

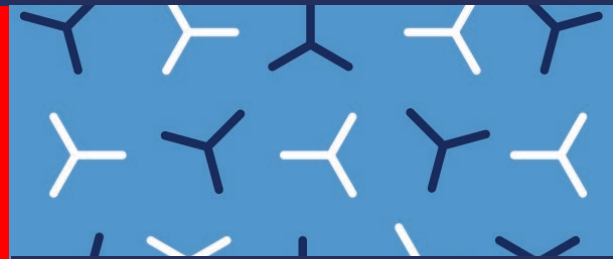


# INCUBATENERGY LABS 2022 DEMO DAY

Powered by:  **Xcel** Energy®



October 26  
Minneapolis  
Minnesota



EPRI

A decorative vertical bar on the left side of the slide, featuring a yellow background with several stylized sun icons in blue, white, and red. The sun icons are of varying sizes and are arranged in a repeating pattern.

# XeroHome™

Supported/Hosted by: **Ameren Missouri**

EPRI Subject Matter Expert: **Siva Sankaranarayanan**

XeroHome™ calculates and recommends  
customized home energy upgrades to make  
*every home* a zero-carbon home!



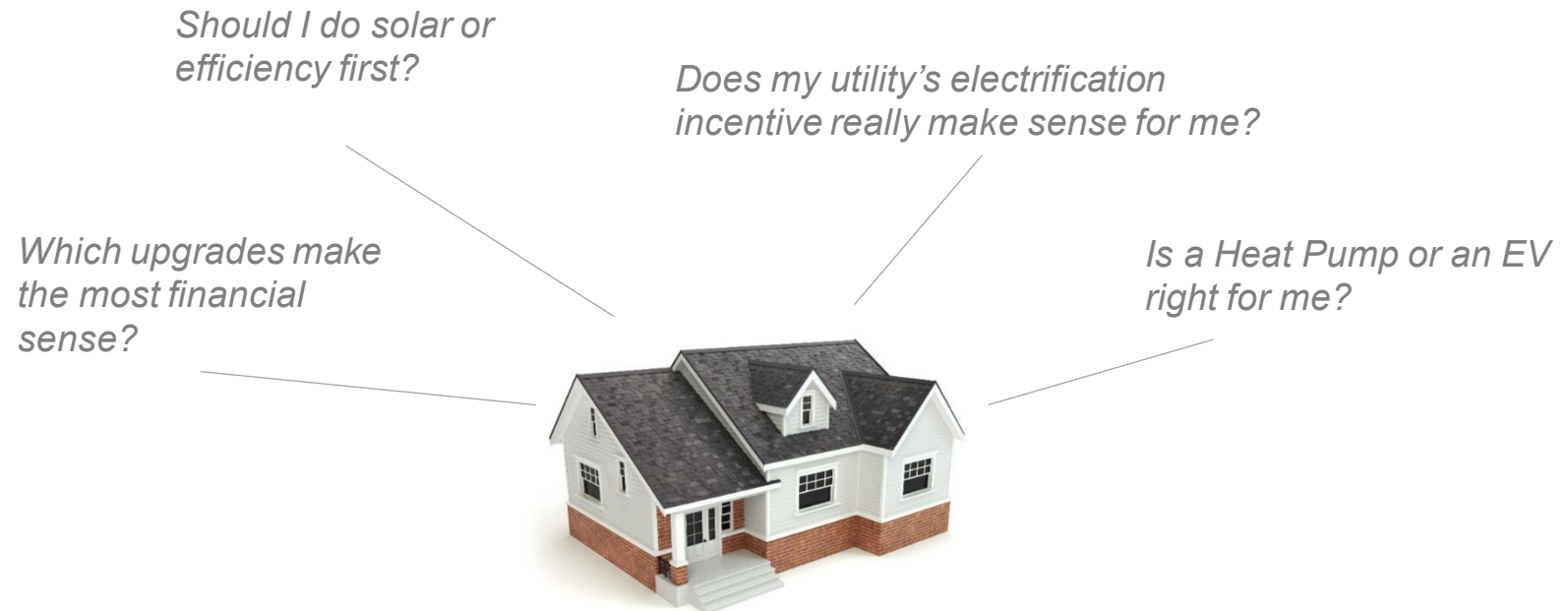
XeroHome™

Decarbonization . Simplified

# Problem Statement

## Decarbonization Requires Action from Homeowners

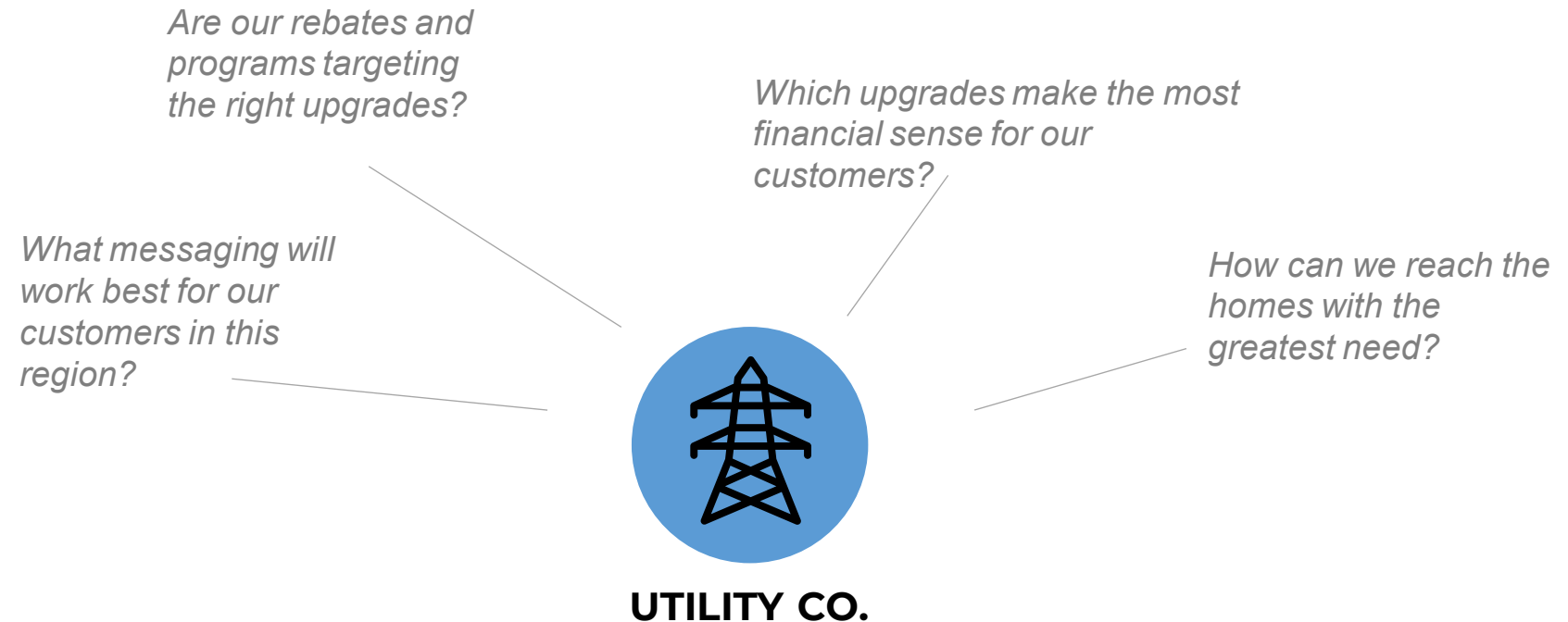
But we cannot expect homeowners to act on decarbonization until they are informed and empowered



# Problem Statement

## Decarbonization Requires Innovation from Utilities

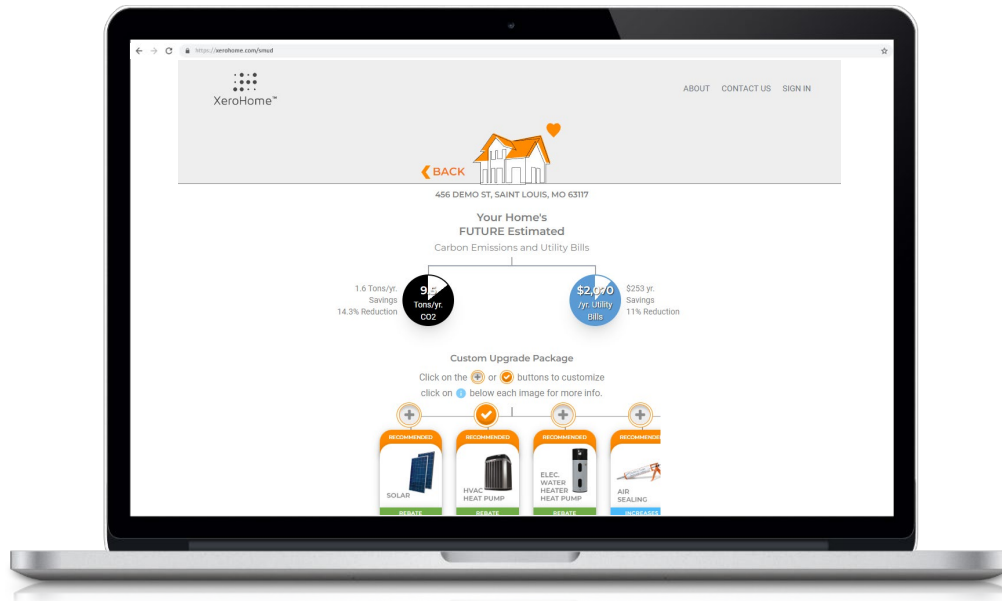
Utilities will require customized data and analysis at portfolio-scale to develop the right programs, policies and strategies



