

2010

JACKSON COMMUNITY COLLEGE

**SUSTAINABILITY &
CLIMATE ACTION PLAN**



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EXECUTIVE SUMMARY

Dear Reader,

The consequences of climate change are grim; floods, droughts, sea level change, loss of biodiversity, and increased extreme weather events all have the ability to drastically disrupt life on our planet.

In 2007, the Intergovernmental Panel on Climate Change (IPCC) declared that warmer temperatures observed over the past 50 years are due to human activities. Moreover, “continued GHG (greenhouse gas) emissions at or above current rates would cause further warming and induce many changes in the global climate system during the 21st century that would very likely be larger than those observed during the 20th century.”¹

Many experts believe that global climate change is the greatest challenge of the 21st century. Nevertheless, this great challenge brings with it great opportunities.

As an institution of higher education it is not only our responsibility to inform students and the community about climate change, it is also our duty to lead by example. Within this Climate Action Plan you will learn about the various ways Jackson Community College is facing this challenge head on, whether it be upgrading our facility to increase energy efficiency or offering programs of study to help train a generation of green workers.

This report should not be read as a statement of the college’s stance on the science of climate change. The science has spoken. Greenhouse gas emissions must be reduced if we wish to maintain a healthy environment. This report should instead be read as Jackson Community College’s pledge to undertake aggressive changes to the way we operate in order to preserve the ecological system that has allowed our species to prosper on this planet.

It is my hope that you read this report and join us in confronting climate change.

Sincerely,



¹ *Climate Change 2007: Synthesis Report Summary for Policymakers - An Assessment of the Intergovernmental Panel on Climate Change (IPCC)*

Achieving Climate Neutrality

Climate neutrality is, by definition, having no net greenhouse gas emissions (GHG) emissions. At Jackson Community College various steps are being taken, and more aggressive steps will be attempted, to reduce our GHG as close to zero as possible. These steps will be taken providing they do not interfere with our ability to assist students in achieving their educational goals.

Presently, absolute GHG elimination is not practical given the college operations and responsibilities. Therefore, the goal of this climate action plan will be to eliminate GHG at the college by the year 2050. This plan is a reasonable amount of time to achieve neutrality given the college's current and projected financial resources as well as the expected advancements in alternative energy and energy efficiency.

This plan will also act as a living document, continuously update over the years to reflect any changes in the college and updates in technology that may further reduce GHG.

JCC's Approach to Sustainability

Jackson Community College has chosen to use a triple-bottom line approach for advancing sustainability on campus. The triple-bottom line approach promotes sustainability by taking into account people (social responsibility), planet (environment awareness), and profits (fiscal responsibility).

Fiscal Responsibility

Energy use, whether it be in the form of electricity, heating/cooling, daily commuting, or air travel, is one the most expensive operational costs the college faces. In fiscal year 2008-2009, the college spent \$1,174,057.08 on heating fuel and electricity.

According to the US Energy Star program, "adopting a strategic approach to energy management can lower your energy bills by 30 percent or more."

The overwhelming majority of the greenhouse gases JCC is accountable for are a result of the burning of fossil fuels for energy use. Therefore, addressing energy efficiency on campus will not only create a substantial cost savings to the college, it will also drastically reduce the college's greenhouse gas emissions.

Environmental Responsibility

The Intergovernmental Panel on Climate Change (IPCC) has stated in 2007 that "climate change is likely to lead to some irreversible impacts. There is medium confidence that approximately 20 to 30% of species assessed so far are likely to be at increased risk of extinction if increases in global average warming exceed 1.5 to 2.5°C (relative to 1980-1999). As global average temperature increase exceeds about 3.5°C, model projections suggest significant extinctions (40 to 70% of species assessed) around the globe."

Given these dire warnings, Jackson Community College has committed to reducing, and eventually eliminating, our contribution to global greenhouse gas emissions. The college will also provide our students and community with the necessary skills and information to adequately cope with any changes that have already resulted, or are predicated to impact, the planet as a result of climate change.

In addition to climate change concerns, this report will look at other environmental impacts from college operations. For example, recycling and resource use reduction are mentioned within this report. While, solid waste reduction does not contribute heavily to climate change (only about 1% of college's GHG emissions are related to solid waste), the benefits to the overall environment should not be overlooked.

