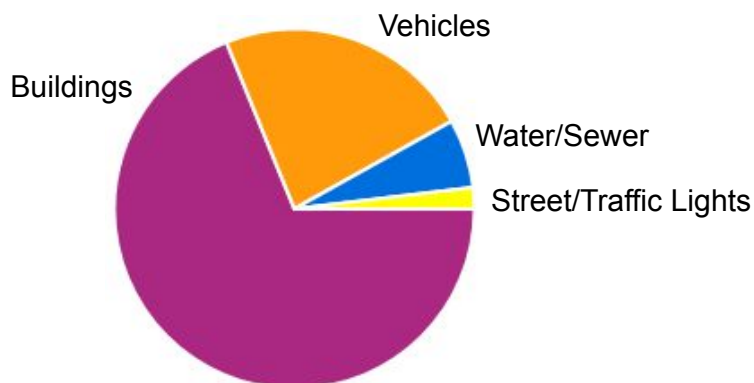


Building Energy and Technical Assistance

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Typical Breakdown of Municipal Energy Consumption



Prioritizing Clean Energy

- Consider energy when purchasing new equipment or planning changes to facilities
 - New roof, replacement of heating equipment, addition of cooling, etc.
- Other considerations for prioritizing energy projects
 - Energy use
 - Most of municipal energy use is in buildings
 - Most of the highest users are schools
 - Energy use intensity (EUI) of buildings - kBtu per square foot
 - Comfort or air quality issues
 - Displacement of oil, propane, electric resistance, or steam heating

Municipal Assistance from UMass Amherst

- Variety of direct technical assistance detailed on following slides
 - Offered to municipalities across the state
 - Free, but capacity is limited
 - To request any assistance: laurenm@umass.edu
- Online training and information
 - ag.umass.edu/clean-energy/municipal
 - ag.umass.edu/clean-energy/solar
 - ag.umass.edu/clean-energy/vehicles
 - ceere.org/heatpumpworkshop.html

Municipal Energy Profile

- 2-page document
 - Summary of municipal energy use and Green Communities program performance
 - Guidance on priorities
 - High-level recommendations and related resources
- Based on
 - Review of MassEnergyInsight data, with assistance addressing any issues
 - Discussion with municipal representatives

Changes Since Baseline Year

Holyoke was designated a Green Community in 2010, with the goal of reducing municipal energy consumption by 20% from the baseline year of FY09. The table below details energy reduction results:

Category	Energy Consumption (MMBtu)			
	FY09 Baseline	FY19	FY20	FY21
Building	124,883	135,500	120,909	118,409
Vehicle	29,473	28,992	27,560	28,023
Water/Sewer	19,145	20,448	20,455	20,034
Street/Traffic Lights	22,329	8,129	8,159	8,481
Total	196,130	193,069	176,083	173,948
Total Reduction *	Actual	-	2%	12%
	Weather Normalized	-	-0%	3%

This data is tracked in MassEnergyInsight (MEI), a web-based tool provided to municipalities by the Massachusetts Department of Energy Resources (DER). While most utility companies, including municipal utilities, upload monthly data to MEI, Holyoke Gas & Electric (H&E) has been uploading data to MEI at the annual level. Monthly data allows MEI to calculate weather-normalized annual building energy consumption, providing a more accurate comparison of building energy performance from year to year, and it also allows for more thorough analysis of energy efficiency opportunities and effectiveness of implemented efficiency measures. We have worked extensively with City and H&E staff to update MEI with monthly data for the baseline and most recent years and to streamline the process for the utility to provide monthly data in the future.

Recommendations

Holyoke has significant opportunity to further reduce municipal energy consumption, emissions, and annual energy costs. We recommend prioritizing these steps:

Municipal Energy Profile for Holyoke, Massachusetts – FY21

Overview

This profile provides a summary of municipal energy use in the City of Holyoke, along with guidance to improve energy efficiency. Holyoke's total municipal energy consumption in FY21 was 173,948 MMBtu. Most of the City's energy use is in buildings (68%), followed by vehicles and water and sewer systems. Natural gas accounts for 62% of energy use in buildings, with the rest electricity and a minimal amount of oil.

Facility Energy Use

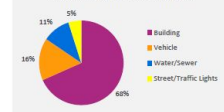
The facilities that used the most energy in FY21 are shown in the table and graph below. Almost all of these facilities are schools, which is typical of most communities. In total, school buildings account for 48% of the City's energy use.

Energy use intensity (EUI), the energy use per square foot, is an indicator of building efficiency. While EUI will vary depending on building type and use, a lower value generally indicates higher efficiency. This metric can be useful in comparing buildings, especially those of the same type, and identifying which may have the most opportunity to improve efficiency. The statewide average EUI for schools was 56 kWh/sqft in FY19.

