Dickinson

# Energy and Water Management Guidelines

## Overview – our historic commitment

Energy Management has been an important operations focus at Dickinson College for decades. The college historically valued energy management as a financial sustainability strategy to reduce annual operating expenditures for utilities and apply the savings to sorely needed asset renewal projects. The college's energy use per square foot can be found on the Sustainability Dashboard, at the following link: http://marcomm.dickinson.edu/dashboard/greenhouse_emissions.html .

In 2005, the aim of the college's energy management initiatives began to point towards environmental sustainability and specifically carbon emissions reductions. This was substantiated when the college joined the Second Nature *President's Climate Commitment* in 2007 and targeted 2020 as our carbon neutrality date[i].

Since the 1980's, the college has employed energy management consultants to help us develop efficiency and fuel procurement strategies and we have consistently benchmarked well against peer institutions. In a 2005 Benchmarking study of similar colleges and universities in the northeast, Dickinson was found to consume the least KBTUs per gross square foot of the 15 incorporated institutions, and approximately ½ the institutional average. Dickinson also compares very well to benchmarks put out by the *Association of Physical Plant Administrators* (APPA) and other benchmarking organizations.

## Energy Management Team

The college's AVP for Sustainability and Facilities Planning oversees the college's energy management strategy, along with key members of the Facilities Management department – to include the AVP for Facilities Management, the Direct of Trades, and the Director of Projects. These individuals interact regularly to discuss energy management strategies and issues. The AVP for Sustainability and Facilities Planning serves as the de-facto Energy Director for the college, with responsibilities that include procuring energy, developing energy and associated carbon reduction goals, measuring and verifying progress vs. the goals, acting as the liaison on energy issues with senior staff, and communicating the energy management goals, strategies and successes to the broader college community. Additionally, the college's *Space Planning Committee* (SPC) reviews and approves energy projects, and the *President's Commission on Environmental Sustainability* (PCES) and the *Planning and Budget Committee* (P&B) review energy management initiatives and budgets.

## Energy Management Goals and Policies:

The college's energy goals and policies are summarized below:

- We prioritize connecting as many buildings as possible to our Central Energy Plant, which provides benefits for efficiency, maintenance and asset renewal requirements.

- We are committed to **LEED certification** of Silver or higher for all new construction projects that exceed $500K. We currently have five LEED Gold projects; one project that has been completed and is in the final stages of certification - expected to achieve Gold status; and one project, our new residence hall, that is currently under construction and is targeting LEED Platinum certification. Since LEED buildings have an energy efficiency focus, our LEED certification policy is a de-facto energy management policy, and our new buildings are significantly more efficient that what is required by code.

- The college's **carbon neutrality commitment** requires the development of a **Climate Action Plan** (CAP) which provides a roadmap to neutrality[ii]. The CAP calls for a 25% reduction of carbon emissions by 2020. The CAP was updated in 2013 and was supported by the completion of two campus Energy Audits and a Renewable Energy Study, completed by our energy management consultants. The CAP also provides a vehicle for connecting energy management goals with the campus sustainability culture, with ties to the curriculum and co-curricular initiatives. This is perhaps best evidenced by Eco-rep Program[iii] and the annual Energy Challenge[iv], both lead by the *Center for Sustainability Education.*

- In 2017, the college developed an Energy Use Intensity (EUI) standard for our new construction and large renovation projects. The standard, which is based on our 2020 carbon neutrality goal, is as follows:

  > *New HVAC/MEP systems and the replacement of existing systems are expected to achieve 60KBTU/GSF or less, with options provided for achieving 45 KBTU PER GSF PER YEAR or less. Also, systems must exceed AASHE 90.1 – 2010 Energy Efficiency Standards by 30% or more. In addition, unless otherwise noted, heating systems and fixtures, to include domestic hot water, should be fueled with natural gas.*

It is worth noting that the new EUI standard has been adopted by Facilities Management, to include our Capital Project Management staff.

The college also monitors EUI for existing buildings and uses data to identify maintenance issues and to prioritize energy projects. The data is assessed to identify the highest EUI buildings in general, but also to identify changes in EUI over time which may be related to a change in program, changes in degree days, or system malfunctions. The college has been prioritizing the installment of additional consumption meters to improve data, trouble-shooting and decision-making.

