Utah State University

Sustainability

Faculty Senate Update

January 2022 for Fiscal Year 2021
Changing 140,000 light bulbs will not get USU to net zero, but it is not a bad start. Over the past two years, USU’s lighting teams managed to replace a remarkable 95% of bulbs on USU campuses with energy-efficient LEDs. These teams, at times, have changed hundreds of bulbs daily. Indeed, their work could reduce electricity used for lighting by two-thirds. In a year atypical in so many ways, new and efficient lighting contributed to USU’s extraordinary 15.5% reduction in greenhouse gas emissions in fiscal year (FY) 2021, year-over-year.

This year’s reduction is substantial and exceeds the goal of 10% per year set by the Faculty Senate’s 2019 resolution. However, travel changes over the past two years have been the biggest driver in the downward trend. Air travel, for example, dropped from 16 million in FY 19 to just over 500,000 in FY 21. Although less dramatically, personal reimbursed miles, gasoline use, and commuting have fallen as well. In coming years, new travel patterns will emerge. Transportation-related emissions may rebound.

Others sources of emissions may fare better. The pandemic necessitated additional ventilation to reduce the risk of transmission. As the pandemic wanes, so may the additional energy required to heat, cool, and circulate fresh air. Effects of on-going efficiency upgrades will also become clearer as trends stabilize.

In addition to the energy and efficiency goals, faculty and students also have gained ways to learn about sustainability. Connections added sustainability video options in the module on being a learner in 2021. Additionally, a new sustainable teaching pathway opened in the ETE10 program, so faculty can explore sustainability in their teaching. The Planetary Thinking Workshop will return in spring 2022 to provide faculty with time and resources to incorporate sustainability into their classes.

The past year included important advancements in efficiency and education. Looking forward to FY 22, more projects are in the works:

- The second phase of the Fine Arts Visual solar installation is complete, and it will be online for the next report. (Objective 5)
- The ribbon cutting for USU’s first net zero-energy building in Moab is in April. (Objective 4)
- USU’s Utility Department is in a planning process for de-carbonizing the Central Energy Plant. (Objective 4)
- A life cycle calculator for USU energy-intensive purchases has been developed and will be implemented with potential purchasers in the coming year as well. (Objective 7)
1. Employ best practices to ensure that we have a robust and consistent process for estimating USU’s total greenhouse gas emissions. Total greenhouse gas emissions from Logan and Statewide campuses should serve as the key performance indicator to evaluate USU’s progress on this initiative.

2. Work with Rocky Mountain Power to purchase a renewable energy portfolio. Continue to engage Logan Light and Power and Price Public Utilities to develop similar opportunities to purchase renewable and carbon-free energy portfolios.

3. Accelerate conversion of lighting on Logan campus to energy- and cost-saving LED lights, to be completed within the next two years.

4. Increase investment in best available energy management technology and energy-saving HVAC commissioning projects for the next ten years.

5. Continue to investigate opportunities to increase solar and wind energy on or near campus, beyond those provided in the renewable energy portfolios that we seek to purchase from public utilities.

6. Improve fuel efficiency of fleet vehicles and conduct a pilot study of integrating electric vehicles into our fleet.

7. Implement a non-binding ‘shadow’ price on carbon emissions for all major University expenditures.

8. Establish a mandatory carbon offset fee of $10 per round-trip for all University-sponsored air travel paid by the department, college or index funding the trip. Use funds raised by that fee to pay for projects with the highest return on investment for reducing USU’s greenhouse gas emissions and/or improving air quality on and near USU campuses.

9. Develop a fundraising campaign focused on advancing USU’s efforts towards sustainability and carbon neutrality.

10. Expand and institutionalize USU’s Planetary Thinking in the Curriculum Workshops with a focus on general education courses to ensure that all students graduate with an understanding of the causes, implications, and solutions to climate change.

11. Expand adoption of climate and sustainability-related learning outcomes and assess students’ attitudes and understanding of relevant content.
Highlights

**Greenhouse Gas Inventory**
The FY 2021 greenhouse gas inventory indicated a 15.5% decrease in emissions, following a 12% decrease last year.

