

Bicentennial Plan

FOR A SUSTAINABLE AND CARBON
NEUTRAL CAMPUS

2017-2021



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ACKNOWLEDGEMENTS

Colgate's Bicentennial Plan for a Sustainable and Carbon Neutral Campus was guided and supported by the strong leadership of our senior administration. We commend **interim President Jill Harsin** and **President Brian Casey** for championing sustainability and committing Colgate to the worthy pursuit of sustainability and carbon neutrality. Central to this report was **J.S. Hope**, Interim Associate Vice President for Finance and Administration. His support enhanced the value of our work and this report. Sustainability at Colgate and the process of climate action planning benefited tremendously from the support of **Constance (Connie) Harsh** who served as interim Provost and Dean of the Faculty as we put this plan together.

Sustainability Council members worked hand-in-hand with Colgate's Bicentennial Plan Steering Committee who wrote this report and initiated numerous meetings, conversations, research that led to the final publication of Bicentennial Plan for a Sustainable and Carbon Neutral Campus. The Steering Committee included Steve Dickinson, Ian Helfant, John Pumilio, and Trish St. Leger. Over the course of about 12-months, the members of the Steering Committee gathered regularly for writing, planning, and coordinating meetings.

Dozens of Sustainability Office interns as well as students in CORE 128, F-SEM 124, ENST 480, and ENST 390 contributed valuable research and helped improve our understanding of sustainability on campus. These students made much of the information and data in this report possible and we are grateful for the leadership of our students and their faculty for sharing their vision and expertise.

Finally, this plan has benefited from the efforts and enthusiasm of dozens of Colgate students who are passionate sustainability advocates and who serve on one or more of the numerous sustainability-oriented groups on the Colgate campus.

EXECUTIVE SUMMARY

In 2009, Colgate University publicly committed to the teaching and practice of sustainability when it became a signatory of the American College and University Presidents' Climate Commitment (ACUPCC). With the final approval of our 2011-2015 Sustainability and Climate Action Plan, Colgate pledged to achieve carbon neutrality by 2019, our bicentennial, and to make carbon neutrality and sustainability a part of the curriculum and other educational experiences for all students. Through the successful implementation of the 2011-2015 Sustainability and Climate Action Plan, as well as ad-hoc projects and institutional commitments, we reduced our net campus carbon footprint by 8,822 MTeCO₂, a 53 percent reduction. This reduction led to annual avoided spending of nearly \$385,000 and national recognition for our successes.

Colgate's sustainability program has profoundly impacted the lives of hundreds of Colgate students. Dozens of students have studied and researched issues of sustainability through our formal curriculum. Their contributions through research and class projects have directly advanced our campus sustainability program. Additionally, over 70 students have worked in the Office of Sustainability as student interns since 2009. A growing and impressive group of students have gone on to continue studies or pursue careers in the field of sustainability.

Today, Colgate has achieved a national reputation for its commitment to sustainability and climate action. In 2011 Colgate received a Climate Leadership Award from Second Nature. In 2015 Colgate was listed on the Princeton Review's Green Honor Roll (one of only 24 institutions out of 861 schools that were rated), earned an AASHE STARS Gold Rating, and was ranked in Sierra Magazine's "Coolest Schools" issue as one of the greenest institutions in the country. Colgate can justly take pride in its rapid emergence as a leader in sustainability among American institutions of higher education.

While our recent progress and achievements are exciting, our work is ongoing and our priorities have broadened. The Sustainability Council, President Casey, and the Board of Trustees are committed not only to reaching carbon neutrality through various mitigation strategies, but also to integrating sustainability into our curriculum, co-curricular educational experiences, and habits and decision-making across the university. As an institution, we must engage our students, faculty, and staff in order to become fully committed and effective in embracing our responsibilities to climate action and sustainability. In the Bicentennial Plan for a Sustainable and Carbon Neutral Campus, we continue to lay the groundwork for achieving carbon neutrality and integrating sustainability throughout the university with mechanisms to:

- Broaden understanding, engagement and commitment to sustainability across the university in both operations and culture
- Deepen our collective teaching and learning of sustainability within both the curriculum and the co-curriculum
- Create an energy master plan and develop effective mechanisms to monitor and track energy costs and usage across campus
- Establish financing mechanisms and models to support the ongoing implementation of sustainability on campus

Colgate University

- Increase local purchasing and sustainability within campus dining services
- Increase awareness of the carbon impacts of campus transportation, commuting, and university-sponsored travel
- Effectively steward our lands on and beyond campus
- Mitigate our carbon emissions and realize our commitment to carbon neutrality by 2019
- Explore the best local and global options for carbon offsets in preparation for 2019
- Develop an adaptation and resiliency plan that recognizes the long-term climate change impacts that are already inevitable

Meeting Colgate's ambitious target date of 2019 for carbon neutrality will require the purchase of carbon offsets. As a result, our climate action planning efforts will continue well beyond our carbon neutrality date as we continue to implement projects and policies that will reduce our campus's gross emissions and, therefore, our dependency on carbon offsets. In light of this, in 2011, the university established a complementary goal to reduce our campus-wide greenhouse gas emissions 40 percent below our 2009 baseline by 2020, including growth in campus infrastructure.

In pursuit of these goals, Colgate's Bicentennial Plan for a Sustainable and Carbon Neutral Campus provides more than strategic direction. It challenges all members of our community to consider what actions they can take, big or small, to help our university achieve the common goals of a more sustainable campus and carbon neutrality by 2019.

MISSION STATEMENT

To promote educational opportunities, foster partnerships, provide leadership, and contribute practical solutions to advance environmental stewardship, social justice, and fiscal responsibility at Colgate University.

VISION STATEMENT

Colgate's sustainability program strives to:

1. Enhance Colgate's liberal arts education by working with faculty and staff to integrate the concept and practice of sustainability into our curriculum
2. Promote a learning and working environment that is environmentally and socially conscious
3. Integrate sustainability into our operations, day-to-day practices, and into our built environment
4. Advance sustainability in the Central New York region through collaboration with local institutions, agencies, and individuals

INTRODUCTION

COLGATE AT A GLANCE

Colgate University is a private liberal arts college located in the Village of Hamilton in Madison County, New York. The school was founded in 1819 as a Baptist seminary and today is non-denominational.

Colgate University owns about 1,780 acres of land in rural Central New York. The main campus includes 160 buildings and 2,234,931 square feet on 515 acres of built environment. Another 1,059 acres is protected forest, and the remaining 200 acres are leased to local farmers for crop and dairy production. Colgate was recognized as the most beautiful campus in the country in the 2010 and 2014 editions of the Princeton Review's Best 379 Colleges guidebook.

Colgate has approximately 2,900 full-time students in 54 undergraduate majors. Colgate is a residential campus and all but approximately 250 students live in on-campus housing. The university employs over 300 faculty members and over 600 staff.

As of January 2016, Colgate's endowment was valued at over \$890 million; the total cost of attendance is approximately \$62,500 for tuition, room, and board per student per year. In 2015, Colgate's operational budget was \$174,437,066, and our energy budget was \$4,732,972.

Colgate operates a central heating and cooling plant that provides heat and domestic hot water for 37 main campus buildings. Since 1981, Colgate has been using biomass to meet the majority of its heating and hot water requirements. In 2015, Colgate used 21,287 tons of wood chips in the central plant that produced 244,801 MMBtus of heat energy (Table 1) or about 71 percent of the total energy used on campus for heating purposes. When the outside temperature drops below 35°F, Colgate must use backup natural gas or fuel oil #2 to supplement the biomass boiler. In Fiscal Year 2015, Colgate used 61,329 MMBtus of natural gas and 7,095 MMBtus of fuel oil #2 in the central plant to supplement the wood boiler.

Altogether, Colgate spent a total of \$2,297,847 on various fuels in Fiscal Year 2015 to heat both its on-campus and auxiliary buildings.

Additionally, Colgate buildings used a total of 30,199,884 kWh of electricity in Fiscal Year 2015 (Table 1).

Colgate University

Table 1. Utility unit cost, energy use, and associated greenhouse gas emissions at Colgate University, FY 2015.

Colgate Utility	Quantity	Unit Cost	Total Cost	MMBtu/Unit	Total MMBtu	\$ / MMBtu	Greenhouse Gas Emissions (MTeCO ₂)
Wood Chips (tons)	21,287	\$42.00	\$894,407	11.50000	244,801	\$3.65	-
Natural Gas (CCF)	597,168	\$0.88	\$524,166	0.10270	61,329	\$8.55	3,261
Fuel Oil #2 (gallons)	245,859	\$3.29	\$809,824	0.13849	34,049	\$23.78	2,536
Propane (gallons)	34,141	\$1.73	\$59,064	0.09133	3,118	\$18.94	180
Kerosene (gallons)	3,439	\$3.02	\$10,386	0.13500	464	\$22.37	36
Electricity (kWh)	30,199,884	\$0.05	\$1,419,395	0.00341	103,072	\$13.77	1,803
Water (gallons)	60,199,055	\$0.01	\$579,847				
TOTAL			\$4,297,089		446,833		7,816

SUSTAINABILITY AT COLGATE AND CARBON NEUTRALITY BY 2019

Striving toward sustainability at Colgate represents an enormous opportunity with many facets. Higher education as a whole is on the frontier of rapid and profound change. A robust sustainability program can help make our institution stronger, more resilient, and a continued leader as our cultural, economic, and political systems profoundly shift towards a more just, sustainable, and low-carbon future. Colleges and universities that have invested in sustainability programs have benefited from reduced operating costs, reliable and distributed energy and food systems, increased student recruitment and retention, community-building, land stewardship and ecosystem services, fostering a strong sense of place, and most important of all, enhanced academic and co-curricular educational programs. Over the years, Colgate has recognized this opportunity and embraced it.

Colgate's initial commitment to sustainability began in 2005 when the Sustainability Council was charged to develop a coordinated environmental vision for short- and long-term planning to ensure a safe, healthy, and sustainable environment. Ultimately, the council seeks to advise and guide the university on ways to integrate teaching, research, operations, and community engagement to address current and future sustainability challenges.

Colgate University

The university more formally committed to sustainability in 2009 with the signing of the American College and University Presidents' Climate Commitment (ACUPCC), since rebranded as Second Nature's Carbon Commitment, and the hiring of the university's first sustainability director. The Carbon Commitment requires Colgate to: 1) measure its greenhouse gas emissions on an annual basis, 2) develop and implement a climate action plan with mitigation strategies to reduce those emissions, 3) achieve carbon neutrality by offsetting the remaining emissions after a specified date, and 4) make carbon neutrality and sustainability a part of the curriculum and educational experiences for all students.

In 2011, with the guidance of the Sustainability Council, Colgate produced its first Sustainability and Climate Action Plan as part of its institutional commitment to carbon neutrality. The 2011 Sustainability and Climate Action Plan established 2019 -- the institution's bicentennial -- as Colgate's carbon neutrality date, and created a five-year road map to advance sustainability and reduce carbon emissions on campus.

By all accounts, the 2011 Sustainability and Climate Action Plan was a success. We initiated or fully implemented nearly all of the strategies detailed in the report. These included student and staff education and behavior change programs, installation of low-flow showerheads across campus, completion of numerous lighting upgrades, construction and renovation of LEED certified buildings, switching from fuel oil #6 to natural gas in our central plant, installation of a solar thermal renewable energy system on 100 Broad Street, installation of geothermal energy at Chapel House, purchasing of hybrid and electric vehicles, installation of charging stations for electric vehicles, the initiation of composting and electronic waste recycling programs, the expansion of our bike rental and recycling programs, and the creation of a student-run organic vegetable garden.