# XeroHome Solution

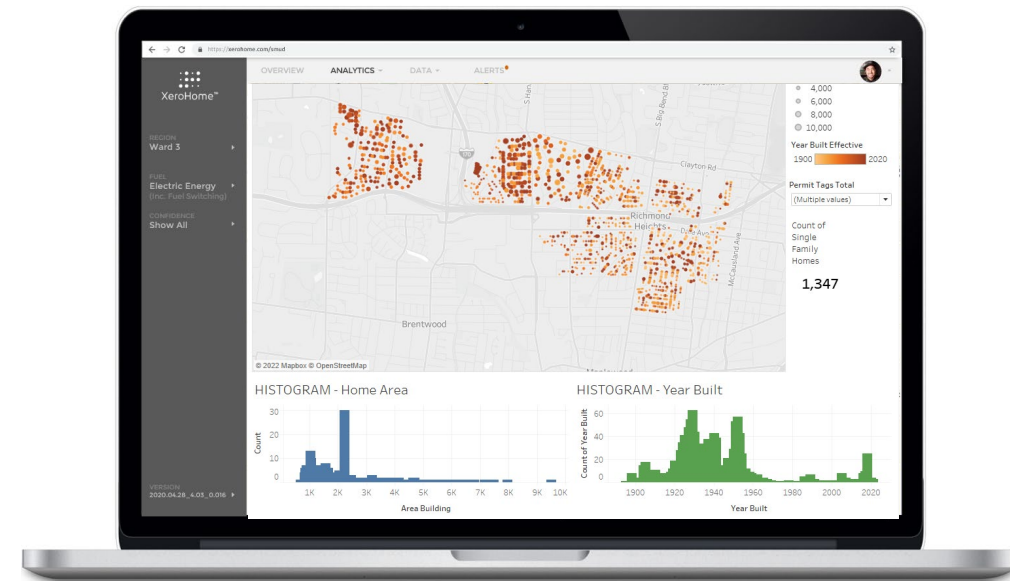
## Homeowner Portal

Provides energy analysis and upgrade recommendations for individual homes



## Utility/City Dashboard

Provides a portfolio scale analysis of all homes in a city/region

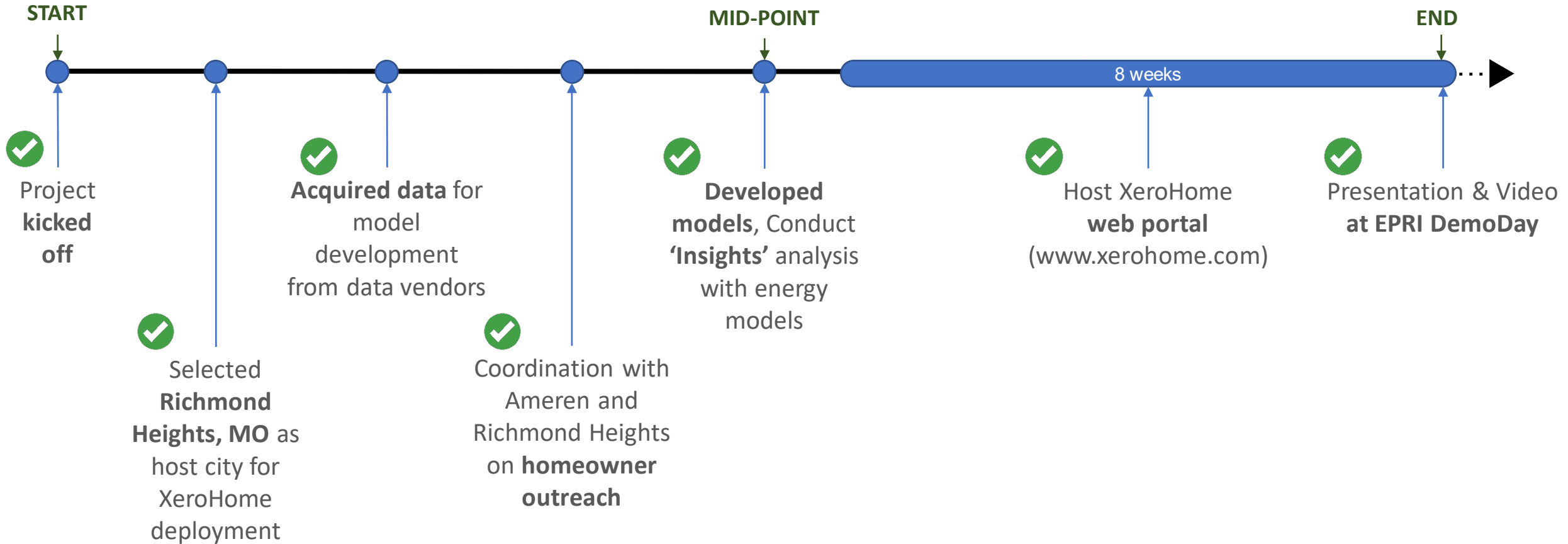




# Project Scope

- Project team (Vistar Energy) deployed the XeroHome™ homeowner engagement platform for all homes in the City of Richmond Heights, MO.
- Goal was to demonstrate XeroHome's ability to:
  1. Inform and engage residents of Richmond Heights,
  2. Promote Ameren's residential programs, and
  3. Support them on taking action towards home energy upgrades.
- XeroHome's large-scale energy analysis was presented to Ameren's program staff related to
  1. Opportunities on refining Ameren's residential program rebates, financing etc.
  2. Customer targeting and
  3. Developing local policies to support building decarbonization.

# Project Timeline



# RESULTS

## Portfolio Scale Analysis





## Portfolio Scale Analysis – Richmond Heights, MO

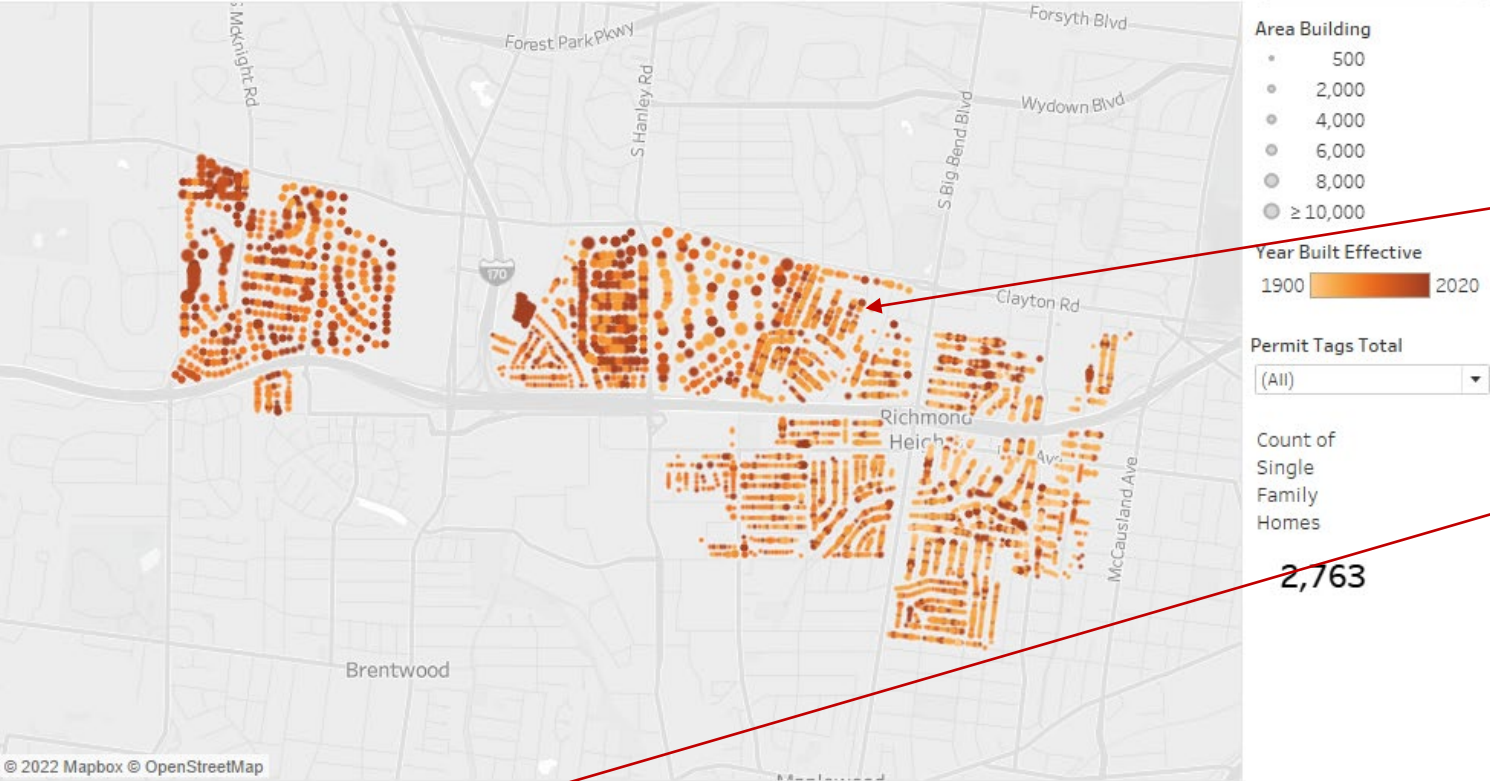


- Richmond Heights is a city of about 2,700 homes in St. Louis, MO
- We modeled all homes in Richmond Heights using XeroHome's EnergyPlus™-based building energy modeling platform.
- These results were visualized as a portfolio scale analysis providing insights on the spread of energy savings, costs and payback periods for several home energy efficiency and electrification upgrade measures.
  - These results provided Ameren Missouri with insights on which measures are likely to provide the most savings to their customers and how to identify those customers.
  - The results also provided deeper understanding on how rebates can be developed using Net Present Value calculations

# Portfolio Scale Analysis – Richmond Heights, MO



Map - Richmond Heights

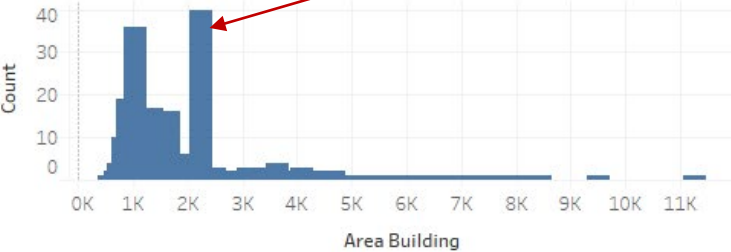


Home size is by size of dot  
Year built is by color

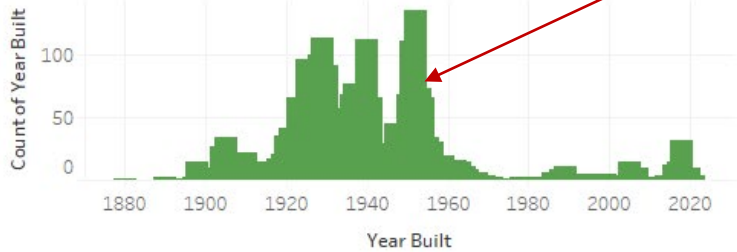
Most home sizes are between  
1,370 to 2,900 sf  
Median size: 1900 sf

