Culture Over Carbon Messaging Platform

A resource for cultural institutions working to reduce energy use and carbon emissions in their buildings
How to use this tool

This Message Platform presents overarching key messages and supplemental, supporting messaging that target key audiences of the Culture Over Carbon Project. These include:

- external audiences including visitors, donors, and other stakeholders, who may want to know about the effort, and
- internal audiences, who need to understand the energy analysis provided, are decision makers, will serve on teams to assess and implement efficiency improvements, etc.

This resource describes the opportunities for cultural institutions to address climate change through energy efficiency and decarbonization of their facilities. It also creates the basis of how participants can concisely and consistently talk about energy efficiency, decarbonized buildings, and the Culture over Carbon Project.

Additional resources to support the messaging material are listed in the Messaging and Resources Framework on the next page (p. 2) and will be linked accordingly.

The Culture Over Carbon Messaging Platform:

- Explains why buildings and facilities are critical solutions to address climate change
- Describes how cultural institutions can reap the benefits of energy efficiency and decarbonization
- Helps audiences understand the scope and interpret the results of the project
Energy & Climate

The Climate Challenge

When talking about climate change, the challenge before us can be daunting. This section focuses the conversation on solutions for the buildings sector that will help mitigate impacts of a warming planet and shows the relationship between using less energy and reducing carbon emissions.

- Climate change is a global challenge, but one that has actionable solutions to cut carbon and other greenhouse gas (GHG) emissions that are fueling the increase of global average temperatures.

- Scientists have determined that keeping the temperature increase under 1.5 degrees Celsius (2.7 degrees Fahrenheit) is the goal we need to meet in order to avoid the worst impacts of climate change. This is the basis of the Paris Climate Agreement.

- Cultural institutions experience the impacts of climate change through risk and damage to living and material collections, buildings and natural spaces, and the lives of staff and community members.

- Using less energy to run the buildings where we live, learn, and work is one of the critical solutions to address climate change because the built environment represents 39% of U.S. global carbon emissions.

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Why Energy Is Important

- Energy efficiency on its own brings valuable benefits such as lower monthly energy bills, higher valuation, healthier spaces, and better comfort (see full Co-Benefits section on p. 8).

- Efficiency also inherently reduces the carbon footprint of a building.

- Roughly 27% of carbon from buildings comes from direct emissions from burning fossil fuels such as natural gas at the building site as well as electricity production from bulk power plants.

- The remaining 10% accounts for emissions that result from manufacturing and transporting building materials.

- Key measures that impact building efficiency include: lighting, automatic controls, building envelope, energy storage, water heating, and high efficiency equipment, (see additional details in Implementing Energy Efficiency section on p. 16).
Taking Action: Institutional Leadership

Cultural institutions are critical community resources that can help visitors, donors, and other stakeholders understand the challenges of climate change and model solutions that will limit the impacts globally and locally.

- Cultural institutions serve as a trusted source of documentation, reputable information, and education on important societal issues.
- We are looking at different ways to have a positive impact on our community and environment including Improving the way buildings use energy.
- Increasing the energy efficiency of our properties means we are helping in the climate fight by lowering the amount of energy we use and the related carbon emissions from energy production and use.
- We also enjoy the benefits of lower utility expenses, which can be reinvested in programs, and more comfortable, healthier spaces for visitors and employees.
- Energy efficiency is the most cost-effective way to meet climate objectives, minimize stress on our electricity grid, reduce operation costs, and limit dependence on fossil fuels.
Taking Action: Sector-Wide Impact

Cultural institutions are taking action to address climate change by understanding how their facilities use energy, how their buildings’ energy use impacts the local community, and what efficiency measures they can implement to make their facilities more energy efficient.

- The Culture Over Carbon research project will create a sector-wide benchmark to measure individual buildings against, enabling building staff to understand energy use, and measure reductions.
- This is important because the cultural sector operates many buildings, sees millions of visitors per year, and provides a significant number of jobs.
  - According to UNESCO, the U.S. has over 33,000 institutions as of March 2019.
  - Museums support over 726,000 jobs in the U.S. (before the COVID-19 pandemic).
  - If the participating cultural institutions decreased their energy use by 20% the energy saved would be enough to power almost 6,000 homes a year--or every household in Gulf Shores, Alabama.
Ensuring Equitable Outcomes in All We Do

Historically, communities of color have disproportionately borne the burden of fossil fuel emissions and have not benefited from efficiency investments.