Social Responsibility

Social responsibility is vital to maintaining a happy and healthy community, both locally and globally. JCC's values consist of integrity, compassion, interdependence, quality, inclusion, service and professionalism. These values advance ethical decision making and promote a working environment that embraces sustainability.

JCC is following through with its vision of meeting the needs of the community by committing to reducing its greenhouse gas emissions and incorporating sustainability into its curriculum to prepare students to succeed in green jobs.

By promoting a culture of environmental stewardship, the college hopes it will encourage its students and staff to reduce their own greenhouse gas emissions, thereby creating a healthier environment for our community and planet.

GHG Inventories

Greenhouse gas inventories have been completed for 2008 and 2009. The full reports are available online at the ACUPCC reporting website: <http://acupcc.aashe.org/>.

The results of the reports have shown that the majority of greenhouse gas emissions at JCC are a result of student/employee commuting, electricity, and natural gas use. These categories collectively account for 93% of the college's eCO₂.

Moreover, trends have shown (see Table 1) that the college's carbon footprint has steadily increased from 2003-2009. These figures are almost surely due to an increase in the college's size. For instance, the college's student population has grown from 3,158 Fiscal

Year Equivalent Students (FYES) in 2003 to 4,745 FYES in 2009. Also, during this time total building square footage increased from 519,461 sq. ft. to 624,611 sq. ft.

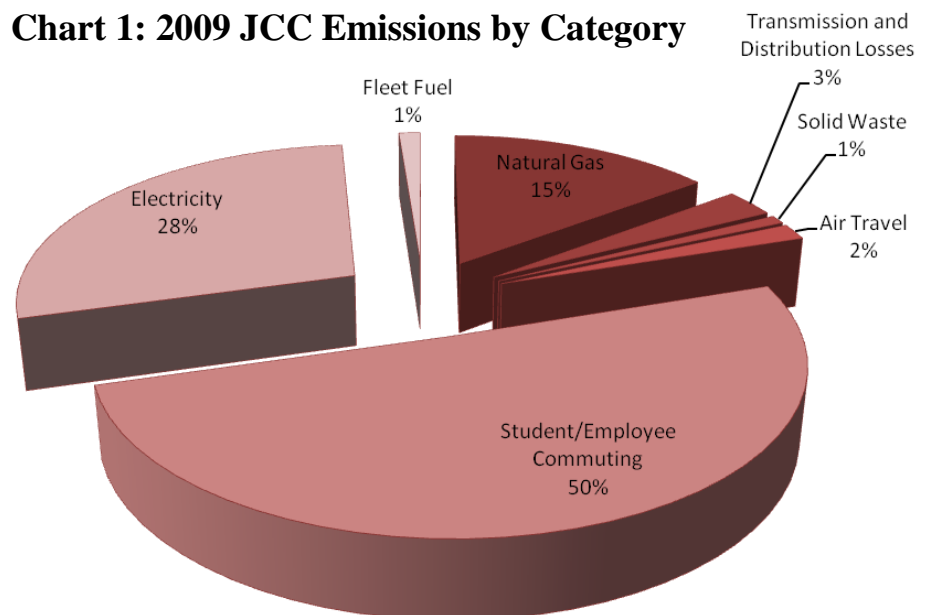
Emissions Targets

Jackson Community College's GHG reduction targets are organized by scope. Scope 1 emissions include stationary combustion (natural gas for heating/cooling), mobile combustion, process emissions, and fugitive emissions. Scope 2 emissions account for purchased electricity, purchased heat, purchased cooling, and purchased steam. Finally, Scope 3 accounts for emissions resulting from employee and students commuting, air travel, and solid waste.

The emission scope will likely determine the institution's ability to reduce emissions. For example, scope 1 and 2 emissions are emissions that are more directly associated with activities by or within the institution, whereas scope 3 emissions are all indirect emissions that are a consequence of the institutions activities.

JCC can have more of a direct impact on operations

Chart 1: 2009 JCC Emissions by Category



and, thereby can have a greater ability to reduce scope 1 (i.e. heating/cooling) and scope 2 emissions (i.e. electricity) than it would scope 3 (i.e. employee and student commuting.)

This logic led the college to schedule its emissions reduction targets by scope – leaning more heavily on reducing scope 1 and 2 emissions in the earlier years and scope 3 emissions in the later years of the action plan. (Table 2)

Please note, even though the college plans to focus short-term on scopes 1 and 2 it has made, and will continue to make attempts, to reduce scope 3 emissions; specifically commuting.

