

# CLIMATE ACTION PLAN

## Central Connecticut State University



SEPTEMBER 2009

# TABLE OF CONTENTS

| SECTION   | PAGE NO.    |
|---|-------------|
| <b>Executive Summary.....</b>   | <b>ES-1</b> |
| I        Background .....   | ES-1        |
| II       Steps Included in Developing the Climate Action Plan.....                                  | ES-1        |
| III      Mitigation Strategies and Education, Research, and Community Outreach .....                | ES-2        |
| <b>1. INTRODUCTION.....</b>   | <b>1-1</b>  |
| 1.1      Sustainability At Central Connecticut State University .....                               | 1-1         |
| 1.2      Climate Change Commitments.....  | 1-3         |
| 1.2.1    Conference of New England Governors and Eastern Canadian Premiers Climate Action Plan..... | 1-3         |
| 1.2.2    State of Connecticut Renewable Portfolio Standards.....                                    | 1-3         |
| 1.2.3    Renewable Energy Credits (RECs) .....  | 1-4         |
| 1.2.4    American College & University Presidents' Climate Commitment.....                          | 1-4         |
| 1.3      Development of Climate Action Plan .....   | 1-4         |
| 1.4      Implementation of Climate Action Plan.....   | 1-5         |
| 1.4.1    Implementation Structure .....   | 1-5         |
| 1.4.2    Communication and Outreach.....  | 1-5         |
| 1.4.3    Ongoing Monitoring and Tracking Progress .....   | 1-5         |
| 1.4.4    Periodic Plan Review and Updating .....  | 1-6         |
| 1.4.5    Reporting and Recordkeeping.....   | 1-6         |
| 1.5      Structure of the Climate Action Plan.....  | 1-6         |
| <b>2. CAMPUS GREENHOUSE GAS EMISSIONS.....</b>  | <b>2-1</b>  |
| 2.1      FY 2008 and FY 2009 GHG Emissions Inventories .....  | 2-2         |
| 2.2      Business-As-Usual Emissions Trajectory.....  | 2-5         |
| 2.2.1    Campus Growth Projection: Student Population and Building Footprint.....                   | 2-5         |
| 2.2.2    GHG Emission Trends by Source: Time, Student Population, Custom Growth .....               | 2-6         |
| 2.2.3    Business-As-Usual Emission Projections .....   | 2-9         |
| <b>3. MITIGATION STRATEGIES.....</b>  | <b>3-1</b>  |
| 3.1      Goal for Climate Neutrality .....  | 3-1         |
| 3.2      Prioritization Of GHG Emission Reduction Projects .....                                    | 3-3         |
| 3.2.1    Funding of GHG Emission Reduction Projects.....  | 3-3         |
| 3.3      Mitigation Goals and Strategies.....   | 3-3         |
| 3.3.1    Phase 1 Strategy.....  | 3-3         |
| 3.3.1.1  Student Commuting.....   | 3-4         |
| 3.3.1.2  Stationary Sources .....   | 3-4         |
| 3.3.1.3  Purchased Electricity .....  | 3-5         |
| 3.3.1.4  Other Measures.....  | 3-7         |
| 3.3.2    Phase 2 Strategy.....  | 3-8         |
| 3.3.3    Phase 3 Strategy.....  | 3-9         |
| <b>4. EDUCATION, RESEARCH AND COMMUNITY OUTREACH.....</b>   | <b>4-1</b>  |
| 4.1      Education .....  | 4-1         |
| 4.2      Research .....   | 4-5         |

---

|           |                         |            |
|-----------|-------------------------|------------|
| 4.3       | Community Outreach..... | 4-5        |
| <b>5.</b> | <b>NEXT STEPS .....</b> | <b>5-1</b> |

## LIST OF TABLES

| <b>TABLE</b>   | <b>PAGE NO.</b> |
|--|-----------------|
| Table 1-1: Connecticut Renewable Portfolio Standards.....        | 1-4             |
| Table 2-1: Sources of GHG Emissions Included in Each Scope.....  | 2-2             |
| Table 2-2: FY 2008 and FY 2009 GHG Emissions by Source Data..... | 2-3             |
| Table 2-3: FY 2008 and FY 2009 GHG Emissions by Scope Data.....  | 2-4             |
| Table 2-4: GHG Emission Projection Method for Each Source.....   | 2-8             |
| Table 3-1: GHG Mitigation Phases and Interim Milestones .....    | 3-1             |
| Table 3-2: Additional Phase 1 Mitigation Measures.....           | 3-8             |
| Table 3-3: Phase 2 Mitigation Goals and Strategy.....            | 3-9             |
| Table 4-1: Planned Educational Activities at CCSU.....           | 4-2             |
| Table 4-2: Planned Community Outreach Activities at CCSU.....    | 4-6             |

## LIST OF FIGURES

| <b>FIGURE</b>  | <b>PAGE NO.</b> |
|--|-----------------|
| Figure 2-1: FY 2008 and FY 2009 Gross GHG Emissions by Source .....              | 2-3             |
| Figure 2-2: FY 2008 and FY 2009 Gross GHG Emissions by Scope.....                | 2-4             |
| Figure 2-3: FY 2008 and FY 2009 Gross and Net GHG Emissions .....                | 2-5             |
| Figure 2-4: Student Population and Building Footprint Projected to FY 2050 ..... | 2-6             |
| Figure 2-5: Contribution to FY 2009 GHG Emissions by Source .....                | 2-7             |
| Figure 2-6: GHG Emission Projection by Source from FY 2008 through 2050 .....    | 2-9             |
| Figure 3-1: GHG Mitigation Scenarios Over Time.....                              | 3-2             |
| Figure 5-1: Summary of Climate Action Goals and Mitigation Strategies.....       | 5-2             |

---

## ACKNOWLEDGEMENTS

There are several committees that have been active with the development and leadership associated with Central Connecticut State University's (CCSU's) Climate Action Plan (CAP). The committees, committee members, and others that participated in the development of this CAP are acknowledged below.

### **CLIMATE ACTION PLANNING COMMITTEE:**

Richard Bachoo, Chief Administrative Officer  
Tom Brodeur, C.P.M, Purchasing Manager  
Sal Cintorino, Assistant Chief Administrative Officer/Director of Facilities Management  
Domenic Forcella, Environmental Health & Safety Officer – Committee Chair  
Rob Gagne, Plant Facilities Engineer II  
Frank Scarlett, Facilities Contract Administrator

### **PRESIDENT'S ADVISORY COMMITTEE ON ENVIRONMENTAL SUSTAINABILITY:**

Abigail E. Adams (Anthropology Dept.)  
Dan Moran (Facilities Dept.) -retired

#### Members:

Tom Brodeur (Purchasing Dept.)  
Charles Button (Geography Dept.)  
Kim Chagnon (Budget)  
Gerald Cotter (Central Connecticut State University System)  
Donald DeGruttola (Sodexo-Dining Services)  
Alex Estrom (Student Government Associate) – past member (student rotating membership)  
Jane Higgins (Student Affairs) -retired  
Robert LeBaron (University Engineer)  
Clayton Penniman (Biology Dept.)

#### Staff:

Barbara DeMaio (Facilities Dept.) -retired  
Dom Forcella (Environmental Health and Safety Office)  
Rene Karas (Facilities Dept)  
Frank Scarlett (Facilities Dept)

### **GLOBAL ENVIRONMENTAL SUSTAINABILITY ACTION COALITION:**

#### Officers and Steering Committee Members:

Founder & Faculty Chair – Charles Button  
Honorary Chair – Dr. Jack Miller, CCSU President  
Alumni Chair – Lauren Payne  
Student Co-Chairs – John Gulliksen and Katie Lloyd

---

CCSU Faculty Steering Committee:

Leah Glaser

Abigail Adams

James Malley

Carol Jones

Paul Petterson

**REVIEWED AND ENDORCED BY THE OFFICE OF THE PRESIDENT:**

Dr. Jack Miller, President

**CCSU wants to acknowledge the consulting firm of Woodard & Curran, Inc for their guidance, experience, and support in the development of CCSU's CAP.**



September 16, 2009

Dear Colleagues:

Central Connecticut State University is deeply committed to environmental sustainability. We were one of the first universities to become a signatory to the American College & Universities Presidents Climate Commitment in August 2007.

One key component of our sustainability efforts is the Climate Action Plan (CAP), which serves to outline the University's approach to achieving climate neutrality. Following our CAP, we have been able to reduce greenhouse gas (GHG) emissions through the construction of a state-of-the-art Energy Center, purchase of renewable energy credits, investment in building retrofits, and engagement in campus-wide and community educational initiatives. To build upon these successes, and follow the CAP, we will develop and implement further mitigation strategies to achieve climate neutrality by 2050. We have established interim reduction goals to be achieved by 2015 (20% GHG reductions from 2008 levels) and 2025 (50% GHG reductions from 2008 levels).

I am grateful to the Climate Action Planning Committee and the President's Advisory Committee on Environmental Sustainability for their dedication and leadership in working to create a sustainable community of enduring value for the University and the state of Connecticut.

Sincerely,

A handwritten signature in black ink, appearing to read "Jack Miller".

Jack Miller  
President

mm

---

## EXECUTIVE SUMMARY

### I. Background

This Climate Action Plan (CAP) fulfills part of Central Connecticut State University's (CCSU) obligation as a signatory of the American College & University Presidents' Climate Commitment (ACUPCC). CCSU became a signatory in August 2007, which commits the University to work toward achieving climate neutrality. This CAP provides an inventory of CCSU's FY 2008 and FY 2009 greenhouse gas (GHG) emissions, business-as-usual (BAU) projections for future GHG emissions, CCSU's past successes that lay the foundation for reducing CCSU's carbon footprint, CCSU's climate neutrality goals and mitigation strategies to be implemented to achieve those goals, and plans for continued educational, research, and outreach activities to make environmental sustainability part of CCSU's core culture. The preparation of this first CAP document reaffirms CCSU's commitment to carbon neutrality and presents our plan to become climate neutral by 2050.

Prior to setting a long-term goal for achieving climate neutrality and interim goals to foster progress along the way, it is vital that an institution understand how GHG emissions are expected to increase or decrease in the future under "business-as usual" (BAU) conditions. Based on CCSU's GHG emissions inventory for FY 2009, the major sources of GHG emissions at CCSU include on-campus stationary sources (primarily natural gas and fuel oil used to generate steam, domestic hot water, comfort heating and emergency electrical generation) – (24.9% of total), purchased electricity (24.8% of total), and student commuting (31.3% of total). Combined, these sources represent 81% of CCSU's GHG emission in FY 2009. Projected out over time, CCSU's BAU trajectory for GHG emissions increases approximately 1% per year over FY 2008 levels. Therefore, CCSU's primary mitigation strategies are focused on these major GHG emissions sources.

### II. Steps Included in Developing the Climate Action Plan

In addition to its obligations under the ACUPCC, CCSU has demonstrated a long standing commitment to sustainability through focused actions associated with energy conservation, internal sustainability initiatives, and sustainability programs incorporated into both academic and departmental settings. Some of the CCSU's more significant accomplishments toward climate neutrality and environmental sustainability consist of the following:

- **CCSU Energy Center.** The CCSU Energy Center was completed in 2004 and was constructed to replace the 50-year old Power House. The Energy Center is significantly more efficient and cleaner burning and demonstrates CCSU's dedication to energy conservation.
- **President's Advisory Committee on Environmental Sustainability.** In 2006, the President created the President's Advisory Committee on Environmental Sustainability, which consists of faculty, staff, students and management representatives. Its mission is to help guide the University toward sustainability and embrace environmental sustainability as an institutional way of operating.
- **Global Environmental Sustainability Action Coalition (GESAC).** In 2007, CCSU's Climate Action Coalition was formed and later became the Global Environmental Sustainability Action Coalition (GESAC). GESAC is a group of CCSU students, administrators, faculty, and alumni committed to providing information on how to live a sustainable life.
- **Sustainability Baseline Audit.** In 2007, CCSU hired Woodard & Curran to perform a comprehensive environmental sustainability baseline audit. The objective of the sustainability baseline audit was to assess the University's current environmental impacts and the breadth and status of current sustainability

---

initiatives. The audit report was issued in July 2007 and noted that CCSU already had many successful sustainability initiatives in place and identified areas for improvement.