• This time we can get it right. There is an industry-wide effort to direct investments to low-income neighborhoods and communities of color.

• Saving money through energy efficiency can provide extra funding for programming at cultural institutions, offering valuable public education services, particularly in marginalized communities.

• By showcasing energy efficiency and building decarbonization solutions, institutions can provide a vision of what a clean energy future can look like.

• Implementing energy efficiency and sourcing building energy from non-polluting renewable resources can help lessen the disproportionately inequitable impacts of burning fossil fuels.
Co-benefits of Efficiency

Energy efficiency has benefits beyond direct energy and carbon savings. These co-benefits are not uniformly monetized today, but there is a growing dataset to back their economic value.

Improved health & comfort

• Efficient buildings with advanced ventilation and envelope performance create healthier spaces and better comfort.

• When including indirect costs associated with lost economic productivity, the total cost of chronic disease in the United States reaches $3.7 trillion each year, approximately 19.6% of the country’s gross domestic product.

• Outdoor air quality needs improvement, too. More than 40% of Americans—over 135 million people—are living in places with unhealthy levels of ozone or particle pollution. People of color are over three times more likely to be breathing the most polluted air than white people.

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Co-benefits of Efficiency

Better future proofing and building resiliency.

- With natural disasters occurring three times more often than they were 50 years ago, according to a report by the United Nations (UN), it is important for buildings to be prepared.
- Investment in upgrading the building stock efficiency can also improve resiliency to storms and utility service disruption.
- For example, according to the National Institute of Building Sciences, every $1 invested in mitigation through federal grants results in an average of $6 saved during disaster recovery.

Increased productivity & worker retention

- High efficiency (and net zero energy) commercial buildings can lead to increases in productivity of 6-16%, according to an RMI study.

Higher wage jobs

- Clean energy investments offer high paying jobs to traditionally low-income workers.
- Energy efficiency investments in New York’s building sector are projected to double the 2019 workforce by adding over 200,000 new jobs and continue to increase through 2050.
Project Scope

The project’s broad review of the energy use patterns in cultural institutions will result in a roadmap for energy reduction at individual institutions and the sector as a whole.

- Analysts evaluated the data looking for field-wide use patterns and provided recommendations for key efficiency actions.
- Recommendations were also provided to prepare institutions for expected building code and policy changes that may impact them.
- The patterns that emerged from analysis of approximately 130 institution’s data is the first estimate of the sector’s energy impacts on climate and will support strategic planning for making reductions in line with the goal of avoiding the worst effects of climate change.
- The in-depth energy use analysis can inform data-driven decision-making about investments and strategic planning at any institution.
- The analysis and recommendations will help individual institutions reduce operating costs to improve their financial condition, pursue capital funds for energy-related projects, and prepare for expected changes in energy availability and regulations.
- This report is funded by a National Leadership grant (2021-2023) from the Institute of Museum and Library Services (IMLS).
Diverse Cultural Institution Types Participating

130 cultural institutions participated* in analysis of building energy use.

- Institutions from across the country participated by submitting their energy use data to researchers.
- Energy use patterns varied widely between the various cultural institutions due to factors including the age of facilities, such as historic homes, or specialized needs to maintain collections, such as those in art museums.
- Art museums were the most represented institution type, and typically had the highest energy use per square foot.
- Children’s museums typically had the lowest energy use per square foot.

*Participants are still being added and multiple organizations had more than one facility that was analyzed. In total over 200 individual buildings have been analyzed.
Why the Project is Important

A better understanding of sector-wide energy use will support the creation of energy and carbon roadmaps to guide large-scale reduction of energy use and emissions from the sector as well as make grant and fundraising proposals more compelling.

• Due to different building use patterns and characteristics, this sector faces unique challenges including:
  • Inadequate facility staff or budget to handle aging infrastructure or maintenance.
  • Lack of awareness of the benefits of energy and water efficiency.
  • Lack of understanding of building decarbonization codes and policies and how they apply to cultural institutions.
  • Inconsistent adoption of voluntary regulations as related to collection care requirements.

• This research provides data-driven solutions to help cultural institutions overcome some of these challenges.

