A PREVIEW: THE NEW UW GREEN BUILDING STANDARD

May 8, 2024

BE BOUNDLESS
UW OFFICE OF SUSTAINABILITY

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New Position
Sustainability Project & Engagement Specialist

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UNIVERSITY of WASHINGTON
GBS DEVELOPMENT

CONSULTANT (O’Brien360) (experienced with UW)

MODEL (UBC)

UW STAKEHOLDERS
• Faculty from College of Built Environments and UW Engineering
• UW Project Managers
• UW Bothell & Tacoma Facilities Staff
• Staff from Medicine, Housing and Food Services, and Athletics
• Representatives and stakeholders of the Environmental Stewardship Committee and the Executive Committee for the Sustainability Action Plan
WHY A GREEN BUILDING STANDARD?
URGENCY OF GHG REDUCTION

Each gray line represents 1 year - 1982-2022
URGENCY OF GHG REDUCTION

This dashed line represents the mean 1982-2011
URGENCY OF GHG REDUCTION

This orange line is 2023
URGENCY OF GHG REDUCTION

This black line is 2024
URGENCY OF WATER CONSERVATION

Department of Ecology News Release - April 16, 2024
Updated: April 19, 2024

Statewide drought declared due to low snowpack and dry forecast

Limited exceptions for metro areas with healthy water storage

OLYMPIA – With winter’s snowstorms largely behind us and summer just weeks away, our state’s low snowpack and forecasts for a dry and warm spring and summer have spurred the Department of Ecology to declare a drought emergency for most of Washington.

After an exceptionally dry start to the winter, Washington’s snowpack made up some ground in February, March and April. But with chances of snowfall and precipitation diminishing, and hot and dry weather expected for the next several months, the Department of Ecology is wary of a devastating drought event.

The declaration covers much of the state except in the metro areas of Seattle, Spokane and Yakima, which have sufficient water supplies to ensure a sufficient water supply during the drought period.

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  Washington Drought Declaration
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Further information, including drought declaration criteria and a map of drought-affected areas, can be found at:


Local water resources managers will continue to monitor conditions and make recommendations on water usage restrictions as needed.

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BENEFITS OF GREEN BUILDINGS

Reduce energy & water consumption

Reduce greenhouse gases emitted in the construction and operation of the building

Improve habitat

Create buildings that support health and feel welcoming

Increase resilience to climate change
CONTRIBUTION TO UW GHG EMISSIONS

- **64%** GOODS & SERVICES
- **527.5K MtCO₂e** (2022)
- **18.5%** FOSSIL FUEL CONSUMPTION IN BUILDINGS
- **6.3%** AIR TRAVEL
- **5.7%** COMMUTING
- **5.5%** OTHER
CONTRIBUTION TO UW GHG EMISSIONS

(2022)
527.5K MtCO₂e

57% OTHER

GOODS & SERVICES

18.5% FOSSIL FUEL CONSUMPTION IN BUILDINGS

6.3% AIR TRAVEL

5.7% COMMUTING

7% CONSTRUCTION

5.5% OTHER
OLD vs NEW GREEN BUILDING STANDARD
OLD UW Green Building Standard

PROJECT TYPES

TIER 1
new construction
major renovation

TARGETS

WATER
50% below code

ENERGY
15% below code

LEED GOLD
OLD UW Green Building Standard

**PROJECT TYPES**

- TIER 1
  - new construction
  - major renovation

**TARGETS**

- WATER
  - 50% below code (Difficult to achieve)

- ENERGY
  - 15% below code (Not well aligned with new carbon-based code)

- LEED GOLD
NEW UW Green Building Standard

**PROJECT TYPES**

<table>
<thead>
<tr>
<th>TIER 1</th>
<th>new construction major renovation</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIER 2</td>
<td>partial renovations interiors projects</td>
</tr>
<tr>
<td>TIER 3</td>
<td>system upgrades</td>
</tr>
<tr>
<td>TIER 4</td>
<td>non-energy projects</td>
</tr>
</tbody>
</table>

