EcoLadder
Environmental Consulting LLC

Spring 2016

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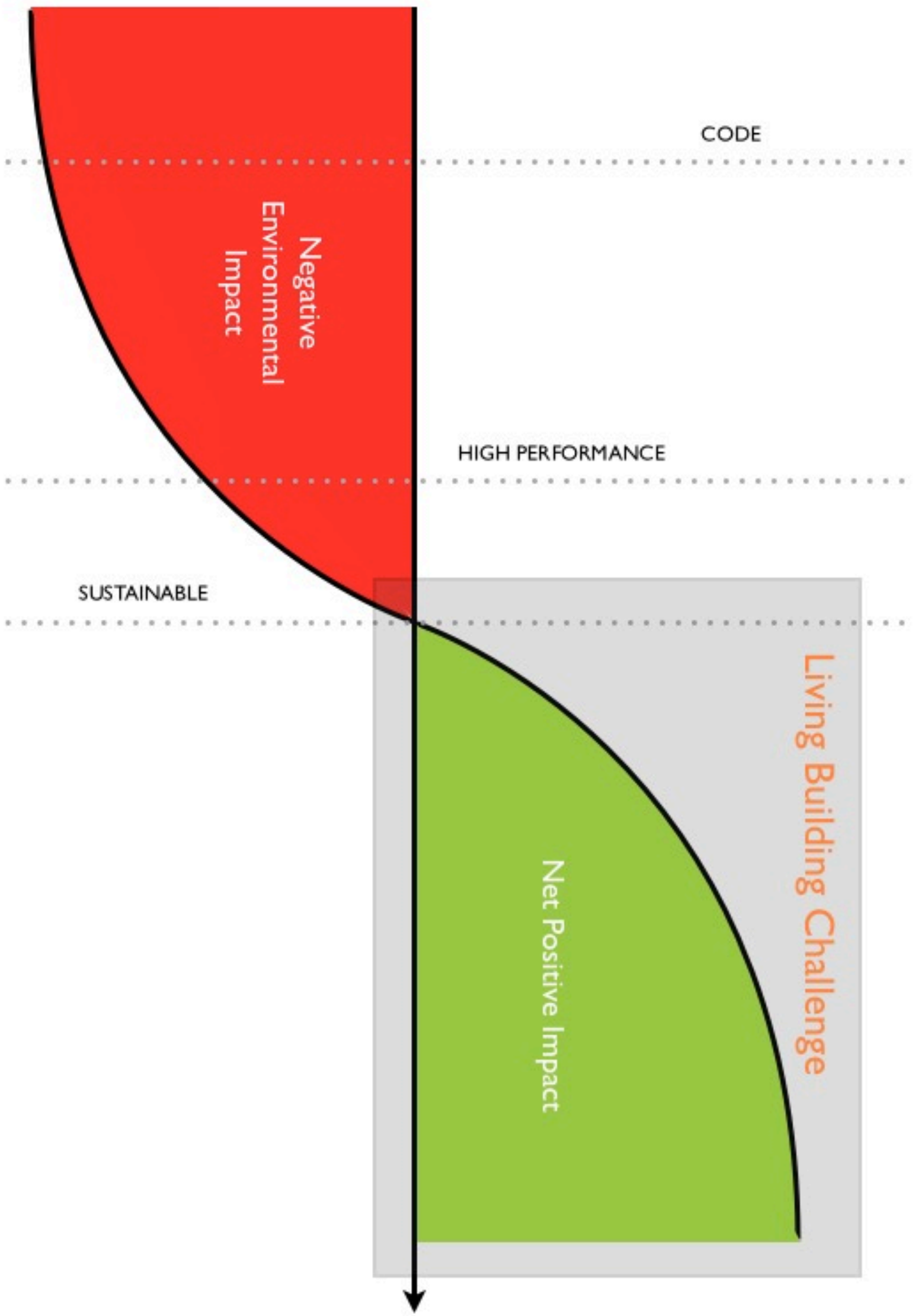
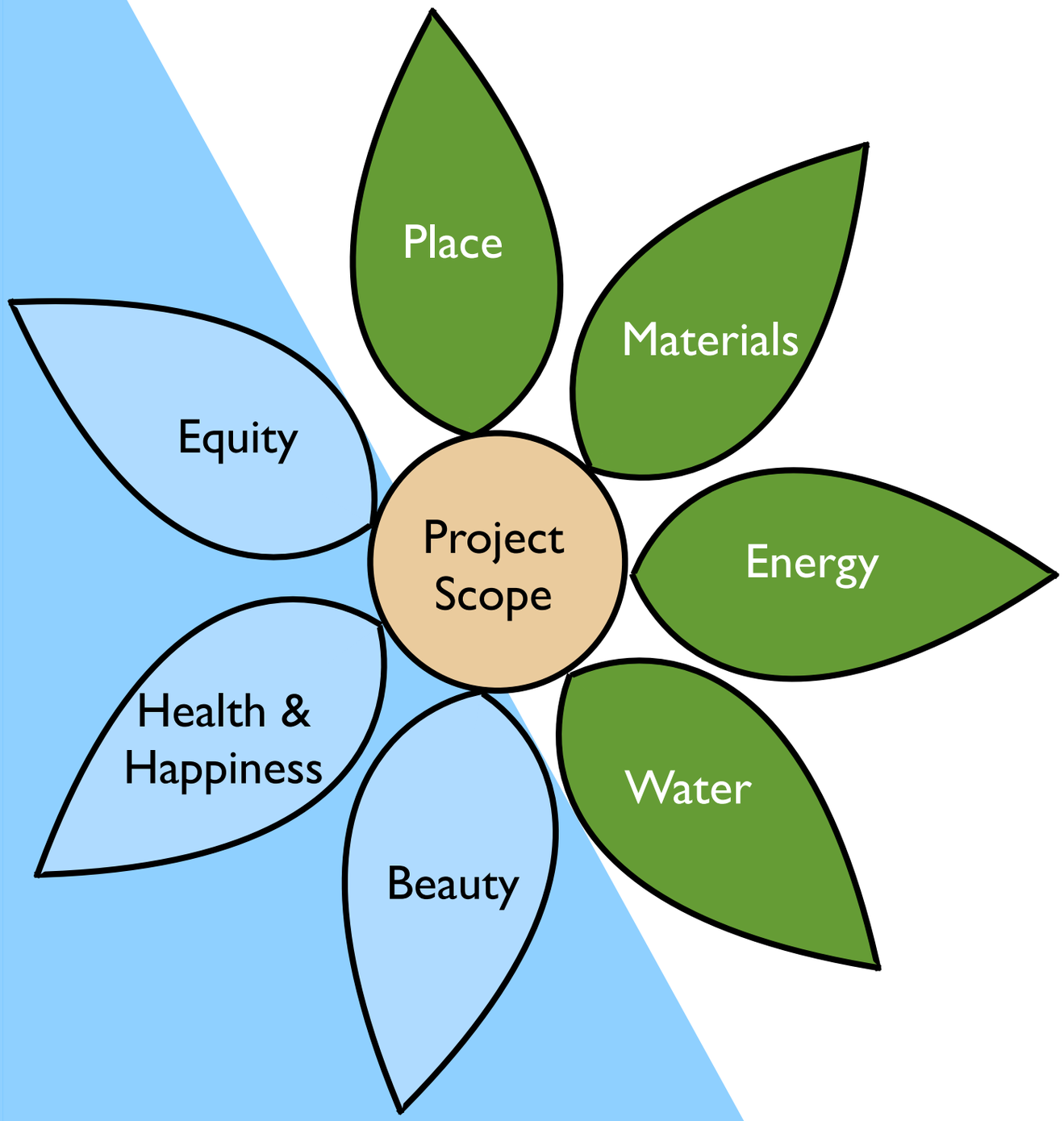
The Living Building Challenge at Georgia Tech

