit affordable housing developer and owner to replace existing boilers with SanCO2 heat pumps. Funding for the electrification and research aspects of this initiative come from San Diego Gas and Electric Company Emerging Technology Program as well as the Low-Income Weatherization Program and mid-stream program known as TECH. This electrification effort will be coupled with the installation of on-site solar generation meant to offset the anticipated increase in electricity cost. Ultimately, the intent of this project is to demonstrate scalable decarbonization strategies for affordable multifamily housing- with a focus on reducing costs, improving reliability, and maximizing benefits from renewables. Domestic hot water system electrification is a high-potential decarbonization vector in multifamily buildings, especially in California where combustion-based water heating remains common. This end use is responsible for 28% of multifamily residential energy consumption in the United States, according to the Energy Information Administration. Centralized heat pump water heating systems are attractive replacements for gas boilers as they offer substantial energy efficiency and demand response potential. This project is currently in the field monitoring phase, and the systems are operating at a near-optimized stage, with changes being made as needed. The project has so far raised crucial questions regarding multiple facets of centralized water heating electrification, such as the influence of electricity rate structures on the cost-effectiveness of such systems, the gaps in the modeling of heat pump systems, and the critical need for a workforce that is more familiarized with the projects at hand.



Courtesy of National Community Renaissance

## EPRI ROTATIONAL STUDENT PROGRAM

EPRI officially kicked off the E&SES Rotational Student Program (RSP), which is being piloted June-December. The RSP aims to provide a comprehensive, multi-semester rotational experience to introduce student employees to the dynamic world of energy R&D focused in the areas of electrification and sustainable energy strategy. RSP participants are challenged to expand their knowledge in engineering, business, safety, climate, and sustainability while cultivating their personal and professional leadership style. P204 is excited to welcome **Prutha Bhide** as our rotational intern from June-September. Prutha is graduate student at the School of Environment and Sustainability, at the University of Michigan. She loves mathematics, energy, and environmental science and will be based in Michigan!



### Hybrid Grid-Connected Exterior Lighting Project to Increase Safety for Disadvantaged Communities

**Sara Beaini** is co-leading a demonstration project with **Frank Sharp** to provide affordable, reliable, exterior lighting for low-income and/or disadvantaged communities across California. The California Energy Commission (CEC), under GFO-20-303, provided funding to EPRI, along with project partners ClearWorld and Redwood Energy, for the development, testing, and deployment of hybrid solar exterior lighting for communities where light levels are often below standard requirements for a safe and useable space. The research project will deploy more than 100 LED hybrid-powered exterior lights at eight sites. Locations include residential communities, schools, and public recreational parks. Click [here](#) for more information about the project.



New Hybrid, Smart, Grid-Connected LED Lighting System

## P204 INDUSTRY OUTREACH

ASHRAE Annual Conference- Tampa, FL | June 24-28, 2023

Maggie Sheng and Siva Sankaranarayanan presented alongside Madeline Kostic from Seattle City Light at the ASHRAE Annual Conference on “A Framework for Evaluating Pathways to Building Decarbonization: Case Study in Seattle City Light”. This project focused on how to ensure that the decarbonization of the building sector is done in a cost-effective and equitable way. Developing pathways for building decarbonization requires a thoughtful and multistakeholder framework that clearly identifies and quantifies value creation as well as impacts and challenges. Their presentation can be viewed [here](#).

Penn Zhao presented alongside Viswanath Ananth at the ASHRAE Annual Conference on “Integrating Building-Scale Solar + Storage + Flexible Advanced Technologies to Maximize Value to Commercial Buildings”. The presentation was a high-level summary of the lessons learned from the CEC funded project EPC-17-005, which was a demonstration project to focus on Integrating Building-Scale Solar + Storage + Flexible Advanced Technologies to Maximize Value to Commercial Buildings. The focus of this presentation was to share the successes of developing a building-integrated solar + storage demonstration through that project, as well as sharing the challenges that the project had experienced, and more importantly, the solutions to cope with the challenges. Their presentation can be viewed [here](#).