**TARGETS**

| WATER         | 25-40% below code depending upon project |
| ENERGY        | EUI below state requirement            |
| LEED GOLD     | (or equivalent) some required credits  |
| EMBODIED CARBON | <500kg CO₂ e/m² in primary materials |
| ECOLOGY       |                                       |
| HEALTH & WELLNESS |                                   |
| EQUITY        |                                       |

- No new fossil fuels
- Required Life Cycle Cost Assessment
- Must connect to District Energy System
NEW UW Green Building Standard

**PROJECT TYPES**

- **TIER 1**: new construction or major renovation
- **TIER 2**: partial renovations or interiors projects
- **TIER 3**: system upgrades
- **TIER 4**: non-energy projects

**TARGETS**

- **WATER**: 25-40% below code depending upon project
- **ENERGY**: EUI below state requirement
- **LEED GOLD** (or equivalent) some required credits
- **EMBODIED CARBON**: <500kg CO₂e/m² in primary materials
- **ECOLOGY**
- **HEALTH & WELLNESS**
- **EQUITY**

- No new fossil fuels
- Required Life Cycle Cost Assessment
- Must connect to District Energy System
NEW FEATURE: LIFE CYCLE COST ANALYSIS (LCCA)

Life-cycle cost analysis (LCCA) is a tool to determine the most cost-effective option by evaluating the purchase cost, maintenance and operating costs.

PURCHASE PRICE

COST TO OPERATE & MAINTAIN

COST OF ENERGY AND WATER CONSUMED & EMISSIONS GENERATED
NEW FEATURE: EMBODIED CARBON

"Embodied carbon will be responsible for almost half of total new construction emissions between now and 2050"
SUSTAINABLE BUILDINGS: Learning by Doing UW, Examples

Health Sciences Education

Founders Hall

Hans Rosling Center for Population Health

UNIVERSITY of WASHINGTON
UW EXAMPLE – Health Sciences Education Building

Whole Building Analysis in the Health Sciences Education Building (HSEB)
Health Sciences Education Building embodied carbon analysis by Miller Hull:

<table>
<thead>
<tr>
<th>MATERIAL DESCRIPTION</th>
<th>GWP (kgCO2eq)</th>
<th>Mass Total (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel, W section (wide flange shape)</td>
<td>588,166</td>
<td>517,281</td>
</tr>
<tr>
<td>Cast-in-place concrete, structural concrete, 5000 p..</td>
<td>484,508</td>
<td>2,355,158</td>
</tr>
<tr>
<td>Extruded polystyrene (XPS), board</td>
<td>416,084</td>
<td>5,578</td>
</tr>
<tr>
<td>Cast-in-place concrete, structural concrete, 3000 p..</td>
<td>293,318</td>
<td>1,350,786</td>
</tr>
<tr>
<td>Cast-in-place concrete, structural concrete, 4000 p..</td>
<td>154,025</td>
<td>869,023</td>
</tr>
<tr>
<td>Polyethylene sheet vapor barrier (HDPE)</td>
<td>89,467</td>
<td>34,145</td>
</tr>
<tr>
<td>Steel, HSS section</td>
<td>86,564</td>
<td>48,942</td>
</tr>
<tr>
<td>Aluminum, sheet</td>
<td>85,836</td>
<td>21,243</td>
</tr>
<tr>
<td>Steel, deck</td>
<td>75,352</td>
<td>36,306</td>
</tr>
<tr>
<td>Mineral wool, board, generic</td>
<td>70,684</td>
<td>39,858</td>
</tr>
</tbody>
</table>

The analysis drove decisions about how to reduce embodied carbon (e.g., concrete, etc.)
Health Sciences Education Building embodied carbon analysis by Miller Hull:

<table>
<thead>
<tr>
<th>TOP MATERIALS BY GWP (57 materials defined)</th>
<th>GWP (kgCO2eq)</th>
<th>Mass Total (kg)</th>
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**Highest emissions:** Steel (from frame)

