



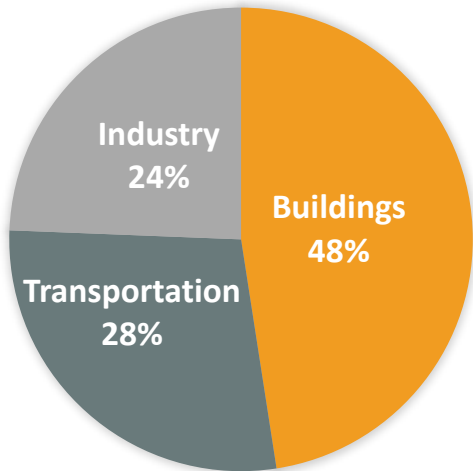
## ORLEANS CITIZENS FORUM

**LEED and Passive House Standards**

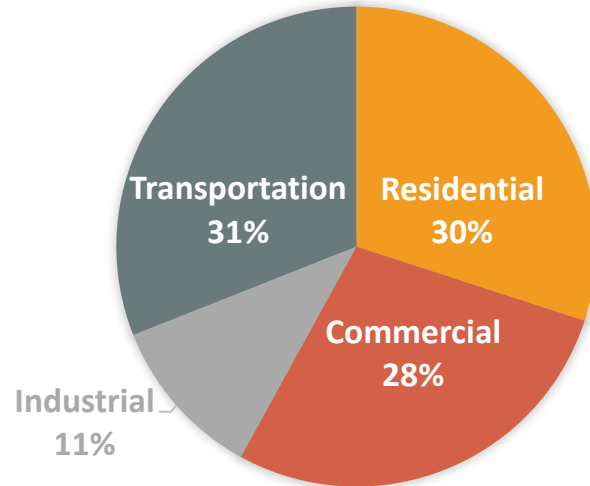
April 2, 2022

# 40% OF GLOBAL ENERGY IS USED IN BUILDINGS

US ENERGY CONSUMPTION BY SECTOR  
2013



MA ENERGY CONSUMPTION BY SECTOR  
2015

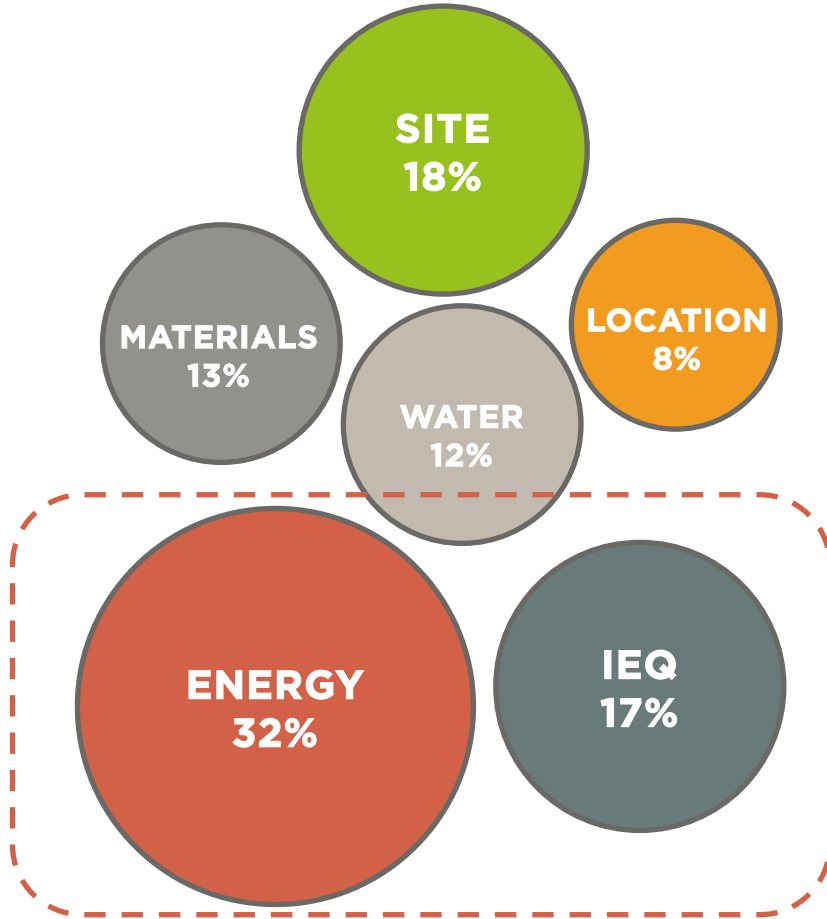


WHY ARE BUILDINGS SO IMPORTANT?



