

# University of Connecticut

Carbon Reduction Working Group

Meeting #4

12/1/23

1881

## Agenda

- UPDC Project Updates with Elizabeth Craun
- Facilities Operations Project Updates



# UConn Capital Projects – Emission Reducing Strategies

# Priorities - Carbon Use Reduction/Elimination and Climate Resiliency

- Institutions such as UConn must both make efforts to reduce their current and future carbon emissions and make efforts to manage the current impacts of climate change (climate resiliency).
- Carbon emissions may be reduced in a capital program (new buildings and substantial renovations) by minimizing building footprints, having a “tight” building envelope, using recycled and renewable materials, and incorporating sustainable utilities at the building or district level.
- Thoughtful site selection and design are the most powerful tools in increasing climate resiliency, but building design must also account for the impacts of climate change.
- These impacts have been observed to include, but are not limited to:
  - More frequent and intense precipitation events.
  - More frequent and dramatic temperature extremes (high and low).
  - Higher nighttime lows in the summer months.
  - More frequent and intense droughts.
  - Increase in number and variety of invasive species and decline in native species of high ecological value.

# The UConn Building Standard - LEED Gold

- The Board of Trustees of UConn have committed to seeking LEED Gold certification for every new building and substantial renovation across all campuses. All projects must make best efforts to achieve this standard. The most recent LEED Gold certified project is Science 1.
- LEED is an architectural certification program that scores buildings on a number of criteria, including:
  - Access to and promotion of public and human-powered transit
  - Site selection/population density/previous impacts to site
  - Human health, comfort, and well-being
  - Energy efficiency, from building envelope “tightness” to on-site power production
  - Use of responsible materials (sustainable/recycled/low embodied carbon/minimal off-gassing)
  - Operations (integrated pest management, recycling of construction materials and consumables)
- LEED gives projects credit for, but does not currently explicitly require, the generation or use of renewable energy on site (some other programs, such as the Living Building challenge, require carbon neutrality or net positivity).

# LEED Gold continued

- To qualify for many forms of funding (such as State of CT bonds), projects must meet High Performance Building Standards (energy reduction standards), as well as LEED Silver (a score of 50-59 out of a possible 110 points).
- UConn has further determined that all new building projects, additions, and substantial renovations meet LEED Gold (score of 60-79) standards.
- LEED Platinum (score of 80+) is the final tier of LEED certification; no UConn buildings have been certified Platinum.
- UConn Challenges:
  - No LEED credit for population density or access to public transit – students in UConn housing are not counted as residents, and UConn shuttles run through WTRD do not count as public transit due to service reductions outside of academic year.
  - Lab spaces, and many programming/amenity spaces, are energy intensive.
- UConn Assets
  - UConn 2015 Master Plan ([Home | Campus Master Plan 2015-2035 \(uconn.edu\)](#)) informs responsible site selection.
  - Enabling projects are standard for new buildings and substantial renovations and provide opportunities for sustainable infrastructure.

# Landscape and Setting – Sustainable Site Selection and SITES Certification

- Stormwater Management/Aquifer and Watershed Protection is important for climate resiliency.
- Unmanaged flooding events can pose immediate safety risks (local flooding), exacerbate risks downstream (including crop loss), and contaminate drinking water. While New England escaped the extreme/damaging/unsafe temperatures that gripped much of the U.S. this summer, flooding events in Vermont and Western Massachusetts devastated prime farmland, much of it farmed using organic methods, all the way to the Long Island Sound.
- UConn's Storrs campus is within the watershed for two protected, ecologically valuable waterways.
- SITES ("LEED for landscape") is a newer program – UConn has received this certification for the new Student Rec Center, opened in 2019.
- "SITES-certified projects help reduce water demand, filter and reduce stormwater runoff, enhance biodiversity, provide pollinator and wildlife habitat, reduce energy consumption, improve air quality, improve human health, increase outdoor recreation opportunities and much more."
- SITES projects also promote labor and environmental justice by evaluating project impacts on the surrounding area, and by evaluating labor standards used on the project.
- The Northwest Science Quad district site design, and Science 1 specifically, have focused heavily on stormwater management and the expansion of UConn's Woodland Corridor; the project is expected to obtain SITES Certification.

