



# THE VILLANOVA UNIVERSITY CLIMATE ACTION PLAN: EXECUTIVE SUMMARY

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January 2010

A Message from the President

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VILLANOVA  
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VILLANOVA  
UNIVERSITY  
Commitment  
to Sustainability



## A MESSAGE FROM THE PRESIDENT



Villanova University is a learning community unlike any other. Our mission as a Catholic Augustinian institution is rooted in the ideals of *Veritas*, *Unitas*, and *Caritas* (truth, unity, and love). These ideals are inextricably linked to the environment for two important reasons.

First, the earth and all its life forms inherently deserve our respect and our stewardship. As an academic community, we recognize the danger of ignoring the plight of our planet. We are committed to intellectual endeavors, actions, and policies that support our environment now and for generations to come.

Second, climate change is an issue of peace and justice. As we seek to serve others—and to show compassion for the poor and vulnerable—we recognize that the quality of life of every person worldwide is dependent upon the stability of our environment. As a university, we embrace the goals of clean water and air, the availability of nutritious foods, and the successful management of pollutants for the health of all people.

The Villanova Climate Action Plan outlines Villanova's role as a signatory of the American College & University Presidents' Climate Commitment. It highlights our approach to offsetting carbon emissions, becoming a climate-neutral campus, and accelerating research and education to help society re-stabilize the earth's climate. Should you wish to view the complete report, please see <http://acupcc.aashe.org>.

As you read this executive summary in light of Villanova's core Augustinian mission, I encourage you to consider the fundamental questions of our actions.

If not Villanova community members, who?  
If not now, when?

Our work on behalf of the earth today is our shared practical and moral imperative.

Rev. Peter M. Donohue, O.S.A., President



## INTRODUCTION

In keeping with its Augustinian tradition—which emphasizes service to, and care for, one’s community—Villanova University integrates sustainability and respect for the earth into its curricula, research, and institutional policy and practice. Faculty, staff, and students across the Villanova campus and around the world recognize Villanova’s role in addressing sustainability and the global climate crisis.

Villanova has a rich history in the natural sciences and in promoting environmental awareness. Gregor Johann Mendel, the father of modern genetics, was an Augustinian abbot and botanist. The Villanova community embraced the inaugural Earth Day in 1970, and has since used this opportunity to host dynamic speakers and special events. In the early 1990s, the Villanova campus became a designated arboretum, which is in itself a mitigation strategy.

Educators and researchers across all five colleges—the College of Liberal Arts & Sciences, the Villanova School of Business, the College of Engineering, the College of Nursing, and the School of Law—offer courses and conduct research relevant to environmental sustainability and climate change. To broaden dialog beyond the walls of the campus, Villanova has recently hosted two environmental conferences in recent years, Catholic Social Teaching and Ecology and the International SustainAbility Conference.

In 2007, Father Peter M. Donohue, Villanova’s 32nd president, signed the American College & University Presidents’ Climate Commitment (ACUPCC)—publicly establishing a commitment to sustainability that had been gaining momentum on the Villanova campus.

The ACUPCC holds Villanova accountable for the following:

- submitting information on the institutional structure for developing a Climate Action Plan (CAP);
- reporting the results of the university’s initial greenhouse gas (GHG) emissions inventory;
- submitting a formal CAP;
- updating GHG emissions inventories within 3 years and at least every other year thereafter; and
- submitting narrative reports describing progress in implementing the Villanova CAP within 4 years and at least every other year thereafter.

To ensure that Villanova fulfills this commitment and its associated goals, Father Donohue established the President’s Environmental Sustainability Committee (PESC). This committee represents a subset of environmentally-minded faculty, staff, and students. The charge of this committee includes the development of the CAP.

The publication of the Villanova CAP represents the university’s strong commitment to environmental stewardship. To that end, Villanova has set interim milestones and the year 2050 as its target date for climate neutrality.





The CAP is divided into sections including Campus Emissions; Mitigation Strategies; Educational, Research, and Community Outreach Efforts; Financing; and Tracking Progress.