LEED

PASSIVE HOUSE



$$1E-2E-3=0$$

THREE STEPS TO NET ZERO OPERATIONAL ENERGY

- 1 minimize **EUI**
- 2 eliminate **FOSSIL FUELS**
- 3 add **RENEWABLES**

0 achieve **NET ZERO**



# Opportunities to be Greener + Healthier

## PASSIVE STRATEGIES

Solar Orientation

Daylight Harvesting

Self-shading Facades

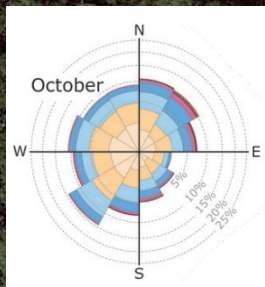
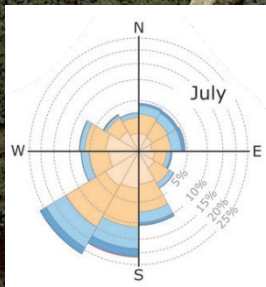
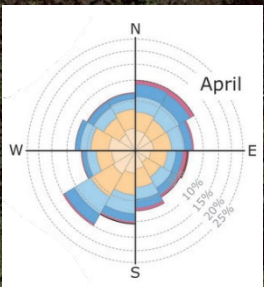
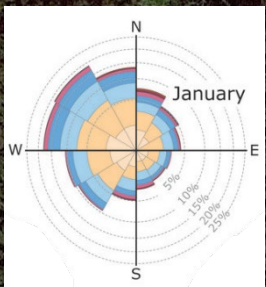
Compact Footprint

