

AQUINAS COLLEGE

Climate Action Plan

December 8, 2015

This document is intended to serve as an update to Aquinas College's 2010 Climate Action Plan. Outdated information was removed and can be found in either the 2010 document or subsequent Progress Reports.



Grace Hauenstein Library

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Acknowledgements

The Aquinas College Climate Action results from the efforts of many members of the Aquinas community and others who share our commitment to the future.

Executive Summary

Alongside the college community, The Center for Sustainability at Aquinas College has established a series of feasible and measureable goals as a means of managing the College's effort toward carbon neutrality. As an institution, Aquinas has set the goal of climate neutrality by 2040. This goal will require the elimination and offsetting of approximately 9,810 metric tons of carbon dioxide equivalent. Based on Aquinas' updated carbon footprint, the college must eliminate 8,364 metric tons of carbon dioxide equivalent over the next 25 years.

Our 25-year Climate Action Plan focuses on strategic actions which will reduce carbon emitted as a result of activities across the college. Our plan also addresses our obligation to continue to design, promote and extend learning opportunities which will educate and inform the college community as well as our neighbors about climate change and sustainability. Our key action arenas include: Human Factors, Leading & Learning, Built Environment, Land Use, Materials Recovery, and Transportation.



Photo Credit: Andris Visockis

Implementation Introduction

Aquinas College is an educational institution rooted in heritage and place. Our campus is nestled among hardwood and coniferous forests in urban Grand Rapids, Michigan, with two creeks running through the heart of campus as well as an active pond community. Guided by the four charisms of the Dominican tradition (prayer, study, community and service) and the insights of liberal arts education and scholarship, members of the Aquinas community serve as stewards of our place on the planet as well as champions for sustainability.

In light of global concerns regarding the anticipated effects of climate change, Aquinas College community members recognize the need for immediate, decisive, and global action to mitigate the effects of climate change. Aquinas has set milestones for achieving carbon neutrality by 2040. Our 25-year Climate Action Plan focuses on six key arenas of action: The Human Factor, Learning and Leading, Built Environment, Land Use, Materials Recovery, and Transportation.

No single strategy will allow Aquinas College to fully meet its objectives. Instead, a diverse portfolio of strategies—including operational, technical, educational, behavioral, and financial approaches—comprise our approach for each of the six key arenas identified above. All of these approaches will require resolve, partnership, and persistence throughout the planning period.

Former Aquinas College President C. Edward Balog signed the Presidents' Climate Commitment in 2008. Since that time, a number of GHG reduction and climate change education strategies have been implemented. These early successes have helped to engage student activism, foster faculty scholarship and promote greater partnering among representatives from various campus departments. We believe these early outcomes were made possible through information-sharing and collaboration between the college's three standing Sustainability Committees, which are embedded in the bylaws of Aquinas College's tripartite governance structure. Moving forward, our habits of transparency, commitment, and accountability will be essential for effectively implementing a comprehensive Climate Action Plan and meeting the complex challenges of achieving carbon neutrality.

Due to its long-term planning horizon and indeterminate factors such as rates of behavioral change and technological innovation, our Climate Action Plan will be reviewed on an annual basis and updated to reflect progress, as well as to meet challenges and capture opportunities presented by changing circumstances and conditions. Aquinas College will follow up this Climate Action Plan with regular greenhouse gas inventories and milestone reporting.



Defining the Scoping Boundaries of Aquinas College

In order to maintain consistency during the implementation of this Climate Action Plan, we consider the following to be within the organizational boundaries of Aquinas College unless

otherwise noted:

<p>Scope 1: Direct Emission Sources</p> <ul style="list-style-type: none"> • On-Campus stationary sources (Natural Gas) • Direct transportation sources • Fugitive Emissions from HVAC recharge • Fertilizers used on campus grounds 	<p>Scope 3:</p> <ul style="list-style-type: none"> • Daily commuter traffic – student • Daily commuter traffic – staff and faculty • Directly Financed Outsourced Travel • Study Abroad Travel • Solid Waste Disposal • College Financed Copy Paper Use
<p>Scope 2: Indirect Emission Sources</p> <ul style="list-style-type: none"> • Electricity use 	

The Aquinas College Approach to Climate Action Planning & Implementation

This document represents one iteration of the Aquinas College Climate Action Plan (CAP). The momentum for implementing our plan will draw upon the efforts and process which are embodied in our institutional commitment and attention to redesign and continual improvement for sustainability. So while our Climate Action Plan sets vision and targets for the years and decades to follow, its content is determined through an adaptive process—one which responds to changing conditions.

The actions proposed in this plan were instigated, in part, by the results of a design charrette on sustainable energy funded by the Wege Foundation in cooperation with Second Nature. Held January 29-30, 2009, the charrette included key members of the Aquinas community, including individuals serving on Aquinas’ standing sustainability committees and those with direct responsibilities in the key action arenas. Furthering the work of the charrette and setting reduction goals for this first Climate Action Plan, the Center for Sustainability tapped into the expertise of campus community members. Utilizing Aquinas College’s community expertise, four phases of strategic action for six tactical arenas were established. These phases and tactical arenas are described below. A collection of specific strategies have been identified for each key action arena and are provided in Appendix B.

Action Phases and Temporal Boundaries

Phase Two Strategies: (1-10 years)

Action steps in this category are moderately cost effective or require existing infrastructure to be in place before implementation. Phase Two strategies begin to incorporate a transition toward alternative and renewable energy technologies, both onsite and in partnership with regional resources.

