

# **MySmartE – A software platform for smart and connected energy-aware residential communities**

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# Team

## Principal Research Investigators

- *Panagiota Karava (Civil)*
- *Ilias Bilonis (Mechanical)*
- *James Braun (Mechanical)*
- *Thanh Nguyen (Management)*
- *Leigh Raymond (Political Science)*
- *Julia Rayz (CIT)*
- *Torsten Reimer (Communication)*

## Community Partners

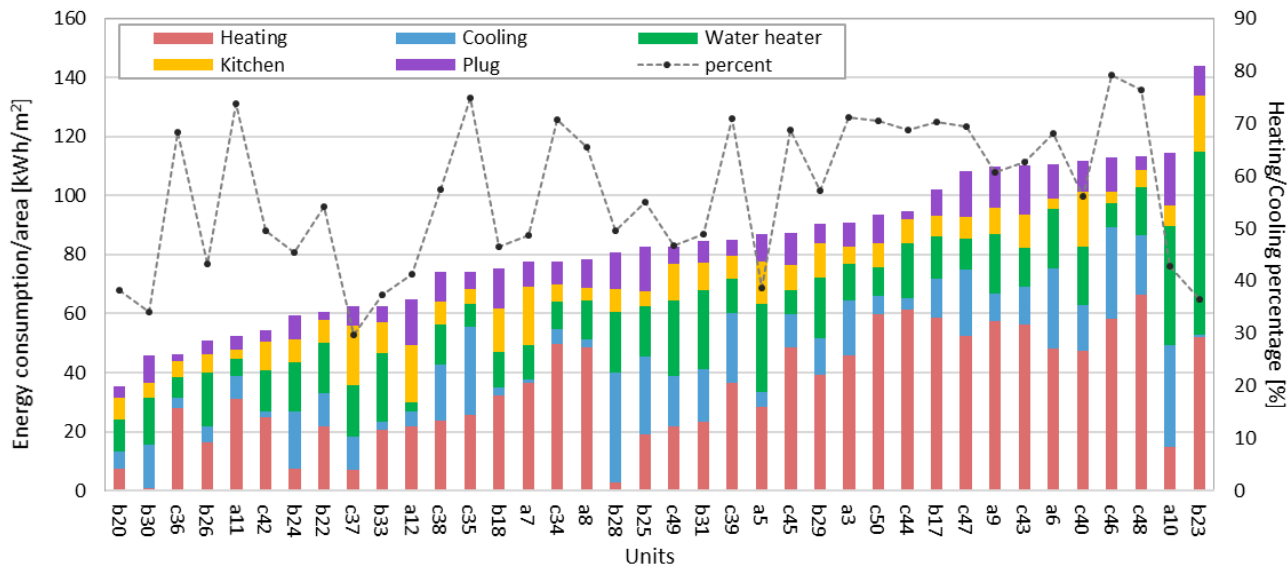
- *Jacob Sipe (IHCDA)*
- *Gary Hobbs (BWI)*