- **Energy Conservation Plan.** In November 2007, in support of reducing the campus' overall environmental footprint, and lessen CCSU's contribution to climate change, the campus developed an Energy Conservation Plan. The plan included specific recommendations and strategies for green power, energy conservation projects, and carbon reductions. Several recommendations from the plan have been implemented and will continue.
- **American College & University Presidents' Climate Commitment.** In August 2007, CCSU signed the ACUPCC, promising to take concrete steps toward achieving climate neutrality. As part of the ACUPCC, submission of this CAP is due within two years of becoming a signatory.

This CAP is intended to be a dynamic document that will be continually reviewed and revised as deemed necessary to reflect new technological advancements, mitigation strategies, and/or changing economies to keep the CAP current.

### III. Mitigation Strategies and Education, Research, and Community Outreach

To reduce GHG emissions to below FY 2008 baseline levels work toward the longer-term goal of climate neutrality, CCSU must develop mitigation strategies that incorporate conservation, efficiency, renewable energy and carbon offsets. CCSU has identified mitigation projects to be implemented in three phases, with interim target goals for each phase. A summary of these phases and goals are provided below:

- **Phase 1 (FY 2010 to FY 2015) - Reduce GHG emissions to 20% below FY 2008 levels by FY 2015.** To achieve this goal, CCSU will focus on avoidance and reduction of GHG emissions from its three major sources: student commuting, stationary sources and purchased electricity. During Phase 1, CCSU will improve the systems for accurately evaluating student commuter miles and develop additional alternative transportation options and incentives for student commuters. CCSU has worked and will continue to work with the Connecticut Department of Transportation on a new busway route connecting New Britain and Hartford. The new busway will have two stops in the general area around CCSU. Additionally, the University will be looking to work with the State DOT in its rideshare program to expand campus commuting options. Finally, the University will begin to develop a network for students to assist them in finding carpool opportunities. The University will work with the Student Board of Governors to enhance student participation. CCSU will focus on identifying and implementing building envelope improvements and creating and implementing policies for thermal comfort. CCSU will conduct studies to determine if the on-site generation of renewable electricity (e.g., solar, wind, fuel cell etc.) is feasible. In addition, CCSU will work to better understand its current electricity mix and implement energy conservation and efficiency measures. Other projects designed around the lesser GHG emissions sources will address reducing faculty commuting and campus vehicle fleet usage, and reducing airline miles traveled.
- **Phase 2 (FY 2016 to FY 2025) – Reduce GHG emissions to 50% below FY 2008 levels by 2025.** To achieve this goal, CCSU will build upon the studies performed and data gathered during Phase 1. While CCSU has not yet identified the specific projects that it will implement to meet this goal, it has broken down this goal into sub-goals in order to guide future mitigation projects. These sub-goals consist of specific reductions achieved through electrical energy conservation and efficiency measures, renewable energy purchase and/or generation, thermal conservation and efficiency measures, continued reductions in student /faculty/staff commuter miles and motor vehicle fleet use.
- **Phase 3 (FY 2026 to FY 2050) – Climate Neutrality by 2050.** CCSU does not anticipate that it will be possible, even in the future, to be considered “climate neutral” without the help of offsets. Although the



---

purchase of carbon offsets may be necessary to achieve the end goal of climate neutrality, CCSU will reserve this action as a last resort. CCSU will work within the climate action planning framework to add further specificity to Phase 2 and Phase 3 mitigation strategies over time.

An important part of CCSU's strategy toward reaching climate neutrality and further perpetuate important sustainability related themes and programs, is to continually reach out to the CCSU community and surrounding community. CCSU past outreach activities have been focused on students, faculty, staff, the greater New Britain and Hartford communities, and other important stakeholders. Planned educational activities consist of workshops, symposiums, art exhibits, curriculum additions, reviewing the development of a possible Master's degree in Global Sustainability, and numerous programs focused on residential halls and student living. Planned community outreach activities consistent of continued communications in school and local newspapers, radio announcements, departmental seminars, and expansion of the CCSU sustainability web site.

---

## 1. INTRODUCTION

Central Connecticut State University (CCSU) is one of four universities within the Connecticut State University System (CSUS). All four universities are charter signatories of the American College & University Presidents' Climate Commitment (ACUPCC), and each individually are working toward fulfilling their obligations as a signatory. CCSU views its role as a signatory as demonstrating its commitment to strengthen the institution's commitment to environmental sustainability. Development of this first climate action plan (CAP) fulfills part of CCSU's obligation to develop and submit a CAP within two years of signing the ACUPCC. The commitment to work toward climate neutrality is a significant undertaking and one that will take continuous balancing and adjusting of the many environmental, social, and financial priorities of the institution. As a result, CCSU sees its CAP as a dynamic, working document that will be under continuous review and revision. However, the preparation of this document reaffirms CCSU's commitment to climate neutrality and outlines mitigation strategies developed to meet our goals.

### 1.1 SUSTAINABILITY AT CENTRAL CONNECTICUT STATE UNIVERSITY

In addition to its obligations under the ACUPCC, CCSU has demonstrated a long standing commitment to sustainability through focused actions associated with energy conservation, internal sustainability initiatives, and sustainability programs incorporated into both academic and departmental settings. A summary of some of the major accomplishments achieved to date are summarized below:

- **CCSU Energy Center.** The CCSU Energy Center was completed in 2004 and illustrates CCSU's dedication to energy conservation and efficiency. The Energy Center was constructed to replace the 50-year old Power House and is significantly more efficient and cleaner burning. The Energy Center project began with an evaluation of CCSU's infrastructure and the development of an energy conservation plan in the mid-1990s. All new buildings at CCSU are tied into the Energy Center for heat and chilled water. As older buildings are renovated, every effort is made to upgrade mechanical systems, lighting, windows, doors, and insulated roofing to the extent that upgrades are technically and economically feasible.
- **President's Advisory Committee on Environmental Sustainability.** In 2006, the President created the President's Advisory Committee on Environmental Sustainability, which consists of faculty, staff, student and management representatives. The mission of the advisory committee is to help guide the University toward sustainability and embrace environmental sustainability as an institutional way of operating. An early recommendation of the Committee was to complete a sustainability baseline audit to assess CCSU sustainability practices and identify areas for improvement. CCSU's President's Advisory Committee on Environmental Sustainability also has a long term goal to develop an Institutional Sustainability Plan with a particular focus on energy conservation. An Energy Conservation Plan has been developed to support the overall Sustainability Plan.
- **Sustainability Baseline Audit.** In March 2007, a sustainability baseline audit was initiated, based on the recommendation from the President's Advisory Committee on Environmental Sustainability. The objective of the audit was to assess the University's current environmental impacts and the status of current sustainability initiatives. The audit report was issued in July 2007 and noted that CCSU already had many successful sustainability initiatives in place, including energy conservation programs; a new, efficient Energy Center; energy-efficient and water-saving features in buildings; green purchasing efforts; and a hazardous waste minimization program. The audit also identified areas for improvement, including improving recycling programs, launching an educational campaign on water conservation, energy conservation, and personal reduce/reuse/recycle, as well as improving the sustainability of food service operations, reducing transportation impacts, and formalizing some of CCSU's current programs (e.g., purchasing, green building) with formal policies.

- 
- **Sustainability Related Programs and Resolutions.** CCSU President, Jack Miller, was one of the first ten Presidents to officially endorse the Focus the Nation, Global Warming Solutions for America and CCSU's Climate Action Coalition resolution in the Spring of 2007. CCSU hosted the country's largest observance of "Focus the Nation – Global Warming Solutions for America" with the Inaugural Global Sustainability & Climate Change symposium. The symposium brought together state and national government leaders, agency heads, business leaders, faculty, students, staff, and the general public to examine the global climate change critical issues. On November 24, 2008 The Faculty Senate approved a Resolution on Sustainability calling "upon all academic and administrative departments to play an active role in confronting this unprecedented challenge to civilization by promoting sustainability in all aspects of CCSU's academic life – from governance and strategic planning to facilities management – through education, communication, research and professional development." The Graduate Studies Committee voted on a similar resolution on Feb. 26, 2009.
  - **Global Environmental Sustainability Action Coalition (GESAC).** In 2007, the CCSU Climate Action Coalition was formed and later became GESAC. GESAC is a group of CCSU students, administrators, faculty, and alumni committed to providing information on how to live a sustainable life. GESAC's mission is to "educate, empower, and motivate the CCSU community; civic, business and political leaders; and Connecticut residents to embrace our ethical responsibility as global citizens to adopt a sustainable lifestyle". GESAC regularly sponsors, hosts and organizes sustainability themes events, workshops and symposiums.
  - **Energy Conservation Plan.** In November 2007, in support of reducing the campus' overall environmental footprint, and lessen CCSU's contribution to climate change, the campus developed an Energy Conservation Plan. The plan included specific recommendations and strategies for green power, energy conservation projects, and carbon reductions. Several recommendations from the plan have been implemented and will continue such as the installation of energy efficient lighting fixtures outdoors, LED and other retrofits as part of the Connecticut Light & Power programs, installation of motion-sensor lighting in classrooms and other campus areas, projects involving de-lamping, re-lamping and re-ballasting, restroom efficiencies, removal of window air conditioning units, and installation of vending machine misers.
  - **Green Procurement Policy.** In November 2008, a Green Procurement Policy for Environmentally Preferable Products and Services was implemented. Under the policy, CCSU will "give preference to environmentally superior products, where quality, function and cost are equal or superior". CCSU Purchasing will also include in its Requests for Quotations its preference for environmental sustainable products and request offers of environmentally sustainable product alternatives. Requests for proposals will include sustainability and green campus initiative statements, which included double sided printing on recycled paper and minimization of packaging materials.
  - **Green Building Design.** CCSU has committed to constructing new buildings in accordance with State Law requiring that all new State-funded buildings be built in accordance with Leadership in Energy and Environmental Design (LEED) standards. The law became effective in October 2007 and was expanded in January 2008 and applies to all facility renovations where at least \$2 million in funding comes from the State or new construction costing over \$5 million. These projects must meet at least LEED silver standards or its equivalent.
  - **Water Conservation Measures.** CCSU has already enacted water conservation measures across campus. CCSU currently has individual water metering at each building, parking garage, and other water-using features on campus (this is not the case at most college campuses). The metering helps identify water usage issues, and the progress of current conservation efforts. The majority of residences on campus (five out of nine, or 56%) currently have low-flow features installed. These include low-flow showerheads and faucets, as well as reduced flush toilets.

- 
- **Commuter Bus System.** CCSU provides commuter shuttle bus transportation during the academic calendar between the campus and points in New Britain and Hartford. There were nearly 3,000 riders that used the commuter bus system in 2008.
  - **Green Pay Day.** Green Pay Day is a program that grounds the campus fleet vehicles for one day per week on pay day. During this day, campus Facilities personnel must walk or ride a bicycle to job assignments. Approximately 1,250 gallons of gasoline is saved annually by this program.
  - **Campus wide recycling.** The campus recycling program has taken over 628 tons out of the waste stream and sent it to recycling this past year. Residence Halls will become more active this year with competition as part of the Dean's Cup.
  - **Food Service.** CCSU's food vendor continues to work on reducing its contribution to the waste stream by offering pitchers of water instead of bottles, and Sodexo has committed to reductions in food waste, investigating composting and reducing food miles by buying locally.
  - **Climate Neutral Conference.** GESAC's symposium of 2007 was climate neutral.

These accomplishments are among the few areas in which CCSU has demonstrated its commitment to sustainability. There are other such programs, including CCSU's recycling program, green chemical usage, hazardous waste reductions, and numerous awards, competitions, seminars, and sustainability themed events that are part of CCSU's operations.

## 1.2 CLIMATE CHANGE COMMITMENTS

There are several climate change commitments that have been endorsed by the CSUS and/or CCSU. Some of these commitments are campus focused, while others apply to the system in its entirety. A summary of the major climate change commitments endorsed by the CSUS and/or CCSU are outlined below.

### 1.2.1 Conference of New England Governors and Eastern Canadian Premiers Climate Action Plan

The CSUS has committed to support the Conference of New England Governors and Eastern Canadian Premiers Climate Action Plan goal to reduce GHG emissions. This commitment consists of reducing GHG emissions in accordance with the timeline specified below as organized by short-term, mid-term, and long-term goals.