Target 1: 10% by 2015; reduce the college’s Scope 1 and Scope 2 emissions 10% below reported 2008 levels.

Target 2: 20% by 2020; reduce the college’s Scope 1 and Scope 2 emissions 20% below reported 2008 levels.

Target 3: 40% by 2030; reduce all Greenhouse gases 40% below 2008 levels.

Target 4: 60% by 2040; reduce all Greenhouse gases 60% below 2008 levels.

Target 5: 75% by 2045; reduce all Greenhouse gases 75% below 2008 levels.

Target 6: 100% by 2050, by 2050 Jackson Community College will be carbon neutral.

implement to meet its **Target 1** goal, 10% by 2015 goals.

Greenhouse gas mitigation strategies at JCC will be divided up into four categories:

Energy Conservation (EC)

Comprehensive and ongoing strategies will be carried out to ensure the college uses energy efficiently, thereby reducing its reliance on fossil fuels and release of greenhouse gases.

Waste Reduction (WR)

JCC commits to reducing the amount of solid waste sent to the landfill.

Alternative Energy (AE)

Alternative sources of energy will be investigated and put into practice in order to reduce the college’s reliance on fossil fuel based electricity and heating/cooling.

Commuting (CM)

Actions will be implemented to reduce the number of single user automobiles used for travel to/from campus.

Carbon Mitigation Strategies

The following strategies represent immediate approaches to climate mitigation the college will

2010: Target 1 Actions

EC 1: Energy Efficiency Facilities Improvement

Overview: Commercial buildings in the U.S. are responsible for about 18% of U.S. greenhouse gas emissions. Furthermore, 30% of the energy used is used inefficiently or unnecessarily. Lack of insulation, inefficient heating and cooling systems, and obsolete lighting can cause buildings to use much more energy than is needed.

JCC facilities employees and the Director of Sustainability will conduct an internal audit to identify energy inefficient areas at the college they believe qualify for an upgrade based on energy use.

As described in the article *Green Starts with Energy: It's Simpler than you think*, a sequenced approach to reducing energy use in a building is the most logical and effective way to proceed. Accordingly, the college will focus on addressing lighting and tuning control systems in the short term. Lighting and control systems upgrades are also currently an attractive choice for the college because its utility provider, Consumers Energy, is offering large financial incentives for upgrades.

Once the college believes it has exhausted all opportunities in lighting and control systems upgrades it will then move on to addressing reducing loads, improving fan and motor systems, and upgrading large building systems.

If an internal energy audit fails to deliver at least 10% energy conservation savings, measured in dollars during the first two years, an external energy consultant will be budgeted to perform a more comprehensive audit.

Performance Measurement: Electricity (kWh) and natural gas (MBTUs) total used as a function of building square footage and student population.

Initiate Strategy: Immediately

Department(s): Sustainability and Facilities



EC 2: Employee Energy Awareness Program

Overview: Many employees aren't aware of the plentiful energy saving opportunities that surround them at the workplace. Nor are they mindful of the environmental damage these actions create. Awareness and education programs will play an important role in creating energy conscious employees.

The Department of Sustainability will develop an employee energy awareness program similar to the US DOE EERE Federal Energy Management Program (FEMP). The objective of the employee energy awareness program is to instill energy efficiency as a basic value of the organization.

The college will generate habitual behavior amongst the employees and make simple energy saving tasks second nature. The program will begin by targeting specific energy inefficient behaviors that lead to excessive energy use on campus. Initial efforts will be aimed at specific energy inefficient areas that can easily be changed with straightforward behavioral adjustments. These areas will include but not be limited to the following: space heaters, lighting, and shutting down office equipment on nights and weekends.

Performance Measurement: Electricity (kWh) and natural gas (MBTUs) total used as a function of building square footage and employee population.

Initiate Strategy: Immediately

Department(s): Sustainability and Marketing

WR 1: Increased Recycling Capacity

Overview: JCC’s Facilities Department has an established recycling program that can manage the recycling of a variety of materials. However, there is still great potential for improving the overall amount (tonnage) of recycling at the college.

JCC has been recycling paper since at least the 1980’s. The college started with plastics in October of 2008 and cardboard in August 2009. They have been recycling metals, ballasts and batteries for several years, and we began to recycle skids in August of 2009. The college also accepts old batteries to be recycled.

