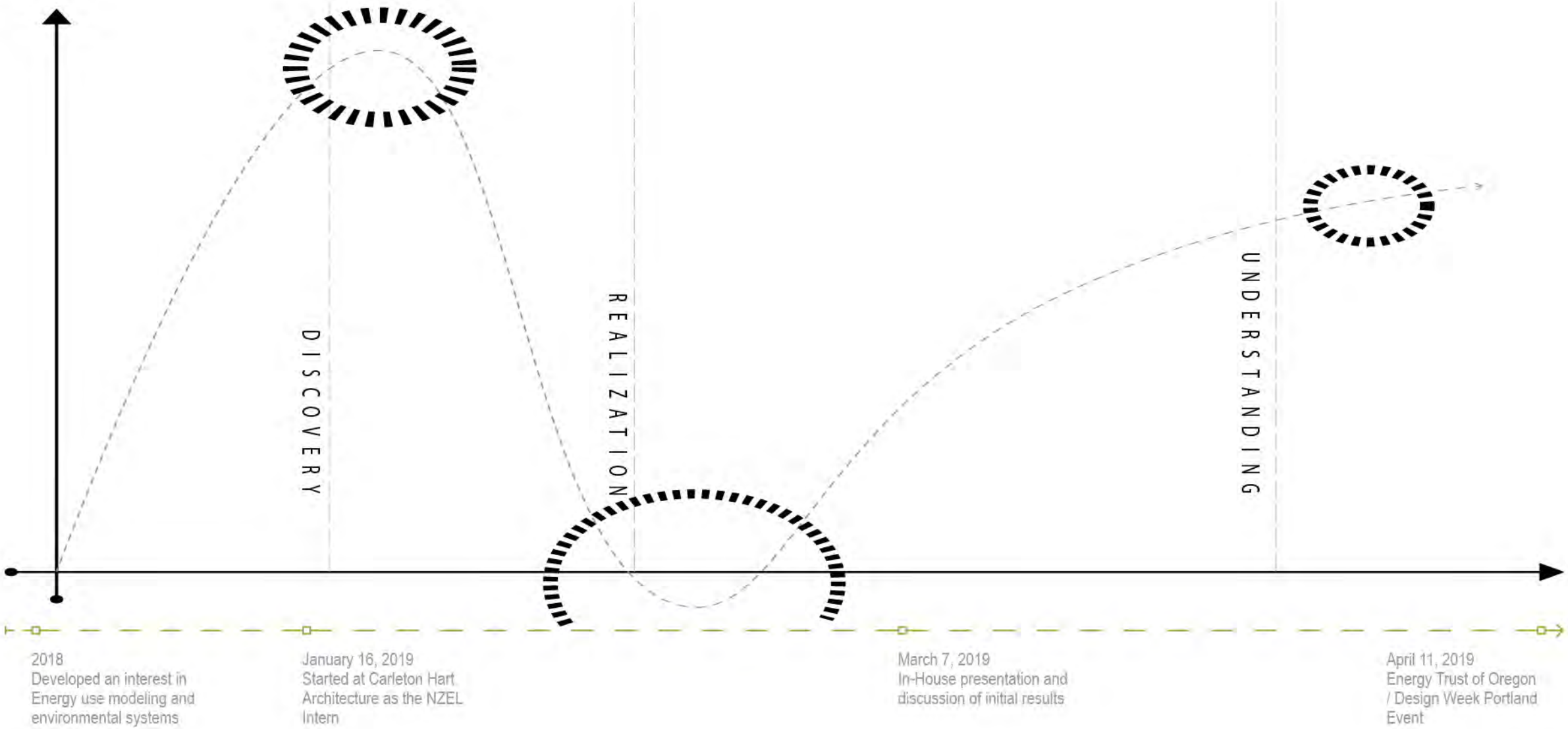
CARLETON HART ARCHITECTURE

Energy Trust Net Zero Emerging Leaders Internship at CHA


NZEL EXPERIENCE AT CHA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INSPIRING COMMUNITY
THROUGH DESIGN

OLESON WOODS
Portland, Oregon
38,498 SF
32 Units

CLARA VISTA TOWNHOMES (SILVER)
Portland, Oregon
65,352 SF
44 Units

ROBERT LINDSAY TOWER
(Sustainability Upgrades Feasibility Study)
Portland, Oregon

IRIS GLEN
Klamath Falls, Oregon
33,065 SF
37 Units

BRIDGE MEADOWS (GOLD)
Portland, Oregon
48,612 SF
36 Units

HOOD RIVER CROSSING
Hood River, Oregon
39,859 SF
40 Units

TIGARD KNOLL
Tigard, Oregon
39,859 SF
40 Units

CHAUCER COURT
(Rehabilitation Project)
Portland, Oregon
61,000 SF
84 Units

MIRACLES CLUB (GOLD)
Portland, Oregon
48,860 SF
40 Units

THE MAGNOLIA (SILVER)
Portland, Oregon
46,382 SF
49 Units

BARCELONA
Location: Beaverton, Oregon
Size: 40,025 SF
47 Units

LASCALA
Location: Beaverton, Oregon
Size: 47,015 SF
44 Units

GILMAN COURT (GOLD)
Portland, Oregon
55,800 SF
60 Units

ROSEWOOD PLAZA
Location: Gresham, Oregon
Size: 54,710 SF

SUSTAINABILITY AT WORK CERTIFICATION

HILL PARK
Portland, Oregon
30,209 SF
39 Units

BRIDGE MEADOWS (PLATINUM)
Beaverton, Oregon
49,100 SF
41 Units

NAYA GENERATIONS
Portland, Oregon
30,209 SF
40 Units

BEATRICE MORROW
(Pursuing GOLD)
Portland, Oregon
32,394 SF
80 Units

COLONIA UNIDAD
(Pursuing GOLD)
Woodburn, Oregon
44 Units

HOLMAN 42
(Pursuing GOLD)
Portland, Oregon
51,605 SF
59 Units

WOODY GUTHRIE PLACE
(Pursuing GOLD)
Portland, Oregon
29,031 SF
64 Units

2002 | 2004 | 2006 | 2008 | 2010 | 2012 | 2014 | 2016 | 2018

LEGEND
- LEED Certification
- Earth Advantage
- Green Communities

Sustainability at CHA

LaScala Apartments

A 44-unit residential building in Beaverton, Oregon. Earth Advantage Platinum certified.

Woody Guthrie Place

Currently under construction, this 64-unit mix of market rate and affordable housing in Portland's Lents neighborhood is pursuing LEED® for Homes Mid-Rise Gold Certification.

Hill Park Apartments

A 39-unit affordable housing building in Southwest Portland, Earth Advantage Platinum certified.

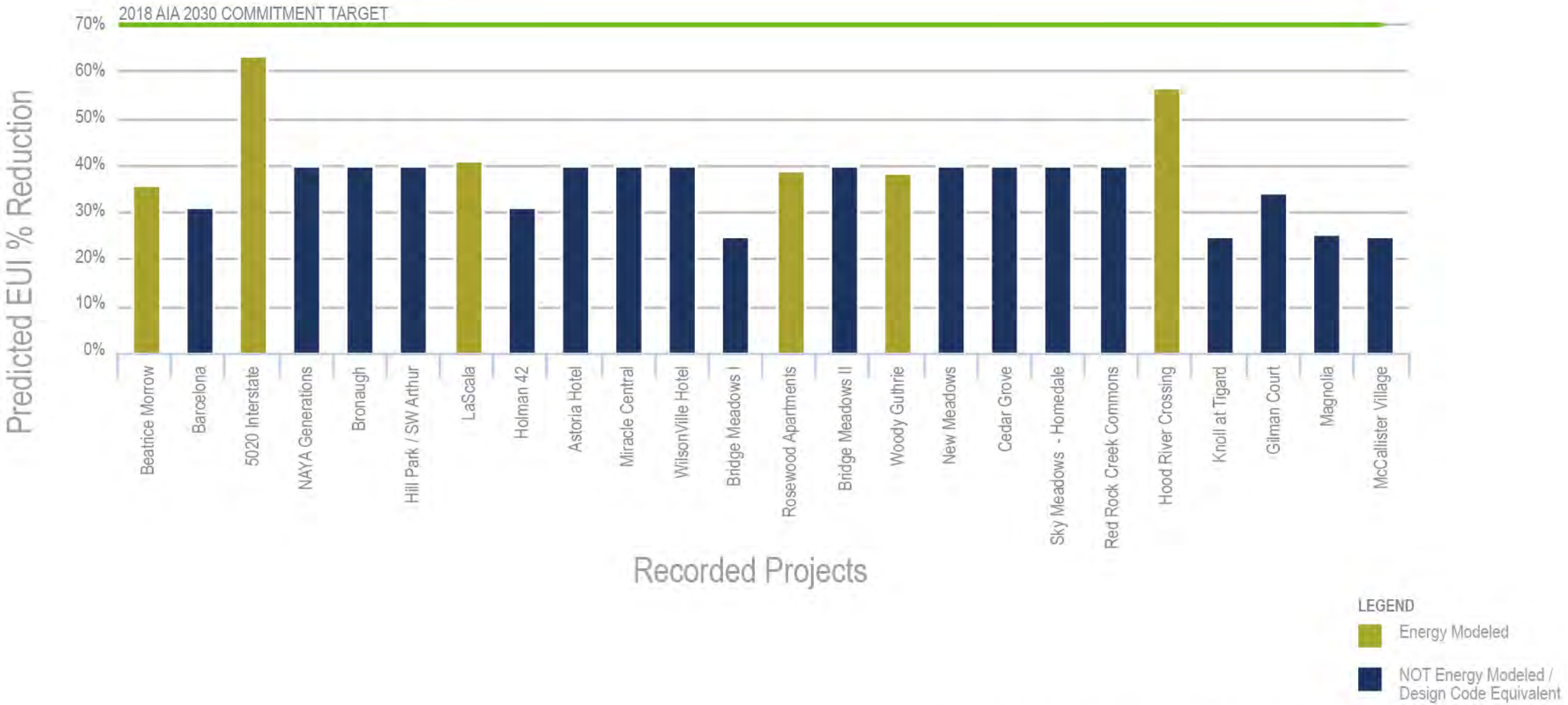

2030 CHALLENGE

Participation by Firm Size - AIA 2030 Commitment

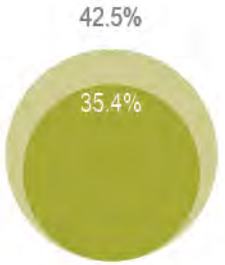
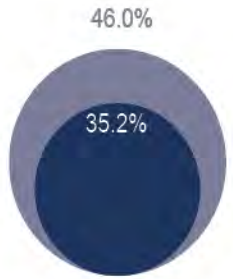
Built (Design Closeout Final)

Unbuilt (Design Phase)