Preliminary Design Considerations


CODE
HIGH PERFORMANCE
SUSTAINABLE
Negative Environmental Impact
Living Building Challenge
Net Positive Impact

Engineering Considerations



Architectural Considerations

Place

The City in a Forest

TENTH STREET

TENTH STREE

INTERSTATE 75/85

FIFTH STREE

commons

LB
@GT

MARIETTA STREET

NORTH AVENUE

Creating a Welcoming Space

- Landscape Integration
- Eco-Commons Lawn
- Human Powered Living
- Urban Agriculture

Existing Conditions

Materials

N

500 KM

1000 KM

2500 KM

Sourcing Parameters

- 20% of Materials Construction Budget
- 30% of Materials Construction Budget
- All Project Consultants

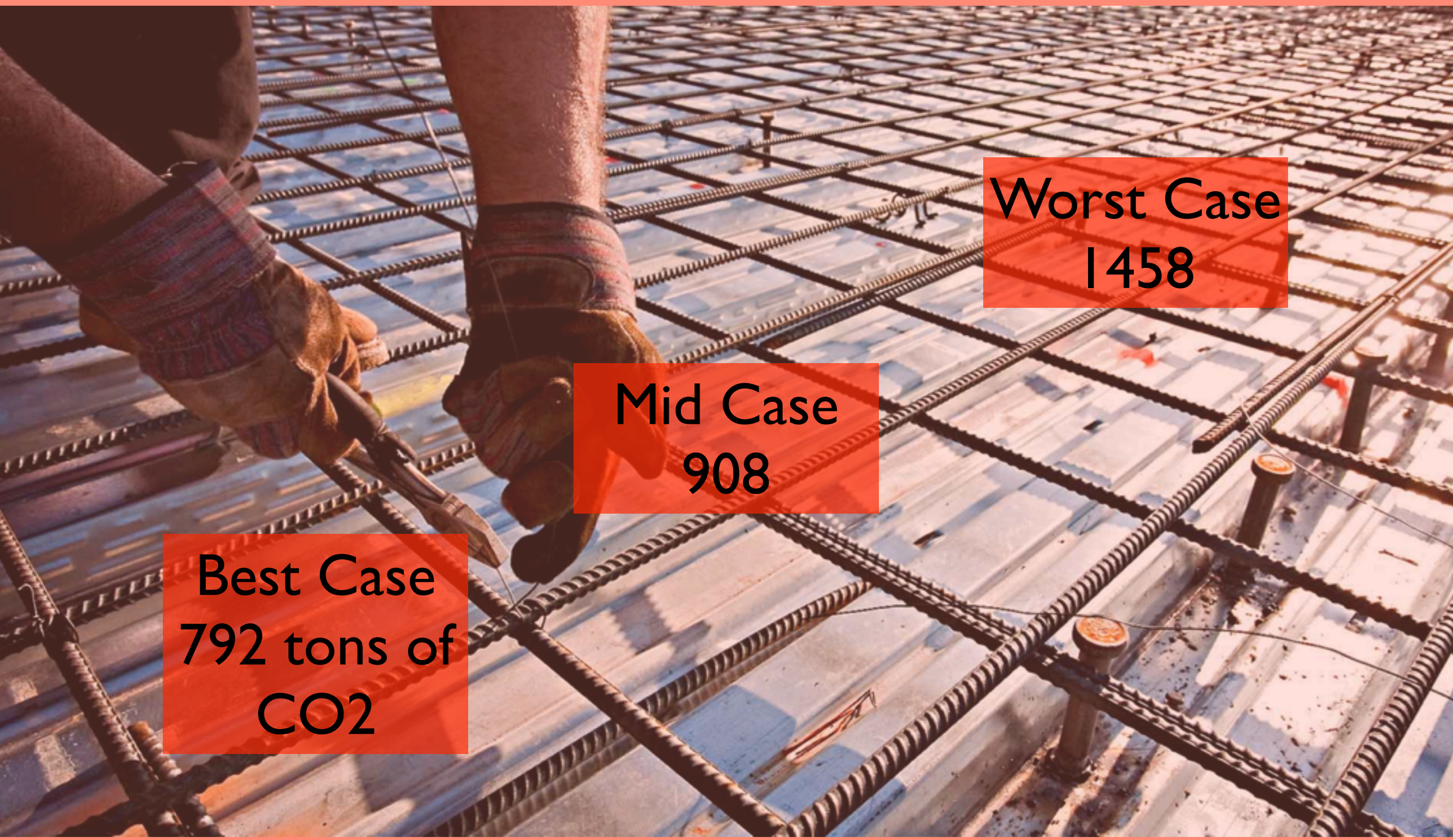
*25% of Materials Construction Budget can be sourced from anywhere.