“Convenience” is often cited by the public as the number one reason for deciding to recycle. Therefore, to increase the amount of material recycled, the college will need to focus on adding additional recycling bins and receptacles to compete with the waste bins.

To encourage recycling and further compel the college to gather data on recycling the college will participate in RecycleMania in 2011. RecycleMania is a friendly competition and benchmarking tool for college and



university recycling programs to promote waste reduction activities to their campus communities. Over a 10-week period, schools report recycling and trash data which are then ranked according to who collects the largest amount of recyclables per capita, the largest amount of total recyclables, the least amount of trash per capita, or have the highest recycling rate. With each week’s reports and rankings, participating schools watch how their results fluctuate against other schools and use

this to rally their campus communities to reduce and recycle more. (source: <http://www.recyclemaniacs.org/overview.htm>)

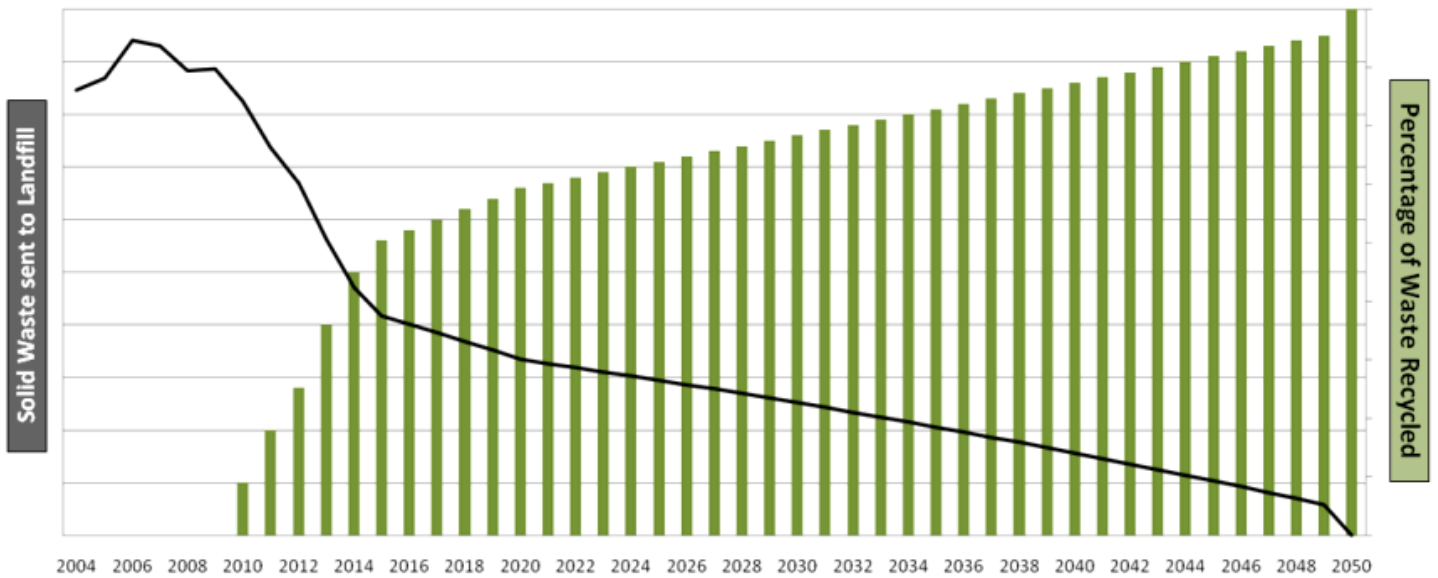
Performance Measurement: Amount of recyclables per capita, total recyclables, trash per capita, and recycling rate

The table on the right outlines the recycling goals for JCC. The goals are in percentage of waste recycled.

Goal	Year	
28%	2012	2009 Average Recyclemania Participant Rate
56%	2015	2009 Average of the Top 5 participants in Recyclemania Rate
66%	2020	2009 Average of the Top 20 participants in Recyclemania Rate
100%	2050	Zero Waste Landfilled

Initiate Strategy: Steadily increasing over time

Department(s): Sustainability and Facilities



WR 2: Composting and biodegradable products

Overview: The goal of a composting will be to divert dining and food waste from landfills. The Department of Sustainability will work with the college’s dining service provider and the Facilities Department to arrange a system to effectively compost food waste.

The compost resulting from program can be used in planned student and community gardens. Excess compost can also be offered to college staff for personal use. The program will be assessed cost savings from reduced waste removal fees. The positive savings from the reduced fees will be used to offset the increased cost of biodegradable dining products.