These projects are just a few of the dozens of initiatives we have launched over the past few years. As a result, since our baseline inventory in 2009, we have reduced our:

- net campus carbon footprint by 8,822 MTeCO₂, a 53 percent reduction;
- scope 1 and scope 2 emissions by 983 MTeCO₂, a 10 percent reduction;
- energy consumption in our central heating plant by 6,691 MMBtus, a 2 percent reduction;
- electricity consumption by 1.4 million kilowatt-hours, a 5 percent reduction;
- water consumption by about 15.3 million gallons of water, a 20 percent reduction;
- landfill waste by 64 tons, an 8 percent reduction; and
- campus-wide paper consumption by about 15,940 reams, a 45 percent reduction.

These reductions have resulted in avoided spending (savings) of nearly \$385,000 annually (Table 2). These metrics underscore that Colgate's commitment to sustainability and carbon neutrality is fiscally responsible not to mention the added value of enhancing our educational programs, strengthening our institutional image, recruitment, community building, and risk management among other benefits.

Colgate University

Table 2. Annual avoided spending (savings) as a result of Colgate’s commitment to sustainability and resource conservation and efficiency, FY 2009 vs 2015.

Colgate Resource	Amount Reduced	Unit Cost	Annual Avoided Cost
Central Plant Heat Energy (MMBtu)	6,691	\$6.22	\$41,618
Electricity (kWh)	1,400,000	\$0.05	\$65,800
Water (gallons)	15,300,000	\$0.01	\$153,000
Waste (tons)	64	\$72.00	\$4,608
Paper (reams)	15,940	\$7.51	\$119,709
TOTAL ANNUAL AVOIDED COST			\$384,735

Remarkably, Colgate has been able to achieve these savings while adding over 150 students and employees on campus and constructing and operating the 15,000 square foot Trudy Fitness Center.

On the academic side, faculty who are dedicated to sustainability have raised awareness and initiated faculty development sessions on integrating sustainability in the curriculum. Today, approximately 10 percent of Colgate classes focus on or include sustainability as a major component, and 45 percent of our academic departments offer at least one course focusing on issues of sustainability.

Colgate’s senior administration and board of trustees have guided and supported the university’s sustainability program from the outset. Under their strong leadership, the university completed its Campus Master Plan and Strategic Plan updates in January 2014. The Campus Master Plan emphasized that, “minimizing the amount of energy each new or renovated building requires through high-performance design will help Colgate manage future energy costs and greenhouse gas emissions. Efficient space use and enhanced space management is critical in minimizing needed new construction. Ensuring sustainable building practices in campus projects—including LEED certification for all applicable construction—is generally more cost effective and easier to achieve during the initial design and construction than via future retrofit.”

Likewise, the Strategic Plan reaffirmed that, “We are on track to be carbon neutral by our bicentennial in 2019. Campus planning and building design will incorporate sustainable practices from inception to implementation.”

In 2015, a working group of faculty, staff, and students published Colgate’s first Green Building Standards. Approved by Colgate’s senior administration, the Standards allow a consistent and coordinated design and construction process that is essential to developing high-performing, sustainable buildings, as is emphasized in Colgate’s Campus Master Plan and Strategic Plan updates.

Colgate University

A faculty, staff, and student Sustainable Food Systems Working group was formed in Fall 2013 and charged by the President with working to increase recognition of the paramount importance of campus food operations for sustainability at Colgate. In summer 2015, partly as a result of this group's work, Colgate contracted with Chartwells to replace Sodexo as its campus food provider. Chartwells has committed to the importance of local food purchasing, sustainable practices, and educating students about the environmental significance of food production and consumption as central aspects of its operations. In addition, the position of Sustainable Dining Manager was created to coordinate sustainability efforts within dining services.

Colgate's leadership also supports sustainability and climate action in ways that extend beyond campus. On November 15, 2015, Interim President Jill Harsin reiterated Colgate's commitment to sustainability and climate action by signing the White House's American Campus Act on Climate Pledge (Appendix 1). In her letter to the White House, Interim President Harsin joined more than 200 other colleges and universities to demonstrate Colgate's support for strong international climate action in advance of the United Nations climate negotiations in Paris (COP-21).

On November 19, 2015, Interim Dean of the Faculty and Provost Constance Harsh joined a select group of higher education presidents, other campus and business leaders, as well as high-ranking government officials in a roundtable discussion at the White House to discuss the ongoing effort to advance climate action in higher education and beyond.

EMERGENCE TO INTEGRATION

As highlighted in the previous section, Colgate's sustainability program has made rapid progress over the past few years. However, institutionalizing sustainability requires more than stockpiling successful projects in piecemeal fashion. In order to reap the full suite of benefits from a robust sustainability program, broad-reaching institutional engagement and participation are essential. Despite our recent successes, important opportunities remain to further engage influential individuals and departments with sustainability. Integration happens when individuals consciously and unconsciously embrace principles of sustainability in both their long-term and day-to-day decision-making processes. Expanding the consideration of ecological and carbon impacts in operational, educational, and governance decisions will help lead to a true culture of sustainability at Colgate. The Bicentennial Plan for a Sustainable and Carbon Neutral Campus is focused on how we transition from an emergent sustainability program to an integrated one. Doing so will help secure our future as a leading liberal arts college and consolidate our role as a national leader in sustainability and climate action. Colgate's Sustainability Council led the development of this Plan with campus-wide feedback from dozens of faculty, students, staff, and technical experts in our operations from across the university with the goal of aligning our often silo-ed campus around a united strategy and vision for a sustainable campus.

GUIDING PRINCIPLES AND DECISION-MAKING CRITERIA

Colgate's guiding principles for sustainability were adopted in the 2011 Sustainability and Climate Action Plan. Today, they continue to serve as an important guide for day-to-day decision-making. The integration of Colgate's guiding principles into our campus culture and mindset will allow us to collectively advance sustainability on campus.

Colgate's Guiding Principles for a Sustainable Future:

1. Foster opportunities that link the curriculum with operations in a way that supports Colgate's liberal arts education and gives students the opportunity to put sustainability theory into practice.
2. Cultivate learning opportunities that engage students with the long-term social, environmental, and economic sustainability of Central New York.
3. Promote a campus community that values cultural and ecological diversity.
4. Provide a safe, healthy, and engaging work and living environment that fosters interaction, recreation, and education.
5. Consider long-term impacts, lifecycle analyses, and integrated systems thinking in all our sustainability initiatives so that they consider holistically the interdependent issues of economic vitality, environmental quality, and social equity.
6. Support new policies and programs that prioritize the efficient use of, and reduced demand for, energy and natural resource extraction.

Colgate University

7. Consider end-of-life disposal and recycling options when making purchasing decisions. Take necessary precautions to prevent environmental pollution and unnecessary landfill waste.
8. Consider life-cycle cost analysis, including social and environmental impacts, for our contracts, investments, and purchasing decisions.
9. Use university investments to support companies that are socially responsible and are good environmental stewards, all else being equal.
10. Favor policy, purchasing, and operational decisions that exert a positive influence in our bioregion. This includes decisions that minimize environmental impacts, support healthy communities, maximize long-term value, and contribute to local and regional economic health.

As we continue our journey towards a sustainable future, it is important to remain flexible and open to emerging technologies and new opportunities. As these opportunities present themselves, they should be evaluated using the following criteria:

- Time horizon: how important is early success or is success over the long-term worth striving for?
- Achievability: how likely is it that this goal can be attained?
- Financial cost: what financial resources would be required to support the proposed initiative and where would potential sources of funding come from?
- Community readiness: will various stakeholders support the proposed initiative or will it be unpopular or overly burdensome?
- Impact: if achieved, will the goal have a significant influence or a marginal influence on Colgate's overall sustainability profile?
- Ease of implementation: will the work require a considerable investment of institutional time and energy? How technically difficult would the initiative be to implement?

COLGATE'S EMISSIONS AND 2019 PROJECTIONS

FISCAL YEAR 2015 EMISSIONS

Colgate's gross campus carbon emissions in Fiscal Year 2015 were 14,562 metric tons of carbon dioxide equivalent (MTeCO₂). That represents a 2,253-ton reduction from our 2009 baseline, a 14 percent reduction (Figure 1).

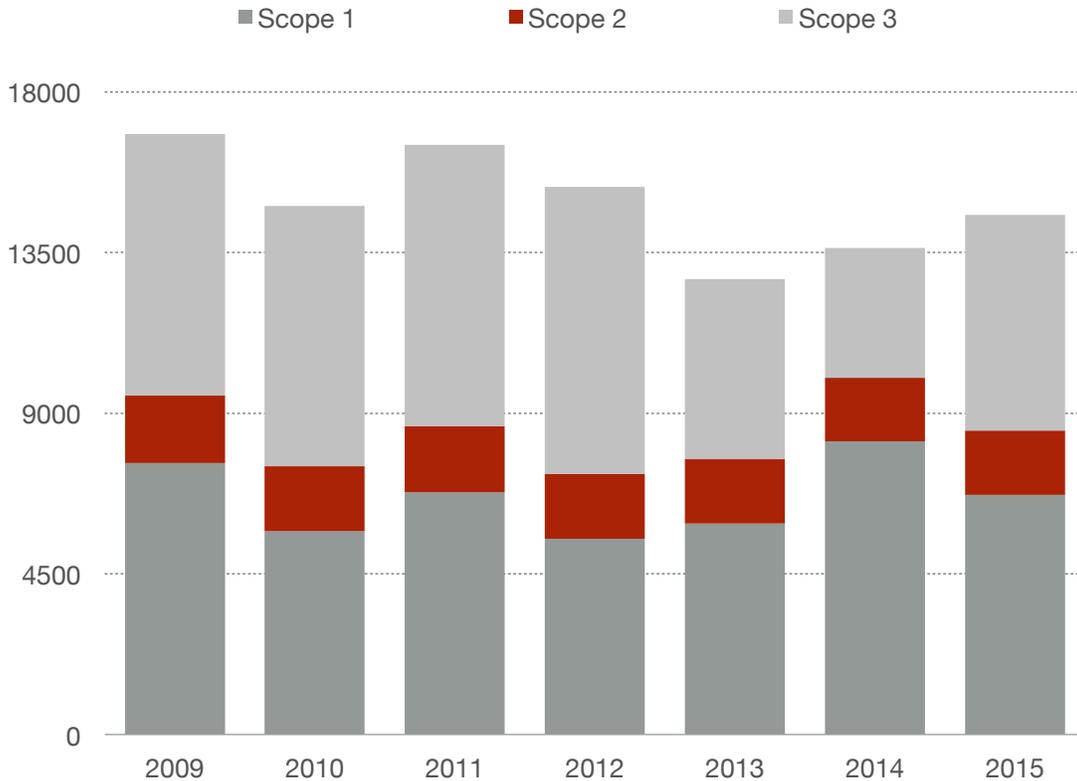


Figure 1. Total greenhouse gas emissions at Colgate University, FY 2009-2015.

Colgate's scope 1 emissions include on-campus stationary combustion of fossil fuels (such as natural gas, fuel oil #2, kerosene, and propane), vehicle fleet emissions, refrigerants, and fertilizers. Scope 2 emissions are associated with purchased electricity. Scope 3 emissions include faculty and staff commuting, the Colgate Cruisers, employee business ground travel, air travel, paper use, and solid waste.

