GreenLEAF Community
ENPRO 358

Our Objective

Design a residential community for:

- **Comfort**
- **Affordability**
- **Efficiency**
- **MARKETABILITY**

GreenLEAF – Green Living. Efficiently and Affordably for Families

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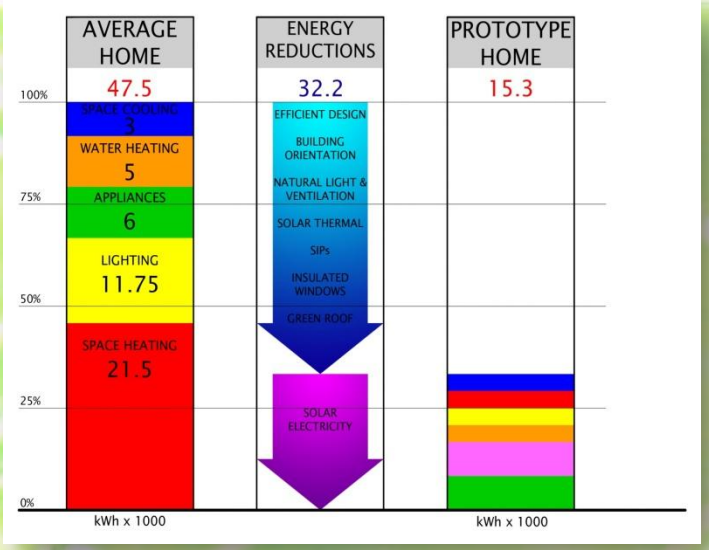
Project Evolution



- Third Semester
  - IPRO 323 (Fall 2009)
    - Zero CommunIITy – Developed an almost completely self sustaining house

  - IPRO 358 (Fall 2010)
    - Green Class Community – Expounded upon 323's ideas and further reduced energy consumption

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THE TEAM

Team Coordinator

Joshua Hasbrouck

Design Team

Coordinator: Antonio Gutierrez

Members:
Samantha Leach
Iryna Yanyshyn
Alec Weege

Technical Team

Coordinator: John Allen

Members:
Sukmin Lee
Se Yen Lai
Joshua Hasbrouck
Ying Xiao

Marketing Team

Coordinator: Anthony Scatchell

Members:
Ying Xiao
Sarah Czapla

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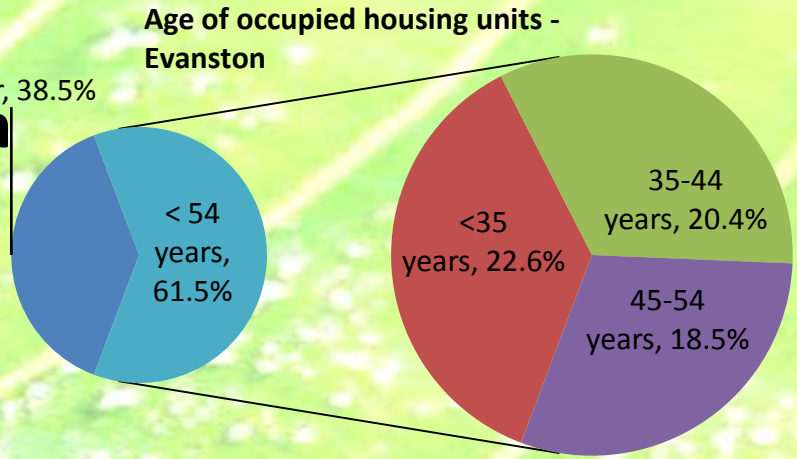
Market Research

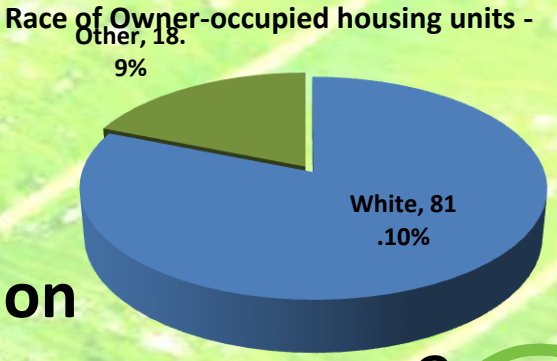
- **Target Market:**

High Education → High Income → High Concern

  - Mostly 2-person households
  - 1 or less occupants per room
  - 3 bed-rooms are popular



- **Survey added information**
  - Garage
  - Central Park
    - Garden
  - Home Control System re-evaluation



