

Carbon Neutrality by 2016 Update October 15, 2008

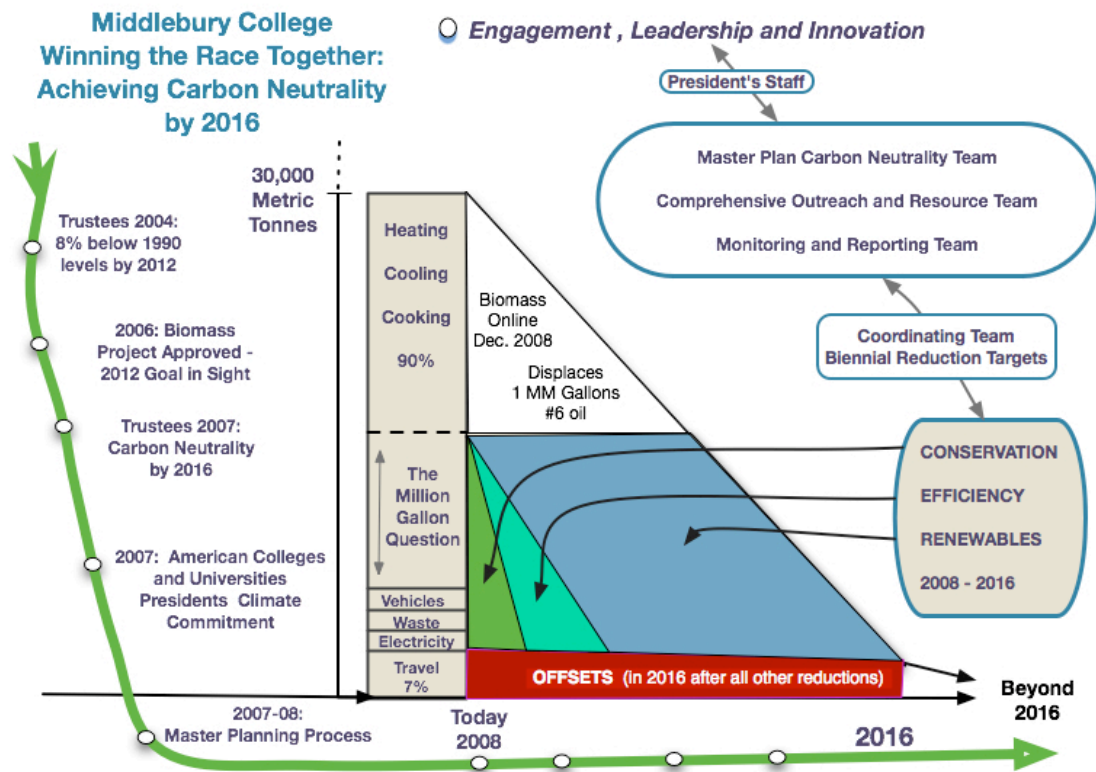
Biomass project on time and on budget. Scheduled to be fired up for testing on or about December 1, 2008. There will be a series of test burns to tune the plant's performance and establish that it is meeting air quality requirements and by early January it should be ready to run continuously.

Once in operation the plant will reduce net carbon emissions by 40% which will bring the College down from about 30,000 metric tonnes of CO₂ equivalents (MTCDE) to 18,000 MTCDE – a very significant reduction. In FY 2008-09, the plant will operate for six months of the fiscal year so our reduction will be approximately 20% of the total for the year. In FY 2008-09 we should see the full reduction of 40%.

Payback on the biomass plant has been shortened because the cost of oil has risen considerably while the price for wood has remained relatively stable compared to the assumptions made when the original payback estimate was made.

The willow shrub test site to explore the potential for growing biomass fuel is moving along well. Our partner, SUNY Environmental School of Forestry, did some sampling and measurements of the site and the shrubs and found that their growth and productivity are robust. The project is more than two years into its four year duration. The results of the research will tell us how much potential fuel could be grown with minimal or no inputs of fertilizers and pesticides. We still have many questions to answer beyond that, but they aren't relevant until we know if there is sufficient potential for growing our fuel locally.

The MiddShift Implementation Working Group completed a nine-month effort to prepare an implementation strategy for achieving carbon neutrality by 2016 reflecting the Trustees' resolution to achieve the goal through renewable energy, conservation efficiency and, as a last resort, offsets. The group consisted of 16 people representing students, faculty, staff and all major departments of the College.