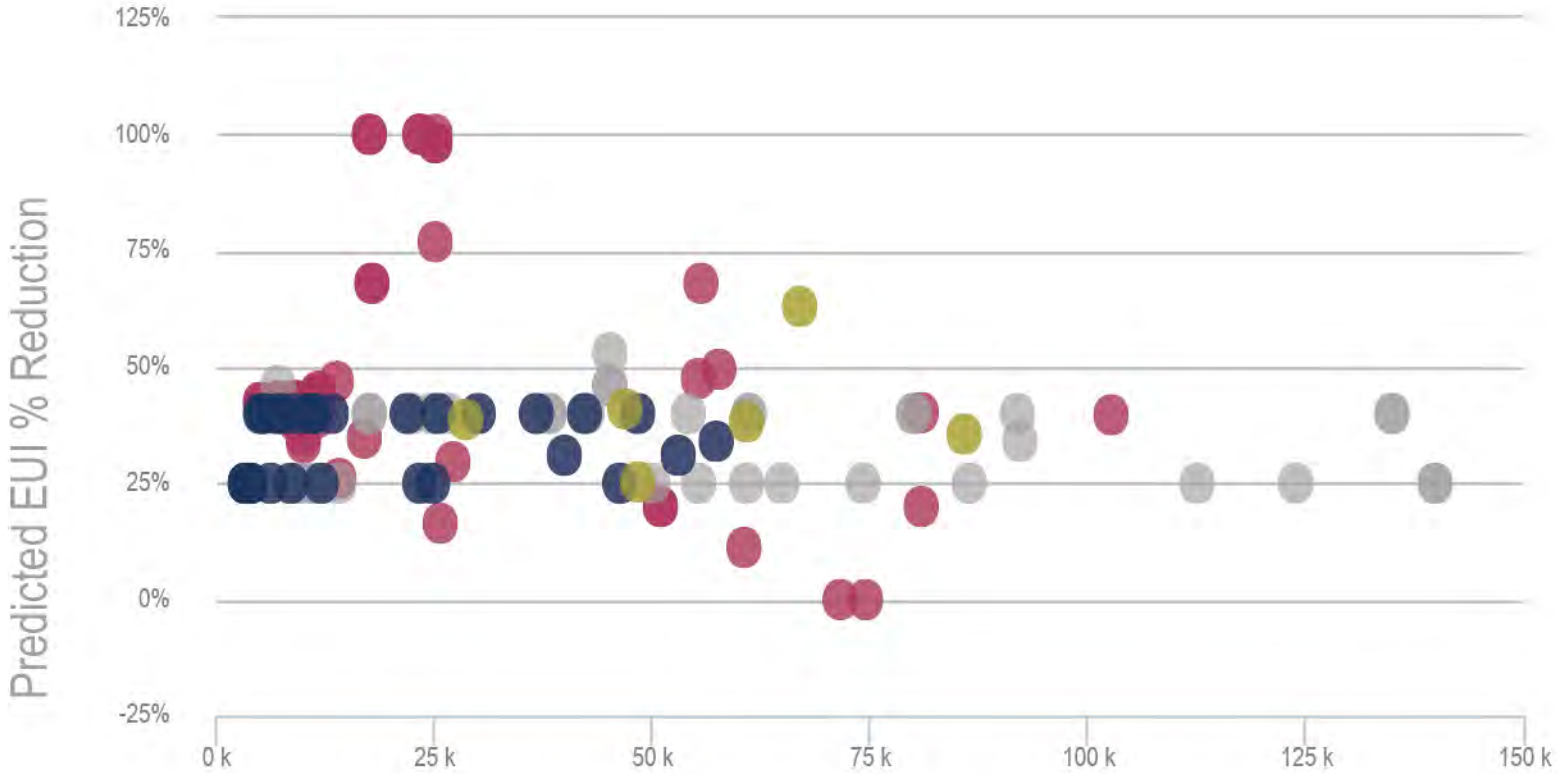
Recorded Projects - Predicted EUI % Reduction



Recorded Projects - Predicted EUI % Reduction

	% GSF Energy Modeled	% Predicted EUI Reduction Increase
CHA		
AIA 2030 Program		

Reported Projects - Comparison to DDx Portfolio



LEGEND

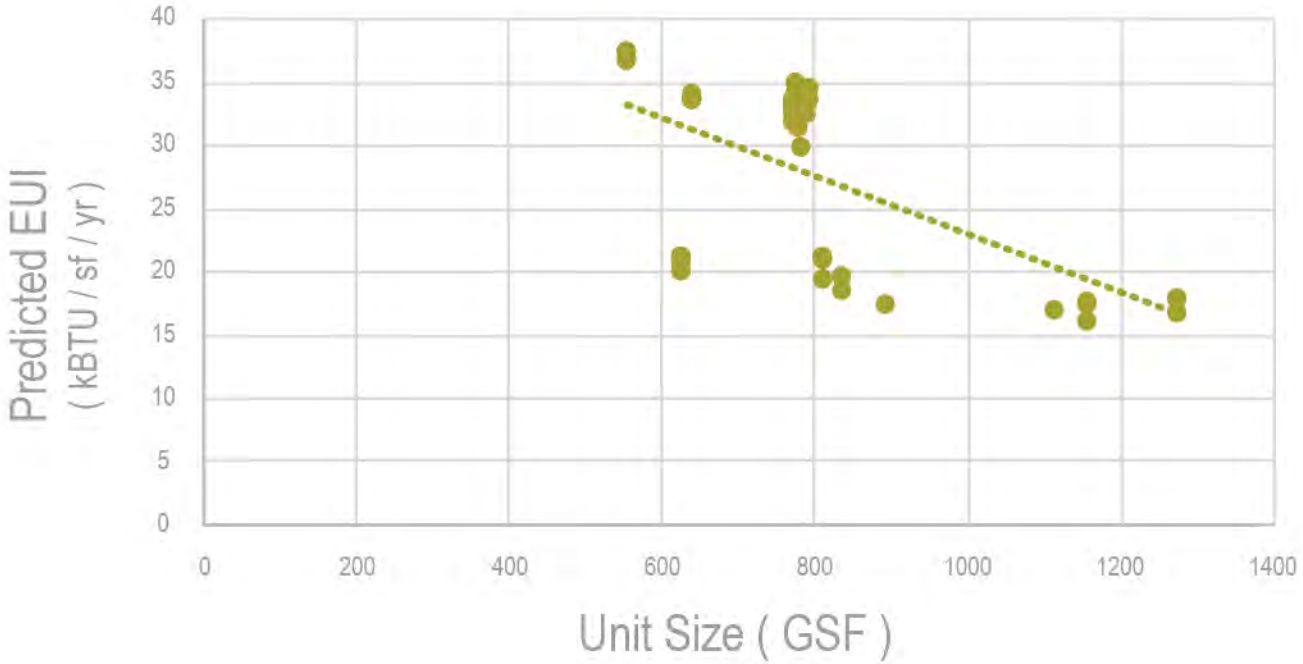
	Color Key	Qty.	EUI % Reduction
CHA	Modeled	6	avg 41.0%
	NOT Modeled	33	avg 34.3%
DDx	Modeled	56	avg 41.4%
	Not Modeled	36	avg 33.5%

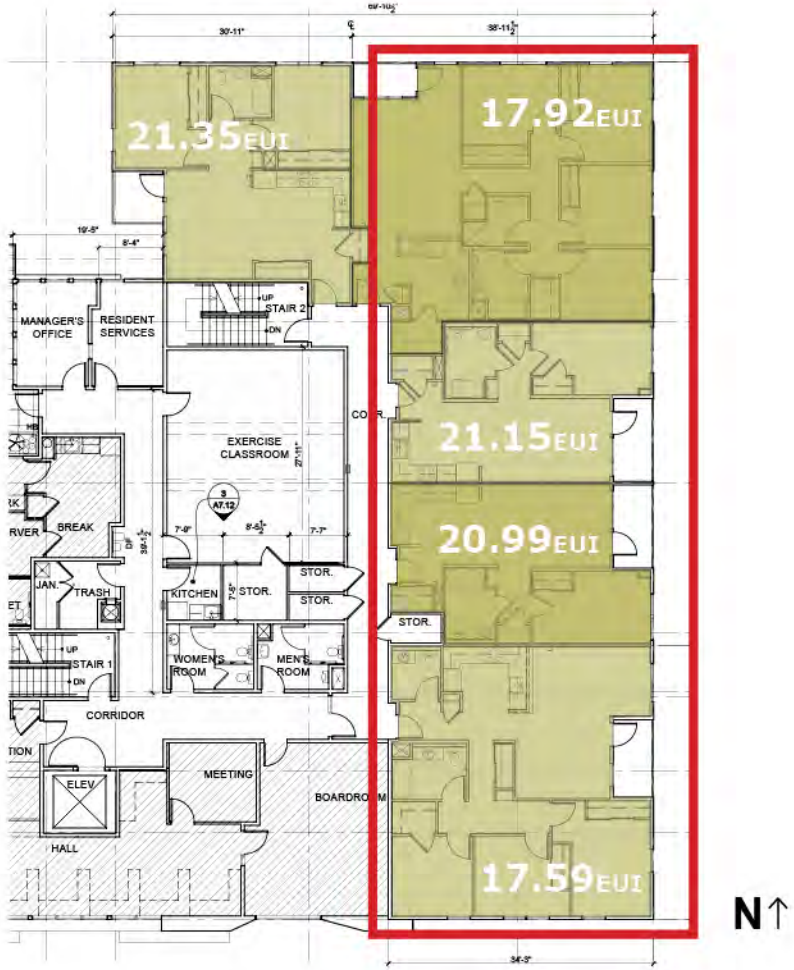
Recorded Projects - Comparison to DDx Portfolio

Case Study: Rosewood Apartments

Comparison of Home Energy Rating Certificates
Predicted EUI for individual residential units.

Multi-building residential project with three buildings
(1 new construction; 2 renovation buildings)





Building C - 2nd Floor Plan

Predicted EUI Distribution

Plug Loads

Energy Demands

- Determined by user
- Determined by program type

Building Envelope

Energy Environment

- Massing, Form, & Orientation
- Exterior Cladding
- Window-Wall Ratio
- Shading Strategies

Mechanical Systems

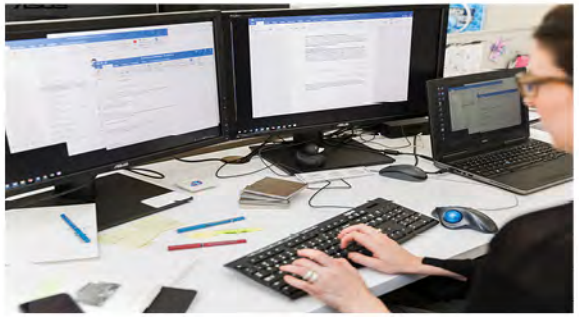
Energy Consumption

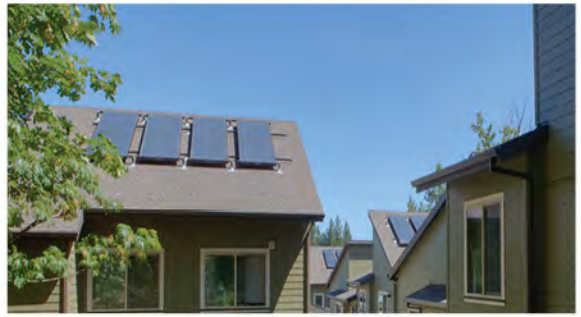
- Heating & Cooling
- Ventilation
- Mechanical Equipment

Renewable Systems

Energy Generation and Supplementation

- Photovoltaic (PV) systems
- Solar Hot Water (SHW) systems
- Geothermal





WORKFLOW IMPLICATIONS

For Project Teams:

- Use the **ZERO TOOL** to set early energy targets!
- **TRACK PROJECT DATA** with Excel Template for DDx recording at end of each phase to streamline performance tracking.
- In-house project team **ENERGY MODELING** with Insight! Use the Automated Program Interface (API) to connect Insight projects directly to the DDx to simplify recording.

For CHA Sustainability Committee:

- **ASSIST** project teams throughout recording process at each design phase.
- **REVIEW** goals and performance with each project team at each design phases.
- **UPLOAD** annual portfolio via DDx batch upload by annual March 31st deadline.