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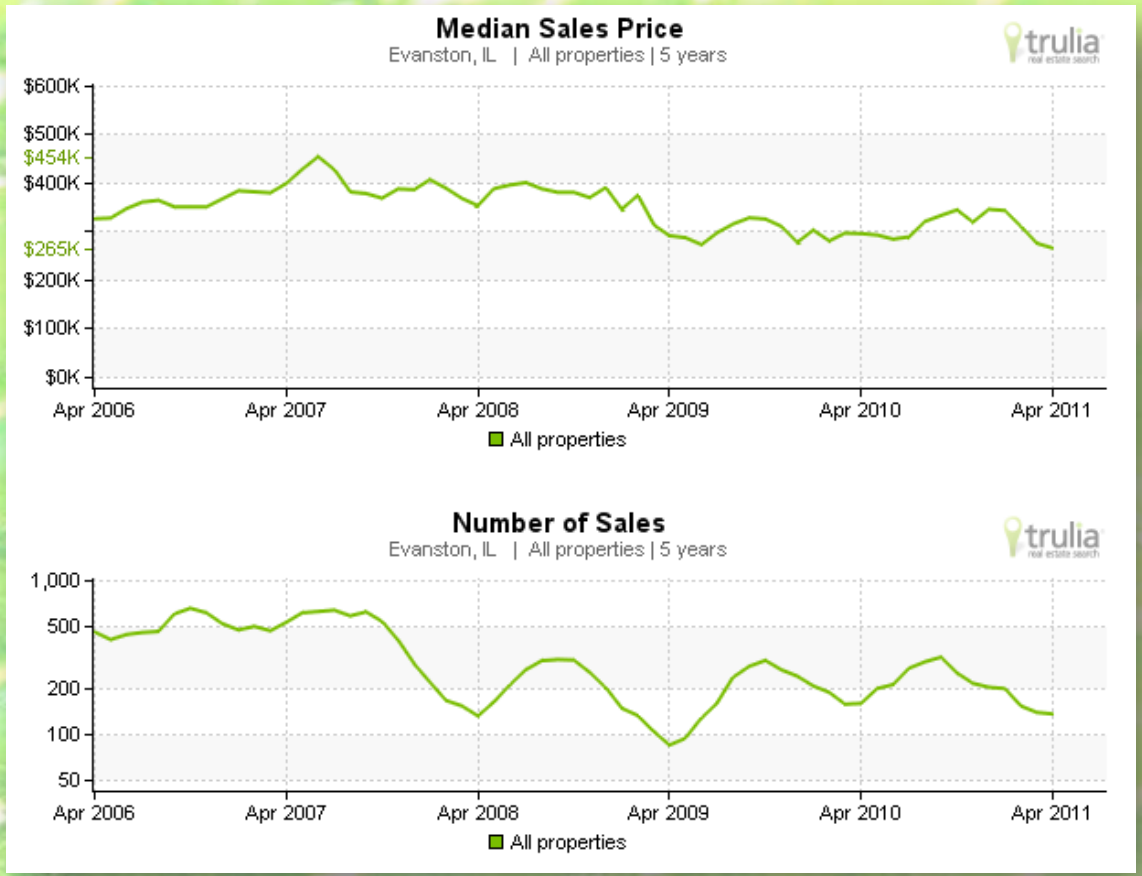
Industry Information

- **Where is market heading?**
- **Price-sensitive consumers**
- **Average listing price**
- **What about eco-friendly?**
- **Environmentally friendly …with focus on savings**
- **Upfront costs repaid**