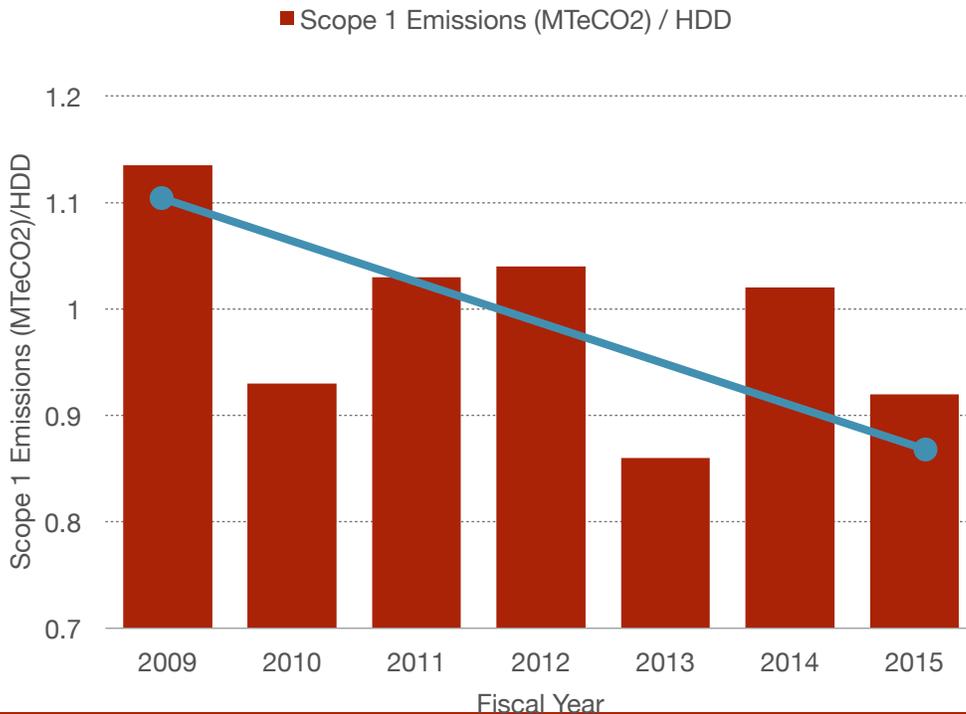
It is important to note that over the past three years, the number of heating degree days has increased as we have experienced recent colder and longer winters in Central New York (Table 3).

Colgate University

Table 3. Colgate University emissions per scope and heating degree days (HDD), FY 2009-2015.

Fiscal Year	Emissions (MTeCO ₂)			Heating Degree Days (HDD)
	Scope 1	Scope 2	Scope 3	
2009	7,607	1,885	7,323	6,724
2010	5,704	1,807	7,297	6,172
2011	6,785	1,844	7,891	6,634
2012	5,478	1,814	8,041	5,301
2013	5,901	1,806	5,052	6,858
2014	7,999	1,790	3,637	7,855
2015	6,705	1,803	6,054	7,288

Between 2009 and 2012, the average number of heating degree days was 6,208. Between 2013 and 2015, the number of heating degree days was 7,334. Despite this increase in colder temperatures, we can see a significant downward trend in the amount of scope 1 emissions over time. Chart 2 shows this downward trend when normalizing greenhouse gas emissions to compensate for weather patterns between heating seasons. The spike in FY 2014 is attributed in part to the heating plant upgrade that took place over the heating season.



Colgate University

Figure 2. Colgate University scope 1 emissions per Heating Degree Days, FY 2009-2015.

Likewise, we have reduced our net campus carbon footprint (scope 1, 2, and 3 emissions plus forest sequestration and carbon offsets) by 8,822 MTeCO₂, a 53 percent reduction (Chart 3). The sharp downward trend between Fiscal Year 2011 and Fiscal Year 2013 is largely due to mitigation projects, the carbon sequestration project, and our investment in Patagonia Sur carbon offsets. The upward trend between Fiscal Year 2013 and Fiscal Year 2015 is due in part to the elimination of renewable energy certificate (REC) purchases, increased heating degree days (Table 3), and improved tracking of air travel emissions.

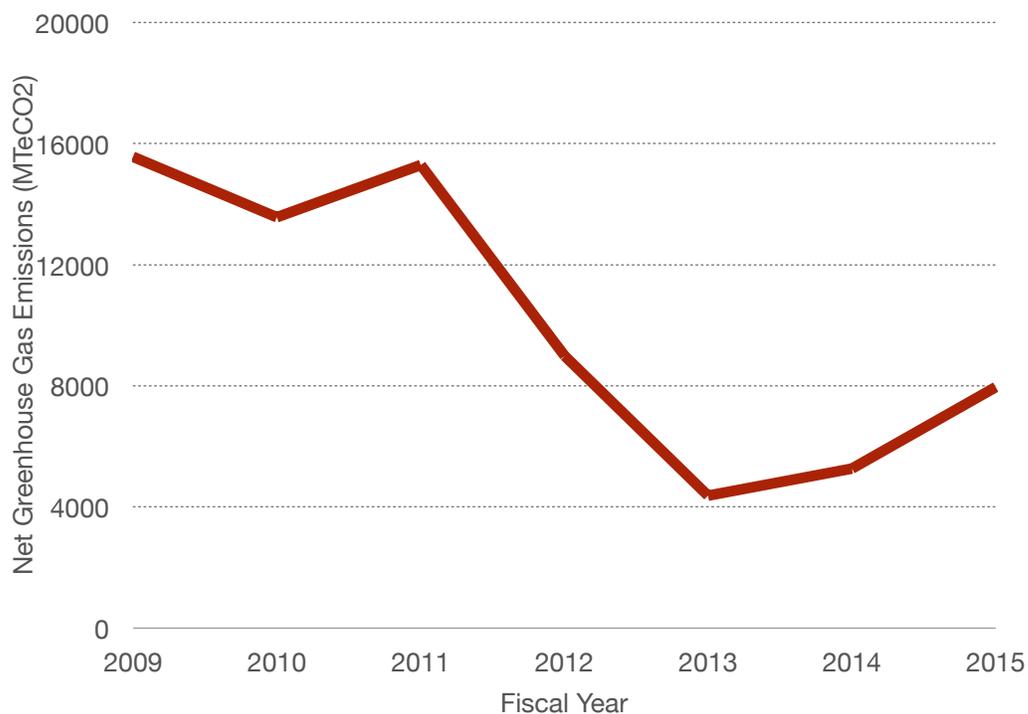


Figure 3. Colgate University net greenhouse gas emissions, FY 2009-2015.

As a result, the university's net footprint in FISCAL YEAR 2015 was 7,984 MTeCO₂ after compensating for offsets and forest sequestration. Colgate's highest sources of emissions continue to be the on-campus stationary combustion of fossil fuels (6,011 MTeCO₂), followed by air travel (4,297 MTeCO₂).

A breakdown of emissions by category highlighted in Chart 4 reveals that the major sources of emissions at Colgate University are:

- Buildings (54%): heating, cooling, electricity

-
- Air Travel (30%): faculty and staff business travel (estimate)
 - Ground Travel (15%): vehicle fleet, commuting, business ground travel, Cruisers
 - Other (1%): fertilizer, solid waste, paper, refrigerants

FISCAL YEAR 2019 EMISSIONS PROJECTION

Colgate's gross campus carbon footprint (14,562 MTeCO₂) drops to about 13,000 MTeCO₂ when we factor in the annual sequestration of about 1,600 tons of carbon from our forested lands.

Between 2016 and 2019, we will continue to implement projects and initiatives that further reduce our campus carbon footprint (see Ecological and Carbon Footprint Mitigation section). Using a conservative 2 percent per year reduction through mitigation projects and increased travel and energy efficiency gains, we anticipate reducing Colgate's emissions by another 1,000 MTeCO₂ to about 11,600 MTeCO₂ in 2019.

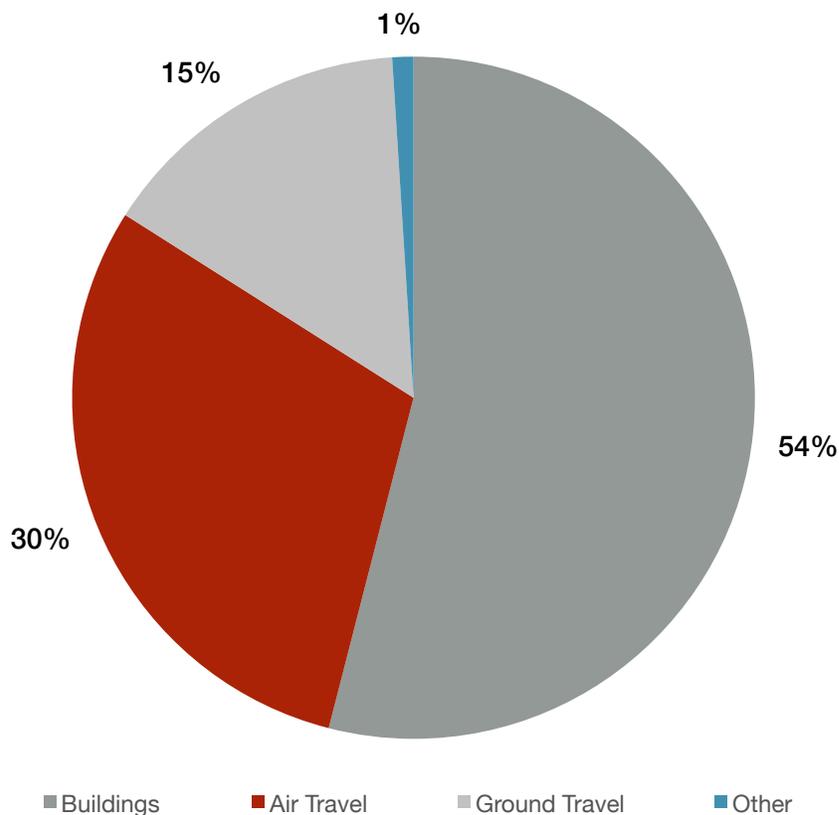


Figure 4. Source of emissions at Colgate University, FY 2015.

Colgate University

Colgate is also planning to construct several new buildings before our 2019 carbon neutrality date. Nearing completion is the Class of 1965 Arena, a new 90,867 square foot state-of-the-art athletic facility. Also, on the horizon is the construction of Benton Hall (a new 18,000 square foot career services building), a new 60,000 square foot residence hall, and a 17,000 square foot center for art and culture. This does not include the possible construction of a new performing arts center, which is likely to be built beyond 2019. We do not have enough information about the project at this time to include in this report. Nevertheless, this increased square footage will increase our energy and resource use that will drive up our campus carbon footprint by an estimated 1,200 MTeCO₂ (Table 4).

Table 4. Projected energy consumption and greenhouse gas emissions of new building projects at Colgate University.

Building	Square-Footage	Est. Electricity (kWh)	Annual Power Cost	GHG Emissions	Est. Heat Energy (MMBtu)	Annual Energy Cost	GHG Emissions	Total Energy Cost	Total GHG Emissions
Class of 1965 Arena	90,867	1,791,502	\$82,409	107	8,500	\$124,100	452	\$206,509	559
Benton Hall	18,000	360,000	\$16,560	21	1,800	\$26,280	96	\$42,840	117
Residential Commons	60,000	1,200,000	\$55,200	72	6,000	\$87,600	319	\$142,800	391
Center for Arts and Culture	17,000	340,000	\$15,640	20	1,700	\$24,820	90	\$40,460	111
TOTAL	185,867	3,691,502	\$169,809	220	18,000	\$262,800	957	\$432,609	1178

The overall result will be an estimated 13,139 MTeCO₂ gross emissions in 2019 (Table 5). In order to achieve our goal of carbon neutrality, we need to invest in offsets and renewable energy certificates in order to balance our carbon budget.

Colgate University

Table 5. FY 2019 total projected gross emissions.

FY 2015 Emissions	14,562
Forest Sequestration Project	(1,600)
2016-2019 Mitigation	(1,000)
TOTAL	(2,600)
New Construction Projects	
Class of 1965 Arena	559
Benton Hall	117
Residential Commons	391
Center for Arts and Culture	111
TOTAL	1,177
FY 2019 Total Projected Gross Emissions	13,139

As already emphasized, Colgate has set an ambitious target date of 2019—to coincide with our bicentennial celebration—for achieving carbon neutrality. Meeting this goal will require the purchase of carbon offsets. At the time of this writing, we estimate that it may cost the university approximately \$144,000 per year in carbon offsets to achieve the goal of carbon neutrality (see section on “Offsets”). As a result, our climate action planning efforts will continue well beyond our carbon neutrality date as we continue to implement projects and policies that will reduce our campus's gross emissions and, therefore, our investments in carbon offsets. In light of this, in 2011 the university established a complementary goal to reduce campus-wide greenhouse gas emissions to 40 percent below our 2009 baseline by 2020, regardless of growth.