• Cultural institutions with the knowledge to understand these policies and prepare their buildings will be decarbonization pillars in their communities.
Cultural Institutions as Responsible Community Members

Because we educate and bring communities together in the preservation of culture and history, cultural institutions have an opportunity to showcase solutions and shift behaviors through leading by example.

- Cultural institutions are uniquely positioned to create change because we have vast physical and intellectual resources, abilities, creativity, freedom, and authority.
- Collecting energy use data and benchmarking performance against other institutions will help institutions make strategic energy management decisions to save critical funds through lower energy expenses and reduce carbon and other GHG emissions.
- By working together, Culture Over Carbon participants can use our market power to create change.
Making an Impact: Strategic Planning & Decision Making

Analysis of energy use data and implementing key energy efficiency in buildings can have big impacts.

• Through this project, data analysis and tracking will support participating institutions to:
  • Reduce operating costs
  • Improve their financial condition
  • Pursue capital funds for energy-related projects, and
  • Prepare for expected changes in energy availability and regulations.

• Facility operators and decision makers will target and implement best practice energy efficiency measures that make sense based on their unique facilities and institutional needs (see categories outlined in the following pages).

• Also important is the impact that lowering energy will have on carbon emissions from buildings. Energy efficiency measures and building decarbonization measures relate but are not entirely the same (see page 20).

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Decision Making

No two cultural institutions are identical, and facilities operators will need to consider their mission and operational goals when deciding which energy efficiency measures to put into place.

Here are some examples of how different institutions might use energy efficiency to solve some of their unique challenges:

• Historic homes tend to have little or no insulation and can’t add it due to their historic nature. This building type tends to use more heat so an HVAC retrofit using high efficiency heat pumps might be a big energy and cost saver.

• Zoos tend to have high electrical usage, which may be due to pumping water to animal enclosures across a large campus. Installing and retrofitting with high efficiency pumps might be an energy and cost benefit in these cases.

• Art museums need to control the amount of light and humidity in their spaces to protect the art. Using clerestories on the roof or light shelves high on the walls that bounce light off the ceiling may bring in free daylight that doesn’t impact the art. High efficiency ventilation, that can also de-humidify the air, could also be an energy and cost saver in this institution type.
Implementing Energy Efficiency

Each cultural institution will use their customized FirstView report to help guide their decision-making on which energy efficiency measures to prioritize. The measures that follow are common energy efficiency best practices.

Use efficient lighting & harvest free daylight.

- Energy efficient lighting provides the same amount of light for less money.
- LEDs are more efficient than incandescent lighting, they last longer, and generate less heat, which saves money by reducing cooling needs.
- Bringing daylight into spaces as possible, using shades to control glare and heat gain, and using reflective surfaces and light shelves to bring light deeper into spaces can reduce the need for electrical energy and lead to better light quality.

Install automatic controls.

- Automated controls for heating, cooling, lighting, and other building systems allows the systems to work together and creates efficiencies.
- For example, daylight sensors can save energy by automatically turning off the lights when there is adequate sunlight in a room.

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Implementing Energy Efficiency

Consider improvements to the building envelope.

- Sealing and insulating walls and windows keeps energy from moving from one side to the other.
- Operable windows, trees, or shade structures can protect against, or bring in, the sun and wind, minimizing the energy needed for heating, cooling, and lighting.
- Ultimately the envelope should help optimize the other building systems.

Reuse and store energy.

- Squeezing all the energy out of heated or cooled air, known as energy recovery, and storing energy in the mass of the building or other mediums (such as ice or water), saves energy and money.
- This is especially effective if the building doesn’t need to use energy during the most expensive times of day.
- Energy recovery systems such as heat recovery ventilators (HRVs) can offer energy savings by harvesting heat from exhaust to pre-condition incoming air or vice versa.

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Implementing Energy Efficiency

**Investigate efficient hot water heating.**
- Water heating accounts for 19-32% of building energy.
- Electric heat pump water heaters can create significant energy and cost savings as they are 2-4 times more efficient than conventional electric resistance water heaters.