### 100 units of Gradient Heat Pump Installed Under the “Innovative Low GHG Residential Space Conditioning Technologies” Grant

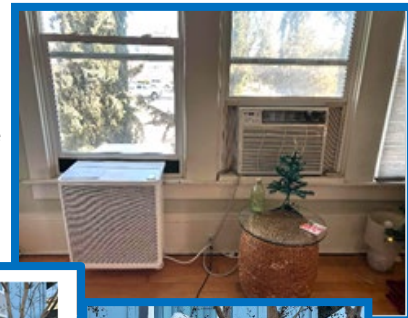
Sara Beaini completed a portfolio of 6 projects, funded by the California Strategic Growth Council’s Climate Change Research Program that had 3 primary objectives:

- Develop Blueprints for Energy Innovators
  - o How to Design, Market, Sell, and Finance your product or service for Low-Moderate Income (LMI)/Disadvantaged Communities (DAC)
- Demonstrate an easy-install window heat pump with low-GWP refrigerant in LMI/DAC
  - o 100 units deployment in CA Central Valley
- Demonstrate low-GWP heat pump efficiency enhancements
  - o Thermal Energy Storage
  - o Heat Pipe Assisted Heat Exchanger
  - o Oil-Free Membrane Compressor

The underlying research theme of our portfolio was to address how to improve access, acquisition, and adoption of low GWP energy efficient heat pumps for the low/moderate-income customers (LMI) and disadvantaged communities (DAC). When evaluating product features of cost, convenience, comfort, choice and connectivity, cost (product affordability and operation cost/bill savings) is the main factor that drives LMI customers’ adoption for emerging technologies that offer savings. The other benefits or features become secondary.

The project started in 2019, right at the start of the pandemic and was completed in spring 2023, after successful installation of 100 Gradient units in multifamily and single-family homes across the CA Central Valley (Tracy and Fresno), thanks to the support of Redwood Energy for identifying eligible host sites. EPRI, as the prime, led the portfolio of 6 projects, including 2 technology development projects to improve the efficiency of heat pumps: (i) with thermal energy storage (led by Aaron Tam of P170), and (ii) with heat pipe assisted heat exchanger (led by Matthew Robinson of P170). The teaming partners were Gradient, GLYNT and Redwood Energy. Gradient’s projects included the development of an oil-free membrane compressor, and the deployment of their first commercial product with 100 units in LMI/DAC residential sites. GLYNT developed blueprints that summarized (i) development of their “Reflect” program – how LMI customers can building credit through on-time utility payments; (ii) customer purchase journey through digital energy engagement. Check out 2022 EPRI report [3002024807](#), on “Understanding the Credit and Finance Needs in Limited Income Households: National Survey” and 2021 EPRI report on “Understanding the Purchase Journey of Home Energy Equipment in Limited Income Households: A Comparison of US National and Regional Surveys”, both led by Min Long of P182. For this project report, the EPRI ID is: [3002021632](#), 2021 EPRI report on “Understanding the Purchase Journey of Home Energy Equipment in Limited Income Households: A Comparison of US National and Regional Surveys”.

Gradient Indoor Unit (left).  
Existing A/C, that would be removed (right)



▪ Funder



▪ Prime



▪ Technology Provider

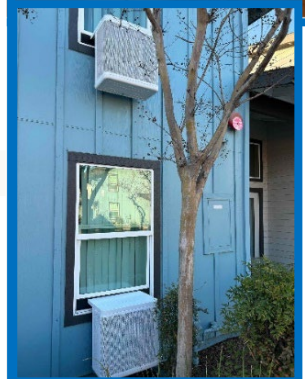


▪ Community Engagement Partners




▪ Special Thanks:

- City of Modesto, Central Valley Opportunity Center, Modesto Irrigation District, Turlock Irrigation District, Tuolumne River Trust, City Ministry Network, Stanislaus Community Foundation, Debrief LLC
- Eden Housing Stone Pine Meadows, Tracy
- Lowell Community Development Center, Fresno



Modular Use with Multiple Units

Stay tuned for more details about the portfolio findings which will be shared at the upcoming September advisory meeting in Indianapolis.

## About EPRI

Founded in 1972, EPRI is the world's preeminent independent, non-profit energy research and development organization, with offices around the world. EPRI's trusted experts collaborate with more than 450 companies in 45 countries, driving innovation to ensure the public has clean, safe, reliable, affordable, and equitable access to electricity across the globe. Together, we are shaping the future of energy.

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### EPRI

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