CAMBRIDGE COMPACT FOR A SUSTAINABLE FUTURE

2017

Annual Report

MESSAGE

2017 was an exciting year of growth for the Compact. Your engagement and commitment enabled us to advance and successfully execute initiatives that were a part of our year one work plan-all with the end goal of creating a more healthy, livable, and sustainable Cambridge.

We came together to learn and share ideas, best practices, and innovations. Through the power of collaboration and coordinated action we harnessed the expertise and influence of our member organizations to address important sustainability topics.

The pages that follow highlight our efforts over the past year and set the stage for what's to come. You, our members, are the champions of the Cambridge Compact. These achievements are yours to celebrate. We look forward to working together in 2018 and beyond.

2017 Compact Executive Committee

Lisa Peterson	Jaclyn Olsen	Steve Lanou
City of Cambridge	*Harvard University*	*MIT*
Chair	*Co-Vice Chair*	*Co-Vice Chair*

Members

City of Cambridge*
Harvard University*
Massachusetts Institute of Technology*
Akamai Technologies
Alexandria Real Estate Equities, Inc.
Biogen
BioMed Realty
Boston Properties Inc.
Cambridge Innovation Center
Cambridge Redevelopment Authority
CDM Smith
Draper Laboratory
Eversource
Forest City
Google
Sanofi Genzyme
Homeowner's Rehab, Inc.
Novartis
Twining Properties

* Founding members

OUR JOURNEY

2013 - 2014

Formed as a community partnership to leverage the combined capacities in research, innovation, and program development of its member organizations to address the crisis of global climate change.

Founded by City of Cambridge, Harvard University, Massachusetts Institute of Technology

Number of signatory members: 19

2015

Began its first strategic planning process to identify concrete actions over the next three years.

Reviewed existing initiatives in the City and region to identify unique opportunities for Compact involvement. This was supplemented with a survey. Members were asked for input on what the Compact should focus on over the next three years and the benefits that could be realized.

Held a workshop to finalize initiatives that would be of interest to members.

2016

Completed the strategic planning process and presented the 2016 - 2019 work plan to members for feedback and affirmation.

Work plan initiatives fall within four engagement strategies–education, research, pilot, and responsiveness & advocacy–and span five focus areas.

- Greenhouse Gas Inventories
- Climate Resiliency and Adaptation
- Building Energy
- Renewable Energy
- Sustainable Transportation

"The Cambridge Compact for a Sustainable Future brings together local institutions, universities, research centers, non-profits, and businesses that are committed to ensuring that Cambridge is a healthy, livable, and sustainable city for generations to come. We look forward to continuing to engage the business and institutional community in our efforts to promote sustainability and resiliency."
- Lisa Peterson, Deputy City Manager, City of Cambridge

"Advancing building energy efficiency, renewable energy, net zero labs, climate resiliency/adaptation and sustainable transportation are just a few examples of the initiatives that the Cambridge Compact for a Sustainable Future has focused on since its formation in 2013. The Compact is a testament to the value of sharing best practices, learning from each other, and collaborating to achieve shared goals."
- Iram Farooq, Assistant City Manager for Community Development

COMPACT IN ACTION

June 2016	First Three-Year Work Plan Adopted
October 2016	Member Commitments for Year 1 Work Plan Initiatives Confirmed
December 2016	Sustainable Transportation Workshop
January 2017	Renewable Energy Purchase and Storage Survey Launched
March 2017	Net Zero Lab Work Group Established
April 2017	Results of Renewable Energy Survey Released
April 2017	Laboratory Energy Benchmarking Survey Launched
April 2017	Multi-Family Energy Efficiency Workshop
June 2017	Climate Change Resiliency and Adaptation Workshop
June 2017	Compact All-Member Meeting
October 2017	Results of Lab Energy Benchmarking Study Announced
November 2017	Board Meeting
December 2017	Building Water Efficiency Strategies Workshop

SUSTAINABLE TRANSPORTATION

EDUCATION

Led by MIT and City of Cambridge

This educational session

- Examined tools that have contributed to sustainable transportation trends in Cambridge.
- Leveraged member experiences to increase awareness about how employers could incentivize sustainable commuting, as seen in the AccessMIT Program.