**Replace inefficient heating & cooling equipment when possible.**
- Electric heating and cooling equipment, such as heat pumps, create efficiency and cost savings.
- Air source heat pumps, the most common type today, work like an air conditioner in reverse: they harvest heat from outside air and use it to heat the building.
- Heat pumps can be up to four times more efficient compared to gas heat or electric resistance heat and can deliver plenty of heat even in very cold outside air conditions.
- Separating ventilation from heating and cooling systems and using passive strategies like opening windows at night to cool the space, use less mechanical energy to move air in a building, thus saving energy.
Measuring Energy Use

The energy use of the buildings in the project is measured as Energy Use Intensity (EUI).

- EUI is a measure of total energy use (electric and thermal) divided by gross square foot for a year (kBtu/sf).
- EUI represents energy use only, it does not include renewable energy generation.
- EUI is a useful metric because it’s a way to normalize energy use and compare buildings to other similar types of buildings.
- Some building types are more energy intensive than others, such as hospitals.
- For comparison, in the U.S. the Median EUI of a K-12 school is 48.5 kBtu/sf and a hospital is 234.3 kBtu/sf.
- Highly efficient K-12 schools could have an EUI as low as 17-25 kBtu/sf.
- The chart shows the Median EUI’s of the cultural institutions in the study by type. Median EUI ranged from 61-169 kBtu/sf.
Relating kWh to Carbon

A highly energy-efficient building, also known as a low-energy building, is measured in kWh. It has similar aspects to a low-carbon building, measured in CO₂ equivalent*, but they are not the same.

To achieve significant carbon reductions from the built environment, and as grid-supplied resources get cleaner, building-grid integration will become necessary to address peak demand and enable load shifting. Reducing onsite GHG emissions through electrification and embodied carbon will become priorities for driving down the climate changing impacts of the built environment.

Core components of a low-energy building:

- Maximize energy efficiency
- Prioritize on-site renewables
- Utilize off-site renewables
- Measure and manage net zero operations

Additional components of a low-carbon building:

- Electrification and minimize/eliminate on-site fossil fuels
- Optimize building-grid integration and on-site storage
- Specify low GWP refrigerants
- Select low embodied carbon materials

*This includes carbon emissions and other GHG emissions.
Savings Estimates

Collectively, the participating institutions use an estimated 1 billion kWh per year to power their buildings.

- That amount of energy is equivalent to 25% of the power produced at Hoover Dam.
- If the participating cultural institutions decreased their energy use by 20% the energy saved would be enough to power almost 6,000 homes a year—or every household in Gulf Shores, Alabama.
- That 20% energy savings across all of these facilities would translate to $20 million dollars in savings per year (assuming a $.10 per kWh commercial rate).
- The related annual carbon and other GHG emissions reductions would be like taking 10,000 cars off the road.
Internal Messaging & Fact Bank
FirstView Report Overview

Culture Over Carbon participants received a FirstView report on their building’s energy use. NBI’s FirstView software tool uses measured energy data to create a signature that compares performance to similar building types within the study.

- This diagnostic tool helps determine if the project is operating within the range of best practice efficiently or if improvements are needed.
- Using data typically found on energy bills, FirstView calculates an Energy Use Intensity (EUI), which is a measure of your building’s energy use per square foot.
- FirstView reveals underlying patterns in building end use consumption and automatically allocates energy use to heating, cooling, thermal baseload, and electric baseload end uses.

FirstView analysis provides:
1. Diagnostics – Uncover patterns in building energy end-use characteristics and generate diagnostic reports about areas to investigate.
2. Peer Building Benchmarks – Compare building performance to other subsets of buildings or across portfolios.
3. Design Model Predictions – Compare expected results from an energy model to actual measured results.
4. Trending – Compare performance from year to year.

Using energy signatures to inform decision making

With the FirstView reports participants can:

• Understand trends over time, anomalies in the data that might lead to equipment repair or operational adjustments and show the percent improvement that results from implementing efficiency measures.

• The FirstView report will provide data to support decisions on which efficiency measures to implement in what sequence and plan for long term capital improvements.

• This is also an opportunity to set measurable goals, that can be incorporated into a sustainability plan, such as achieving a percent annual energy reduction, phase out of HFC refrigerants, or replacing gas systems with electric equipment at the end of useful life.

• This type of plan can be used for fundraising and grant proposals, backed by data and associated recommendations.
Fact Bank: Climate Change

- The past decade has been the warmest on record, with an average temperature increase of 1.87 degrees Fahrenheit from pre-industrial levels.

