CCSU
Central Connecticut State University

PACES Brief on Campus Energy

In keeping with our charge to advise the President of Central Connecticut State University on the best practices and means for achieving environmental sustainability, the members of CCSU's President's Advisory Council on Environmental Sustainability (PACES) offer this Brief on Campus Energy.

This Brief on Campus Energy is the first of three briefs that PACES is planning to submit. Subsequent briefs on sustainability will focus on Recycling and Waste Reduction, and on Visibility and Education.

Respectfully submitted to President Zulma Toro on October 7, 2019, by the contributing members of PACES:

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Background

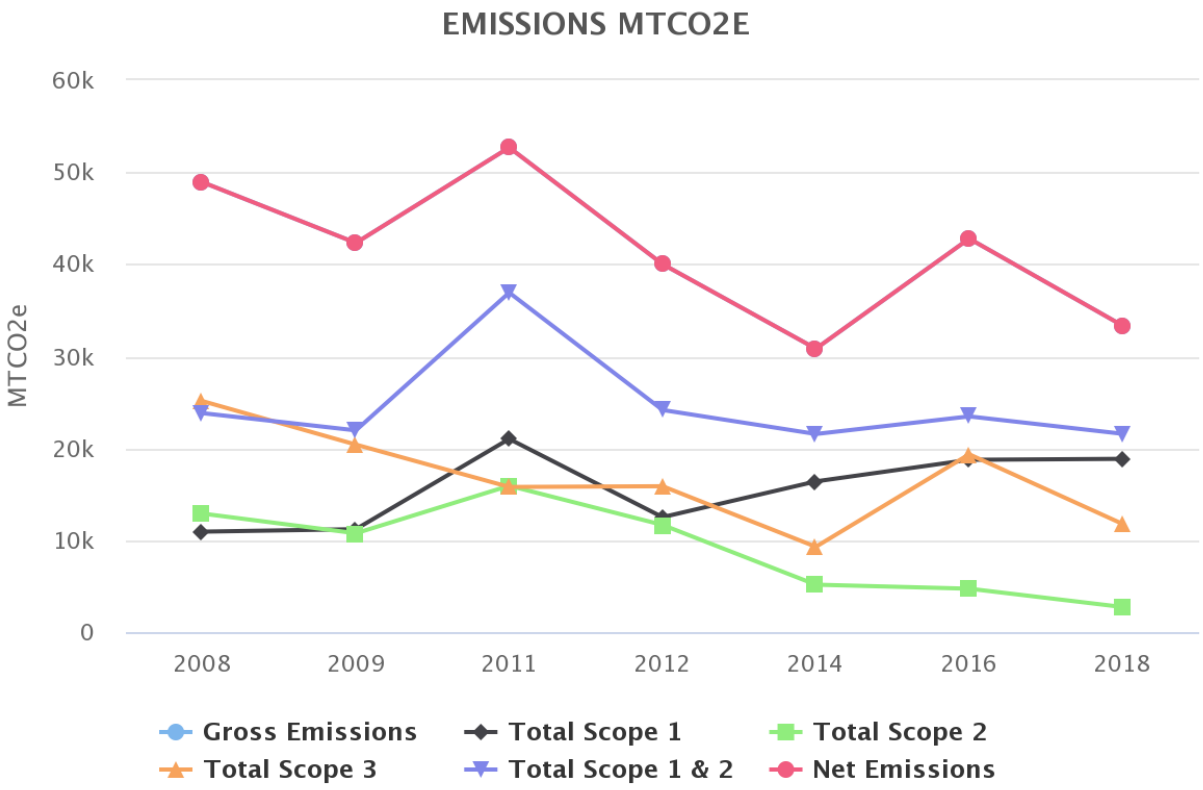
In August 2007, CCSU's president, Dr. John W. Miller, signed the American College and University Presidents' Climate Commitment (ACUPCC), promising to take steps towards achieving climate neutrality, and publicly reporting greenhouse gas emissions (GHG) annually, including progress made towards CCSU's reduction goals. GHG emissions sources were reported and include fuel burning equipment (boilers, chillers, generators, and fleet vehicles), purchased electricity, and travel and commuting of students, faculty and staff. A baseline Greenhouse Gas Inventory was calculated in 2008 with net emissions of 44,640.4 MR eCO2. As part of the ACUPCC, the Climate Action Plan (CAP)[1] and the Energy Conservation Plan were developed, which both identified potential mitigation strategies and target goals.