Phase Three Strategies: (10-20 years)

Broad goals support these strategies which will require significant financial investment. These strategies continue an effort to integrate alternative and renewable energy in the Aquinas College sustainability portfolio.

Phase Four Strategies: (20-30 years)

Phase Four strategies are intended as “clean up” strategies. Aquinas College maintains the long-term prospect of carbon neutrality, but also acknowledges the reality that any organization, no matter how environmentally conscious, will still generate an environmental impact. Phase Four of the Climate Action Plan focuses on the purchase of green power and renewable energy credits or carbon offsets as a final effort toward achieving carbon neutrality.

Detailed descriptions, relevant scope and emissions category as well benefits of feasible and appropriate strategies are included in Appendix B. Illustrative examples of these strategies are included below.

Tactical Arenas

1) The Human Factor (energy conservation through behavioral change, education, and incentives)

2) Learning & Leading Strategies (curriculum development, educational programming, research and community outreach supporting improved understanding of sustainability as well as climate change, deployment of carbon reduction strategies and sustainable business practices; administrative policies supporting the Climate Action Plan)

3) Power Management and Procurement (reduced carbon footprint through information analysis and sourcing of low-carbon or “zero-carbon” energy)

4) The Built Environment (energy efficiency through mechanical retrofitting and deferred maintenance programs, design, renovation, and construction of efficient buildings)



*Aquinas Energy Design Charrette
Photo Credit: Center for Sustainability*

5) Transportation (alternative transportation programs for commuters)

6) Materials Recovery (reduction of waste to landfills through green purchasing, recycling, and composting)

The Climate Action Plan as a Working Document

The Climate Action Plan has been conceived as a “living” and aspirational document. This Climate Action Plan will:

- Target milestones through a structure of five-year time blocks;
- Propose graduated stages of reduction in greenhouse gas emissions;
- Reflect opportunities for “mid-course corrections” that may arise in implementing the plan over time;

- Employ strategies to continually modify the physical campus and encourage behavioral change before the enrollment/purchase of renewable energy credits (RECS) or carbon offsets.

Uncertainties of the AQ Climate Action Plan

Despite our confidence in the appropriateness of the assumptions which have shaped this plan, we recognize that uncertainties exist. First, our emissions projections are subject to: a lack of comparative carbon footprint data; unknown future enrollment; unknown campus expansion or contraction (through real estate acquisition or sale, mergers, et al.) Second, we cannot forecast efficiencies or availability of future technology. Third, the approach to financing our efforts can only be roughly approximated since future external funding opportunities are unknown and there is a lack of knowledge regarding future cash flows and investment capabilities.

Identified Objectives of Aquinas' Climate Action Plan

Aquinas College has identified the following as encompassing objectives to be addressed in the Climate Action Plan.

Carbon Neutral College Campus

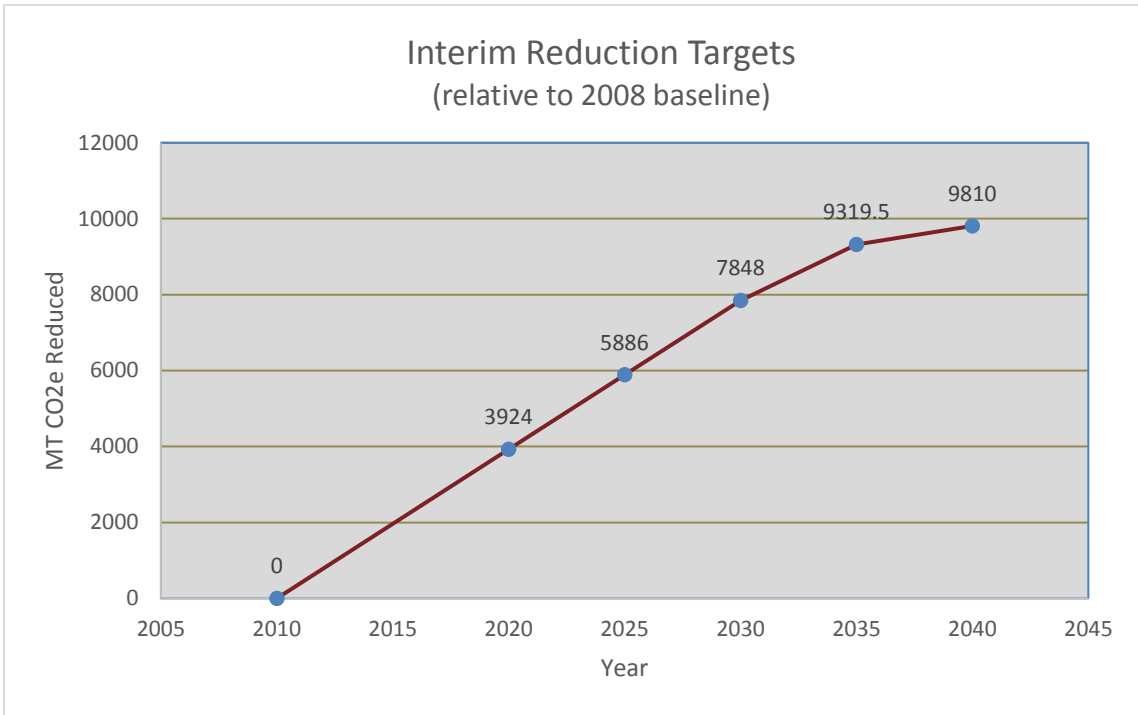
“Carbon neutrality” is the conceptual goal of achieving a contribution of zero emissions (Net Carbon Footprint = Carbon Emissions – (Sequestration Potential + Carbon Offsets) of carbon dioxide and carbon dioxide equivalents (CDE) to the atmosphere. Moving toward carbon neutrality is possible, but can only begin after the full picture is realized. Consider the impact of a growing college. Increased enrollment leads to increased demand on the institution's built environment, equating to a continuously growing carbon footprint. The carbon footprint continues to expand if fossil fuels are burned to produce heat and electricity and to power vehicles. Aquinas' Climate Action Plan strives to reduce our carbon footprint until the operations of the college have no negative impact on our world's climate.

