

**Bull Run**  
TREATMENT  
PROJECTS

*Our water: Safe and abundant  
for generations to come*

PORTLAND WATER BUREAU

## Bull Run Treatment Projects

**ENVISIONING a Green Building Policy  
that LEEDs the Way –  
Holistic Sustainability for  
Infrastructure Facility Design**

April 28, 2022



PNWS-AWWA  
**Water 2022**  
Tacoma, WA • April 27-29

# Agenda

1. Welcome/Introductions
2. Bull Run Filtration project overview
3. Sustainability Targets
4. LEED
5. Envision
6. Green Building Policy
7. ETO – Path to Net Zero
8. Q&A



# Introductions



**Tanya Doran, LEED Green Associate,  
Fitwel Ambassador  
Stantec Consulting**  
Western Canada Carbon Lead  
Tanya.Doran@Stantec.com

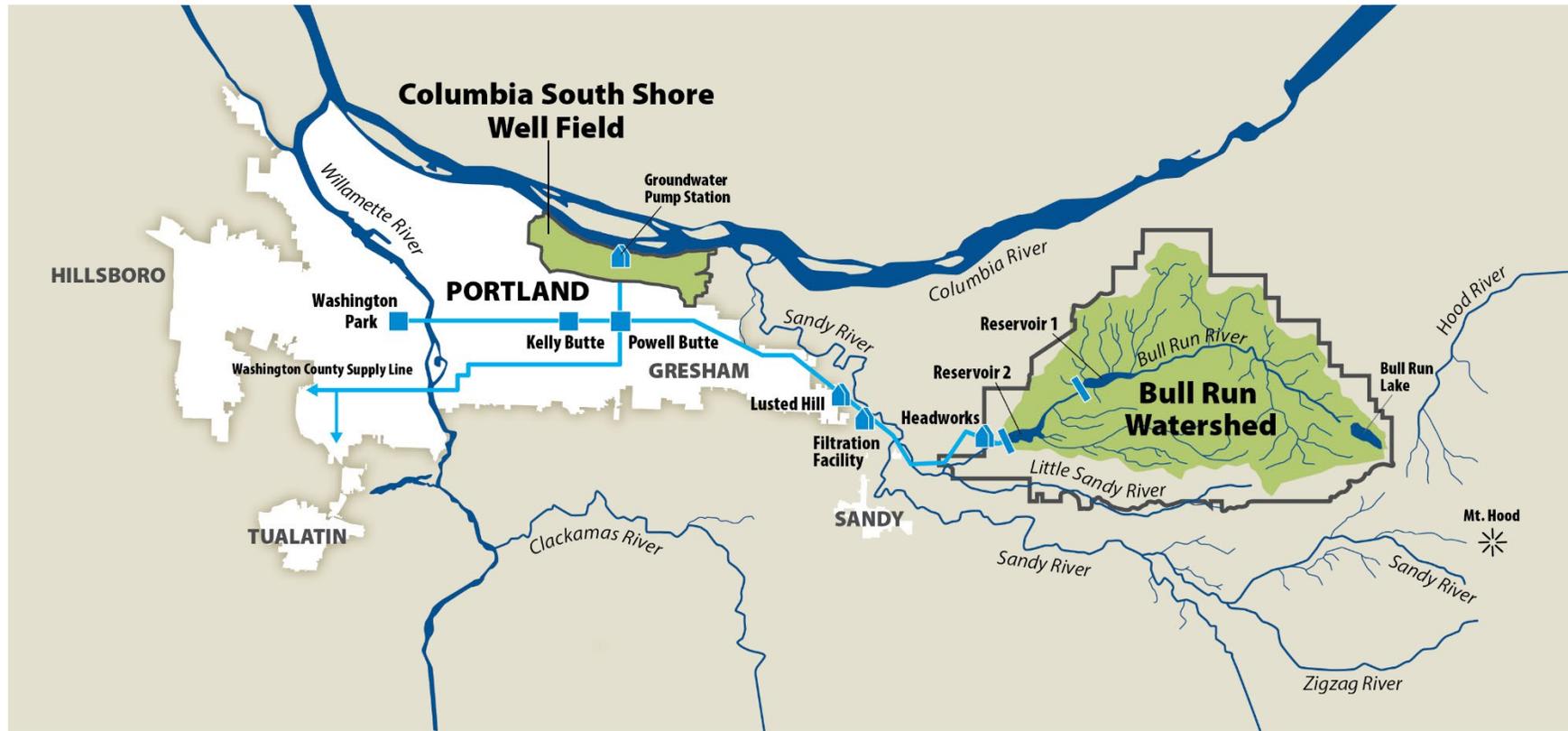


**Christopher Bowker, P.E.**  
**Portland Water Bureau**  
Treatment Projects Compliance and  
Environmental Coordinator  
Christopher.Bowker@portlandoregon.gov



**Summer Fowler Well Faculty,  
LEED AP+ BD&C, Assoc. AIA,  
OAME Board  
Owner + President  
ecoREAL Solutions**  
summer@ecorealsolutions.com

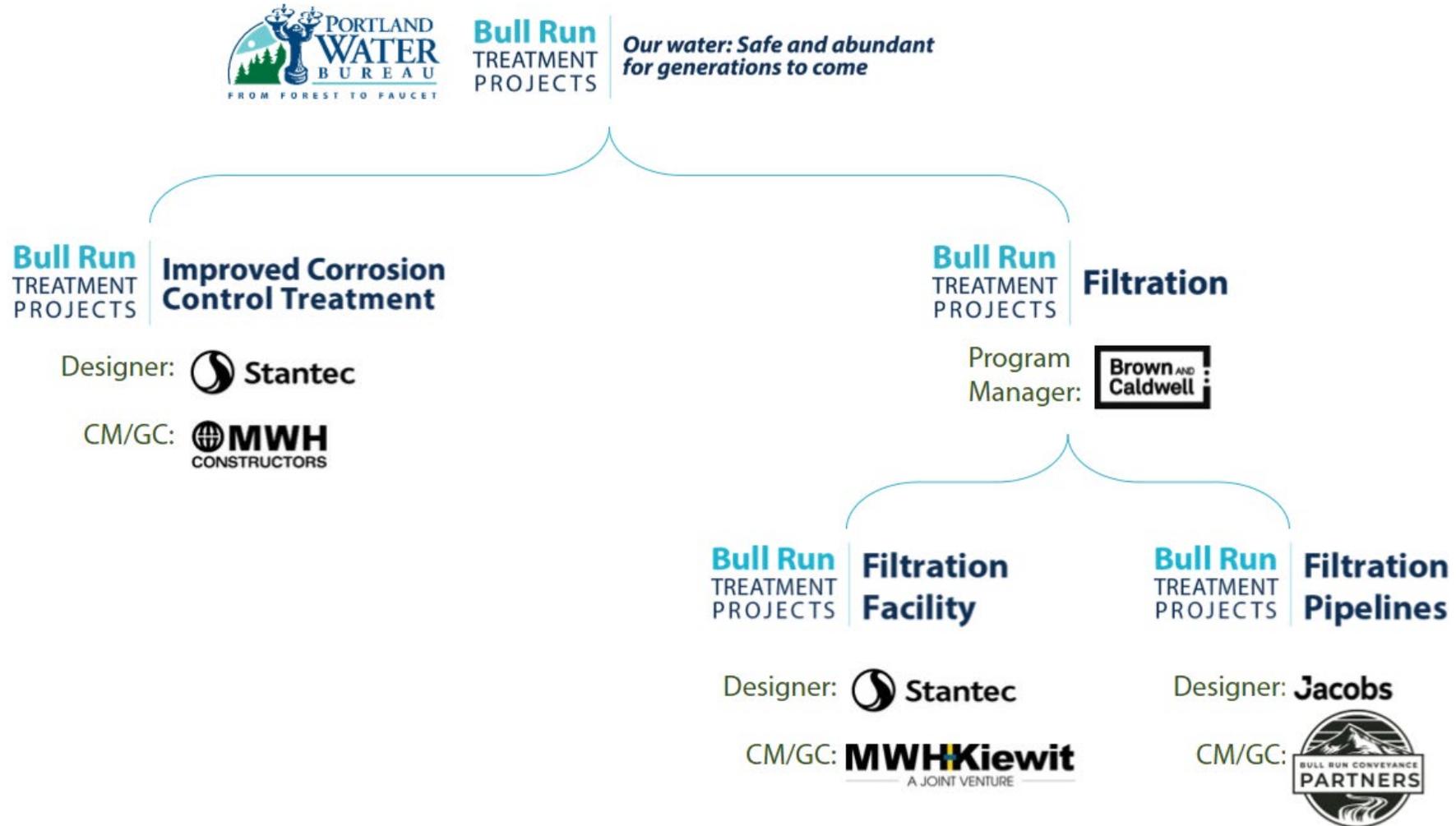
# Thanks to thoughtful planning, Bull Run has been a source of excellent water since 1895