## CAMPUS EMISSIONS: OVERVIEW

The university has identified the nine primary sources of greenhouse gas (GHG) emissions:

- on-campus stationary sources;
- university fleet;
- refrigeration;
- agriculture;
- electricity;
- faculty, staff, and student commuters;
- institutionally-sponsored air travel/study abroad;
- solid waste; and
- transmission and distribution losses.

For fiscal year 2009, these GHG emissions totaled 83,040 metric tons carbon dioxide equivalents (MTCDE), with zero offsets being purchased. In accordance with Villanova's new Campus Master plan, Villanova projects overall campus growth at approximately 2.4 million gross square feet (GSF). The projected addition of campus buildings does not necessarily relate to growth in the overall land ownership of the university. However, it does provide a helpful benchmark in the projection of corresponding increases in campus emissions, which Villanova will take into account during implementation of the CAP.

## MITIGATION STRATEGIES: OVERVIEW

Villanova has approached the CAP process through three key steps to ensure a comprehensive approach: 1) assess; 2) reduce; 3) offset.

### **Assess**

Assessment is the foundation for providing a comprehensive approach to developing a plan for climate neutrality. Villanova has undertaken this process through the GHG emissions inventory described above, as well as through a comprehensive energy audit. Assessment also includes analysis to understand rate tariffs, system capacities, and procurement strategies.

### **Reduce**

The reduction analysis is guided by the assessment process described above (with primary focus on campus mechanical and electrical systems), along with a utility strategy and a renewable energy study. As a result of this analysis, Villanova has chosen to focus on three crucial areas for project-oriented reductions in emissions: generation systems; distribution systems; and end-use systems.



Highlights of Villanova's reduction strategy include the following steps.

- **Chiller plants.** Villanova will develop a cooling plant strategy to include equipment that is not only environmentally responsible, but also has the flexibility to vary fuel sources as prices change.
- **Modernization of the boiler plant to include biomass.** This will provide the single-largest reduction in emissions for the campus by shifting its heating infrastructure from non-renewable fossil fuels to a biogenic fuel source. Villanova will continue to monitor the relative advantages of this strategy against any attractive alternatives that are developed from both an economic and environmental standpoint.
- **Modernization of Villanova's heating infrastructure.** This will allow for cogeneration through the use of backpressure steam turbines, lowering our grid-source electricity requirements.
- **Installation of on-campus photovoltaic arrays.** At least three sites on campus will be considered as sources of renewable energy to support the electrical needs of the university.
- **Reduction of end-use energy consumption.** Such reduction will include improvements to lighting fixtures and development of holiday and summer curtailment policies to reduce consumption of energy and emissions during times of relatively low occupancy.
- **Further exploration of ways to reduce emissions.** This will include implementation of incentives to use public transportation and improvements in the fuel efficiency of the campus fleet.

#### Offset

Once the optimal systems are in place and greenhouse gas emissions are minimized, the remaining emissions can be offset through the purchase of a variety of available offsetting instruments.

## EDUCATIONAL, RESEARCH, AND COMMUNITY OUTREACH EFFORTS: OVERVIEW

### Educational Efforts

Villanova will continue to develop educational experiences for undergraduate and graduate students through several approaches.

- Develop new programs and courses, and continue to encourage faculty to develop inter- and cross- disciplinary courses, modeled after those which have already been formed at Villanova. These include those in established in science departments (e.g., Geography & the Environment; Biology; Civil & Environmental Engineering; ~~and~~ Chemical Engineering) and in other departments (e.g., Philosophy ~~and~~ History).
- Establish further service learning opportunities. Villanova is among the top universities in the nation for the proportion of students who participate in such experiences, many of which have environmental themes (e.g., the activities of the Environmental Leadership Learning Community, the Engineers Without Borders group, and the Business Without Borders group).



- Continue to support student organizations, including the Villanova Environmental Group, the Ecological Society of Villanova, and the newly-formed student chapter of Engineers for a Sustainable World. Continue to support graduate students at the School of Law, who have an Environmental and Energy Law Society.
- Expand environmental content in the development of programs for Student Orientation each fall.
- Encourage students to participate in RecycleMania and other campus-wide initiatives.
- Educate Villanova community members about sustainability and climate-neutral practices through university operations including Dining Services and Facilities.
- Continue to sponsor national and international academic conferences on ecological and environmental issues.