Aquinas College has set a goal of Carbon Neutrality for Scope 1, 2 and 3 emissions by 2040.

Interim Milestone Reduction Targets

Year	% Reduction	Cumulative Reduction Amount (MT CO2e)	Annual Reduction for Milestone Period (MT CO2e)
2020	40%	3924.00	784.80
2025	60%	5886.00	392.40
2030	80%	7848.00	392.40
2035	95%	9319.50	294.3
2040	100%	9810.00	98.10

Note: Milestone reduction targets are only based on a percent reduction from the 2008 baseline and reflect a no-growth scenario for the college. Aquinas College recognizes the limitation of this type of goal-setting; however, without sufficient forecast data, alternate growth scenarios are not able to be predicted at this time.



Zero Landfill Status (90% Diversion)

Aquinas has recognized that a comprehensive measure of an organizational environmental footprint must also consider effect on the flow of material goods in and out of its campus. The college is committed to source reduction or diversion of its solid waste to achieve Zero Landfill Status as set forth by Zero Waste International Alliance (ZWIA). In the context of a college campus, ZWIA encourages source reduction of commodities and selection of commodities that eliminate discharges to land, water or air that may threaten human, animal or plant health. Aquinas College shall make every attempt to segregate, minimize, reuse, repair, rebuild, recycle or compost waste to attain Zero Landfill Status. Our region's improving materials recovery infrastructure, such as the Kent County \$12.5 million single-stream recycling facility opened in September 2010, will support these efforts.

Aquinas College has set a goal for Zero Landfill by 2016.

Greenhouse Gas Inventory Baseline

Introduction:

A carbon footprint analysis measures the amount of carbon emitted due to the operation of an organization, whether it be through heating and cooling, lighting, transportation, and other sources. Taking the time to prepare and execute a carbon footprint analysis is an exacting process, but crucial to acting upon our commitment to sustainability.

Aquinas recognizes the 2007-2008 (Fiscal Year) Carbon Emissions as the effective baseline of carbon emissions for the college. This analysis was prepared through the use of the Clean Air-Cool Planet (CA-CP) calculation tool based upon input data secured through a multi-year collection process. We chose to utilize the CA-CP tool due to its ease of use, thoroughness, and availability of consistent default emissions coefficients. Aquinas' baseline emissions include the following:

Scope 1 Emissions

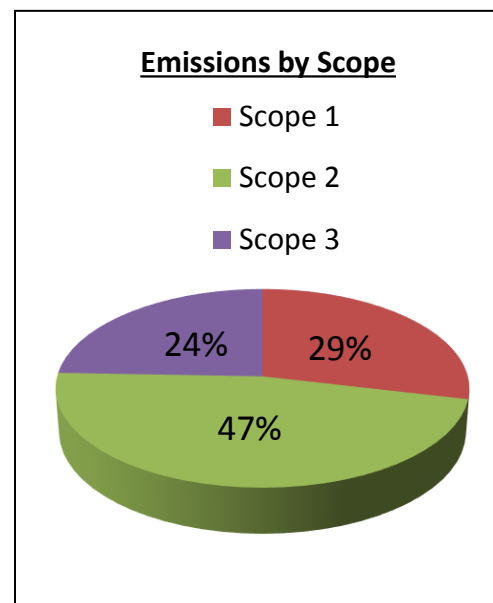
Stationary Combustion	2735.0 MT of CO ₂ e
Mobile Combustion	33.0 MT of CO ₂ e
Fugitive Emissions	42.0 MT of CO ₂ e
Total Scope 1 emissions	2810.0 MT of CO₂e

Scope 2 Emissions

Purchased Electricity	4,604.0 MT of CO ₂ e
Total Scope 2 emissions	4,604.0 MT of CO₂e

Scope 3 Emissions

Commuting	1,481.0 MT of CO ₂ e
Air Travel	686.0 MT of CO ₂ e
Solid Waste	-24.0 MT of CO ₂ e
Copy paper	20.2 MT of CO ₂ e
Outsourced Travel	154.6 MT of CO ₂ e
Total Scope 3 emissions	2317.8.0 MT of CO₂e



Campus-Based Sequestration

The wooded campus areas of Aquinas College are estimated to sequester nearly 50 metric tons of CO₂e from the atmosphere. Sequestration was determined using the calculator on the "Michigan Conservation and Climate Initiative" web site. Assumptions included 21 Acres of forestland, principally Maple/Beech, with an age of 26 years and older.

Key Action Arena 1: The Human Factor

Introduction:

Decreasing energy use offers one of the least expensive and most effective methods to improve the carbon footprint of an organization. A priority of the campus sustainability initiative has been--and will continue to be—encouraging responsibility for change at the individual level. Empowering students, staff, and faculty to conserve energy and resource use is essential for Aquinas to reach carbon neutrality. It will take the involvement of all stakeholders on Aquinas' campus to reduce carbon emissions.

Strategy Overview:

1. Educate AQ community about our collective environmental impacts;
2. Generate enthusiasm among individuals take action to reduce their environmental impacts;
3. Introduce campaigns to empower individual to take action in their community;
4. Employ technologies to further assist in reduction of individual's environmental impacts.

