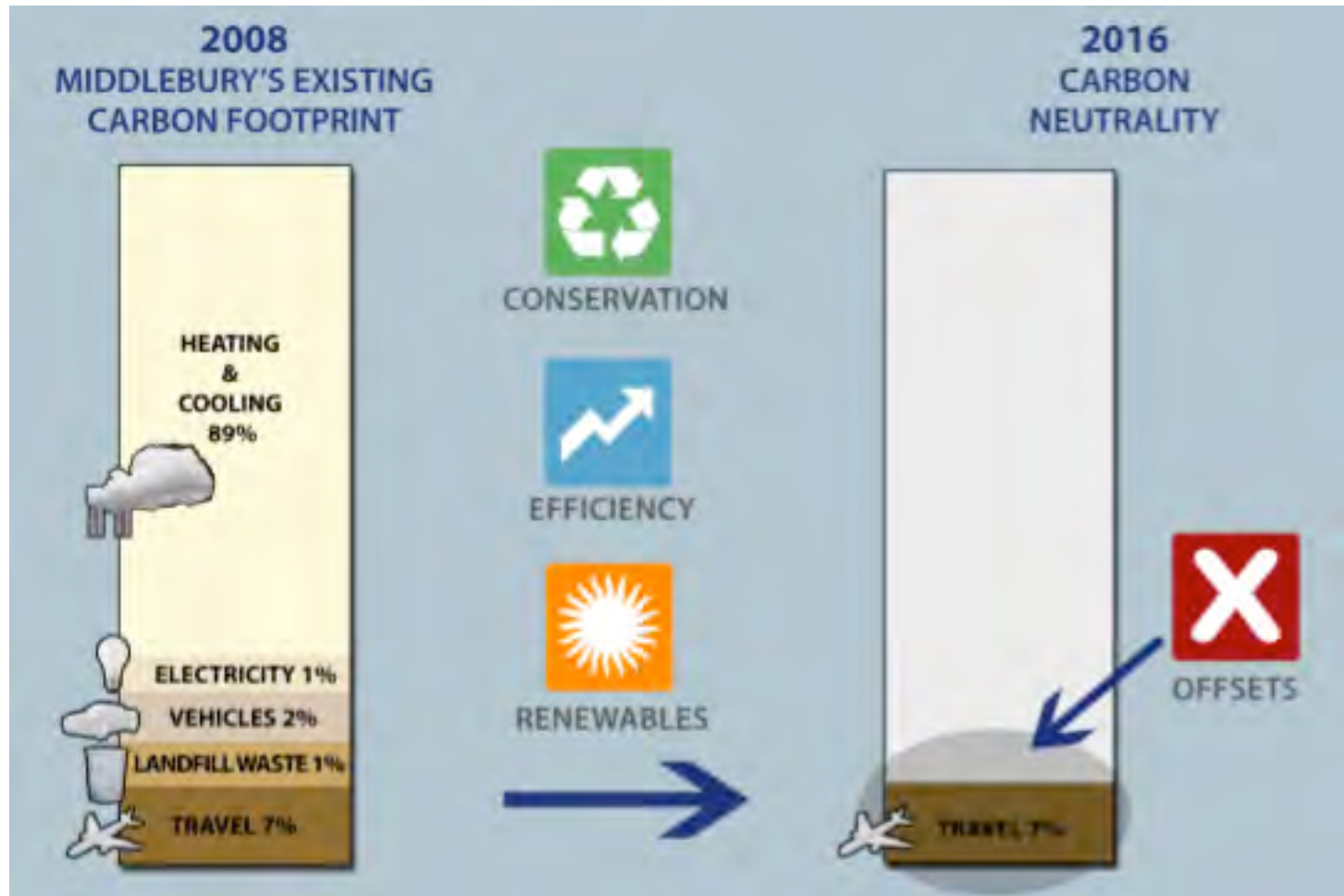


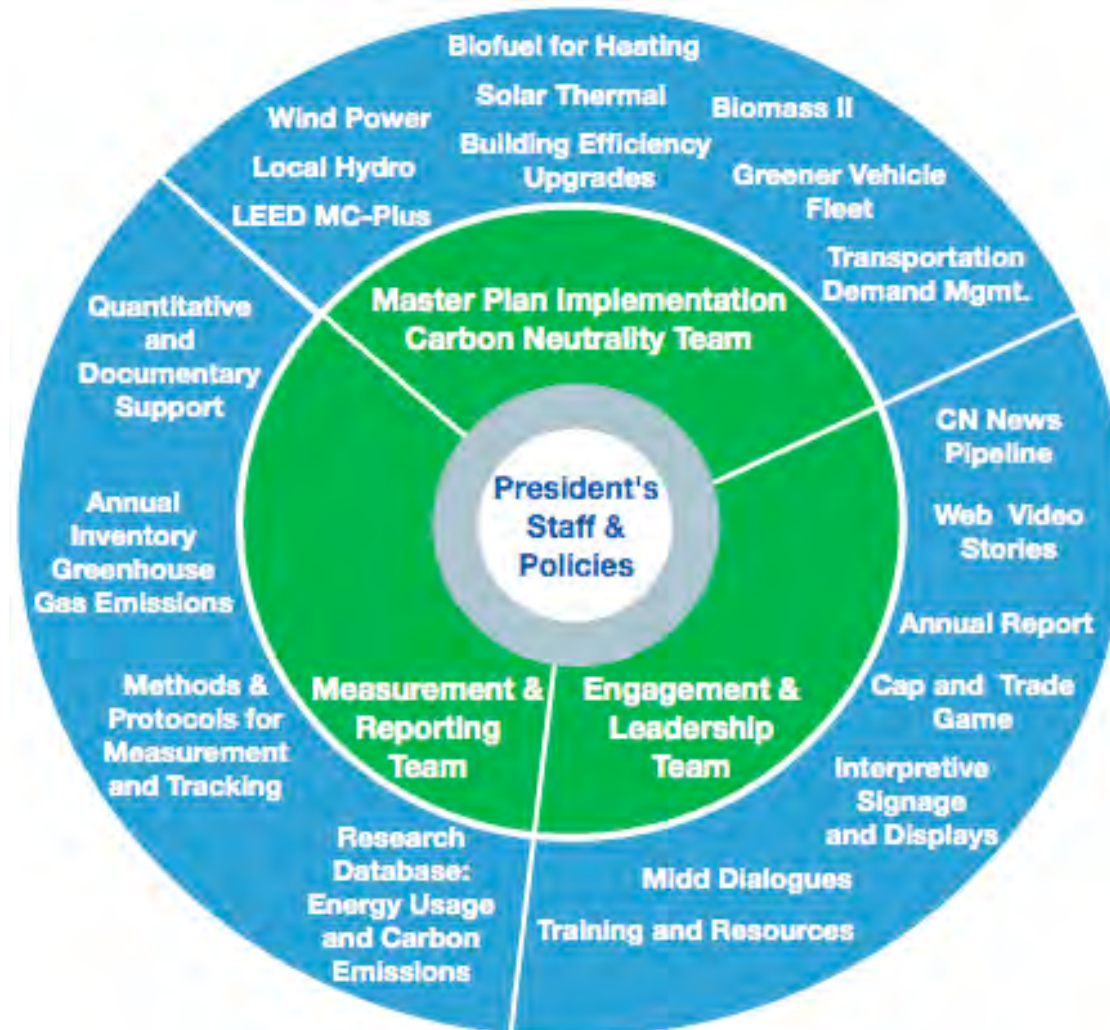
make neutrality  a reality

Jack Byrne, Director, Sustainability Integration Office
Middlebury College
Sustainable Endowments Institute Webinar, February 3, 2010

- May 2007: Carbon Neutrality by 2016 and American College and University Presidents Climate Commitment
- May 2008: Climate Action Plan Adopted
- September 2008 Implementation Teams Appointed



Three teams implementing Middlebury's climate action plan



Carbon Neutrality and Master Plan Implementation



Biomass Gasification System - CHP

- 40% reduction in CO₂
- \$12 million cost, 11 year payback
- Saves over \$800,000 yr. in fuel costs
 - \$800,000 to local economy

The million gallon question:

Use of #6 fuel oil cut from 2 million gal. to 1 million gal. due to biomass (20,000 tons woodchips/yr).

How to displace the remaining 1 million gal. with a renewable, carbon neutral source?

- Biomass energy district?
- Farm biomethane?

Criteria for projects:

- Cost-effective and economic
- Carbon reduction & environmental benefits
- Regional and local economic/social benefits
- Proven technology and practices
- Reasonable risks and foreseeable consequences

Willow Shrub Pilot