# Why focus on residential sector?

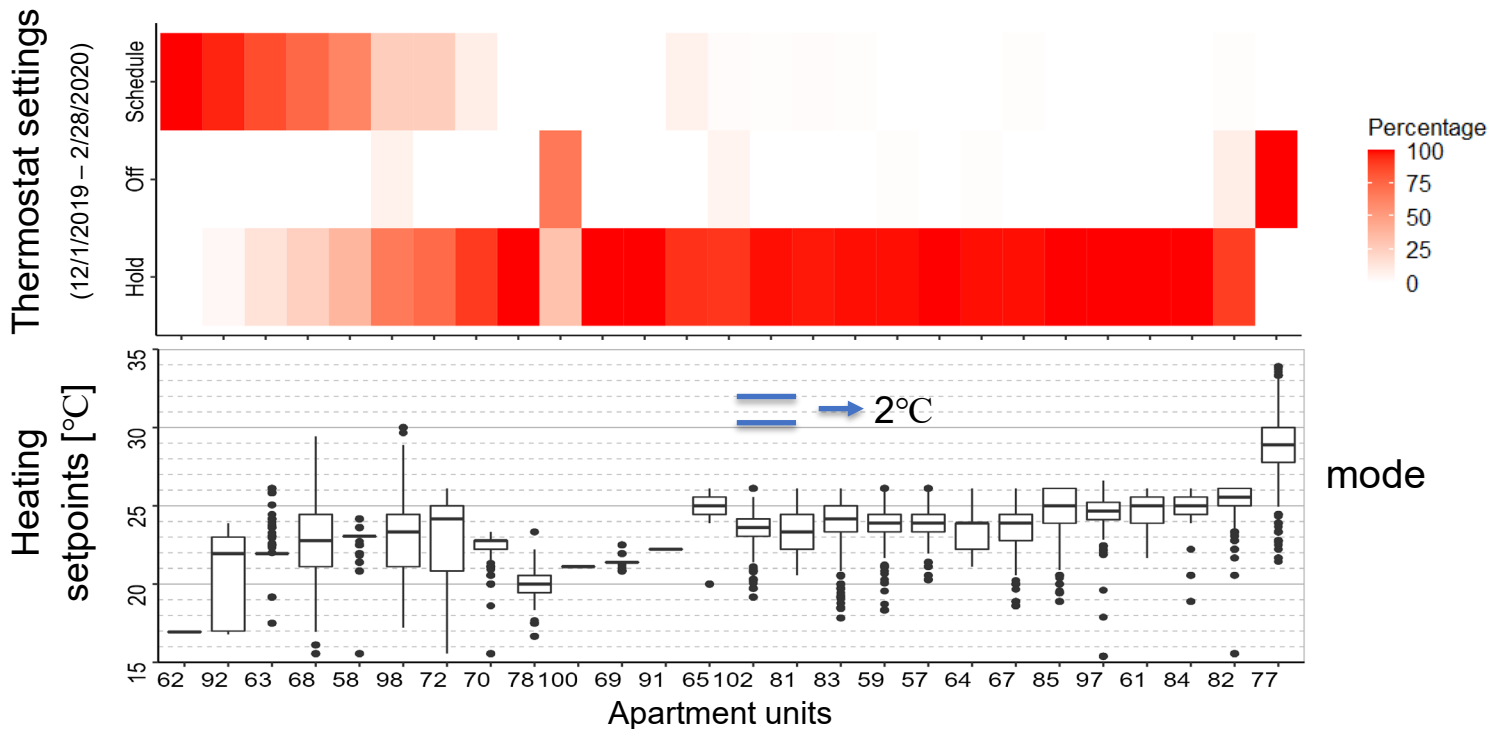
- 20% of total energy use and GHG emissions in the US
- Significant investments on energy efficiency programs

# Why focus on resident engagement?



- ❑ Large variations (38–143 kWh/m<sup>2</sup>) in total unit-level energy consumption
- ❑ HC ranges from 30 to 80% (average 56%) of the total energy consumption.