Passive House Envelope

Microclimates



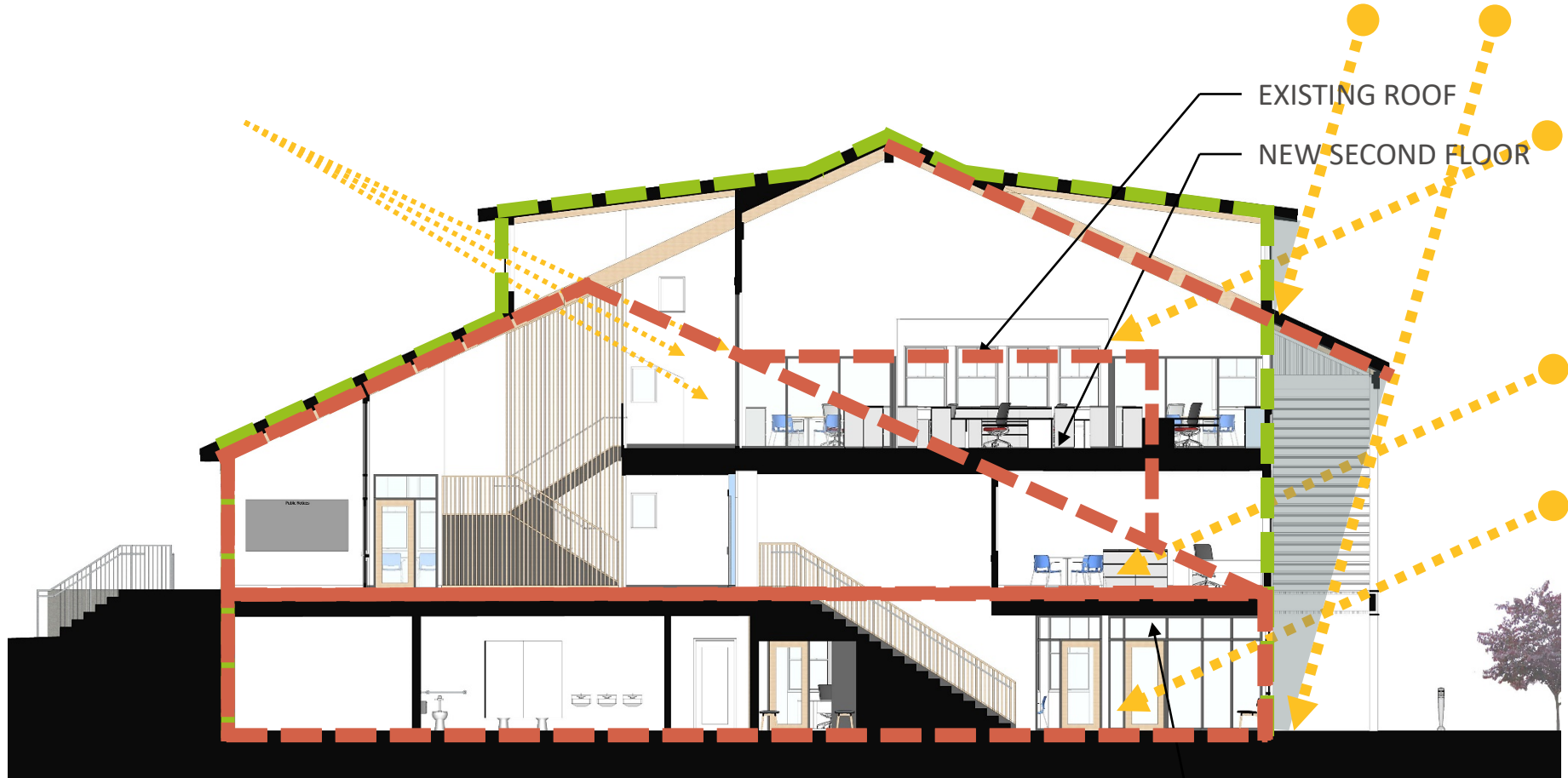




SUMMER SUN PATH

WINTER SUN PATH

BENEFICIAL SOLAR ORIENTATION

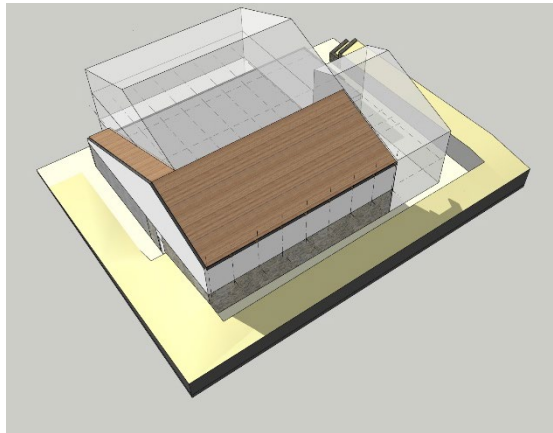
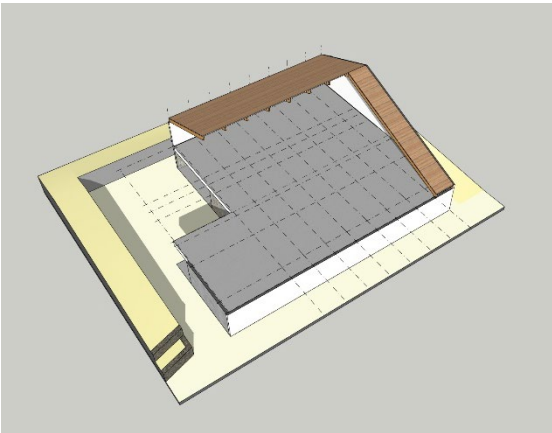
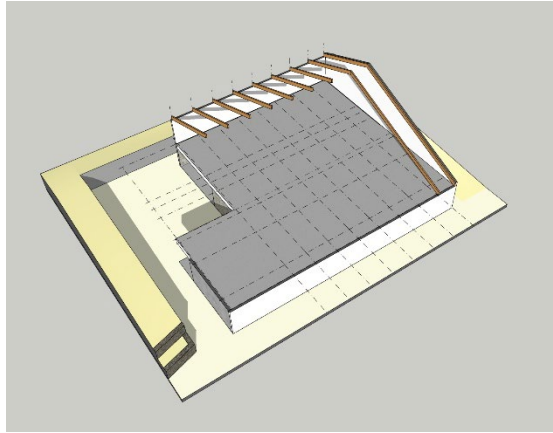
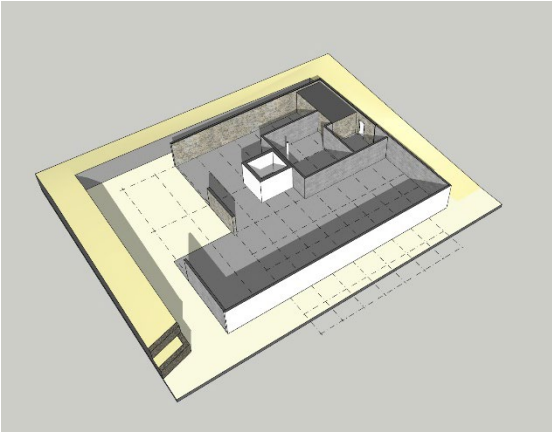


