Net Zero Emerging Leaders Internship

Energy Use Intensity Feedback and Integration of Energy Modeling

Energy Trust of Oregon

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I’m Jess...

and this is Otak.
Sustainability at Otak

Otak Signed the AIA 2030 Commitment in 2011

Formed Green Otak (GO) Committee

GO Operations
- Office Energy Use
- Waste Reduction and Supplies
- Transportation

GO Training
- Promoting Staff Accreditation
  - LEED
  - WELL
  - ECO Districts
  - Envision

GO Practice
- Improving Design Process To Make “Greener” Work
- AIA 2030 Design Data Exchange
- Net Zero Emerging Leader (NZEL)
NZEL Internship Objectives

1. worked on energy modeling and analysis through Sefaira Architecture...

2. used troubleshooting techniques to understand and navigate best tool practices for optimal use...

3. contributed data to building performance feedback loop to better inform design...

4. established paths of integration and use for further energy modeling integration..
What is Energy Modeling?

Energy Use Intensity - EUI

- **ENERGY**
  - ENVELOPE DESIGN
    - Facade Glazing
    - Walls
    - Floors
    - Infiltration
    - Roof and Roof Glazing

- **DAYLIGHTING**
  - DAYLIGHTING DESIGN
    - Visible Light Transmittance
    - Glazing
    - Work Plane Height

- **THERMAL COMFORT**
  - HVAC DESIGN
    - Design Air Flow
    - Cooling Coil Source
    - Heating Coil Source
    - Heat Recovery

- **HVAC SIZING**
Using Sefaira For Energy Modeling

Sefaira Architecture

- Explore design options and understand impacts on building performance
- Analyze building envelope, HVAC Systems and on-site renewable energy potential
- Test effectiveness of current or compared energy conservation strategies

Impacted Design Process Phases

- Project Win/ Kick Off; Concept Pre-Design; Design Development
Building Type Use

Otak 2018 Portfolio
Oregon Projects

Through the AIA 2030 DDX, the primary building use types offer a look at Baseline EUI comparisons for projects and allows Otak to look at the diversity of our portfolio.

* Building Type Source from AIA 2030 DDX Firm Reported Levels
Energy Modeling Case Study: Hyatt Place Portland, Oregon

This mixed-use building on Northwest 12th and Flanders represents a new kind of sustainable design for hospitality and housing in Portland, informed and planned around elegant design challenges to comply with new building codes and the needs of a dynamic, developing city.
Energy Modeling Case Study: Hyatt Place Portland, Oregon

Development Phase
Use Type: Lodging - Hotel
199,801 Gross Square Feet
23 Floors

National Average EUI: **94.0** kBtu/sf/yr
Zero Tool Baseline EUI: **69.3** kBtu/sf/yr
AIA 2030 Goal EUI: **20.8** kBtu/sf/yr
Sefaira Predicted EUI: **18** kBtu/sf/yr

**76%** Percent savings for the project energy consumption
Energy Modeling Case Study: Hyatt Place Portland, Oregon

SketchUp Mass Energy Model  SketchUp Energy Model  Revit Energy Model
Results

For 2018, Otak submitted 41 project buildings, providing over 1,063,791 gross square feet of building envelope and energy analysis.

100% of our submitted projects were energy modeled using Sefaira.

Building analysis average reflects a 43.7% predicted EUI reduction in relation to the 70% reduction for the net zero challenge goal.

Average pEUI Reduction 43.4%
Integration of Energy Modeling at Otak

1 Early Communication and Planning
   - Sustainability Action Plan
   - MEP Team
   - Client

2 Standardize Practice within Design Process
   - Create and implement the use of designated energy modeling resources and sharing space

3 Create a Path to Assist Further Analysis
   - Data Driven Design
   - Building Performance Assessment for Comparison
   - Daylighting Analysis and Concept Stage
   - Climate Design Evaluation
   - Informed Energy Code Compliance