		Insert project information below to complete an inventory of current project energy performance		
General	**1. Input Building Specs**	***Project Name***	Beatrice Morrow	
		Project ID - *CHA####*	CHA15029	
		Project Address	3368 NE MLK Blvd, Portland, OR 97212	
		Climate Zone	x	4C - Mixed-Marine
				5B - Cool Dry
				6B - Cold Dry
		Project Category	Non-Residential	
		Construction Type(check one)	x	New Construction
				Renovation
		Year of Occupancy	2019	
		Reporting Year	2018	
		Project Phase	Design Closeout Final	
		Use(write in)		
		Use Type 1	Residential - Mid-Rise/High-Rise	
		sf	73,068	
		Use Type 2	Mixed Use	
		sf	12,790	
		Use Type 3		
		sf		
		if project is broken into various uses, list all uses and respective square foot area		
		Total Area	85,858	
		Target Certification		BREEAM
		(check one)		Green Globes
				LEED Platinum
				LEED Gold
				LEED Silver
			x	LEED Certified
				Living Building
				WELL
				Energy Star for Homes

PROJECT WORKFLOW

SD — *Schematic Design*

- Eco-Charettes or similar
- Identify sustainability certification path

DD — *Design Development*

- Review energy use data
- Identify feasible design strategies
- Optimize heating / cooling systems

CD — *Construction Documents*

- Review energy use data
- Refine design strategies
- Refine envelope detailing

CA — *Construction Administration*

- Review energy use data & strategies
- Test & balance systems

DCF — *Design Closeout Final*

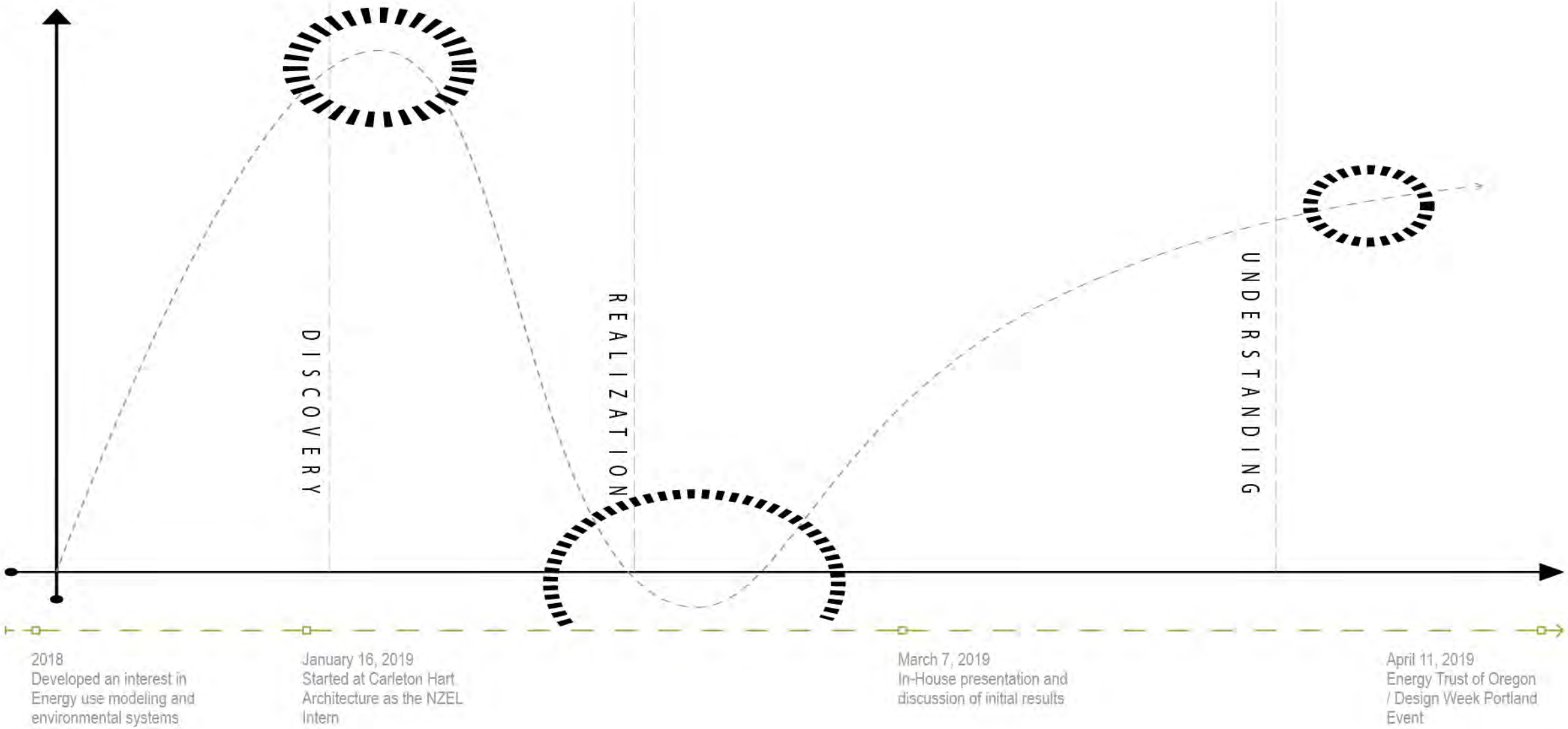
- Review energy use data
- Review target goals
- Conduct tenant / user survey

DOCUMENTATION

- Establish EUI baseline with Zero Tool
- Begin Excel project data collection sheet
- Verify Excel data / Revise per project updates
- Verify FINAL Excel project data
- Run Insight energy model
- Record phase data with DDx
- Record FINAL data with DDx

Goal : Develop metrics for post-occupancy energy data collection

NZEL EXPERIENCE AT CHA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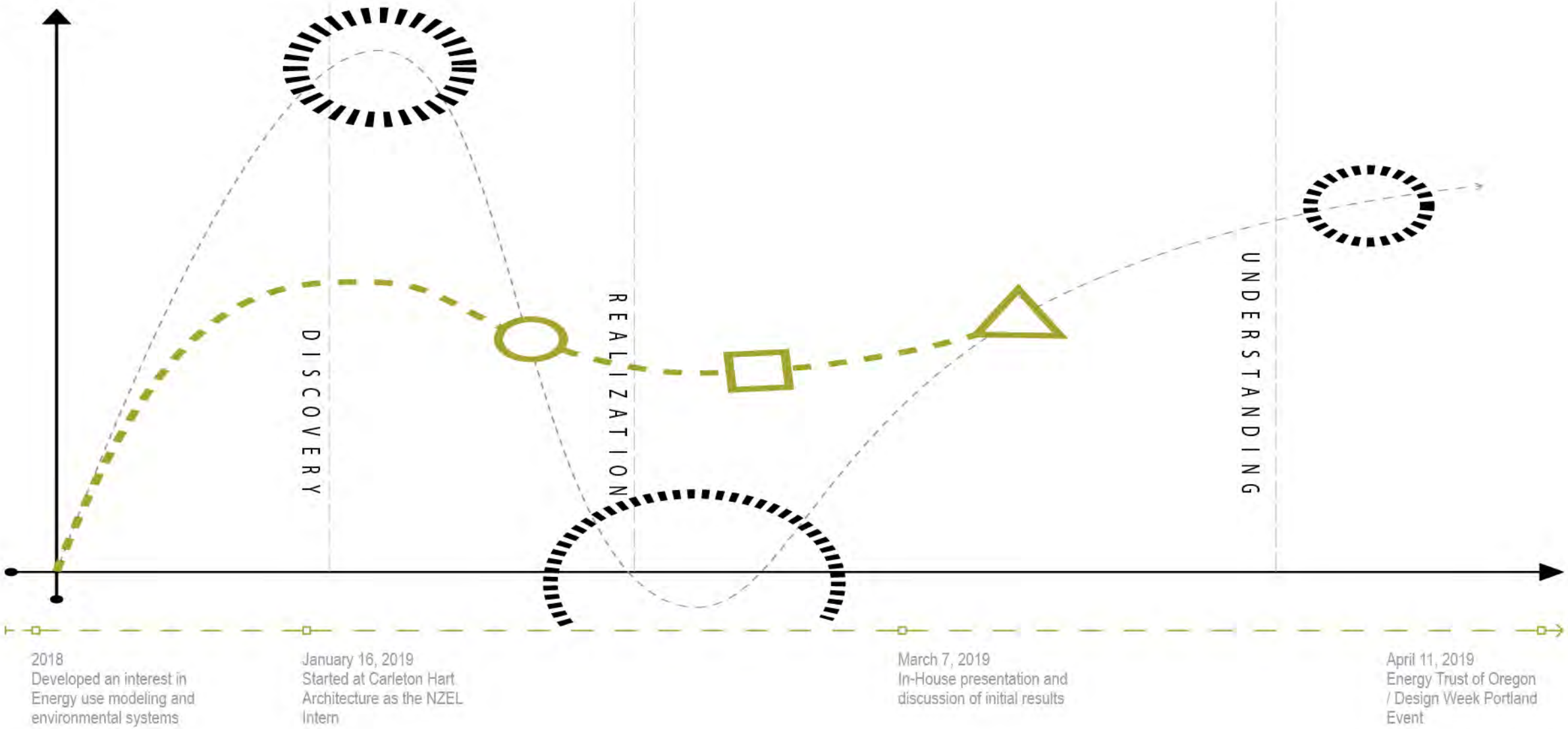
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Thank you!

NET ZERO EMERGING LEADERS:

Knowledge is Power

MADELAINE MURRAY | HENNEBERY EDDY ARCHITECTS

Hennebery Eddy design studio (LEED Gold)

Hennebery Eddy Background

- Net-Positive Design Philosophy
- AIA 2030 Commitment

Design Data Exchange (DDx) Influence on Firm

- Using DDx as an Archive
- Tools Beyond DDx

Globalization of Data

- Net Zero Emerging Leaders Internship

Net-Positive Design Philosophy

Healthy | Efficient | Adaptive

Provide design solutions for buildings that result in a positive impact through efficient energy use, water consumption, and adaptive structures. Net-positive approach is the foundation of design decisions. *Knowledge* of how to achieve net-positive results is the *power*.

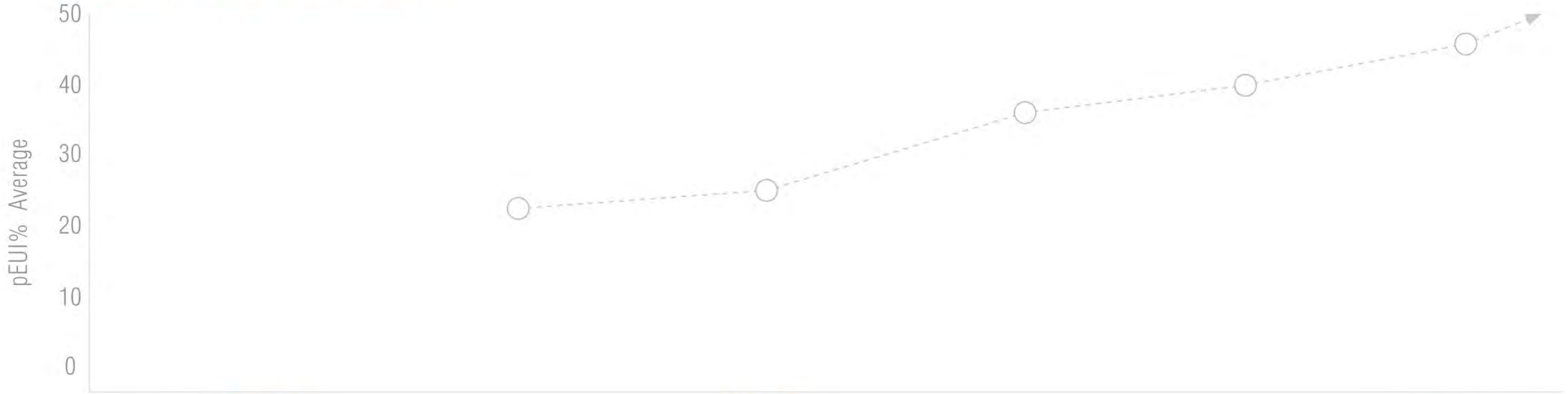
Hennebery Eddy Architects

Net-Positive charrette: the philosophy

TriMet South Terminus: the first step

Portland Community College Newberg Center: achieving goals by industry standards

Net-Positive Design Philosophy & Design Data Exchange:



2011
Partners w/ Energy Trust Oregon New Buildings Trade Ally

2014
3 projects

2015
Hennebery Eddy Signs AIA 2030 Commitment
6 projects

2016
23 projects

2017
24 projects

2018
NZEL Internship Platform to share data
42 projects

Reporting Year / Reported Projects

Examples of Projects Meeting 2030 Target:

Yellowstone Youth Campus

108%

Energy Use Intensity (EUI) reduction

Bend Science Station

100%

Energy Use Intensity (EUI) reduction

Clackamas Fire Station 16

70%

Energy Use Intensity (EUI) reduction

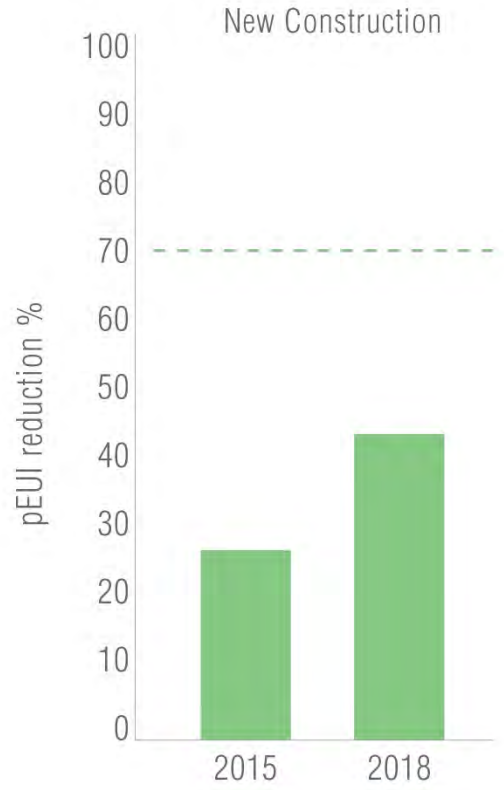
DDx as the Archive:

Knowledge is Power

Reporting and analyzing projects: highlighting progress and room for improvement.

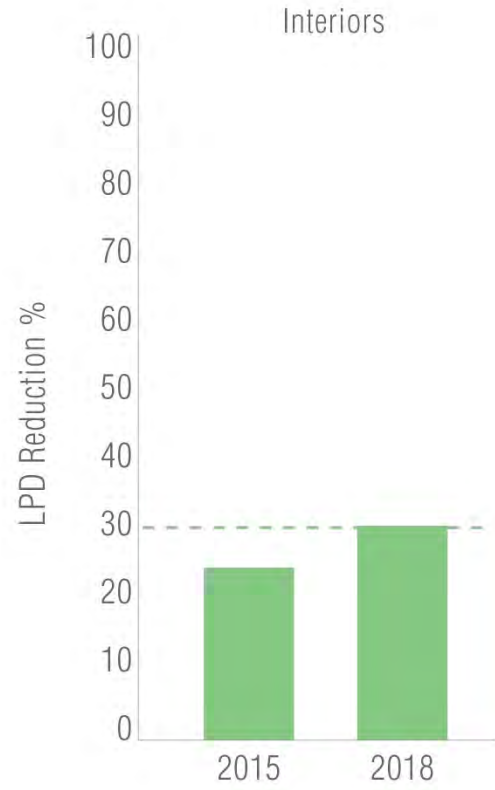
By reporting basic information such as location, square footage, and Energy Use Intensity (EUI), the data is more accessible at a general level.

Design Data Exchange (DDx) has value with the firm, clients, and future generations.



19% improvement

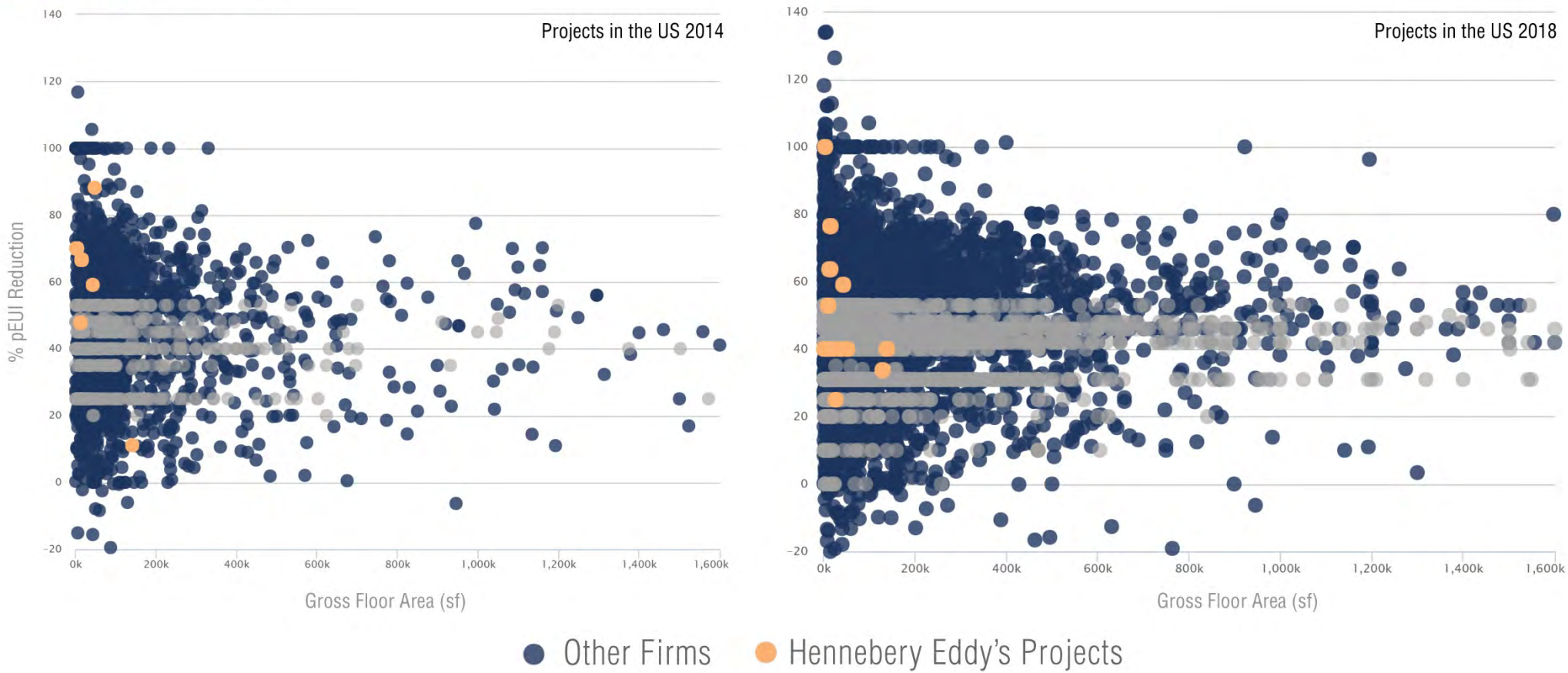
in Predicted Energy Use Intensity



5% improvement

in Lighting Power Density

Locating Our Firm:



2015 ⇢ **2018**

Hennebery Eddy Architects

Net Positive Tools and the DDx:

Define project goals early for projects with a net positive focus: an eco-charrette to get the conversation started with clients.

DDx is a platform for documenting: encouraging energy modeling and a net-positive checklist throughout the design process.

Another resource: Energy Trust Oregon (ETO) offers incentive programs that offset costs to achieve design goals. This includes eco-charrettes, Path to Net Zero, & solar incentives.

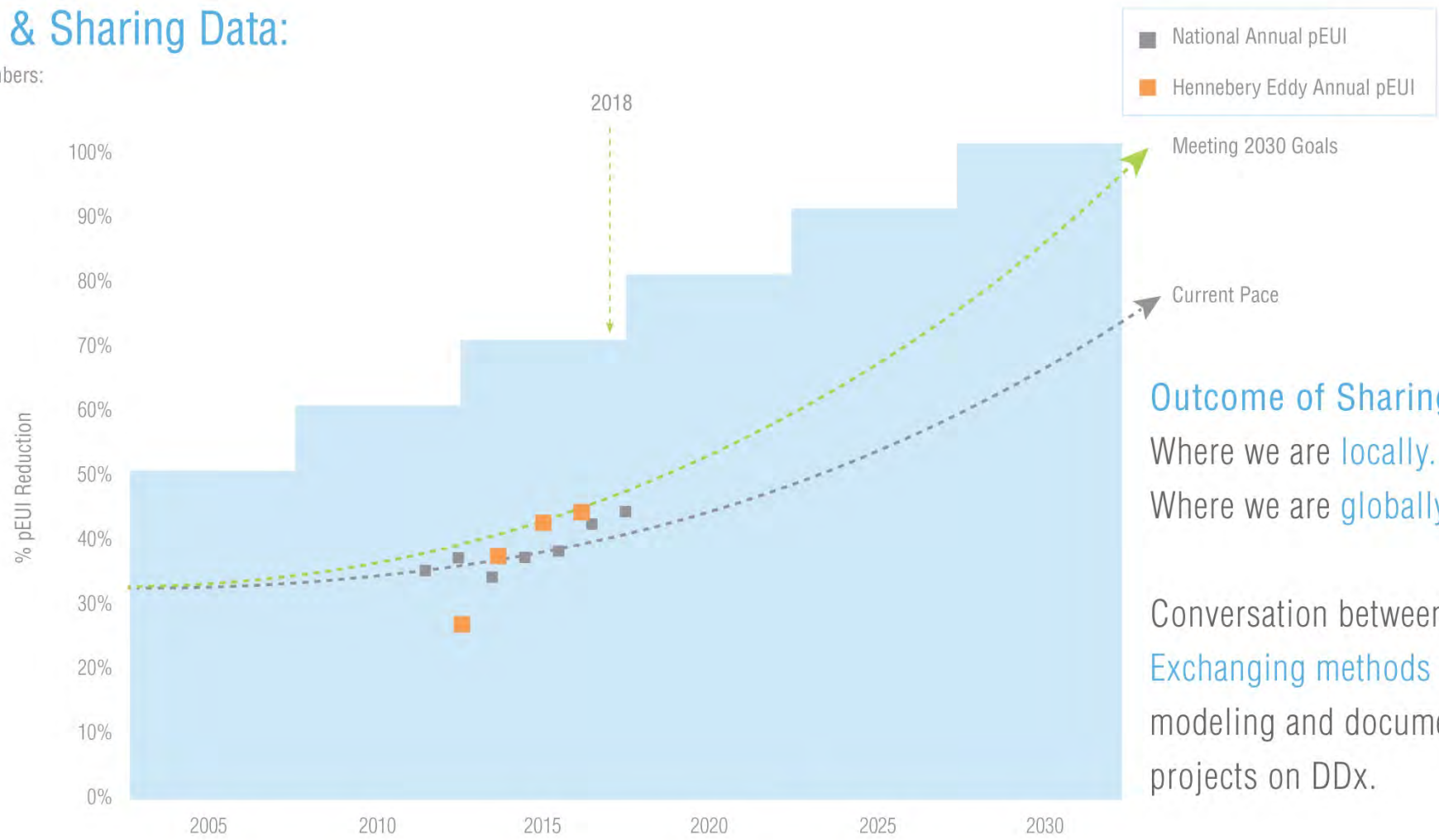
How can historic preservation projects be recognized through DDx?

Sustainability committee participating in a charrette

Reviewing fixtures with representatives from the Yellowstone Youth Campus

Gathering & Sharing Data:

AIA 2030 By the Numbers:



Annual predicted energy use intensity (pEUI) savings is a weighted average of whole building project gross square feet (GSF). pEUI savings is relative to the 2030 Baseline–2003 Commercial Building Consumption Survey (CBECS)[8] and 2001 Residential Consumption Survey (RECS).[9]

Outcome of Sharing Data:

Where we are locally.