### Research Efforts

Villanova faculty and students across all colleges will continue to be involved in a wide range of projects relating to sustainability and climate change. Villanova will support these projects. In addition, the growth of new programs, and the attendant increase in financial support from the university as a whole, will expand research in the area of climate neutrality.

Faculty members in the College of Liberal Arts & Sciences are pursuing individual research projects that have a bearing on climate neutrality and sustainability. Several of these projects are funded by external grants, including from the NSF. The success of these research programs in the past bodes well for the future.

Villanova students will continue to participate in sustainability research both in and out of the classroom. In addition to formal research projects, students will continue to be involved in projects that have a strong environmental sustainability emphasis. Such student research projects currently include:

- increasing bicycling on campus;
- promoting recycling on campus;
- developing a green career fair;
- introducing organic and fair-trade clothing to the VU Shop;
- promoting donations at the end-of-the-year move;
- performing a sustainability assessment of White Hall; and
- improving water resources and reducing use of plastic.

In addition, several centers and institutes are funded and supported by Villanova. Examples include the Center for the Advancement of Sustainability in Engineering as well as the Center for Global Leadership and the Innovation, Creativity, and Entrepreneurship Center, both of which conduct work related to sustainability in the Villanova School of Business.





## Community Outreach

Villanova is committed to offering programs to members of the Villanova community and to those in the greater community.

The university will build upon its current efforts in this area by continuing to:

- sponsor national and international academic conferences on ecological and environmental issues, most of which are open to the public;
- sponsor departmental seminars, which are open to the entire Villanova community;
- host events with state-wide attendees, such as the Commonwealth of Pennsylvania's Sustainable Stormwater conference;
- support Earth Day events that educate the public about environmental sustainability and climate neutrality; and
- proactively communicate—through print collateral, news media coverage, social media outreach, and a frequently-updated website—to inform and educate the community about Villanova's sustainability initiatives.

## FINANCING: OVERVIEW

The cumulative present cost of mitigation strategies identified in the CAP is approximately \$38 million. This cost will be financed through two related mechanisms, an initial investment fund and a longer term self-funding mechanism. First, the university will allocate approximately \$4 million to finance high rate on investment (ROI) energy projects needed to jumpstart the program. Utility cost savings from these and subsequent efficiency-improving investments will be plowed back into the self-funding mechanism to finance subsequent capital investments spelled out in the CAP. The energy budget will be corrected annually for both campus growth and fluctuations in energy unit costs.

## TRACKING PROGRESS: OVERVIEW

Moving forward, Villanova intends to update its GHG inventory annually. Along with the updated inventory, Villanova will prepare a narrative summary every two years, which reports the following:

- mitigation strategies undertaken for each fiscal year;
- campus emissions;
- a comparison between actual emissions and emissions projections contained in the CAP; and
- explanations for any significant differences shown in the comparison, along with possible remedies.

Every five years, the university will conduct a comprehensive review of the CAP to evaluate progress to date and to verify that previous assumptions remain valid. This exercise will also provide an opportunity for Villanova to review changes in technology, energy and environmental markets, and financing mechanisms. Most importantly, the review will allow for a re-evaluation of Villanova's ability to achieve its milestones and meet the target date for climate neutrality. Revisions to the CAP, including any modifications to milestones (to earlier or later dates) will be reported as part of this process.



## TARGET DATES

Based upon the implementation of the Campus Master Plan and the mitigation strategies as detailed above, by the year 2025 Villanova will reduce its emissions by 24 percent relative to 2009 emissions levels. After this date, Villanova intends to begin the purchase of offset instruments to continue its drive toward net climate neutrality.

**In order to allow sufficient time to investigate alternatives, and for technological and societal changes to take place, Villanova has set the year 2050 as its target date for net climate neutrality.**

## FURTHER INFORMATION

To view the university's GHG Inventory and CAP, please see <http://acupcc.aashe.org>. For a comprehensive look at sustainability efforts across the Villanova campus—both in and out of the classroom—please see [www.villanova.edu/sustainability](http://www.villanova.edu/sustainability).