University of Maryland
sustainability council

Meeting Summary

September 20, 2011

Council members present:
Robert M. Specter, Vice President for Administrative Affairs & CFO (Chair)
Michelle Eastman, Assistant President and Chief of Staff
Mahlon Straszheim, Associate Provost, Academic Affairs
Mary Ann Ottinger, Professor and Associate Vice President for Research
Steve Hutcheson, Professor of Cell Biology & Molecular Genetics
Ross Salawitch, Professor, Atmospheric and Oceanic Sciences
Thomas Zeller, Associate Professor, History
Scott Lupin, Associate Director, Environmental Safety and Director, Office of Sustainability
Joan Kowal, Energy Manager, Facilities Management
Jay Elvove, Manager, OIT
Monette Bailey, Senior Writer/Editor, University Relations
Ian Page, Graduate Student, Agriculture and Resource Economics
Matthew Popkin, Undergraduate Student, Government and Politics

Guests:
Wallace Loh, University President
Mary Hummel, Assistant Vice President for Student Affairs
Russell Furr, Director, Environmental Safety

Meeting start time: 1:00pm

Meeting Highlights

Greenhouse Gas Inventory of the University of Maryland
Sally DeLeon, Measurement Coordinator in the Office of Sustainability, presented findings from the *Carbon Footprint of the University of Maryland: Greenhouse Gas Inventory Report 2010*. The full presentation is included in **Appendix A**.

A discussion of the GHG inventory followed the presentation.
- Ross Salawitch prepared a handout to the Council containing his feedback on the GHG inventory. His comments centered on four main points. See **Appendix B** for his full comments.
    o 1) Renewable Energy Credits (RECs) may not have the environmental benefit that companies that sell them say they have and that the University should preference Power Purchase Agreements (PPAs) over RECs.
    o 2) The University should implement a carbon offset program for air travel.
    o 3) The University should promote the Green Permit for fuel efficient vehicles.
    o 4) Facilities Management should quantify the tradeoff between dollars spent on energy efficiency upgrades verses energy use offset.

- Joan Kowal responded to Ross's comments about RECs, saying the campus agrees that we don't want to rely on RECs, which is why she recently executed renewable energy PPAs. We will keep and retire the RECs associated with those projects. It was a student decision to purchase RECs in 2010 with student funds. Their purchase does not necessarily represent the University's strategy for reaching carbon neutrality.
- Matthew Popkin stated that the big picture issue is that the University has a commitment to becoming carbon neutral yet we still purchase electricity that is produced by fossil fuel. Be it through RECs or PPAs, the University should take immediate action to purchase electricity from renewable sources.
- Rob Specter said that future GHG inventory reports should include an accurate accounting of REC purchases.

Green Office Program

Aynsley Toews, Enhancement Coordinator in the Office of Sustainability, presented on the Green Office program, which the Office of Sustainability will soon launch campus wide. The full presentation is included in **Appendix C**. Green Offices is the first in a suite of certification programs the Office of Sustainability intends to develop. Future programs may include Green Labs, Green Events, Green Greek Chapters, and Green Residences.

Student Advisory Subcommittee and University Sustainability Fund

The Student Advisory Subcommittee members have been appointed and they intend to meet in October before the November 1st deadline for proposals to the Sustainability Fund. The Fund was promoted to deans, directors, and department heads. The University Sustainability Fund Info Fair on September 19 was well attended. Of the nine projects that received funding last year, four are now complete. See **Appendix D** for a status update on all nine 2010 Sustainability Fund grant recipients.

Sustainability Minor

Mahlon Straszheim reported that proposals for a sustainability minor are due to the Provost by September 30 and he expects there will be an announcement this fall about the new academic program.

Smart and Sustainable Campuses Conference

Scott Lupin reported that the University has retaken control of the Smart and Sustainable Campuses Conference. NACUBO was the lead sponsor of the conference for the past two years. The Office of Sustainability is managing conference planning and is working on making this conference stand out from other campus sustainability conferences. The conference will be held at the Inn & Conference Center at UMUC on April 16 & 17, 2012.

University Sustainability Fund and Waste Management Signage

Fran Avendano, Communications Coordinator in the Office of Sustainability, presented the new signs that were installed at the sites of each (but not all) of the projects that received grants from the University Sustainability Fund in 2010. She also presented the new recycling, compost, and trash signage that was installed in residence and dining halls this summer. This waste management signage will become the new campus standard so that the campus has a consistent look and feel to waste management. See **Appendix E**.