ACTION PLAN FOR A SUSTAINABLE CAMPUS

Colgate's Bicentennial Plan for a Sustainable and Carbon Neutral Campus is a five-year plan that takes us through our 2019 carbon neutrality date to Fiscal Year 2021. The plan is centered around eight core strategic areas:

1. **Campus Culture.** Programs and strategies that foster sustainable behavior and decision-making by providing educational resources, generating excitement, and raising awareness around issues of sustainability in our living, learning, and working environment.
2. **Curriculum and Learning.** Initiatives that provide an exceptional liberal arts education through the lens of sustainability and climate action and preparedness.
3. **Campus Operations.** How we go about our day-to-day business has large ramifications for our ecological and carbon impacts. Energy and buildings, transportation, waste, and water use strategies are specified in this section.
4. **Ecosystems and Land Stewardship.** Respecting and protecting our natural heritage and physical resources is vital to both our academic mission and attachment to place. How is Colgate caring for its land?
5. **Food and Dining.** Strategies that promote environmentally sound dining operations and procurement of local and sustainable foods while supporting our local economy.
6. **Financing.** Sustainability at Colgate is a good investment. While many projects have short paybacks, some may be capital intensive and require creative financing strategies.
7. **Climate Ready: Resilience and Adaptation.** Is Colgate prepared for climate change? These strategies will help us evaluate risks and build resiliency for the future.
8. **Offsets.** Achieving carbon neutrality by 2019 will require investments in carbon offsets.

This section highlights specific actions under each strategic area that together will propel sustainability at Colgate University.

It is important to emphasize that Colgate's Bicentennial Plan for a Sustainable and Carbon Neutral Campus is a living document. Surely, new research, policies, incentives, partnerships, organizational structures, and innovations will create opportunities not available today. For this reason, we must remain vigilant and open to reevaluating and revising our strategies when better opportunities emerge.

CAMPUS CULTURE

While our recent progress and achievements are exciting, Colgate's high-level sustainability goals and aspirations need to achieve broader commitment and support at every level of decision-making at the university. Opportunities to foster a sustainable mindset exist throughout Colgate's culture, governance structures, and overall decision-making processes.

Student Engagement

According to the Princeton Review Hopes and Worries Survey, students are increasingly committed to sustainability and are looking for strong sustainability programs as they research which undergraduate institutions to attend. As a leading liberal arts institution, it is critical that Colgate has a sustainability program that will engage students, both those already committed to sustainability and those that are not, to practice a sustainable lifestyle when they arrive on campus. Through peer-to-peer programming, sustainability-minded students have already been engaging fellow students and influencing student culture on campus. The Office of Sustainability provides internships to interested students who, in turn, educate their peers on issues of sustainability. These interns also manage a newly-founded Green Ambassador Program aimed at further engaging first-year students interested in issues of sustainability. Recently, the Student Government Association (SGA) added a sustainability coordinator to its executive board. This sustainability coordinator has been successful in passing legislation requiring all members of SGA to become "Green Certified," providing student leaders with the tools and knowledge to make decisions with a lens of sustainability. The SGA sustainability liaison has also been responsible for passing a bylaw that prevents student organizations that utilize Student Activity Fee money from providing Styrofoam materials at their events. While these achievements have been important for the university, it's important to further integrate a sustainable culture throughout the student experience at Colgate and take sustainability to the next level.

COMMITMENT: Better integrate sustainability within first-year orientation to emphasize its importance from a student's first day on campus beginning in the fall of 2017.

Lead responsibility: Dean of the College Sustainability Committee and Orientation Planning Committee.

Orientation is a critical time for new students who are coming to campus, as it is their opportunity to begin to assimilate to campus culture. By emphasizing that sustainability is a core value of the institution, new students will feel more inclined to participate. Rather than a formal sustainability presentation, sustainability should be integrated throughout the various orientation programs. Specifically, student research done in the Fall 2015 ENST 390 course provided valuable recommendations that we can pursue including:

- Eliminating plastic cups and plastic water bottles at all events
- Educating new students on waste disposal at waste container sites
- Incorporating meetings with sustainability interns into Link training
- Reducing paper by providing orientation materials through electronic means

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COMMITMENT: Institute optional graduation pledge for Class of 2018 by December 31, 2017.

Lead responsibility: Director of Sustainability.

By implementing an optional graduation pledge for our seniors, it provides our students an opportunity to make a symbolic commitment before representing themselves and Colgate University in the workplace. Fortunately, the Graduation Pledge Alliance has already created language for Colgate to consider: "I pledge to explore and take into account the social and environmental consequences of any job I consider and will try to improve these aspects of any organizations for which I work."

COMMITMENT: Link student academic experience to on-campus operational practices by September 1, 2017.

Lead responsibility: Director of Sustainability, Associate Vice President for Facilities, Director of Planning, Design, and Construction.

The student educational experience can be enhanced when concepts of sustainability taught in the classroom are combined with opportunities for students to get involved with campus decision-making processes. Specifically, we have opportunities for students to become engaged in Colgate operations such as building design and construction, purchasing decisions and contracts, investment opportunities, introducing new technologies and innovations on campus and others. Additionally, students are missing a valuable opportunity when they are not involved in governance decisions. In order to maintain transparency with the student body, we propose including more students on governance and operations/building committees to engage them further with sustainability and the major infrastructural changes the university engages in.

Employee Engagement

As part of the university's job description project, every job description now includes a set of key behavioral competencies that are expected of all employees. Sustainability was one of those behavioral competencies. The inclusion of sustainability in job expectations will further promote employee engagement with sustainability and report on it as part of the annual review process. The language for the behavioral competency in sustainability reads as follows:

Understand the impact of decision-making and personal behavior in achieving the university's commitment to a sustainable and carbon neutral campus; supports and advances the university's sustainability initiatives; influences others to use sustainable practices.

In order for staff to successfully achieve competency in sustainability, programming must be developed to facilitate staff learning and engagement opportunities. One example includes the sustainability passport program.

COMMITMENT: Develop a Sustainability Passport Program that allows staff to succeed at fulfilling the sustainability behavioral competency that is part of every job description by September 1, 2017.

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Lead responsibility: Director of Sustainability.

The Sustainability Office in collaboration with Human Resources and other key departments will create, support, and organize a suite of educational programming that advance the employee's knowledge of sustainability at Colgate while promoting pro-environmental behaviors on campus. Through the Sustainability Passport Program, employees will register for sessions of their choice, earning "credits" for each program they participate in. Once enough credits are earned, employees will receive recognition for their competency in sustainability at Colgate and beyond. This professional development program will create better environmental stewards and advocates for sustainability on campus further supporting our sustainability and carbon neutrality goals

Alumni Engagement

COMMITMENT: Leverage connections with alumni engaged in sustainability by organizing at least one annual alumni event that focuses on sustainability and climate issues by September 1, 2017.

Lead responsibility: Office of Alumni Relations.

Strengthen connections with the Common Good Network. The mission of the Common Good Network is to build a community of Colgate alumni in similar industries to create greater engagement with the university, while building professional on-ramps for undergraduates through the Center for Outreach Volunteerism and Education (COVE).

Purchasing and Contracts

COMMITMENT: Develop and implement a Sustainable Purchasing Policy by September 1, 2017.

Lead responsibility: Director of Purchasing.

The goods and services that Colgate purchases on an annual basis have both environmental and social impacts and we recognize that we can use our purchasing power to support a more sustainable economy. Each purchasing decision presents an opportunity for Colgate community members to choose environmentally preferable products and services from companies that support sustainability.

CURRICULUM AND LEARNING

Colgate's curriculum and co-curriculum include many offerings that relate to sustainability. These range from academic courses, to co-curricular programming, to internships, and diverse aspects of student life. Nevertheless, sustainability is often considered to fall within the domain of Environmental Studies, rather than being a shared curricular responsibility across departments and divisions. It is imperative to challenge this misconception even though our ENST program is robust, multifaceted, and interdisciplinary. A related challenge lies in extending the visibility of sustainability in the curriculum beyond those faculty and students who are directly invested in promoting it to the more general Colgate population. Currently, both our faculty and student populations consist of a substantial minority who are knowledgeable proponents of sustainability, alongside a much larger majority who are less aware of and invested in the importance of sustainability as a central component of our educational mission. We serve the needs of the first category quite well both within the curriculum and co-curriculum; therefore, our central challenges involve the second group.

COMMITMENT: Identify and encourage courses on sustainability and climate change in the curriculum by September 1, 2017.

Lead responsibility: Sustainability Council.

Of the approximately 1,100 courses Colgate offers, 97 focus primarily upon sustainability, while 9 include sustainability thematically. Additionally, out of approximately 50 academic departments and programs, 19 either offer courses focused on sustainability or courses that contain sustainability thematically. Most of the courses with a primary focus on sustainability are housed in Environmental Geography, Environmental Biology, Environmental Geology, Environmental Economics, Environmental Studies (ENST), Geography, Geology, Biology, and Peace and Conflict Studies (see [Sustainability Courses offered](#)).

The importance of sustainability to our curriculum was recognized in the adoption of "The Goals of a Colgate Education" approved by Colgate's Academic Affairs Board, Faculty and Trustees in 2010. Goal 11 of the 13 Goals calls for Colgate students to, "Respect nature and the diversity of life on earth: recognize their individual and collective responsibilities for the stewardship of the Earth's resources and the natural environment." In addition, goals 6 and 10 relate to sustainability through the perspectives of scientific inquiry and social justice. Goal 6 calls upon students to "Examine natural phenomena using the methods of science, and understand the role of science in contemporary society." Goal 10 calls upon students to "Be engaged citizens and strive for a just society: embrace their responsibilities to local, national, and global communities; use their influence for the benefit of others." While it is clear that our curriculum is successful in engaging those already committed to sustainability, the Goals are consistent with the need to engage the more general population of faculty and students in issues related to sustainability and climate literacy.

Colgate's required Core Curriculum also provides a number of possible niches for increasing the presence of sustainability-related courses. As defined on the institution's website: "Colgate's Core program is a defining feature of its liberal arts curriculum. The Core Curriculum at Colgate takes seriously the faculty's mission to engage students in the fullness of a liberal arts education: to learn, reflect, and live with an expanding awareness of one's

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responsibility to self, community, and the larger world. As such, Colgate's Core Curriculum aims to prepare students for rich and fulfilling lives in a context of rapid change here and around the globe."

Because the Core Curriculum is a required component for all Colgate students and one of the primary vehicles for achieving the Goals of a Colgate education, faculty members on the Sustainability Council and beyond have begun to work with the university professors and staff of both Core 152 (Challenges of Modernity) and Core Communities and Identities (e.g., Core Arctic, Mexico, Russia, South Africa) to develop modules and approaches that will allow for exposure to sustainability and climate change issues. To this end, one of the concurrent sessions at the Spring 2015 White Eagle Core pedagogy retreat was devoted to "Sustainability and Social Justice in the Core." Looking forward, a sustainability module for Core 152 could revolve around an important environmental text (e.g. Silent Spring by Rachel Carson) while topics for Core Communities and Identities could be customized for the country or region studied (e.g. the 2005 Tsunami for Core India). In addition, the Core could sponsor an open lecture for all students of the Core on climate change and Colgate's commitment to carbon neutrality each semester or academic year by a Colgate faculty member or invited speaker who has relevant expertise. In the longer term, the Core could incorporate an official sustainability component during its next revision (~2020) so that all students who graduate from Colgate will have exposure to key issues around sustainability.