# Why focus on thermostat-adjustment behavior?



□ High usage of **fixed setpoints**

# MySmartE – A software platform for smart and connected energy-aware residential communities

**ihcda**



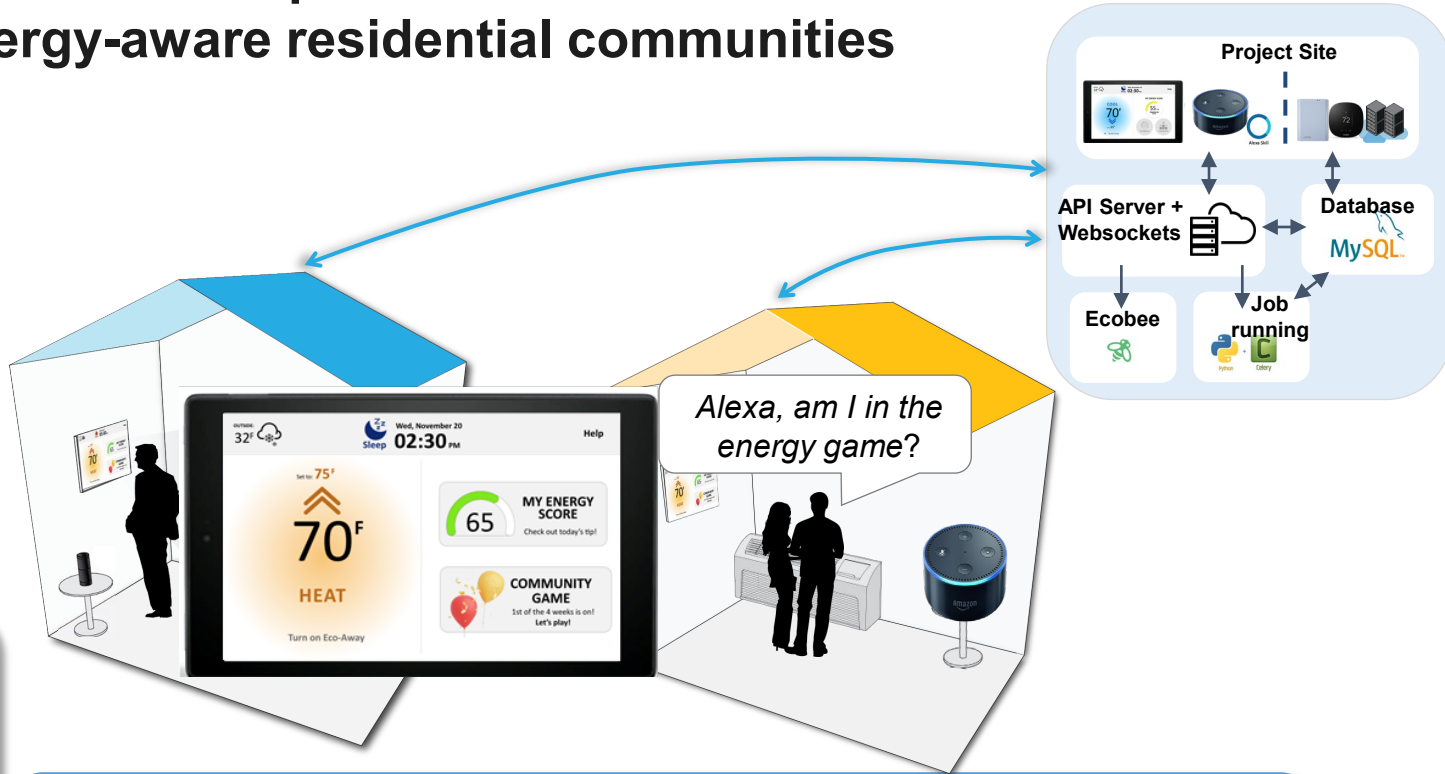
Launches *Moving Forward* program



Builds innovative housing communities



Conducts *sociotechnical* research and develops new S&C resident engagement technology



**MySmartE app is a home energy management system that works with a tablet and amazon alexa and helps residents in understanding and reducing their home energy use**

# Our Pilot S&CC

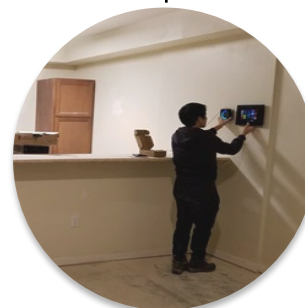
**Community 1** (50 households, Indianapolis)   **Community 2** (44 households, Fort Wayne)   **Community 3** (12 households, South Bend)   **Community 4** (25 households, New Albany)