WORKER COMMUTE MODES: 2014 - 2016 AVERAGE

42% Drove Alone	29% Public Transit	13% Walked
6.5% Car Pool	4.8% Biked	3.6% Work from home

Source: American Community Survey, 2000 US Census

"We find the Compact to be an extraordinary platform for engaging a coveted set of sustainability leaders in Cambridge, who collectively challenge our thinking, provide multiple perspectives from the business, government, non-profit, and institutional communities, and seek to develop collective solutions that draw from their best practices."
- Steven Lanou, Project Manager, Office of Sustainability, MIT

"Cambridge has a long history of promoting sustainable transportation, and as a result, the number of vehicles and parking permits registered per household has declined in recent years, with more people opting to walk, bicycle, or take public transit. The Compact provides a platform for the exchange of ideas and techniques that will enhance efficient sustainable commuting options for our community."
-Susanne Rasmussen, Director of Environmental & Transportation Planning, City of Cambridge

EDUCATION

BUILDING ENERGY EFFICIENCY

"HRI has been involved in development and implementation of several Compact initiatives. HRI shares best practices learned from discussions at the Compact with our property manager, asset manager and Board. Although the group represents a wide variety of stakeholders, looking at how each has aligned to meet the city's climate change goals is impressive and important to continue."
- Jane Carbone, Director of Development, Homeowner's Rehab Inc.

"The Cambridge Compact for a Sustainable Future works to build best practices, knowledge and skills on strategies to better address climate change among its member organizations. As both the electric and gas distribution company servicing the City of Cambridge, we at Eversource are proud to be a partner on these efforts."
- Tilak Subrahmanian, Vice President, Energy Efficiency Eversource

Led by Homeowner's Rehab Inc. and City of Cambridge

This educational session

- Presented building owners and property managers with information on incentive programs and strategies to achieve cost savings through energy efficiency upgrades and renewable energy.
- Announced the launch of 'Cambridge Multi-Family Energy Pilot,' a program that offers multi-family building owners access to no-cost energy efficiency and solar assessments.

MEMBER ENERGY USE DATA

513 Buildings

45 Million square feet

772 Million kWh electricity

12.9 Million therms of natural gas

4 Million kBtu of fuel oil

55,200 kBtu of diesel

Source: BEUDO data reported for 2016

EDUCATION

CLIMATE CHANGE RESILIENCY AND ADAPTATION

Led by MIT and Novartis

At this educational session the Compact

- Facilitated joint discussions on a range of climate related business risks including strategies that could be used to increase resilience to heat stress, flooding due to sea level rise, storm surge and increased precipitation.
- Gained agreement on decision to organize a climate resiliency tabletop exercise focused on business continuity planning for diverse stakeholders including the City, Cambridge businesses and institutions.

"The work that the Compact is doing on climate resilience is an especially timely effort. Starting with a panel in 2017, the Compact acted as a convening authority to gather experts from across multiple sectors that will be impacted by climate change issues. The initial panel to discuss collaborative climate resilience led to more detailed analysis of the business continuity risks, created new relationships and increased our chances to create a more resilient community that will benefit the people that live and work in Cambridge."
- James Goudreau, Head of Climate, Novartis

"The education workshop has proven to be an enormously valuable event as it helped test the waters for determining resiliency issues of greatest interest. The break-out group discussion prioritized 'business and research continuity' as an area of collective concern that Compact members are keen to address in the immediate term.."
- Brian Goldberg, Sustainability Project Manager, MIT