Most homes were built between  
1923 and 1988  
Median year built: 1952

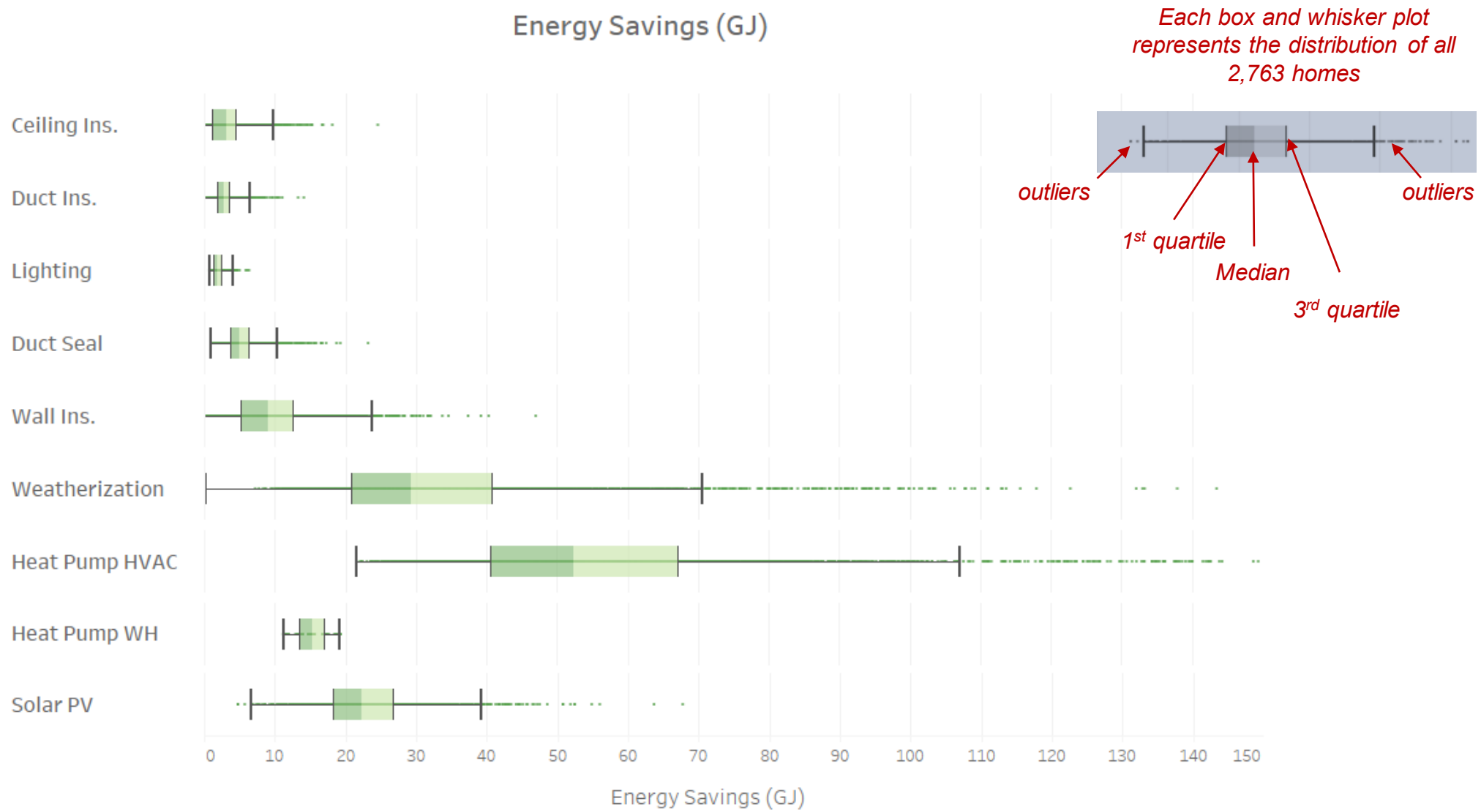
HISTOGRAM - Home Area



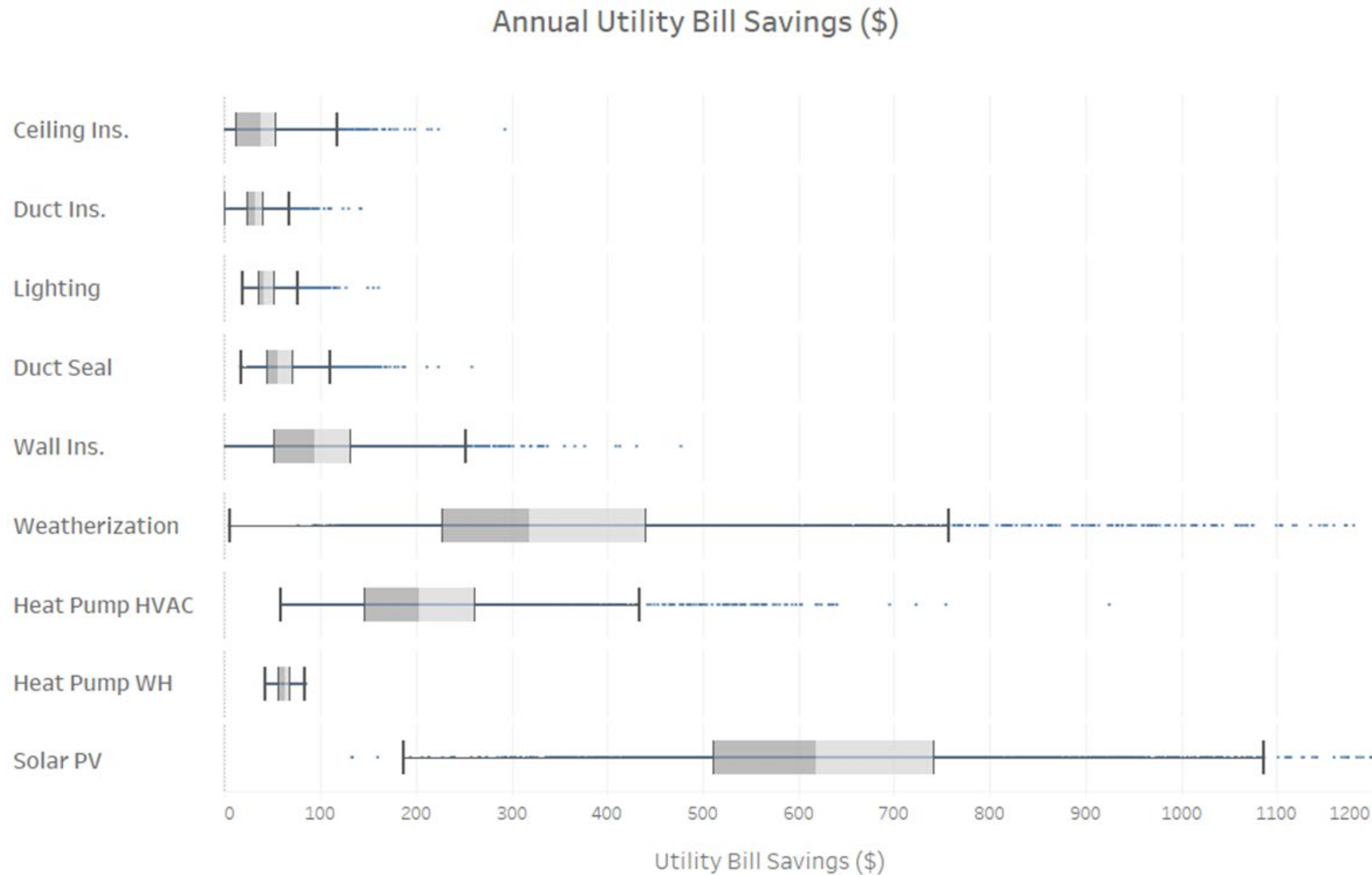
HISTOGRAM - Year Built



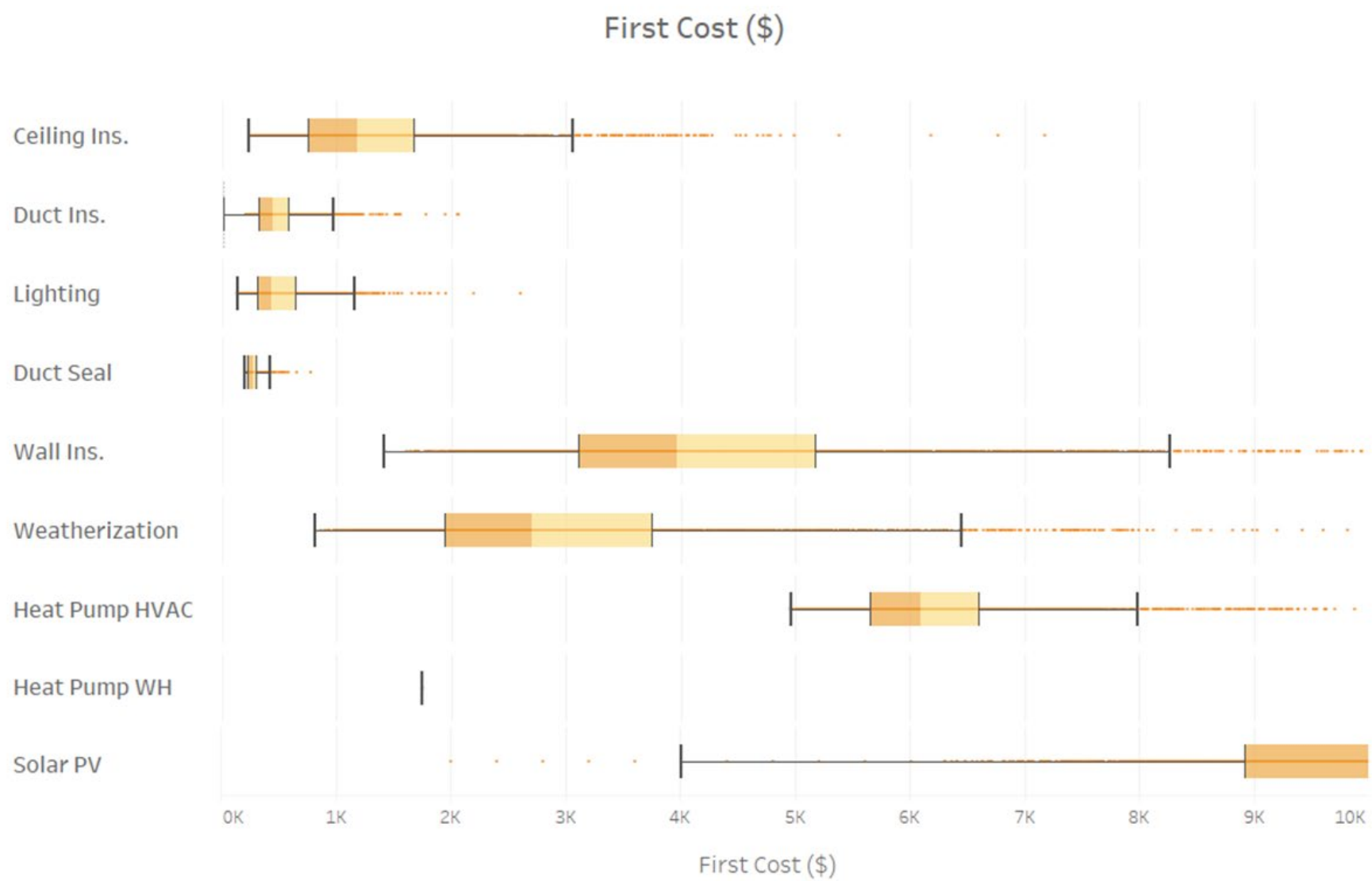
# Energy Savings (GJ) from Various Energy Upgrades Across all homes in Richmond Heights, MO