Phase Two Strategies:*

- Supply every student room and apartment with "Bye Bye Standby Energy Saving Starter Kits" to reduce standby energy draws from electronics.
- Provide training to campus members on energy management technologies currently in place.
- Coordinate yearly energy competitions between buildings.



Photo Credit: Center for Sustainability

Phase Three Strategy:

- Upon completion of individual metering of all buildings, provide real-time energy information to building occupants.

**Important Note: Strategies indicated here and in following key areas are illustrative of the collection of strategies which will be deployed. See Appendix B for additional information.*

Key Action Arena 2: Learning and Leading Strategies

Introduction:

This effort aligns with Aquinas' commitment to innovation and learning for sustainability. Recent innovation includes launching the first Bachelor of Science in Sustainable Business degree in the nation (2003), creating the Center for Sustainability (C4S) (2005), and developing a Master of Sustainable Business degree (2010). Additionally, Aquinas College hopes to serve as a model for implementation strategies among small campuses throughout the nation by aggressively tackling carbon emissions reduction efforts and behavioral change at individual and institutional levels.

Strategy Overview:

1. Continue to lead with innovative educational programming related to sustainable business practices;
2. Create and deploy incentives to foster faculty and student research and curriculum development related to sustainability;
3. Develop and implement administrative policies to encourage carbon reduction;
4. Develop and implement administrative policies which support incentives to embed sustainability across the curriculum.

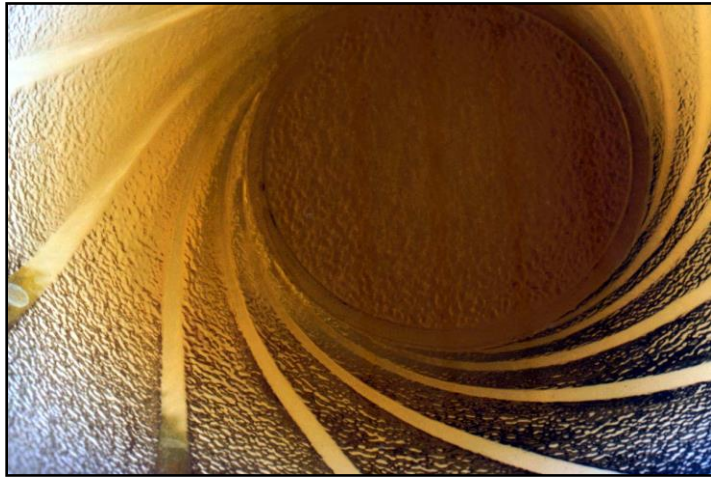


Photo Credit: www.bigfoto.com

Phase Two Strategies:

- Build on the Faculty Sustainability Fellows program to foster research and curricular development projects related to sustainability across the curriculum.
- Continue sustainability and climate-change related programming for the AQ campus community as well as the public (e.g. Recyclemania, Green Chemistry Clearinghouse, Economicology Forums)
- Further develop the Economicology Google site as a platform for exploration in sustainability.

Phase Three Strategies:

- Establish an endowment fund to support sustainability across the curriculum activities
- Develop demonstration projects which can be used to both educate students and the community

Key Action Arena 3: Power Management and Procurement					
Emissions Category:	Stationary Combustion	Scope:	1	CO2e Contribution:	2735.0 MT CO2e
Emissions Category:	Purchased Electricity	Scope:	2	CO2e Contribution:	4604.0 MT CO2e
Emissions Category:	Fugitive Emissions	Scope:	1	CO2e Contribution:	42.0 MT CO2e

Introduction:

On Aquinas' campus, relatively large amounts of energy are used within the built environment to heat or cool spaces, provide ventilation, and light rooms. On-site boilers for space heating operate on natural gas provided by DTE Energy. The Ventilation and Air Conditioning (VAC) systems and lighting systems run on electricity, provided mostly by Consumers Energy. Akin to much of the Grand Rapids Metro Area, the electricity used at Aquinas is largely sourced from coal-fired power plants. A small amount of energy is generated on site from the 10 kW photovoltaic cells (or solar array) on the Jarecki Center.

Generating heat from natural gas and electricity from coal threatens ecosystem health, human welfare, and is simply not sustainable in the long-term. Aquinas must decrease the amount of energy used on campus, and transition to a renewable energy portfolio. A renewable energy resource is an energy type that is replenished naturally within a reasonable amount of time. If necessary and only as a last resort, Aquinas will consider purchasing offsets to reach carbon neutrality.

Strategy Overview:

1. Real-time communication, monitoring and reporting of energy usage;
2. Energy conservation attained through smart building controls and information technology;
3. Off-site wind energy electrical production;
4. Off-site PV electrical energy production;
5. Increase on-site solar photovoltaic (PV) production

Phase Two Strategies:

- Smart Metering for Campus Buildings: Smart metering is a server-based, web-enabled application that performs logging, reporting, charting, and bill emulation of utility usage. It allows the user to monitor their electric, gas, and water bills on an on-going basis based on the rate structure of the bill. A Smart Metering system enables Aquinas to have a greater body of information from which to make decisions regarding facility alterations and improvements. Submetering for natural gas is present in all buildings. However, 10 buildings lack submetering for electricity. Submetering will allow problem areas to be identified and addressed, and provide more real-time utility information.



Photo Credit: www.bigfoto.com

- Provide real-time data on electrical usage in buildings through powered kiosks. 11 buildings currently have real-time kiosks in place, leaving 23 buildings left to complete.
- Upgrade the electronics in the photovoltaic array on the Jarecki/Lacks building.