Caution should be taken when purchasing products labeled “environmentally friendly”, “eco-friendly”, “green”, etc. Products with these types of labels are notoriously misleading in their advertising due to a lack of a strong eco-labeling agency. Biodegradable products purchased by the college must be able to be composted along with food waste. All products planned to be composted should be ASTM D6400 tested and approved by the Director of Sustainability.

Performance Measurement: Food related waste diverted from landfill, cost savings from reduced waste removal fees.

Initiate Strategy: After initial recycling goals are reached.

Department(s): Dining Services, Facilities, Sustainability

AE 1: Small Wind/Solar Equipment Installations

Overview: The college plans to install a small wind energy system on the south side of Emmons Road, north of Justin Whiting Hall. The college plans to install a 10kW Bergey Excel turbine mounted on an 80 ft self supporting lattice tower.

Primarily, this wind turbine is being erected as an educational device to be used in the training of alternative energy skilled workers. The JCC Alternative Energy Program will help the college stay up to date on changing technology which can lead to new and innovative energy sources.

Secondly, the system will be used to generate, non-polluting electricity for use at the college. Any excess electricity generation will be supplied back to the utility grid.

Performance Measurement: kWh created, GHG emissions offset

Initiate Strategy: Immediately

Department(s): Sustainability, Facilities



AE 2: Large-scale alternative energy projects at the college

Overview: Large-scale alternative energy systems will be vital to the college achieving climate neutrality. These projects will include, but not be limited to, large scale wind (>100kW), photovoltaic array(s), geothermal energy systems, and solar thermal energy systems.

Additional, grants are expected to be a major source of funding for large-scale alternative energy projects.

Performance Measurement: kWh created, GHG emissions offset

Initiate Strategy: Long-term

Department(s): Sustainability, Facilities

CM 1: Increase public transportation options and ridesharing

Overview: JCC has an online ridesharing web address through ZipRide at jccmi.zipride.com. Only JCC students can use the site. The site was created to match commuting students and/or employees with one another for carpooling. However, there has been little to no success with the site. If the site is going to be successful additional marketing of the service should be carried out.



JCC will also explore expanding Jackson Transit Authority (JTA) bus routes to campus. In addition, JCC will

help to market JTA services on campus. Recently, at an on campus event bus schedules were handed out and a drawing was held for two free monthly bus passes.

Performance Measurement: Carpooling usage (available from ZipRide and surveys) and Bus usage

Initiate Strategy: Immediately

Department(s): Sustainability and Marketing

A Note on Commuting

The single greatest category of GHG emissions by JCC is commuting. As a community college it is unrealistic to make far-reaching reductions in emissions without radically altering the college's educational model or impairing the college financially through the purchase of mass amounts of offsets.

JCC must rely on social and technological progress in transportation for a considerable reduction in GHG to occur. Specifically, widespread social acceptance of mass transportation and carpooling, as well as increased fuel efficiency standards and alternative fuels.

Furthermore, flexible summer work schedules (i.e. 4 day work weeks) and online meeting technology will be explored to establish feasibility.

Sustainability & Alternative Energy Curriculum

Making climate change neutrality and sustainability a part of the curriculum and other educational experiences for all students is a requirement of the ACUPCC.

JCC has allocated the majority of its sustainability efforts over the past year into developing a top-quality alternative energy degree program. The degree in Alternative Energy and most of the

courses will be offered for the first time in the fall 2010 semester.

Most courses will be offered in Whiting Hall, a state-of-the-art, sustainably designed educational facility scheduled to open in August 2010.

Alternative Energy Program

The economic potential of the clean energy economy has been an increasingly high profile topic in Michigan and across the nation. Many reports and analyses have predicted high job growth within the alternative energy sector. Not to mention the positive environmental significance of a "green" economy.

Consequently, JCC has created an Alternative Energy Associate's Degree program of study for students pursuing a career in the emerging field of alternative energy.

Courses and labs within this new program will provide students an opportunity to learn theory and skills required to design, install, operate, and maintain alternative energy systems for both residential and small commercial applications. Specific training topics include: energy efficiency, photovoltaic systems, wind turbines, geothermal systems, solar thermal systems, bio-fuels, and hydrogen fuel cells.

Typical job opportunities may be found with firms that produce parts, components, products, and/or services, including installation and distribution of alternative energy systems.