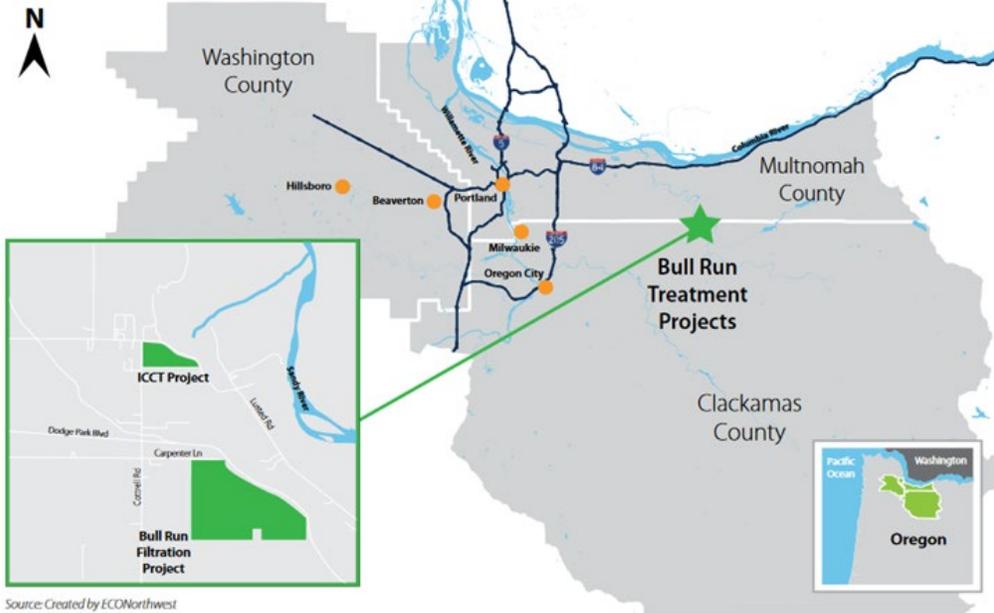
- Serves almost 1 million people
- 2 supplies for water
- Uses 100 million gallons of water on an average day



# Bull Run Treatment Program



# Project Location



Source: Created by ECNorthwest







**PORTLAND WATER BUREAU**  
FROM FOREST TO TAP

**BULL RUN TREATMENT PROGRAM**  
Water Treatment Plant and Conduits

# PROGRAM CHARTER



**PROGRAM VISION**  
Protecting the water we love for generations to come

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**MISSION**  
Deliver the Bull Run Treatment Program in a fiscally responsible and sustainable manner to meet regulatory requirements and exceed customer expectations.

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**GOALS AND OBJECTIVES**

- Continue to produce excellent tasting water while meeting regulatory requirements and water quality goals
- Engage O&M staff throughout the program lifecycle to create an adaptable system with a successful handoff
- Advance social equity and D/M/W/ESB capacity
- Maintain transparent communication, stakeholder engagement, and good neighbor practices
- Emphasize a safe work environment and minimize lost work incidents
- Execute a sustainable project that minimizes its carbon footprint
- Complete construction well in advance of compliance deadline to allow time for commissioning
- Create a fun, collaborative program team that encourages sharing lessons learned

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**WE VALUE**

- One team with a passion for achieving the Program vision, with high morale, and professional fulfillment for team members
- An inclusive and collaborative culture
- Being respectful and honest with each other, all stakeholders, and the public
- Sound investments for tangible benefits
- Team members that are creative and flexible

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**SUCCESS FACTORS**

- Consistently meet all water quality goals – both internal and external
- The plant is safe and easy to operate
- Meet equity and D/M/W/ESB goals for the program
- Neighbors, City Council, and the public are pleased with the result
- Construction is executed safely
- On-schedule delivery at best value budget
- Program is recognized for excellence

*Handwritten signatures and notes are present at the bottom of the page, including names like 'James', 'John', and 'Mike'.*

# Sustainability Management Plan

## Guiding Principles

- PWB Mission, Vision and Values

## Commitment to Sustainability

- City of Portland Green Building Policy

## Roles & Responsibilities

- PWB, Team

## Management Frameworks

- LEED
- Envision

## Scope

- Overall project, occupied buildings

## Process and Timeline

- Milestones through design, construction and post-occupancy

# Current commitments

The screenshot shows the City of Portland website with the following content:

- Header: The CITY OF PORTLAND Oregon, Search PortlandOregon.gov, Sign In, +Aa -Aa \*Aa
- Navigation: City Home, Government, Charter, Code and Policies, City of Portland
- General Information: 503-823-4000, EMAIL: cityinfo@portlandoregon.gov, MORE CONTACT INFO
- Breadcrumbs: Portland Policy Documents > Environment (Build) > Green Building
- Policy List: ENB-9.01 - Green Building Policy, ENB-9.02 - Green Building Policy Update (superseded)
- Subscribe to RSS button
- Policy Title: ENB-9.01 - Green Building Policy
- Policy Type: GREEN BUILDING POLICY, Binding City Policy, BCP-ENB-9.01

- A. Register and certify for the US Green Building Council's Leadership in Energy and Environmental Design (LEED) Building Design and Construction (BD+C) at the Gold level **and/or** achieve Living Building Challenge status.
- B. Achieve 15 percent energy savings beyond the applicable Oregon Energy Efficiency Specialty Code.
- C. Incorporate on-site renewable energy systems **and** meet the State of Oregon's 1.5 percent for Green Technology requirement.
- D. Earn or meet LEED's advanced energy metering credit requirements to support ongoing energy monitoring and commissioning.
- E. Earn or meet LEED's enhanced commissioning credits requirements.
- F. Use native and/or non-invasive drought-tolerant plants, and use no potable water for irrigation, except for the first two years to establish plantings, or in cases of drought.
- G. Select WaterSense-labeled products for all eligible fixtures to reduce total potable water use by at least 20 percent over the building's estimated baseline.
- H. Cover the entire roof, minus skylights, mechanical systems, and fire and access routes, with an ecoroof. Exemptions to this requirement must be approved by the Commissioner-in-Charge of the bureau or office after completing the compliance check-sheet in Appendix A. Bureaus and offices are encouraged to consult with the Bureau of Environmental Services for technical assistance.
- I. Incorporate stormwater management and related watershed enhancement strategies that support Salmon Safe certification during construction and after project completion.
- J. Incorporate measures to reduce bird strikes and fatal light attraction, including treatment of exterior glass and glazed surfaces, lighting design, best management practices and other applicable measures as specified in Appendix B.
- K. Provide or lease no more than the minimum auto parking required by code. In extraordinary circumstances, with written approval from the Bureau of Transportation, and with commitment to implement an approved Transportation Demand Management (TDM) Plan, additional on-site auto parking above code minimum may be provided. Additional auto parking shall be limited to the minimum shown in a parking demand analysis approved by the Bureau of Transportation. Extraordinary circumstances may include: visitors or employees arriving or departing a site when there is no transit service within ¼ mile of the site and there is insufficient on-street parking within ¼ mile of the site to meet projected demand. City fleet vehicle parking is exempt from this requirement.