Can we grow some of our biomass fuel on fallow agricultural land?

Four year willow shrub study on 10 acres with SUNY College of Environmental Science & Forestry

Biomass Energy District



- Partnership with Town and Medical Center - feasibility of:
 - ecological supply of biomass from farm and forests
 - switch to biomass heat/power
 - biomass purchasing Co-op
 - renewable energy fund
- May help with offsets

challenge

Efficiency Improvements 2009

(with Efficiency Vermont)

- Total cost of four projects: \$159, 320
- Annual cost savings: \$104,410 (includes savings due to electricity and heating efficiency improvements)

Project Description	Completed	Energy Savings (kWh/yr)	Annual Cost Savings	Efficiency Vermont Incentives
Biomass Boiler Plant	Apr 2009	108,751	\$70,485	\$13,810
Robert A. Jones Lighting	Apr 2009	13,987	\$1,150	\$845
McCullough Hall - Renovations	Jul 2009	18,863	\$9,675	\$1,610
Proctor Hall - Renovations	Sep 2009	116,198	\$23,100	\$14,230
TOTAL		257,800	\$104,410	\$30,495

- Revised design and construction guidelines require LEED Silver minimum performance – new and renovated space should be designed for minimal energy consumption, e.g. Franklin Env. Ctr.

Community Engagement and Leadership

PowerStrip: How much can you take off?