# Enabling Projects – A tool for carbon reduction and climate resiliency

- An “enabling project” is typically required for new campus buildings located in an area that isn’t currently being used for a similar purpose (i.e. size, type, and/or presence of building), and is a key tool for sustainable growth.
- Enabling projects may be used to increase pedestrian and vehicular safety, promote mass and human-powered transit, expand or repair utilities, or add highly quality stormwater management or wildlife habitat.
- For both the most recent (Science 1) and next (South Campus Residence Hall) major buildings to be completed at UConn-Storrs, the enabling projects were used to expand the use of renewable energy at the UConn-Storrs campus.



# Sustainable Infrastructure and On Site Solar Generation – Science 1

- The Science 1 Building hosts nearly 1500 360-Watt panels on its roof, with a generation capacity of up to 500 kW. Any rooftop space not needing for safety, access, maintenance, skylights, or equipment was utilized for solar generation (approximately 1 acre). This solar array can provide 14% of the buildings total energy usage on an annualized basis. Rooftop solar was elected for this building due to institutional priorities, the suitability of the structure and siting of Science 1, and the energy demands of the building category (laboratory).
- The enabling projects associated with the Science 1 building include:
  - The Supplemental Utility Plant (Phase 1 complete)
    - The SUP added electrical, heating, and cooling infrastructure to support Science 1, future development in the area, and more reliably support the Storrs campus as a whole. The SUP is not currently equipped with cogeneration capacity, but does utilize steam from the CUP, and there is space on site to add cogeneration in the future. A future connection to Eversource behind the SUP is planned. Expanding both on-site generation and electrical service provides operational redundancy and reduces peak demand on the electrical grid (which is expected to increase).
  - The Northwest Science Quad (complete)
    - The Northwest Science Quad site development project reclaimed an existing parking area for Science 1 and its parking, while \*decreasing\* impermeable area and storm runoff, managing and treating runoff, and expanding a woodland corridor on campus.
    - This project also connected to SUP with existing steam, water, and safety infrastructure via tunnel.
  - North Eagleville Road Safety Improvements (under construction)
    - This project will increase pedestrian and vehicular safety in and around North Eagleville road, allowing safer human-powered travel to and from student parking, housing, and science buildings as well as the core campus.

# Layout and Orientation of Science 1 Solar



# Ground-Loop Heat Exchange – South Campus Residence Hall

- The South Campus Residence Hall, a new suite-style housing complex with nearly 700 beds and a dining hall, will open in August 2024, adjacent to Mirror Lake and the existing South Campus dorms.
- The Residence Hall is on track to attain LEED Gold status.
- The enabling project for the Residence Hall is the South Campus Infrastructure Project, which includes new and replacement subsurface utilities and the installation of a ground source heat exchange system (via 78 750-foot geothermal boreholes) for heating and cooling.
  - Ground source heat exchange is essentially a highly efficient heat pump, with heat exchanged (usually within sealed pipes) under the ground surface (subsurface temperatures remain relatively stable through the seasons, meaning they are always on the “right” side of the ambient temperature) or, uncommonly, in surface water bodies. It also allows for the storage of heat exhausted in the summer, to be extracted in the winter.
  - The geothermal system has been designed to handle the heating demand of the new Residence Hall, and both its cooling demand and that of existing buildings.
  - Existing paved areas (parking) will be used to install the geothermal heat exchange loop, and will be returned to the same use after the project is complete.
  - The Residence Hall will be connected to steam for peak shaving and operational redundancy (and will also allow the Residence Hall to open on time, despite delays in electrical equipment sourcing that will delay the in-service date for the geothermal system).
  - Though less exciting, the replacement of steam lines and other utilities in need of replacement will improve the efficiency of the delivery of existing utilities.