**Largest Mass:** Concrete
This analysis drove decisions about how to reduce embodied carbon (e.g. concrete, etc).

Very high emission/mass: Polystyrene (insulation)
Health Sciences Education Building embodied carbon analysis:

**EARLY EMBODIED CARBON STUDIES: WALL ASSEMBLY**

<table>
<thead>
<tr>
<th>Material Type</th>
<th>GWP (KgCO2eq)</th>
</tr>
</thead>
<tbody>
<tr>
<td>W01 CONCRETE</td>
<td>10,082</td>
</tr>
<tr>
<td>W06 FIBER CEMENT</td>
<td>3,423</td>
</tr>
<tr>
<td>W07 PRECAST CONCRETE</td>
<td>3,271</td>
</tr>
<tr>
<td>W08 CORRUGATED METAL</td>
<td>2,631</td>
</tr>
</tbody>
</table>

This option was selected on balance with aesthetics, schedule & cost.

Analysis influenced final material selection:
- Fiber cement exterior siding
- Cross laminate timber floors reduced emissions by 20%
UW EXAMPLE – FOUNDERS HALL

Designed to achieve:
• 76% reduction in cumulative carbon emissions through cross laminate timber (CLT)
• CLT adds to well-being, beauty and warmth
• 70% less energy
• 53% less water compared to a comparable facility built with conventional methods and materials
Hans Rosling Center for Population Health

- LEED Platinum
- High energy efficiency
- Clean indoor air
- Rainwater collection to flush toilets
- Shading fins on the east and west façades
- Improved accessibility throughout the site
- Design elements that promote human health
- Gender neutral restrooms
Synergies and Opportunities

- Renovation and renewal = opportunities for buildings and energy
- Renovation will be done more sustainably b/c of the new GBS
- No net new square footage
- Minimize carbon emissions through building renewal, where appropriate
NEW UW Green Building Standard DRAFT Applicability

Still finalizing applicability....

- UW capital projects and public work in WA State:
  - All campuses, facilities, departments, units
  - Buildings and facilities owned and operated by UW

- Under development & likely a Phase 2 roll-out:
  - Leases, other ownership models, development agreements, etc.

- Once new GBS is finalized and published:
  - GBS applies to all projects that have yet to complete project formation once the new standard is published
  - Target publish date: June 30, 2024
NEXT STEPS: Roll-Out and Implementation

• We have already begun a ‘soft-launch’ with several projects: Hagget Hall, Anderson Hall, ASUW Shell House, T-Wing Renovation

• Next steps are more education, training, and tools for successful implementation!
Next Steps: Education

Quick Reference Guide
Note early engagement
# NEXT STEPS: Process Integration

## Project Concept Development

### Options Analysis

**Stage:** Planning

**Sight Selection:**
Identify barriers and opportunities for meeting GBS requirements

**Budgeting:**

<table>
<thead>
<tr>
<th>PHASE: Project Formation</th>
<th>STAGE: Planning</th>
<th>SUBPHASE: Project Initiation</th>
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<tr>
<th>PHASE: Project Development</th>
<th>STAGE: Pre-design</th>
<th>SUBPHASE: Owner Project Requirements (OPR)</th>
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<th>STAGE: Planning</th>
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Owner Project Requirements (OPR) include GBS Tier and requirements, update OPR to include performance expectations.
Other Sustainability Initiatives & Resources

- 2022 Greenhouse Gas Emissions Inventory (Includes goods and services)
- GHG Preview Webinar
- Energy Transformation
- Decarbonization Town Hall
- Draft Air Travel Emissions Reduction Program
- Sustainability Action Plan Update (kick-off in fall 2024)
- Stay Informed! Sign-up for UW Sustainability news
Thank you!

QUESTIONS?
Questions or need help with the new GBS?
Contact: Lisa Dulude, lisad3@uw.edu

Website: sustainability.uw.edu
Email: sustainability@uw.edu
Visit our staff page for individual contact information