The report, *Winning the Race Together*, 1) identifies actions and research needed to reduce emissions and 2) recommends a process by which the implementation strategies can be carried out. It was presented to President's Staff in August and the President is in the process of appointing members of the three implementation teams that are recommended in the report (more below).

Key elements of the report:

In order to make significant progress after the biomass project comes online we will need to **displace the remaining million gallons of #6 fuel oil**. A study was done by students in Environmental Economics 265 of

the feasibility of burning more biomass, or liquid biofuels (100% blend), or a combination thereof. Their analysis recommends that the College pursue the option of increasing its use of biomass as an alternative to liquid biofuels for economic, environmental and social cost/benefit reasons. A further analysis should be conducted over the coming year to identify the best options for going forward with more biomass taking into account the performance and maximum potential of the new system.

Solar thermal technology is very efficient and cost effective even in a northern climate. Conduct pilot installations of solar thermal systems on several buildings not served by the central heating system to test their potential for reducing the consumption of fuel and electricity in these buildings and deploy on further buildings based on the results of the pilot study. Also assess the potential of this technology to heat water for the swimming pool. A pilot project is currently being installed at 107 Shannon Lane.

Concentrated Solar Power – Participate in a pilot project with Solaflect Corp. to install and test new technology they have developed to generate steam by concentrating solar rays on a boiler system. Solaflect has offered to deploy their system on a test site on College land to gather data on performance in a northern climate. Work is underway to explore such an installation on a corner of land along Route 125 between Bicentennial Way and Blinn Lane where a short connection to an existing steam line would be made.

Wind at Worth Mountain – we gathered six months of wind data at Worth Mountain and a student did a senior thesis to analyze it. The data was from a wind measurement tower erected on the mountain that blew down halfway into the gathering period. An analysis of the data gathered there points to sufficient potential to pursue this possibility further. Middlebury staff and faculty recently met with NRG Systems in Vermont to discuss the data and their experts also felt that there is good potential. We are currently discussing the possibility of NRG putting one of their wind measuring systems up gratis in exchange for training access for their staff to complete the data gathering and analysis of the potential for a large wind turbine.

Existing Buildings: Energy Efficiency Upgrades – 37% of the buildings on campus perform at below 50% of the state’s energy code. 16% of square footage performs at 25 to 50% below code. This is wasted energy that can be avoided. Newer buildings perform well. The report urges that easy, lower cost, short payback efficiency upgrades be done vigorously in partnership with Efficiency Vermont, the state’s energy utility with whom the College works closely. It also recommends developing a priority schedule of energy efficiency upgrades in sync with the Master Plan, such as the insulation improvements currently underway as part of the renovation to McCullough. Other recommendations include: completing and adopting LEED MC-Plus guidelines for renovations and new construction and siting and design of new buildings to maximize natural cooling options and minimize need for air conditioning.

The report contains **many other recommendations regarding efficiency of energy use, conservation and institutional practices and policies that will reduce emissions** and keep the college community engaged in achieving the goal together.

The other **major element of the report** is how to keep the implementation process moving toward success and integrating that effort with other ongoing efforts like the implementation of the Master Plan. The report recommends three implementation teams each chaired by a member of the President’s staff:

i. Master Plan Implementation Team – Carbon Neutrality Group

Objectives

- Reduce the amount of energy consumed for heating and cooling the campus
- Reduce the amount of electricity consumed on campus
- Shift the fuels used for heating and cooling from carbon positive to carbon neutral through the use of renewable fuels and technologies

ii. Community Engagement and Leadership Team

Objectives

- Reduce the amount of energy used/carbon emitted by individuals in their residential halls, offices, laboratories, etc.

- Reduce the amount of carbon emitted due to College-related travel
- Raise the level of carbon neutrality awareness and leadership behavior of students, faculty, staff and trustees

iii. Carbon Neutrality Measurement and Reporting Team

Objectives

- Measure and track the College’s carbon emissions and energy consumption in detail
- Work with the Master Plan and Engagement Teams to provide information needed to help accomplish their objectives

These teams are being formed and will convene in November to set forth their work plans and timelines. The diagram below provides an overview of the structure and subject matter for each team.



Each of the three implementation teams will be chaired by a member of the President’s Staff and those three chairs will as function as a Coordinating Team to assure that the work of each implementation team is complementary to and informed by each of the other teams. They will also report to the President and Trustees on the progress of their work.