

# Energy Use Profile for ASNUNTUCK COMMUNITY COLLEGE

## Benchmarking 2016



Photo Credit: Asnuntuck Community College



Photo Credit: Asnuntuck Community College

**Strategic energy management** presents a significant opportunity for campuses throughout Connecticut to improve building energy performance, save money and reduce carbon emissions.



**Benchmarking** is the process of comparing current energy usage data to previous years' energy usage data for the same facility or to the energy performance of comparable facilities. Benchmarking provides an opportunity to stimulate conversation and deeper inquiry into energy use, opportunities for savings and optimizing building performance.

MANY OF CONNECTICUT'S HIGHER EDUCATION INSTITUTIONS HAVE MADE BOLD CLIMATE CHANGE COMMITMENTS. Higher education, the only sector with a coordinated organizational commitment to carbon neutrality, provides a model for setting and tracking climate targets and accountability in meeting climate commitments.

In Connecticut, 27% of colleges and universities have made commitments to become carbon neutral and have developed greenhouse gas inventories and climate action plans for their campuses. These commitments impact over 44% of the full-time students enrolled at higher education institutions in Connecticut.

Accordingly Connecticut's higher education institutions will provide a strong contribution to meeting Connecticut's goals for reducing greenhouse gas emissions by 80% by 2050.

Connecticut State Colleges and Universities (CSCU) campuses - which include 12 community colleges and 4 state universities - provide

opportunities to approach sustainable energy management systemically and make significant contributions toward the state's 20% energy reduction goals. Moreover the CSCU campuses comprise 18% of the total square footage of all state agency buildings and 30% of all higher education students in Connecticut.

This report analyzes energy use and benchmarking data for **Asnuntuck Community College**. It was produced with companion reports for each of the 11 other community colleges in the CSCU system, with the goal of providing data and analysis to inform the CSCU Energy Master Plan and to improve energy management at Asnuntuck Community College specifically.

### KEY FINDINGS

# 84%



of Asnuntuck Community College annual total energy cost in 2016 was for electricity, even though only half of its total energy was supplied by electricity.

# 17%

more energy (as measured in site energy use intensity) is being used by Asnuntuck Community College in 2016, as compared to

# \$30,800

in annual potential savings could be realized if Asnuntuck Community College reduced its building energy use by 10%.



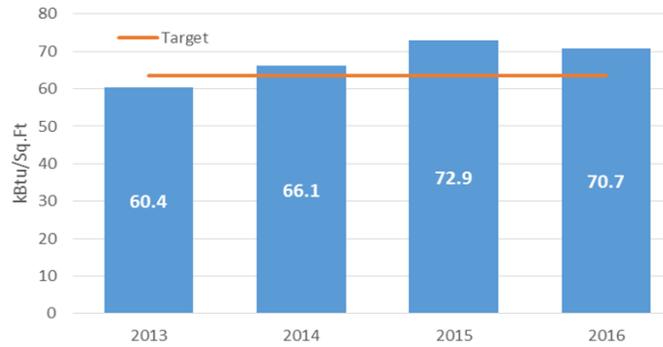
**Asnuntuck Community College** is comprised of one 2-story building that includes, among other spaces, an auditorium, a gymnasium and a classroom with machine technology. Its existing gross area is 166,636 square feet, though the college recently broke ground for an Advanced Manufacturing Center, which will expand the gross area by another 27,000 square feet.

## Finding 1

### Between 2013 and 2016, energy use increased by 17% for Asnuntuck Community College.

The energy performance of a building is a reflection of the building's design, systems, equipment, and operating and maintenance practices, as well as the behavior of those using the building. Site energy is the annual amount of all energy a property consumes onsite, as reported on utility bills. Site energy use intensity (EUI) is the site energy use per square foot of property.

The current average site EUI for community colleges in Connecticut is



**Figure 1. Building energy performance** (site EUI) by calendar year from 2013 to 2016 (in blue) and a proposed energy use target (in orange) for Asnuntuck Community College. The target reflects a 10% reduction in energy use from 2016 use.