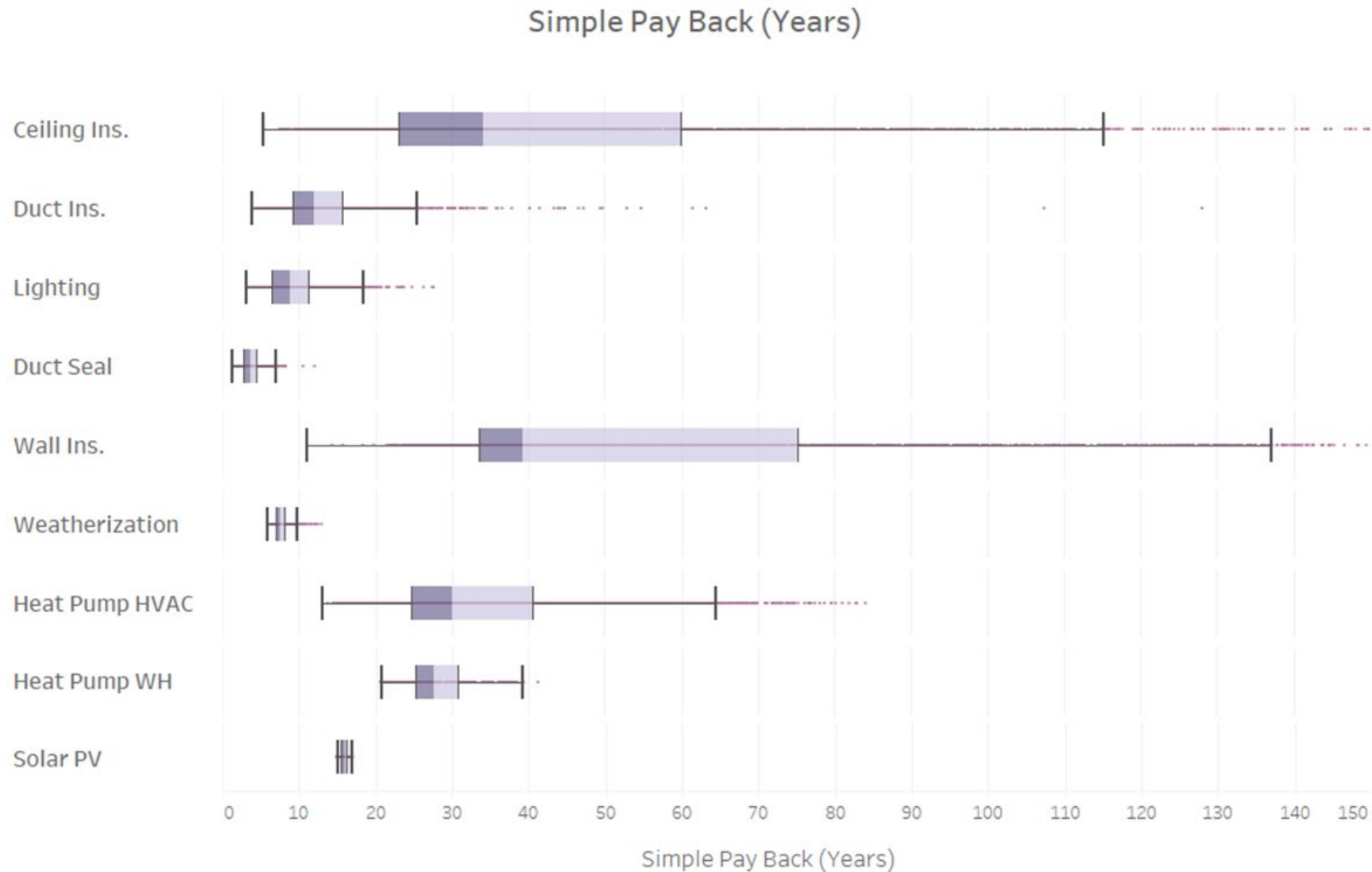
# Annual Utility Bill Savings (\$) from Various Energy Upgrades Across all homes in Richmond Heights, MO



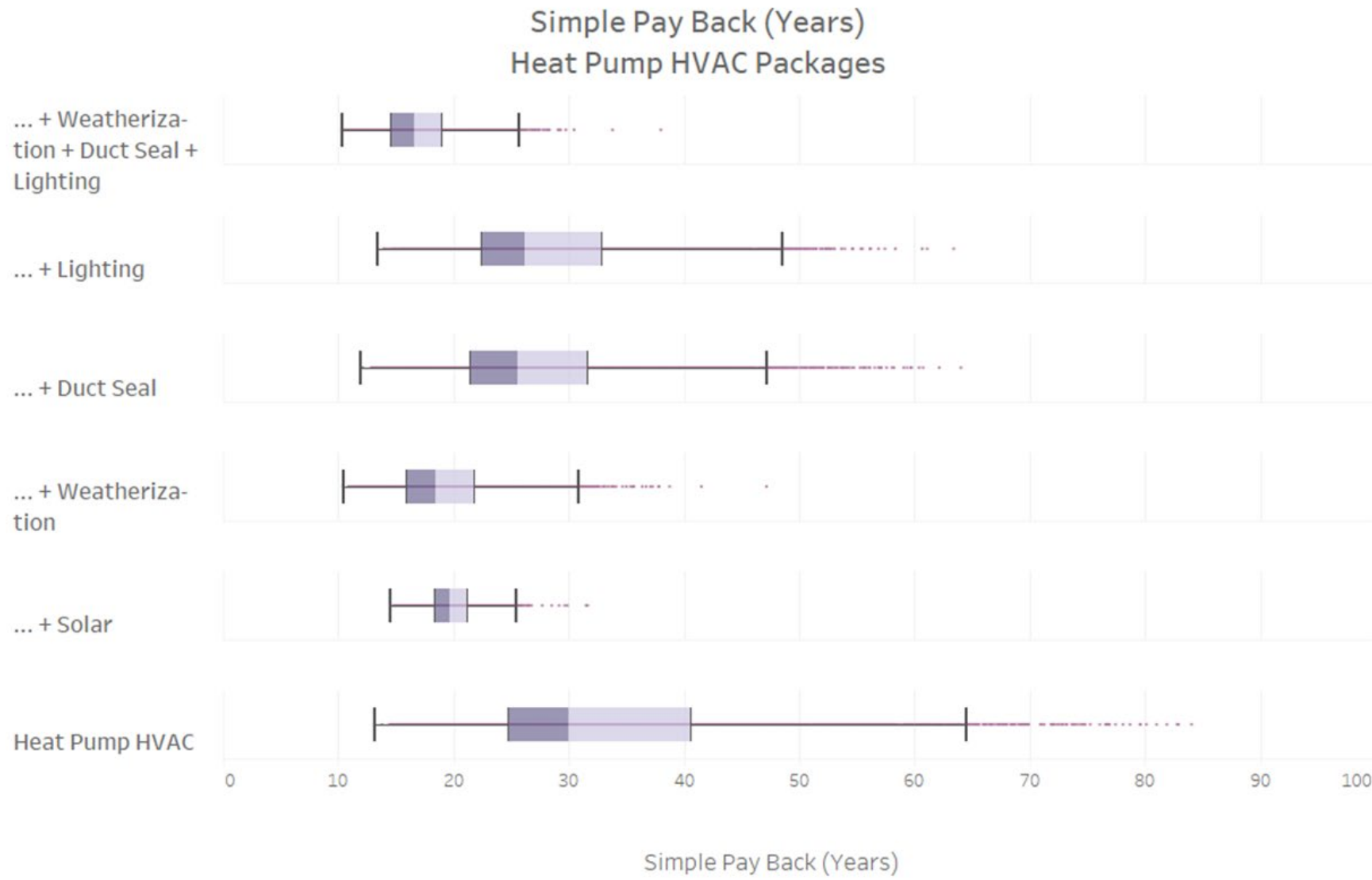
# First Costs (\$) for Various Energy Upgrades Across all homes in Richmond Heights, MO



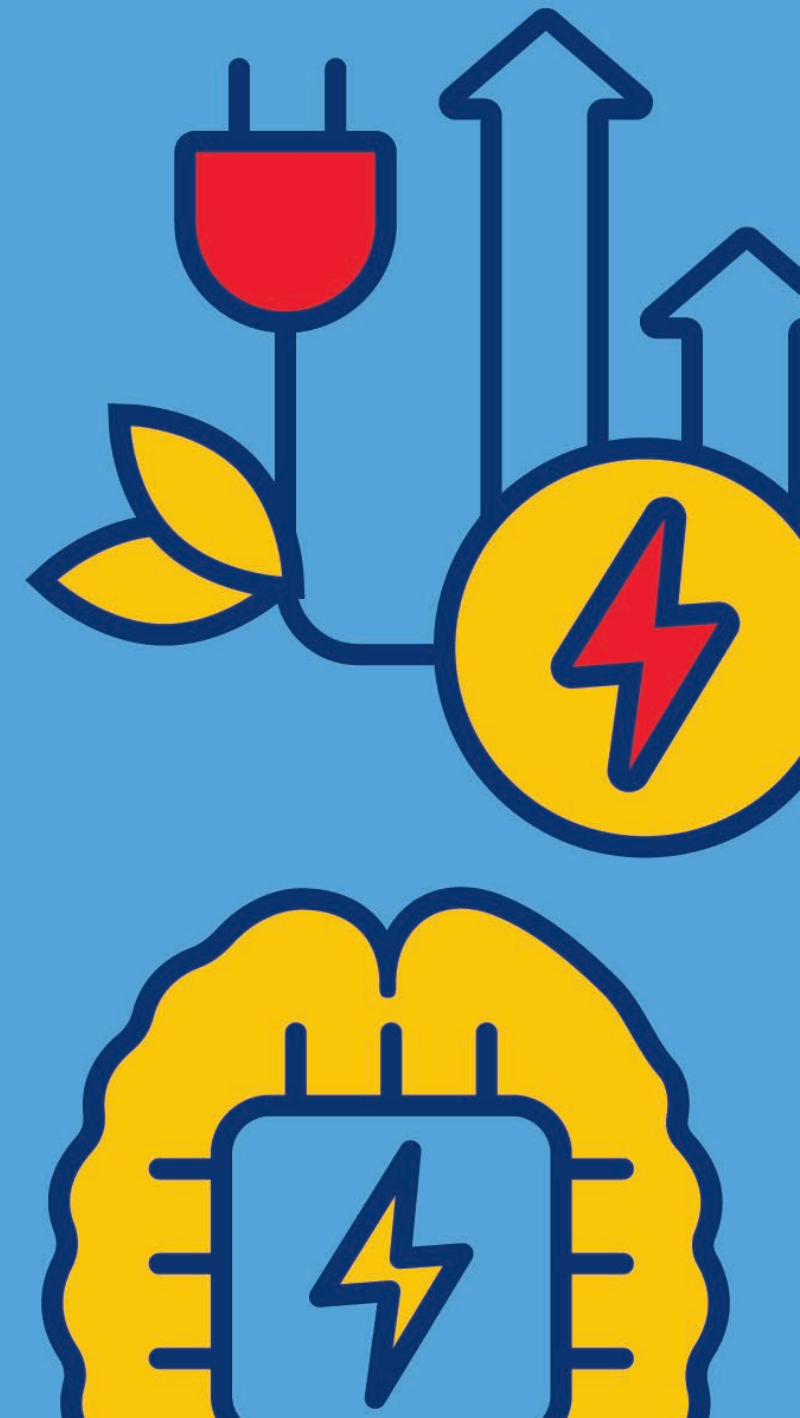
# Simple Payback (yrs.) for Various Energy Upgrades Across all homes in Richmond Heights, MO