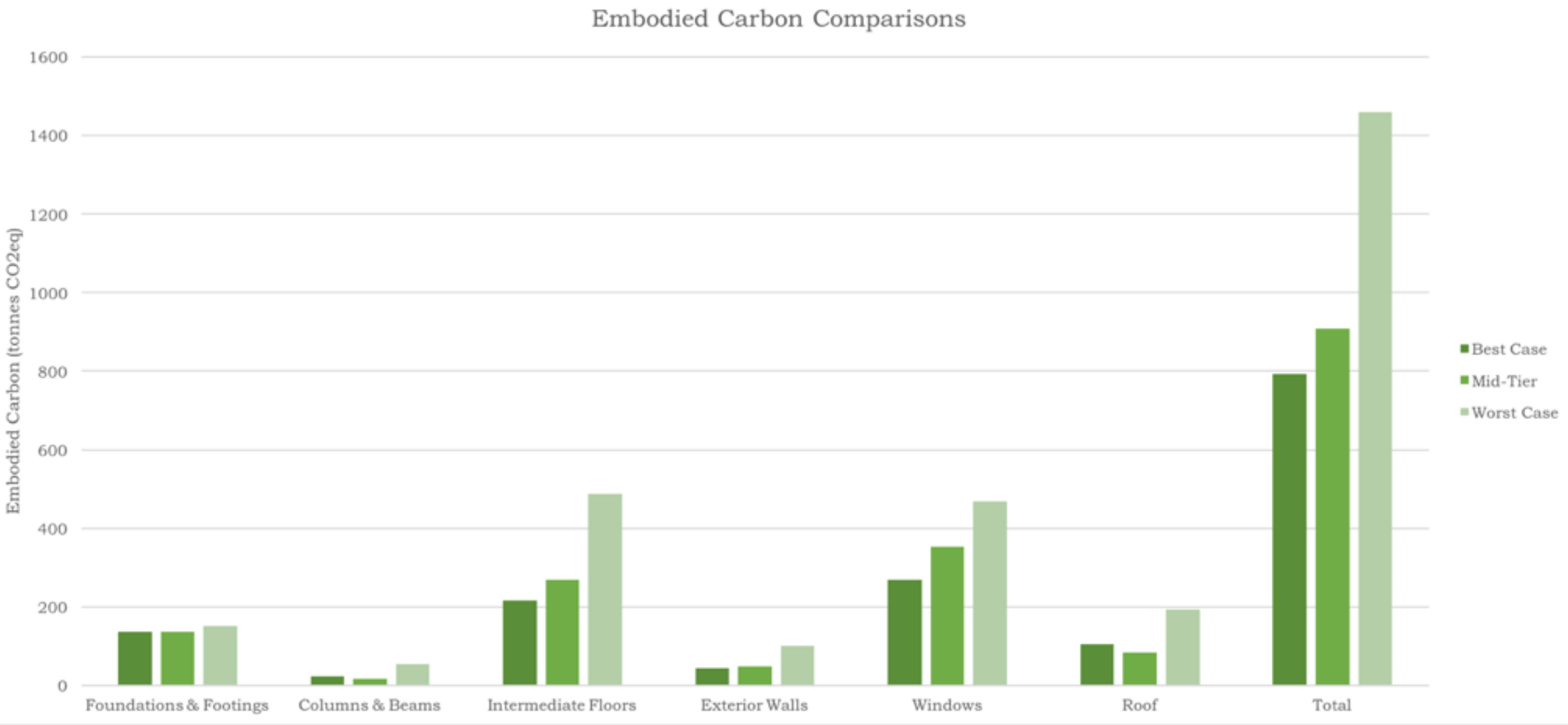
0 250 500 1,000 1,500 Kilometers

Red List

- PVC
- Creosote
- Mercury
- Added Lead

Embodied Carbon




Embodied Carbon Comparisons
Embodied Carbon (tonnes CO2eq)
1600
1400
1200
1000
800
600
400
200
0
Foundations & Footings
Columns & Beams
Intermediate Floors
Exterior Walls
Windows
Roof
Total
Best Case
Mid-Tier
Worst Case