Courses

The following courses will be offered in the 2010-2011 academic year:

Introduction to Sustainability, STM 101, Credits: 3
Students familiarize themselves with environmental issues facing our community, state, country, and planet. This course provides a meaning to the term “sustainability” and builds skills so that the leaders of tomorrow can protect the earth’s resources and meet the needs of humanity indefinitely. This course is an introduction to both the scientific and social sides of environmental problems the world faces, with a specific aim at establishing a foundation in environmental comprehension and further learning within the topic of sustainability.

Principles of Alternative Energy, ALT 200/ELT 160, Credits: 3

This course introduces students to alternative energy systems and their design and application. The course focuses primarily on wind turbines, solar systems, and hydrogen fuel cells. A basic understanding of electricity is highly recommended.

Fundamentals of Energy Efficiency, ALT 210/CCT 160, Credits: 2

This course explores the fundamentals of designing and maintaining an energy efficient building to reduce a homeowner or business’s cost of utilities. Students learn techniques to identify wasted energy and the methods needed to modernize an energy inefficient home.

Energy Audit Techniques, ALT 215/CCT 162, Credits: 3

This course explores the necessary knowledge and skills to conduct a building energy audit. The class covers the operation of the latest building science technology and equipment to identify heating, cooling, base load, and air leakage problems in a building.

Wind Energy, ALT 250/ELT 163, Credits: 3

In this course students gain many of the skills necessary to install a residential wind turbine system. Topics include siting wind turbines, turbine components, estimating turbine electricity output, loading, battery, inverters, and off-grid/grid-connected systems. Labs include hands-on activities with turbines and electrical equipment. Prior electrical skills and knowledge are required to be successful in this course.

Solar Energy, ALT 255/ELT 166, Credits: 3

This course explores the design, installation, and maintenance of photovoltaic (PV) systems. Topics include site survey and assessment, estimating solar array electricity output, inverters, battery systems, and off-grid/grid-connected systems. Labs include hands-on activities with solar panels and electrical equipment. Prior electrical skills and knowledge are required to be successful in this course.

Geothermal Energy & Systems, ALT 260/CCT 165, Credits: 2

This course explores the basics of geothermal energy production, theory, and technology. Residential system installation, maintenance, and problem diagnosis is covered.

Solar Thermal Energy & Systems, ALT 265 /CCT 167, Credits: 2

This course explores the basics of solar thermal energy technology and application. The class covers system installation, maintenance and problem diagnosis.

Alternative Fuels, ALT 270 /AUT 160, Credits: 3

This course is an overview of alternative fuels used in automobiles and light trucks. Students learn about various alternate fuels, their effect on exhaust emissions, their effect on the environment, the economic impact of alternate fuels, and how they contribute to the reduction of importing foreign oil. Topics include hydrogen, fuel cells, natural gas (CNG & LNG), propane (LP gas), ethanol, methanol, and biodiesel.

Additional Sustainability Curriculum Integration

In addition to the alternative energy and sustainability courses and programs, the topic of sustainability has been integrated into other courses at JCC.

Faculty members across the curriculum at the college have incorporated the subject of sustainability into their coursework.

For example, at the request of English faculty, the Director of Sustainability has given lectures to students to promote environmental awareness and inform of JCC sustainability initiatives and programs. Based on these presentations, students have chose to write research papers on various topics within sustainability like recycling, renewable energy, alternative fuels, and green buildings.

Sustainable Earth Action League (S.E.A.L.)

S.E.A.L. is a student group created by Christina Henry (A.S. '10) in the winter of 2010 with the mission of encouraging, planning and implementing innovative and sustainability projects on the JCC campus or elsewhere in the surrounding community.

S.E.A.L. events and projects are designed to be environmentally sustainable and with respect of JCC's goals towards climate neutrality. Events and projects have been used to promote awareness of environmental concerns.