# Simple Payback (yrs.) from a Package of HP HVAC and Various Energy Upgrades Across all homes in Richmond Heights, MO



# Energy Upgrade Measures Analysis



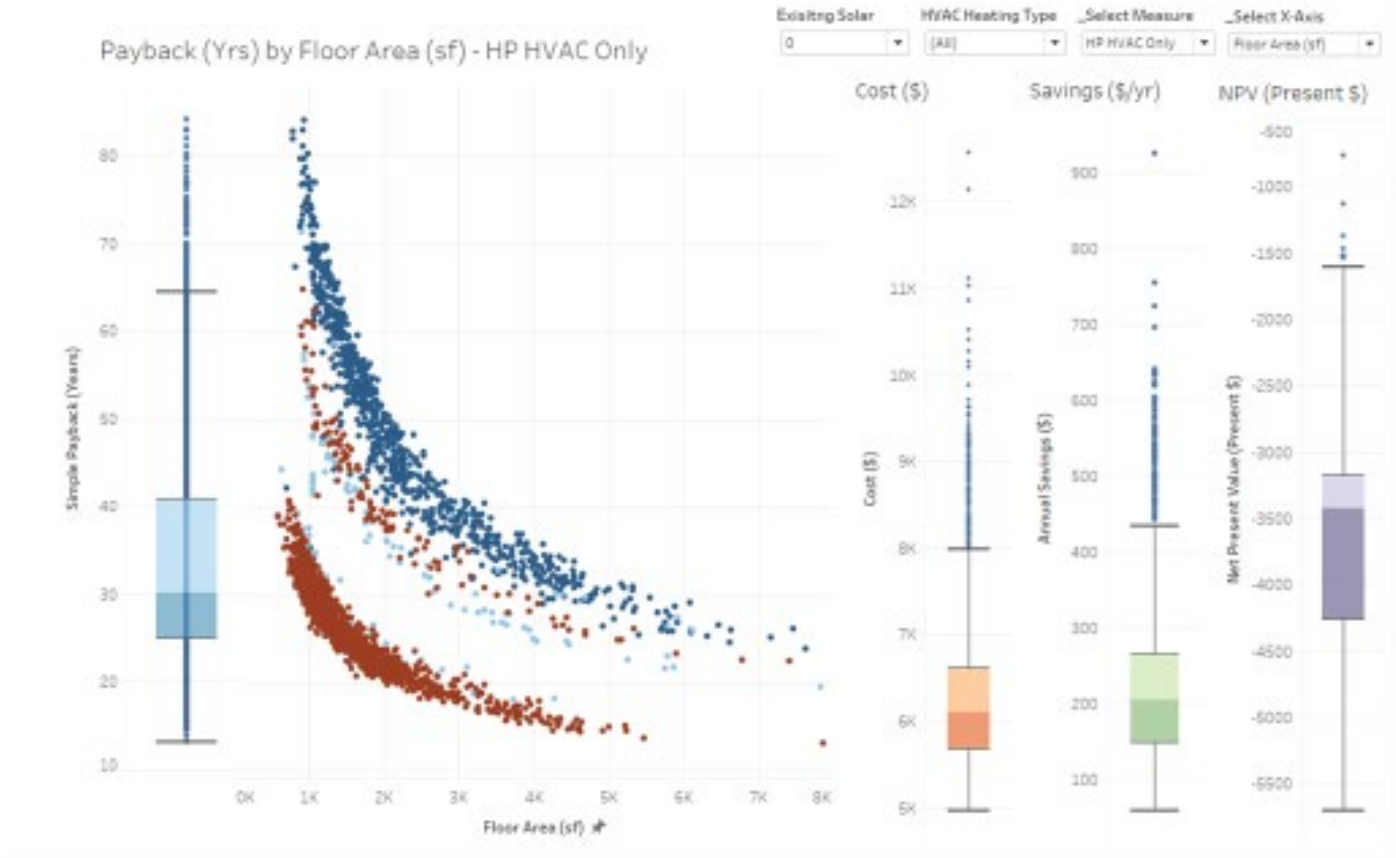




- We further analyzed each energy efficiency measure separately to look at how the simple payback periods distribute over various physical traits of the home such as floor area, vintage etc
  - A Net Present Value (NPV) calculation was done for each measure
  - Data on Simple Payback was plotted against home area
  - Colors used to identify discernable variables that can explain the results
  - Cost and Savings were provided as box and whisker plots



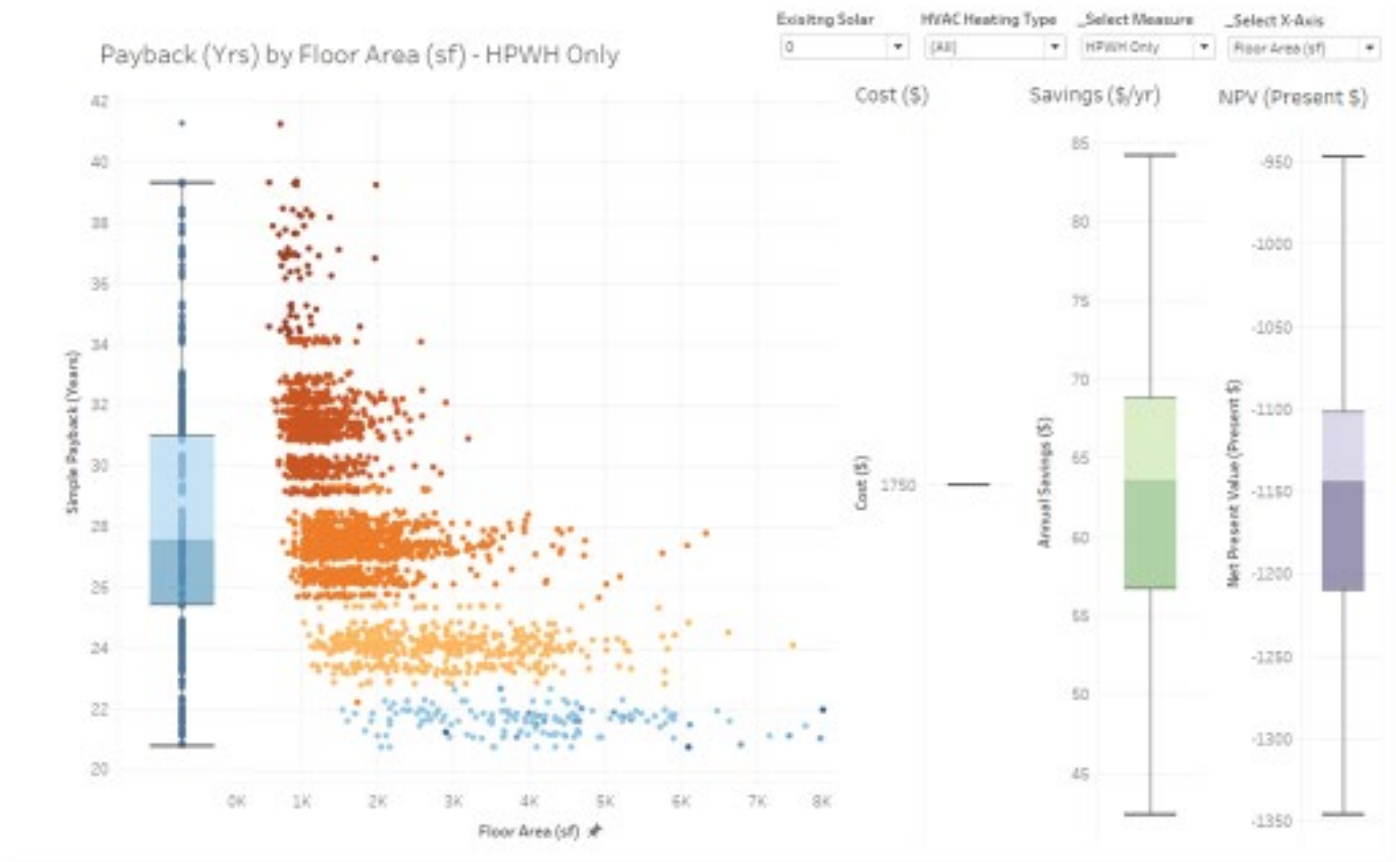
## Heat Pump HVAC Colors Indicate Roof R-Value