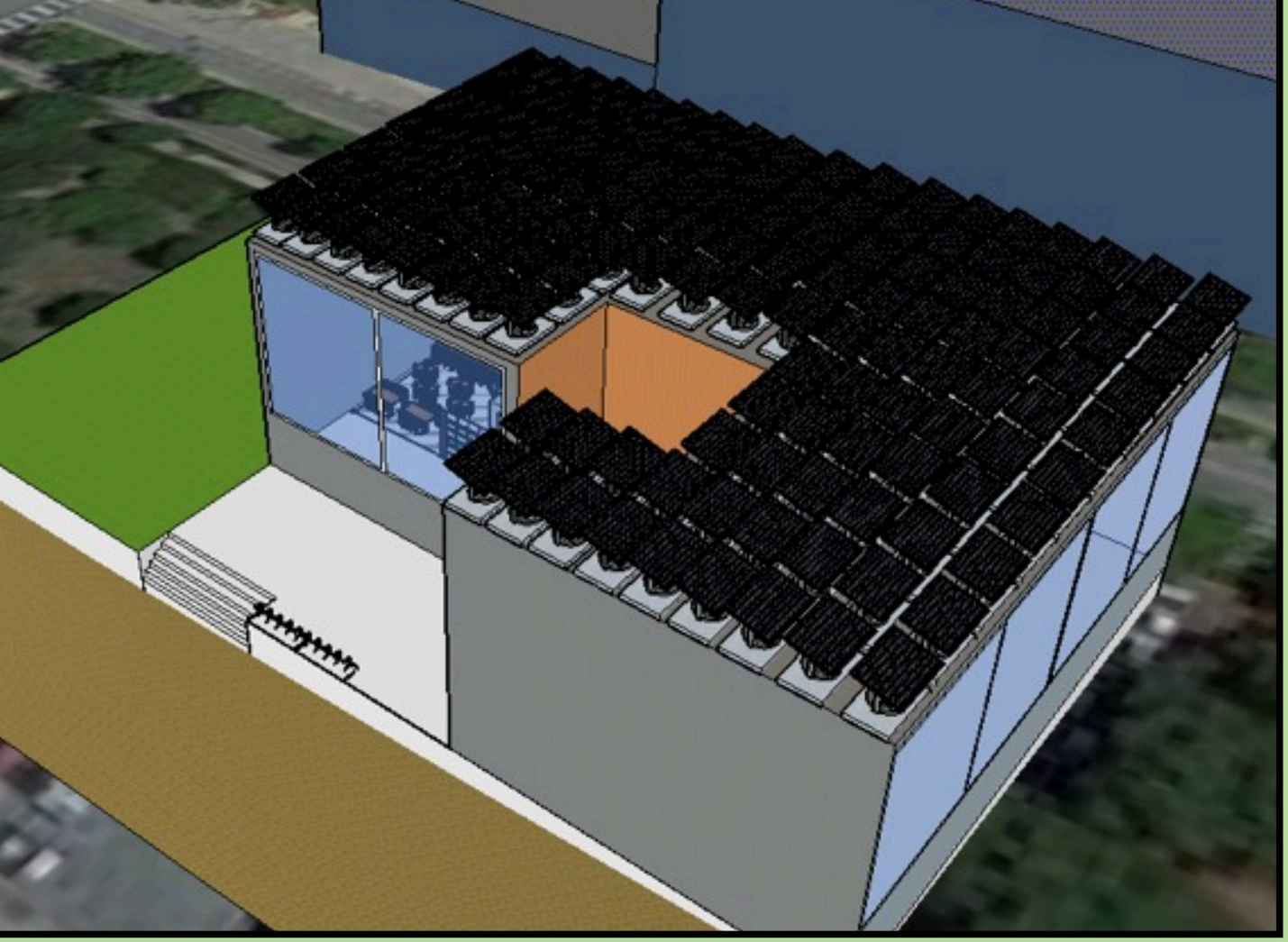
Material Selection

Concrete

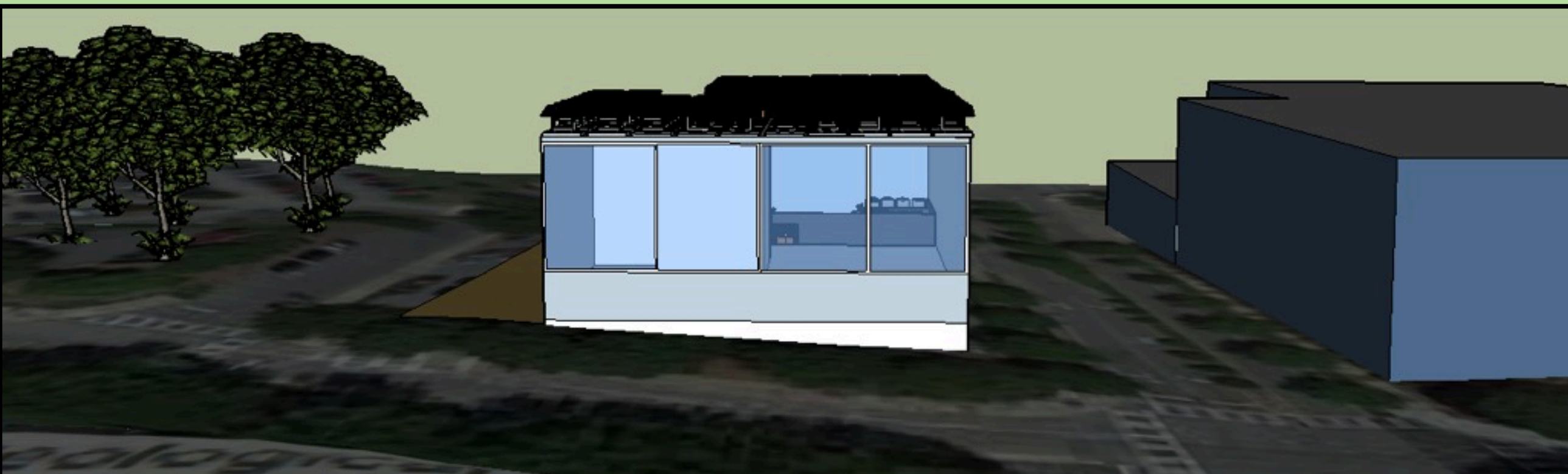
Steel & Aluminum

Wood