More info at:

<https://www.portlandoregon.gov/citycode/article/54355>

# Sustainability

Green Building Policy

LEED v4 Gold

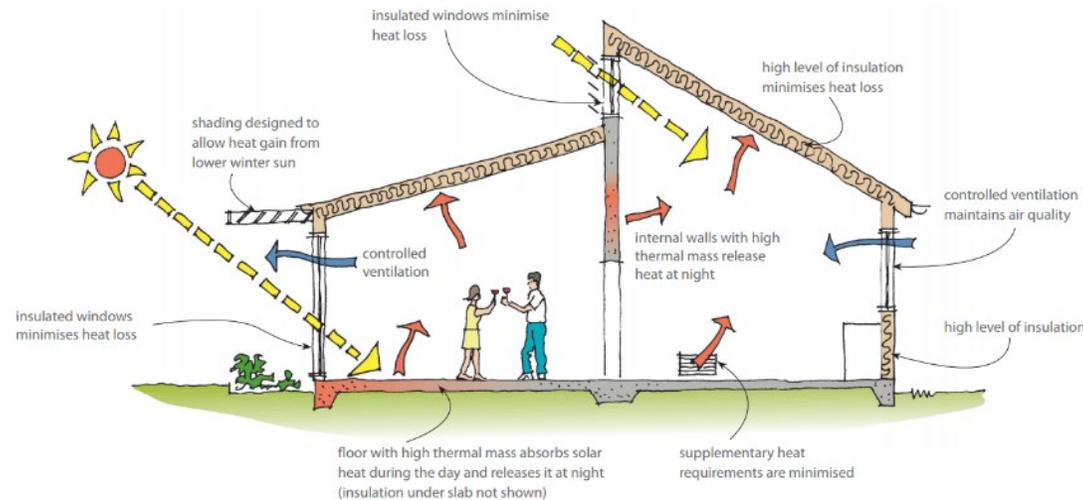
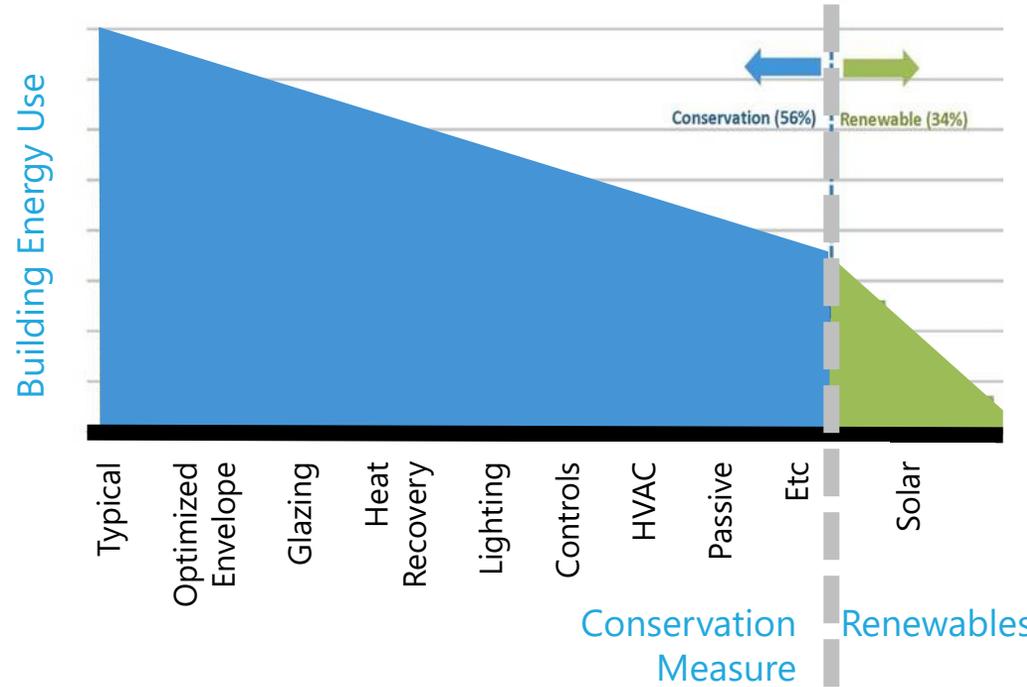
Energy Points

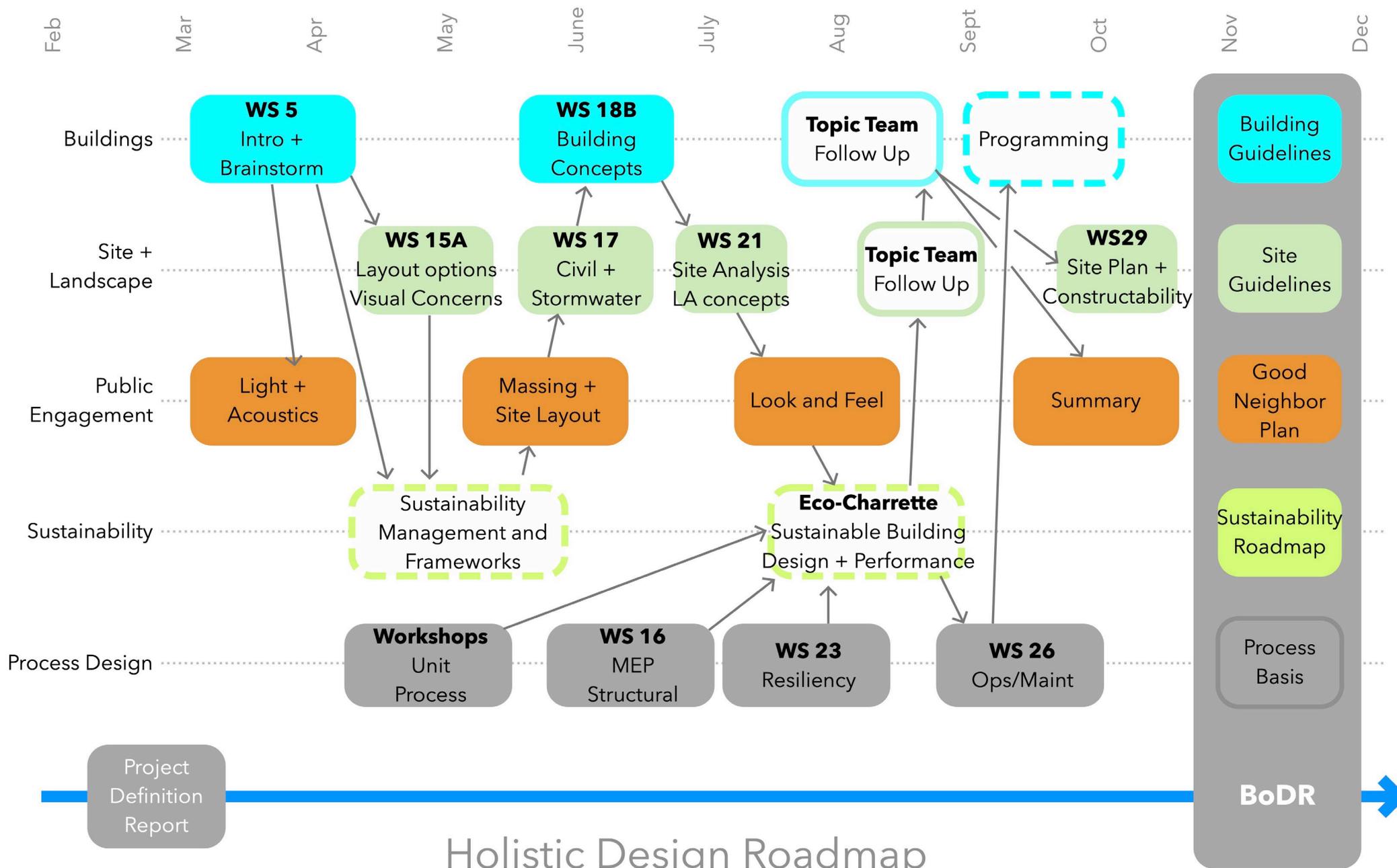
Net Zero Energy

Passive Design

High Performance

Renewables





# Holistic Design Roadmap



ENVISION™



## **ENVISION PROJECT LEVEL**

Sustainability  
Framework  
Certification  
optional

## **LEED = BUILDING LEVEL**

Rating System  
City of Portland  
Green Building  
Policy

**Holistic  
Design**

# LEED BD&C (*Building* Design & Construction)

To reverse contribution to global **climate change**

To enhance individual **human health** and well-being

To protect and restore **water resources**

To protect, enhance, and restore **biodiversity** and ecosystem services

To promote sustainable and regenerative **material resources** cycles

To build a **greener economy**

To enhance social equity, environmental justice, **community** health, and quality of life



# Determining Levels of Achievement

## Credit Categories

### Prerequisites

### Credits

Intent

Requirements

Intent

Requirements

Exemplary Performance

- Has Minimum Program Requirements
- Prerequisites and credits
- Most credits are yes/no – some have some degree of scaling
- Scoring is based on the percentage of applicable points achieved
  - Certified 40-49 points
  - Silver 50-59 points
  - Gold 60-79 points
  - Platinum 80 + points