- **Short-term Goal:** Reduce regional GHG emissions to 1990 emissions by 2010.
- **Mid-term Goal:** Reduce regional GHG emissions by at least 10% below 1990 emissions by 2020, and establish an iterative five-year process, commencing in 2010, to adjust the goals if necessary and set future emissions reduction goals.
- **Long-term Goal:** Reduce regional GHG emissions sufficiently to eliminate any dangerous threat to the climate (75–85% reduction below current levels)

By signing the ACUPCC, CCSU has committed to strive for carbon neutrality. This will aid in reaching the regional goals set by the Conference of New England Governors and Eastern Canadian Premiers. The regional goals are an aggregate number with each state and province expected to reduce GHG emissions by its source categories.

### 1.2.2 State of Connecticut Renewable Portfolio Standards

The State of Connecticut Renewable Portfolio Standards (CTRPS) requires that electricity providers obtain a percentage of their retail load from energy produced from renewable sources. The possible renewable energy

sources span three Classes of sources referred to as Class I, Class II, and Class III. Class I includes carbon-free sources such as energy derived from solar power, wind power, wave/tidal power and some hydropower, as well as low-carbon emitting sources such as fuel cells and sustainable biomass facilities. Class II includes low-carbon emitting sources of energy such as some biomass facilities and trash to energy facilities. Class III includes those sources that are low carbon-emitting, but generally do not emit at levels as low as Class II, such as combined heat and power systems, waste heat recovery systems, and electricity savings from conservation and load management programs. As part of its standard purchases, CCSU will receive the GHG mitigation benefits from CTRPS. Details regarding the percentage of each Class of renewable energy to be provided over time are included in **Table 1-1**.

**Table 1-1: Connecticut Renewable Portfolio Standards**

| Year | Class I | Class II or Class I (add'l) | Class III | Total |
|------|---------|-----------------------------|-----------|-------|
| 2009 | 6.0%    | 3.0%                        | 3.0%      | 12.0% |
| 2010 | 7.0%    | 3.0%                        | 4.0%      | 14.0% |
| 2011 | 8.0%    | 3.0%                        | 4.0%      | 15.0% |
| 2012 | 9.0%    | 3.0%                        | 4.0%      | 16.0% |
| 2020 | 20.0%   | 3.0%                        | 4.0%      | 27.0% |

### 1.2.3 Renewable Energy Credits (RECs)

In addition to the real mitigation benefits received from CT's RPS, CSUS has committed to purchasing three percent of its annual power from FY 2010 through FY 2012 consumption from renewable sources in the form of Green-e Certified Renewable Energy Credits (RECs) through its electricity supplier, Hess.

### 1.2.4 American College & University Presidents' Climate Commitment

In August 2007, CCSU signed the American College & University Presidents' Climate Commitment. Over 600 college and university presidents around the country have now signed the ACUPCC, promising to take concrete steps toward achieving climate neutrality. These efforts demonstrate the forward-thinking dedication of higher education to sustainability. As part of the ACUPCC, submission of this CAP is due within two years of becoming a signatory. The process used to develop this CAP is summarized in the following section.

## 1.3 DEVELOPMENT OF CLIMATE ACTION PLAN

One of the requirements as a signatory to the ACUPCC is to develop a CAP within two years of becoming a signatory. The overall objective of the CAP is to outline the University's approach to attain climate neutrality. The CAP must include an inventory of GHG emissions, BAU projections for GHG emissions, target dates for achieving climate neutrality, specific actions to meet climate neutrality, plans to incorporate climate neutrality concepts into education, research, and community outreach and mechanisms for tracking progress toward climate neutrality. This document serves as CCSU's CAP and includes the necessary components to fulfill the CAP requirement of the ACUPCC.

This CAP was developed by CCSU's Climate Action Planning Committee. The Climate Action Planning Committee is staffed and managed out of CCSU's Administrative Affairs Office and Chaired by CCSU's Environmental Health & Safety Officer. With support from Woodard & Curran, CCSU has been proactively pursuing sustainability initiatives for a number of years. This includes: CCSU's Sustainability Baseline Audit, Energy Conservation Plan and

---

development of its 2008/2009 GHG Inventories. Each of these initiatives built upon the next to support the development of this CAP.

## **1.4 IMPLEMENTATION OF CLIMATE ACTION PLAN**

The following sections describe CCSU's approach for the implementation of this CAP and related activities to be performed to monitor the progress toward climate neutrality.

### **1.4.1 Implementation Structure**

CCSU's Climate Action Planning Committee was formed as an extension to the President's Advisory Committee on Environmental Sustainability, with a mission of developing CCSU's CAP. Upon submission of this CAP, the Climate Action Planning Committee will transition from the planning to implementation phase, and have the responsibility for implementing the goals presented in this plan. The Climate Action Planning Committee will subsequently be known as the Climate Action Plan (CAP) Implementation Committee. The membership and structure of the Committee will remain as it currently exists. The CAP Implementation Committee will continue to work closely with the President's Advisory Committee on Environmental Sustainability and the Global Environmental Sustainability Action Coalition.

Subcommittees of the President's Advisory Committee on Environmental Sustainability will work to advise, monitor, promote, and publicize the projects needed to achieve CCSU's goals. The CAP Committee will report its activities to the President's Advisory Committee on Environmental Sustainability and coordinate with Facilities Management and Student Affairs. Additionally, outreach through CCSU's Sustainability webpage and student media outlets will take place. A member of the President's Executive Committee closely monitors the President's Advisory Committee on Environmental Sustainability.

### **1.4.2 Communication and Outreach**

It will be the responsibility of the CAP Implementation Committee to coordinate and implement communication and outreach associated with climate action goals, strategies, and implementation. One of the first tasks of the CAP Implementation Committee will be to develop a communication plan regarding climate neutrality for CCSU. It is anticipated that existing communication vehicles such as the sustainability web page, campus publications, and focused seminars will continue to be utilized and adapted for this purpose.

In addition to communications discussed above which will target the wider CCSU community, the CAP Implementation Committee will also be responsible for providing regular briefings to the University President associated with the ACUPCC. These briefings will be provided through the Administrative Affairs Office, where the current chair of the Climate Action Planning Committee resides.

### **1.4.3 Ongoing Monitoring and Tracking Progress**

The CAP Implementation Committee will meet at regular intervals to revisit this CAP, discuss the progress made toward goals identified in this CAP, monitor the progress achieved through mitigation strategies, and revise and update the CAP as may be necessary to reflect technological advancements, changing economies, and/or other updates to the program to keep the CAP current (see Section 1.4.4). The CAP Implementation Committee will identify and implement strategies to collect the necessary data to monitor its progress toward CAP goals.

---

#### 1.4.4 Periodic Plan Review and Updating

CCSU anticipates future updates of this CAP to continually incorporate new mitigation strategies based on campus and CSUS initiatives. On an annual basis, the CAP Implementation Committee will determine the potential necessity to update this CAP. Updates will be issued as needed.

#### 1.4.5 Reporting and Recordkeeping

It will be the responsibility of the CAP Implementation Committee to maintain and assemble the records associated with CAP implementation and ongoing monitoring. Minutes of CAP Implementation Committee meetings will be maintained and summarize the findings and progress toward achieving climate neutrality. On an annual basis, the CAP Implementation Committee will complete a comprehensive review of the CAP and progress made toward its goals. The findings of the review will be formalized in a CAP Annual Report.

### 1.5 STRUCTURE OF THE CLIMATE ACTION PLAN

The purpose of this CAP is to fulfill CCSU's obligation as a signatory of the ACUPCC and demonstrate CCSU's commitment to climate neutrality. This plan is organized into the following sections, including the information summarized below:

- **Section 2, Campus Emissions** – Describes CCSU's GHG emissions sources and presents CCSU's GHG current and baseline emissions inventories and highlights emissions trends over time. The BAU emissions trajectory will also be presented in this section.
- **Section 3, Mitigation Strategies** – Identifies and describes CCSU's mitigation strategies related to conservation, efficiency improvements, renewable energy and offsets to achieve climate neutrality. Financing mechanisms for proposed projects will be presented as well as potential barriers to implementation.
- **Section 4, Educational, Research, Community Outreach Efforts** – Provides a description of plans to continue to perpetuate climate neutrality themes as part of the curriculum and student educational experiences and to expand research, community outreach and other efforts toward the achievement of climate neutrality.
- **Section 5, Next Steps** – Presents a discussion of actions to support the implementation of this CAP and to continue to monitor progress.

---

## 2. CAMPUS GREENHOUSE GAS EMISSIONS

Concern over climate change has grown in recent years, as more and more scientific evidence implicates human activities in the rise of atmospheric GHG emissions<sup>1</sup>. Increasing concentrations of GHG emissions traps heat in the upper atmosphere, which in turn, is predicted to have severe impacts both on the natural environment (melting ice caps, raising sea levels, altering seasons) and society (disrupting food supply, increasing vector-borne disease, displacing coastal populations, among other impacts).<sup>2</sup>

CCSU completed its first GHG inventory for fiscal year (FY) 2008 in accordance with the ACUPCC requirement to complete a GHG inventory and publicly report on GHG emissions within one year of becoming a signatory. The FY 2008 inventory was completed using the Clean Air Cool Planet (CACP) Campus Carbon Calculator v5.0 which uses GHG emission estimation methodologies that are consistent with the standards of the GHG Protocol of the World Business Council for Sustainable Development (WBCSD) and the World Resources Institute (WRI). The GHG Protocol is the most widely used international GHG emission accounting tool and it provides organizations with a standard methodology to understand, quantify, and manage greenhouse gas emissions.<sup>3</sup> The GHG Protocol is also used by the Chicago Climate Exchange and California Climate Action Registry which have been leaders in the effort to quantify, report and systematically reduce GHG emissions in the United States.

To help delineate direct and indirect emission sources, improve transparency, facilitate fair comparisons and prevent double-counting and double-crediting, the GHG Protocol defines three “scopes” for GHG accounting and reporting purposes.

- Scope 1 includes all direct sources of GHG emissions (such as stationary combustion sources, vehicle fleets, and refrigerant releases) from sources that are owned or controlled by CCSU.
- Scope 2 includes GHG emissions from imports of electricity, heat or steam which are generally associated with the generation of these imported sources of energy.
- Scope 3 includes all other indirect sources of GHG emissions that may result from the activities of CCSU but occur from sources owned or controlled by another company or individual. ACUPCC signatories have agreed to account for and report on emissions from Scopes 1 and 2, and in addition, some Scope 3 emissions specifically associated with faculty, staff and student commuting, and direct financed air travel.

Following the completion of the FY 2008 GHG Inventory, the information was made publicly available through the ACUPCC Reporting System. CCSU completed its second GHG inventory for FY 2009 using the more updated version of CACP’s Campus Carbon Calculator (v6.1), and in the process, made adjustments to the FY 2008 inventory. These adjustments were made in order to maintain consistency in the annual inventory development process. The FY 2009 inventory additionally accounts for GHG emission sources for which data was not available or complete in FY 2008 or previous years. While the FY 2009 GHG inventory included sources of data that were not included in the FY 2008 inventory, it is CCSU’s policy to strive for continuous improvement in the GHG inventory process to ensure that the University is accurately capturing all sources of GHG emissions, even when this results in an increase of emissions due to the addition of a new source or improved accuracy of data collection and handling. **Table 2-1** lists the sources of GHG emissions included in each Scope in CCSU’s FY 2008 (updated) and FY 2009 inventories.

---

<sup>1</sup> Intergovernmental Panel on Climate Change. (2008) Climate Change 2007, The IPCC Fourth Assessment Report.

<sup>2</sup> Pew Center on Global Climate Change. (2006) *Climate Change 101: The Science and Impacts*.