# Heat Pump Water Heater Analysis

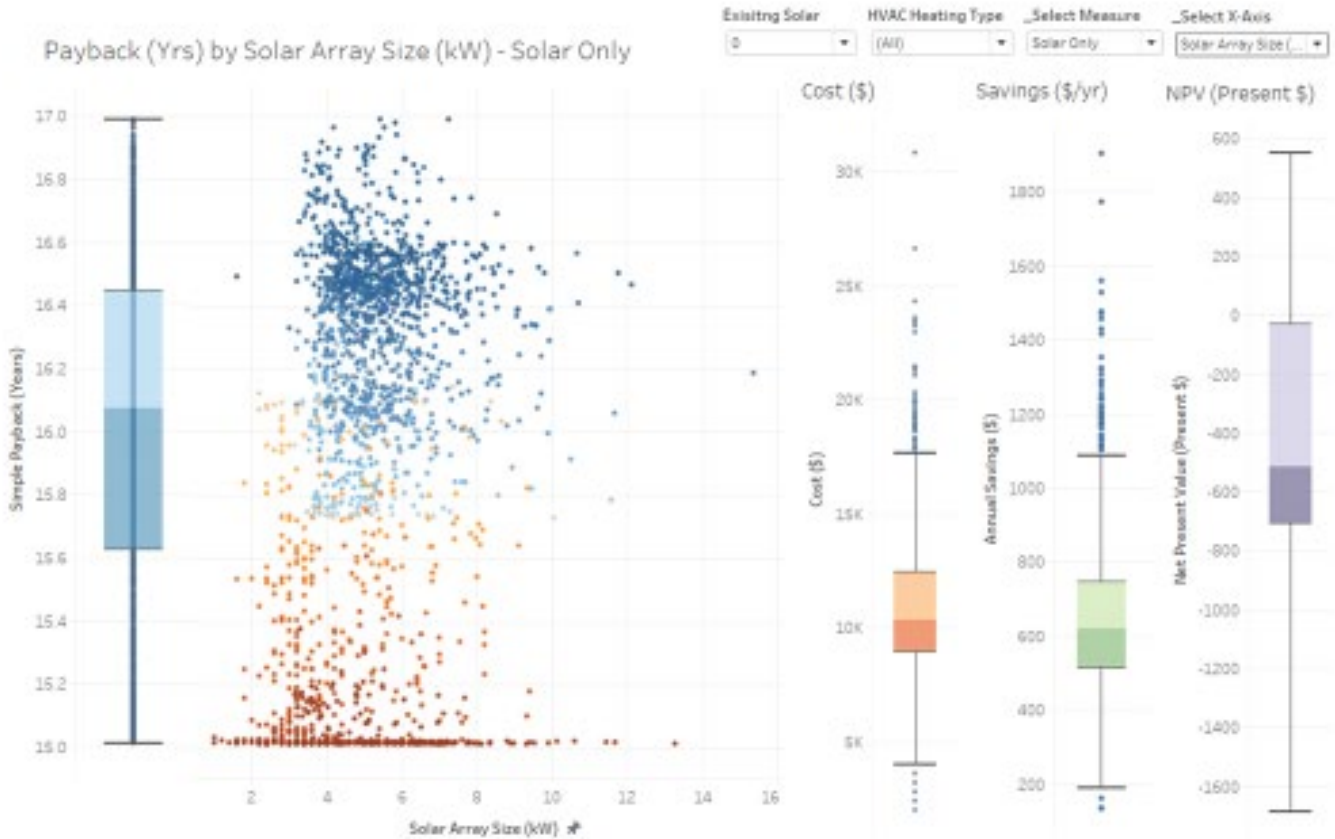


## Heat Pump Water Heater Colors Indicate # of Bedrooms



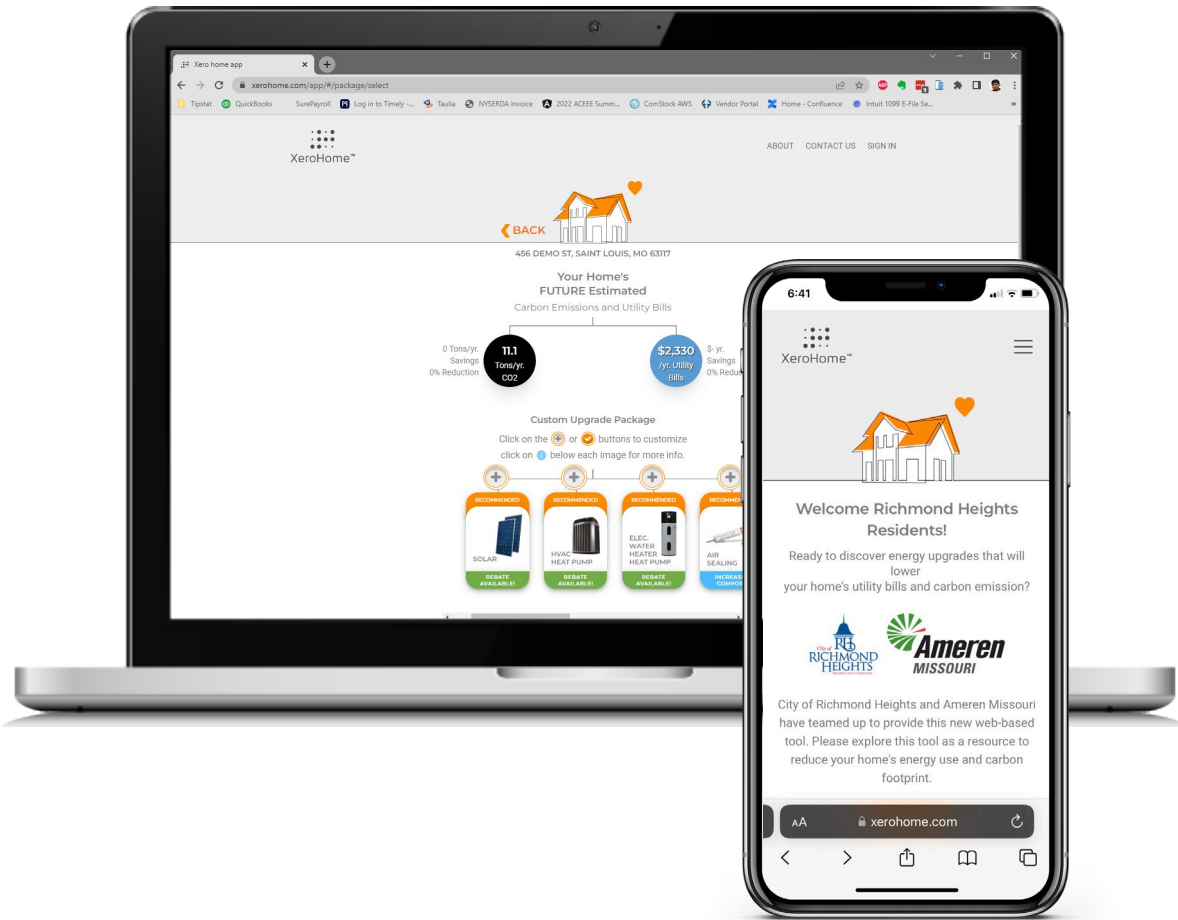


## Solar PV Colors Indicate Roof Orientation



# XeroHome Homeowner Web Portal

# XeroHome - Homeowner Portal Deployment



- The XeroHome portal can be accessed via any browser on a computer or smart phone on <https://xerohome.com>
- The portal was deployed for all homes in Richmond Hts, MO on Sept 2<sup>nd</sup>, 2022

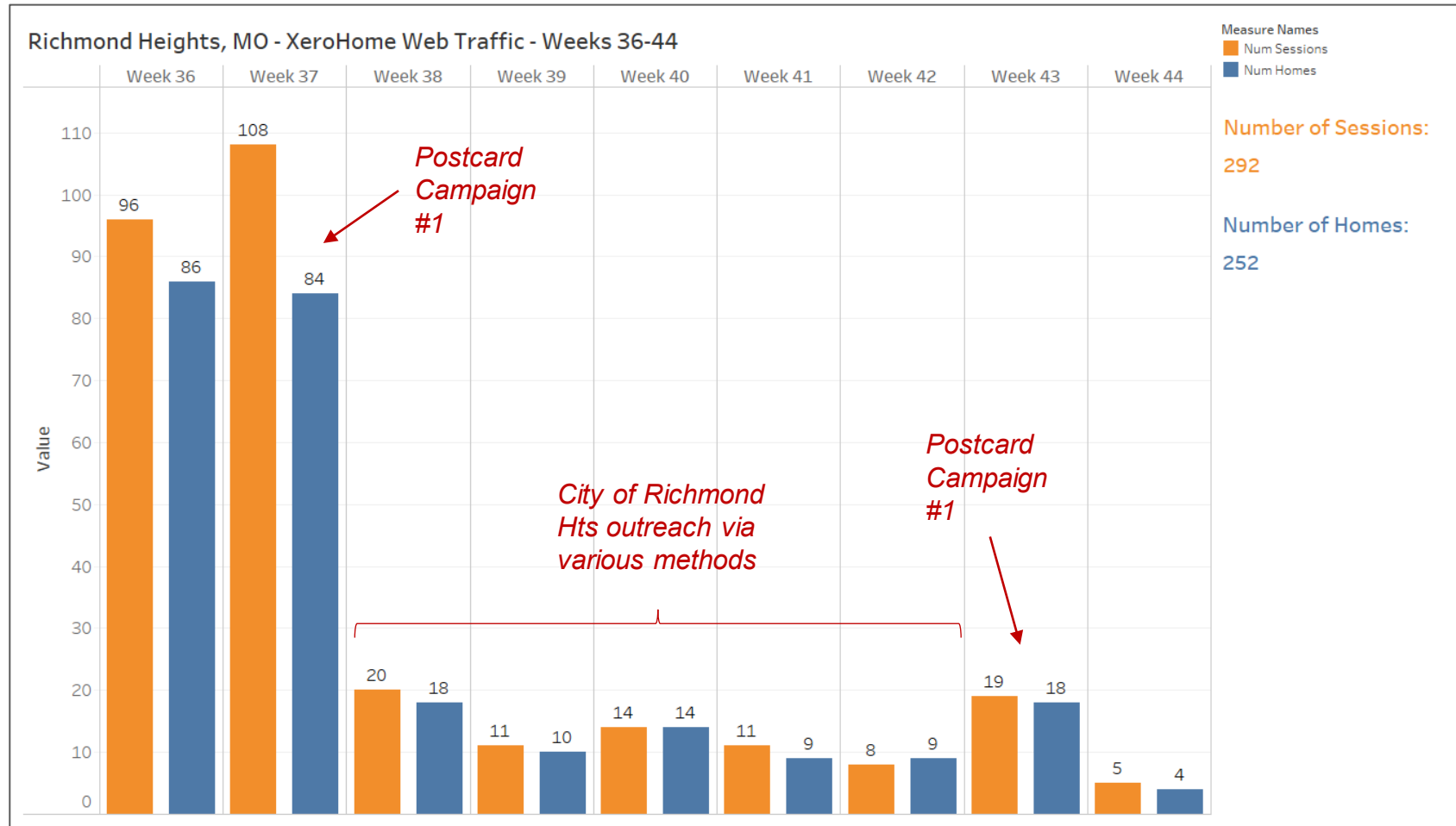


# XeroHome - Homeowner Outreach



- Postcards were sent to all residents of Richmond Heights, MO. On Nov 2<sup>nd</sup> and again on Oct 22<sup>nd</sup>
- City of Richmond Heights mentioned the link in the following media
  - City's website
  - Newsletter (print/digital)
  - Social media posts
  - Community Center monitors
  - National Night Out handouts

# XeroHome Portal – Web Traffic Analysis



- In the first 8 weeks after deployment:
  - There were a total of **292 sessions**
  - In which **252 homes** were searched by Richmond Heights residents