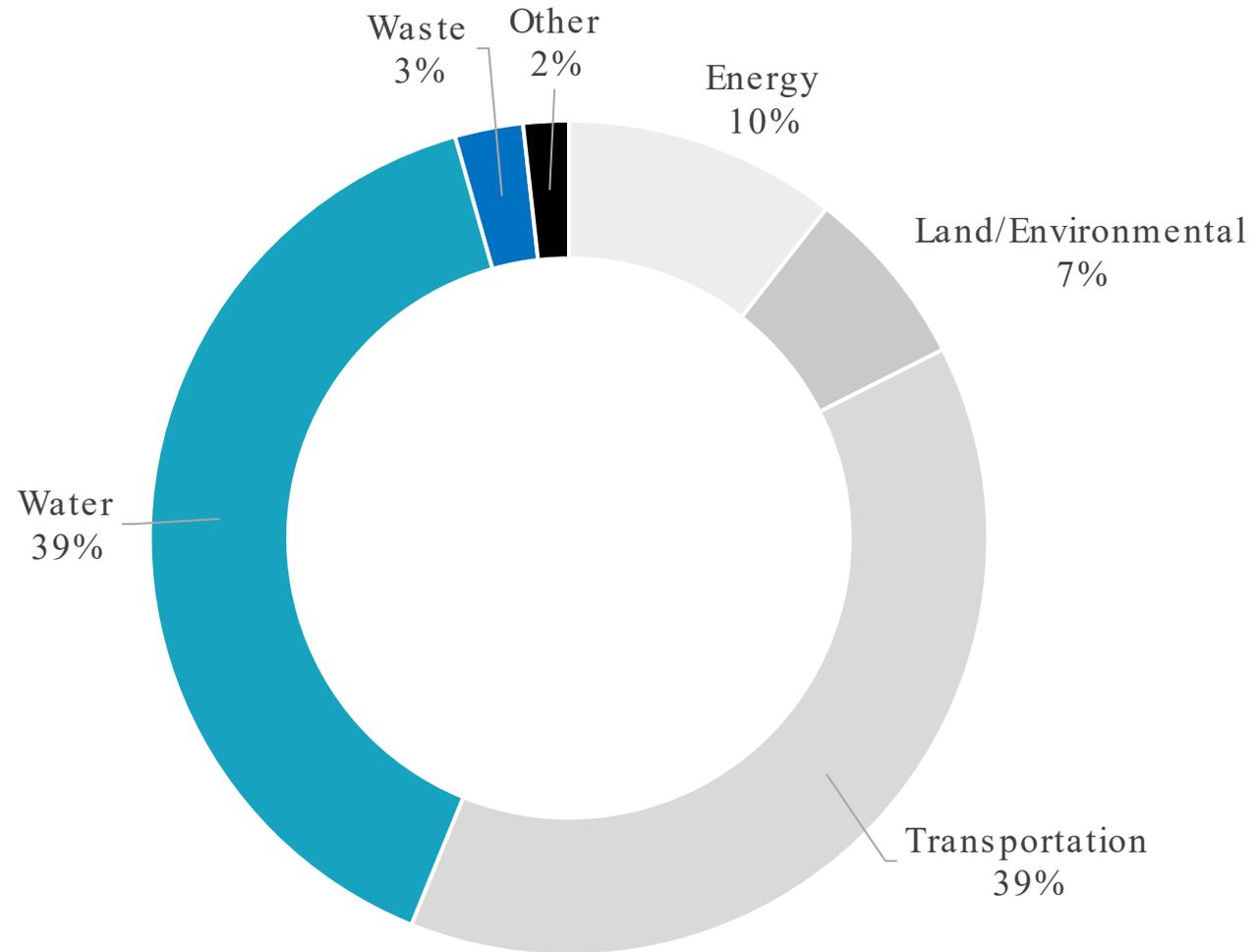


# Determining Levels of Achievement

- Filtration Facility Administration Building is targeting
  - Gold 60-79 points



# Envision Projects by Sector





## Natural World

14 Credits



## Leadership

12 Credits



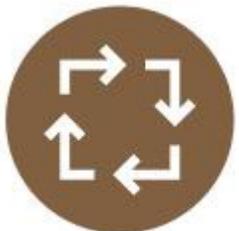
## Climate and Resilience

10 Credits



## Quality Of Life

14 Credits



## Resource Allocation

14 Credits

# Major Categories

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Credits are organized into five categories

# Envision credits



**Quality  
Of Life**  
14 Credits

## WELLBEING

- QL1.1** Improve Community Quality of Life
- QL1.2** Enhance Public Health & Safety
- QL1.3** Improve Construction Safety
- QL1.4** Minimize Noise & Vibration
- QL1.5** Minimize Light Pollution
- QL1.6** Minimize Construction Impacts

## MOBILITY

- QL2.1** Improve Community Mobility & Access
- QL2.2** Encourage Sustainable Transportation
- QL2.3** Improve Access & Wayfinding

## COMMUNITY

- QL2.1** Advance Equity & Social Justice
- QL2.2** Preserve Historic & Cultural Resources
- QL2.3** Enhance Views & Local Character
- QL2.4** Enhance Public Space & Amenities

**QL0.0** Innovate or Exceed Credit Requirements



**Leadership**  
12 Credits

## COLLABORATION

- LD1.1** Provide Effective Leadership & Commitment
- LD1.2** Foster Collaboration & Teamwork
- LD1.3** Provide for Stakeholder Involvement
- LD1.4** Pursue Byproduct Synergies

## PLANNING

- LD2.1** Establish a Sustainability Management Plan
- LD2.2** Plan for Sustainable Communities
- LD2.3** Plan for Long-Term Monitoring & Maintenance
- LD2.4** Plan for End-of-Life

## ECONOMY

- LD3.1** Stimulate Economic Prosperity & Development
- LD3.2** Develop Local Skills & Capabilities
- LD3.3** Conduct a Life-Cycle Economic Evaluation
- LD0.0** Innovate or Exceed Credit Requirements



**Resource  
Allocation**  
14 Credits

## MATERIALS

- RA1.1** Support Sustainable Procurement Practices
- RA1.2** Use Recycled Materials
- RA1.3** Reduce Operational Waste
- RA1.4** Reduce Construction Waste
- RA1.5** Balance Earthwork On Site

## ENERGY

- RA2.1** Reduce Operational Energy Consumption
- RA2.2** Reduce Construction Energy Consumption
- RA2.3** Use Renewable Energy
- RA2.4** Commission & Monitor Energy Systems

## WATER

- RA3.1** Preserve Water Resources
- RA3.2** Reduce Operational Water Consumption
- RA3.3** Reduce Construction Water Consumption
- RA3.4** Monitor Water Systems

**RA0.0** Innovate or Exceed Credit Requirements



**Natural  
World**  
14 Credits

## SITING

- NW1.1** Preserve Sites of High Ecological Value
- NW1.2** Provide Wetland & Surface Water Buffers
- NW1.3** Preserve Prime Farmland
- NW1.4** Preserve Undeveloped Land

## CONSERVATION

- NW2.1** Reclaim Brownfields
- NW2.2** Manage Stormwater
- NW2.3** Reduce Pesticide & Fertilizer Impacts
- NW2.4** Protect Surface & Groundwater Quality

## ECOLOGY

- NW3.1** Enhance Functional Habitats
- NW3.2** Enhance Wetland & Surface Water Functions
- NW3.3** Maintain Floodplain Functions
- NW3.4** Control Invasive Species
- NW3.5** Protect Soil Health

**NW0.0** Innovate or Exceed Credit Requirements



**Climate and  
Resilience**  
10 Credits

## EMISSIONS

- CR1.1** Reduce Net Embodied Carbon
- CR1.2** Reduce Greenhouse Gas Emissions
- CR1.3** Reduce Air Pollutant Emissions

## RESILIENCE

- CR2.1** Avoid Unsuitable Development
- CR2.2** Assess Climate Change Vulnerability
- CR2.3** Evaluate Risk & Resilience
- CR2.4** Establish Resilience Goals and Strategies
- CR2.5** Maximize Resilience
- CR2.6** Improve Infrastructure Integration

**CR0.0** Innovate or Exceed Credit Requirements

# Envision Project Development Lifecycle



# Credits



LEADERSHIP: COLLABORATION

## LD1.1 Provide Effective Leadership and Collaboration

18

POINTS

### INTENT

Provide effective leadership and commitment to achieve project sustainability goals.