<sup>3</sup> <http://www.ghgprotocol.org/>



**Table 2-1: Sources of GHG Emissions Included in Each Scope**

| Scope          | FY 2008  | FY 2009  |
|----------------|--|--|
| <b>Scope 1</b> | <ul style="list-style-type: none"> <li>▪ On-Campus Stationary Sources (i.e. natural gas and fuel oil combustion for steam and comfort heating)</li> <li>▪ Motor Vehicle Fleet</li> <li>▪ Fertilizer Application (Agriculture)</li> </ul> | <ul style="list-style-type: none"> <li>▪ On-Campus Stationary Sources (i.e. natural gas and fuel oil combustion for steam and comfort heating)</li> <li>▪ Motor Vehicle Fleet</li> <li>▪ Fertilizer Application (Agriculture)</li> <li>▪ Refrigerant and Chemical Release</li> </ul> |
| <b>Scope 2</b> | <ul style="list-style-type: none"> <li>▪ Purchased Electricity</li> </ul>  | <ul style="list-style-type: none"> <li>▪ Purchased Electricity</li> </ul>  |
| <b>Scope 3</b> | <ul style="list-style-type: none"> <li>▪ Faculty and Staff Commuting</li> <li>▪ Student Commuting</li> <li>▪ Direct Financed Air Travel</li> <li>▪ Electricity Transmission and Distribution Losses</li> </ul>                           | <ul style="list-style-type: none"> <li>▪ Faculty and Staff Commuting</li> <li>▪ Student Commuting</li> <li>▪ Direct Financed Air Travel</li> <li>▪ Electricity Transmission and Distribution Losses</li> <li>▪ Solid Waste Disposal</li> </ul>                                       |

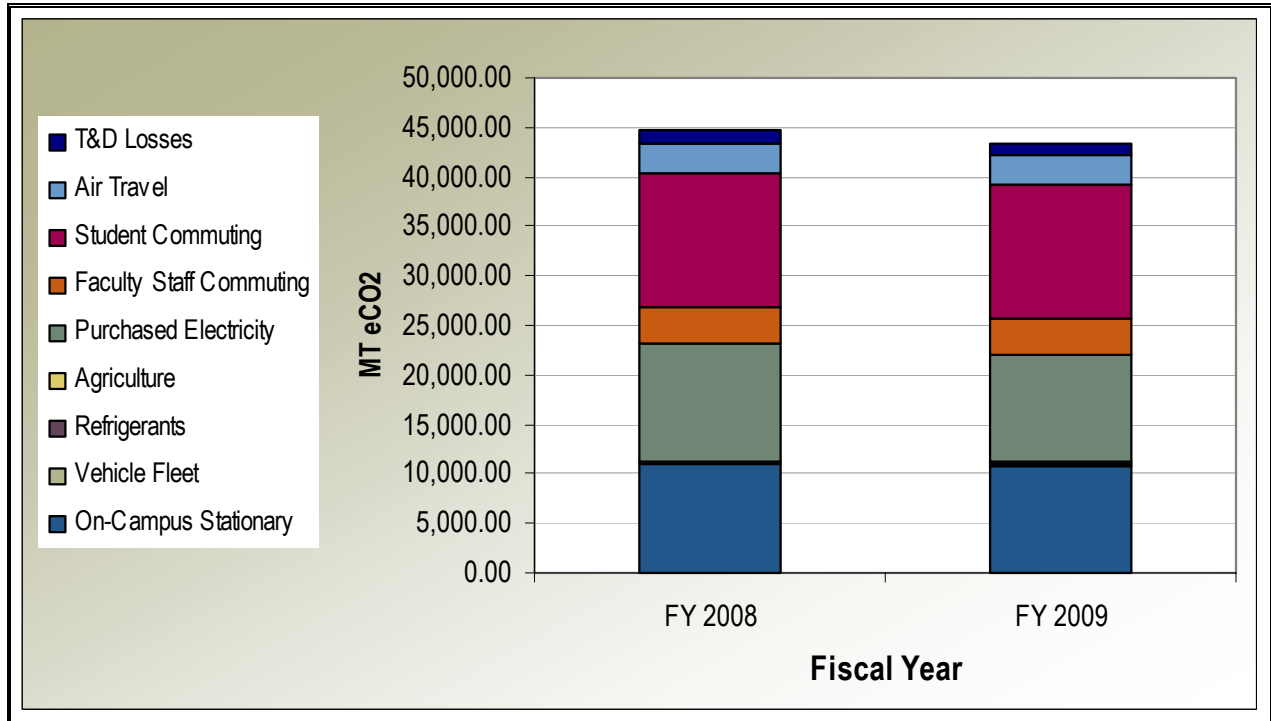
## 2.1 FY 2008 AND FY 2009 GHG EMISSIONS INVENTORIES

The FY 2008 and FY 2009 GHG emissions inventories were compiled by CCSU's consultant, Woodard & Curran Inc., with data assembled and provided by CCSU's Climate Action Planning Committee. As mentioned above, the FY 2008 GHG Inventory was updated during the development of the FY 2009 GHG emission inventory and has been modified from what was previously submitted to the ACUPCC to present a more accurate representation of CCSU's GHG emissions. CCSU's GHG emissions inventory is expressed in units of metric tonnes of carbon dioxide equivalents (MT eCO<sub>2</sub>).

**Figure 2-1 and Table 2-2** provide the updated GHG inventory for FY 2008 and the new GHG inventory for FY 2009 by GHG emissions source. **Figure 2-2 and Table 2-3** provide the updated GHG inventory for FY 2008 and the new GHG inventory for FY 2009 by GHG emissions scope. The FY 2008 and 2009 inventories summarize the gross emissions of GHGs and do not incorporate the use of any additional or non-additional offsets such as RECs, certifiable offsets, composting or afforestation. The incorporation of offsets, which includes RECs purchased by CCSU in FY 2009 in an amount equal to 3% of its purchased electricity use, is included in CCSU's net GHG emissions inventory which is depicted in **Figure 2-3**. Note that in FY 2009, solid waste data were incorporated into the GHG inventory which resulted in a reduction of Scope 3 emissions since solid waste that is not recycled at CCSU is sent to a waste-to-energy mass burn incinerator in Bristol, CT. It is customary to include reductions due to energy

generation from solid waste in Scope 3 emissions as these reductions are not considered to be offsets. Solid waste data was not available for FY 2008.

**Figure 2-1: FY 2008 and FY 2009 Gross GHG Emissions by Source**



**Table 2-2: FY 2008 and FY 2009 GHG Emissions by Source Data**

| GHG Source                | FY 2008 (MT eCO2) | % of Total | FY 2009 (MT eCO2) | % of Total |
|---------------------------|-------------------|------------|-------------------|------------|
| On-campus Stationary      | 10,908.3          | 24.4%      | 10,790.5          | 25.0%      |
| Vehicle Fleet             | 260.7             | 0.6%       | 220.0             | 0.5%       |
| Refrigerants              | 0.0               | 0.0%       | 154.2             | 0.4%       |
| Agriculture               | 13.7              | 0.0%       | 23.9              | 0.1%       |
| Purchased Electricity     | 11,949.4          | 26.8%      | 10,742.2          | 24.9%      |
| Faculty/Staff Commuting   | 3,628.3           | 8.1%       | 3,659.9           | 8.5%       |
| Student Commuting         | 13,561.7          | 30.4%      | 13,585.6          | 31.4%      |
| Air Travel                | 3,136.4           | 7.0%       | 3,136.4           | 7.3%       |
| Electricity T&D Losses    | 1,181.8           | 2.6%       | 1,062.4           | 2.5%       |
| Solid Waste               | 0.0               | 0.0%       | -162.6            | -0.4%      |
| <b>Gross Annual Total</b> | <b>44,640.4</b>   |            | <b>43,212.6</b>   |            |

Figure 2-2: FY 2008 and FY 2009 Gross GHG Emissions by Scope

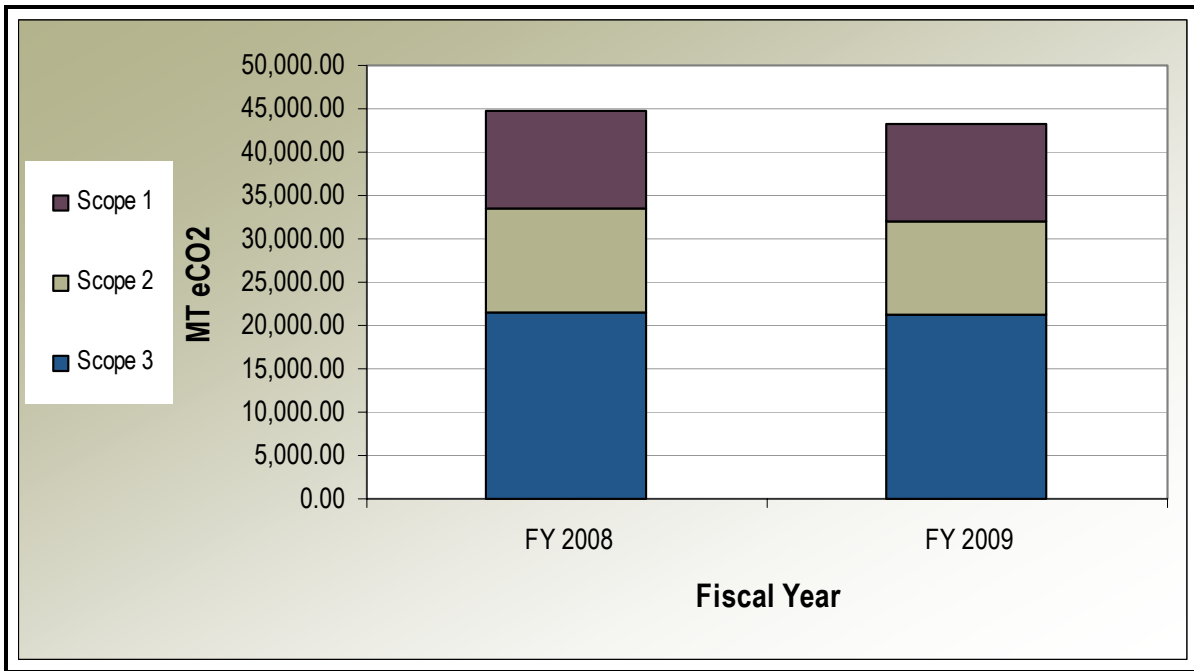
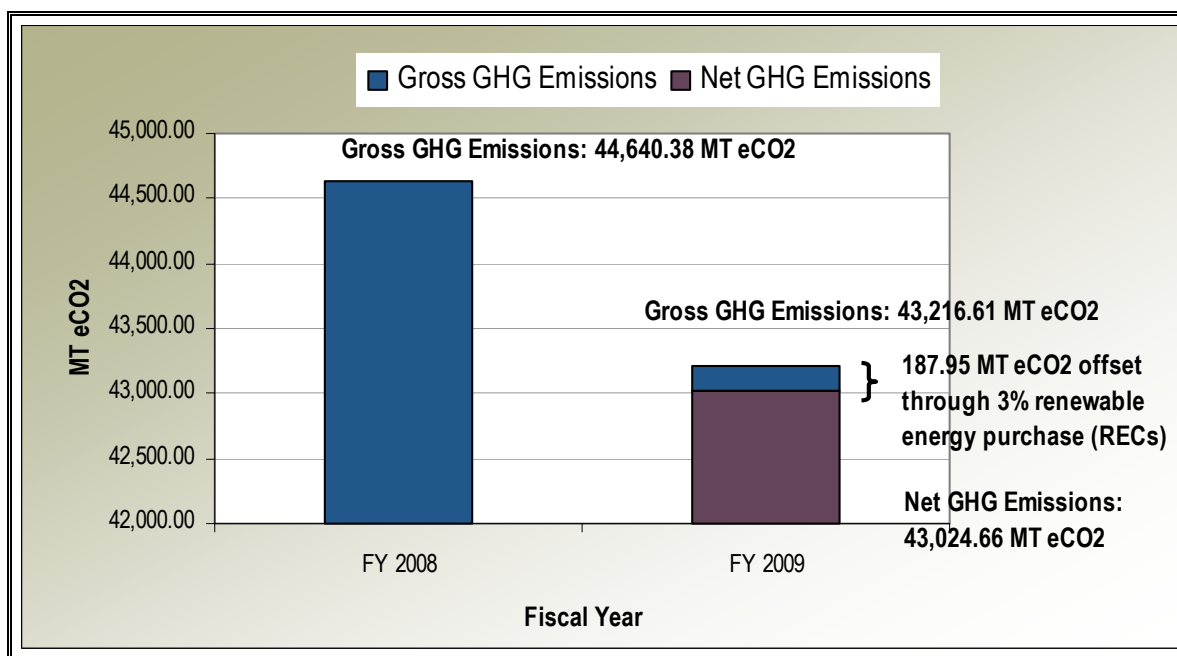