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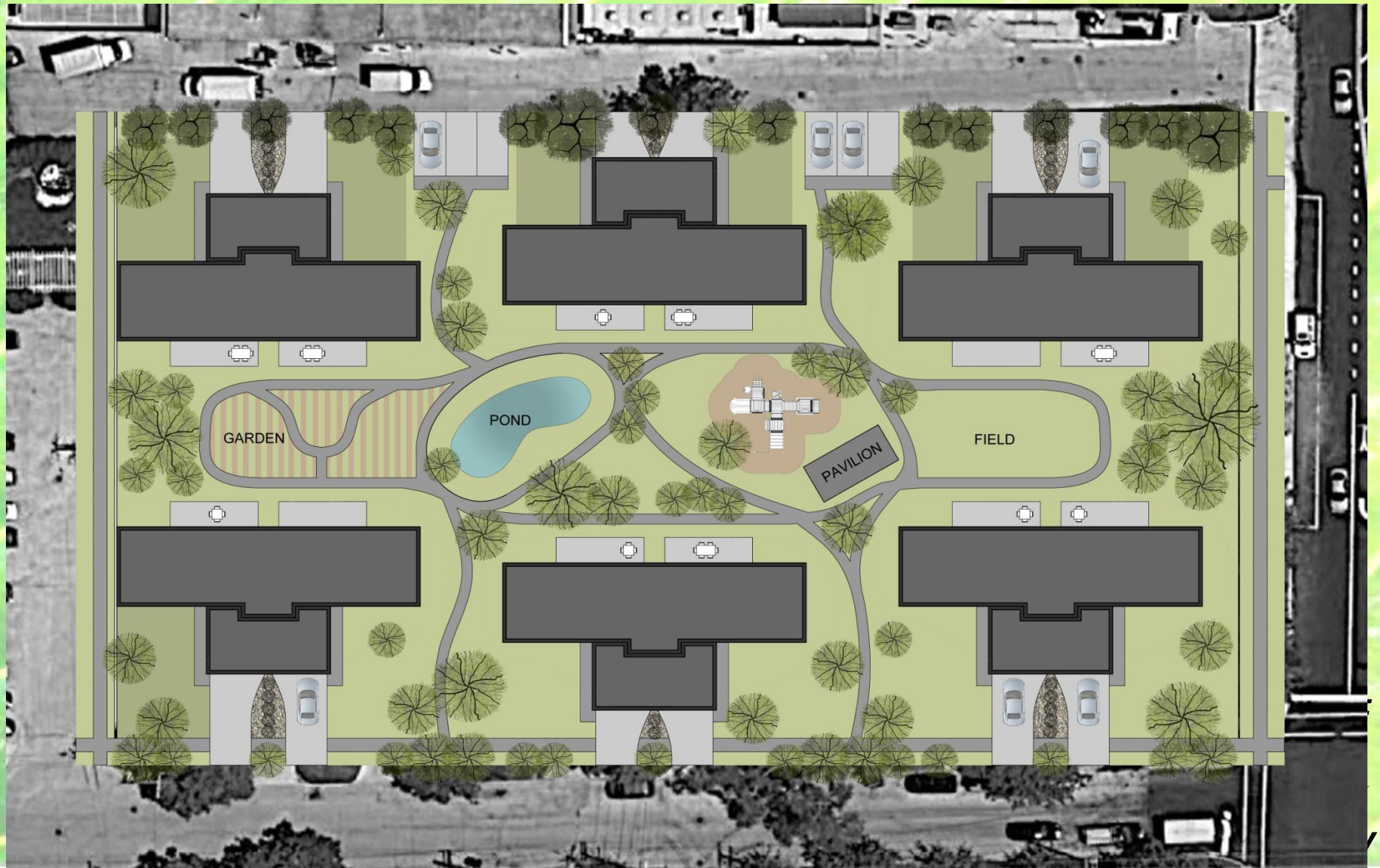
Site Plan