### METRIC

The degree to which the project owner and project team have made general, and project-specific, sustainability commitments and instituted sustainability management policies.

### LEVELS OF ACHIEVEMENT

IMPROVED	ENHANCED	SUPERIOR	CONSERVING	RESTORATIVE
A	A + B	A + B + C	A + B + C + D	Not Available
(2) Initial Commitment	(5) Strong Commitment	(12) Strong Commitment	(18) Sustainability As A Core Value	
<p><b>(A)</b> A written commitment by the owner and project team to address the social, environmental, and economic aspects of the project. Commitments to sustainability are clearly articulated at the project level in a project chartering session and/or contract documents.</p>				
<p><b>(B)</b> Commitments are supported by a sustainability management policy that is commensurate with the scope, scale, and complexity of the project.</p>				
<p><b>(C)</b> Sustainability commitments, and progress toward their achievement, are revisited periodically through meetings or written reports.</p>				
<p><b>(D)</b> Key members of the project team have made clear commitments to sustainability, as evidenced by:</p> <ul style="list-style-type: none"> <li>• Organizational sustainability policies and/or reports.</li> <li>• Examples of projects, or initiatives, to improve sustainable performance.</li> <li>• Sustainability strategies embedded into their business strategy.</li> <li>• Third-party organizational recognition or commitments.</li> </ul>				

Higher Levels of Achievement = More Points

Number of Points Achieved

All criteria must be satisfied for higher levels of achievement

# Envision Criteria & Documentation



## LEADERSHIP: COLLABORATION

### LD1.1 Provide Effective Leadership and Collaboration

- D. Have key members of the project team made organizational commitments to sustainability?**
- 1. Identification and description of key members of the project team.*
  - 2. Documentation of each of the following commitments to sustainability:*
    - a. Organizational sustainability principles and policies. For example, sustainability reports, preferably either verified or partially verified by an independent third party, with clearly expressed targets and associated performance (e.g., Global Reporting Initiative, corporate GHG emissions reduction targets, corporate energy reduction targets, corporate waste reduction targets).*
    - b. Recognition of past or ongoing projects, or significant initiatives undertaken, to improve sustainable performance (e.g., project write-ups, awards, or third-party recognition received for sustainable performance, efforts or initiatives to train and/or credential staff in sustainability).*
    - c. Evidence that the organizations involved in the project have sustainability strategies that are embedded into their business strategy, or evidence of a clear link between the strategies. For example, illustration or description of the governance of sustainability within the organizations and clear demonstration of support and commitment from senior management to sustainability.*
    - d. Third-party organizational recognition or commitments related to sustainability (e.g., signatory to the UN Global Compact, listed on the CDP Climate Performance Leadership Index, listed on the Jantzi Social Index, listed on the Dow Jones Sustainability Index, BCorp certification, JUST Label, etc.).*

# Envision Criteria & Documentation



## LEADERSHIP: COLLABORATION

### LD1.1 Provide Effective Leadership and Collaboration

#### A. To what extent has the project team undertaken a stakeholder mapping exercise to determine stakeholders?

1. *Comprehensive list of potential stakeholders identified, with stakeholder classification (primary or secondary) and a statement or rationale for selection.*
  - a. *Primary stakeholders are individuals or groups directly impacted by the project, such as the communities crossed and served by a new road. This should include stakeholders who could be impacted or affected by the project during its life-cycle.*
  - b. *Secondary stakeholders are individuals or groups indirectly affected by the project.*
2. *Evidence that stakeholders were identified and prioritized in a fair and equitable fashion.*

#### B. To what extent has the project team analyzed, planned, and executed the engagement for key project stakeholders?

1. *Engagement plans for each stakeholder that consider the issues the project team needs to address and the method(s) of engagement (e.g., some stakeholders may require only one-way communication, while others may require dialogue and partnership-building engagement such as consultations, hosting stakeholder advisory panels, soliciting online feedback, hosting multi-stakeholder forums and partnerships, and/or convening networks of stakeholders).*
  - a. *Stakeholder engagement plans should be proactive. This would be characterized by outreach and a determination to involve those who will be affected by, or are very likely to have an active interest in, the project, as opposed to passive invitations to participation such as public notices with little or no follow-up to ensure a robust response.*
  - b. *Engagement moves beyond education into active dialogue. Stakeholder views are monitored, and a two-way line of communication is established to reply to inquiries.*
  - c. *Sufficient opportunities are provided for stakeholders to be involved in decision making. The participation process is transparent with opportunities to provide meaningful input.*

2. *Documentation of engagement, which may include letters, meeting minutes, or memoranda with stakeholders. Documentation shows the issues that were addressed with stakeholders and their concerns/feedback specific to the project.*

#### C. Was a lead member of the project team directly involved with stakeholder groups to understand their needs?

1. *Documentation that a lead person from the project team, in addition to any public involvement lead or manager, worked with stakeholder groups to understand communication needs and the desire for and scope of involvement.*

#### D. To what extent has stakeholder engagement feedback been incorporated into project plans, design, and/or decision making?

1. *Documentation showing that feedback raised by stakeholders was evaluated and prioritized and how feedback changed/impacted/ altered the project plans, design, and/or decision making.*

OR

*Documentation showing how feedback raised by stakeholders was already incorporated into the project plans, design, and/or decision making.*

2. *Supporting evidence that stakeholder feedback was treated fairly and equitably, according to principles of social and environmental justice, regardless of race, color, wealth, religion (creed), gender, gender expression, age, national origin (ancestry), disability, marital status, sexual orientation, or military status.*

#### E. Has the project team sought feedback from stakeholders as to their satisfaction with the engagement process and the resulting decisions that were made based on their input?

1. *Letters or other documentation showing support from stakeholders for the engagement process undertaken for this project.*
2. *Letters or other documentation showing support from stakeholders for the decisions that were made based on their input.*
3. *In certain cases, documentation may also demonstrate an absence of significant new stakeholder issues arising as the project advances to final design and construction.*

#### F. Has the project engaged one or more stakeholders as partners?

1. *Documentation that one or more stakeholders, having mutual interests or interdependencies, are identified and engaged as partners.*

# Verification

- After completing Verification, projects can be designated as:
  - **Envision Verified (20%)**
  - Envision Silver (30%)
  - Envision Gold (40%)
  - Envision Platinum (50%)



# Verification Pathways

## ENVISION VERIFICATION PATHWAYS

### *Pathway A: Design + Post-Construction*



### *Pathway B: Post-Construction*



# Verification Pathways

## ENVISION VERIFICATION PATHWAYS

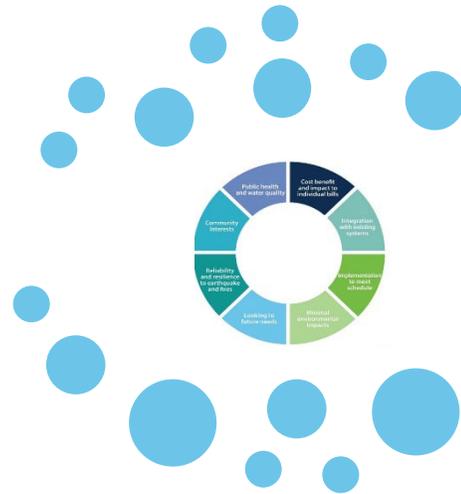
### *Pathway A: Design + Post-Construction*



### *Pathway B: Post-Construction*



# Rating systems and frameworks provide structure



Goals



Implementation



ENVISION™

Performance  
Metric

*It's important to keep rating systems in perspective. Good design drives success. No point chasing.*