President Loh's Comments to the Council

President Wallace Loh thanked the Council for the advice it provides to his office and for managing the University Sustainability Fund. He said that sustainability is even more of a challenge of education as it is of science. We must educate people about the implications of climate change on the economy and national security. Our dependence on fossil fuels is very dangerous and we have to find ways of informing people about the implications of our everyday decisions. He encouraged the Council to address this important issue of the need for better sustainability education.

President Loh opened the floor to questions and comments.

- Matthew Popkin asked if the President's house, which he understood is undergoing renovation, could be renovated to become a model of sustainability. President Loh described the project, which includes replacement of an old, antiquated residential structure with outdated HVAC and other building systems, asbestos contamination, inadequate accessibility, severe space limitations and lack of convenient parking nearby. A new, privately-funded University House is proposed, and primarily it would be used as a venue for social events and fund raising activities. President Loh suggested that the site could be a valuable showcase of the University's commitment to sustainability, and possibly provide a teaching opportunity by making information about its sustainability characteristics available to visitors. The project would be built to the University's sustainability standard (LEED Silver) at the minimum, and to a higher level if resources permit.
- Ross Salawitch commented that the University of Maryland is ahead of many universities on sustainability and we should be proud of our accomplishments. He also thinks the sustainability minor is a great idea and he looks forward to President Loh's support of it.
- Scott Lupin echoed the importance of the minor. He mentioned that the other half of the Presidents' Climate Commitment is to educate all students about sustainability.
- Matthew Popkin mentioned that the *University* Sustainability Fund is currently only funded by students and suggested the University should contribute to the Fund. President Loh said he and Rob Specter will consider his suggestion.

Climate Action Plan Update

Sally DeLeon presented an update on the University's progress toward meeting its Climate Action Plan (CAP) goals. The full presentation is included in **Appendix F**.

A discussion of the CAP status update followed the presentation.

- Ross Salawitch suggested the University consider implementing a no fly zone – an area around the campus or list of cities where faculty, staff, and students would be encouraged to take the bus, train, or drive instead of fly. He also suggested the University implement voluntary air travel carbon offsets.
- Mary Ann Ottinger said she would like to work with Mahlon Straszheim to focus on the Education and Research goals of CAP.
- Scott Lupin said the Office of Sustainability will put together a prioritized list of issues for the Council to address based on CAP, UMD Sustainability Metrics, and STARS. He mentioned that the heavy lifting of the Council will be to address the areas of weakest performance and to draft new policies or programs to address those areas. This will be the focus of the October Council meeting.