Where we are globally.

Conversation between firms Exchanging methods of energy modeling and documenting projects on DDx.

Students watch as solar panels are installed at Cascades Academy of Central Oregon

24.6-kW solar panel array at Cascades Academy of Central Oregon

Net Zero Emerging Leaders:
Extending the Conversation

Sustainability is not a race;
Design Data Exchange is not a competition.

Encourages the philosophy of
"knowledge is power"

Architects play a key role in combating climate change, nearly 40% of US energy is consumed by buildings (AIA).

Design Data Exchange is our way of "climate leadership" – how we can recognize *where we are* and *where we are going*.

HOLST

Net Zero Emerging Leader Internship

Holst Architecture | Energy Trust of Oregon

Holst Architecture

Medium Sized Firm

40 Employees

Architecture 2030 Challenge

2017: 26 Projects

2018: 33 Projects

HOLST

Agenda

HOLST


Research

Why?

Built environment is an energy intensive industry

Design Energy (pEUI)

Site Energy (EUI)

Bake energy data into the design process

HOLST

Best Practices

Tools for Architecture

Sefaira

Autodesk Insight 360

EnergyPlus

Energy Data

Post-occupancy

High Performance Buildings

Smart Grids

HOLST

Holst Method

Challenges

- Not part of a process
- Requires a lot of work at the end of the reporting year

Goals

- Streamline reporting
- Incorporate into the design process
- Create a feedback loop

HOLST


Reporting

Project Team Reporting

REPORTING SPREADSHEET

PROJECT TEAM MEETINGS

DATA CLEANING

HOLST

Architecture 2030 Reporting

*Cost Per Square Foot for internal use only.

*Have to manual enter Climate Zone, green section and gray section into DDx.

*If more rows are needed, go to the right bottom edge of the table, click and drag blue corner symbol down to add more rows.

REQUIRED

Project Name	Project ID	Project Category	Construction Type	Project Phase	Country	St
text	numeric	selection option	selection option	selection option	selection option	te
Example Project	*11-025.00*	*Non-Residential*	*New Construction*	*Design Development*	*United States of America*	*Or*
HDC-Asian Health & Service Center	15-043.00	Non-Residential	New Construction	Design Closeout Final	United States of America	Or
Jigme Singye Wangchuk Law Library(RI)	15-056.00	Non-Residential	New Construction	Construction Administration	Other-Asia	
72 Foster: SD-CA	15-086.02	Residential	New Construction	Design Closeout Final	United States of America	Or
LISAH	15-090.00	Residential	New Construction	Construction Documents	United States of America	Or
Mississippi & Fremont 2016	16-002.00	Residential	New Construction	Design Closeout Final	United States of America	Or
Overlook - West	16-024.00	Residential	New Construction	Construction Administration	United States of America	Or
Overlook - East	16-024.01	Residential	New Construction	Construction Administration	United States of America	Or
Courtyard - South Lake Union	16-030.00	Interior Only	Major Renovation of Existing Building	Construction Administration	United States of America	W
SCCC: Holst Architecture CA	17-016.08	Non-Residential	Major Renovation of Existing Building	Construction Administration	United States of America	Or

Batch Upload

TIME SAVER

SEPARATE TEMPLATE

INTERNAL DATA

HOLST

Design Data Exchange (DDx)

- Information challenges:
  - 3D Models
  - GMP drawings
  - Energy models
  - HVAC System information (ME)

HOLST

Data Analysis

DDx Data Report

- Percentages towards a goal
- Overall program performance
- Assumption: already on board for sustainable buildings

Supplement to DDx

- Make the argument for sustainable designs
- EUI relative to:
  - Design code
  - Energy model
  - Building type
  - Materials

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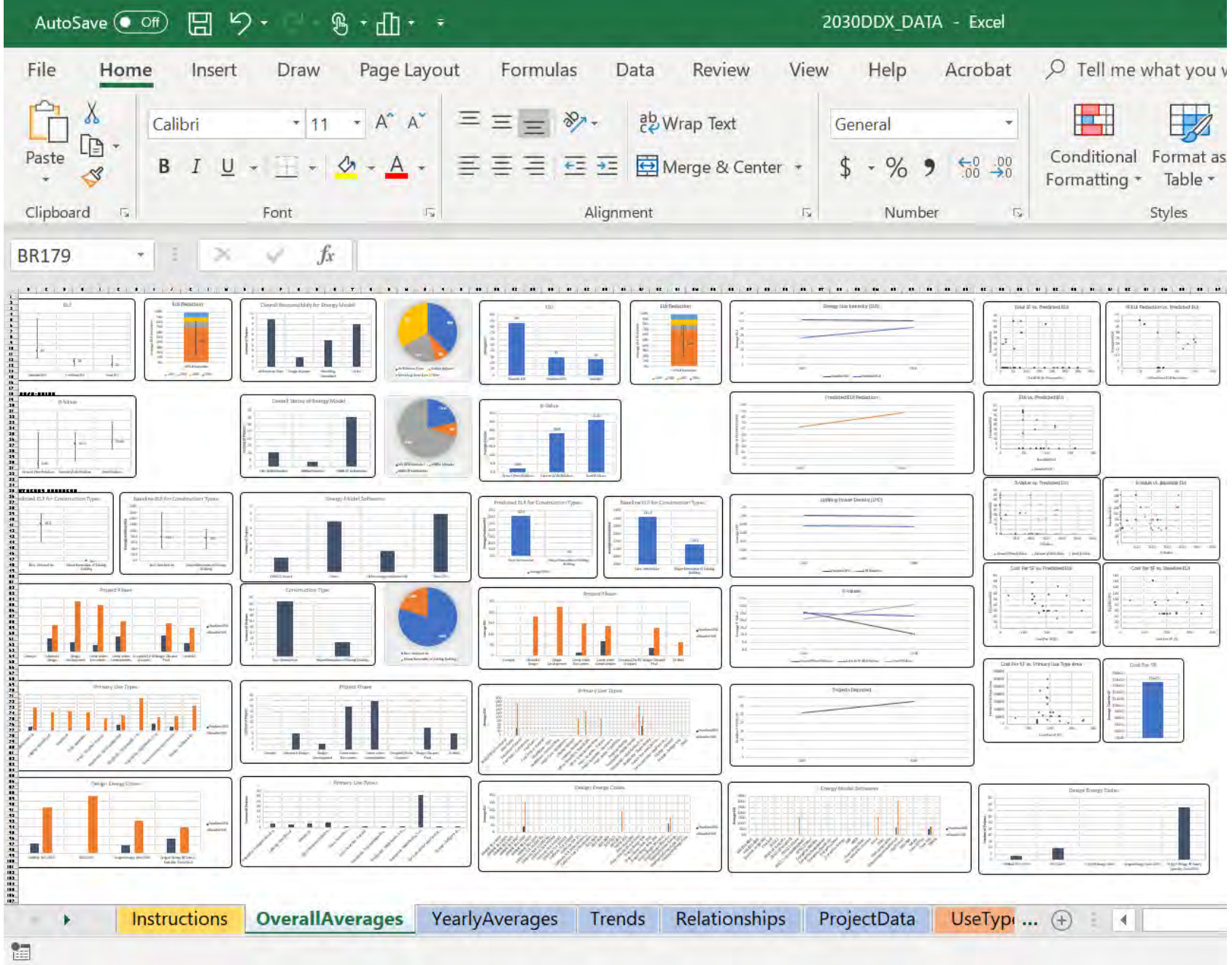
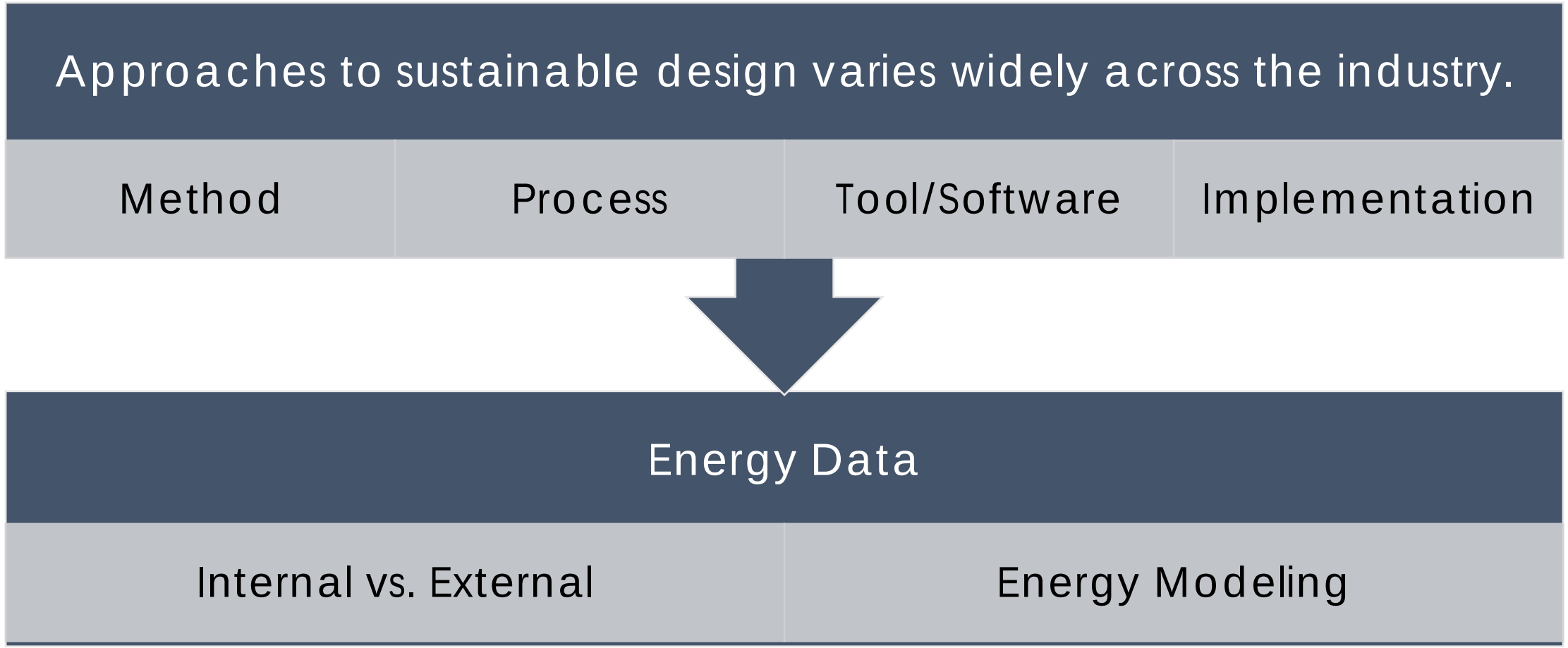

AutoSave Off
2030DDX_DATA - Excel
File Home Insert Draw Page Layout Formulas Data Review View Help Acrobat
Tell me what you
Paste
Calibri
11
Wrap Text
General
Merge & Center
Conditional Formatting
Format as Table
Clipboard
Font
Alignment
Number
Styles
BR179
Instructions
OverallAverages
YearlyAverages
Trends
Relationships
ProjectData

HOLST

Lessons Learned

NZEL Lunch



HOLST

Working at Holst

COMMUNITY

PROJECT SITE VISIT

MICROBIAL BUILT ENVIRONMENT SPEAKER

NEW HQ CHARETTE

GREEN TEAM

HOLST

Future Challenges

Design Energy and Site Energy

- Benchmarking
- Energy modeling

Information collection

- Design source energy
- Design CO2e intensity
- LCA/proxy

HOLST

Next Steps

ENERGY, MATERIALS AND WATER

IN-HOUSE ENERGY MODELING

SUSTAINABLE DESIGN PROCESS

HOLST


Thank You!