Table 2-3: FY 2008 and FY 2009 GHG Emissions by Scope Data

| GHG Scope                 | FY 2008 (MT eCO2) | % of Total | FY 2009 (MT eCO2) | % of Total |
|---------------------------|-------------------|------------|-------------------|------------|
| Scope 1                   | 11,182.8          | 25.1%      | 11,188.7          | 25.9%      |
| Scope 2                   | 11,949.4          | 26.8%      | 10,742.2          | 24.9%      |
| Scope 3                   | 21,508.2          | 48.2%      | 21,281.7          | 49.2%      |
| <b>Gross Annual Total</b> | <b>44,640.4</b>   |            | <b>43,212.6</b>   |            |

**Figure 2-3: FY 2008 and FY 2009 Gross and Net GHG Emissions**



## 2.2 BUSINESS-AS-USUAL EMISSIONS TRAJECTORY

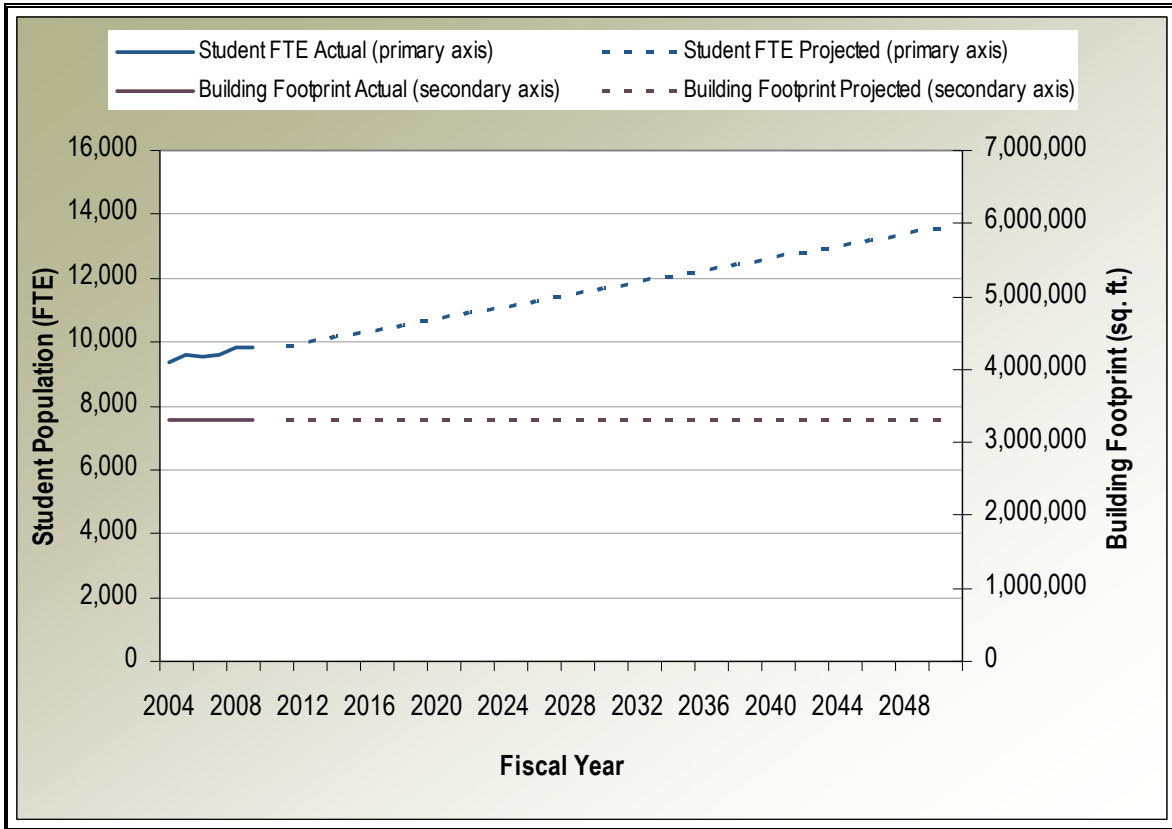
Prior to setting a long-term goal for achieving climate neutrality and interim goals to foster progress along the way, it is vital that an institution understand how GHG emissions are expected to increase or decrease in the future under BAU conditions. To arrive at this understanding, CCSU made two major considerations: 1) how the CCSU campus is expected to change over time; and 2) how major sources of GHG emissions are expected to change over time and due to various campus conditions.

### 2.2.1 Campus Growth Projection: Student Population and Building Footprint

CCSU has developed the University's Strategic Plan and Objectives and 2020 Master Plan which provide the basis for estimating future growth and expansion at CCSU. In developing BAU emissions projections, these plans were reviewed to determine how student population (expressed at FTEs) and building footprint (gross square feet) are expected to change due to future strategic initiatives and campus construction, renovation and demolition plans. In addition, historic data for student population and building footprint dating back as far as FY 2004 were analyzed to identify linear growth trends, based on linear regression analysis, to determine how these factors have changed over time and could change in the future. After reviewing both CCSU's plans for the future and the linear growth trends, it was determined that student population could be best projected by applying historic regression analysis to future years. Since the building footprint has not changed over the time period for which data was available, (FY 2004 to present), a projection of building footprint based on linear regression was not appropriate. At this time, CCSU does not have any plans to expand the total campus building footprint significantly. Building footprint is therefore projected to remain constant into the future until a more accurate assessment can be made. As plans for future growth and expansion develop and a more detailed projection of building footprint becomes available, the BAU GHG emission projections will be reviewed to determine if they are based on the most appropriate campus growth variable (i.e. student population or building footprint). The University has future plans to add residence halls. As plans are developed and building design is finalized, CCSU will adjust the BAU GHG emissions projections accordingly.

Figure 2-4 below shows the projected growth in campus population (annual increase of approximately 95 students) and projected no growth in building footprint.

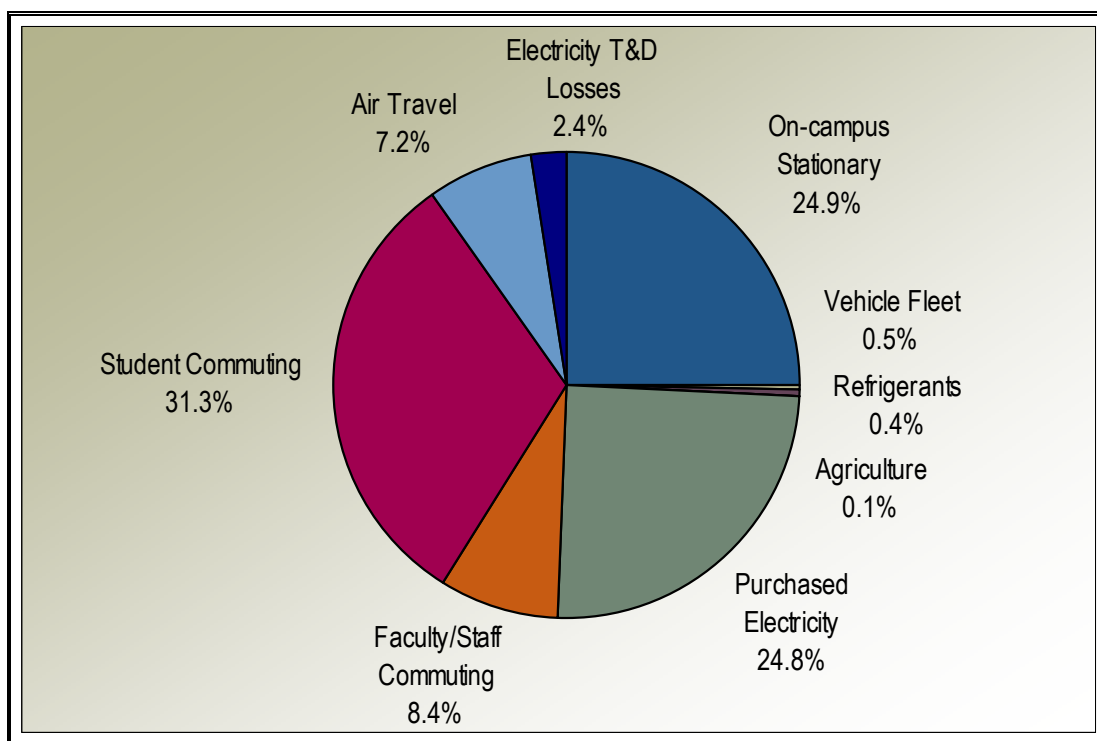
**Figure 2-4: Student Population and Building Footprint Projected to FY 2050**



### 2.2.2 GHG Emission Trends by Source: Time, Student Population, Custom Growth

According to the FY 2009 GHG emission inventory, the major sources of GHG emissions at CCSU include on-campus stationary sources (primarily natural gas and fuel oil used for steam, domestic hot water, comfort heating and emergency electrical generation) at 24.9% of total, purchased electricity at 24.8% of total, and student commuting at 31.3% of total. Combined, these sources represent 81% of CCSU's GHG emission in FY 2009. See Figure 2-5 below for the complete breakdown of FY 2009 GHG emissions by source.

Figure 2-5: Contribution to FY 2009 GHG Emissions by Source



Upon identifying its major sources of GHG emissions, CCSU explored how GHG emissions from these sources fluctuated due to changing campus conditions such as increases or decreases in student population, percentage of students that live off-campus, and campus building footprint. Generally, GHG emissions from stationary sources (Scope 1) and purchased electricity (Scope 2) tend to fluctuate with student population and building footprint while GHG emissions from commuting (Scope 3) tend to fluctuate with the percentage of students that live off-campus and the number of faculty and staff employed by the University during a given year. For some sources, including most of the minor sources (e.g., refrigerants, fertilizer, motor vehicle fleet), there was not enough data to establish a conclusive relationship between GHG emissions and changing campus conditions. For example, releases of refrigerants were only reported for FY 2009 and there is no historic information available regarding releases at this time. Additionally, refrigerant releases are generally due to equipment leaks, which typically do not fluctuate with changing campus conditions since the releases are largely accidental. In addition, for sources for which historic data was available (generally back to FY 04), historic data were analyzed to identify linear growth/reduction trends based on linear regression analysis to determine how GHG emissions from these sources have changed over time and could change in the future. After reviewing these trends and dependencies, CCSU determined the method it would use for projecting GHG emissions from each source into the future, paying particular attention to the major sources of GHG emissions. A summary of each method used to project future GHG emissions and the reasoning behind it, is included in **Table 2-4** below.

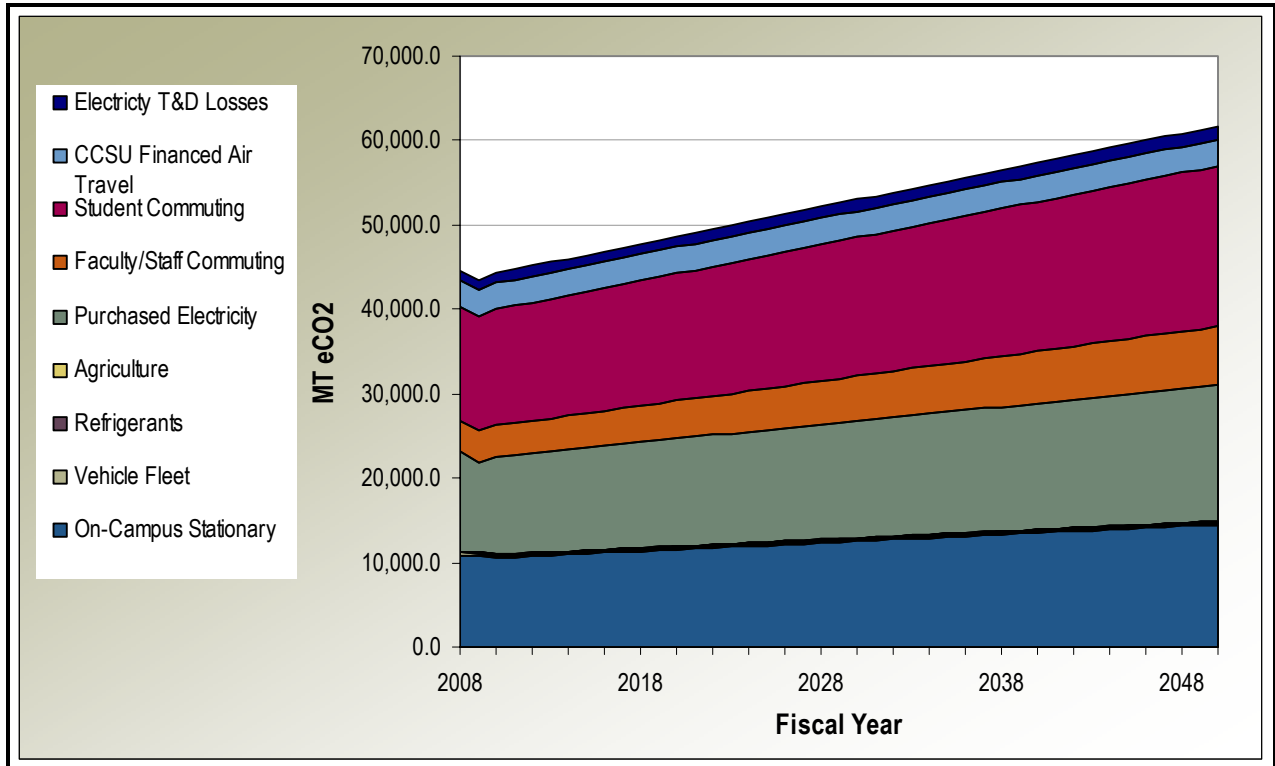
**Table 2-4: GHG Emission Projection Method for Each Source**