# ETO Path to Net Zero (PTNZ) Architecture 2030 Synergies

- PTNZ Baseline - Architecture 2030

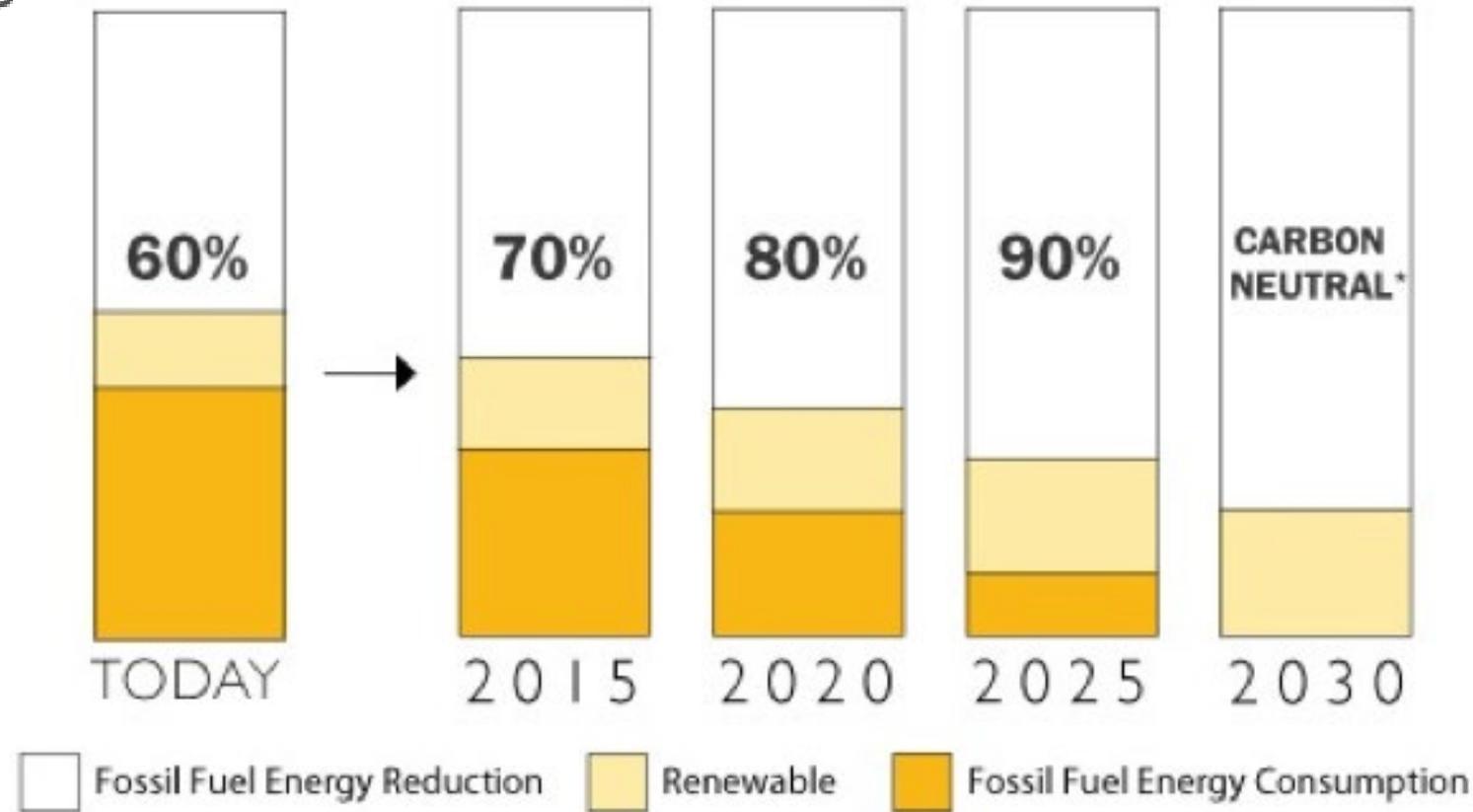
- Synergy State “GET” program

- LEEDv4 Gold - Optimize Energy

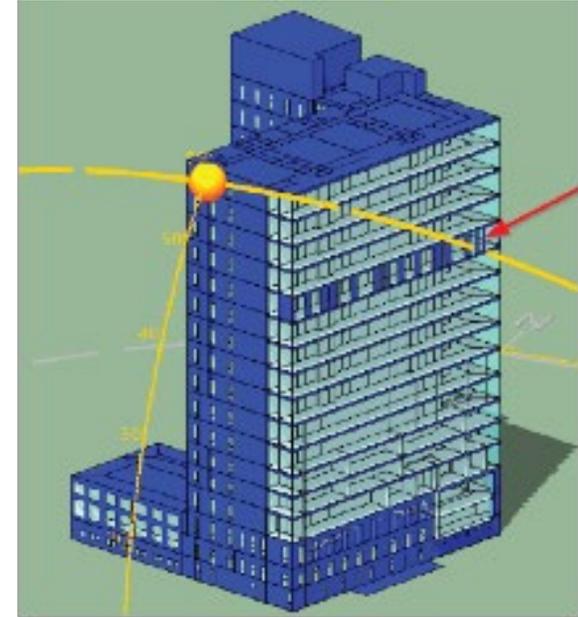
- WELL Building Standard (IWBI)

- Living Building/ Petal (ILFI):

- Zero Energy Certification (ILFI)

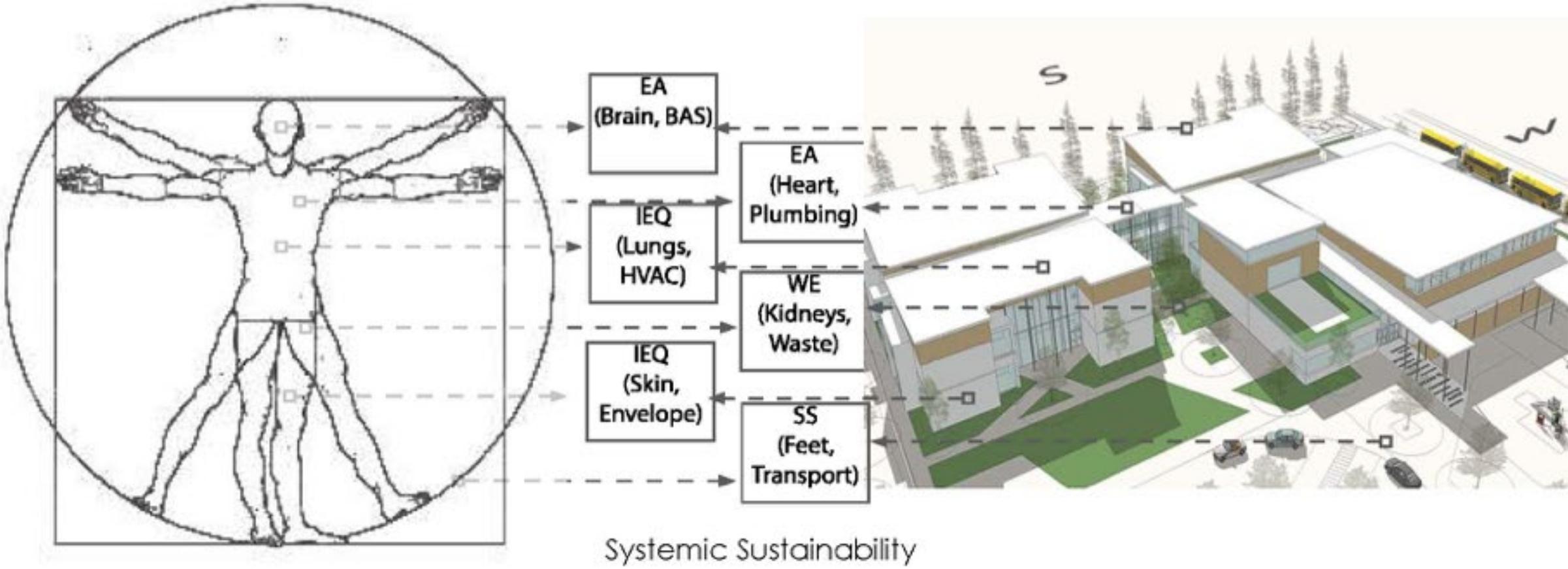


# ETO Early Design - "Shoe Box" Energy Modeling



- **Additional to LEED Energy Model**
- Preliminary Energy & Water Early Design Analysis
- Site Conditions
- Massing and Orientation
- Basic Envelope attributes
- Lighting Levels
- Thermal Comfort Ranges
- **\*60% funded by Energy Trust Incentives (pending possible program changes)**

# Path to Net Zero – Holistic Building



# Optimize Building and Human Performance

Indoor Environmental Quality and Well Building Guiding Principles

Health and Safety Best Practices backed by Medical Science...