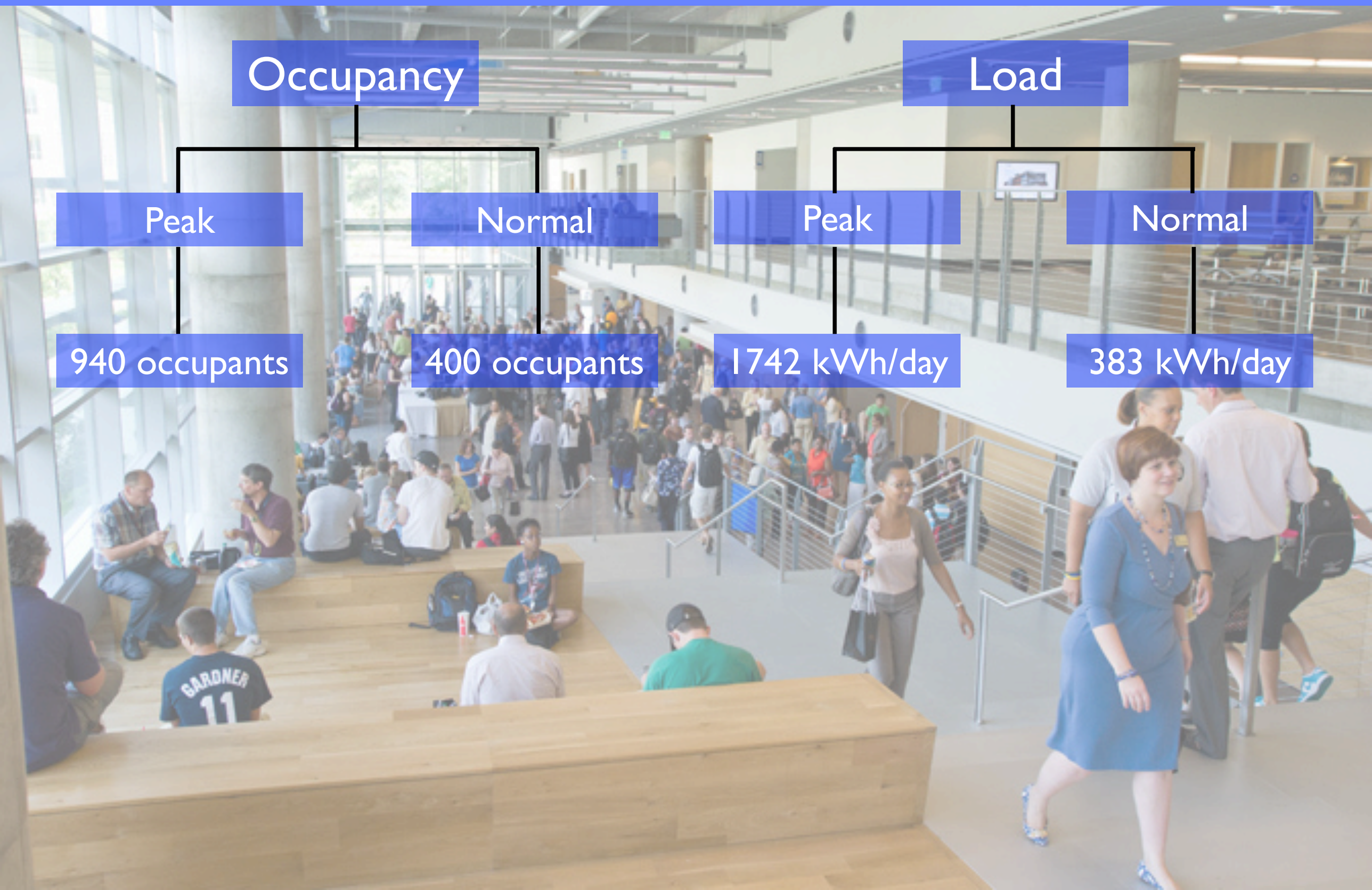
Energy



Site Energy Assessment



Occupancy and Energy Load



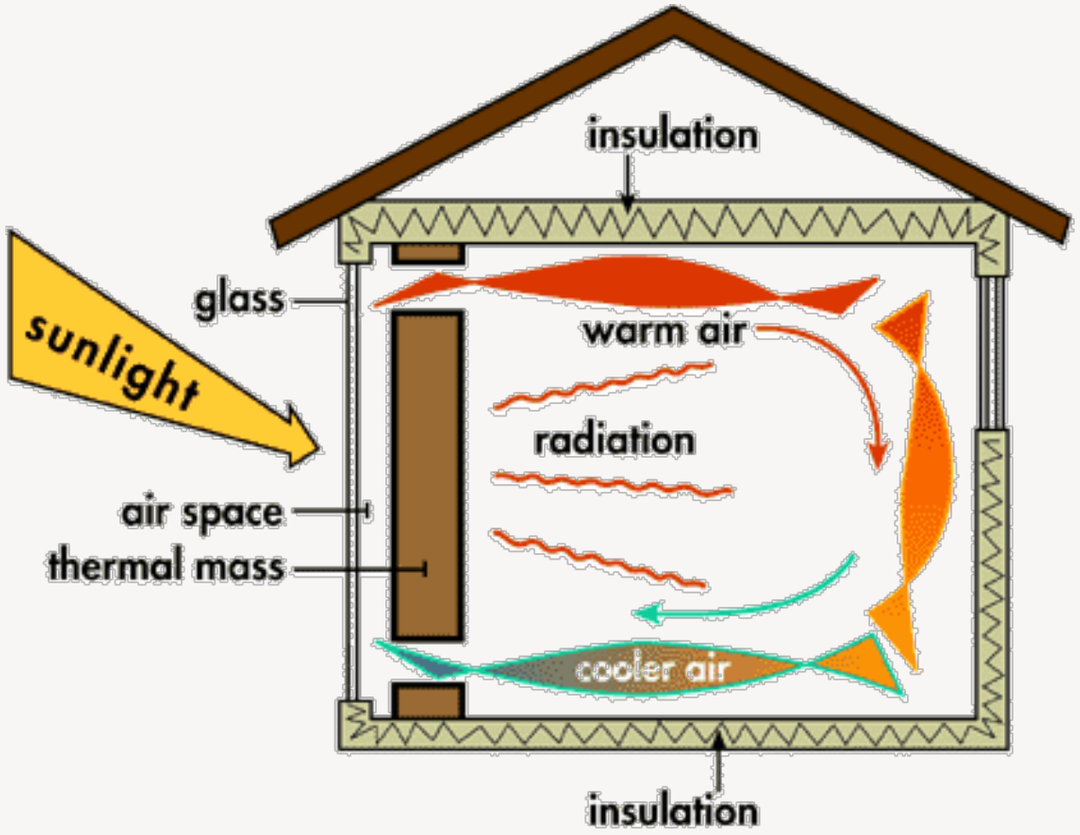