- The college's energy management strategy includes the strategic employment of renewable energy systems.
    - In the past ten years, the college has installed more than 100KW of solar on campus.
    - In 2017, a 3-megawatt solar array is being installed on campus that will produce more than 25% of the college's electricity.
    - Two recent capital projects (The Durden Athletic Training Center and the new residence hall), have included the design and installation of solar infrastructure to accommodate future rooftop solar panels.
    - As a best management practice, we consider solar for any large renovation and/or new construction projects.
    - As a best management practice, we track local, state and federal grant opportunities associated with renewable energy projects.

- In 2014, the college designed a Trigen system to be installed at the Central Energy Plant, but the project was tabled due to not receiving grant monies to support the project, and because utility rates for gas and electricity did allow for positive financial returns. We will continue to monitor grants and utility pricing to determine if a Trigen system makes sense for the future.

- The college has also adopted a best management practice of identifying life cycle costs and benefits associated with energy management initiatives and projects. One benefit of the life cycle analysis is to provide added financial incentive for installing the most efficient HVAC/MEP systems possible, since the life cycle and total cost of ownership analysis provide a financial impetus for efficiency.

- The college has historically employed a formal energy curtailment program during periods of non-occupancy on campus, to include college breaks and holidays. We also curtail energy in buildings at night and on weekends. Our curtailment program is greatly assisted by our web-based EMS systems on campus, which allow changes to be made adeptly. Our curtailment programs have a proven impact on energy consumption and costs, and have been widely accepted by the community, whose participation and acceptance is crucial.

Measurement and Verification (M&V): Since the inception of the Green Revolving Loan Fund, the college has made every attempt to measure and verify the impact of energy management and CAP projects. The AVP for Sustainability and Facilities Planning tracks utility consumption and carbon emissions on a regular basis to ensure that we are meeting our financial and environmental goals. Our M&V efforts are supported by our utility tracking software through the *SchoolDud*e data management platform, as well as our LUCID energy dashboard software. We are also able to monitor our carbon emissions using the SIMAP software developed by the University of New Hampshire, and we do so on a regular basis. ,

Evaluate Progress: We evaluate progress on our energy management goals using our M&V systems, noted above. Our utility budget performance and our CAP performance is assessed by the college's Financial Services staff, on an annual basis. Utility Savings related to CAP projects are allocated to the Green Loan Fund to support future CAP projects, many of which advance our energy management goals. In addition, CSE monitors and reports on our greenhouse gas emissions inventory, and develops an annual report that details our carbon neutrality progress.

Recognize Achievements: The college has tied energy management strategies and goals to our carbon neutrality commitment, which has been an effective way to recognize and celebrate achievements. The annual Energy Challenge sponsored by CSE is a great example of this. Another example is when we provided the Class of 2020 *with Class of Carbon Neutrality T-shirts*. Finally, the Green Fund itself is an important example of the way the college has recognized our success in the area of energy management and carbon neutrality.

Water Management: The college's energy management strategies do extend into the realm of water consumption. As with energy, reducing our water consumption has important financial and environmental benefits, and therefore water efficiency has been an important element of large renovations and capital projects. The college's water use is monitored on the *Schooldude* data management platform, which provides water consumption and cost information by building. Water consumption is also monitored on the Sustainability Dashboard, at http://marcomm.dickinson.edu/dashboard/water_consumption.html). As with energy consumption, we use the data to identify areas of concern for maintenance and renovation.

We have developed a list of high efficiency plumbing fixtures to be applied to all renovations and new construction projects which has resulted in reduced consumption. We also have installed native plantings for all landscape renovations, vastly reducing and/or eliminating the need for irrigation.

We look forward to increasing our emphasis on water consumption reduction by using data to establish target-based reductions and to develop a formalized list of best management practices. To this end, our water management plans include an 'energy-like' performance assessment of buildings that will result in the creation of building-specific goals and action plans for improvement.

[i] In 2020, the college will reduce on-campus emissions by 25% and will offset the remaining 75% of emissions using renewable energy credits and carbon offsets. After 2020, the college has set subsequent dates for reducing our reliance on offsets.

[ii] The CAP identifies and prioritizes projects that will reduce carbon emissions, and includes project costs, life cycle costs, and associated financial and carbon reductions. The college has developed a Green Loan Fund to finance CAP projects using the utility savings from past projects

[iii] The Eco-rep program is run by CSE and includes the establishment of Eco-reps in all campus buildings, including residence halls, academic and administrative buildings. Eco-reps advance sustainability initiatives, including energy related goals.

[iv] The Energy Challenge is a 3-week initiative led by CSE in the spring semester. The challenge is a fun way to highlight the importance of reducing energy consumption in campus buildings, and rewards building occupants that reduce energy consumption vs. historical usage.