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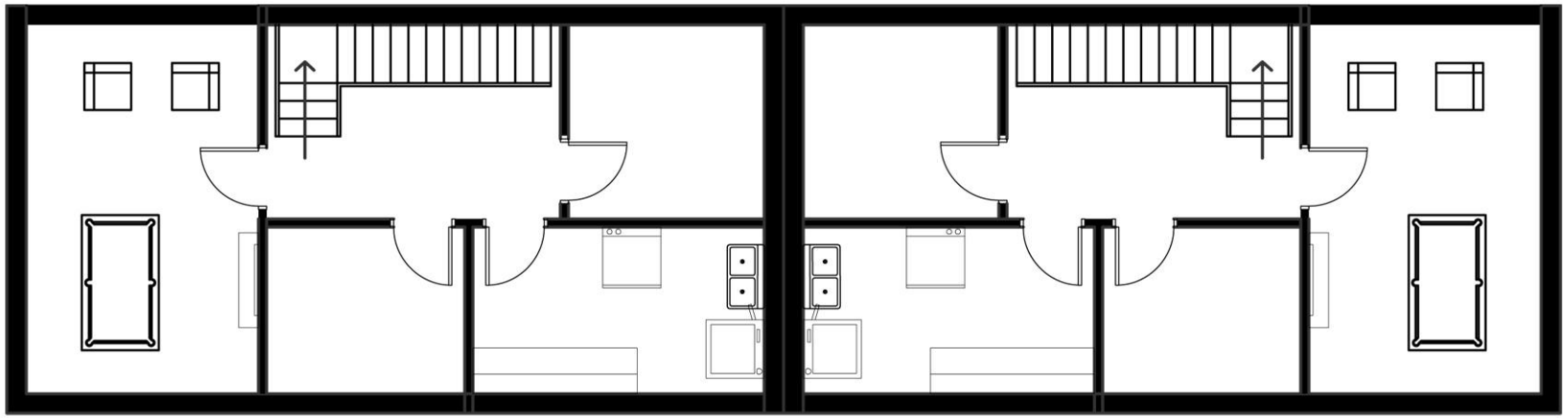
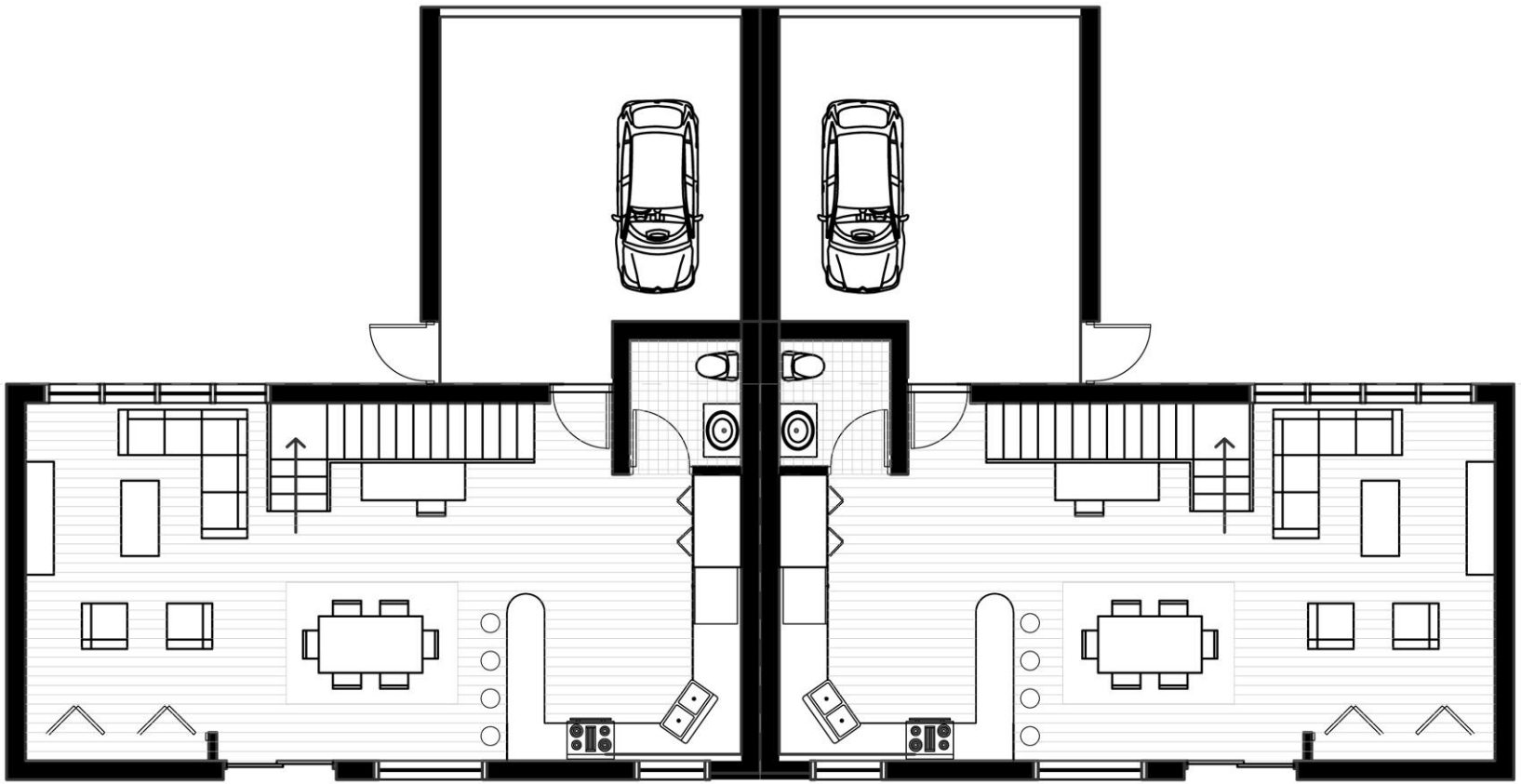
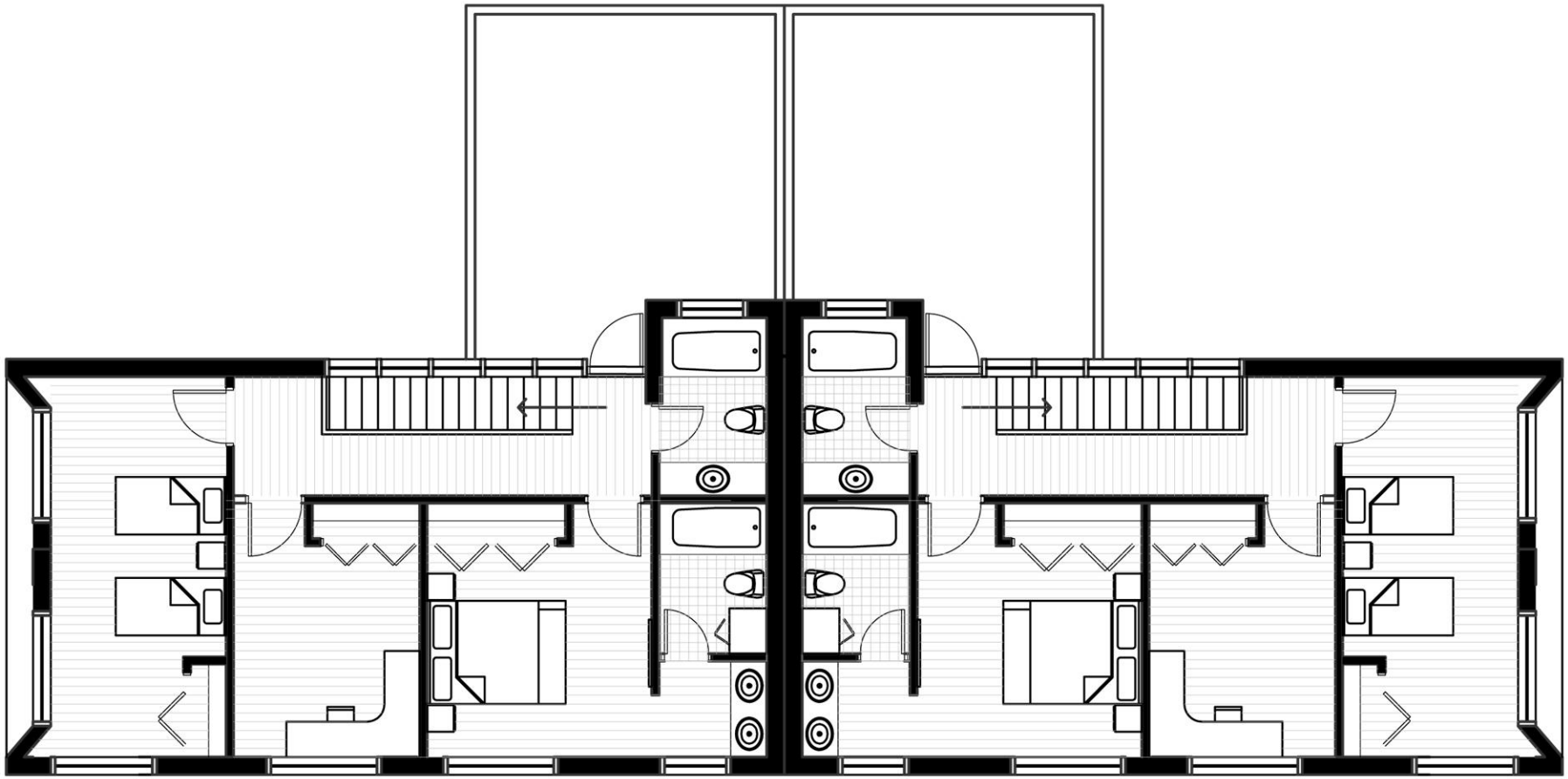
Basement Level