EXISTING GROUND FLOOR

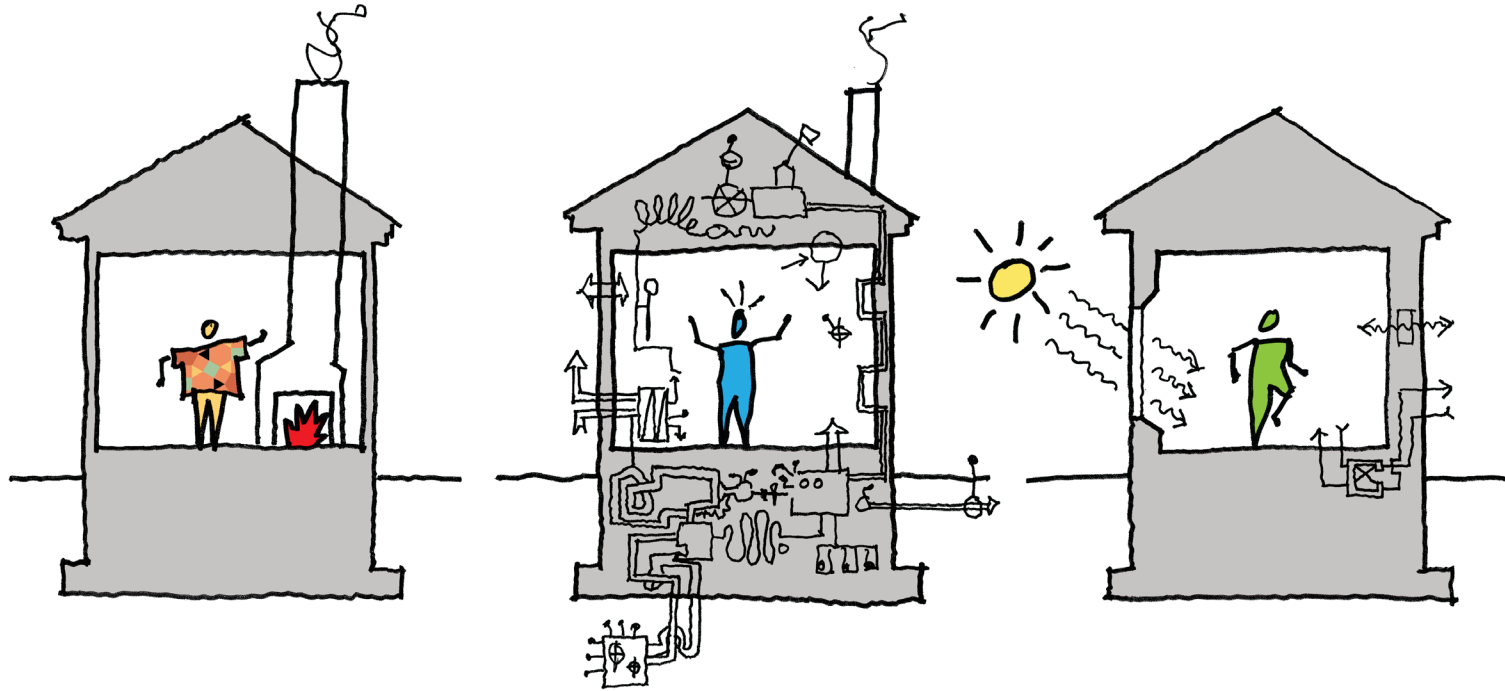
EXISTING FIRST FLOOR







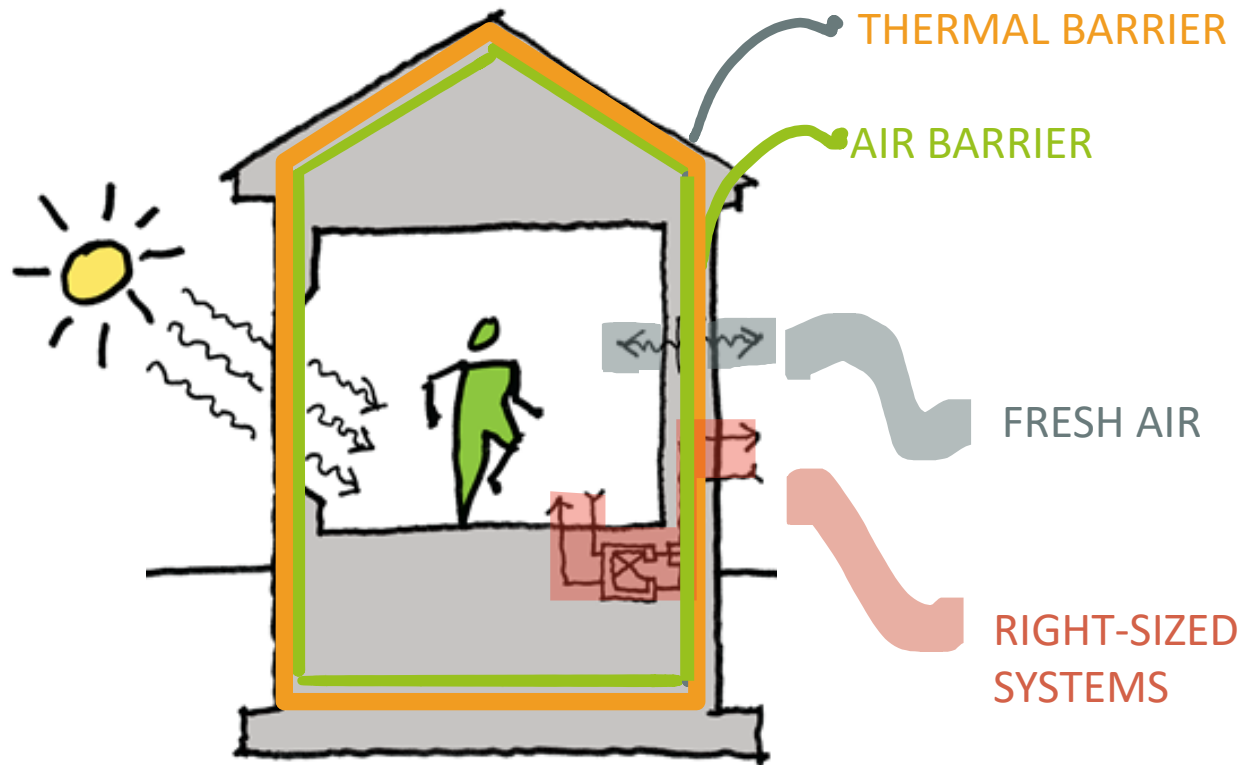
BUILDING REUSE BENEFITS



Credit: Albert Richter Tittmann Architects



PASSIVE HOUSE APPROACH



**Thermal Control**

Minimize thermal bridging  
Optimize solar heat gain