The reduction goals set forth under our CAP are:

Phase	Time Frame	Milestone	Net GHG Emissions	Net Emission Reduction During Phase
Phase 1	FY 2010 to FY 2015	**20% below FY 2008 levels by 2015**	At or below 35,712.3 MT eCO2 by 2015	8,928.1 MT eCO2
Phase 2	FY 2016 to FY 2025	**50% below FY 2008 levels by 2025**	At or below 22,320.2 MT eCO2 by 2025	13,392.1 MT eCO2
Phase 3	FY 2026 to FY 2050	**Climate neutrality by 2050**	0 MT eCO2 by 2050	46,290.1 MT eCO2

[1] http://www.ccsu.edu/about/sustainability/files/ClimateActionPlan.pdf

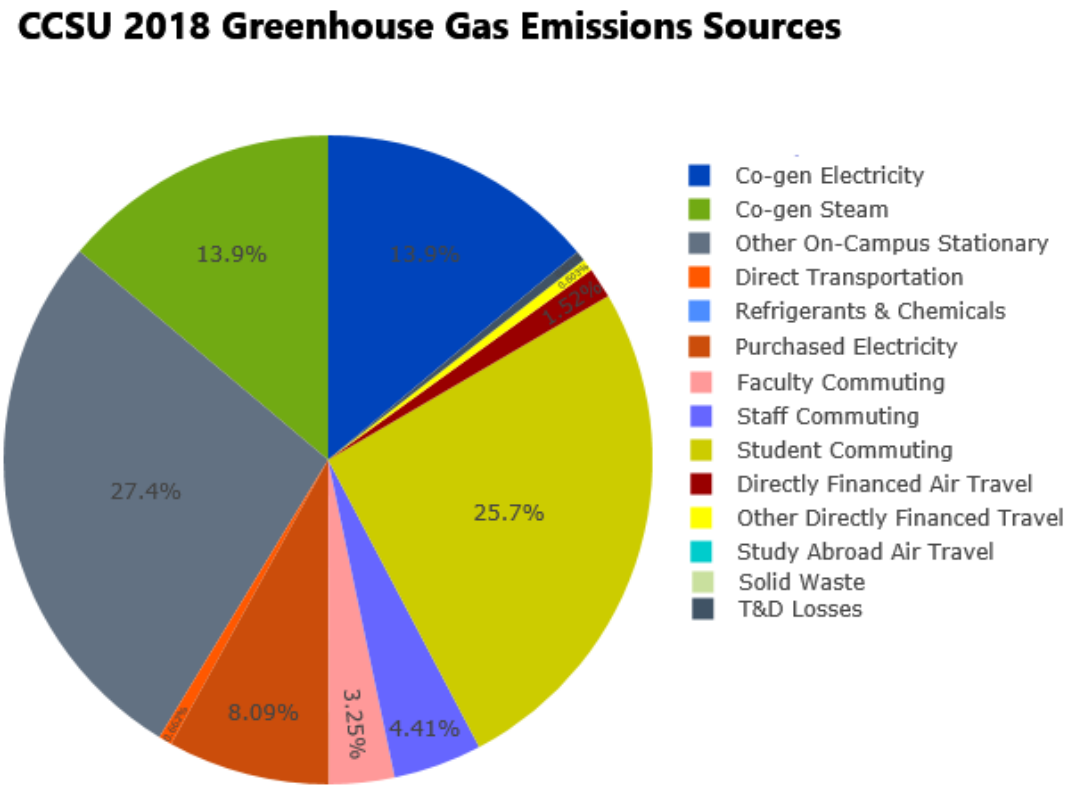
Below shows our progress up to the most recent report which can be found on ACUPCC's reporting platform.[2]



Our Progress Report in 2016 showed an increase in emissions from 2014, missing our Phase 1 goal. The latest progress report completed in June 2019 showed a reduction of 32 percent from the 2008 baseline. This reduction appears to be related to an increase in electricity production by cogeneration; lighting efficiency projects in the four parking garages; and a recent change in electrical procurement with a portfolio of 100 percent renewable sources as of May 1, 2018. The energy loads from new and planned buildings have not been calculated, but their negative impact on attaining continued energy reduction goals is certain.

[2] http://reporting.secondnature.org/institution/detail!730##730

The pie chart below shows the emissions sources reported for 2018. The largest emissions sources are on-campus stationary sources (27.4%) which include fuel-burning boilers, chillers, and generators. The second largest emissions source is student commuting (25.7%).



The 2007 Energy Conservation Plan was developed to help plan upgrades to building efficiencies, increase use of renewable power, and decrease the campus's GHG emissions. In August 2017, CCSU received the final version of the CSCU Energy Master Plan developed in partnership with the BOR. The plan documents existing energy use, energy management practices, and energy reduction initiatives and provides a comprehensive path forward with identified energy reduction opportunities and best management practices.