Phase Three Strategies:

- Enact a policy for the proper maintenance and disposal of equipment requiring refrigerants.
- Green Power Purchase Agreement

Phase Four Strategy:

- Purchase offsets to cover fugitive emissions of refrigerants and remaining footprint from natural gas and conventionally generated electricity (if needed).

Key Action Arena 4: Built Environment					
Emissions Category:	Stationary Combustion	Scope:	1	CO2e Contribution:	2735.0 MT CO2e
Emissions Category:	Purchased Electricity	Scope:	2	CO2e Contribution:	4604.0 MT CO2e
Emissions Category:	Fugitive Emissions	Scope:	1	CO2e Contribution:	42.0 MT CO2e

Introduction:

The built environment is often the greatest area of energy consumption for any organization. The role of the Built Environment, Energy Use and Energy Acquisition consists of two major assignments. First, determine contribution of the built environment due to energy use on campus, both electrical and gas. Second, determine and validate different energy conservation methods that would offset Aquinas’ carbon footprint. The built environment composes any hardwired, brick and mortar installation on the Aquinas campus. As of 2008, the campus contained 34 buildings of various age, style and use, totaling an estimated 648,806 sq. ft.

Built Environment Carbon Neutrality Strategy

Phase Two Strategies:

- Complete the LED bulb retrofit to the exterior lightscape.
- Smart Building Controls: Add remaining buildings to the net-based building control system. Direct digital control systems allow the fine-tuning of building operations to be controlled from a central user interface. Such systems receive analog and digital inputs from the sensors and devices installed in the HVAC system and provide analog or digital outputs to control the HVAC system devices. These systems may be mated with a software package that graphically allows operators to monitor, control, alarm, and diagnose building equipment remotely.
- Integrate LED lighting into the interior lightscape.
- Deploy system to reduce building heat gain

Phase Three Strategy:

- Replace all single pane windows with high efficiency alternatives



Photo Courtesy of Aquinas College

Key Action Area 5: Materials Reduction & Recovery					
Emissions Category:	Colored/White Copy Paper	Scope:	3	CO2e Contribution:	20.2 MT CO2e
Emissions Category:	Solid Waste Disposal	Scope:	3	CO2e Contribution:	-24 MT CO2e

Introduction:

In a sustainable world, the concept of *waste* will take on an entirely different meaning. Nature operates in a system where the needs for millions of species are met without producing any waste because unused or excreted materials become food for other organisms. Aquinas is working hard to transition our campus to operate on the "waste equals food" mantra.

The total amount of waste sent to the landfill or incinerator from February to August 2015 was equal to 50,414 pounds, or 35% of the total waste stream at Aquinas. Several waste collection systems are available campus wide including composting, recycling, and special collections. However, current recycling efforts, despite coming from the best intentions, do not truly maintain closed loop product lifecycles; it is essentially a detour before ultimately arriving at their final resting place. Source reduction strategies and reuse initiatives will be necessary to bring us to a zero landfill campus.

Strategy Overview:

1. Select Environmentally Preferable Products whenever financially viable;
2. Implement source reductions whenever possible;
3. Continue to divert solid waste whenever possible

Phase Two Strategies:

- Further promote "One-Saint's Junk is Another Saint's Treasure" program to encourage reuse
- Digital test taking and grading
- Reuse graduation gowns and other single use items whenever possible

Phase Three Strategies:

- 100% faculty participation in paper-free classes
- 100% of conferencing staff promotes paper-free events
- Require a Take-Back program for all electronics and equipment not currently on leasing program



Photo Credit: www.bigfoto.com

Key Action Arena 6: Transportation					
Emissions Category:	Mobile Combustion	Scope:	1	CO2e Contribution:	33.0 MT CO2e
Emissions Category:	Commuting	Scope:	3	CO2e Contribution:	1481.0 MT CO2e
Emissions Category:	Air Travel	Scope:	3	CO2e Contribution:	686.0 MT CO2e
Emissions Category:	Directly Financed Travel	Scope:	3	CO2e Contribution:	154.6 MT CO2e

Introduction:

Mobile sources of emission are by far the most difficult simply due to the matter of jurisdiction. For the purposes of this study, Aquinas' authority encompassed "any action that could be directly affected by policy or incentive." In the area of mobile sources, it was deemed that staff, faculty, and student commuting shall be included in Aquinas' energy draw in addition to on-campus and campus-endorsed vehicle use. Additionally, any Aquinas directly-financed travel such as that for sports teams, campus clubs, or administrative travel was to be considered within the jurisdiction of Aquinas College.

Strategy Overview:

1. Encourage use of mass transit or alternative travel by students, staff and faculty;
2. Create opportunity for telecommuting/teleconferencing practices by students, staff and faculty;
3. Offset travel emissions.



Photo Credit: Jessica Eimer

Phase Two Strategies:

- Continue subsidization of the Rapid bus system
- Increased promotion of alternative transportation options and resources
- On-line academic courses & educational programming

Phase Three Strategies:

- Purchase LEFE or Electric Vehicles for campus owned vehicles;
- Electric lawn and snow removal equipment

Phase Four Strategy:

- Purchase offsets for remaining travel emissions

Funding of Aquinas College's Climate Action Plan

Aquinas College has made a substantial commitment to its Climate Action Plan as well other sustainability efforts through its institutional support of the college's Center for Sustainability and related activities. The Center currently serves as the "hub" for climate action planning and implementation, supporting the college's sustainability committees and student organizations in their work. In addition to its campus-oriented goal of fostering educational programming and practices which move Aquinas toward sustainability, the Center's community outreach activities and web-based resources have resulted in a number of effective partnerships to support sustainability across the region, the state and the nation.