COMMITMENT: Increase faculty awareness of teaching to sustainability by September 1, 2017.

Lead responsibility: Faculty Members of Sustainability Council.

Recently, faculty have been asked to submit their yearly self-reports via an online interface. Approximately 50 percent do so, while many others continue to submit in the more traditional format. In both cases, faculty are asked to comment upon both general aspects of their teaching and specific innovations or changes to individual courses. This provides an under-utilized opportunity to garner further information about teaching that involves sustainability, which may also help in our overall assessment efforts. The Sustainability Council will work with the administration to incorporate a section into the self-reporting process to solicit information about this, for example by incorporating the following question into the faculty annual report in the section on individual courses.

Which choice below most closely represents your course as it relates to the three dimensions of sustainability: economic prosperity, social well-being, and environmental stewardship?

1. The primary and explicit focus of this course is sustainability and/or understanding or solving one or more major sustainability challenges (e.g. the course focuses on the geopolitical effects of climate change).
2. This course is primarily focused on a topic other than sustainability but incorporates a unit or module on sustainability, includes one or more sustainability-focused activities, or integrates sustainability issues throughout the course.
3. This course does not cover issues of sustainability.

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In addition, it may be possible to include sustainability indicators within the Banner information related to each Colgate course. If this proves feasible, it would provide another means of tracking sustainability in the curriculum and one that could update automatically.

Various opportunities exist for encouraging awareness of teaching sustainability across the curriculum, which can be leveraged more effectively. Teaching Tables represent one example. An exemplary title for such a teaching table could be: "Are You Teaching to the Past or the Future (or Both)? Sustainability across the Curriculum." In another vein, Colgate's Faculty Development Council may be able to encourage faculty to pursue curricular proposals focusing on sustainability. In addition to curricular innovation, specific opportunities arise that can foreground sustainability within the curriculum and co-curriculum. For example, the 2015-16 theme of our well-funded Lampert Institute for Civic and Global Affairs centered around food, which has clear sustainability-related import. The Lampert Institute could pursue additional sustainability-related themes in future years.

The AASHE STARS rating system includes a section on Sustainability Literacy Assessment. The Sustainability Council will work with Colgate's administration and the Center for Learning, Teaching, and Research to explore incorporating this assessment into the testing that students undergo upon arrival as first-years and departure as seniors from Colgate. This will link ongoing innovation in the curriculum with our overall assessment efforts.

COMMITMENT: Enhance co-curricular education/experiential learning that foregrounds sustainability by May 30, 2017.

Lead responsibility: Sustainability Council.

Formal Co-Curricular Programming:

The long-standing Environmental Studies Brown Bag Program brings visitors to campus to address a broad range of sustainability-oriented topics on Fridays throughout the fall and spring semesters. The program is funded sufficiently to provide appropriate honoraria for our guests, as well as "brown bag" lunches for those attending. Attendees include students, faculty, staff and occasionally local residents. Recent topics include: arctic change, local food issues, urban development, and deer population problems. The Sustainability Council will work with ENST to broaden the outreach of these Brown Bags as a way of attracting greater participation by faculty and students for whom sustainability has been a peripheral, rather than a central, concern.

Experiential Learning:

The ENST junior seminar -- Environmental Studies 390: Community-based Environmental Issues -- explicitly focuses upon experiential learning. All ENST and ENST-cognate majors are required to take ENST 390. As stated in the catalog: "This project-based, interdisciplinary course examines current environmental issues in the context of community-based learning. Topics for investigation are selected by faculty, usually in conjunction with the campus sustainability coordinator, the Upstate Institute, or directly with local and regional agencies or organizations. Students get practical experience working in interdisciplinary teams to examine environmental issues with a goal of developing relevant recommendations." The Sustainability Council will continue to explore the ways in which

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student projects can benefit the university's overall sustainability efforts, as well as enhance our cooperation with the local community on sustainability-related matters.

Sustainability Interns:

Colgate has 13 paid interns each year that work for the Director of Sustainability. These interns contribute to on and off campus efforts in many ways. Students are hired as part of a competitive application process through Colgate's Office of Sustainability. Colgate's Director of Sustainability ultimately hires and supervises the successful applicants. It is a year-long internship. The interns are trained by staff in the Office of Sustainability and in our Communications Department. Colgate representatives presented an overview of our sustainability internship program at the 2015 national AASHE conference and the response helped to clarify that that it represents a cutting edge example of such programming among US institutions of higher education.

Outdoor Education:

The mission of Colgate's Outdoor Education program is to provide the community with experiential opportunities that emphasize safety, environmental awareness, and technical skills while promoting personal growth and group development through a rediscovery of the natural world. Wilderness Adventure (WA) is a pre-orientation program at Colgate, in which over 125 first-year students come to campus early to make friends, learn about Colgate from upper-class student leaders, and use the outdoors to acclimate to Colgate, central New York, and life as a college student. Living and traveling with a small group of other first-year students and two or three highly trained leaders, students work together to hike, paddle, climb, cave, bike, or sail through Upstate New York's Adirondack State Park or other wilderness areas. All Wilderness Adventure students receive information about the seven Leave No Trace principles, and are instructed on how to follow the principles as they travel and camp with care. Each WA student leader participates in a Leave No Trace awareness workshop during their training year before leading a Wilderness Adventure trip.

The Sustainability Council will facilitate Outdoor Education program partnering with ENST and Biology faculty and students to increase the emphasis upon sustainability in the context of Wilderness Adventure and staff training. Currently, principles such as "Leave No Trace" are well-incorporated, but there is additional room to foreground sustainability in this area of the co-curriculum. One possible approach would be to designate certain Sustainability Interns to serve as links to Outdoor Education to work toward these ends.

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CAMPUS OPERATIONS

The strategies highlighted in this section provide strategic direction for the campus community. They represent a core part of our effort to transition our sustainability program from an emergent one to an integrated one. Once implemented, these strategies will open the door for a more advanced sustainability program and facilitate the implementation of a broader set of ecological and carbon mitigation projects.

Energy and Buildings

Colgate University has 160 buildings encompassing over 2.3 million square feet of floor space. Providing electricity and heating to conditioned space on campus is responsible for 91 percent of Colgate's scope 1 and scope 2 emissions or 54 percent of all university emissions including air travel and other forms of transportation (Chart 4). In 2015, Colgate spent over \$4.2 million in energy and water consumption (Table 1). For these reasons, how we manage our energy and construct, renovate, and operate our buildings has significant impacts on our energy use, budget, and ecological and carbon footprints and, therefore, must be an essential component of Colgate's sustainability and climate action planning.

Fully implementing the following actions, guidelines, and strategies will help Colgate significantly reduce energy, water, material consumption, and operating costs from buildings.

COMMITMENT: Integrate Colgate's Green Building Standards into the university's Building Design and Construction Standards, and put them into practice by July 1, 2017.

Lead responsibility: Associate Vice President for Facilities and Capital Projects.

With the completion of Colgate's Green Building Standards in 2015, the university must now ensure that the strategies highlighted in the standards are put into routine practice. One way to accomplish this is to roll the Green Building Standards into Colgate's existing Building Design and Construction Standards. This will encourage project managers and all bidding contractors to consider sustainability, performance, and overall energy use and carbon emissions from the outset of all building projects. Together, this will fundamentally improve the way we design, construct, renovate, and operate buildings on campus.

COMMITMENT: Complete Energy Master Plan by July 1, 2018.

Lead responsibility: Associate Vice President for Facilities and Capital Projects.

In order to effectively reduce carbon emissions, Colgate needs to develop a comprehensive plan for managing energy on campus, now and in the future. Colgate's energy master plan will benchmark and track energy cost and use, strategically identify and prioritize energy efficiency and conservation measures, energy purchasing and financing, and analyze and evaluate future trends and alternative energy opportunities. Colgate's Energy Master Plan will emphasize the following components essential for an effective energy management program:

- Benchmark and track energy cost and use

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- Evaluate the Energy Use Index (EUI) for all major campus buildings
- Establish energy reduction and performance goals
- Conduct energy audits
- Identify, analyze, and prioritize specific energy-saving opportunities that include:
 - Lighting and controls upgrade plan (interior and exterior lighting)
 - An evaluation and implementation of a recommissioning program for existing buildings and new construction.
 - An evaluation of continuous commissioning in existing buildings as well as implementation in new construction.
- Implement energy saving projects and training programs
- Evaluate and recommend renewable energy technologies for Colgate's energy supply
- Monitor progress and report results
- Establish feedback loop for continuous improvement

COMMITMENT: Expand natural gas along Broad Street and other campus buildings to replace fuel oil #2 by July 1, 2018.

Lead responsibility: Associate Vice President for Facilities and Capital Projects.

Replacing fuel oil #2 with natural gas will reduce carbon emissions, utility costs, and improve local air quality. This process is already underway and will eventually include the remainder of Broad Street houses and the Townhouses. Once these upgrades are complete, Colgate will reduce greenhouse gas emissions by a combined estimate of 500 MTeCO₂.

Transportation

In 2015, transportation accounted for 6,503 MTeCO₂ or over 45 percent of Colgate's carbon footprint. Emissions from transportation include:

- air travel (4,297 MTeCO₂) ;
- faculty and staff commuting (806 MTeCO₂);
- employee business ground travel (588 MTeCO₂);
- Colgate's vehicle fleet (570 MTeCO₂);

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- varsity athletics ground transportation (132 MTeCO₂); and
- Cruiser bus service (110 MTeCO₂).

COMMITMENT: Colgate will replace its current vehicle fleet with zero-emission or low-emission vehicles on a rolling basis.

Lead responsibility: Associate Vice President for Facilities and Director of Sustainability.

Colgate's vehicle fleet consists of approximately 95 vehicles (22 student/faculty vans, 68 Buildings and Grounds vehicles, and 5 Campus Safety vehicles) and is responsible for approximately 570 MTeCO₂ emissions per year, about 4 percent of Colgate's total emissions.

In 2015, Colgate partnered with Enterprise to lease cars and vans in our vehicle fleet. As part of this arrangement, Colgate will replace larger vans with smaller, more fuel-efficient options. Additionally, we will continue to monitor the availability of electric, hybrid, and compressed natural gas powered vehicles that will be able to meet our transportation needs.

COMMITMENT: Continue collaborating with First Transit Inc (Cruiser and on-demand service) and Wade Tours and Hale Transportation (charter service) to emphasize low-carbon operations that reduce our environmental and carbon impacts.

Lead responsibility: Director of Purchasing and Director of Sustainability.

The Colgate Cruiser was responsible for approximately 110 tons emissions in Fiscal Year 2015 or 0.8 percent of Colgate's total emissions. While its emissions are minimal, its cost to the university is substantial, so, independent of the Climate Action Plan, the university will want to ensure that the Cruiser is operating in the most efficient way possible. Opportunities to improve sustainability while reducing carbon emissions include:

- switching fuel from diesel to biodiesel, propane, or compressed natural gas (CNG);
- implementing and enforcement of a no idling policy;
- creating efficient routes that maximize occupancy;
- creating maintenance schedules that prioritize fuel efficiency through routine tune-ups, optimal tire pressure, and well-cared-for equipment overall;
- accurately tracking of fuel use, miles, emissions (especially greenhouse gas emissions) and how and when they share that data with Colgate; and
- creating an overall institutional commitment to sustainability principles, values, and practices.

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COMMITMENT: Implement an air travel carbon footprint report card by division in order to raise awareness by September 1, 2017.

Lead responsibility: Director of Sustainability and Sustainability Council.