Net Zero Emerging Leaders Internship

Energy Use Intensity Feedback and Integration of Energy Modeling

Energy Trust of Oregon

Jessica Meylor

Zaq Dohallow, Amy Sheckla-Cox

Otak

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...

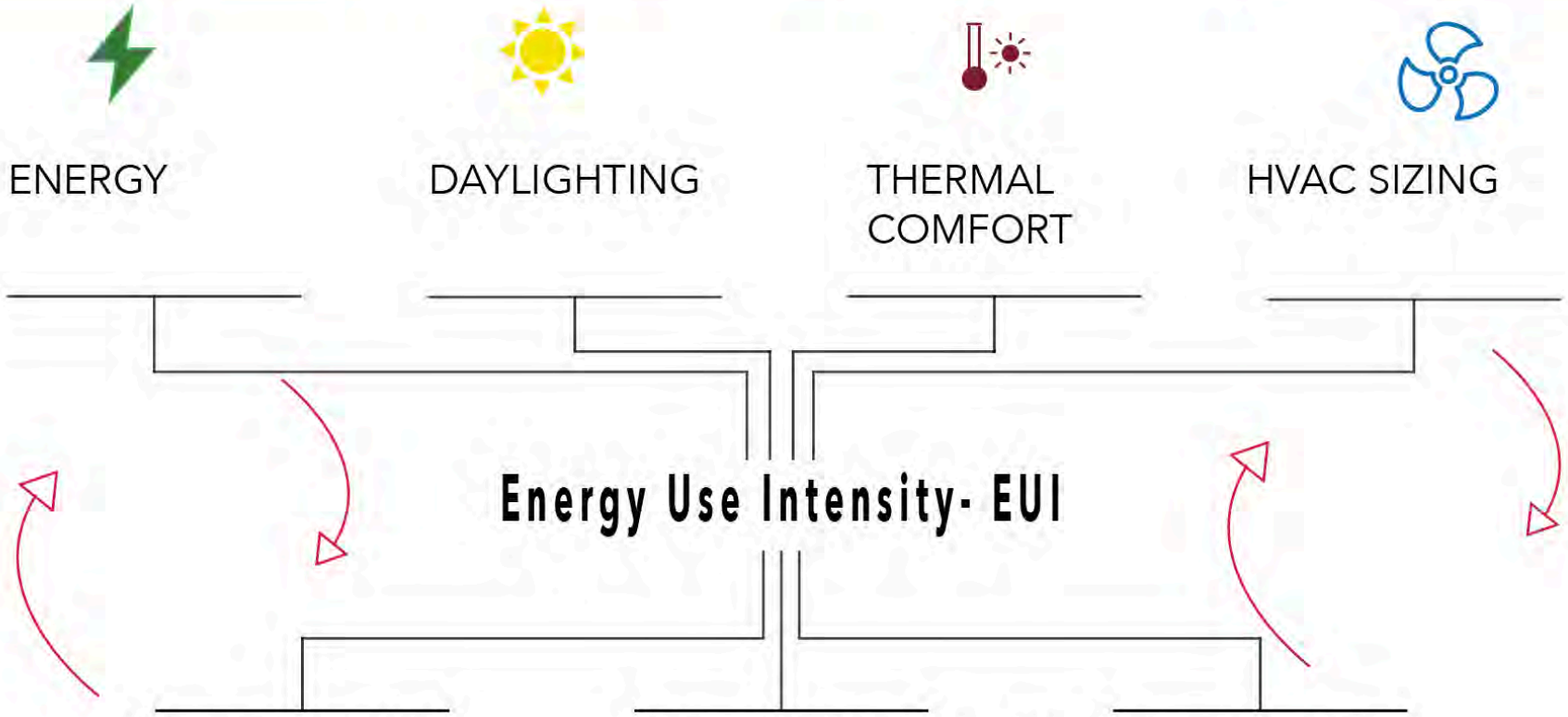
2. used troubleshooting techniques to understand and navigate best tool practices for optimal use...

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?

Output Analysis



Input Assessment

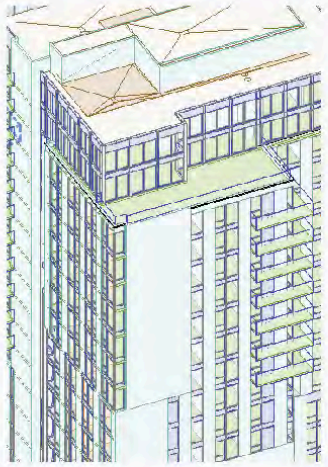
Using Sefaira For Energy Modeling

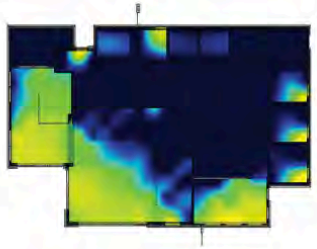
Sefaira Architecture

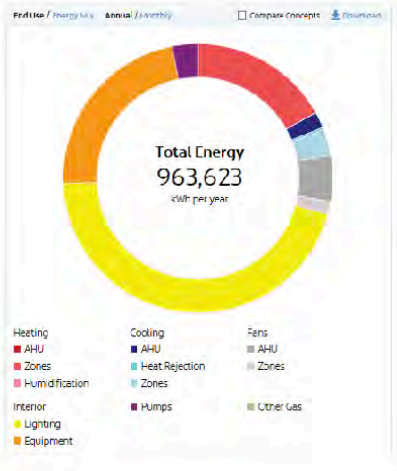
- Explore design options and understand impacts on building performance
- Analyze building envelope, HVAC Systems and on-site renewable energy potential
- Test effectiveness of current or compared energy conservation strategies

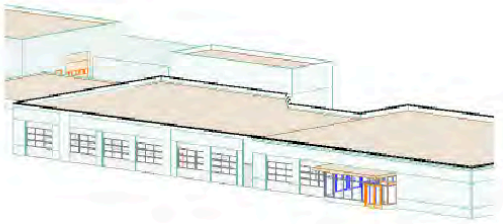
Impacted Design Process Phases

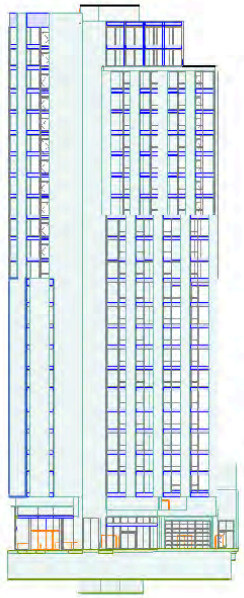
- Project Win/ Kick Off; Concept Pre-Design; Design Development

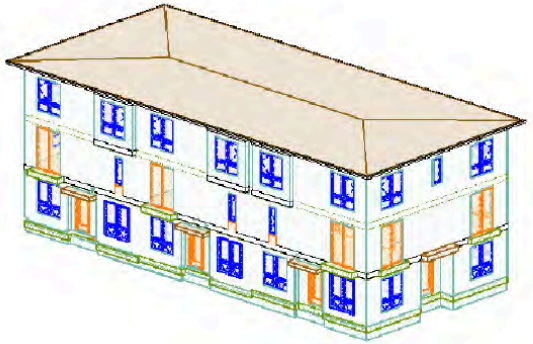


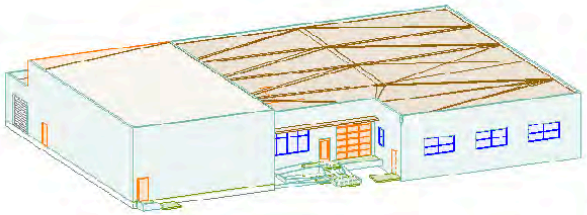


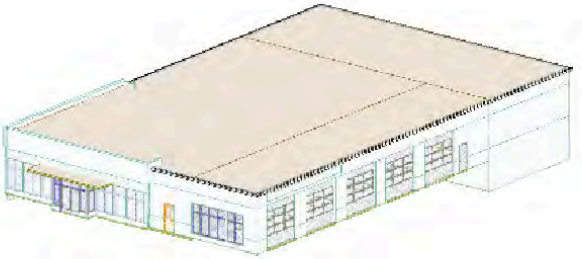












Building Type Use

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

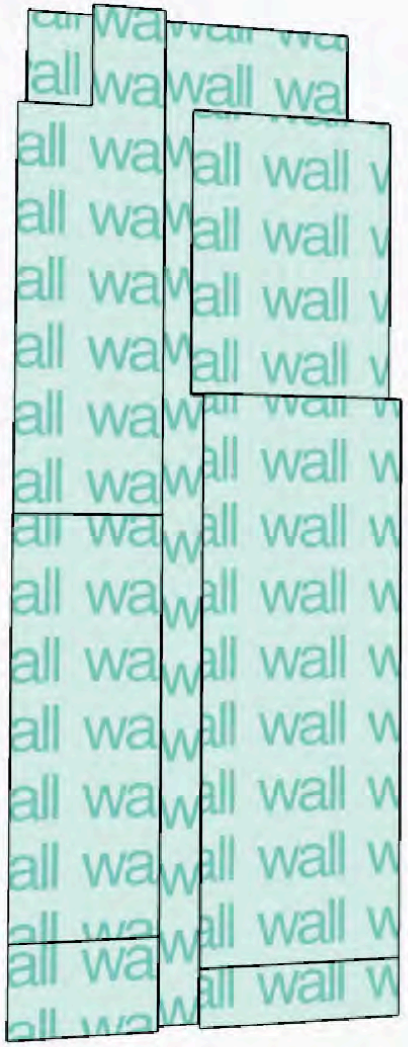
Zero Tool Baseline EUI: **69.3** kBtu/sf/yr

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

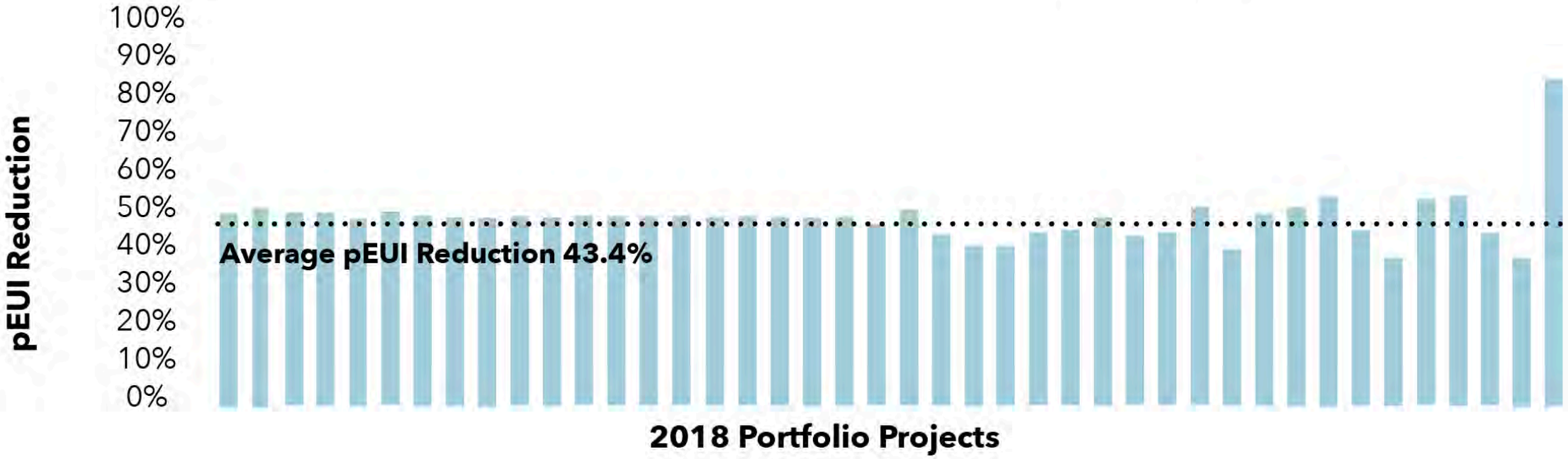
Revit Energy Model

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.