**Air Tightness**

Eliminate Infiltration



**SUPERINSULATED**

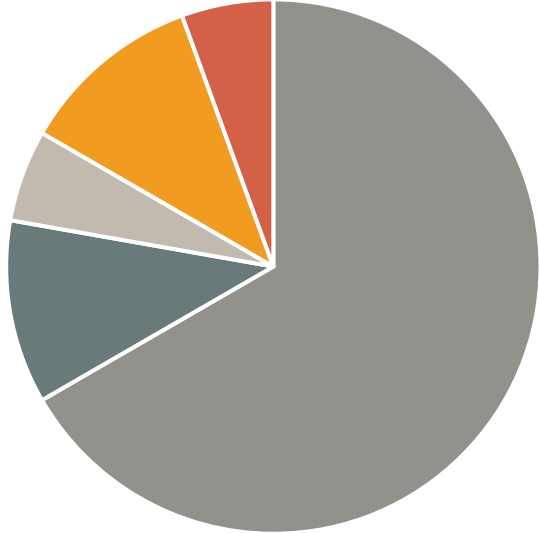


**AIR-TIGHT =**



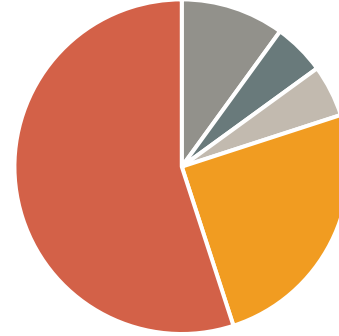
GOAL: RADICALLY LOWER CONSUMPTION

## CODE Energy Footprint



- Heating (active)
- Hot Water (active)
- Cooling (active)
- Household Electricity
- Heat & Hot Water (passive)