RESEARCH

RENEWABLE ENERGY PURCHASE AND STORAGE

"*CDM Smith is dedicated to helping our clients operate more efficiently, capture renewable resources, and build stronger and healthier communities. Our involvement in the Compact has helped us address complex environmental and infrastructure challenges with smart, integrated solutions.*"
- Carol Rego, Vice President, CDM Smith

"I have enjoyed working on the Compact, it creates a collaborative environment between neighbors and the City of Cambridge."
- Mike O'Hearn, Senior Property Manager, Boston Properties

Led by City of Cambridge and Harvard University

- Phase I- Energized 16 members to respond to a survey that analyzed members' current renewable energy policies and interest to shift to low or zero carbon energy sources.
- Identified member interest in exploring group renewable energy purchase and learning more about energy storage projects.
- Phase II- Initiated student research project to capture learnings from members current or planned energy storage work, and compile information on commercially viable storage technologies, incentive programs, and local/regional case studies relevant to Cambridge building types.

MEMBER ANNUAL ELECTRICITY USE FROM ONSITE RENEWABLE SYSTEMS

794974 kWh

Source: BEUDO data reported for 2016

NET ZERO LAB WORKING GROUP

PILOT

Led by Harvard University and Novartis
Staffed by City of Cambridge

- The Net Zero Working Group is one of the first city-academic-industry collaborations to assess net zero lab feasibility.
- Collaborated on a lab energy use benchmarking study to establish a baseline for energy and water consumption in laboratory buildings in Cambridge. Study includes data from 98 buildings and represents 12.9 million sq. ft. of building area.
- The Working Group meets monthly to share best practices and to identify innovative examples of lab energy reduction opportunities

Members of the Net Zero Lab Working Group

- Harvard University (Co-chair)
- Novartis (Co-chair)
- Alexandria Real Estate Equities, Inc.
- Amgen*
- Biogen
- BioMed Realty
- City of Cambridge
- Draper
- Eversource
- Forest City
- MIT
- Novartis
- Pfizer*
- Sanofi Genzyme

**Non-Compact Members*

"The Lab Energy Benchmarking study will allow Compact members to make smarter, more informed decisions about how best to reduce the emissions associated with the energy-intensive laboratory sector. It's a great example of how the Compact brings people together across sectors to create a stronger set of tools and resources for more effectively combatting climate change."
- Jaclyn Olsen, Assistant Director, Office for Sustainability, Harvard University

"Co-leading the Net Zero Labs Work Group has been a rewarding experience. I have been introduced to and connected with many peer organizations who are managing energy/environment and sustainability topics just as I am. The comparisons and discussions of improvement areas, technology and management strategies has been incredibility helpful to me and my organization."
- Scott Smith, Associate Director, Energy & Environment, Novartis

Progress Towards a Sustainable Cambridge

Cambridge emitted approximately 1.46 million metric tons of carbon dioxide equivalent ($MTCO_{2e}$) in 2012 from the residential, commercial, institutional, industrial, transportation and waste management sectors. Taking into account planned State and City measures with readily determined impacts, the forecasts indicate that Cambridge will not reach an 80% reduction in emissions by 2050.

The Cambridge Compact for a Sustainable Future was formed to address the challenges of climate change and advance Cambridge as a leader in community sustainability. The Cambridge community-wide GHG inventory provides us an opportunity to enhance the effectiveness of our existing climate actions to reduce emissions, and collaborate to advance the GHG management outcomes in Cambridge.