- Student electricity conservation competition
- Average kWh savings over a 2 week period by 75 students: 50%
- Winning team achieved an 88% savings
- Expanding at and beyond College through partnership w/ Efficiency Vermont and Vermont Community Foundation



Power Strip							COMPETITION SCHEDULE
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	
	Team Coordinator distributes kits to team	1st Week Baseline				Record watt-hours	
		Plug in meters before 12pm Fill out worksheet Competition begins 12pm					
2nd Week Conservation					Team Coordinator collects kits	Download data-Connect with Data Coordinator.	
Reduce electricity				Competition ends 12pm Unplug meters Finish worksheet			
Pass kits off to next Team Coordinator	Team Coordinator distributes kits to team	next team participates					

Community Engagement and Leadership

Know Your Thermo-stats:

- Change behavior during summer: Turn it off when not in use
- Change behavior in winter: Turn down your thermostat, keep the windows closed

**AVOID
TEMP°TATIONS**


There are nearly **400** window AC units installed on campus each summer...

when left on, these units waste **\$512** each night...

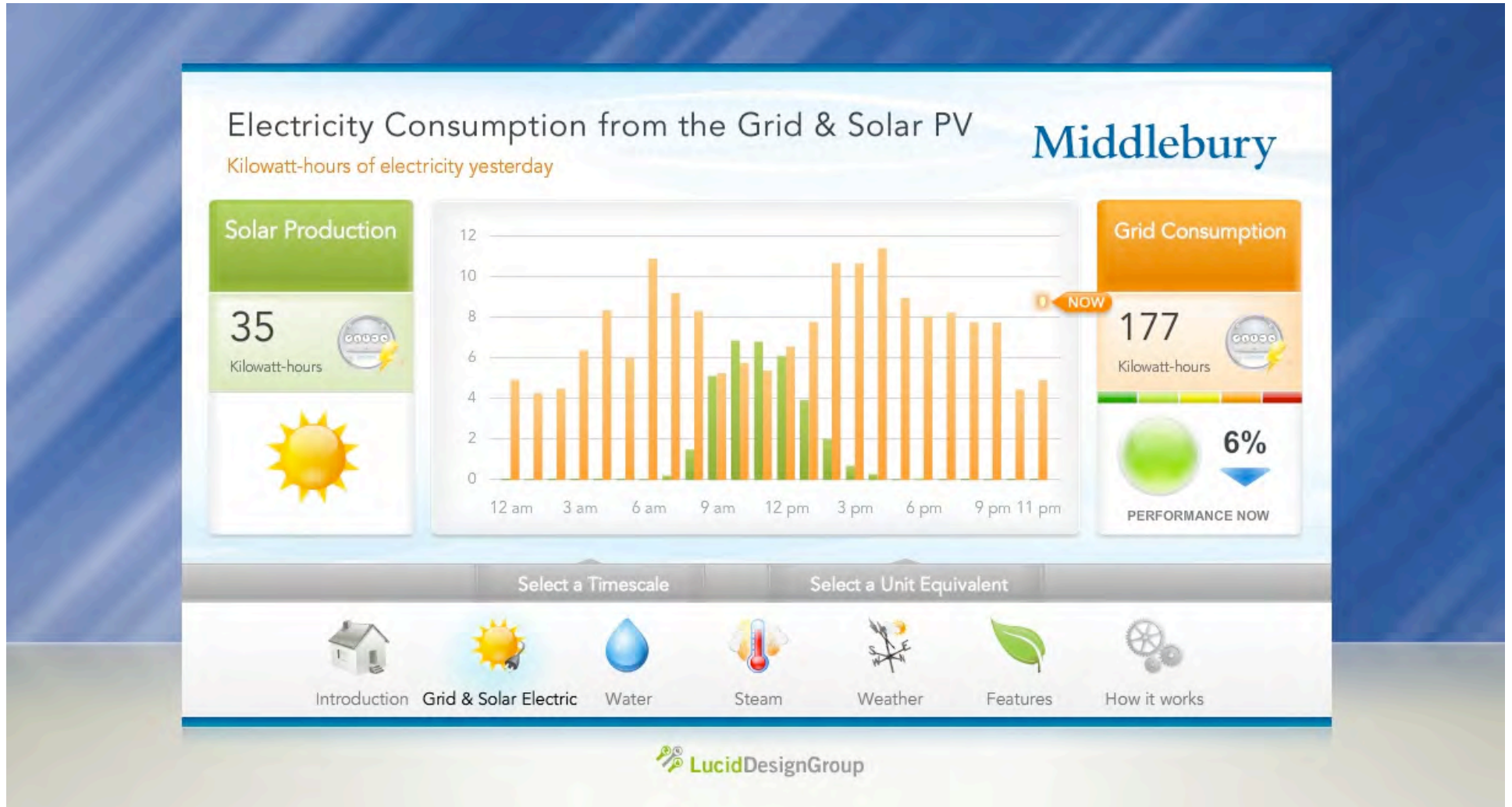
this adds up to **\$15,000** per month!

Turn off the AC at the end of the day, shut windows and doors to improve efficiency.

make neutrality a reality
CO₂016

Middlebury.  LEAVE A SMALL FOOTPRINT

<http://buildingdashboard.com/clients/middlebury/franklin/>



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