|         | GHG Emission Source                         | Projection Method   | Reasoning/Improvements   |
|---------|---|---|--|
| Scope 1 | On-Campus Stationary: Natural Gas           | Student Population Based                                  | Multiple data points available and trends show gas consumption increasing with student population. Consider changing to Building Footprint based as more data become available.  |
|         | On-Campus Stationary: Distillate Oil        | Custom: No growth projected from FY 2009 levels           | Only two data points available (fuel use in FY 08 and FY 09). Consider changing to Student Population Based or Building Footprint based as more data become available.   |
|         | Motor Vehicle Fleet: Gasoline and Diesel    | Custom: No growth projected from FY 2009 levels           | Only two data points available (fuel use in FY 08 and FY 09). Inconclusive evidence that fleet fuel varies with student population. Consider changing to Building Footprint based as more data become available.   |
|         | Refrigerants                                | Custom: No growth projected from FY 2009 levels           | Only one data point available (FY 09). Consider changing to Linear Projection if historic data is made available. Consider changing to Building Footprint based as more data become available.   |
|         | Fertilizer Use and Weighted Avg. % Nitrogen | Custom: No growth projected from FY 2009 levels           | Only two data points available (fuel use in FY 08 and FY 09). Consider changing to Linear Projection if historic data is made available.   |
| Scope 2 | Purchased Electricity                       | Student Population Based                                  | Multiple data points available and trends show electricity consumption increasing with student population.   |
| Scope 3 | Student Commuting: Automobile and Bus       | Student Population Based                                  | Multiple data points available and trends show commuter miles increasing with student population. Consider possible trend with off-campus headcount or % off-campus in future.   |
|         | Faculty-Staff Commuting: Automobile         | Linear Trend based on regression analysis of FY04-09 data | Faculty/Staff FTE numbers have increased over time which directly influences the calculation of Faculty/Staff Commuter miles since it depends on the FTE values. Linear regression fit is acceptable, consider updating if historic data become available. |
|         | Air Travel: Faculty                         | Custom: No growth projected from FY 2009 levels           | Only one data point available (FY 09). Consider changing to Linear Projection if historic data is made available.  |
|         | Air Travel: Students                        | Custom: No growth projected from FY 2009 levels           | Only one data point available (FY 09). Consider changing to Student Population Based if data become available.   |
|         | Electricity T&D Losses                      | Based on Purchased Electricity                            | See Purchased Electricity.   |
|         | Incinerated Waste                           | Custom: No growth projected from FY 2009 levels           | Only one data point available (FY 09). Consider changing to Building Footprint or Student Based as more data become available.   |

### 2.2.3 Business-As-Usual Emission Projections

Based on the projected campus growth and the GHG emission projection method applied to each source (Table 2-4), CCSU developed its projection of BAU emissions from FY 2008 through FY 2050 using the CA-CP Campus Carbon Calculator v6.1. **Figure 2-6** depicts the projection of GHG emissions through this time period.

**Figure 2-6: GHG Emission Projection by Source from FY 2008 through 2050**





### 3. MITIGATION STRATEGIES

#### 3.1 GOAL FOR CLIMATE NEUTRALITY

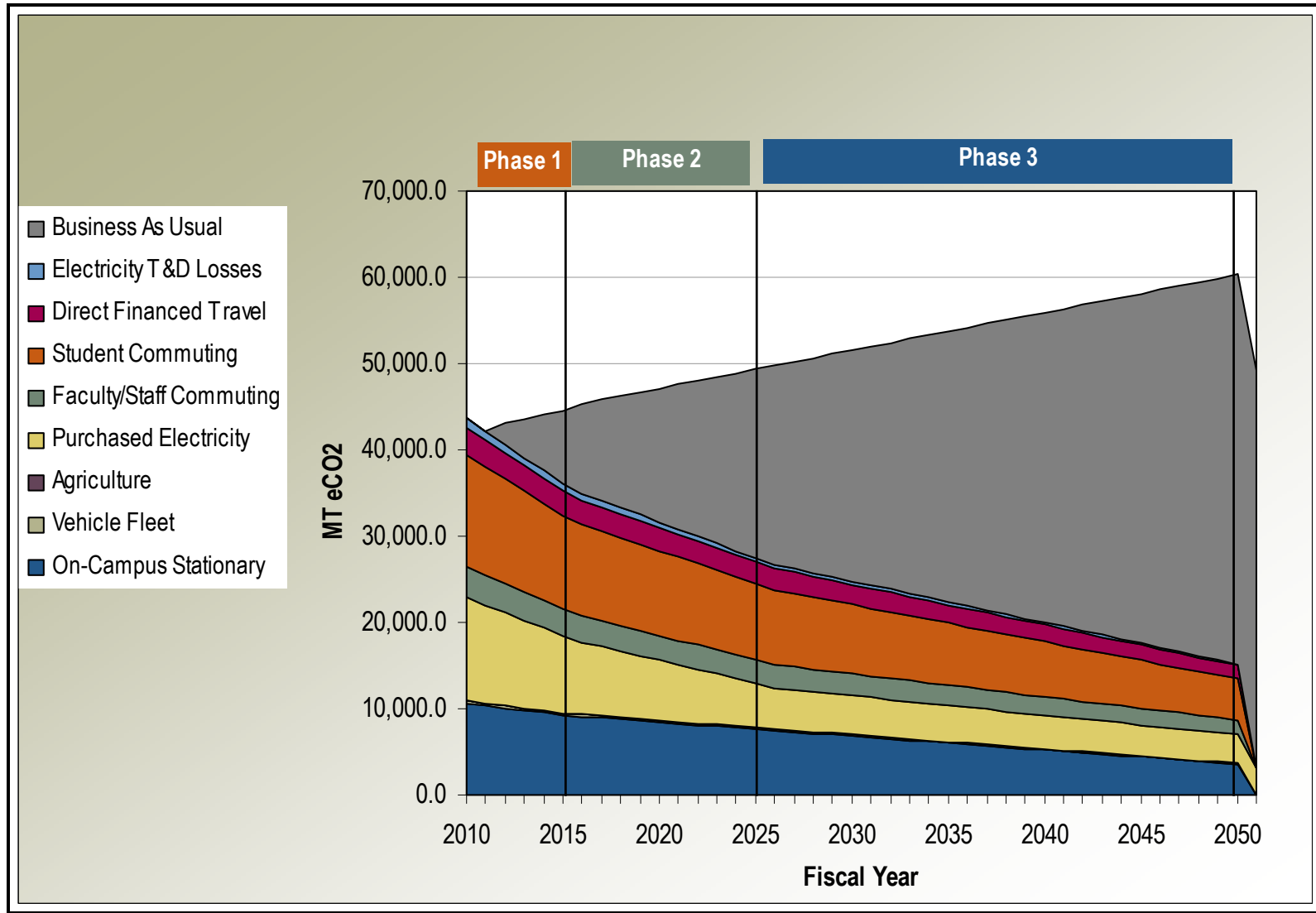
As a signatory to the ACUPCC, CCSU has pledged to eliminate its contribution to global warming over time through the development and implementation of a CAP to achieve climate neutrality. Specifically, the CAP is required to include a target date to achieve climate neutrality and interim milestones. Based on CCSU's BAU GHG emission projections, GHG emission reduction projects that are planned for future implementation, and the changing state of technology under the assumption that advances in technology past FY 2025 will allow CCSU to achieve reductions not possible at present, **CCSU has set a target date for climate neutrality of FY 2050**. CCSU defines climate neutrality to mean having no net GHG emissions within the scope of emissions described in Section 2.

To assist in the achievement of the goal for climate neutrality, CCSU has identified three mitigation strategy phases and set two interim milestones which are based on a percentage reduction over FY 2008 GHG emission levels. FY 2008 was established as the baseline year for these milestones because it is the earliest year for which CCSU has complete GHG emission data for all major sources of GHG emissions. **Table 3-1** describes the three phases and interim milestones associated with each phase. **Figure 3-1** depicts the GHG mitigation scenarios for each phase, graphically.

**Table 3-1: GHG Mitigation Phases and Interim Milestones**

| Phase   | Time Frame         | Milestone                        | Net GHG Emissions                    | Net Emission Reduction During Phase |
|---------|--------------------|----------------------------------|--------------------------------------|-------------------------------------|
| Phase 1 | FY 2010 to FY 2015 | 20% below FY 2008 levels by 2015 | At or below 35,712.3 MT eCO2 by 2015 | 8,928.1 MT eCO2                     |
| Phase 2 | FY 2016 to FY 2025 | 50% below FY 2008 levels by 2025 | At or below 22,320.2 MT eCO2 by 2025 | 13,392.1 MT eCO2                    |
| Phase 3 | FY 2026 to FY 2050 | Climate neutrality by 2050       | 0 MT eCO2 by 2050                    | 46,290.1 MT eCO2                    |

Figure 3-1: GHG Mitigation Scenarios Over Time



---

## 3.2 PRIORITIZATION OF GHG EMISSION REDUCTION PROJECTS

To reduce GHG emissions to below FY 2008 levels and push for climate neutrality despite increasing projected BAU emissions, CCSU must develop mitigation strategies that incorporate conservation, efficiency, renewable energy and carbon offsets. CCSU supports the principles included in the *Forum for the Future's Carbon Management Hierarchy*<sup>4</sup> and will use these principles as part of a high-level screening tool with which to evaluate and prioritize potential GHG mitigation strategies.

### Forum for the Future's Carbon Management Hierarchy Applied by CCSU

- 1) **Avoidance:** CCSU will avoid carbon-intensive activities through conservation efforts
- 2) **Reduction:** CCSU will reduce carbon-intensive activities through improved efficiency
- 3) **Replace:** CCSU will replace high carbon energy sources with low-carbon source such as renewable energy
- 4) **Offset:** As a last resort, CCSU will offset those emissions that can't be eliminated through the measures above to meet milestones and the target date for climate neutrality.

CCSU will also prioritize and implement GHG emission mitigation projects based on the University's strategic initiatives. Other factors that CCSU will consider when prioritizing mitigation projects include: initial capital investment, payback period, net effect on CCSU's GHG footprint, opportunity to educate community, opportunity to integrate project into curriculum, and ability for project to offer on-going research opportunities.

### 3.2.1 Funding of GHG Emission Reduction Projects

Currently, the primary sources of funding for GHG emission mitigation projects are the Facilities Management Annual Operating Budget, the University's Capital Budget and the President's Funds. In the future, CCSU will explore the opportunity of developing funds dedicated to financing projects that reduce GHG emissions through energy conservation and efficiency, campus community awareness, enhanced data collection and utilities metering, renewable energy generation and purchases, and offset purchases. Examples of potential sources of future funds include: revolving funds that are replenished by savings generated by conservation measures; alumni donations and fundraising, student activity fees and graduating class gifts, self-financing performance contracts, and grants from government, foundations and business partners.

## 3.3 MITIGATION GOALS AND STRATEGIES

CCSU has outlined the following initial strategies to work toward meeting its GHG reduction goals and eventual carbon neutrality.