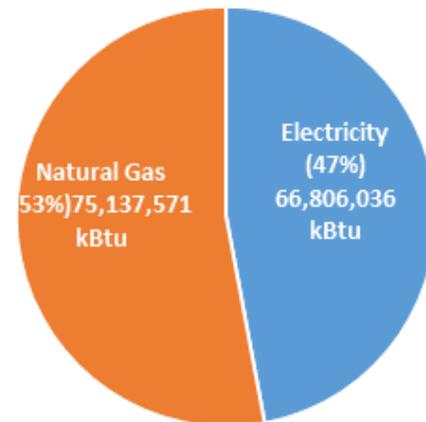
101 kBTU/ft<sup>2</sup> (See **Methods** for source). Asnuntuck Community College's site EUI is currently below the Connecticut average, at 70.7 kBTU/ft, indicating better than average energy performance among Connecticut community colleges. However, from calendar year 2013 to calendar year

2016, site EUI increased from 60.4 to 70.7 kBTU/ft<sup>2</sup> (see **Figure 1**), representing a 17% increase. This report sets forth a 10% reduction in energy use as an attainable initial target. Further, this target should include the Advanced Manufacturing Center.

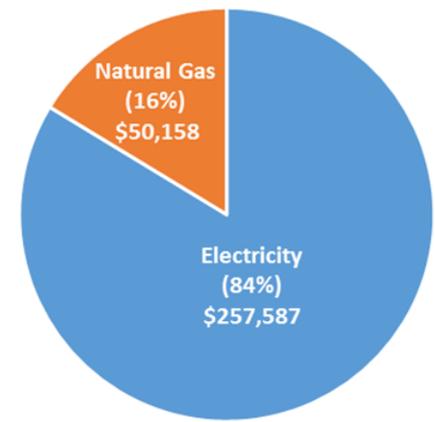
## Finding 2

### Electricity accounted for half of Asnuntuck Community College's total energy use, but 84% of its total energy costs in 2016.

From June 2015 to June 2016, Asnuntuck Community College's total campus energy consumption was split almost equally between electricity and natural gas (see **Figure 2** for energy consumption by energy source). However, due to the relatively higher cost per Btu of electricity during this time period, electricity costs were significantly higher at 84% of the total, compared to natural gas (see **Figure 3**). In order to optimize cost savings, the



**Figure 2. 2016 energy consumption by energy source** for Asnuntuck Community College.



**Figure 3. 2016 energy cost** for Asnuntuck Community College.

college might consider prioritizing actions that save electricity use (see **Next Steps** in this report), with the

understanding that energy prices vary over time and that both electricity and natural gas prices may vary year to year.

## Finding 3

### Asnuntuck has the potential to save up to \$30,800 per year, if building energy use is reduced by 10%.

In 2013, Asnuntuck Community College spent \$1.64 per square foot on its total energy costs (including electricity and natural gas) versus \$1.85 in 2016 (see **Figure 4**). If Asnuntuck reduced its energy use by 10% below



**Figure 4. Energy cost per square foot** for Asnuntuck Community College from 2013 to 2016 (in blue) and a proposed target (in orange) that assumes a 10% reduction in energy use.

2016 levels, the cost per square foot would drop to \$1.66, resulting in

potential savings up to \$30,800 per year, assuming energy prices remained constant.

### Finding 4

Electricity use at Asnuntuck Community College varied between 105,000 kWh and 173,000 kWh over the course of the year, with peaks in the warmer months.

Detailed electricity use data are available for Asnuntuck Community College from January 2013 to August 2016 (see **Figure 5**). Specific trends vary by year, but across all years, usage typically peaked in August, successively

increasing each year, with the highest annual peak occurring in 2016 at 173,000 kWh. Of the annual data available thus far for full calendar years, electricity usage was highest in 2015.