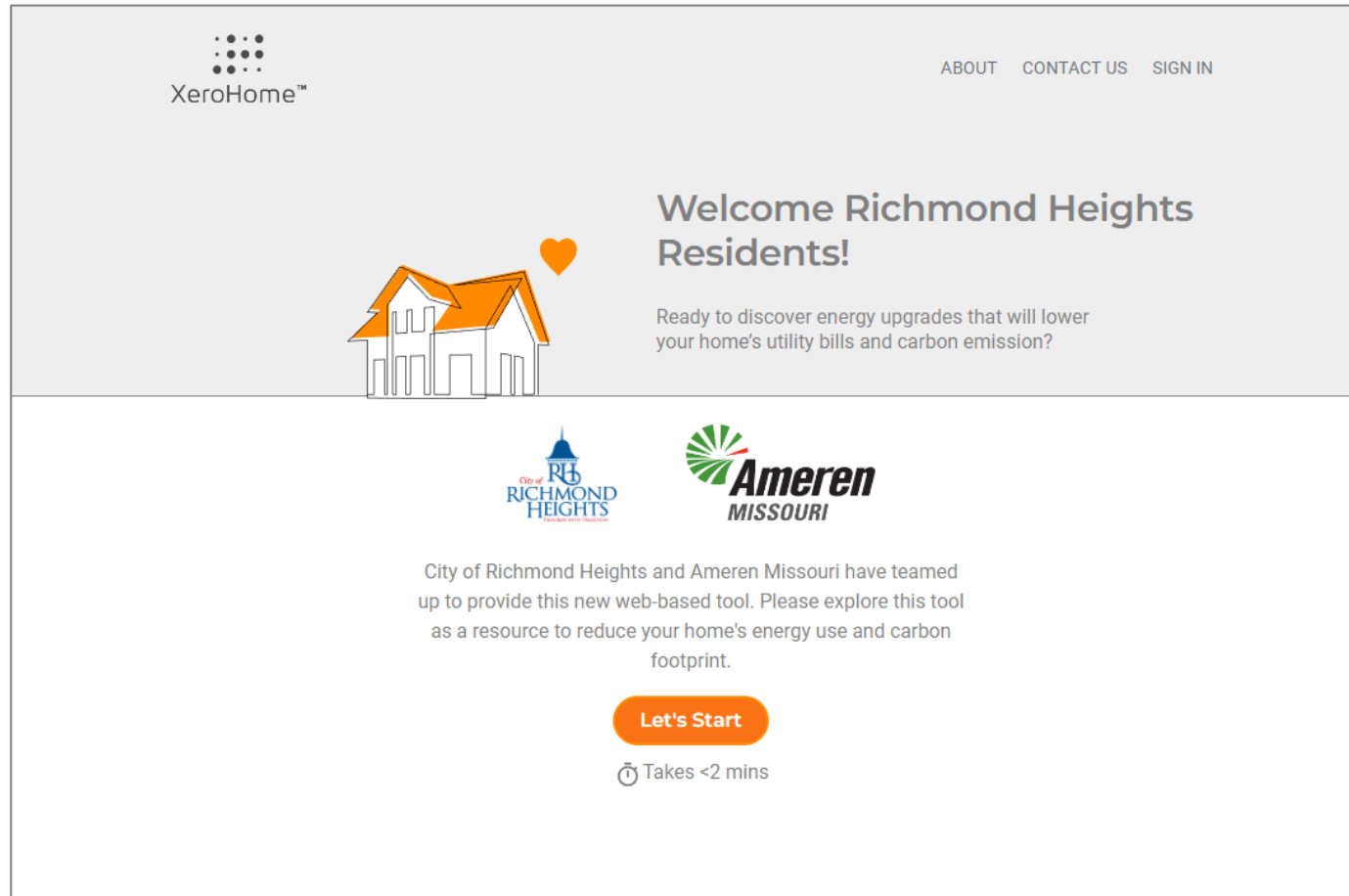


# XeroHome Portal – Web Traffic Analysis



- In the first **8 weeks**, **1 in every 11 homes (i.e., 252 homes)** in the city was on the XeroHome platform

# XeroHome - Homeowner Portal



- Homeowners could type in their Richmond Hts home address and explore recommended upgrades for their home
- Energy savings and carbon calculations are done on individual homes via XeroHome's unique cloud-based building energy modeling platform, which runs the DOE EnergyPlus™ energy simulation engine.

# XeroHome - Homeowner Portal

The screenshot displays the XeroHome Homeowner Portal interface. At the top, the XeroHome logo is on the left, and navigation links for 'ABOUT', 'CONTACT US', and 'SIGN IN' are on the right. The main section is titled 'Custom Upgrade Package' and includes instructions: 'Click on the + or - buttons to customize' and 'click on i below each image for more info.' Below this, three recommended upgrade options are shown in a carousel: '6.6 kW SOLAR', 'HVAC HEAT PUMP', and 'ELEC. WATER HEATER HEAT PUMP'. Each option has a 'REBATE AVAILABLE!' badge and a 'Learn More' link. A horizontal scrollbar is visible below the carousel. Below the carousel, the 'Cost' is listed as '\$20,186 - \$24,223' with a 'Show Breakdown' button. The 'Rebates' section shows 'Up to \$5,200' with a 'Hide Breakdown' button. A table lists specific rebates: 'Ameren Missouri Rebate' for \$550 and 'Solar Federal Income Tax Credit' for \$4,650, each with an external link icon. A disclaimer states that rebates are updated periodically and links may redirect to third-party websites. The 'Investment recovery' is listed as '16 - 19 yrs' with a 'Show Breakdown' button. At the bottom, a 'TAKE THE FIRST STEP!' section asks if the user wants a free, no-obligation package, with 'YES', 'NO', and 'I have a question' buttons.

XeroHome™

ABOUT CONTACT US SIGN IN

Custom Upgrade Package

Click on the + or - buttons to customize  
click on i below each image for more info.

RECOMMENDED

6.6 kW SOLAR

REBATE AVAILABLE!

Learn More i

RECOMMENDED

HVAC HEAT PUMP

REBATE AVAILABLE!

RECOMMENDED

ELEC. WATER HEATER HEAT PUMP

REBATE AVAILABLE!

Learn More i

Cost: \$20,186 - \$24,223

Show Breakdown

Rebates: Up to \$5,200

Hide Breakdown

Ameren Missouri Rebate \$550

Solar Federal Income Tax Credit \$4,650

All rebates and rebate amounts noted here are updated periodically. Above links will redirected you to third party websites that may have more up-to-date and accurate information about these rebates.

Investment recovery: 16 - 19 yrs

Show Breakdown

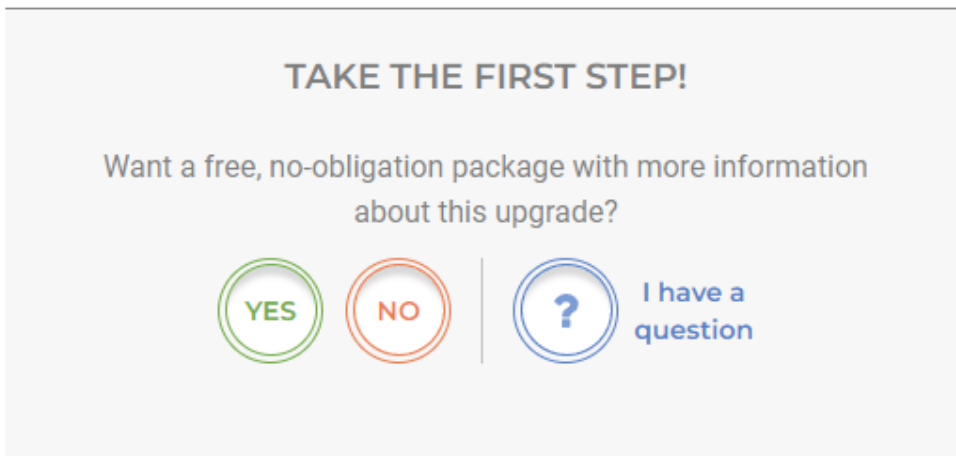
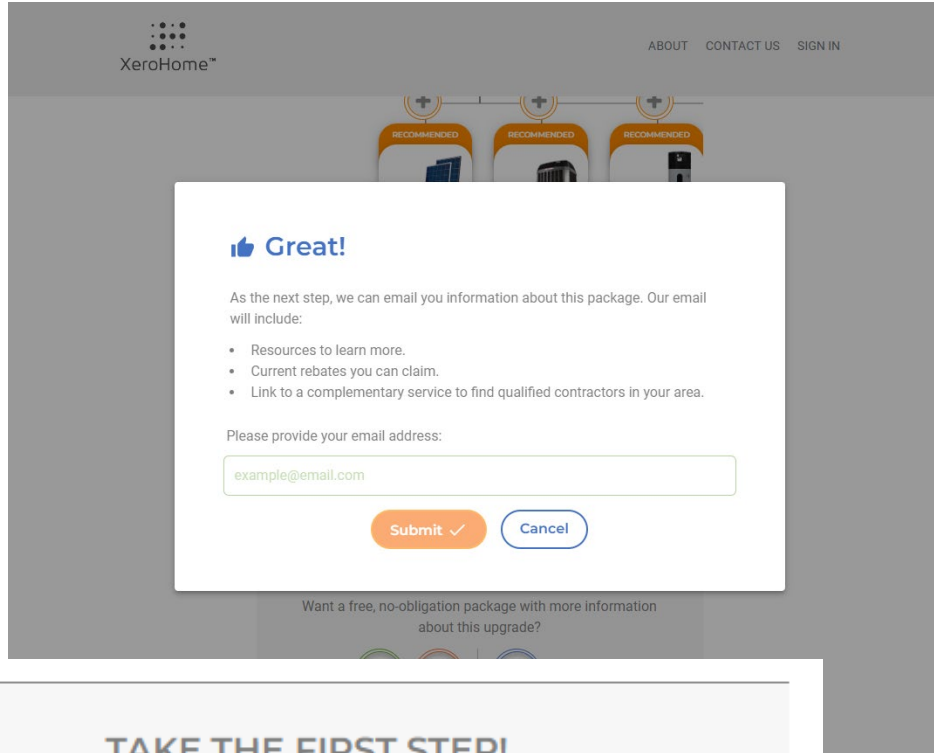
TAKE THE FIRST STEP!

Want a free, no-obligation package with more information about this upgrade?

YES NO ? I have a question

- Homeowners could explore each upgrade measure in detail and combine multiple measures for their home
- Costs, rebates from Ameren Missouri's Residential Energy Upgrade Programs, and investment recovery are provided for the package of measures the homeowner selects.

# XeroHome - Homeowner Portal



- Homeowners could indicate if they were interested/not interested or had a question about their selected measures package
- **Yes** – interested in specific energy upgrades
- **No** – not interested
- **Question** – about the site or a measure which XeroHome team responded to.