Ground Level



Second Level

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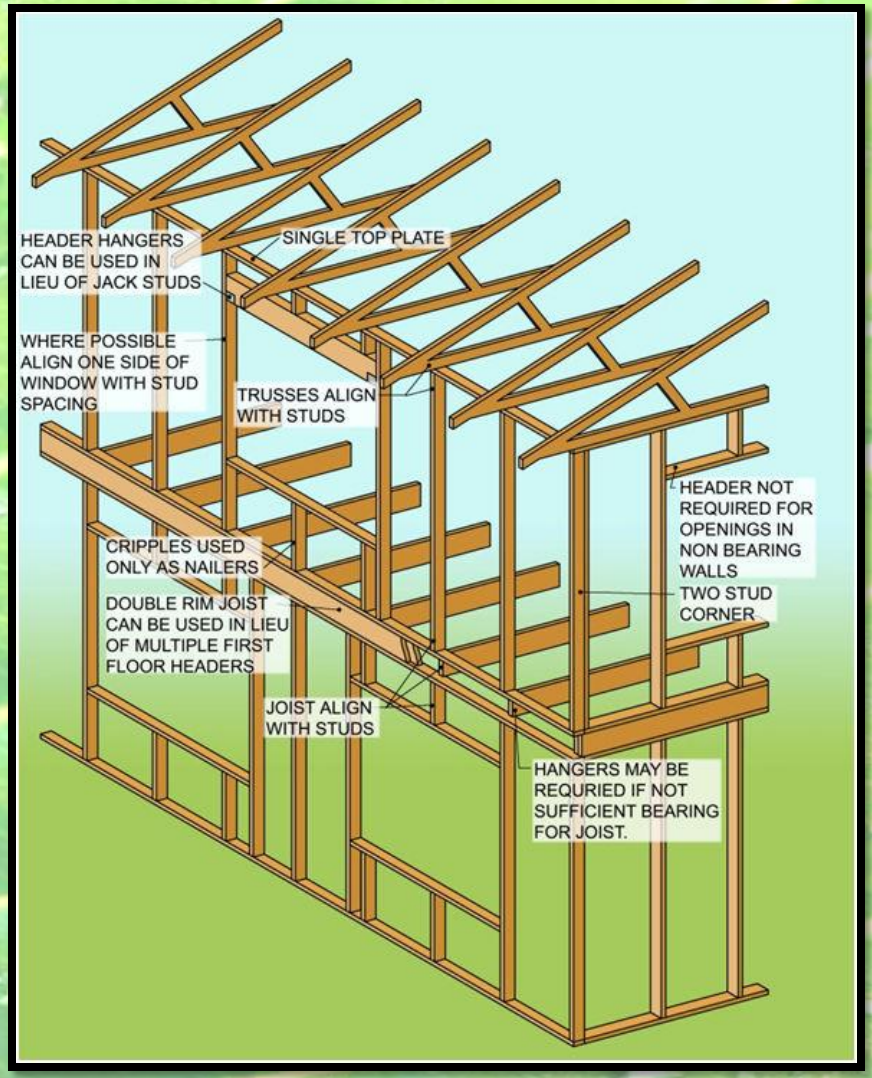
Building Envelope