Net Positive Performance

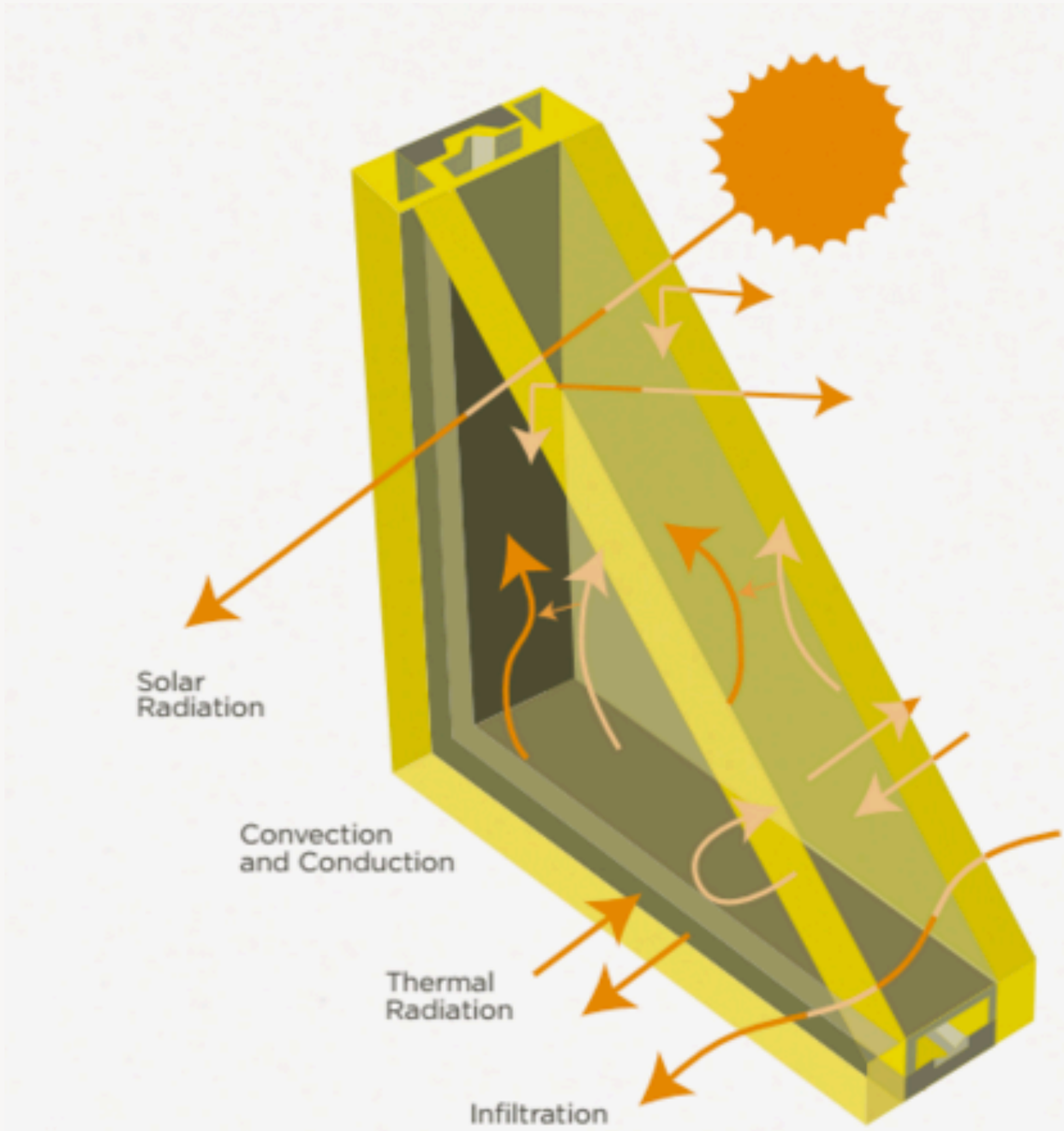
Emergency Backup

- Combined lighting and refrigeration load:
  21 kWh/day

Costs & Recommendations