### 3.3.1 Phase 1 Strategy

During Phase 1, CCSU's goal is to reduce annual GHG emissions to 20% below 2008 levels for a net total of 35,713 MTeCO<sub>2</sub> annually by FY 2015. According to BAU emission projections, this goal would represent a 23% decrease

---

<sup>4</sup> <http://www.forumforthefuture.org.uk/about-us>

---

from the year 2015 BAU emissions projections. To achieve this goal, CCSU will focus on avoidance and reduction of GHG emissions from its three major sources: student commuting, stationary sources and purchased electricity. In addition, CCSU will conduct the studies and collect the data necessary to support more aggressive GHG mitigation measures to be initiated during Phase 2.

### **3.3.1.1 Student Commuting**

CCSU is largely a commuter school with approximately 82% of its students living off-campus in the surrounding towns and cities. According to the methodology used in the FY 2008 and FY 2009 GHG emissions inventory, the average one-way trip traveled by a commuter student is 13 miles. GHG emissions associated with student commuting represents the largest percentage of CCSU's GHG footprint (31.3%). CCSU plans to better quantify and reduce GHG emissions from commuter students through the following measures:

- Improving accuracy of methodology used to estimate student commuting miles since the current methodology utilizes home addresses for some students when local addresses should be used.
- Developing mechanisms for student commuting data collection (i.e. trip length) through improved recordkeeping and periodic commuting surveys.
- Improving and expanding the bus routes and schedules to surrounding areas to accommodate class schedules and areas of most dense commuter student populations.
- Develop a more sophisticated web-based method for communicating potential carpool and vanpool opportunities to students.
- Offer preferential parking to students that carpool to school.
- Offer incentives to students who do not use a parking permit (i.e. voucher toward textbooks)
- Enact a carpooling "pledge" program at the start of each semester for which students pledge to carpool "n" days per month. This will also assist in data collection.

It is estimated that the successful implementation of these activities can reduce GHG emissions from student commuting to 20% below 2008 student commuting levels by 2015. To achieve this goal in a linear fashion, this will require that CCSU decrease student commuting by approximately 3 to 4% per year. This would result in a savings of 2,712 MT eCO<sub>2</sub> annually by 2015.

### **3.3.1.2 Stationary Sources**

The majority of CCSU's stationary sources of GHG emissions are associated with the combustion of natural gas used for the generation of steam for comfort heating and domestic hot water. There are a few minor sources of GHG emissions that result from the combustion of distillate oil in small residential furnaces or emergency electrical generation equipment. During Phase 1, CCSU will focus on identifying and implementing building envelope improvements and creating and implementing policies for thermal comfort. To reduce GHG emissions resulting from stationary sources, CCSU plans to:

- Create submetering systems for steam, natural gas and fuel oil for each building, as applicable, to determine which buildings require the most thermal energy which will aid in project prioritization.

- 
- Conduct comprehensive thermal energy audits of each building with focus on building envelope, temperature settings and control, age and efficiency of small boilers.
  - Continue to implement “low-hanging” building envelope projects such as: weatherization and infiltration sealing, increased insulation, high performance window and door replacement, and low emissive reflective window film. Create master schedule for more capital intensive building envelope projects for Phase II.
  - Build a phase-out schedule for small boilers identified as “old” and “inefficient”.
  - Explore the thermal energy savings and any repercussions associated with reducing current building temperature settings in winter and increasing current building temperature settings in summer. Additionally, consider implementing occupied/unoccupied building temperature settings. Develop a thermal comfort policy around these findings.
  - Explore the thermal energy savings and any repercussions associated with reducing current domestic hot water temperature settings and develop a thermal comfort policy around these findings.
  - Explore the month-long “summer shutdown” of the thermal side of the energy center (which saves about 12,000 CCF of natural gas per summer) and determine if the shutdown can last longer than 1 month or if there are other times during the year when a shutdown might be appropriate.
  - Evaluate the possibility of reducing energy use during holidays and weekends. This includes the possibility of adjusting schedules so that thermal energy savings can be captured.
  - Implement changes in dining services practices that will reduce current hot water requirements.
  - Continue to service and maintain Energy Center boilers according to manufacturer’s recommendations in order to maintain their thermal efficiency.

It is estimated that the successful implementation of these activities can reduce GHG emissions from stationary sources to 15% below 2008 stationary source levels by 2015. To achieve this goal in a linear fashion, this will require that CCSU decrease GHG emissions from stationary sources by approximately 3% per year. This would result in a savings of 1,636 MT eCO<sub>2</sub> annually by 2015.

### **3.3.1.3 Purchased Electricity**

CCSU has not yet conducted any feasibility studies for the implementation of renewable electrical generation systems on campus. During Phase I, CCSU will focus on conducting studies to determine if the on-site generation of renewable electricity (e.g., solar, wind, fuel cell etc.) is feasible. In addition, CCSU will work to better understand its current electricity mix and implement energy conservation and efficiency measures. To reduce GHG emissions resulting from purchased electricity, CCSU plans to:

- Continue to install electricity sub metering on all campus buildings and explore the idea of capturing this data in a centralized system and relaying data to the campus community through a building energy use dashboard program.
- Conduct feasibility studies to determine if the on-site generation of renewable energy is appropriate, including: solar photovoltaic, fuel cell and wind.

- 
- Develop a better understanding of electricity fuel mix for future GHG inventories. While the State of CT has renewable energy portfolio standards, the classification of these standards makes it difficult to determine the precise mix of electricity that CCSU is receiving. For example, the Class I renewable energy group includes both wind power, which is carbon-neutral, and energy derived from biomass, which is not a carbon-neutral process. Simply knowing the percentage of Class I, II and III sources required to be in CCSU's fuel mix does not provide an accurate estimate of the associated GHG emissions. In the future, it is assumed that the State of CT will have a better understanding of the actual fuel mix used by its suppliers to meet these standards and CCSU should incorporate this information into its GHG inventory.
  - Continue its current relamping program which converts T-12 fixtures/lamps to T-8.
  - CCSU has retrofitted 500 fixtures with LEDs. Over the product life costs and carbon emissions will be reduced.
  - Continue to phase out old electronic equipment with Energy Star rated equipment per CCSU's procurement policy.
  - Continue to periodically assess the option of producing cogenerated electricity and steam from the three 1250 kW gas engines and heat recovery steam generators in the Energy Center. The GHG emissions associated with the on-site production of electricity derived from natural gas are much lower than the GHG emissions associated with the electricity generated by the New England Power Pool System (which contains at least 15% coal production). The transmission and distribution losses are lower for on-site generation as well.
  - Continue to improve lighting controls in all buildings by installing occupancy sensors, stand-alone or energy management system compatible timers, and daylight harvesting sensors and controls.
  - Conduct scheduled HVAC system upgrades and continue to identify equipment that is aging and inefficient and plan for the replacement of this equipment.
  - Examine the ability to reduce campus electricity demand by closing down certain buildings during holidays and breaks.
  - Explore the feasibility of creating a campus-wide energy management system.
  - Create a policy for the proper use or discontinued use of portable electric heaters and window air-conditioning units. Continue to inspect work areas to ensure that CCSU is compliant with Occupational Health and Safety Administration (OSHA) regulations regarding the use of portable space heaters.
  - Continue to promote energy conservation at the student/faculty/staff level through a various campaigns to drive culture change. The *AASHE Cool Campus!*<sup>5</sup> guide states that a multi-faceted campaign should include as many media as possible including:

---

<sup>5</sup> AASHE, *Cool Campus! A How-To Guide for College and University Climate Action Planning*. 2009.

- 
- Campus-wide actions and events
  - Newspaper articles and columns
  - Classroom presentations
  - Campus energy conservation program website and building dashboards
  - Creative signage
  - Use of campus media, including WFCS
  - E-mail blasts
  - Social media such as Facebook groups and instant messaging
  - Residence halls and academic building competitions
  - Publicity stunts
- Provide Facilities contact information to faculty/staff/students and encourage campus community members to contact the Facilities department if buildings/rooms are too hot or too cold.

It is estimated that the successful implementation of the energy efficiency and conservation activities can reduce GHG emissions from purchased electricity to 20% below FY 2008 purchased electricity levels by FY 2015. In addition, upon having a better understanding of CCSU's fuel mix and making appropriate purchasing decisions based on these findings, it is estimated that CCSU can reduce GHG emissions from electricity to an additional 10% below 2008 levels for a total of 30% below FY 2008 purchased electricity levels. To achieve these goals in a linear fashion, this will require that CCSU decrease GHG emissions from purchased electricity by approximately 5-6% per year. This would result in a savings of 3,584 MT eCO<sub>2</sub> annually by 2015.

#### **3.3.1.4 Other Measures**

In addition to the strategies listed above, CCSU will implement the following additional projects in **Table 3-2** in order to reduce GHG emissions from these minor sources during Phase I:

**Table 3-2: Additional Phase 1 Mitigation Measures**

| GHG Source          | Strategy   | Goal  | Annual MT eCO <sub>2</sub> savings by 2015 |
|---------------------|--|---|--|
| Faculty Commuting   | <ul style="list-style-type: none"> <li>• See measures in 3.3.1.1 – Student Commuting</li> <li>• Explore possibility of telecommuting for 1 or more days per week for certain employee types</li> </ul>   | Reduce faculty commuting by 15% below 2008 GHG emission levels. | 544  |
| Motor Vehicle Fleet | <ul style="list-style-type: none"> <li>• Expand the Green Pay Day policy to ground campus vehicles for 1 day per week</li> <li>• Improve accuracy of methodology currently used to estimate GHG emissions from fleet travel and implement appropriate recordkeeping measures</li> <li>• Create a policy for the purchase of more fuel efficient vehicles, such as zero emission vehicles (ZEVs) and partial-zero emission vehicles (PZEVs), as older vehicles are phased out.</li> </ul> | Reduce vehicle fleet by 20% below 2008 GHG emission levels.     | 52   |
| Air Travel          | <ul style="list-style-type: none"> <li>• Improve accuracy of methodology currently used to estimate GHG emissions from air travel and implement appropriate recordkeeping measures</li> <li>• Reduce annual airline miles traveled by 10%</li> </ul>   | Reduce air travel by 10% below 2008 GHG emission levels.        | 314  |

### 3.3.2 Phase 2 Strategy

During Phase 2, CCSU's goal is to reduce annual GHG emissions to 50% below 2008 levels for a net total of 22,320 MTeCO<sub>2</sub> annually by the year 2025. According to BAU emission projections, this represents a 56% decrease under FY 2025 projected BAU emissions. To achieve this goal, CCSU will build upon the studies performed and data gathered during Phase 1. While CCSU has not yet identified the specific projects that it will implement to meet this goal, it has broken down this goal into the following sub-goals listed in **Table 3-3** in order to guide future mitigation projects.



**Table 3-3: Phase 2 Mitigation Goals and Strategy**

| GHG Source   | Goal   | Additional Annual MT eCO <sub>2</sub> Savings upon Phase 1 levels by 2025 |
|--|--|---|
| Student Commuter Miles   | Below 2008 levels by 35%                       | 2,034   |
| Faculty/Staff Commuter Miles   | Below 2008 levels by 25%                       | 363   |
| Motor Vehicle Fleet  | Below 2008 levels by 30%                       | 26  |
| Thermal Energy Conservation and Efficiency Measures  | Below 2008 levels by 30%                       | 3,273   |
| Electrical Energy Conservation and Efficiency Measures, Renewable Energy Purchase/Generation and Associated T&D Losses | Below 2008 purchased electricity levels by 60% | 7,524   |
| Air Travel   | Below 2008 air travel levels by 20%            | 314   |

**3.3.3 Phase 3 Strategy**

During Phase 3, CCSU's goal is to reduce net annual GHG emissions to become "climate neutral" by the year 2050. According to BAU emission projections, this represents an additional annual reduction of 46,290 MT eCO<sub>2</sub> upon year 2025 levels. CCSU does not anticipate that it will be possible, even in the future, to be considered "carbon neutral" without the help of offsets and anticipates that of projected BAU 2050 GHG emission levels; approximately 25% of gross GHG emissions will be offset. CCSU will work within the climate action planning framework using the strategies for prioritization discussed to add further specificity to Phase 2 and Phase 3 mitigation strategies over time.