Advanced Framing

- ❑ **Less wood, more cost effective**
- ❑ **Less heat loss**

R-28 Blown Insulation

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Passive Design

High Efficiency Windows

- ❑ **Double Low E**

Window shades (automatic)

- ❑ **Reduce unnecessary solar heat gain in summer months**

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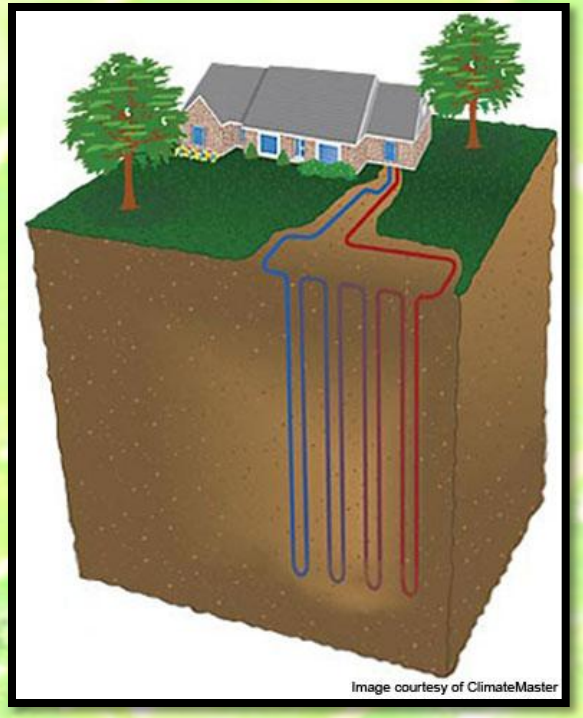
Active Systems



Geothermal (GSHP)

- ❑ Extremely efficient
- ❑ Used in both heating and cooling applications
- ❑ Serves as a preheater to domestic hot water

Solar Hot Water Heating Panels

- ❑ Carries demand for domestic hot water

Energy Recovery Ventilator (ERV)

- ❑ Extracts heat from exhaust air and heats intake air used in ventilation
- ❑ Controls humidity in house

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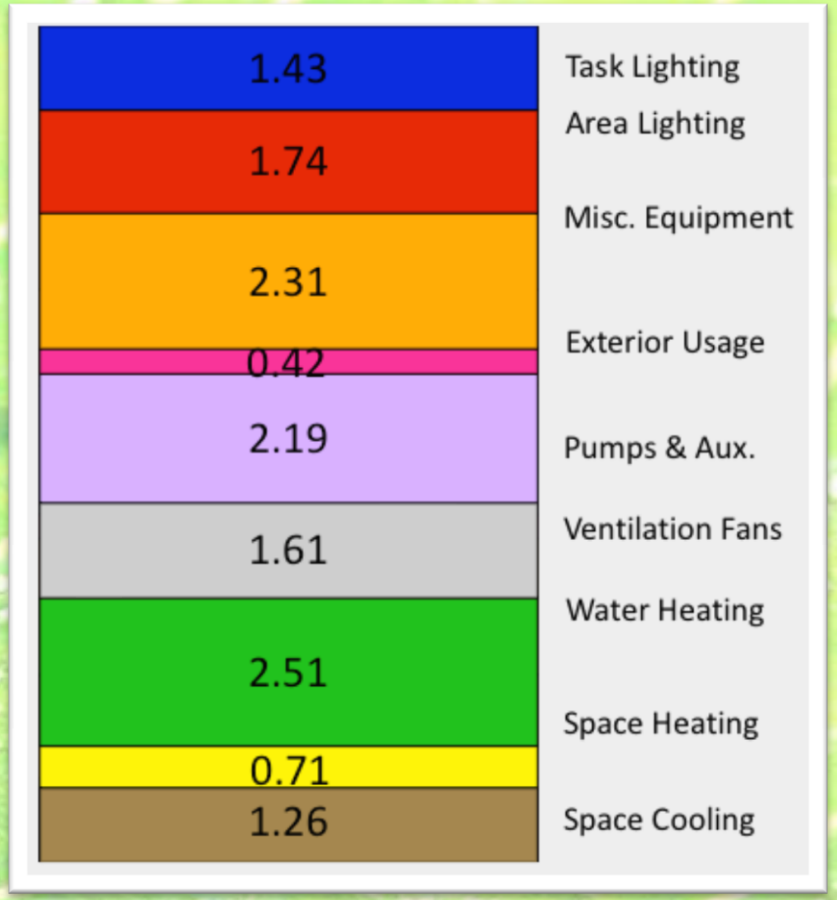
Energy Use