# XeroHome - YES Email



## Congratulations on taking the *first step!*

Dear Richmond Heights Resident,

Taking the first step is sometimes the hardest thing. You did it ... and we think that's amazing! You reviewed and selected a package of energy upgrades for your home on:

**456 Demo St., Richmond Heights, MO 63117**

You are now one step closer to making your home a low carbon, high performing, energy efficient home.

This email provides you a summary of the upgrade package you selected on XeroHome, estimated costs, rebates you may qualify for, and help with finding a qualified contractor in your area.

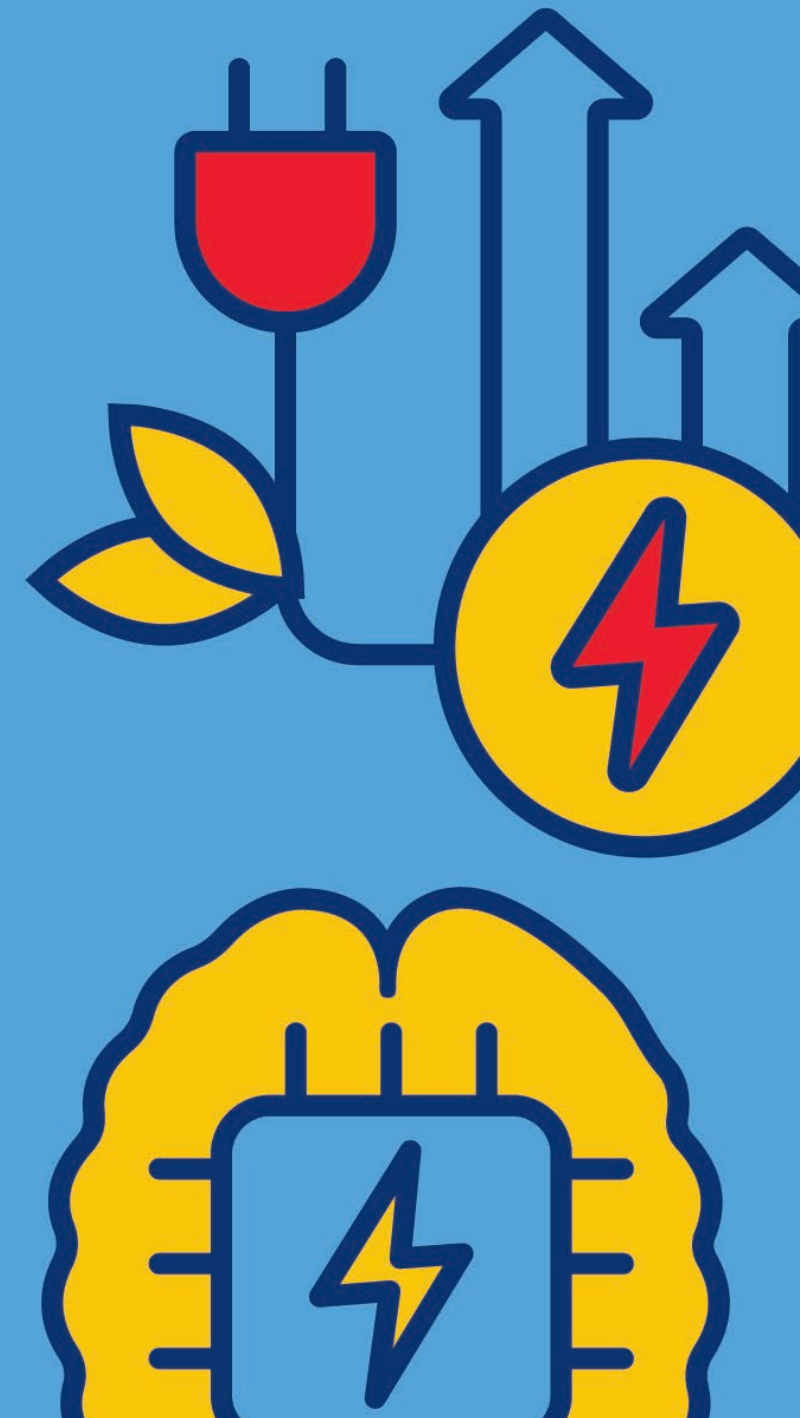
### YOUR UPGRADE PACKAGE:

The upgrade package you selected on XeroHome consists of the following upgrade. Click on the LEARN MORE button to download a US DOE fact sheet about each.

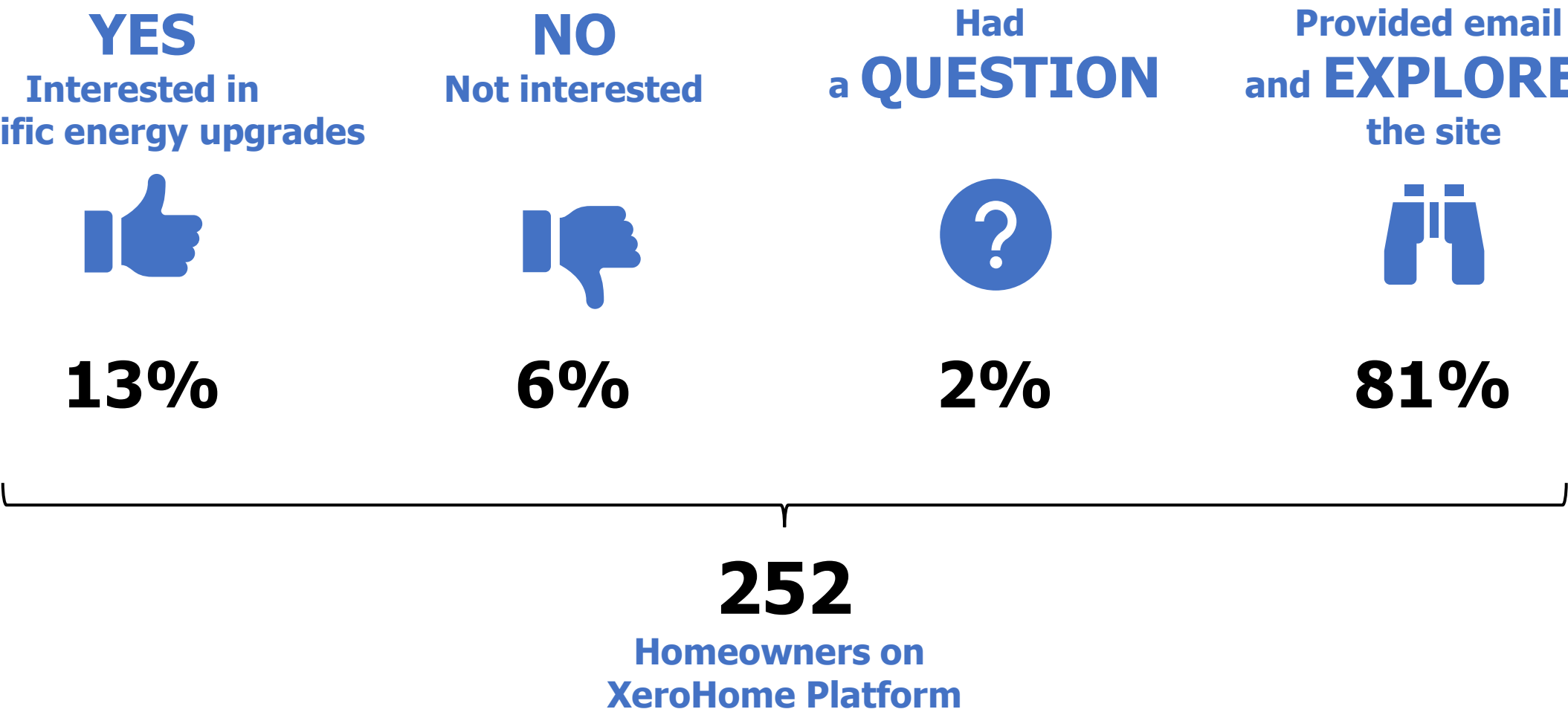


- When homeowners clicked **YES**, they received a detailed email with
  - More information about each upgrade measure
  - Information about cost of each measure
  - Information about rebates
  - Link to website (Ameren) to find a qualified contractor in their region.

# XeroHome Homeowner Engagement Results




# Homeowner Engagement on XeroHome





- Which **energy upgrade measures** were homeowners interested in?

Measures with Ameren  
Missouri Program  
rebates

Efficiency Measure	Number of Homeowners	 CLICKED YES
Heat Pump HVAC	10	
Heat Pump Water Heater	10	
Solar	9	
Duct Sealing	6	
Lighting	5	
Air Sealing	5	
Ceiling Insulation	3	
Radiant Barrier	3	
Wall Insulation	2	
Window Upgrade	2	



Simple payback  
< 10 yrs

Simple payback  
> 10 yrs





- What type of **questions** did the homeowners ask?

Type of Question	Number of Homeowners		
		 CLICKED NO	 QUESTION
UI question/Clarification	4		
Already aware/EEMs installed	3		
Appreciate/Praise	3		
Not interested - Cost prohibitive	3		
Not interested - Not enough savings	2		
Complaint/Dissatisfied	2		
Interested - Rebates	1		

*“Too expensive even with rebates”*

*“Please keep me informed on rebates for solar panels, etc.”*

*“Costs prohibitive at stage of retirement”*

*“Thanks for the information, very helpful”*

*“What is the cost of an electric water heater heat pump?”*

*“I already installed a heat pump last year and received the rebate”*

*“We installed new windows - how much this helps?”*

# Conclusion

# Conclusion

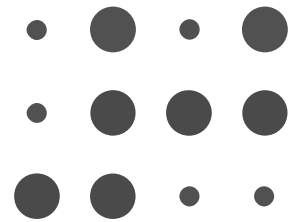


- XeroHome's two-pronged approach was used to
  - Inform and engage homeowners and motivate them to participate in utility residential programs
  - Provide data-driven insights to utility programs so they can better design rebates and be more effective in reaching and converting customers to program participants
- The XeroHome deployment in Richmond Heights, MO showed that this approach can provide effective engagement at the individual scale, and insights at portfolio scale

# Conclusion



- The problem that residential DSM programs face is twofold
  - A large group of audience to target and capture
  - Getting the right recommendation to the right customer on a home-by-home basis is hard to do at scale.
- The XeroHome approach addresses both these issues and opens new possibilities for utility programs to reach customers with better recommendations and specific advice for their homes.



# XeroHome™

Decarbonization . Simplified



## Host Utilities

and collaborators



conEdison, inc.



SOUTHERN CALIFORNIA  
EDISON®

An EDISON INTERNATIONAL® Company



# Thank You

For more information contact:  
Mudit Saxena, CEO & Founder  
916.543.7186  
[msaxena@xerohome.com](mailto:msaxena@xerohome.com)