In 2009, Air travel was responsible for 4,647 MTeCO₂ emissions, nearly 27 percent of Colgate's total emissions. Fast forward to 2015 and air travel accounted for 4,297 MTeCO₂ emissions and that includes a significant reduction in carbon intensity per air mile traveled¹ - a reduction in overall emissions but now over 30 percent of Colgate's total greenhouse gas emissions.

Clearly, air travel plays a vital role in Colgate's educational mission and many university functions, a role that is arguably exacerbated by Colgate's rural location and our commitment to other institutional priorities. Faculty travel by air to support research and conference participation, for example, and professional staff throughout the university require air travel to pursue their work. Colgate's commitment to robust off-campus study opportunities, as well as to Division I athletics, also underscores the centrality of air travel to the university's mission.

Even though there has been a significant reduction in greenhouse gas emissions per mile of air travel since 2009, air travel remains a carbon-intensive form of transportation. Therefore, any reduction of the carbon emissions associated with Colgate's business-related air travel will need to stem from a reduction in air miles traveled. The vast majority of Colgate's air travel emissions will eventually have to be offset in order to achieve the overall goal of carbon neutrality by 2019.

Our commitment here is to explore ways of raising awareness for faculty, staff, students and departments about the actual cost to offset components of the carbon footprint for which they have direct influence. For example, in 2015 we implemented Concur and partnered with Christopherson Business Travel. As a result of these new processes, every employee receives information that includes greenhouse gas emissions in addition to cost when choosing itineraries. Additionally, we may extract data from the Concur system and automate sending a summary of the carbon footprint for travel (airline and mileage) to each department. While a carbon footprint report card may not directly result in fewer miles traveled, it is a first step in linking air travel decisions with our campus carbon footprint and carbon neutrality goal. We anticipate reports like these might serve as motivation to set the stage for charging back departments for the expenses related to offsetting their footprints.

COMMITMENT: Complete user-friendly guidelines for business ground travel that include best practices for reducing costs and environmental impacts by September 1, 2017.

Lead responsibility: Director of Purchasing and Director of Sustainability.

Employee business ground travel was responsible for nearly 600 tons of emissions in Fiscal Year 2015 or 4 percent of Colgate's total emissions. This includes emissions from car travel to conferences, workshops, teaching and research, recruiting, networking, general meetings and other work-related priorities. Employees have the

¹ Greenhouse gas emissions per air mile traveled was 0.00078 in 2009 compared to 0.00048 per mile in 2015.

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option of using personal cars, rental cars, Zipcars, taxis, and Colgate-owned passenger vehicles in our fleet. Developing guidelines and preferred practices that encourage employees to use the most sustainable options could help to raise awareness and reduce emissions.

COMMITMENT: Complete an employee commuter plan that advances sustainable transportation options for Colgate commuters by September 1, 2017.

Lead responsibility: Director of Sustainability and Sustainability Council.

Employee commuting is responsible for over 800 MTeCO₂ or over 5 percent of Colgate's annual greenhouse gas emissions. Opportunities and incentive programs to support alternative commuting include:

- implementing preferred parking for low-emission or electric vehicles;
- installing additional charging stations in prime locations for electric vehicles;
- supporting carpooling through reserved parking and offering emergency rides home;
- creating discounts or helping to arrange for overnight stays for those with long commutes;
- creating incentives or other programs to encourage the purchase of efficient vehicles;
- increasing racks and covered storage for bike commuters; and
- introducing an annual competition that tracks and encourages alternative forms of commuting besides single occupancy vehicle travel.

Waste Reduction and Recycling

Since 2009, Colgate has reduced the amount of landfill waste by 64 tons, an 8 percent reduction, resulting in about \$4,600 in avoided annual spending. This is the result of an improved recycling program, pre-consumer composting in Frank Dining Hall, reduced packaging from our suppliers, implementing a robust electronic waste recycling program, the upgrade of [Colgate's Surplus and Salvage program](#) for reusing items, and overall less consumption due to increased awareness. While we are proud of this progress, we fell significantly short of our goal to reduce landfill waste by 300 tons by 2015 from our 2009 baseline.

Regarding greenhouse gas emissions, Colgate has benefited significantly as a result of Madison County implementing a combined heat and power methane capture facility. As a result, Colgate's emissions have decreased from 2,519 MTeCO₂ in 2009 to -22 MTeCO₂ in 2015. Compare emission factors over time per ton of landfill waste generated:

- Fiscal Year 2009: no methane recovery: emissions factor = 1.0842857 MTeCO₂/short ton
- Fiscal Year 2010: methane recovery and electric generation: emissions factor = 0.160634921 MTeCO₂/short ton

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- Fiscal Year 2015: methane recovery with combined heat and power generation: emissions factor = -0.03 MTeCO₂/short ton

A number of initiatives and programs can be implemented to reduce the overall amount of waste Colgate sends to the landfill. Focusing on source reduction, preventing unnecessary materials and packaging from entering the university in the first place, offers the first important strategy in reducing Colgate's landfill waste. Purchasing decisions, new policies, and working with major suppliers and contractors are all important initiatives. Source reduction strategies reduce the amount of packaging and materials before they enter the campus waste stream. Focusing on source reduction is important because it reduces labor and time (through handling, storage, and separation) and reduces lifecycle greenhouse gas emissions through less waste entering, and therefore, leaving the university.

Once items, materials, and packaging make it to campus, options exist to divert them from the landfill once they are deemed no longer useful by the Colgate community. This includes reusing or donating items and materials such as office supplies, electronic equipment, furniture, and items. Strategies that focus on reuse keep items out of the landfill through salvage programs, donations, and giveaway options. "One person's trash is another's treasure" captures the essence of focusing on reuse as a strategy. As mentioned above, all employees should take advantage of Colgate's Surplus and Salvage program.

Items that reach the end of their useful life may be recyclable and made into new products. Recycling strategies keep items out of the landfill through better recycling infrastructure, increased recycling rates, and changing social norms.

Paper use and behavior change are also important areas where mitigation is possible. In Fiscal Year 2009, Colgate consumed over 12.8 million sheets of paper which is equivalent to over 130,000 lbs. or 65 tons. This contributed to over 278,000 lbs. or 139 tons of greenhouse gas emissions. In 2015, Colgate reduced its campus-wide paper consumption by nearly 8 million sheets of paper or by 62 percent. This resulted in nearly \$120,000 of avoided annual spending and a reduction of 17 tons of greenhouse gas emissions. Consuming less paper, recycling more of it, and purchasing recycled or tree-free paper are all strategies that have reduced emissions. Additionally, there are many opportunities to reduce landfill waste due to behavior change or changes in social norms on campus. Colgate's Green Raider and Green Office Programs have made an impact on landfill waste generation on campus.

Looking forward, Colgate needs to continue to improve and grow these programs so less waste is generated and more is diverted from the landfill. Opportunities such as replacing one-time use disposable containers with reusable options are necessary for reducing landfill waste on campus. And, finally, composting organic matter (yard waste and food scraps) can result in huge reductions in our landfill waste stream. Perhaps the single most important strategy Colgate could implement to reduce landfill waste would be to expand our existing composting program. By weight, food scraps make up a significant portion of our landfill waste.

COMMITMENT: Reduce landfill waste by an additional 100 tons from about 750 tons in 2015 to 650 tons in 2019 with an aspirational goal of becoming a zero-waste campus by 2025.

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Lead responsibility: Associate Vice President for Facilities, Director of Operations and Maintenance, and Director of Sustainability.

Water Conservation and Protection

Since 2011 and the implementation of our Sustainability and Climate Action Plan, Colgate has reduced the amount of water use on campus by 15.3 million gallons, a 20 percent reduction, resulting in over \$150,000 in avoided annual spending. This is the result of widespread water conservation and efficiency measures highlighted by the installation of over 500 low-flow showerheads along with water-saving toilets and faucets, the switch to trayless dining in Frank Dining Hall, and the upgrade of our animal tanks in biology labs.

As a result of these and other programs, we more than doubled our 2015 goal of reducing water consumption by 6 million gallons.

Building on our past successes, Colgate needs to continue to expand and grow these water conservation programs. Reducing irrigation on our athletic fields and golf course presents a good opportunity. Raising awareness and supporting our Green Raider and Green Office Programs can go a long way in further reducing water consumption at Colgate. Perhaps the most aspirational project(s) the university could implement would be to utilize water reclamation and biofiltration technologies to recycle greywater for non-potable uses on campus.

COMMITMENT: Reduce water consumption by an additional 10 million gallons from about 60 million gallons in 2015 to about 50 million gallons by July 1, 2019.

Lead responsibility: Associate Vice President for Facilities and Director of Sustainability.

Ecosystems and Land Stewardship

Colgate owns approximately 1,780 acres of land of which 515 acres include the built environment, 876 acres are protected forest, and 389 acres are leased to local farmers. The built environment includes Taylor Lake, the Seven Oaks Golf Course, and over 2,200 inventoried trees. The Chenango Valley provides a scenic backdrop for Colgate's beautiful campus and historic stone buildings. According to the 2010, 2014, and 2015 editions of the Princeton Review, Colgate was ranked #1 for having the most beautiful campus in the country.

Colgate University recognizes the importance of well-managed forests (both locally and globally) in providing critical wildlife habitat, essential ecosystem services, and in addressing global climate change. As such, we manage our forests with great care and stewardship. In 2014, Colgate's 1,059 acres of forested land received American Tree Farm System certification, verifying our high-level commitment to environmental stewardship and responsible forest management. As a result of our forest stewardship and carbon sequestration work on campus, Colgate has emerged as a national leader in this field.

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COMMITMENT: Complete a comprehensive update of Colgate's Forest and Open Lands Stewardship Plan that was published in 2007 by July 1, 2018.

Lead responsibility: Campus forester and Director of Sustainability.

Colgate's Forest and Open Lands Stewardship Plan emphasizes long-term sustainable forestry management that:

- enhances our academic mission through research and teaching;
- provides aesthetic value and ongoing recreational opportunities;
- provides revenue through timber and biomass energy production;
- provides essential ecosystem services such as clean air, water, and healthy soils; and
- protects the diversity and health of the plants and animals that inhabit our forested lands.

COMMITMENT: Complete a full re-measurement of all sample plots identified in our 2013 Forest Carbon Inventory & Projections report by July 1, 2018.

Lead responsibility: Campus forester and Director of Sustainability.

In 2013, Colgate completed our Forest Carbon Inventory & Projections report. Existing forests have not been given serious consideration in addressing carbon neutrality goals on college and university campuses. At Colgate University, we recognize that carbon storage and annual sequestration is among the many assets provided by Colgate's forested lands. Through research and field measurements, we determined that our 1,059 acres of forests contain 165,491 tons of stored carbon while sequestering an additional 1,578 tons of carbon annually. The goal of re-measurement is to determine actual rates of annual sequestration in the permanent sample plots established in 2013.

Food and Dining

The Colgate University community recognizes the significant environmental, health, labor, animal welfare, and climate change implications of how food is produced and consumed. As a result, our university is committed to sourcing our food in a more sustainable way.

In recent years, Colgate has made considerable strides to advance sustainability in dining services, and the effort is ongoing. During the summer of 2010, a student-led effort resulted in the establishment of a 0.5-acre organic community garden on campus and a switch to trayless dining. At the same time, there was increased demand from students and faculty for more transparency and information regarding our food procurement practices and to provide increased accessibility to local, healthy, and sustainable food options. As the "real food" movement continued to grow on college campuses across the country and especially at Colgate, the university's President charged a Sustainable Food Systems Working Group in August 2013 to coordinate this effort.

Colgate University

After extensive interviews and research, the group made a set of recommendations to the senior administration in February 2014. Specific recommendations included:

1. Form an ongoing Advisory Group to monitor long-term progress and provide cross-departmental support in advancing sustainability in dining services.
2. Hire a full-time manager of sustainability in dining services to evaluate, monitor, and advance sustainability in dining services.
3. Provide a complete assessment of Colgate's local, community-based, and third-party certified food purchases and propose an institutional goal for purchasing of sustainable foods.
4. Make sustainability an emphasis of dining services contract renegotiations in 2015, especially as it relates to direct, local procurement from farmers and producers.