**Efficiency Improvements**
USU energy teams have replaced 95% of lights on USU campuses statewide with LEDs. USU utility data is also now available via publicly web interface.

**Shadow Pricing Carbon**
USU Facilities has adapted a spreadsheet to facilitate life cycle analysis, including a price on carbon. The calculator will become available to purchasers in the coming year.

**Planetary Thinking**
The Planetary Thinking Workshop has returned and will take place in May 2022. The workshop is now also a part of the ETE10 Sustainable Teaching Pathway.

**Other Recommendations**
Read about progress on renewable energy, fundraising, fuel-efficient vehicles, and student learning outcomes.
1. Employ best practices to ensure that we have a robust and consistent process for estimating USU’s total greenhouse gas emissions. Total greenhouse gas emissions from Logan and Statewide campuses should serve as the key performance indicator to evaluate USU’s progress on this initiative.

The process of collecting a complete and standard greenhouse gas inventory continues to improve. In the 2021 fiscal year (FY 21), data detailing the format of USU’s class offerings informed transportation estimates for FY 20 and FY 21. By comparing classes in person and online since FY 19, it was possible to estimate transportation numbers using the 2019 transportation survey and class data as a baseline. The next transportation survey will go out in spring 2022.

With turnover in interns and employees managing space data, the numbers have changed over the years, representing different spaces on the campuses across the state. These numbers are important to normalize greenhouse gas emissions by square foot. This year, the process to calculate those numbers was documented more thoroughly.

Finally, missing utility data for the Price campus was added in FY 21. It was also estimated and added for missing years. Each year, the process of calculating becomes more standard and thorough as people collecting and providing the data become more familiar with the process and data requests.
Greenhouse Gas Inventory 2021

### COVID Changes
- Increased number of classes online, blended face-to-face, and introduction of hybrid face-to-face
- Remote work available for employees if position allows
- University-related commuting and travel declined

### Data Changes
- Standardized data sources of space (sq.ft.) and campus users
- Added missing Price campus utilities to current and historic data
- Estimated commuting with 2019 survey and university data on course offerings during the pandemic

### Boundaries include...
- Students and space from the Logan Campus, statewide campuses, support facilities, and farms.
- Electricity and natural gas for Logan Campus, statewide campuses, support facilities, and farms.
- Commutes on Logan and statewide campuses
  - Logan commutes are based on survey data from the Logan campus.
  - Statewide campuses are estimated from Logan data, excluding bus options.
  - Statewide campuses will be included in future transportation surveys.
- USU-funded air travel and fuel from the USU travel office and State of Utah
- Study abroad based on student destinations
- Waste, recycling, and composting data from the Logan campus only
  - Other campuses do not weigh waste or track this information.
Utah State University produced 67,552 MTCO$_2$e in FY 2021

**USU Emissions (by scope) 2011-2021**

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**Scope 1**
- Electricity
- Steam
- Fuels
- Aggie Shuttle
- USU vehicles
- Aviation
- Animals
- Fertilizer
- Refrigerants & chemicals

**Scope 2**
- Purchased electricity

**Scope 3**
- Commuting
- Business & Research Travel
- Purchased goods
- Paper
- Not food yet
- Waste
- Wastewater
EFFICIENCY IMPROVEMENTS

Key Recs.

3. Accelerate conversion of lighting on Logan campus to energy- and cost-saving LED lights, to be completed within the next two years.

4. Increase investment in best available energy management technology and energy-saving HVAC commissioning projects for the next ten years.

The LED retrofits continued on statewide campuses, using revolving loans through the state, and on the Logan campus north of the cemetery. The process of installing LEDs is 95% complete. Prior to the LED upgrades, lighting accounted for approximately 11% of an average building’s energy use. The project is estimated to reduce that energy use by two-thirds. Teams will complete the remaining 5% in FY 2022.