---

## 4. EDUCATION, RESEARCH AND COMMUNITY OUTREACH

CCSU has a long standing commitment to incorporating sustainability principles into educational, research and community outreach initiatives. CCSU has many examples of past outreach activities that have been performed including sustainability themed articles in community and student newspapers, sustainability themed events, conferences and workshops, poster campaigns, and sustainability focused courses. Much of this information can be located on CCSU's sustainability web site (<http://www.ccsu.edu/page.cfm?p=3630>). This section of the CAP provides a description of CCSU's plans to continue to perpetuate climate neutrality themes as part of the curriculum and student educational experiences and to expand research, community outreach and other efforts toward the achievement of climate neutrality.

### 4.1 EDUCATION

Developing and sponsoring educational events, as well as including sustainability concepts into the curriculum and student environment, have been long standing goals at CCSU. There have been numerous examples of past initiatives in this area and similar initiatives continue to be part of CCSU's mission. **Table 4-1** identifies selected educational events and courses included in the current curriculum at CCSU. The table provides the type of educational activity, a description of the activity, and how the activity will contribute to the overall goal of climate neutrality and sustainability.

**Table 4-1: Planned Educational Activities at CCSU**

| Educational Activity     | Activity Description   | Purpose   |
|--------------------------|--|---|
| Educators' Workshop      | Pedagogy for a Positive Future: Connecticut Teacher Educators' Workshop on Education for Sustainable Development, October 30, 2009. The School of Education and Professional Studies and the CCSU Center for Teaching Excellence and Leadership Development are co-sponsoring a statewide teacher educators' workshop on education for sustainable development.  | The workshop is designed to help teacher educators and Arts and Science faculty who teach methods and content courses to learn more about sustainability education and how it can be incorporated into the curriculum to prepare teacher candidates.                    |
| Sustainability Symposium | 3rd Annual Global Environmental Sustainability Symposium: A Green Economy for a Sustainable Future, April 5, 2010.   | The Global Environmental Sustainability Symposium's goal is to empower the CCSU community and citizens of the world with awareness and the knowledge need to move our society towards a harmonious existence with the Earth.  |
| Residence Halls          | <ol style="list-style-type: none"> <li>1) Present Resident Advisors with information about campus sustainability, as well as the plan for the residence halls.</li> <li>2) Promote sustainability in the halls with programs, to potentially include green games, and student participation in film productions Media Services has planned around sustainability.</li> <li>3) Complete baseline measures of energy use and recycling.</li> <li>4) Launch a focus on reducing food waste. Themes may involve promoting eating more locally, eating lower on the food chain, and/or avoiding the "freshman fifteen". Food scrape days will continue at specified locations, and tray-less days are planned.</li> <li>5) Have a dedicated energy reduction month in November 2009. Each residence hall works to reduce energy consumption and the points go towards the Dean's Cup Award.</li> <li>6) Have a trash reduction month in December, ending with a "moving out—don't throw it out—exchange it" event, where people can take clothing, furnishings, and other reusable items. Students can then browse and pick up what they want.</li> <li>7) Donations from the December event will be made in January.</li> </ol> <p>CCSU will continue to participate in the national competition for Recyclemania in the Spring.</p> | Increase student awareness of sustainability and climate neutrality and promote student activism. Since students serve as our nation's future leaders, having these activities as part of CCSU's standard operations will perpetuate sustainable activities in society. |

**Table 4-1: Planned Educational Activities at CCSU (Continued)**

| Educational Activity | Activity Description   | Purpose   |
|----------------------|--|---|
| Art Exhibitions      | Ongoing art exhibitions coordinated by the Museum of Art that emphasize sustainable themes.  | Bring sustainable themes to the public using different media.   |
| Curriculum           | <p>Course - Sustainability 501: Current Challenges in Sustainability</p> <p>This course will examine global warming and other societal challenges related to living sustainably within three interacting destructive tendencies of the modern world.</p> | An interdisciplinary course to provide the core science background necessary for understanding current environmental problems in sustainability. Proposals will be presented to the curriculum committee during the Fall 2009 semester.   |
|                      | Course - The ecological crisis; The social crisis: The economic crisis:  | Seminar style course regarding the geographical bases of energy resources and global climate change. Emphasis on the geographical, physical, environmental, economic, and social impacts of energy resource development and use and their effects on global climate regions and sustainability.   |
|                      | Course - Sustainability 502: Science for Sustainability  | An interdisciplinary course to provide the core science background necessary for understanding current environmental problems in sustainability. Global biogeochemical cycles (water, carbon, nitrogen, sulfur), atmospheric chemistry, terrestrial and aquatic ecosystems, biological diversity, and effects of toxics will be featured topics.  |
|                      | In the process of establishing a new course titled Geography 475: Energy Resources & Climate Change.   | Emphasis placed on the degradation and depletion of air, water, and soil resources resulting from the acquisition and utilization of energy resources. Risks and effects to human health relating to energy production and use will be discussed. The environmental politics, economics and ethics of environmental decision-making relating to energy resources/technologies and climate change will also be addressed. Emphasis is placed on the concept of sustainability. |

**Table 4-1: Planned Educational Activities at CCSU (Continued)**

| Educational Activity | Activity Description   | Purpose   |
|----------------------|--|---|
|                      | Developing a proposal to the curriculum committee for a new 200-level course in the discipline of Geography titled Fundamentals of Climate Change during the upcoming academic year. | Introductory course regarding the Earth's climate system. The course will address the science, history, and politics of global climate change.  |
|                      | Working toward the establishment of MS degrees with specializations in Global Sustainability in the disciplines of Geography and Biology.  | Under the Graduate School, two specializations will be developed to allow students to follow their major interest in Biology or Geography. Students will take three core courses and then choose a track with emphasis on science or social issues. |

---

## 4.2 RESEARCH

Using continued University wide course development, departments will encourage research for both faculty and students.

## 4.3 COMMUNITY OUTREACH

Reaching out to the community, both within and outside of the CCSU campus, is an important mission of CCSU's sustainability program. There have been numerous examples of past initiatives in this area and similar initiatives are planned. **Table 4-2** identifies selected planned community outreach events and projects. The table provides the type of outreach activity, a description of the activity and how the activity will contribute to the overall goal of climate neutrality and sustainability.

**Table 4-2: Planned Community Outreach Activities at CCSU**

| Outreach Activity            | Activity Description   | Purpose  |
|------------------------------|--|--|
| School Newspaper             | <u>The Recorder</u> – Submit several featured articles on sustainability and climate neutrality topics annually. The Climate Action Implementation Committee will be responsible for selecting the topic, coordinating with the author, and completing peer reviews. | Distributes the message of climate neutrality to the student population and raises awareness of sustainability practices.  |
| Town Newspapers              | <u>The Herald</u> (New Britain) and <u>Hartford Courant</u> (Hartford) – Submit several featured articles on sustainability annually.  | Both are daily papers with general circulation in New Britain and surrounding towns. Distributes the message of climate neutrality and CCSU's progress toward this goal to the communities surrounding the campus. |
| Radio Communications         | Regularly submit public service announcements on WFCS 107.7 FM, the student run radio station broadcasting in the Campus Student Center and through the state.   | Raises sustainability and carbon neutrality awareness among students and the larger CCSU community.  |
| Business Department Seminars | Seminar scheduled for this Spring with KPMG and our School of Business faculty on Green Initiatives.   | Engages the faculty on potential green initiatives and how to continually incorporate them into the CCSU environment and operations.   |
| Sustainability Web Site      | <a href="http://www.ccsu.edu/searchresults.cfm?keywords=sustainability&amp;x=12&amp;y=11">http://www.ccsu.edu/searchresults.cfm?keywords=sustainability&amp;x=12&amp;y=11</a>  | Raises sustainability and carbon neutrality awareness among students and the larger CCSU community. Communicates current and planned initiatives and how to get involved.  |

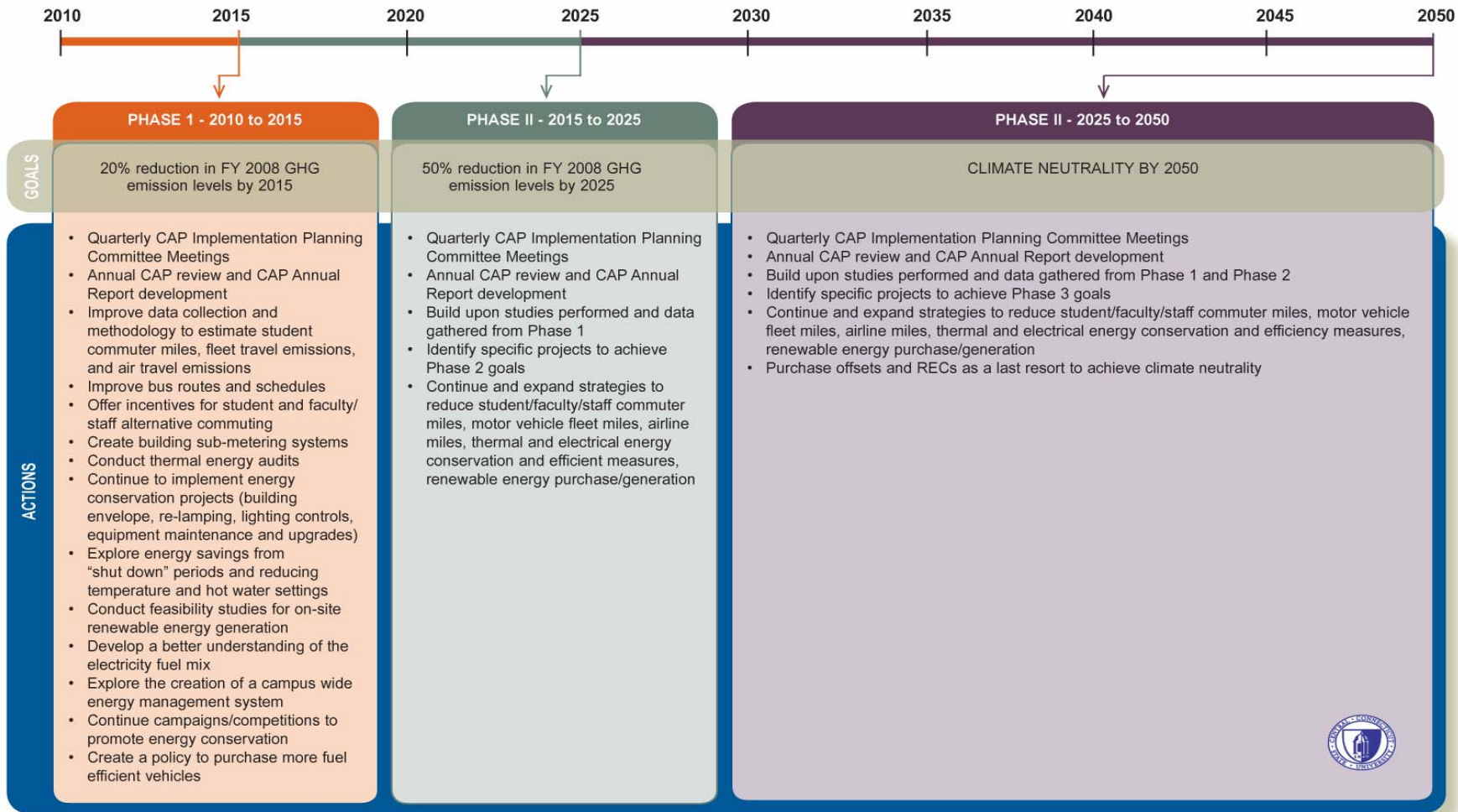
---

## 5. NEXT STEPS

CCSU has been making concerted efforts to institutionalize sustainability and has already taken concrete steps on this path of climate neutrality. As a signatory of the ACUPCC, CCSU is committed to the goals and mitigation strategies outlined in this CAP. The CAP Implementation Committee led out of the Administrative Affairs Division, with support from other associated faculty, staff, and student organizations, will be responsible for the execution of this plan. This CAP is intended to be a dynamic document that will be continually reviewed and updated, as needed. A summary of the goals, mitigation strategies and major milestones associated with the implementation of this CAP is presented in **Figure 5-1**.



**FIGURE 5-1: SUMMARY OF CLIMATE ACTION GOALS AND MITIGATION STRATEGIES**





SEPTEMBER 2009