Smart thermostat & Wifi-enabled power meter



App development



Installation & Virtual onboarding



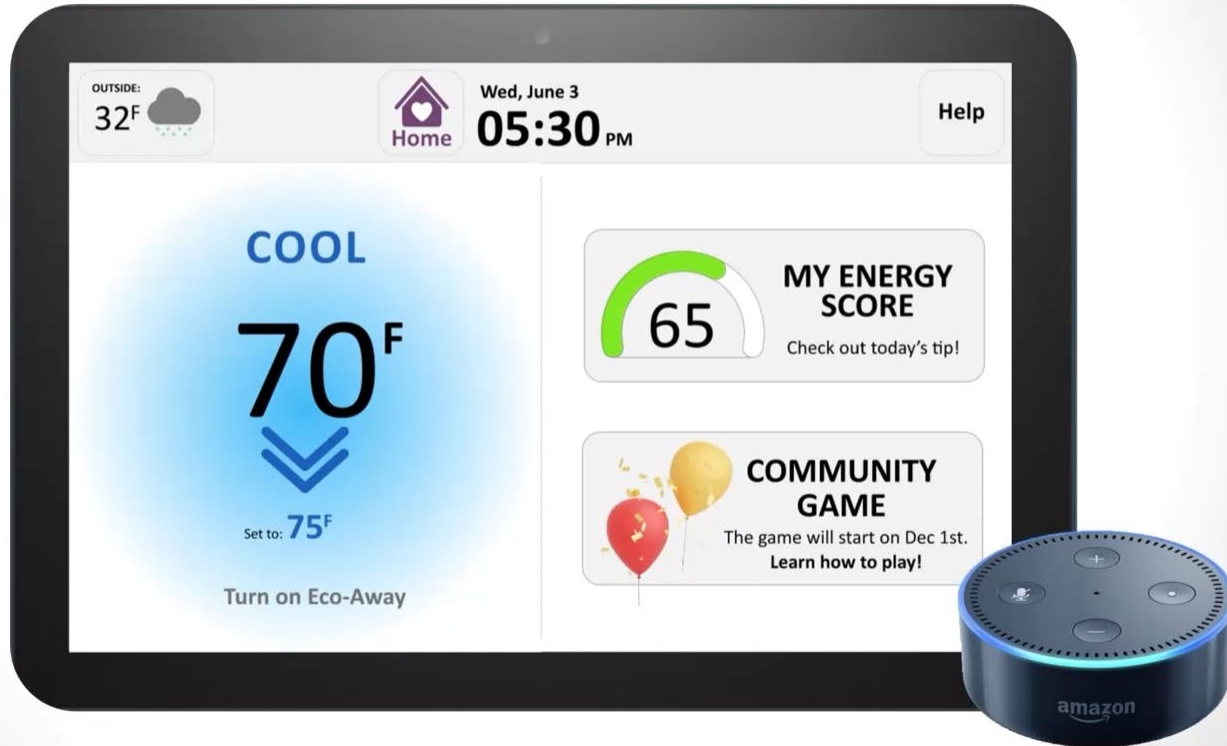
Resident on-site onboarding

# MySmartE

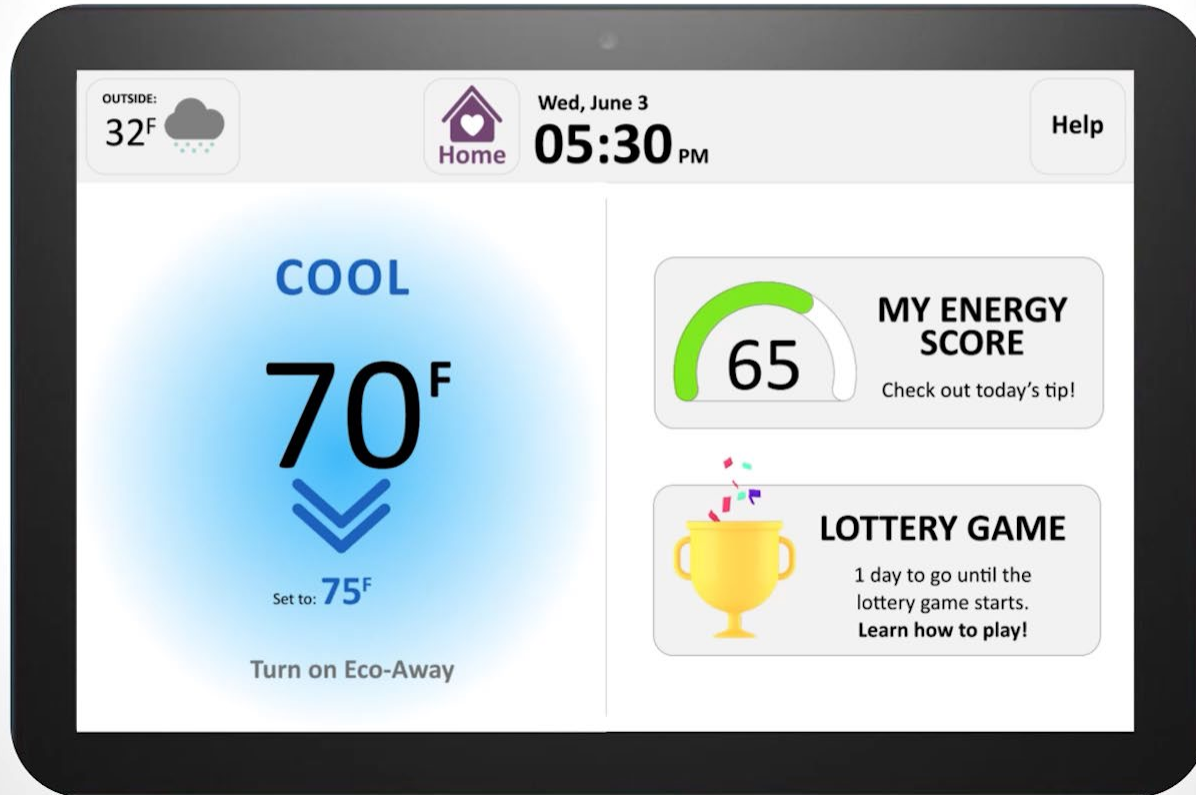