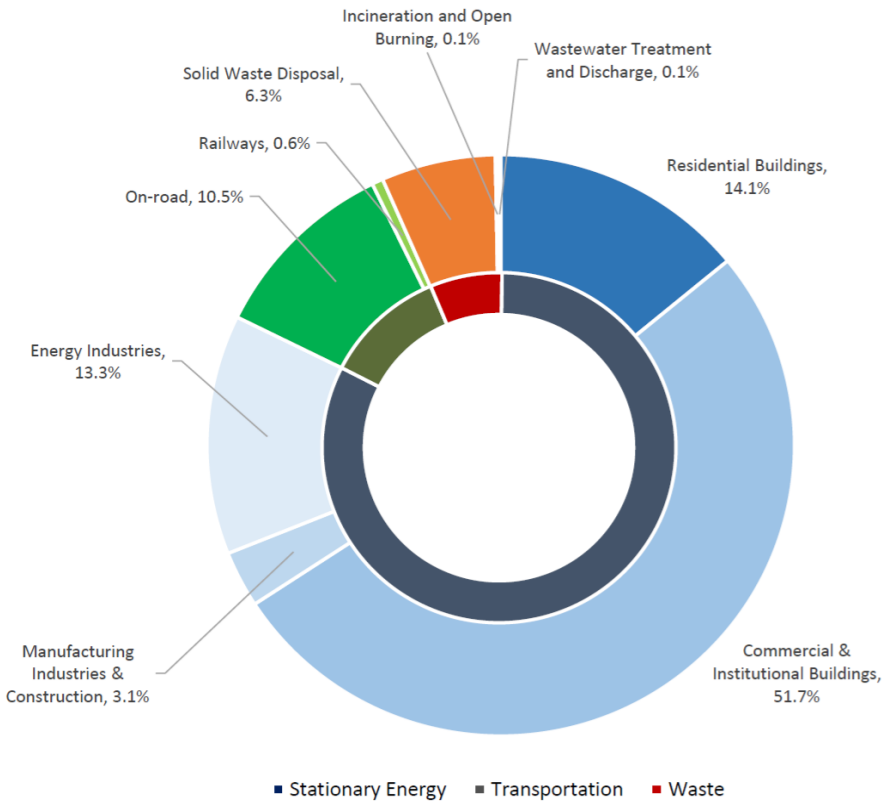
CAMBRIDGE COMMUNITY-WIDE GHG INVENTORY

The Cambridge community-wide Greenhouse Gas (GHG) Emissions Inventory follows the *Global Protocol for Community-Scale Greenhouse Gas Emissions Inventories (GPC)*. The inventory includes Scope 1 and 2 emissions from stationery energy and transportation sources, as well as Scope 1 and 3 emissions from waste and electricity transmission losses.

The calendar year 2012 was chosen as the baseline year for the inventory and for forecasting emission trajectories for 2030, 2040 and 2050 to determine if the city is on track to meet GHG reduction targets in line with the city's Net Zero Action Plan and the Climate Protection Action Committee's (CPAC) goals and objectives. The 2016 Cambridge community wide GHG inventory is expected to be ready by the end of 2018.

Broader and deeper collaboration between the City, institutions and businesses will support a greater understanding of specific emission sources, and help determine actions to bring Cambridge closer to achieving its emission targets.

COMMUNITY WIDE EMISSIONS BY SECTOR AND SUB-SECTOR



Emissions from stationary energy use accounted for 82% of the emissions in Cambridge in 2012.

Energy use in commercial buildings was found to be the largest contributor to emissions followed by energy use in the residential building sub-sector.

STATIONARY ENERGY

Commercial & Institutional Buildings

756,703 MT CO_2e

Includes emissions from use of electricity, natural gas and fuel oil and a portion of emissions from the Manufacturing Industries and Construction sub-sector associated with buildings

Residential Buildings

205,495 MT CO_2e

Includes emissions from use of electricity, natural gas and fuel oil in residential buildings

Energy Industries

194,907 MT CO_2e

Includes emissions from generation plants in the City that primarily supply energy to buildings in Cambridge

Manufacturing Industries & Construction

45,851 MT CO_2e

Includes emissions from industrial equipment, lawn and garden equipment, light commercial equipment and construction activities