CCSU has completed two important steps toward achieving climate neutrality: setting interim goals and identifying opportunities for reducing energy use. The Facilities Department has implemented much of the solutions that represent "low hanging fruit" -- those less costly projects that are more easily implemented with high rewards. More complex projects remain. However, the momentum and

consistent effort needed to meet the goals of the CAP will not be realized unless additional resources are allocated to this initiative.

Recommendations

PACES members believe that achieving the energy goals required to meet CCSU's Climate Action Plan will continue to become increasingly challenging and require the dedicated efforts of a specialist. Our recommendation is that the University employ a full-time energy manager to implement and advocate for energy conservation and renewable energy production measures (see Option 1 below).

While PACES members believe that creating and filling a full-time Energy Manager position is the best option for addressing energy conservation on campus, we understand that there might be financial or other barriers to doing so. In this case, an Energy Savings Performance Contract (ESPC) is a budget-neutral alternative (see Option 2 below).

Option 1: Create an Energy Manager Position

1. What does an Energy Manager do?[3]
    a. Optimizes the energy performance of campus buildings and systems to reduce energy consumption in a cost-effective manner
    b. Develops and implements energy management strategies including plans for continuous improvement

2. Why does CCSU need an Energy Manager?
    a. Buildings use 40 percent of the energy consumed in the US[4]
    b. The energy impacts of newly constructed and planned buildings must be offset with energy savings from existing buildings
    c. CCSU has a complex portfolio of buildings that will benefit from the full-time expertise of an energy specialist who will set and achieve measurable goals

3. How much will it cost?
    a. The average base salary of Association of Energy Engineers survey respondents in the US was $105,661 in 2017[5]
    b. With approximately $3,520,255 in annual energy costs in 2018 for the campus ($1,849,849 for gas; $1,670,405 for electricity), a savings of just 3 percent will pay for the average base salary

4. How much might it save?

[3] https://www.aeecenter.org/certifications/certifications/certified-energy-manager
[4] https://www.eia.gov/tools/faqs/faq.php?id=86&t=1
[5] https://www.aeecenter.org/sites/default/files/resource-attachments/2018%20Energy%20Jobs%20Report_Final.pdf

a. "In many sectors, well-run energy programs may reduce energy costs by 3 to 10 percent annually," according to Energy Star.[6] Based on CCSU's 2018 energy costs, this would amount to $105,607 to $352,025 per year in energy cost savings.
b. Based on this estimate, the low-end represents a wash and the high-end of the estimate contributes positively to the bottom line.

Option 2: Energy Savings Performance Contract (ESPC)

1. What is an Energy Savings Performance Contract (ESPC)?
   a. It is a contract with an energy service provider who is paid with the future cost savings of the energy conservation measures, making it a budget-neutral approach.
   b. The Connecticut Department of Energy and Environment Protection Department (DEEP) describes it as follows: "The ESPC program is designed to assist state and municipal governments in implementing a portfolio of comprehensive energy savings measures with little to no upfront capital. The costs of the energy retrofits are paid for by future guaranteed savings from utility and maintenance budgets."[7]

2. What are the potential energy savings?
   "[P]ublic-sector ESPC projects have demonstrated average energy savings of 13% to 31%."[8]

3. Will the State support an ESPC?
   Yes, per Connecticut General Statutes 16a-37x.

4. What resources are available to assist the university in pursuing an ESPC?[9]
   The state has a toolkit of resources, including a list of pre-qualified energy service providers, standardized contracts and statements of work, etc.

Conclusion

Hiring an energy specialist, whether an individual or a company, is the surest means to achieving the goals in the Climate Action Plan. Energy savings will result in cost savings, savings that should cover the costs of the energy specialist. A secondary approach would be to implement an Energy Savings Performance Contract (ESPC) as a budget-neutral alternative as mentioned in Option 2 above.

CCSU must take action now to meet campus energy goals and commitments.

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6 https://www.energystar.gov/ia/business/guidelines/continuous_improvement/Teaming_Up_To_Save_Energy.pdf

7 https://www.ct.gov/deep/cwp/view.asp?a=4405&Q=513642

8 https://betterbuildingssolutioncenter.energy.gov/energy-savings-performance-contracting-espc-toolkit

9 https://www.boma.org/BOMA/Research-Resources/1-BOMA-Reports/BOMA-Energy-Performance-Contracting-Model.aspx