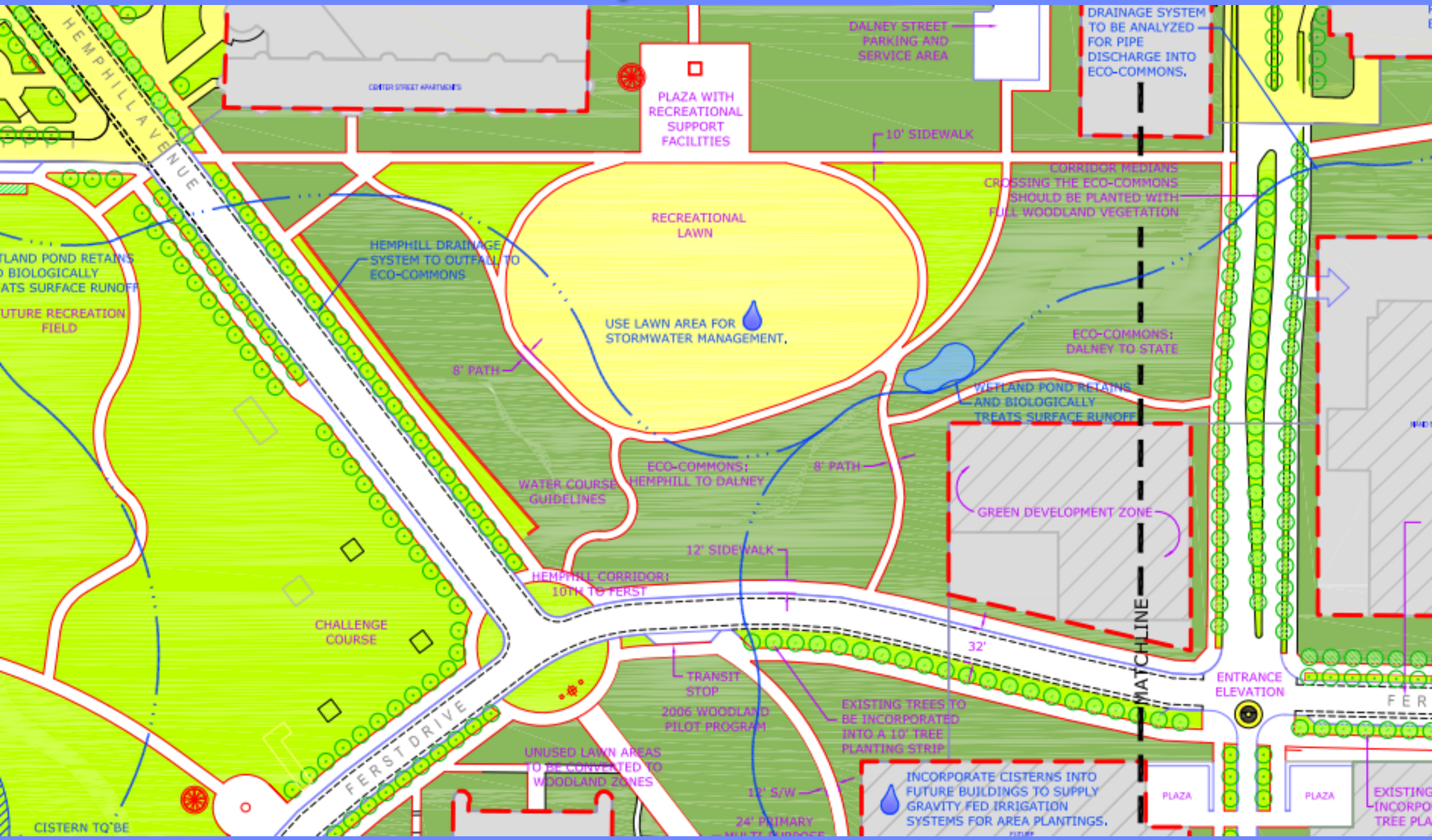
- Passive Solar, Natural Lighting & Ventilation, Low VAV HVAC
- Building Management System