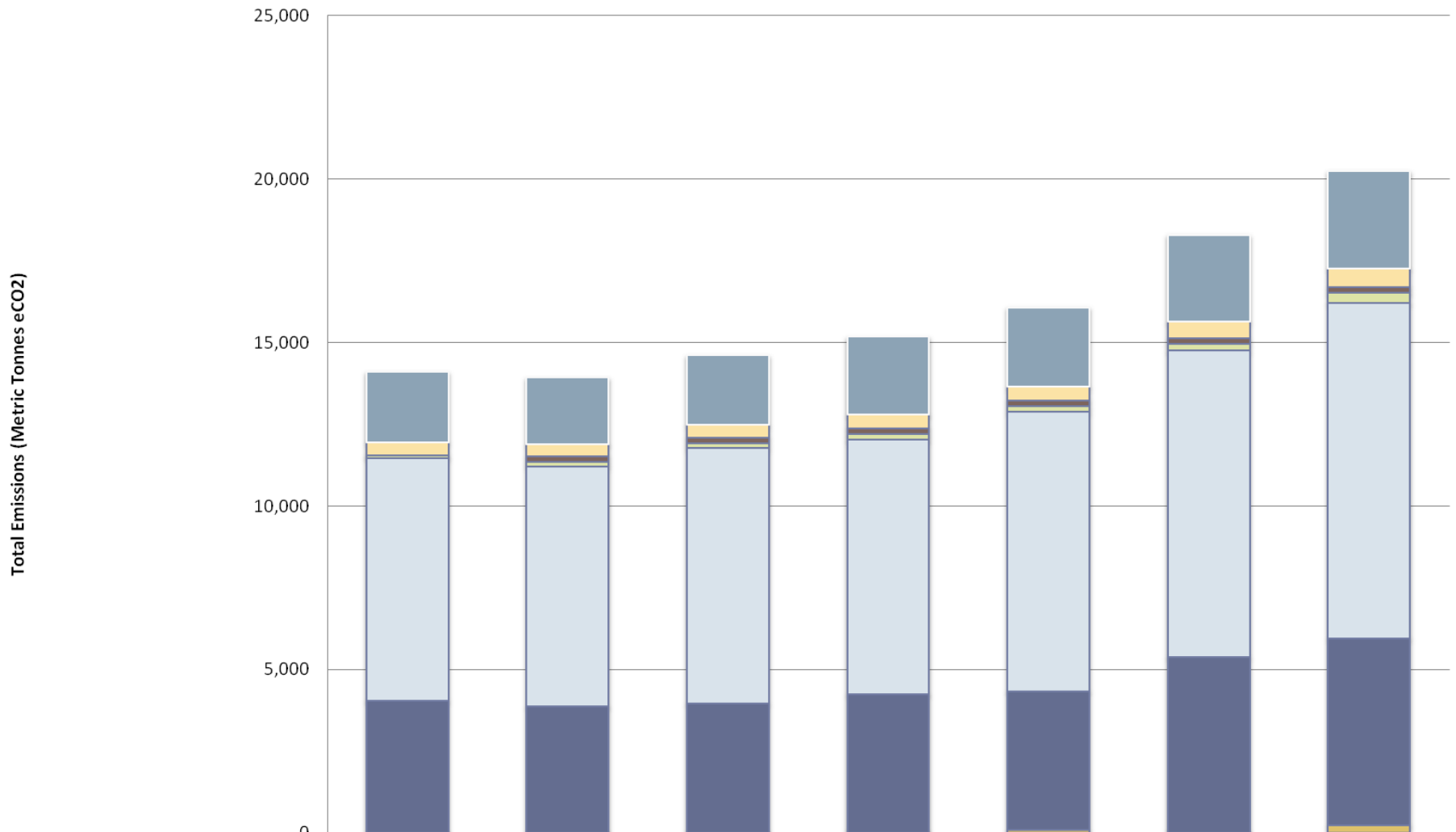
**If you have any questions
or comments please contact:**

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Table 1: Yearly GHG Emissions by Category for Jackson Community College



	2003	2004	2005	2006	2007	2008	2009
On-Campus Stationary	2,155.9	2,043.2	2,127.8	2,385.4	2,432.5	2,655.8	2,980.4
Scope 2 T&D Losses	396.0	377.7	386.3	413.7	420.3	525.3	565.4
Solid Waste	-	165.1	169.6	183.7	181.4	172.4	173.0
Directly Financed Outsourced Travel	97.4	133.7	161.3	175.5	167.0	196.9	326.7
Commuting	7,410.5	7,342.3	7,803.7	7,771.9	8,548.3	9,358.8	10,253.1
Purchased Electricity	4,003.9	3,819.2	3,905.9	4,183.2	4,249.8	5,311.5	5,717.0
Direct Transportation	56.0	62.0	66.8	73.0	88.9	85.0	243.4

Table 2: GHG Reduction Targets by Scope for Jackson Community College