11,430 kWH

ANNUAL ELECTRIC CONSUMPTION



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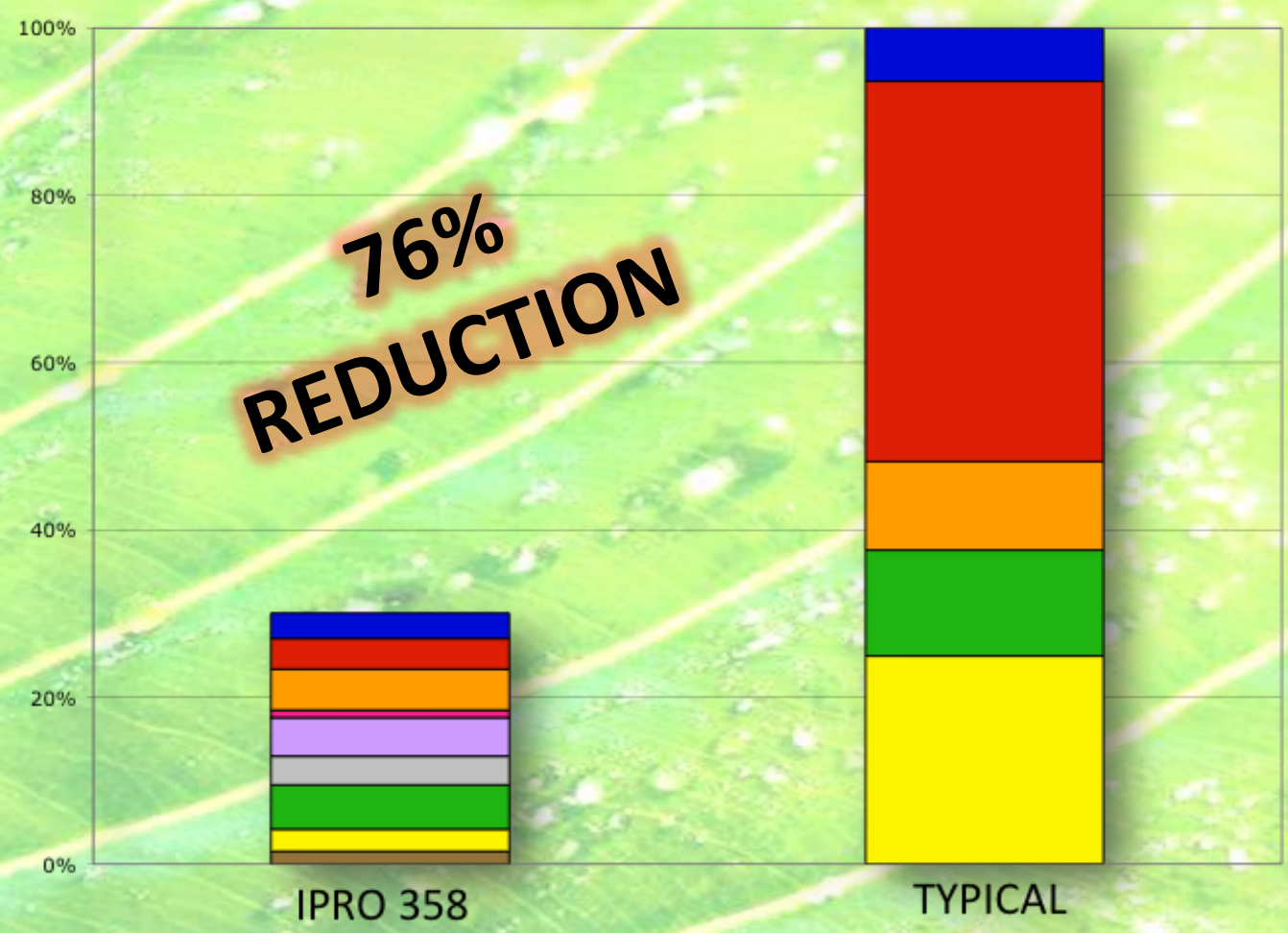
Energy Comparison