USU’s utility systems group continuously works to maintain buildings and increase efficiency. Monitoring energy use facilitates the process. The majority of buildings larger than 3,000 square feet have individual meters. The data they provide helps utility teams monitor and compare performance to the same building in prior years and other similar buildings. ENERGY STAR Portfolio Manager also assists with benchmarking by comparing similar buildings nationwide. For individuals interested in how their building is performing, a new public dashboard is live. A click on a map of the Logan campus shows energy use of the selected building. (Access is restricted to IP addresses from the Logan campus or individuals using a USU VPN.)

USU’s Central Energy Plant is well maintained and the source of heating, cooling, and about half USU’s electricity. However, the natural gas that fuels the plant is source of greenhouse gases. USU Facilities has begun developing of a Carbon Neutrality Road Map for the Central Energy Plant. The study will include options ranging from the current natural gas operation to a fully electric system. This study will be complete in the summer of 2022.
7. Implement a non-binding ‘shadow’ price on carbon emissions for all major University expenditures.

USU Facilities has been adapting a life cycle costing calculator developed by Harvard University for USU campuses. Forecasted utility rates allow users to enter information on upfront cost and operation for an energy conservation measure or energy-intensive purchase. The calculator will estimate the total cost over its lifetime. The non-binding process will provide another perspective in purchasing decisions. This calculator is expected to be in use in FY 22.

10. Expand and institutionalize USU’s Planetary Thinking in the Curriculum Workshops with a focus on general education courses to ensure that all students graduate with an understanding of the causes, implications, and solutions to climate change.

11. Expand adoption of climate and sustainability-related learning outcomes and assess students’ attitudes and understanding of relevant content.

The Planetary Thinking in the Curriculum Workshop is funded and returning in May 2022. The Workshop will host 20 USU faculty who are interested in adding sustainability to one or more of the courses they teach.

Additionally, that ETE10 Pathways program launched a Sustainable Teaching Pathway in late 2021. By participating in the Pathway, faculty can receive badges for attending the Planetary Thinking Workshop and work toward the Teaching Scholar Certificate. Participants were already joining by the end of the fall semester, and the first learning circle for the pathway, which began in January, is full.

The Planetary Thinking planning work group collaborated with Connections this year to offer more options to include sustainability. In the past, faculty had the option to invite a guest speaker on sustainability. This year faculty could also use a video on wicked problems for the module on being a learner. A second video on getting involved included sustainability initiatives.

The Sustainability Council’s Curriculum Work Group is reconvening as well. This group will have the ability to focus more on the progress made in FY 21 to measure student outcomes. The pilot study on student outcomes requires evaluation and modification.
OTHER RECOMMENDATIONS

key 2. Work with Rocky Mountain Power to purchase a renewable energy portfolio. Continue to engage Logan Light and Power and Price Public Utilities to develop similar opportunities to purchase renewable and carbon-free energy portfolios.

USU and other partners began negotiations on a solar power purchase agreement under schedule 32 in the past year. Due to contract negotiation issues between Rocky Mountain Power and the developer, the project went to another buyer.

Nevertheless, USU is exploring options through Rocky Mountain Blue Sky grants, which have funded solar installations on the USU farm in Wellsville, Aspire Research Lab in North Logan, and on the Moab campus. USU and the City of Logan are in discussions about retiring one megawatt of renewable energy credits (RECs) on behalf of USU.

5. Continue to investigate opportunities to increase solar and wind energy on or near campus, beyond those provided in the renewable energy portfolios that we seek to purchase from public utilities.

USU completed the installation of the 158-kilowatt array on the Gateway Terrace. The funding for installing a second approximately 73-kilowatt array on Fine Arts Visual and a 178-kilowatt array on the new USU Moab building was secured in FY 21 for completion in FY 22. On-site solar is still under consideration for USU campuses.

6. Improve fuel efficiency of fleet vehicles and conduct a pilot study of integrating electric vehicles into our fleet.

Due to significant reductions in travel, additional resources have not been allocated to the purchase of new vehicles.

9. Develop a fundraising campaign focused on advancing USU’s efforts towards sustainability and carbon neutrality.

Grants are pursued as opportunities arise. For example, the Rocky Mountain Power Blue Sky program is funding a solar array on the USU Moab campus. Establishing additional resources to manage a fundraising campaign will have to be a priority for the future.