# What is MySmartE?

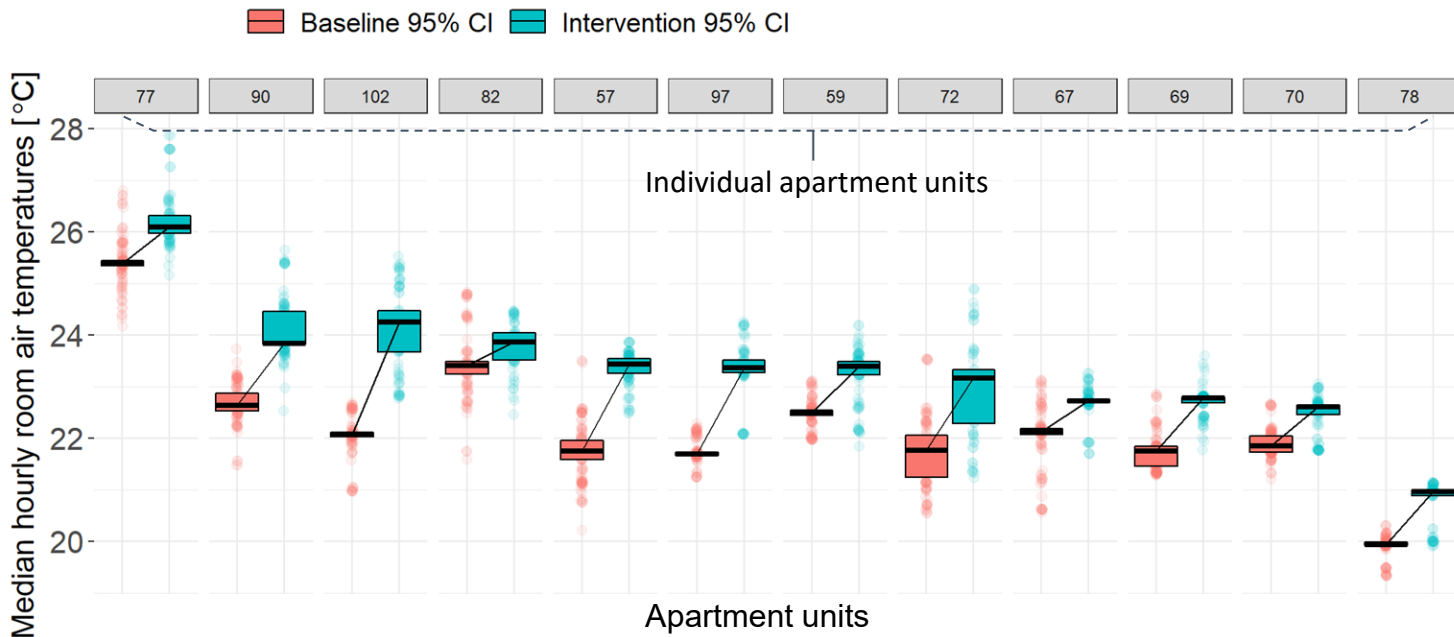


# Community Games



# Before and after intervention

- Household room air temperatures increased after the intervention in cooling season