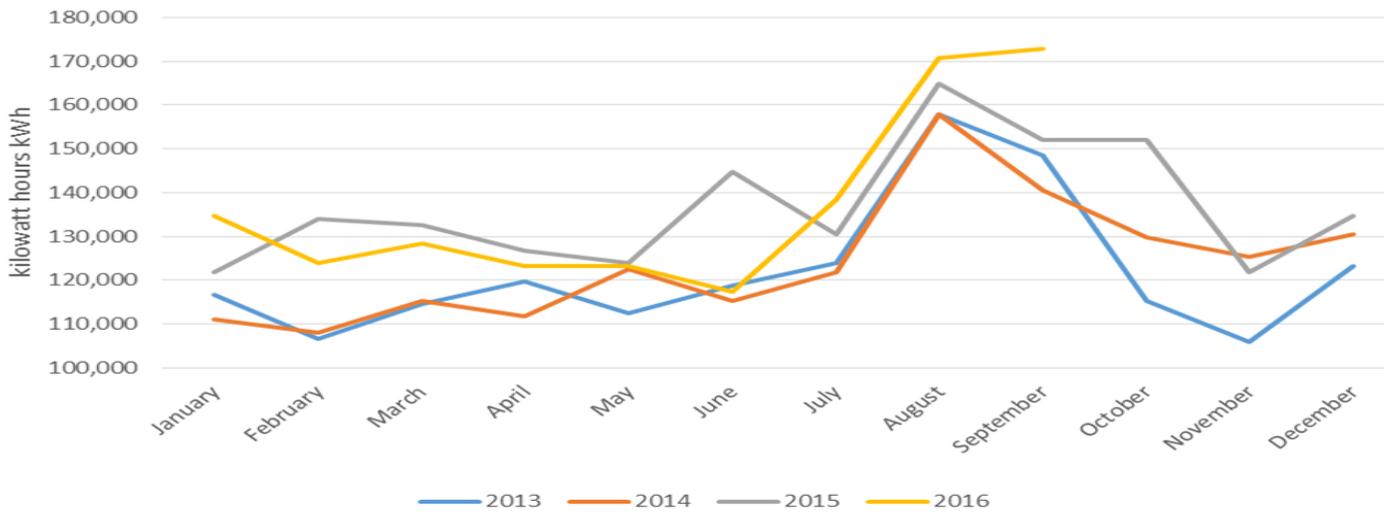


Figure 5. Monthly electric energy use (in kilowatt hours) for Asnuntuck Community College from January 2013 to August

### Finding 5

Natural gas use at Asnuntuck Community College varied seasonally with building heating needs.

Detailed natural gas use data is available for Asnuntuck Community College from January 2013 to June 2016 (see **Figure 6**). Over that time frame, there was no natural gas used between May and August because there were no heating needs. Annually, natural gas

use steadily climbs through the fall as outside temperature drops, peaking at about 16,000 ccf in December and January, and declined through late winter and early spring. The highest reported usage was for the year of 2015, with an annual usage total of 63,390 ccf.

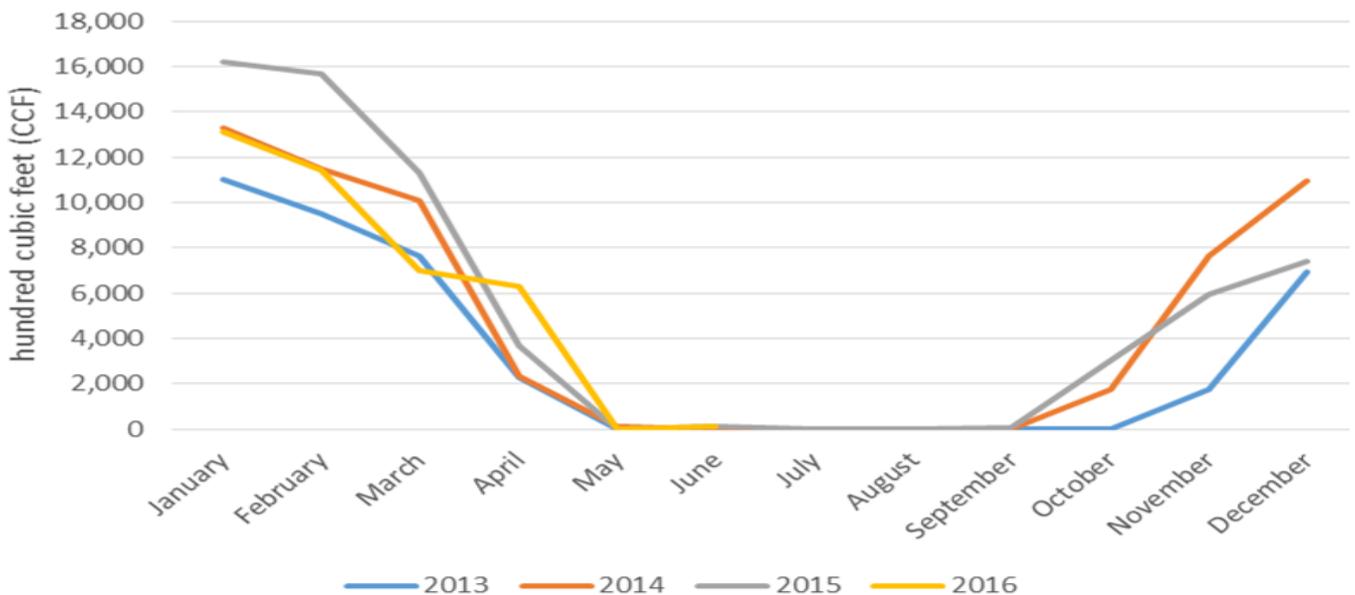


Figure 6. Monthly natural gas energy use (by hundred cubic feet) for Asnuntuck Community College from January 2013 to June 2016.