Active System Payback time < 8 years

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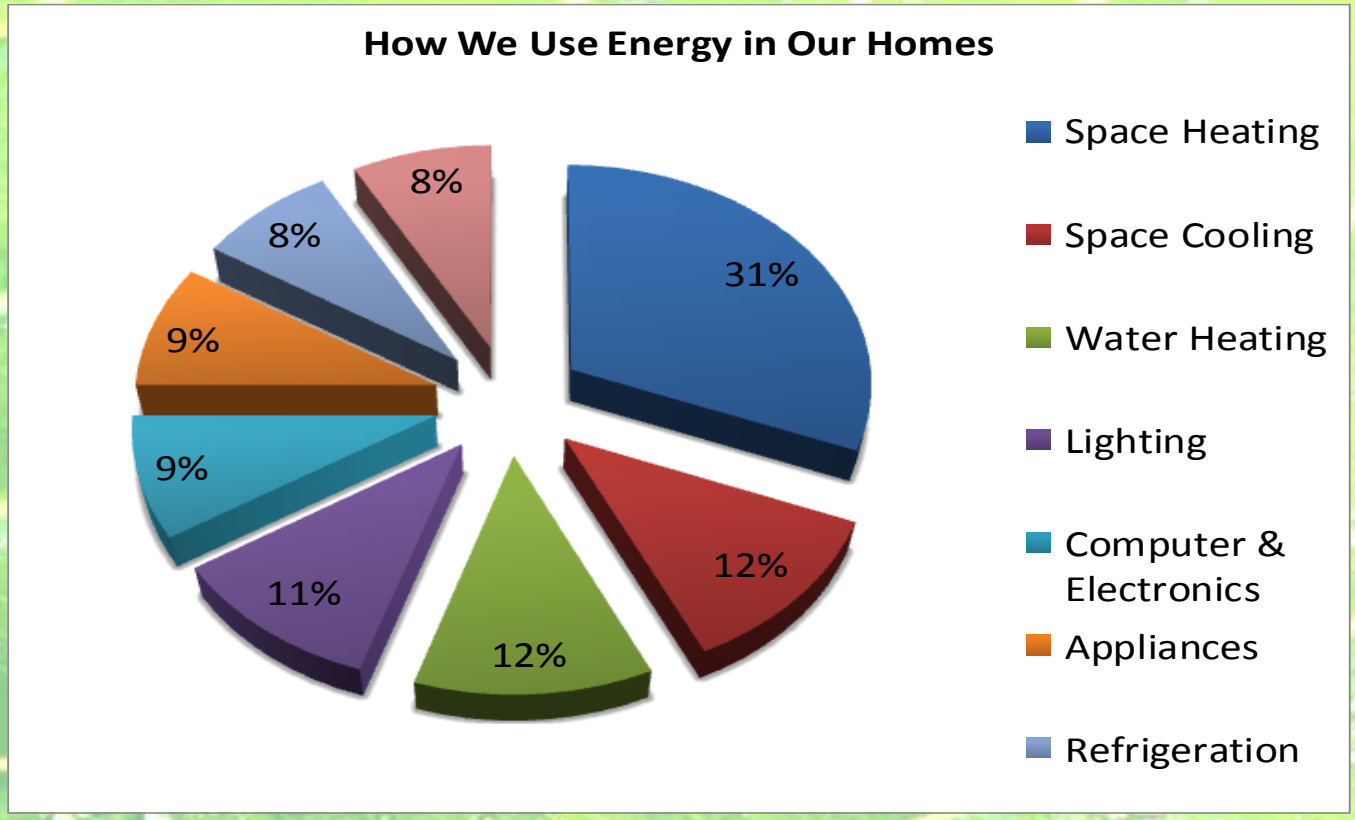
Home Control System

Luxury market only?

"Cool" Factor ⟷ Energy Savings Factor



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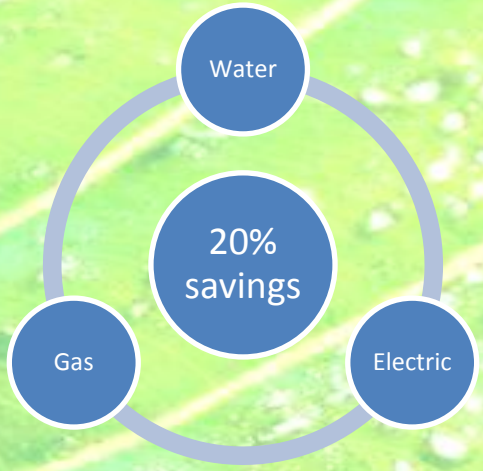
Home Control System

Lighting and Shading

- Sensors
  - Daylight and Occupancy
  - Natural vs Artificial
  - Unoccupied Spaces
- Controls Solar Heat Gain
- Heating/Cooling
  - Reduction of 10%
- Reduces Glare



Energy Monitoring

- Real Time
- Highly Accurate

Dimming Lights	Electricity Savings	Extends bulb life
10%	10%	2 times longer
25%	20%	4 times longer
50%	40%	20 times longer

Financials

40% { • Investor Funded

60% { • Bank Funded

Sold Immediately

- Reduce Interest
- Assist with investor return

Rent to Buy Scheme

- Draw in uncertain customers

- Offer investors 18.36% return
- Selling price: $400,000

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Questions?