Thermal



Lighting



Acoustics



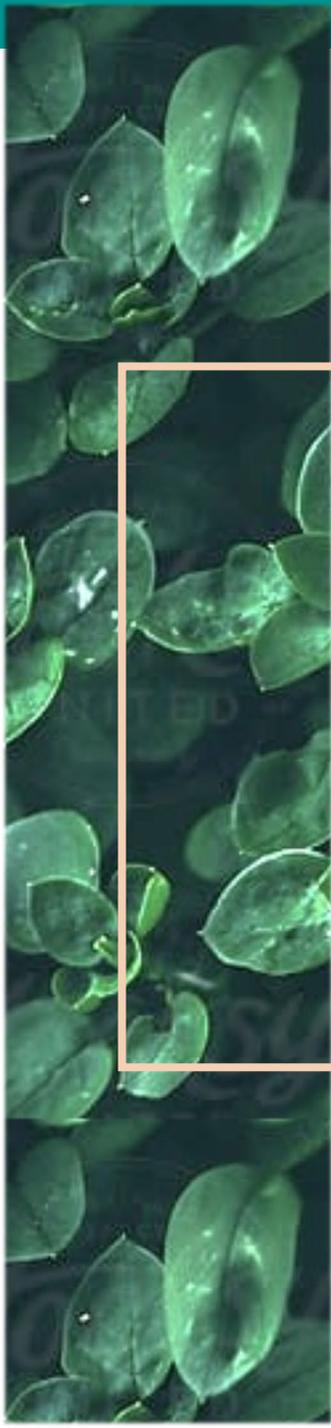
Ergonomics



Biophilia



Indoor Air Quality



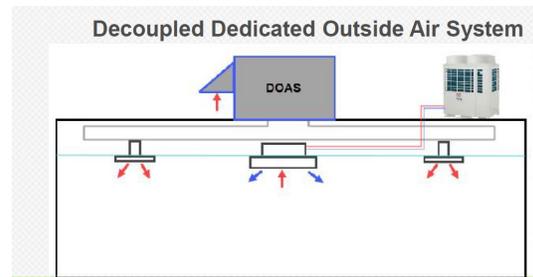
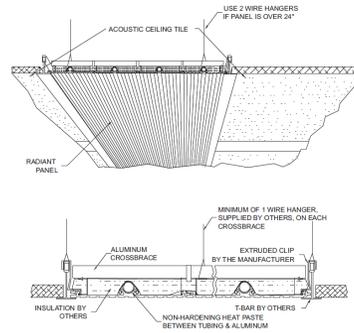
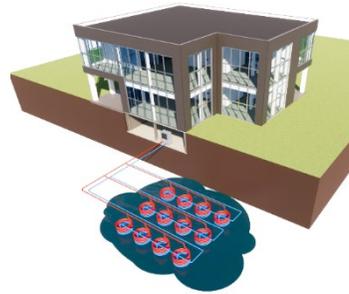
# Healthy Material Tracking

Green Canary is a like a nutritional label for your building making Healthy Material tracking easy.

# Energy Efficiency Measures (EEM)- Active and Passive

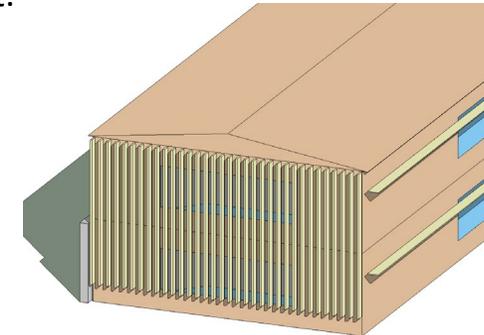
## HVAC System Analyzed

- **HVAC Sys1:**
  - Plant- Water to water heat pump (WWHP) connected to ground/pond for heat rejection
  - Airside-Dedicated Outside Air system(DOAS) connected to 4-pipe Fan coil unit (FCU)
- **HVAC Sys2:**
  - Plant- Water to water heat pump (WWHP) connected to ground/pond for heat rejection
  - Airside-DOAS with 4-pipe Radiant Ceiling panels
- **HVAC Sys3:**
  - DOAS with Variable refrigerant flow system (Air Source), with zonal units.



## EEMs Analyzed

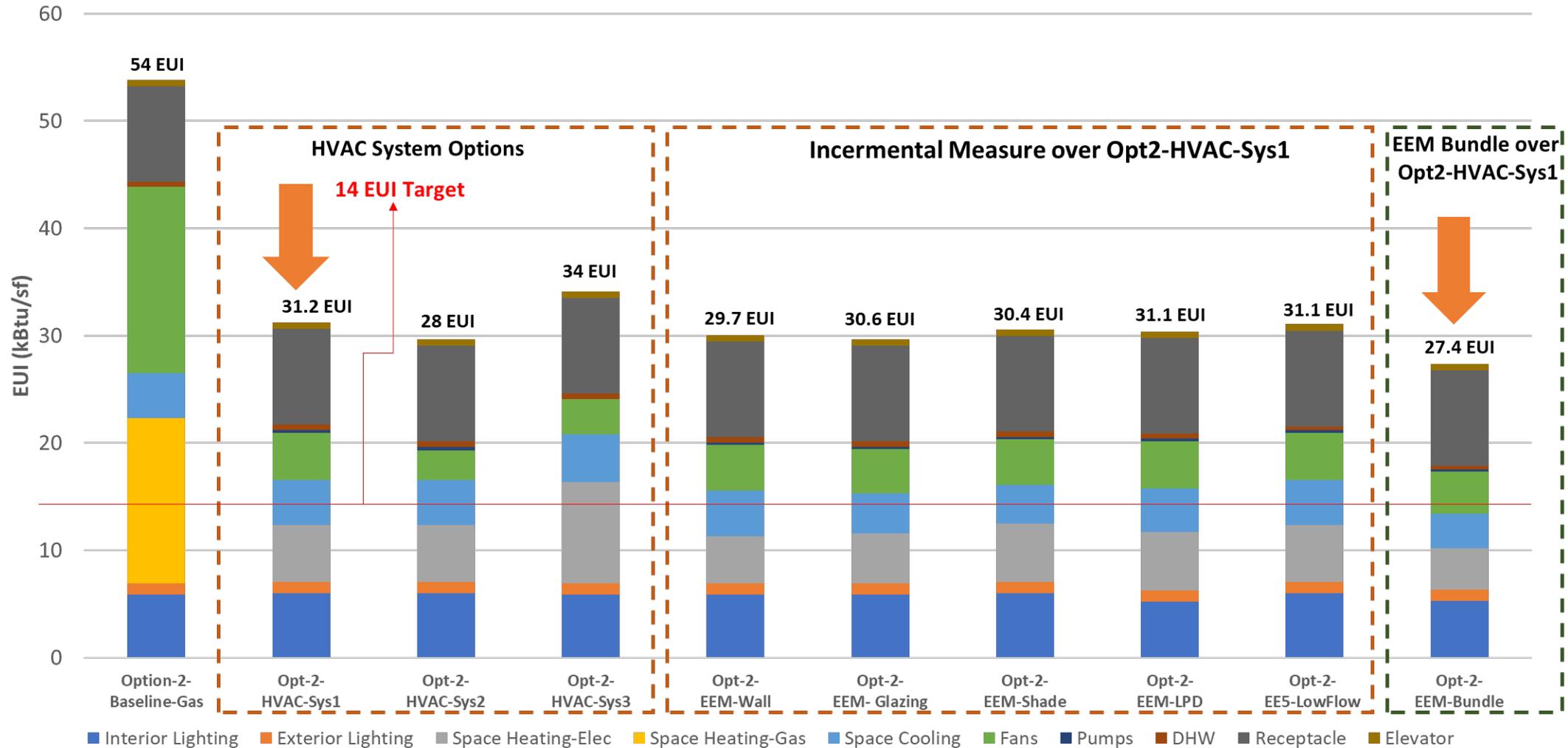
- **Improved Wall:** U-0.064 (R-13.0 + 7.5 c.i)
- **Improved Glazing** – Low-e glass with U-0.4 and SHGC-0.29
- **External Shades**-South 2.5 feet overhang and **West Vertical fins** 1.5 feet wide and spaced 1.5 feet.