Moving Forward

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

Speranza Architecture + Urban Design

The Firm

- Office of 6 located in Eugene, Oregon
- Firm led by Philip Speranza, AIA
- Multidisciplinary firm focusing on
  - Residential
  - Commercial
  - Master Planning
  - Urban Design

Speranza Architecture + Urban Design

NZEL Internship

Our Commitment to the 2030 Challenge, and Ultimately, Better Buildings:

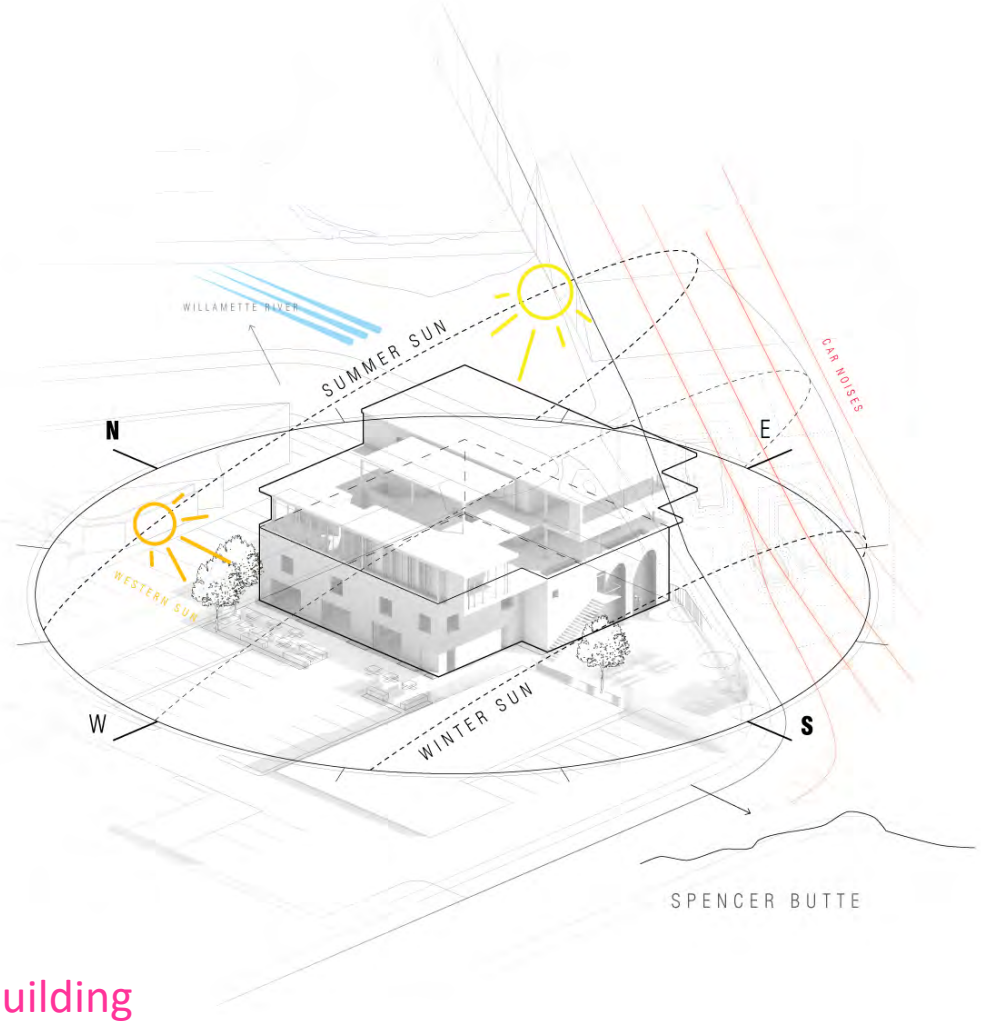
Buildings are a reflection of their spiritual makeup. By creating positive atmospheric experiences, our goal is not only to invest in the sustainability of a building, but also the development of sustainable behaviors.

At SA+UD we pledge to lead efforts towards the design of better buildings and aim to define how well-being in a building can amplify sustainable living.