The Working Group's proposal was well received. After the report was finalized the Advisory Group was formed, a manager of sustainability in dining services was hired, Colgate contracted with a new dining services provider (Chartwells) to help us fulfill our sustainability goals, and we began the process of benchmarking and tracking our food procurement practices.

Importantly, the working group also developed a set of criteria for defining sustainable food largely based on guidelines developed by the Associate for the Advancement of Sustainability in Higher Education's Sustainability Tracking Assessment and Rating System (AASHE STARS) version 2.0. As a result, Colgate's definition of sustainable food includes three key components: 1) local, 2) community-based, and 3) third-party certified foods.

1) Local (a two-tiered definition). Tier 1 includes any food purchased within a 250-mile radius of Colgate University, and Tier 2 includes any food purchased within Madison County or any of the six counties that border Madison County (i.e., Oneida, Otsego, Chenango, Cortland, Onondaga, and Oswego). Our Tier 1 metric is consistent with AASHE STARS 2.0 reporting, but our institutional consensus is that Tier 2 would have a more direct benefit to local farmers, our regional economy, and overall public relations.

2) Community-based. In order to demonstrate Colgate's support of small- and medium-sized locally-owned family farms, the Working Group supports purchasing food from community-based farmers. Enterprises may be considered community-based if they are cooperatively or independently-owned and the majority owner(s) are community members with full autonomy and local decision-making authority with respect to business practices.

Community-based enterprises may include small and medium-sized businesses; family farms, ranches and fisheries; artisan shops; agricultural cooperatives; worker and consumer cooperatives; employee-owned companies; other enterprises that meet the above criteria.

3) Third-party Certified. Recognizing how food is produced is as important (if not more important) as where it is produced. For this reason, Colgate also supports purchasing food from environmentally and socially responsible farmers. In most cases we cannot audit the farms we purchase our food from. As a result, we will depend on a select group of reputable and quality third-party certifiers to help ensure we are purchasing sustainable food products. It will be the responsibility of the Advisory Group to ensure that our list of third-party certifiers is up-to-date and comprised of reputable organizations.

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Colgate's key metric for tracking sustainable food is U.S. dollars spent purchasing local, community-based, and/or third-party certified food as a percentage of our overall food purchases. This metric is consistent with AASHE STARS 2.0 and many other institutions that are advancing local and sustainable food procurement on campus.

COMMITMENT: Complete a full assessment of our local, community-based, and third-party certified food purchases by July 1, 2017 and establish an institutional goal for increasing the purchase of sustainable foods on campus.

Lead responsibility: Manager of Sustainability in Dining Services and Sustainable Food Systems Advisory Group.

COMMITMENT: Complete an initial sustainability audit of dining services that includes waste production as well as water and energy consumption by September 1, 2017.

Lead responsibility: Manager of Sustainability in Dining Services and Sustainable Food Systems Advisory Group.

COMMITMENT: Complete an action plan for advancing overall sustainability in dining operations that emphasizes sustainable food procurement and waste, water, and energy reduction by September 1, 2017.

Lead responsibility: Manager of Sustainability in Dining Services and Sustainable Food Systems Advisory Group.

FINANCING

Achieving carbon neutrality by 2019 requires a significant investment. Colgate needs to find creative and innovative solutions to finance initiatives that will reduce energy, resource consumption and operating costs over time while also lowering our campus carbon footprint. This section focuses on strategies that advance the likelihood of success in funding these initiatives and ensure future investments are guided by sustainable best practices and with consideration of life cycle costing analyses.

COMMITMENT: Fund and Implement a Green Revolving Loan Fund (GRLF) by September 1, 2017.

Lead responsibility: Director of Sustainability, Associate Vice President for Facilities, and Associate Provost.

While sustainability has practical value, good projects are often left on the sidelines because of annual operating pressures and high implementation costs. These barriers can halt momentum and stall an emerging sustainability program, such as the one at Colgate. A green revolving loan fund is an internal fund earmarked for energy efficiency, renewable energy, and other sustainability projects that generate cost-savings over time while reducing carbon and ecological footprints. Savings are tracked and reinvested into the fund to finance the next round of green investments. There are many recent projects that would have fit nicely within the model of a Green Innovation and Revolving Loan Fund.

The concept of a green revolving loan fund is not new. Over the past twenty years, there have been a growing number of these funds popping up at colleges and universities throughout the country. AASHE's Campus Sustainability Revolving Loans Fund database contains information on 85 revolving loan funds at 81 institutions containing over \$118 million. The Billion Dollar Green Challenge (The Challenge) encourages colleges, universities, and other nonprofit institutions to invest a combined total of one billion dollars in self-managed revolving funds that finance energy efficiency improvements. The number of participants of the Billion Dollar Green Challenge continues to grow.

The Colgate University Green Revolving Loan Fund includes the fund's mission, goals, oversight and administration, and operating procedures.

Our goal is to have a \$1.2 million fund within seven years. Colgate will fund its GRLF through three sources. First, with the approval of Colgate's initial Sustainability and Climate Action Plan (S-CAP), the university set aside a reserve to fund S-CAP projects. The current balance of this reserve is \$200,000 and will provide initial seed funding. Second, the university is undergoing feasibility studies for a number of projects that will result in reductions in our carbon footprint as well as cost savings (e.g. recommissioning Ho Science Center, mechanical systems upgrade for Wynn Hall and Olin Hall). These projects will eventually be funded through our capital projects reserves. We will select projects totaling \$1 million with a return on investment (ROI) of seven years or less and reinvest the resultant cost savings into the GRLF. Third, donors who express interest in support of Colgate's sustainability and carbon neutrality goals will be encouraged to invest in the GRLF.

COMMITMENT: Investigate and utilize Energy Performance Contracting (EPC) where appropriate beginning on July 1, 2017.

Lead responsibility: Director of Sustainability and Associate Vice President for Facilities.

Energy Performance Contracting (EPC) is a program in which energy and operational savings over a specified time period are used to fund infrastructure improvements, usually through a financial arrangement provided by a third-party financial institution. The projects are designed so that the annual energy and operational savings are greater than or equal to the required payments over the term of the contract, leaving a net neutral impact on a customer's budget, and are often accompanied by guarantees that the savings produced by a project will be sufficient to finance the full cost of the project.

Up to the present, EPC has not been seen as an attractive option for Colgate for two main reasons:

- Under EPC, the benefits from energy improvement measures accrue largely or completely to a third party, at least for a given time period
- Low electricity rates in the village of Hamilton have made it a challenge for providers of EPC agreements to realize returns from many typical projects.

However, after our carbon neutrality commitment date of 2019, Colgate will be required to purchase carbon offsets (see section 5) for any emissions still being generated. Under these conditions, even if an EPC agreement in itself is revenue neutral for Colgate, it would be a savings due to avoided offset purchases.

Although in the near future, the low electricity rates will continue to make it challenging to realize benefits of energy efficiency projects in a reasonable time frame, Colgate should continue to pursue performance contracting as a possible mechanism to implement projects as it approaches the carbon neutrality date of 2019.

COMMITMENT: Investigate Federal, State and Local Funding Opportunities on an ongoing basis. Develop suite of shovel-ready projects by July 1, 2018.

Lead responsibility: Director of Sustainability, Associate Vice President for Facilities, and Associate Director, Corporate, Foundation & Government Relations.

Funding for sustainability initiatives is available at the federal, state and local levels through grants, rebates and incentives. Colgate has already received rebates for lighting upgrades in Sanford Field House and Huntington Gym as well as the installation of the solar thermal array at 100 Broad Street. Going forward, it is important to continue to seek such opportunity.

Federal and state grant funding for sustainability initiatives at institutions such as Colgate is difficult to find. Grant programs are often targeted for energy producers or for municipalities. In addition, we have found that the turnaround time between the funding announcement and the deadline for proposal submission is usually relatively short. We would like to anticipate the types of funding that might become available and having a suite of "shovel-

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ready” projects for which we have already conducted feasibility studies, finalized scope, and estimated costs. Examples include upgrading our wood chip boilers, conversion of the vehicle fleet to natural gas, expansion of solar thermal, and implementation of geothermal energy.

The New York State Energy Research and Development Authority (NYSERDA) is the primary state agency providing grant funding for energy efficiency projects. Unfortunately, Colgate is currently not eligible for most NYSERDA funding because we are a customer of a municipal utility and do not pay the System Benefits Charge (SBC). However, NYSERDA is in the midst some changes under the Clean Energy Fund program and paying the SBC may no longer be an eligibility requirement for some NYSERDA programs.

There are some sustainability projects in which it would make sense to partner with the Village of Hamilton. For example, NYSERDA’s Cleaner Greener Communities Program encourages communities to create public-private partnerships and develop regional sustainable growth strategies in such areas as emissions control, energy efficiency, renewable energy, low-carbon transportation, and other carbon reductions. Federal Environmental Protection Agency (EPA) programs are often targeted for municipalities and might provide opportunities for a partnership. Colgate will continue to explore carbon reductions where it makes sense to partner with the village.

CLIMATE READY: RESILIENCE AND ADAPTATION

The impacts of climate change are already hitting Central New York and will become more severe in the years ahead. Annual average temperatures in New York State have risen about 2.4°F since 1970, with winter warming exceeding 4.4°F. That makes New York State the 8th-fastest warming state in the country. Aside from rising temperatures, New York State and Central New York, in particular, are experiencing summer droughts punctuated by heavy rain events, heat waves, extreme weather events, and significant shifts in natural seasonal cycles. Our changing climate will impact life in Central New York and campus operations. These include but are not limited to:

- Agriculture
- Budgets and financing
- Buildings and infrastructure
- Disease and human health
- Energy and water resources
- Forest ecosystems, biodiversity, and landscaping
- Local economy

Assessing these impacts and preparing for inevitable change will not only buffer the degree to which Colgate is impacted but also create new opportunities such as strengthening town-gown relations, building resiliency, and reducing energy costs.

COMMITMENT: Complete an initial vulnerability assessment by September 1, 2018.

Lead responsibility: Director of Sustainability.

Building resilience starts with assessing Colgate's exposure and sensitivity to imminent climate change. Evaluating the degree to which our natural, social, and economic systems will be impacted and understanding our vulnerability to these changes is an essential first step in evaluating our climate preparedness and overall risk.

COMMITMENT: Complete an initial adaptation plan by September 1, 2019.

Lead responsibility: Director of Sustainability.

Once we complete our vulnerability assessment and have a better understanding of local risks associated with climate change, it is time to complete an adaptation plan. The adaptation plan should include specific actions that will help build adaptive capacity. Communities and institutions with high adaptive capacity minimize risk and are better prepared to deal with climate change impacts.

OFFSETS

COMMITMENT: Develop a plan to implement and finance offsets that result in carbon neutrality by 2019.

Lead responsibility: Sustainability Council.

Carbon offsets are investments in off-campus projects that reduce, remove, or avoid greenhouse gas (MTeCO₂) emissions. Offsets serve as a counterbalance to emissions from on campus activities. Carbon offset projects come in many forms but generally fall into two broad categories: 1) projects that reduce or avoid emissions, such as the installation of a wind park to replace a coal-fired energy plant, and 2) projects that sequester or remove greenhouse gases from the atmosphere, such as planting trees that absorb atmospheric carbon as they grow.