TRANSPORTATION

On-Road Private Transit

149,815 MT CO_2e

On-Road & Rail Public Transit

12,544 MT CO_2e

WASTE - SOLID WASTE

Landfill Disposal

92,051 MT CO_2e

Incineration and Open Burning

2,145 MT CO_2e

WASTE - WASTEWATER

Wastewater Treatment & Discharge

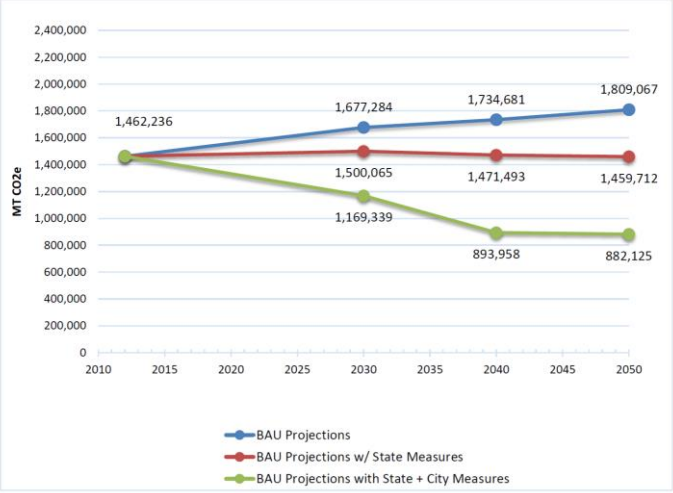
2,148 MT CO_2e

These emissions are from discharge of N_2O, a byproduct of wastewater. Methane produced during wastewater treatment was used for heating the digester tanks or diverted to a cogeneration system

EMISSION FORECAST

These forecasts indicate that while currently planned City and State measures will have significant impact on emissions generated in the future, they are not enough to reach the goal of an 80% reduction by 2050. To reach an 80% reduction in the next 33 years, Cambridge needs to reach an annual generated emissions level of ~ 292,000 MT CO2e - a 66% reduction beyond the current projection. This forecast only considers measures whose impacts were readily quantifiable. The forecast does not include measures such as purchasing 100% renewable electricity for municipal operations, or increasing renewables through a community aggregation program. You can read the complete community-wide GHG emissions inventory report here.

Forecasted emissions for BAU, state measures only and state & city measures scenario for 2030, 2040 & 2050



Board of Directors

- **Lisa Peterson**
  Deputy City Manager, City of Cambridge
  Chair of the Executive Committee (through December 2017)
- **Iram Farooq**
  Assistant City Manager for Community Development
  Chair of the Executive Committee (from January 2018)
- **Jaclyn Olsen**
  Assistant Director, Office for Sustainability, Harvard University
  Co-Vice Chair of the Executive Committee
- **Steven Lanou**
  Project Manager, Office of Sustainability, MIT
  Co-Vice Chair of the Executive Committee
- **Carol Rego**
  Vice President, CDM Smith
  Secretary of the Executive Committee
- **Jane Carbone**
  Director of Development, Homeowners Rehab Inc.
- **Sarah Eusden Gallop**
  Co-Director Government Affairs, MIT
- **James Goudreau**
  Head of Climate, Novartis
- **Tom Lucey**
  Director of Government and Community Relations, Harvard University
- **Joseph Maguire, Jr.**
  Vice President, Development & Asset Services, Alexandria Real Estate Equities, Inc.
- **Sarah Morin**
  General Manager, Cambridge Innovation Center
- **Mike O'Hearn**
  Senior Property Manager, Boston Properties
- **Tilak Subrahmanian**
  Vice President & GM, Energy Efficiency, Eversource Energy
- **Kathleen Woodward**
  Manager, Environment, Health, Safety + Sustainability, Biogen
- **Salvatore Zinno**
  Senior Director, Development, BioMed Realty

