Decarbonization Town Hall

Panelists:
Lela Corson  Frank Hodge  Jan Whittington  Dave Woodson

Facilitator:
Lisa Dulude

October 25, 2023
4:30 p.m.
TRICIA SERIO

Provost and Executive Vice President for Academic Affairs
LOUISA MACKENZIE

Faculty Senate Vice-Chair
Decarbonization Town Hall

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- Frank Hodge
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October 25, 2023
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JAN WHITTINGTON

Faculty Council on Campus Planning and Stewardship Co-chair
Greenhouse Gas Emissions ‘101’

SCOPE 1: DIRECT EMISSIONS
- BUILDINGS
- FLEET
- FUGITIVE EMISSIONS

SCOPE 2: ELECTRICITY GENERATION EMISSIONS
- FOSSIL FUEL GENERATION

SCOPE 3: INDIRECT EMISSIONS
- AIR TRAVEL
- GOODS & SERVICES
- COMMUTING

UNIVERSITY of WASHINGTON
UW SCOPE 1 EMISSIONS

UW SEATTLE BUILDINGS 88%

12%
FUGITIVE EMISSIONS 9%
FLEET 2%
UW TACOMA BUILDINGS .8%
UW BOTHELL BUILDINGS .4%
OUTLYING FACILITIES.1%

From 2023 Greenhouse Gas Inventory
UW SCOPE 1 EMISSIONS: campus split

From 2023 Greenhouse Gas Inventory
STATE MANDATES: SCOPE 1 Emissions

Climate Leadership Act
- 2030 target: 45% reduction
- 2040 target: 70% reduction
- 2050 target: 95% reduction

Climate Commitment Act
- Cap, and invest
- >25,000Mt CO$_2$e must pay to emit
- State-wide GHG reduction targets for 2030, 2040 and 2050
STATE MANDATES: SCOPE 2 Emissions

Clean Energy Transformation Act
→ Applies to electric utilities serving retail customers in Washington
→ Milestones to reach 100% clean electricity by 2045

Clean Buildings Performance Standard
→ Energy efficiency performance standards for commercial buildings
**STATE MANDATES: SCOPE 3 Emissions**

**Commuter Trip Reduction Law**

- Applies to large employers in Washington
- Reduce single-occupancy commute trips
- Promote transit and other alternatives

**Executive Order 20-01**

Requires Washington State agencies to address emissions and environmental performance. State agencies must consider and lower emissions associated with building materials.

*Stay tuned for more information on UW Scope 3 initiatives at the end of the event.*
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From 2023 Greenhouse Gas Inventory
Decarbonization

Town Hall

Frank Hodge
Foster School of Business
Together...
We Foster Leaders
We Foster Insights
We Foster Progress
...To Better Humanity
Sustainability

Energy Use Intensity

- 2030 Baseline: 129 kBTU/sf
- Seattle Energy Code: 46 kBTU/sf
- 2030 Target: 36 kBTU/sf
- 2030 Design: 25 kBTU/sf
- 79% Reduction
- 2030 Commitment

Operational Carbon (CO2e)

- 2030 Baseline (steam): 160 m3/yr
- Code Baseline (steam): 75 m3/yr
- Code Baseline (electric): 31 m3/yr
- High Performance (electric): 13 m3/yr

Embodied Carbon

- Post-Tensioned Concrete Baseline: 2.6311
- Heavy Timber + Concrete Core Design: 1.9061
- 58% Reduction
- LEED Baseline: 535 kgs/yr Indoor
- LEED Design: 336 kgs/yr Indoor
- 53% Reduction

Water Use

- LEED Baseline: 831 kgs/yr Indoor
- LEED Design: 336 kgs/yr Indoor

Sustainability Goals

2030 Challenge

UW Green Building Standards
- 50% water use reduction below code
- 15% energy use reduction below code
- LEED NC v4.1 Gold

Cumulative Carbon (60 years, CO2e)

- 0.000 MT CO2e
- ENERGY USE CO2e
- EMBODIED CO2e
- CUMULATIVE CO2e AS-DESIGNED

YEAR 1 | YEAR 15 | YEAR 30 | YEAR 45 | YEAR 60
---|---|---|---|---
76% Reduction

Updated 6 May 2020
Aureus Earth and the University of Washington Execute Ground-Breaking Carbon Offset Transaction for a Mass Timber Building

Project to store 1,000 tons of CO2 for decades in the University of Washington's Founders Hall, keeping carbon out of the atmosphere for the lifetime of the building

BOULDER, Colo. (PRWEB) September 22, 2022 -- Aureus Earth, the leading provider of carbon offsetting incentive programs for the construction industry, today announced its first transaction that values the long-term biogenic carbon storage in a mass timber building. The transaction was accomplished in partnership with the University of Washington (UW) Foster School of Business, using the newly completed Founders Hall mass timber building as a proof of concept.
Climate-Focused Travel
UW Climate Risk Lab
About the UW Climate Risk Lab