While implementing on-campus projects that reduce Colgate's gross emissions is Colgate's top priority, the university must invest in carbon offsets to achieve carbon neutrality by 2019. Significant sources of emissions such as air travel, commuting, ground transportation, and some forms of energy use are currently impossible to eliminate without extraordinary cost or disruption to our academic mission. Since it will be impossible to mitigate all of Colgate's on-campus emissions by 2019, purchasing offsets to achieve carbon neutrality demonstrates that the university accepts responsibility for our operational impact on global climate change. Investing in offsets could also spur innovation and mitigation efforts by creating a financial incentive to reduce emissions that would obviate the need to purchase future offsets on an annual and ongoing basis. By achieving carbon neutrality in 2019, Colgate acknowledges the harm done by its own operations and takes accountability for that harm by 1) reducing emissions on campus and by 2) reducing emissions elsewhere, that is, through investing in high-quality carbon offsets.

Carbon offsets are a legitimate and cost-effective strategy to achieve carbon neutrality in the short-term since it does not matter where on earth greenhouse gas emissions are generated or offset. Once in the atmosphere, carbon can quickly travel around earth's atmosphere and remain for decades or longer, creating climate impacts far away from the source of emissions. In other words, reducing as much carbon as possible for each dollar spent makes rational sense in terms of global climate change. Therefore, investing in a legitimate carbon offset program can be an effective way for Colgate to mitigate climate change while at the same time taking financial responsibility for our remaining emissions and climate impacts.

The voluntary offset market is mature with generally agreed-upon standards. Colgate can be confident that if we invest in offsets that are certified by one of several well-known institutions (e.g., Verified Carbon Standard, Green-e Climate), the offsets represent real reductions in global net emissions that would not have occurred without Colgate's financing. The process of validating offset projects can be time consuming and complicated, suggesting that purchasing offsets may be more cost-effective than if Colgate initiated its own emission reduction or sequestration projects, notwithstanding possible academic and local community benefits. Nevertheless, a compelling argument can also be made that we should explore local offset opportunities as well. While local offsets will likely be more expensive and more difficult to certify, this situation may change during the coming years, and as an academic institution and significant economic actor in the Central New York region it is incumbent on Colgate to remain vigilant in exploring potential local offset opportunities.

In Fiscal Year 2012, Colgate entered into an agreement with Patagonia Sur for the purchase of 5,000 tons of forestry-based offsets per year for 15 years. The reforestation project is in The Patagonia Sur Nature Reserve in the Palena province of southern Chile in Valle California. Over the course of the 15 years, approximately 225,000 native trees will be planted on roughly 428 acres of land that is the Colgate University Forest. The Patagonia Sur reforestation project received Verified Carbon Standard (VCS) certification. Importantly, the agreement has created academic and research opportunities for students and faculty within the Colgate Forest and The Patagonia Sur Nature Reserve in general.

Besides our investment in Patagonia Sur offsets, Colgate will need to invest in additional offsets to achieve carbon neutrality in 2019. At the time of this writing, Colgate’s Office of Sustainability is working with Second Nature and other leading institutions to update the offset protocol and guidelines for higher education. As this work unfolds, there will be increased opportunities and guidance for Colgate to invest in cost-effective, high-quality, and academically beneficial carbon offset projects. For now, based on future emissions projections as well as current offset protocols and costs, we estimate that Colgate will need to spend approximately \$144,000 per year in offsets to achieve carbon neutrality (Table 6).

Table 6. Total annual estimated costs in carbon offsets and renewable energy certificates (RECs) to achieve carbon neutrality in 2019.

Offsets	MTeCO2 Mitigated	Estimated Annual Cost
Patagonia Sur (Reforestation Project)	5,000	\$50,000
Offsets (Voluntary Market)	6,152	\$86,128
Renewable Energy Certificates (RECs)	2,000	\$8,500
FY 2019 Total Projected Cost	13,152	\$144,628

COMMITMENT: Form a Carbon Offset Working Group to evaluate and recommend offset options by July 1, 2018.

Lead responsibility: Sustainability Council.

As always, it is important for Colgate to remain vigilant for new opportunities in offset programs. In the meantime, we recommend that in Academic Year 2016-17, the Sustainability Council form a Carbon Offset Working Group to formally evaluate and recommend offset options for the university. The working group should:

- Evaluate renewable energy certificates (RECs) or green tags. RECs are specifically designed to mitigate Scope 2 emissions from electricity generation and consumption. RECs are characterized by the creation of renewable electricity whereby clean energy production displaces or reduces demand for more traditional carbon-intensive forms of energy. More specifically, RECs represent the environmental benefits (or attributes)

received by the displacement of conventional fuel use, such as coal, oil, or gas. One REC is representative of one megawatt-hour (MWH) of electricity (1,000 kilowatt-hours) and allows the purchaser to support renewable energy production even though they themselves may not use the renewable energy. Purchasing third-party certified RECs (such as Green-e) can be a cost-effective way for Colgate to mitigate its emissions associated with electricity consumption and presents a promising opportunity for Colgate to support renewable electricity generation while achieving carbon neutrality by 2019.

- Place a high value on academic and research opportunities that go hand-in-hand with an offset program.
- Consider community-based and/or local investment options.
- Invest in high-quality offsets that are either third-party certified or have direct and measurable carbon and community benefits.
- Evaluate all options for socially responsible, community-based, economic, and environmental co-benefits.
- Make appropriate budgetary recommendations for Fiscal Year 2019. Colgate will need to budget for offsets by October 2018.

To achieve carbon neutrality in 2019, Colgate will need to complete our inventory of emissions in the fall of 2019 and purchase offsets no later than December 31, 2019.

CAMPUS PARTICIPATION AND REPORTING

As emphasized throughout this document, Colgate is working hard to transition from an emergent program to an integrated one. Accomplishing this will require commitment and participation from diverse stakeholders across the university. Because sustainability at Colgate is a true campus-wide initiative, we will only be successful if our community is engaged and invested in our overarching shared goals, this includes senior leadership as well as all members of our community.

For these reasons, the Bicentennial Plan for a Sustainable and Carbon Neutral Campus is more of a beginning than an end. As we work to accomplish each commitment and objective, we must remain open to new ideas and opportunities so that everyone has a voice as we strive to advance sustainability and achieve carbon neutrality by 2019.

COMMITMENT: By December 31 of each year, Colgate will formally update the faculty, students, and staff on our progress through presentations at staff and faculty meetings, our annual greenhouse gas inventory, and an annual sustainability report. During these engagements, sustainability leaders will prioritize feedback and create vehicles for continued input.

2017-2021 SUMMARIZED CAMPUS COMMITMENTS

- Campus Engagement
 - Better integrate sustainability within first-year orientation to emphasize its importance from a student's first day on campus beginning in the **Fall of 2017**.
 - Institute optional graduation pledge for Class of 2018 by December 31, 2017.
 - Link student academic experience to on-campus operational practices beginning by September 1, 2017.
 - Develop a Sustainability Passport Program that allows staff to succeed at fulfilling the sustainability behavioral competency that is a part of every job description by September 1, 2017.
 - Leverage connections with alumni engaged in sustainability by organizing at least one annual alumni event that focuses on sustainability and climate issues by September 1, 2017.
 - Develop and implement a Sustainable Purchasing Policy by September 1, 2017.
- Curriculum and Learning
 - Identify and encourage courses on sustainability and climate change in the curriculum by September 1, 2017.
 - Increase faculty awareness of teaching to sustainability by September 1, 2017.
 - Enhance co-curricular education/experiential learning that foregrounds sustainability by May 30, 2017.
- Campus Operations
 - Buildings and Energy
 - Integrate Colgate's Green Building Standards into the university's Construction and Design Standards and put them into practice by July 1, 2017.
 - Complete Energy Master Plan by July 1, 2018.
 - Expand natural gas along Broad Street and other campus buildings to replace fuel oil #2 by July 1, 2018.
 - Transportation
 - Colgate will replace its current vehicle fleet with zero-emission or low-emission vehicles on a rolling basis.
 - Continue collaborating with First Transit Inc (Cruiser and on-demand service) and Wade Tours and Hale Transportation (charter service) to emphasize low-carbon operations that reduce our environmental and carbon impacts.
 - Implement an air travel carbon footprint report card by division in order to raise awareness by September 1, 2017.
 - Complete user-friendly guidelines for business ground travel that include best practices for reducing costs and environmental impacts by September 1, 2017.
 - Complete an employee commuter plan that advances sustainable transportation options for Colgate commuters by September 1, 2017.
 - Waste Reduction and Recycling
 - Reduce landfill waste by an additional 100 tons from about 750 tons in 2015 to 650 tons in 2019 with an aspirational goal of becoming a zero-waste campus by 2025.
 - Water Conservation and Protection

-
- Reduce water consumption by an additional 10 million gallons from about 60 million gallons in 2015 to about 50 million gallons by July 1, 2019.
 - Ecosystem and Land Stewardship
 - Complete a comprehensive update of Colgate's Forest and Open Lands Stewardship Plan that was published in 2007 by July 1, 2018.
 - Complete a full re-measurement of all sample plots identified in our 2013 Forest Carbon Inventory & Projections report by July 1, 2018.
 - Food and Dining
 - Complete a full assessment of our local, community-based, and third-party certified food purchases by July 1, 2017 and establish an institutional goal for increasing the purchase of sustainable foods on campus.
 - Complete an initial sustainability audit of dining services that includes waste production as well as water and energy consumption by September 1, 2017.
 - Complete an action plan for advancing overall sustainability in dining operations that emphasizes sustainable food procurement and waste, water, and energy reduction by September 1, 2017.
 - Financing
 - Fund and Implement a Green Revolving Loan Fund (GRLF) by September 1, 2017
 - Investigate and utilize Energy Performance Contracting (EPC) where appropriate beginning on July 1, 2017.
 - Investigate Federal, State and Local Funding Opportunities on an ongoing basis. Develop a suite of shovel-ready projects by July 1, 2018.
 - Climate Resiliency and Adaptation
 - Complete an initial vulnerability assessment by September 1, 2018.
 - Complete an initial adaptation plan by September 1, 2019.
 - Offsets
 - Develop a plan to implement and finance offsets that result in carbon neutrality by 2019.
 - Form a Carbon Offset Working Group to evaluate and recommend offset options by July 1, 2018.
 - Campus Partnership and Reporting
 - By December 31 of each year, Colgate will formally update the faculty, students, and staff on our progress through presentations at staff and faculty meetings, our annual greenhouse gas inventory, and an annual sustainability report. During these engagements, sustainability leaders will prioritize feedback and create vehicles for continued input.

APPENDIX 1: 2015 WHITE HOUSE LETTER

Colgate University

Colgate University White House Climate Pledge

PLEDGE:

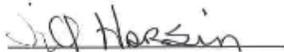
As institutions of higher education, we applaud the progress already made to promote clean energy and climate action as we seek a comprehensive, ambitious agreement at the upcoming United Nations Climate Negotiations in Paris. Although we are optimistic that world leaders will reach an agreement to secure a transition to a low-carbon future, we recognize the urgent need to act now to avoid irreversible costs to our global community's economic prosperity and public health. Today our school pledges to accelerate the transition to low-carbon energy while enhancing sustainable and resilient practices across our campuses.

We put forth our pledges as follows:

COLGATE UNIVERSITY

As a signatory in one of Second Nature's three Climate Leadership Commitments, Colgate University is part of a robust network of over 600 college and university presidents and chancellors who have committed their institutions to take bold and catalytic climate actions. These Climate Leadership Commitments are a key driving force for transformative change on our campus. As part of our Commitment we will:

- Achieve carbon neutrality by 2019, our bicentennial
- Make carbon neutrality and sustainability a part of the curriculum and other educational experiences for all students
- Incorporate sustainable practices in all campus planning and building design from inception to implementation.
- Achieve a minimum of LEED Silver standards for all new construction and major renovations
- Enhance teaching and learning, create long-term economic resiliency, build and restore robust ecological systems, and support a healthier and more just society.



Signature

Interim President, Colgate University

Title, School

November 13, 2015

Date

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