- Positive effect of the intervention for all participating units with baseline data*

# Our Community Impact

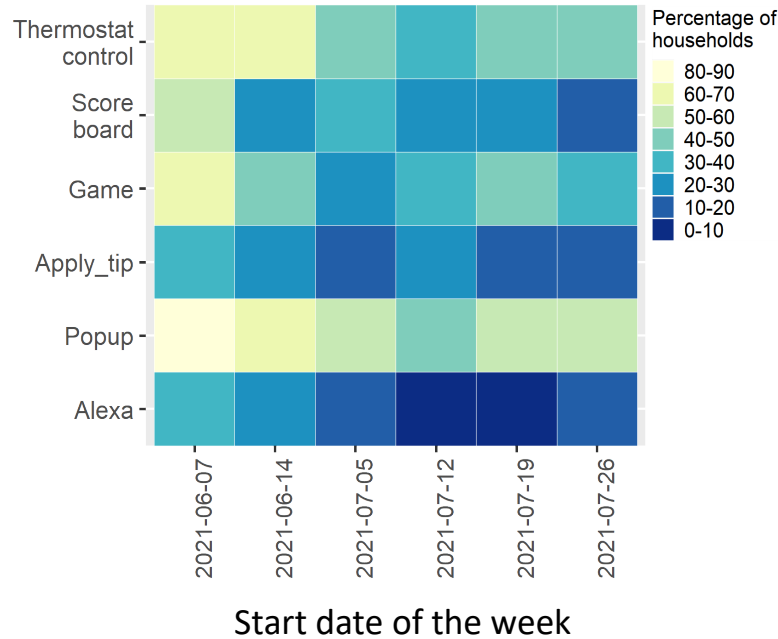


MySmartE app overall?

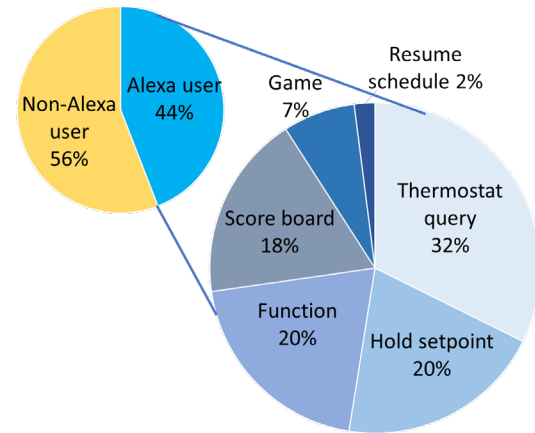


# User interactions

☐ Tablet user interactions



☐ Alexa user interactions



- ☐ 19 tried Alexa (~44%)
- ☐ Thermostat query > Function = Hold > Score board > Game

# Current steps

**SCALE-UP  
DEPLOYMENT**



A map of Indiana is shown with four green location pins. Dashed lines connect these pins to callout boxes labeled *South Bend*, *Fort Wayne*, *Indianapolis*, and *New Albany*. To the right of the map is a grid of six photographs showing various housing styles: a modern multi-story apartment building, a large two-story townhome complex, a traditional two-story house, a long single-story brick row house, a two-story townhome complex, and a two-story grey townhome complex.

**different construction types  
& population demographics**

**New Community  
Partners**

- Housing agencies
- Cities
- Utility providers
- Foundations
- Real Estate /Housing developers

**Thank you**

**Q&A**

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# Field Data

❑ Participants: **36 households**

❑ Timeline:

➤ **Baseline:** Dec. 2019 - Dec. 2020

➤ **Intervention:** Jan. ~ Aug. 2021

(Summer game: June 7<sup>th</sup> ~ 20<sup>th</sup>, July 5<sup>th</sup> ~ August 2<sup>nd</sup>)