- **Improved LPD**- 20 % Reduction form Baseline (0.64 W/SF)
- **Low flow fixtures** – 30% Reduction on Service hot water flow (Lavatory faucets and Shower heads and kitchen Skin)

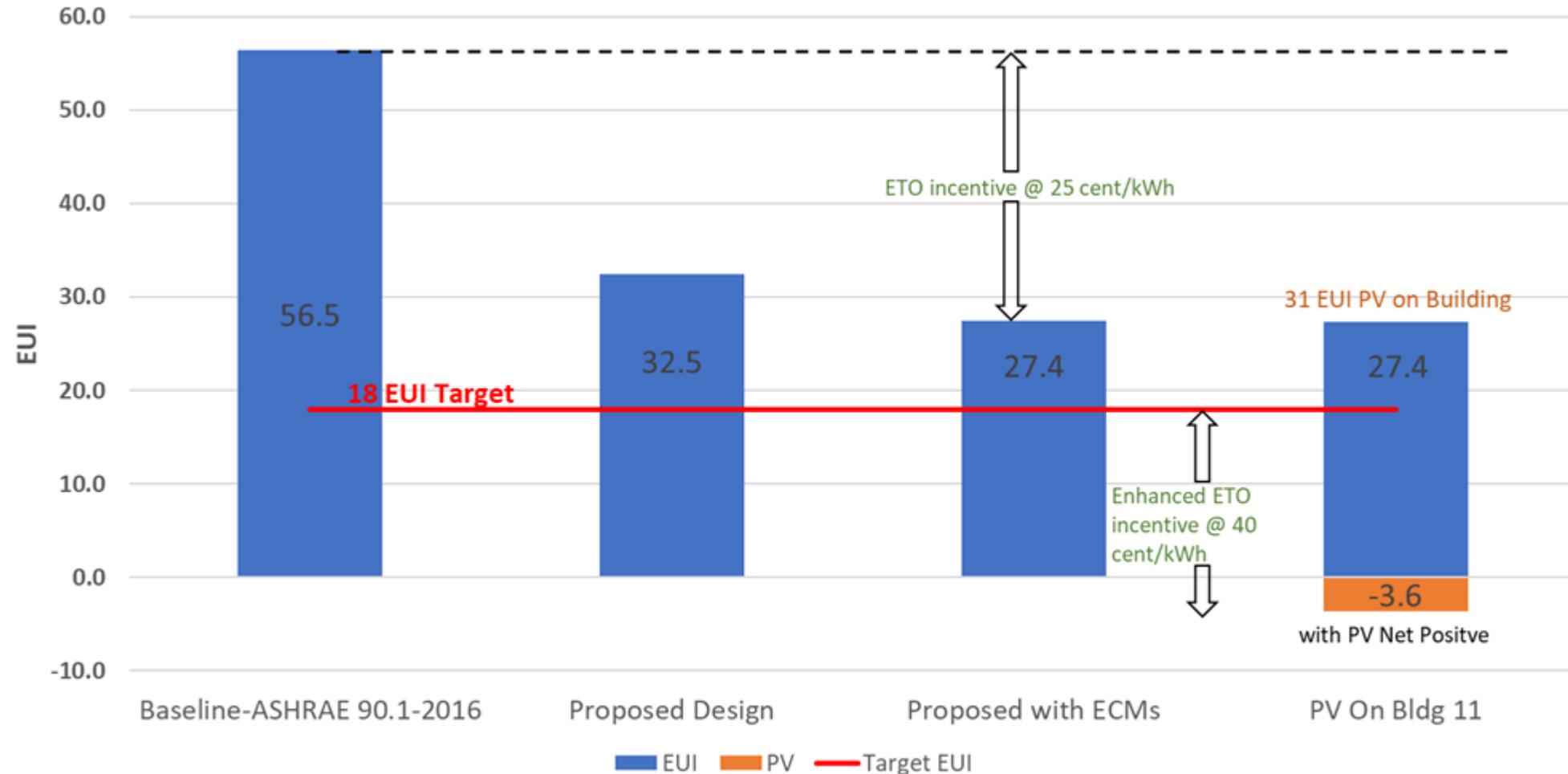
# Energy Efficiency Measures (EEM)- EUI Breakdown

Proposed HVAC System Options and Energy Efficiency Measures (EEMs)-EUI Breakdown



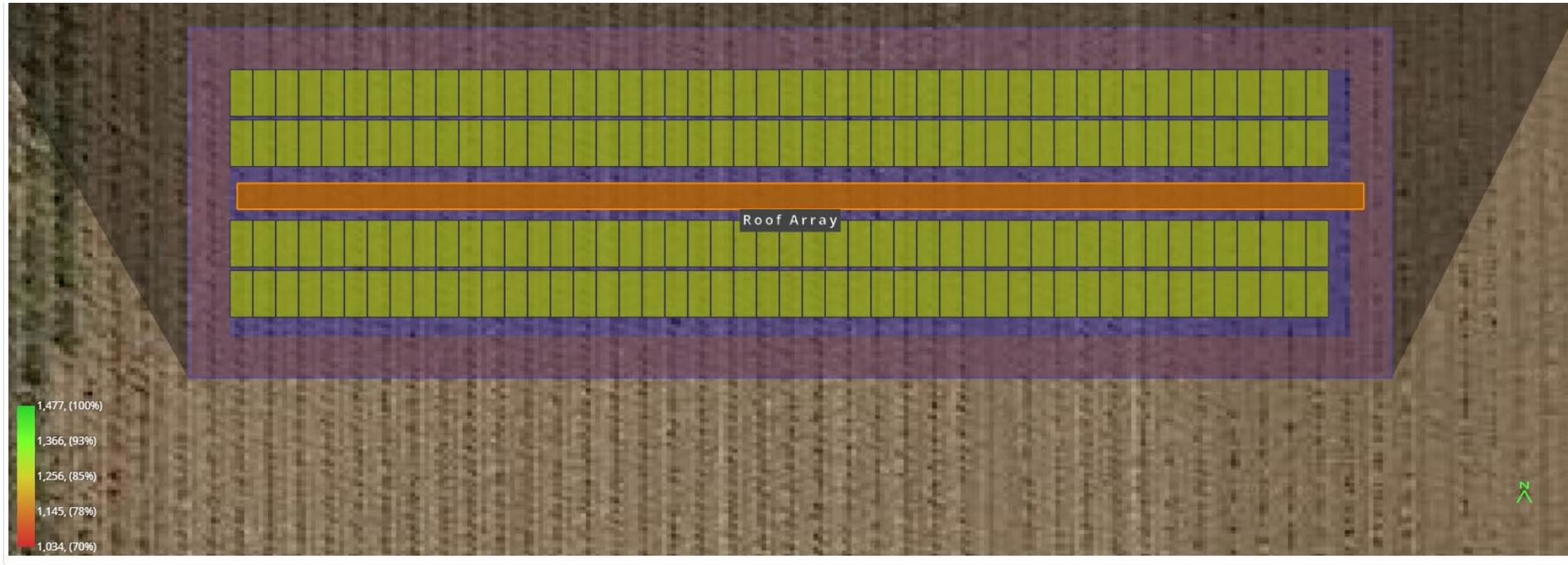
# Proposed Energy use with Photovoltaic Panel (PV)

Pathway to Net Zero and 80% Reduction from Baseline (National Average)



# Renewables - Photovoltaics

## ANNUAL ROOFTOP PV PRODUCTION – 86,900 KWH



### ☐ Shading by Field Segment

Description	Tilt	Azimuth	Modules	Nameplate	Shaded Irradiance	AC Energy	TOF <sup>2</sup>	Solar Access	Avg TSRF <sup>2</sup>
Roof Array	0.0°	180.0°	192	77.8 kWp	1,274.4kWh/m <sup>2</sup>	86.9 MWh <sup>1</sup>	86.3%	100.0%	86.3%
Totals, weighted by kWp			192	77.8 kWp	1,274.4kWh/m <sup>2</sup>	86.9 MWh	86.3%	100.0%	86.3%

# What funding sources are available for sustainability measures and should be pursued?

*Additional context and recommendations:*

- *Energy Trust of Oregon (ETO) offers incentives suitable to this project.*
- *PWB to confirm approval to proceed and enroll the project with ETO. **Who at PWB would sign the 510A Enrollment form?***
- *Specific incentives and initiatives to be explored further in the Eco-Charrette*



**Bull Run**  
TREATMENT  
PROJECTS

*Our water: Safe and abundant  
for generations to come*

Thank you!

Learn More [portland.gov/bullrunprojects](http://portland.gov/bullrunprojects)