It is expected that operational support for the Center will continue to be provided, augmented with grants, philanthropic contributions and revenue-generating programming. External funding for curriculum innovation supporting sustainability and climate change education is particularly of interest, given the increased recognition by donor organizations of the potential "returns" on this type of civic investment.

In terms of funding for capital-intensive strategies, a variety of mechanisms will be utilized. Student "green fees" have proven to be successful at peer institutions and this is currently being explored as a funding mechanism for sustainability initiatives at Aquinas. Energy performance contracting is another option to support energy efficiency installations and improvement. Because of generous support from the Wege Foundation, Aquinas College also has a Green Revolving Fund to improve the campus energy footprint. Additional effort will be put forth to continue to grow the fund.



Photo Credit: www.bigfoto.com

Appendix A – Glossary of Terms

Carbon Dioxide Equivalent ¹	<p>A metric measure used to compare the emissions from various greenhouse gases based upon their global warming potential (GWP). Carbon dioxide equivalents are commonly expressed as "million metric tons of carbon dioxide equivalents (MMTCO₂Eq)." The carbon dioxide equivalent for a gas is derived by multiplying the tons of the gas by the associated GWP.</p> <p><i>Note: There appears to be a discrepancy among sources on whether CO₂Eq or CO₂e signifies Carbon Dioxide Equivalent (CDE) (focusing on emissions represented in mass, as described above) or Equivalent Carbon Dioxide (focusing on concentrations of greenhouse gases and their global warming potential).</i></p>
Climate Neutrality ²	<p>Having no net GHG emissions, to be achieved by minimizing GHG emissions as much as possible and using carbon offsets or other measures to mitigate the remaining emissions. To achieve climate neutrality under the terms of the Commitment, all Scope 1 and 2 emissions, as well as those Scope 3 emissions from air travel paid for by or through the institution and regular commuting to and from campus, must be neutralized.</p>
Commuting ²	<p>For purposes of the Commitment, commuting is defined as travel to and from campus on a day to day basis by students, faculty, and staff. It does not include student travel to and from campus at the beginning and end of term or during break periods.</p>
<i>De Minimis</i> Emissions ²	<p>GHG emissions from one or more sources, for one or more gases which, when summed, are materially insignificant. For the purposes of this report, the <i>de minimis</i> level is less than 5% of the institution's total emissions, as is the standard.</p>
Fugitive Emissions ²	<p>Emissions that are not physically controlled but result from the intentional or unintentional releases of GHGs. They commonly arise from the production, processing, transmission, storage, and use of fuels and other chemicals, often through joints, seals, packing, gaskets, etc.</p>
GHG Emissions Inventory ²	<p>A baseline quantification of GHG emissions, from which emissions reductions can be measured and progress towards climate neutrality can be tracked.</p>
Greenhouse Gas (GHG) ²	<p>GHGs are the six gases covered under the Kyoto Protocol: carbon dioxide (CO₂); methane (CH₄); nitrous oxide (N₂O); hydrofluorocarbons (HFCs); perfluorocarbons (PFCs); and sulphur hexafluoride (SF₆).</p>
Operational Boundaries ²	<p>The boundary established for identifying emissions associated with the institution's operations. The process for establishing operational boundaries includes categorizing direct and indirect emissions, and choosing the scope of accounting and reporting for indirect emissions.</p>
Organizational Boundaries ²	<p>The boundary established for identifying which aspects (departments, schools, joint ventures, etc.) of the institution that it owns or controls.</p>
Scope 1 ¹	<p>A reporting category that accounts for direct GHG emissions from sources the institution owns or controls.</p>
Scope 2 ¹	<p>A reporting category that accounts for indirect GHG emissions from the generation of purchased electricity consumed by equipment or operations owned or controlled by the institution.</p>

Scope 3 ¹	A reporting category that accounts for indirect GHG emissions from all other sources that occur as a consequence of the institution's activities but are not owned or operated by the institution.
Temporal Boundaries ²	The time period over which GHG emissions are evaluated. Here they are evaluated annually, either by calendar year or the institution's fiscal or academic year.

Glossary Sources:

¹U.S. EPA. 2009, September 8. Glossary of Climate Change Terms. Available at:

<http://www.epa.gov/climatechange/glossary.html#C>;

²ACUPCC. 2009. Implementation Guide: Information and Resources for Participating Institutions (Version 1.1). Available at:

http://www2.presidentsclimatecommitment.org/pdf/ACUPCC_IG_Final.pdf

Appendix B –Strategies for each key action arena

Strategy	Description	CAP Category	Emissions Category	Scope	Benefits
Aquinas Safe Cycling/Pedestrian Routes	Engage the city of Grand Rapids Planning to designate and improve cycling conditions around Aquinas campus	The Human Factor Transportation	Daily Commute-Student Daily Commute-Staff and Faculty	3	Community engagement Better entire community Encourages healthy lifestyle Encourages no-carbon transportation
Auto Shades to Regulate Natural Daylight	Research strategies for use of natural day lighting in campus buildings	Built Environment	Electricity Use	2	Reduced electricity usage and cost Carbon savings Aesthetically pleasing
Campus Brown-out	Set times in which there is low occupancy (such as Wednesdays at Aquinas) for certain buildings to operate on minimal power level.	Learning & Leading	Electricity Use	2	Reduced electricity usage and cost Carbon savings
Carbon Footprint Competitions for Dorms and Departments	Encourage participation by promoting competition using the "Dorm Wars" model to achieve reductions	The Human Factor	On-Campus Stationary Sources Electricity Use	1 2 3	Increased student participation Reduced energy consumption Carbon savings
Carbon Neutral Landscaping	Increase amount of non-managed greenspace on Aquinas campus		Fertilizer Use on Campus Direct Stationary Sources (equipment)	1	Encourages biodiversity Aesthetically pleasing
Comprehensive Green Building and Existing Building Remodel Policy	Campus policy for Green Building practices on current and new construction projects	Learning & Leading	On-Campus Stationary Sources Electricity Usage Solid Waste Disposal	1 2 3	Decrease in harmful materials used in construction process Recycling of construction materials
Computer Settings	Standardization of all computer and print settings optimized for reduction of power and paper consumption.	Materials Reduction & Recovery	Electricity Use College Financed Copy Paper Consumption	2 3	Decreased paper usage
Course-centered Research Incentives	Provide faculty with stipends and other funding to support development and incorporation of CAP-related student research projects into existing courses	Learning & Leading The Human Factor			Raises awareness and new knowledge Encourages individual responsibility May involve community outreach

Create a Live Near Work Bonus for Employees	Provide incentives for Aquinas employees to live near the Aquinas campus, resulting in stable neighborhoods around Aquinas' campus.	The Human Factor	Daily Commute-Staff and Faculty	3	Reduced carbon emissions from commuting Strengthens the nearby community
Department Direct Costing	Sub Metering for departments so that departments must account for utility usage in operating expenses	Built Environment	On-Campus Stationary Sources Electricity Use	2	Encourages departments to reduce utility usage Encourages tracking of utility usage during a period
Department Energy Champion	Create a culture of accountability by designating responsibilities to individuals for turning out lights, closing windows, etc.	The Human Factor	On-Campus Stationary Sources Electricity Use	1 2	Creates direct lines of accountability Promotes awareness of energy usage
Department Level Resource Reduction Gainshare	Establish baseline for various departments and issue Gainshare program for savings (Energy, paper, etc.)	The Human Factor Built Environment	Electricity Use Solid Waste Disposal College Financed Copy Paper Use	2 3	Supports Continuous Improvement Engages CCM's to take individual initiative
Digital Test Taking and Grading	Contract software similar to that used by GRE, GMAT etc. that allows for digital test taking and grading	Materials Reduction & Recovery	Solid Waste Disposal College Financed Copy Paper	3	Eliminates possibility of academic dishonesty Increased throughput time for many tests Reduced paper usage for test taking Allows for use of typing in test taking encouraging the use of technology Allows for set timing to be enforced Reduced amount of class time taken for test returning and explanation
Discourage Use of Personal Dorm Refrigerators	Encourage the use of one floor refrigerator	The Human Factor	Electricity Use	2	Decreased energy usage
Dorm Move-Out Recycling Blitz	Encourage collection of items that can be donated, reused, and recycled during dormitory move out	The Human Factor	Solid Waste Disposal	3	Decreased amount of waste Increased community collaboration
Electric Vehicle Fleet	Replace campus vehicle fleet with electric vehicle fleet. Examples: Delivery, maintenance...	Transportation	Direct Transportation Sources	1	Low carbon transportation Ability to use distributed energy as fuel
Eliminate Sale of Bottled Water on Campus	Promote sustainable lifestyle choices through use of reusable drinking containers.	The Human Factor Solid Waste Management	Solid Waste Disposal	3	Decrease in waste

Eliminate Vampire Load in Dorms	Provide each dorm room with a “Wattstopper” or “Smartstrip” style power strip and/or Kill-A-Watt style output.	Built Environment The Human Factor	Electricity Use	2	Decreased energy usage
Evaluate Overhead Lighting Plan for Instructional Rooms		Built Environment		2	
Explore Low-E Coating Options for Building Windows	Research retrofit capabilities for window treatments to reduce heating and cooling loads for campus buildings	Built Environment	Electricity Use	2	Reduction in energy used to heat and cool campus buildings
Faculty/Staff Telecommuting Option	Create policy to support faculty and staff telecommuting as appropriate.	Learning & Leading Transportation	Daily Commute-Staff	3	Reduced travel time Increased worker satisfaction and comfort
Full Adoption of Course Connect for Course Documents	Integrate Course Connect into more aspects of classroom learning	Materials Reduction & Recover	Solid Waste Disposal College Financed Copy Paper	3	Saves paper Encourages use of technology
Full Campus Lighting Retrofit (T12-T8)	Where possible, retrofit existing lighting fixtures and ballasts for use with T8 florescent bulbs	Built Environment	Electricity Use	2	Decreased energy usage
Green Dorm Room Card Activation	Following the example of the hotel industry, room power usage (lighting, sockets) activated by ID card in dock.	Built Environment The Human Factor	Electricity Use	2	Raises awareness about personal energy consumption Prevents wasted energy
Green your Internship Initiative	As part of internship class, encourage students to initiate dialog about company environmental position	The Human Factor			Raises awareness of sustainability to company Encourages students to raise community awareness
Heat Recovery on All Fresh Air Intakes	Reduce heating loads by preheating incoming air during winter month	Built Environment		1	Decreased energy usage
Increase Occupant Awareness	Attain power curtailment through simple occupancy awareness campaign	The Human Factor Built Environment	Electricity Use	2	Decreased energy usage
Increase On-Campus Renewable Energy	Capital Investment of On-Site Renewable Energy	Built Environment	Electricity Use	2	Reduced carbon emissions Promote renewable energy