Water

Rainwater Capture and Infiltration



Raingarden Water Capture

3,887,525 gallons/year

Rooftop Water Capture

296,325 gallons/year

Total Rainwater Captured
4,183,850 gallons/year

Fixture Water Usage

876,730 gallons/year

HVAC Water Usage

333,570 gallons/year

Urban Ag Water Usage

187,000 gallons/year

Total Building Water Consumption
1,397,300 gallons/year

Water Treatment Systems

- Captured Rainwater undergoes graywater treatment
- Graywater treated and made potable using UV radiation
- Partial graywater reuse in building fixtures
- Water from fixtures in the building goes through blackwater treatment

Urban Ag Water Usage

- Bioswale Runoff Control
- Native Landscaping
- Pervious Paving

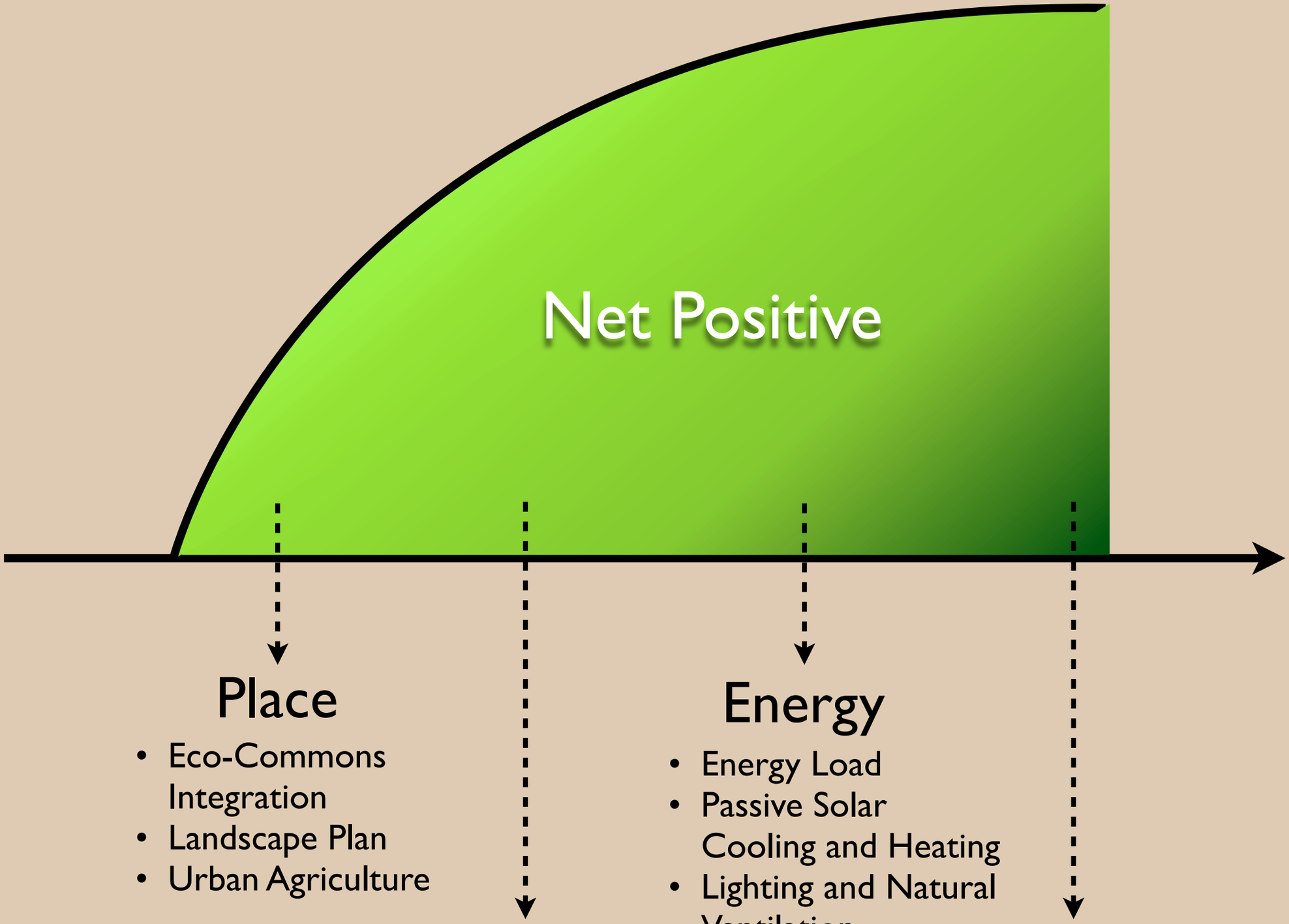
Rainwater Capture

HVAC Water Usage

- Pulsed Power
- Cooling Tower Graywater

Fixture Water Usage

- Composting Toilets
- Urine Separation



Place

- Eco-Commons Integration
- Landscape Plan
- Urban Agriculture

Materials

- Red List
- Sustainable, Local Sourcing
- Embodied Carbon

Energy

- Energy Load
- Passive Solar Cooling and Heating
- Lighting and Natural Ventilation

Water

- Rainwater Capture
- Water Balance
- Water Treatment Systems

EcoLadder
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Thank you for your attention!