## Space Usage - Office Hoteling Pilot Program

- The most efficient building is the one that was never built.
- Office sharing/hoteling, paired with a hybrid work model, can reduce the space needs for many offices on campus.
- This facilitates a reduced footprint for office spaces, reducing the need for new office spaces and allowing for the repurposing/elimination of existing office spaces. This reduces everything from the embodied cost of materials to energy costs.
- There is also an immediate reduction in Scope 3 (transport) emissions – especially important at a rural campus like UConn that lacks safe and reliable public and human-powered transit options.
- The UPDC pilot program offered a department (UPDC) a renovated office space in return for committing to a hybrid work model (3 days in office/2 remote) with no dedicated office or work spaces.
  - The newly renovated office space opened in the former Parking Services office at 3 Discovery Drive (within the Warehouse building) in the Summer of 2022.
  - Tours and presentations are offered to interested departments at all UConn offices, and beyond.
  - Feedback from the department has been positive.

## Ongoing Projects:

1. Energy Conservation Program – LED lighting upgrades in School of Business, Music Drama, Dodd, ITEB, Castleman, Babbidge, Atwater
2. Northwest Dining Hall Demand Control Ventilation
3. ASHRAE Energy Audit Group 1
4. Stamford RCx Implementation

## Projects with Recent Development:

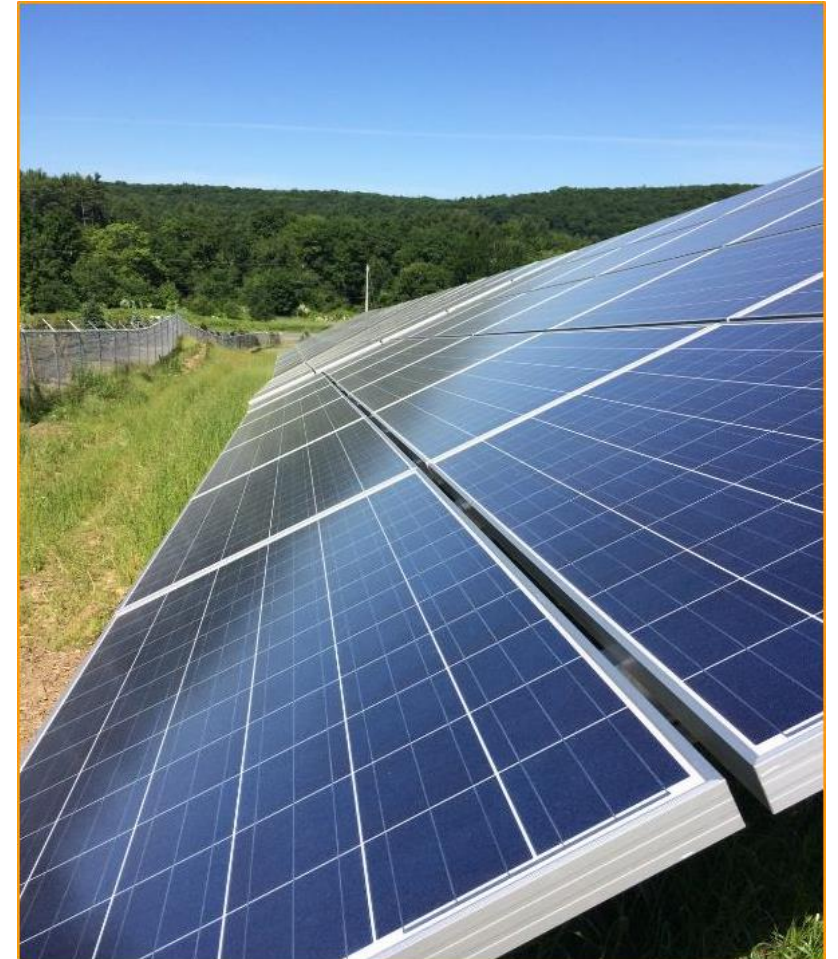
1. Hydrogen Fuel Dispenser FO502031 and Fuel Cell Electric Vehicles (FCEVs) – Purchase orders in process of being issued
2. Electric Vehicle Charging Infrastructure FO502039 – Purchase orders in process of being issued

## Projects planned for the December BOT Meeting:

1. Energy Savings Performance Contract (ESPC) Phase 2 Study and Storrs Parking Lot Solar Canopies

## Upcoming Discussions:

- Spring 2024 Meeting Schedule
- Outreach Events
  - Earth Day Spring Fling April 17, 2024



# Open Discussion