- Numerous reports from the Intergovernmental Panel on Climate Change (IPCC) have sounded the alarm: We have until 2030 to take “rapid and far-reaching” actions to reduce greenhouse gas (GHG) emissions from land, energy, buildings, transport and cities to meet the goals of the Paris Agreement and keep global temperature rise under 1.5 degrees C.

- With building operations and construction representing 39% of the global carbon footprint (taking into account both building materials and operating emissions), reducing energy use in buildings represents a significant climate solution.

- Carbon Calculator (https://store.b-e-f.org/business-calculator/)


- Burning fossil fuels creates air pollution that causes health issues such as higher rates of asthma (need citation).

- Black/African American people have 1.54 times the exposure to particulate matter in the air compared to the overall population.
Fact Bank: Energy Efficiency

• Building decarbonization is a critical path for cities, states and institutions with climate-aligned goals such as zero emissions by 2050, according to an RMI report.

• Energy efficiency is America’s largest energy resource, contributing more to the nation’s energy needs over the last 40 years than oil, coal, natural gas, or nuclear power, according to the NRDC. The U.S. spends more than $430 billion each year to power our homes and commercial buildings, consuming more than 70% of all electricity used in the U.S., about 40% of our nation’s total energy bill.

• Energy efficiency creates jobs; according to NRDC, it accounts for more than 2.2 million U.S. jobs—at least 10 times more than oil and gas drilling or coal mining.

• For comparison, a highly efficient net zero energy building uses about 20-24 kBtu per square foot, per year (sf/yr) and a commercial building built to the ASHRAE 90.1-2019 energy standard uses about 47kBtu/sf/yr.

• Net zero energy buildings are very well designed and operated high performance buildings that combine energy efficiency and renewable energy generation such as solar. These buildings consume only as much energy as they produce on an annual basis.
Resources

- **FirstView Factsheets and Examples.** These explain how the FirstView analysis works, the purpose of the energy signature, and how to read reports.

- **An Insider’s Guide to Talking About Carbon Neutral Buildings.** An easy-to-use guide that explains the relationship between energy savings and carbon emissions reductions.

- **Press Release.** Use events that are already happening as an opportunity to publicize your efforts, using the boilerplate (i.e., you fill in the blanks) press release and messaging:
  - Internal events such as anniversaries, opening a new or retrofitted building, opening a new exhibit, new partnerships
  - Nationally recognized events such as Energy efficiency month (October) or Earth Day (April 22)
  - In celebration of potential funding resources/investments like the Inflation Reduction Act, the Infrastructure Investment and Jobs Act, city and state initiatives

- **Backgrounder.** A factsheet that explains the Culture Over Carbon project and why it is important.
Contact

Want to know more or have questions?

Webly Bowles
NBI Senior Project Manager
webly@newbuildings.org

Erin Murphy
NBI Market Engagement Manager
erinm@newbuildings.org
FOR IMMEDIATE RELEASE

<ORGANIZATION> examines opportunities for energy savings, emissions reduction through building improvements

Groundbreaking project paves the way for U.S. cultural institutions to lead on climate

CITY, STATE—In celebration of <EVENT SUCH AS OCTOBER ENERGY EFFICIENCY MONTH>, <ORGANIZATION> is excited to announce our participation in the leading-edge research project, Culture Over Carbon. The effort, funded with a National Leadership grant by the Institute of Museum and Library Services (IMLS), led to the first ever sector-wide analysis of energy use by U.S. cultural institutions. The project engaged 133 diverse organizations, from zoos to historic homes, to analyze their building’s energy use and provide recommendations for efficiency improvements that will save money and lower carbon emissions that are fueling climate change.

Using less energy to run the buildings where we live, learn, and work is one of the critical climate solutions because the built environment represents 39% of U.S. global carbon emissions. Collectively, the 201 buildings examined use 1 billion kilowatt hours per year—that’s one quarter of the energy produced at Hoover Dam. A 20% savings across the portfolio would save roughly $20 million a year in energy bills and reduce carbon emissions equal to taking 10,000 cars off the road.