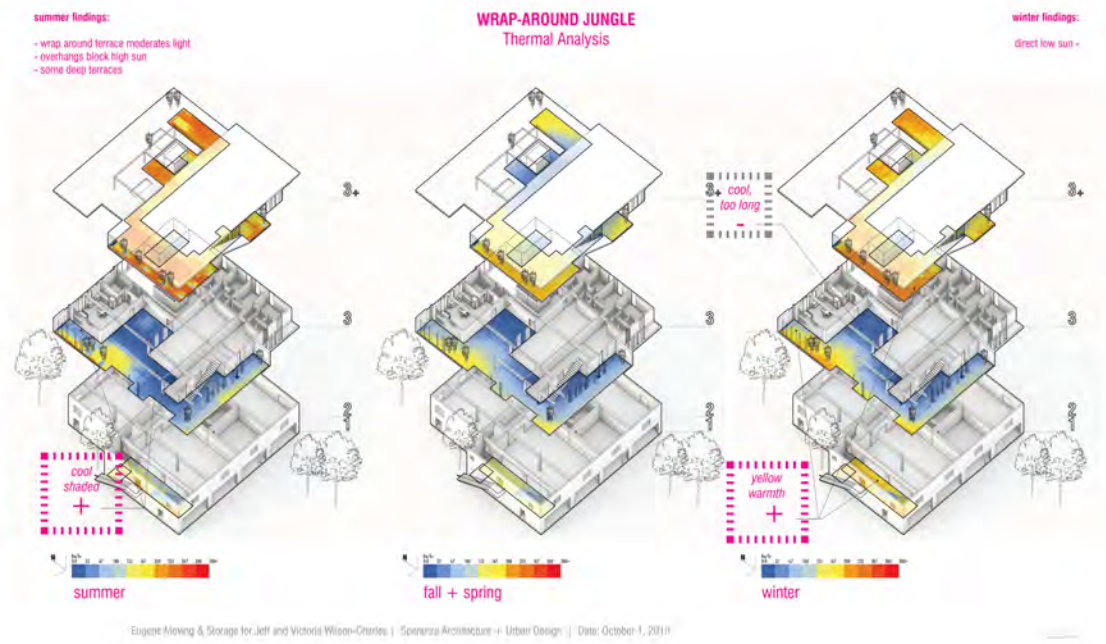
Speranza Architecture + Urban Design

NZEL Internship

Philosophy & Energy

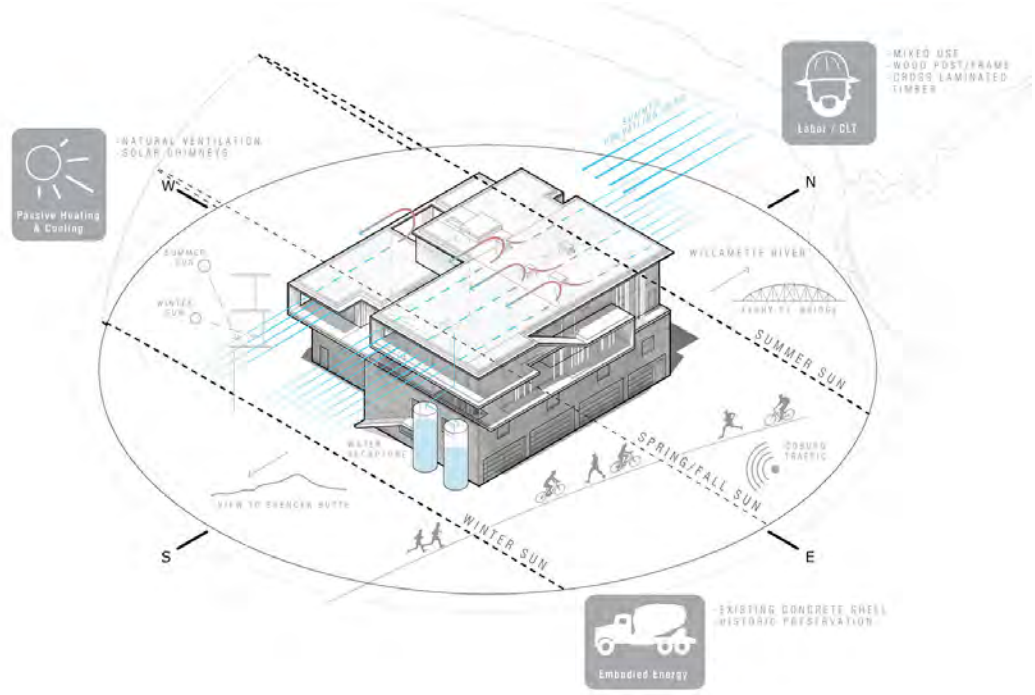


Building Form

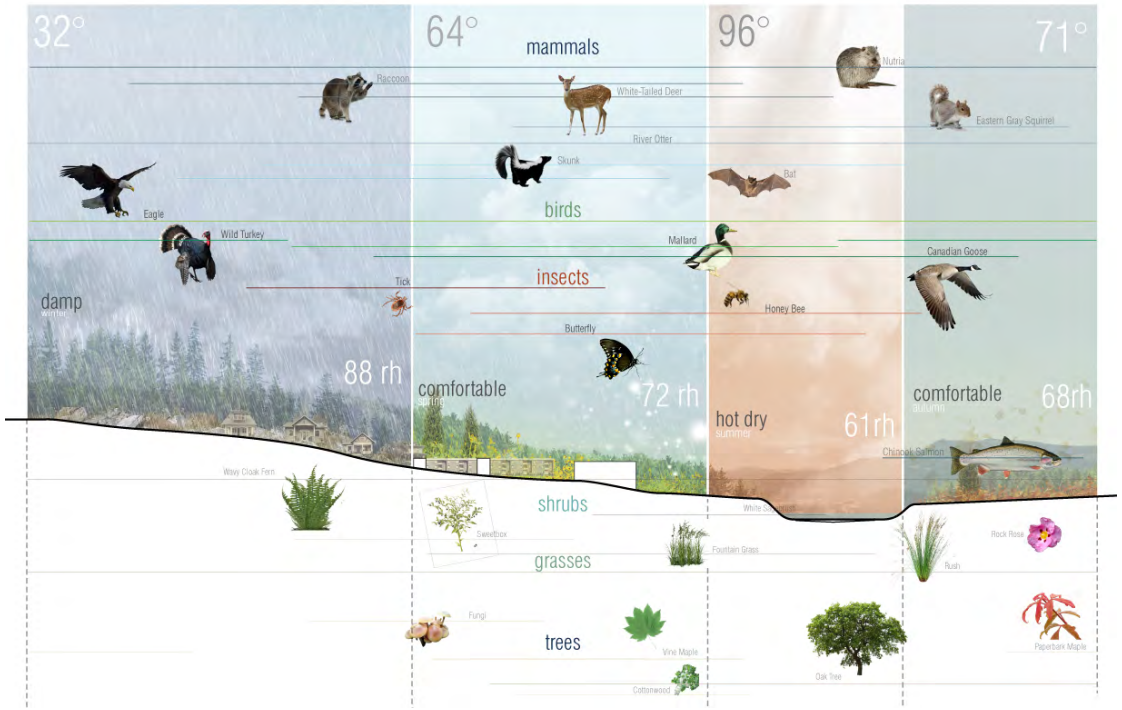


Big Move – Additive or Subtractive

Philosophy & Energy



Sustainable
Strategy



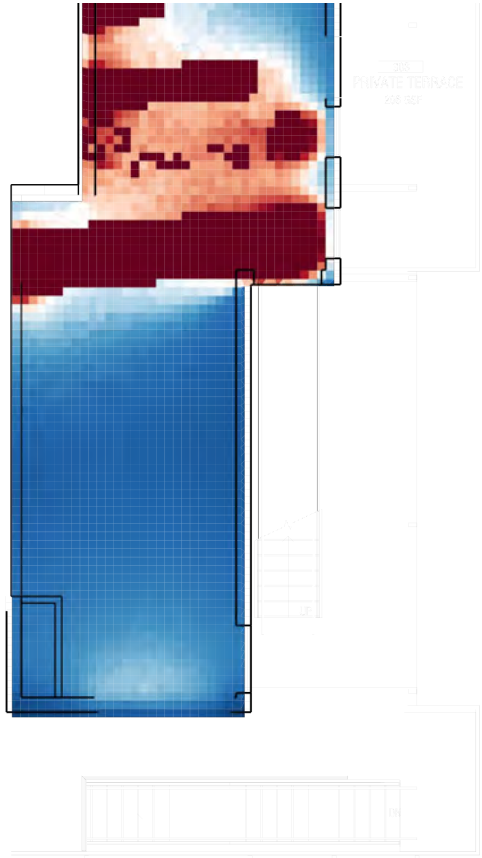
Ecological
Incorporation

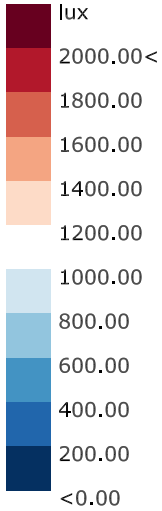
NZEL Internship

THEN - NOW

The Experience – The Future Impact From SAUD & Energy Trust

Real Data





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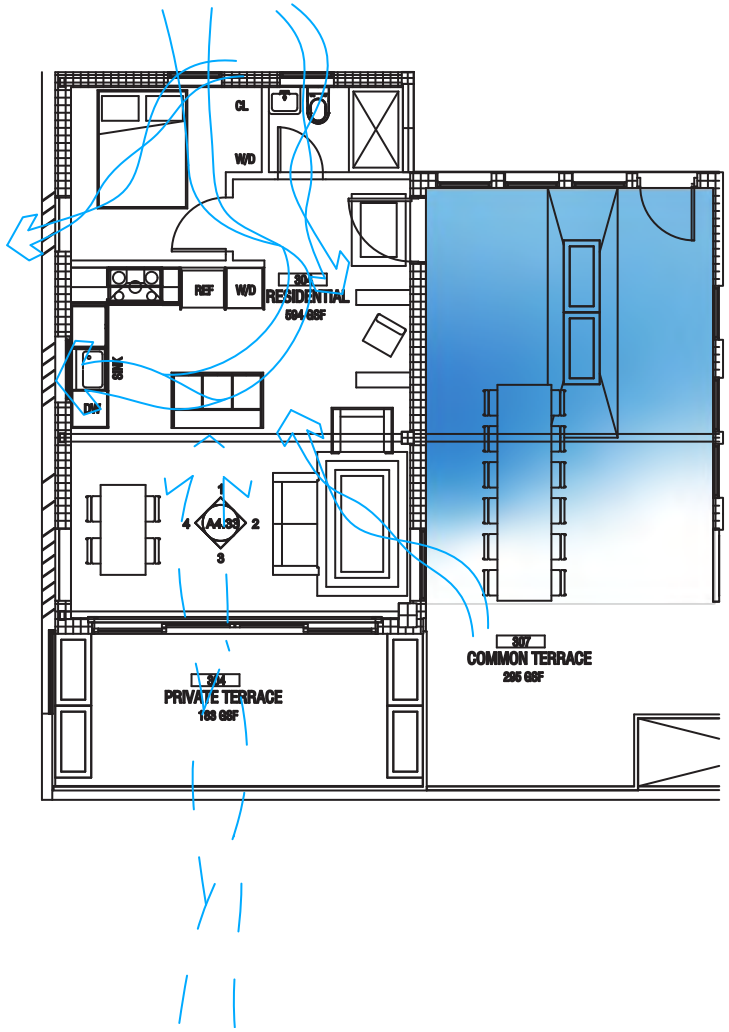
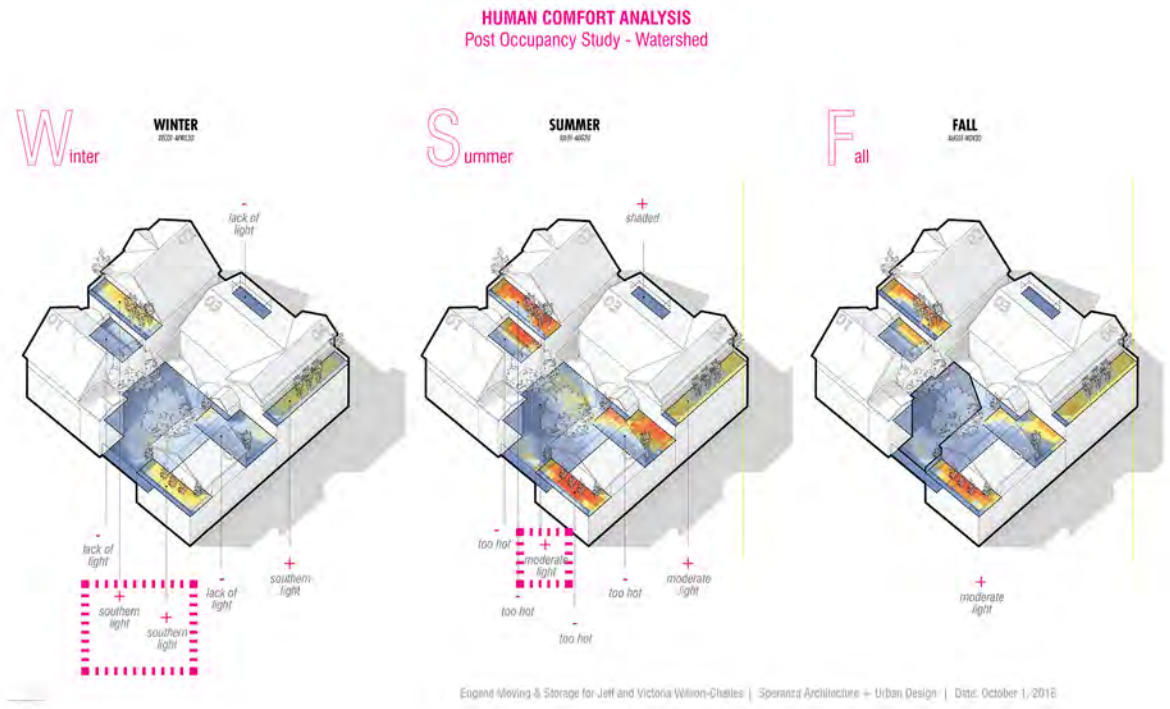


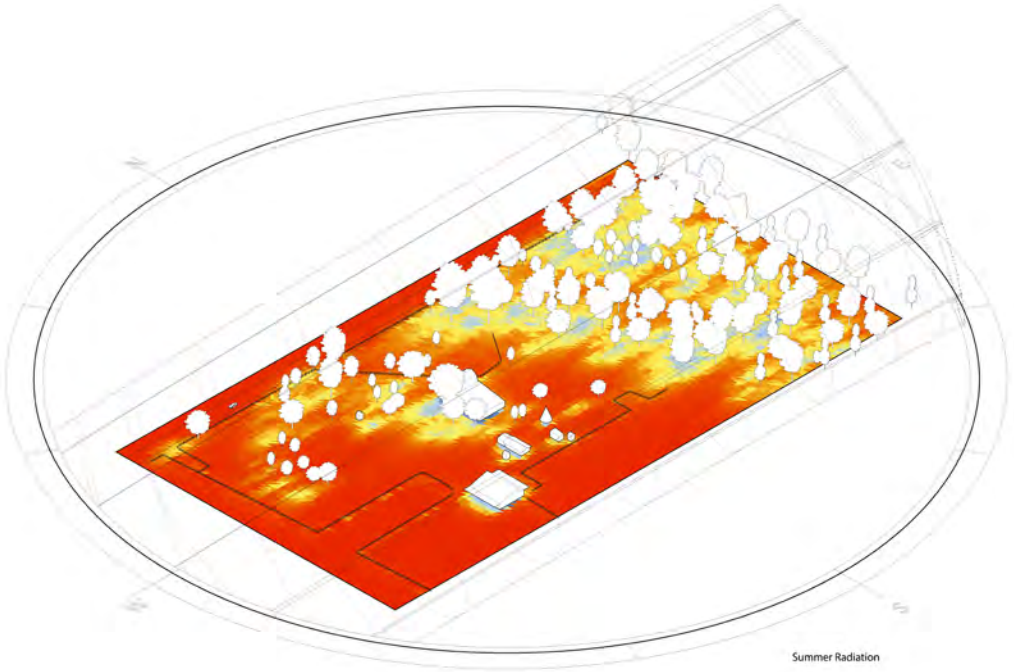
First-hand experience of presenting real data to a client and the impact it makes on their decision-making towards better buildings

Speranza Architecture + Urban Design

NZEL Internship

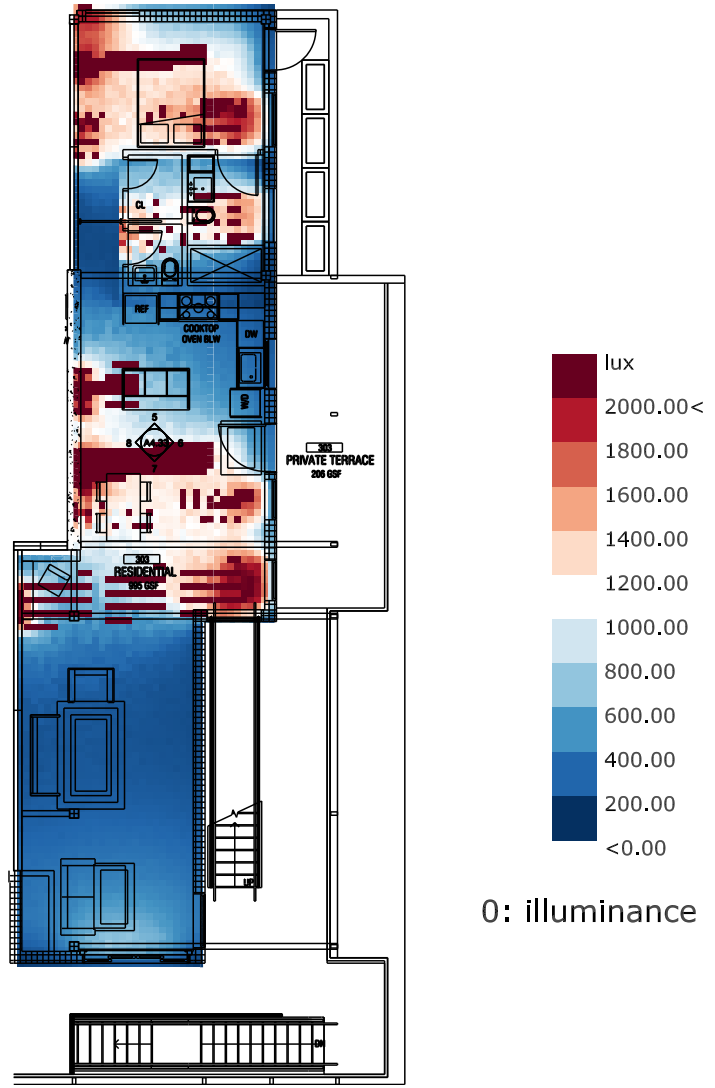
Analysis





Analysis on the front end of the design, partnered with our philosophy, helps us understand how the two can relate and allow us to make better buildings.
We then can create a method of designing sustainable behaviors and make a better contribution to energy efficiency.

Sustainable Behaviors



What the analysis can do to inform the design decision, how it can teach and inform the client, and ultimately how it can teach the user about their contribution to energy efficiency.

Our Effort Towards Efficiency

Speranza Architecture + Urban Design

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