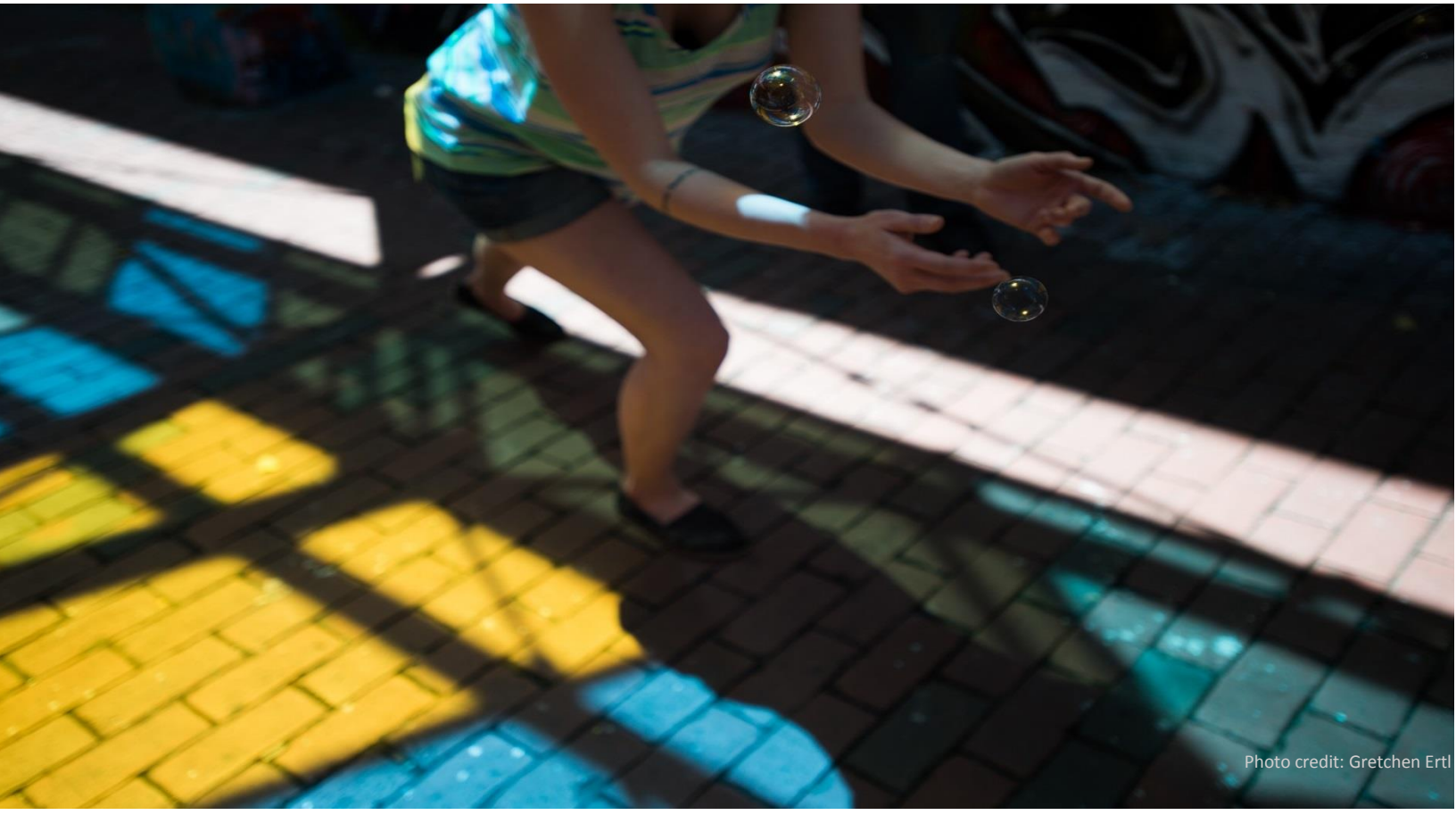


Photo credit: Gretchen Ertl

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