## Passive House Energy Footprint



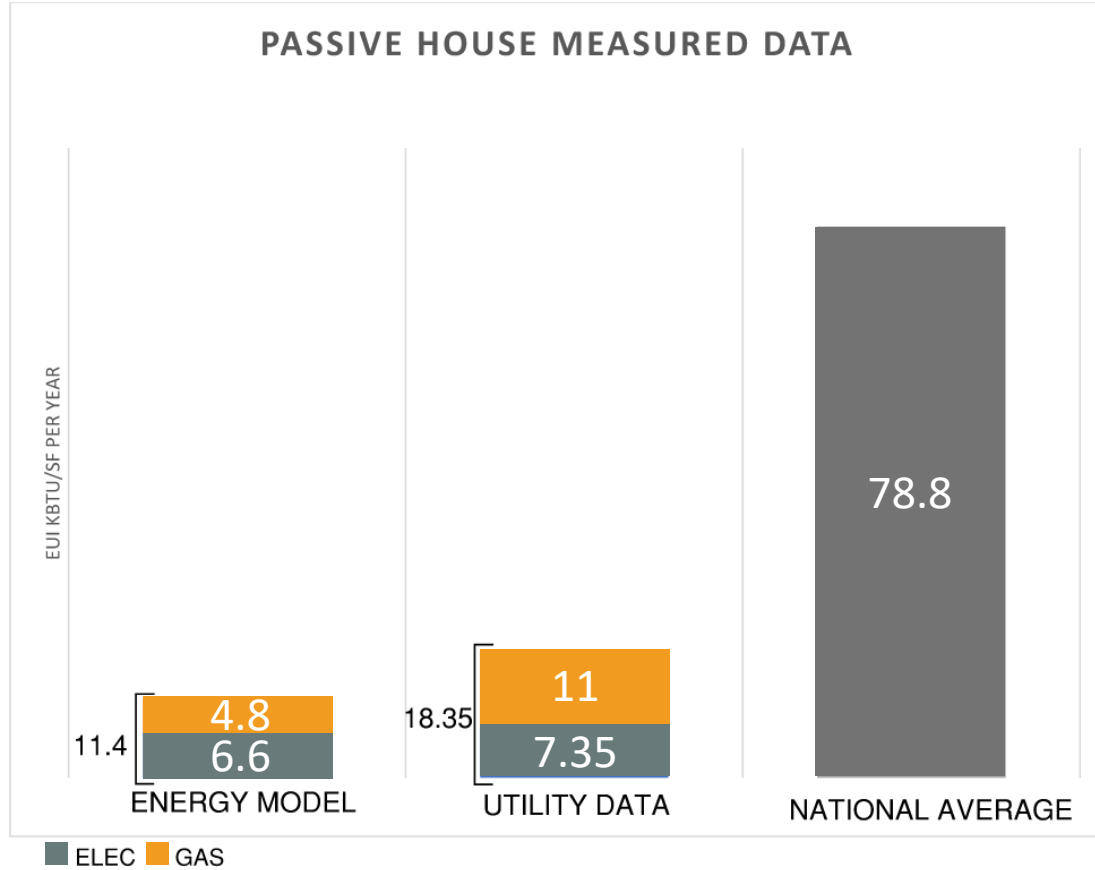
- Heating (active)
- Hot Water (active)
- Cooling (active)
- Household Electricity
- Heat & Hot Water (passive)

**90% less heating energy**  
**66% less total energy**



**GOAL: RADICALLY LOWER CONSUMPTION**

## PASSIVE HOUSE MEASURED DATA



FUNDAMENTALLY LOW OPERATIONAL ENERGY



- **Reduced Carbon Footprint:** Radically low energy
- **Comfortable:** No drafts or temperature swings
- **Healthy:** High Quality, Continuously filtered Air
- **Resilient:** Extreme Thermal Stability
- **Affordable to Operate:** Low Utility Bills for life



## Opportunities to be Greener + Healthier

### ACTIVE STRATEGIES

No Fossil Fuel / All Electric Mechanical System

Lower Operational Costs

Continuous Ventilation

Photovoltaic Panel Ready



**QUESTIONS?**