The UW Climate Risk Lab is a cross-campus initiative equipping organizational leaders with the data, analysis and tools they need to manage present and future risks posed by climate change.
Solutions Facilitated by UW CRL

- An open access data platform
- Faculty- and student-led climate risk research projects that bridge the researcher-corporate divide
- Multi-stakeholder forums, networking events and case competitions
- Courses and training for students, faculty and business leaders
- Mentoring and support for data- and software-driven climate tech startups
Partners

- University of Washington eScience Institute
- Clean Energy Institute
- Paul G. Allen School of Computer Science & Engineering
- Creative Destruction Lab Seattle
- First Street Foundation
- Nicholas Institute for Energy, Environment & Sustainability
- Duke
Climate Action & Adaptation
- Ben Packard
  EarthLab

- Charlie Donovan
  Foster School

- Dan Schwartz
  Clean Energy Institute

- Derek Fulwiler
  Population Health Initiative

- Eric Lawson
  Advancement

- Frank Hodge
  Foster School

- Jeremy Hess
  Center for Health and the Global Environment (CHanGE)

- Kate Simonen
  Carbon Leadership Forum

- Kelsea Shannon
  Advancement

- Lisa Thomas
  Advancement

- Maya Tolstoy
  College of the Environment

- Michelle Johnson-Jennings
  Environmentally- and Land-based Healing, Indigenous Wellness Research Institute

- Samantha Snively
  Advancement

- Sara Curran
  Center for Studies in Demography & Ecology

- Shuyi Chen
  College of the Environment
DAVE WOODSON
Executive Director of Campus Energy, Utilities, and Operations
CHALLENGES

GREENHOUSE GAS EMISSIONS

ENERGY EFFICIENCY

ELECTRICAL CAPACITY CONSTRAINT

AGING

UTILITY INFRASTRUCTURE
ENERGY TRANSFORMATION STRATEGY

<table>
<thead>
<tr>
<th>Phase</th>
<th>Strategy Description</th>
<th>GHG Reduction</th>
<th>Energy Reduction</th>
<th>Capacity Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ENERGY EFFICIENCY: Expand metering, upgrade controls, data analytics, and green revolving fund.</td>
<td>15% GHG</td>
<td>30% energy</td>
<td>2% more capacity</td>
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<td>2</td>
<td>CONVERT TO HOT WATER: Convert from steam to hot water heating.</td>
<td>20% GHG</td>
<td>20% energy</td>
<td>2% less capacity</td>
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<td>3</td>
<td>CENTRAL COOLING: Replace inefficient chillers, use lake water for cooling, and add thermal storage.</td>
<td>no additional</td>
<td>10% energy</td>
<td>25% more capacity</td>
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<td>4</td>
<td>ELECTRIFY HEATING: Use heat pumps to extract heat from cooling towers, sewer and lake water.</td>
<td>45% GHG</td>
<td>15% energy</td>
<td>30% less capacity</td>
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<td>5</td>
<td>FINAL PUSH (FULL DECARBONIZATION): Continuously evaluate emerging technologies for full decarbonization.</td>
<td>20% GHG</td>
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PHASE 5 will remove the remaining carbon from our energy system.
ENERGY RENEWAL STRATEGY

West Campus Utility Plant

Central Power Plant

THERMAL STORAGE

LAB HEAT RECOVERY

SEWER HEAT RECOVERY
ENERGY TRANSFORMATION STRATEGY

PART 3: reduces energy costs and frees up electrical capacity
5-PART TRANSFORMATION STRATEGY

ENERGY EFFICIENCY 1
Expand metering, upgrade controls, data analytics and green revolving fund.

CONVERT TO HOT WATER 2
Convert from steam to hot water heating.

CENTRAL COOLING 3
Replace inefficient chillers, use lake water for cooling, and add thermal storage.

ELECTRIFY HEATING 4
Use heat pumps to extract heat from cooling towers, sewer and lake water.

FINAL PUSH 5 (FULL DECARBONIZATION)
Continuously evaluate emerging technologies for full decarbonization.

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The Youth Perspective

> Young people (16 – 25) across all countries:
  – 59% are very or extremely worried
  – 84% are at least moderately worried
> “45% of respondents said their feelings about climate change negatively affected their daily life and functioning”
> Emotions: sad, anxious, angry, powerless

(Hickman et. al, 2021)
The Student Perspective

Dargan Frierson

Grant Vu

Margo Polley

UNIVERSITY of WASHINGTON
We’ve Done it Before!

> Husky Stadium Remodel
  – $261 million in < 2 years
  – $139 million/yr

> Interdisciplinary Engineering Building
  – $102 million in 2 years
  – $51 million/yr

> Methane Gas Plant?
  – $700 - $900 million in 12 years
  – $75 million/yr
“Like many others of this generation, climate change is existential to them...”

- Quote from a president’s blog

Be Leaders - Act Now!
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