LED Exterior Lightscaping	For exterior lighting end of lifecycle maintenance, replace and retrofit fixture for LED lighting.	Built Environment	Electricity Use	2	85% reduction in energy usage Significant reduction in heat generated by the fixture 50,000 Hour life span at full output, 100,000 hours at decreased life output No mercury to dispose of during bulb disposal Instantaneous startup
Maintenance Fleet Bicycles		The Human Factor Transportation	Direct Transportation Sources	1	Low cost, low carbon transportation
Minimization of Printed Recruitment Material and Mailings, E-news options	Explore potential for digital rewritable (cd, flash drive, etc.) for campus recruitment materials.	Materials Recovery & Reduction	Solid Waste Disposal College Financed Copy Paper	3	Decreased paper usage Unique marketing tool
On Campus Composting	Devise on campus composting program	Materials Recovery & Reduction	Solid Waste Disposal	2	Reduced solid waste
Optimize Building Envelopes of Campus Buildings	See PSI report for listing of suggested optimizations and approximate savings	Built Environment	On-Campus Stationary Sources Electricity Use	1 2	Decreased energy usage
Optimize Building Mechanical Systems of Campus Buildings	See PSI report for listing of suggested optimizations and approximate savings	Built Environment	On-Campus Stationary Sources Electricity Use	1 2	Decreased energy usage
Optional Carbon Offset Program for Study Abroad Students	Provide optional carbon offset fee as regular part of study abroad program fee.	The Human Factor		3	Increased awareness of travel emissions Provides option for students who wish to participate
Photovoltaic Charging Station for Exiting Maintenance Fleet	Installation of a pole mount PV or rooftop PV coupled with battery bank to charge golf carts.	Transportation Built Environment	Direct Transportation Sources Electricity Use	2	Energy security for charging/fueling fleets Low carbon/no carbon fuel source
Policy to Conduct Feasibility Analysis for Carbon Neutral New Aquinas Buildings	Policy to design carbon neutrality into new campus buildings	Learning & Leading	On-Campus Stationary Sources Electricity Usage	1 2	Optimal design reduces need to retrofit buildings in the future

Preferential Parking Spaces for LEFE Vehicles	Issue reduced parking fees and/or preferential parking spaces for Low Emission/Fuel Efficient vehicles	Transportation	Daily Commute-Student Daily Commute-Staff and Faculty	3	
Smart Building Controls		Built Environment The Human Factor		1 2	
Smart Metering for Campus Buildings		Built Environment The Human Factor		1 2	
Solar Power Purchasers Agreement for Aquinas	http://www.epa.gov/greenpower/buygp/solarpower.htm	Built Environment	Electricity Use	2	Stable Utility Costs Low Carbon Electricity Allows Aquinas to have renewable energy on site while avoiding upfront costs
Solar Thermal Strategy for Heating Water at Regina Dormitory (expanded to St. Joes)	Install Solar Thermal Collectors on Dormitory Rooftops to naturally heat water, reducing natural gas consumption	Built Environment	On-Campus Stationary Sources	1	Elimination of natural gas for domestic hot water production
Student Virtual Classroom	Investigate possibility of online and virtual learning for some academic offerings	Learning & Leading Transportation	Daily Commute-Students Electricity Use College Financed Copy Paper	2 3	Reduced transportation to Aquinas College Offers classroom flexibility
Summer Class Optimization	Consolidate Summer Classes into fewer buildings to reduce energy use in off-months	Learning & Leading Built Environment	Electricity Use	2	Reduced overall campus energy usage
Sustainable Commencement	Explore options to reuse commencement gowns, caps, and other materials	Learning & Leading The Human Factor	Solid Waste Disposal	3	Display of sustainability
Sustainability Orientation	Incorporate early learning opportunities about sustainability during AQ students first year on campus	Learning & Leading The Human Factor		3	Ensures that all students are aware of Aquinas' commitment to sustainability
Technology and Equipment Leasing	Contract to utilize "products of service" approach to hardware	Materials Reduction & Recovery Built Environment		1 3	Encourages student body to use technology Helps to create a closed loop cycle for technological equipment

Thin Client Systems	All networked computers operate on Thin Client System. http://www.wyse.com/thincomputing/smarts.asp	Built Environment	Electricity Use	2	Decreased energy usage
Light Timer Switches in Dorm Common Areas	Install light timer switches in dorm common areas such as bathrooms, utility closets, and other low occupancy spaces	Built Environment	Electricity Use	2	Reduced energy usage
Train at Least One Staff Member as Certified Energy Auditor	Increase skill set of existing employees while also improving operating efficiencies of campus buildings	Built Environment The Human Factor	On-Campus Stationary Sources Electricity Use	1 2	Conduct Internal Energy Audits Increased specialization of Maintenance department
Train at Least One Staff Member as Certified Energy Manager	Increase skill set of existing employees while also improving operating efficiencies of campus buildings	Built Environment The Human Factor	On-Campus Stationary Sources Electricity Use	1 2	
Train Maintenance Staff in Green Operations	Train Maintenance Staff to use healthier products and practices in day to day operations	Built Environment The Human Factor	On-Campus Stationary Sources Electricity Use Solid Waste Disposal	1 2 3	Saves energy Healthier indoor air quality
Universal Adoption of Environmentally Preferable Purchasing Policy	Implement EPP Policy for campus departments	Materials Reduction & Recovery Built Environment Learning & Leading	Solid Waste Disposal Electricity Usage	2 3	
Videoconference Capabilities	Increase use of videoconference technology rather than traveling to and from locations	The Human Factor Transportation	Directly Financed Outsourced Travel	3	Support of readily available technology Promotes increase interaction while encouraging productivity

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