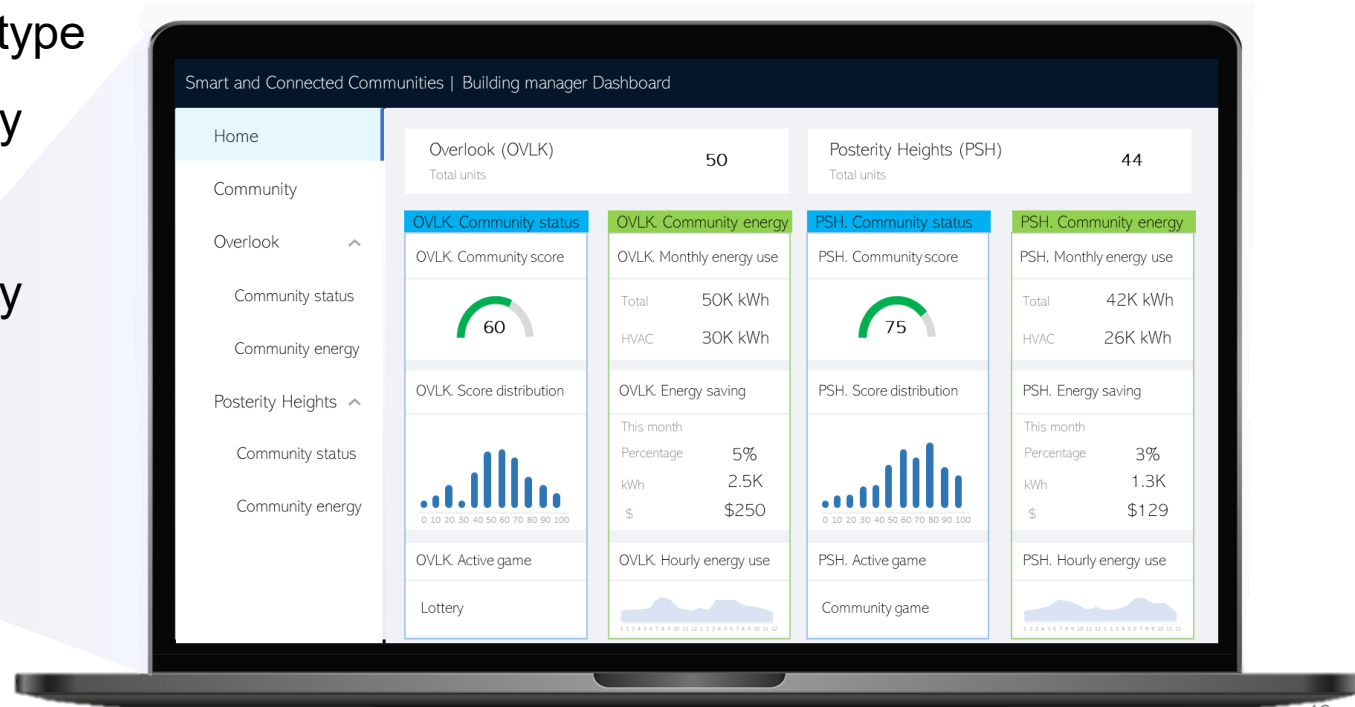
*Before VS. After (12)*

*User interactions (36)*

*Post-experiment  
interviews (13)*

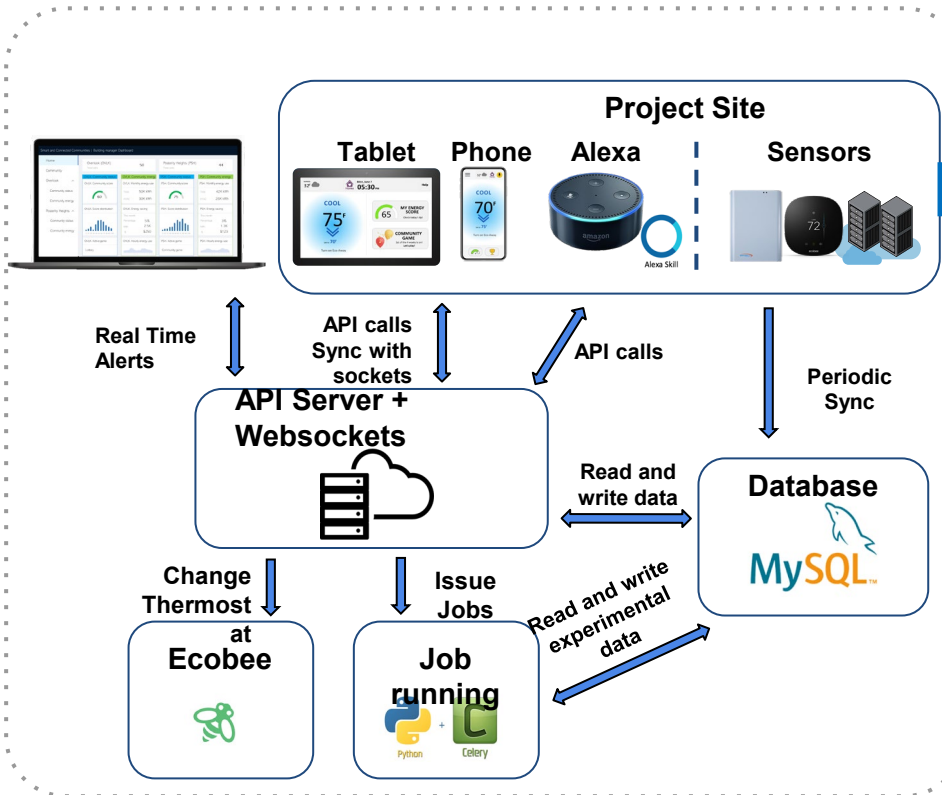
# Facility Manager Portal

- Add/remove project site
- Assign intervention type
- Overview community status
- Overview community energy usage

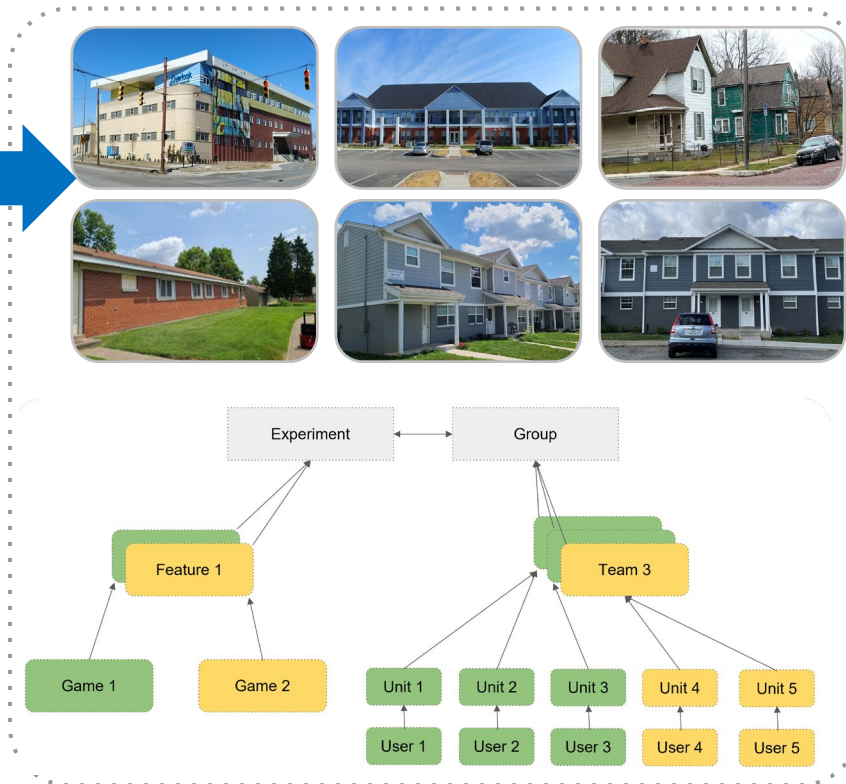


# Facility Manager Portal

## Software infrastructure



## Portofolio management



# Post-experiment Interview

30-min phone interviews with 13 residents:

- ❑ MySmartE improves thermostat accessibility (tablet location, Alexa's remote-control function)
- ❑ Social game excites users (e.g., avatars, social proof information)
- ❑ Users have different learning curves
- ❑ Alexa adoption is slower

# Summary

- ❑ Developed an eco-feedback and gaming platform (MySmartE) to promote energy-conserving thermostat-adjustment behaviors
- ❑ Deployed MySmartE in a multi-unit residential community
  - **Positive effect** of the intervention during the cooling season
  - **Popups** and **social game elements** play a key role in **triggering user interactions**
  - **Simple and intuitive UIs** and **software maintenance** are important