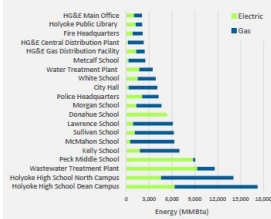
In addition to prioritizing buildings with high EUI, energy efficiency should be considered in all facilities during new construction, renovations, equipment replacement, selection of new equipment, and changes to building use.

Facility	Portion of City's Energy Use	Energy Use Intensity (kWh/square foot)		
	FY19	FY20	FY21	
Holyoke High School Dean Campus	10%	108	82	81
Holyoke High School North Campus	8%	85	79	71
Wastewater Treatment Plant	7%	-	-	-
Peck Middle School	5%	53	52	57
Kelly School	4%	76	71	81
McMahon School	4%	153	126	179
Sullivan School	4%	71	65	56
Lawrence School	4%	115	104	103
Donahue School	3%	77	78	76
Morgan School	3%	80	75	74

Total Municipal Energy Consumption



Facility Energy (Top 20 Facilities)



Building Energy Studies by UMass Clean Energy Corps

- Projects selected on a case-by-case basis
 - Building audits
 - District energy feasibility studies
 - Capital plan reviews and recommendations to align with sustainability goals and avoid future stranded assets
- Based around spring semester class taught by Building Science Professor Ben Weil
 - Site visit or online meeting in February
 - Presentation in May
 - Ongoing implementation support, as staffing allows



Water and Wastewater Treatment Plant Audits by U.S. Department of Energy's Industrial Assessment Center

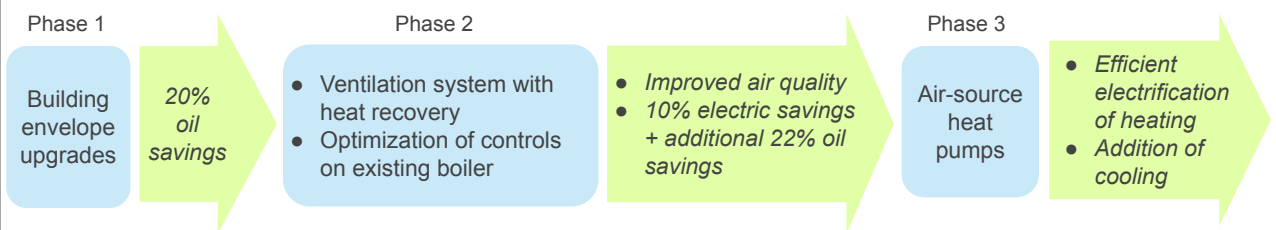
- Directed by Mechanical Engineering Professor Beka Kosanovic
- Eligibility
 - Water or wastewater treatment (or manufacturing) facilities
 - Public or private ownership and management
 - Annual energy costs between \$100,000 - 2.5 million



ceere.org/iac

Case Study - Northfield Elementary School

- Project led by volunteer Energy Committee
- Recommended cost-effective solutions by limiting project costs with reuse of existing equipment when feasible, rather than the total system replacement previously recommended by vendors
- Implementing project in phases, supported by two Green Communities grants
- Annual cost savings over \$30,000



Case Study - Worcester Elementary School



- One of the city's oldest school buildings
 - High energy use intensity
 - Issues with air quality, temperature and humidity control
- Recommendations
 - Replace uncontrolled ventilation and associated heat loss with ventilation system based on occupancy and energy recovery ventilation to reduce heat loss
 - Replace fossil-fuel steam heating with air-source heat pump system (also adds cooling capability)
 - Install a solar duct system to preheat incoming air during heating season
 - Insulate basement walls to prevent condensation of humid air and reduce heat loss
 - Apply coating to the basement floor to reduce water penetration

Benefits: Heating energy savings = 90%
Greenhouse gas emissions reduction
Increased thermal comfort & improved air quality

Case Study - Gill Public Safety Complex



- Project initiated by volunteer Energy Committee
- Provided recommendations in order of priority
 1. Insulate walls – enables #2-3
 2. Adjust temperature setpoint and set back thermostat when building is unoccupied
 3. Air-source heat pumps (mini-splits for offices, air-to-water heat pump for other spaces)
 4. Purchase mobile welding fume extractor
 5. Improve garage doors

Benefits: Energy cost savings = 80%
Greenhouse gas emissions reduction = 92%
Increased thermal comfort & improved air quality

Case Study - Northampton Elementary School

- Implementation of recommendations in progress
 - Air sealing, attic insulation
 - Window replacement
 - Replace the steam heating system in part of building with energy recovery ventilators and air-source heat pumps
 - Upgrade hydronic heating system in the main part of building