## Next Steps

Energy use and benchmarking data provide a critical foundation to understanding building energy performance and tracking changes in energy use over time. While data alone cannot identify why a building is efficient or inefficient or what is causing a change in energy use, the data and graphs in this report are useful tools in identifying the areas of further inquiry. For example:

- The increase in energy use by Asnuntuck Community College from 2013 to 2016 (see **Figure 1**) suggests significant opportunities to save energy and costs. Discussion with building operations staff and an on-site energy audit, available through the EnergizeCT program, would identify specific energy saving measures.
- The peaks of electricity use in summer months (see **Figure 5**) and natural gas use in winter months (see **Figure 6**) suggest opportunities to explore heating and cooling efficiencies to optimize energy costs relative to building use.
- Asnuntuck Community College should consider adopting building

energy performance targets, beginning with a 10% reduction in energy use. Many resources are available to help identify, finance and implement reductions.

- Asnuntuck Community College should explore opportunities for solar energy, which could further reduce energy costs.

The CSCU Energy Master Plan (2016) provides additional detail on current operations and energy management practices and recommendations for improvement. The Energy Master Plan will provide a useful roadmap for coordinated, system-wide energy savings initiatives.

In addition, there are many resources available through EnergizeCT and the Connecticut Green Bank to help implement energy saving actions. These include energy audits, retro commissioning, equipment financial incentives, and financing. Information on these programs is available through utility account representatives and at [www.energizect.com](http://www.energizect.com).

## Additional Background and Methods

### Benchmarking Experience and Value

The Institute for Sustainable Energy has benchmarked over 900 buildings in Connecticut using Energy Star Portfolio Manager. This benchmarking work has helped building owners understand energy use and take the next steps to identify opportunities and implement actions to save energy. According to the U.S. Environmental Protection Agency, buildings that were benchmarked consistently in Portfolio Manager over a 3-year period reduced energy use by an average of 2.4 percent per year, for a total savings of 7 percent.

### Data Sources and Energy Target

In 2015, Eversource launched an online, interactive data tool, known as the Eversource Customer Engagement Platform (CEP). In partnership with Eversource and the Connecticut State Colleges and Universities (CSCU) system office, the Institute for Sustainable Energy helped pilot the use of the CEP to obtain monthly electricity, natural gas usage, and cost data for this report.

This report suggests an initial energy

savings target of 10%. This report further references an average site EUI of 101 kBtu/ft<sup>2</sup> for community colleges in Connecticut. This figure was calculated by consultants Woodard & Curran for the 2016 CSCU Energy Master Plan using aggregate 2014 fiscal year energy data for all 11 community colleges in Connecticut.

### Energy Star Portfolio Manager

Energy Star Portfolio Manager is an online tool created by the U.S. Environmental Protection Agency, designed to track and assess energy and water use across multiple buildings. Portfolio Manager controls for key variables affecting a building's energy performance, including climate, hours of operation and building size, allowing for meaningful comparison of buildings within the same building type. In addition to energy use and cost data, Portfolio Manager analysis relies on building demographic data, such as the number of kitchens, walk-in freezers, pools, and other building features.

Currently, Portfolio Manager does not include "Community College" as a building

type. Data for all 11 community college campuses in Connecticut were coded as the "K-12 School" building type because community colleges, as non-residential centers of education, often function most similarly to this type of building. This coding enables appropriate comparisons between community colleges but should not be used to determine an Energy Star building score.

The Energy Star Portfolio Manager benchmarking account prepared for Asnuntuck Community College is available to authorized users, who have been provided the username and password to the account by the Institute for Sustainable Energy.

### Time Period Covered

Unless otherwise indicated in this report, data is substantially complete from January 2013 to August 2016, and annual data is reported by calendar year.

### Process and Quality Control

Source data were entered into Microsoft Excel before being uploaded to Energy Star's Portfolio Manager. Two independent reviewers cross-checked data to verify the accuracy of the data input.

## AUTHORS AND PARTNERS

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This report was prepared by the professional staff and student interns of the Institute for Sustainable Energy at Eastern Connecticut State University. For over 15 years, the Institute has provided technical support to Connecticut's colleges and universities, state agencies, municipalities, K-12 schools, and others to implement practical solutions that increase energy efficiency, sustainability and resilience. [www.easternct.edu/sustainenergy](http://www.easternct.edu/sustainenergy)



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