“This project will help <ORGANIZATION> make the strategic energy management decisions needed to save critical funds through lower energy expenses and reduce carbon and other GHG emissions,” said <NAME, TITLE>. “The money we save can be invested in programs for our members and visitors. Even more importantly, by working together, the 133 Culture Over Carbon participants can create industry change toward buildings that are healthier, more comfortable places and better for the environment.”

Cultural institutions experience the impacts of climate change through risk and damage to living and material collections, buildings and natural spaces, and the lives of staff and community members. They are also uniquely positioned to showcase solutions and lead by example in the communities we serve. The analysis and recommendations will help individual institutions

-more-
reduce operating costs to improve their financial condition, pursue capital funds for energy-related projects, and prepare for expected changes in energy availability and regulations.

Participating organizations worked with New Buildings Institute researchers to provide a year of energy data and in return they received a diagnostic FirstView report showing how the building is performing compared to other similar buildings and recommended areas for energy efficiency improvements. The in-depth energy use analysis will inform data-driven decision-making about investments and strategic planning to help reduce operating costs, pursue capital funds for energy-related projects, and prepare for changes in energy availability and regulations.

To learn more visit: https://ecprs.org/engagement/culture-over-carbon/

ABOUT <ORGANIZATION>

ABOUT CULTURE OVER CARBON

The Culture Over Carbon project provides cultural institutions actionable data and recommendations to understand how their buildings use energy, help create roadmaps to reduce energy at individual institutions and the sector as a whole, and lower carbon and other greenhouse gas (GHG) emissions to reduce their impacts on climate change.

Under the project, 130 cultural institutions from across the country provided energy use data for over 200 buildings. Analysts evaluated the data, looking for field-wide use patterns and provided recommendations for key efficiency actions. Recommendations were also provided to prepare institutions for expected building code and policy changes that may impact them.

This project is funded by a National Leadership grant (2021-2023) from the Institute of Museum and Library Services (IMLS) and supported by these organizations.
Climate change is a global challenge, but one that has actionable solutions to cut energy use and carbon emissions that are fueling temperature rise. Using less energy to run the buildings where we live, learn, and work is one of the critical solutions to address climate change because the built environment represents 39% of U.S. global carbon emissions. The Culture Over Carbon project provides cultural institutions actionable data and recommendations to understand how their buildings use energy, help create roadmaps to reduce energy at individual institutions and the sector as a whole, and lower carbon and other greenhouse gas (GHG) emissions to reduce their impacts on climate change.

Under the project, 130 cultural institutions from across the country provided energy use data for over 200 buildings. Analysts evaluated the data, looking for field-wide use patterns and provided recommendations for key efficiency actions. Recommendations were also provided to prepare institutions for expected building code and policy changes that may impact them.

**What the data tells us**

The patterns that emerged from the analysis is the first estimate of the sector’s energy impacts on climate and will support the strategic planning for making reductions in line with the goal of avoiding the worst effects of climate change. Consumption patterns between the participants varied widely due to factors including the age of facilities, such as historic homes, or specialized needs to maintain collections, such as those in art museums.
Art museums were the most represented institution type, and typically had the highest energy use per square foot. Children’s museums typically had the lowest energy use per square foot.

**Impacts**

The analysis and recommendations will help individual institutions reduce operating costs to improve their financial condition, pursue capital funds for energy-related projects, and prepare for expected changes in energy availability and regulations.

Because they educate and bring communities together in the preservation of culture and history, cultural institutions have an opportunity to showcase solutions and shift behaviors through leading by example. Saving money through energy efficiency can provide extra funding for programing at cultural institutions, offering valuable public education services, particularly in marginalized communities.

Collectively, the participating institutions use an estimated one billion kWh per year. That amount of energy is equivalent to 25% of the [power produced at Hoover Dam](https://ecprs.org/engagement/culture-over-carbon/).

If the participating cultural institutions decreased their energy use by 20% the energy saved would be enough to power over 6,000 homes a year—or every household in Gulf Shores, Alabama. That 20% energy savings across all of these facilities would translate to $20 million dollars in savings per year (assuming a $.10 per kWh commercial rate). The related annual carbon and other GHG emissions reductions would be like taking 10,000 cars off the road.

**Learn more**

Visit: https://ecprs.org/engagement/culture-over-carbon/

Contact: Webly Bowles, NBI, webly@newbuildings.org

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