Adjourn: 3:05pm

2010 GHG Inventory
Carbon Footprint of the University of Maryland

sustainability   terps leave small footprints
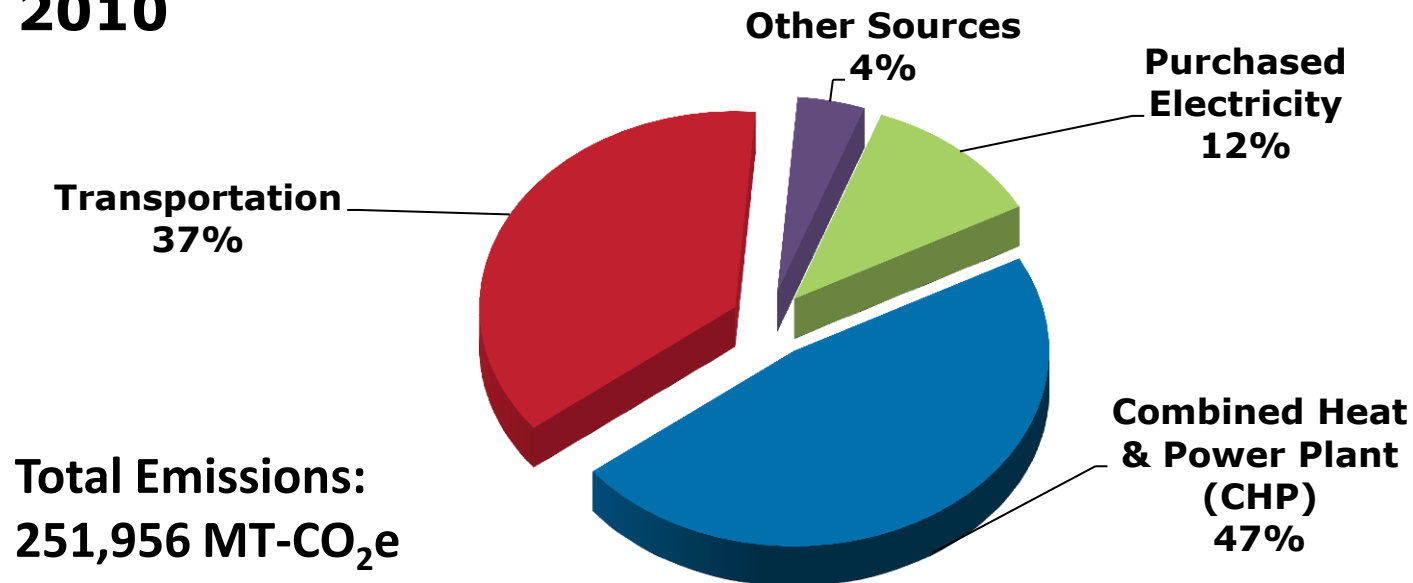
Change in GHG Emissions since 2009
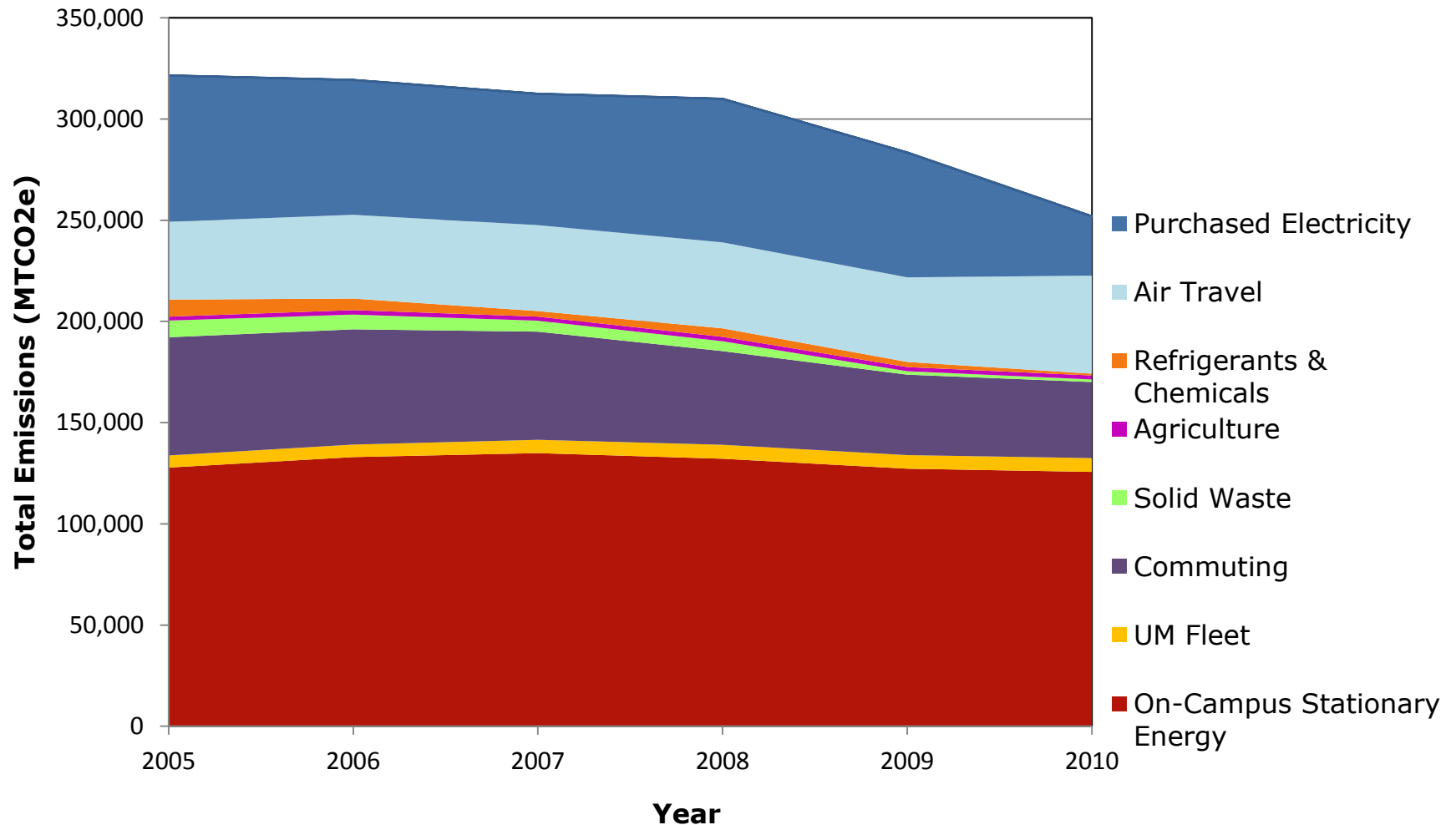
Overall ↓
11.1%
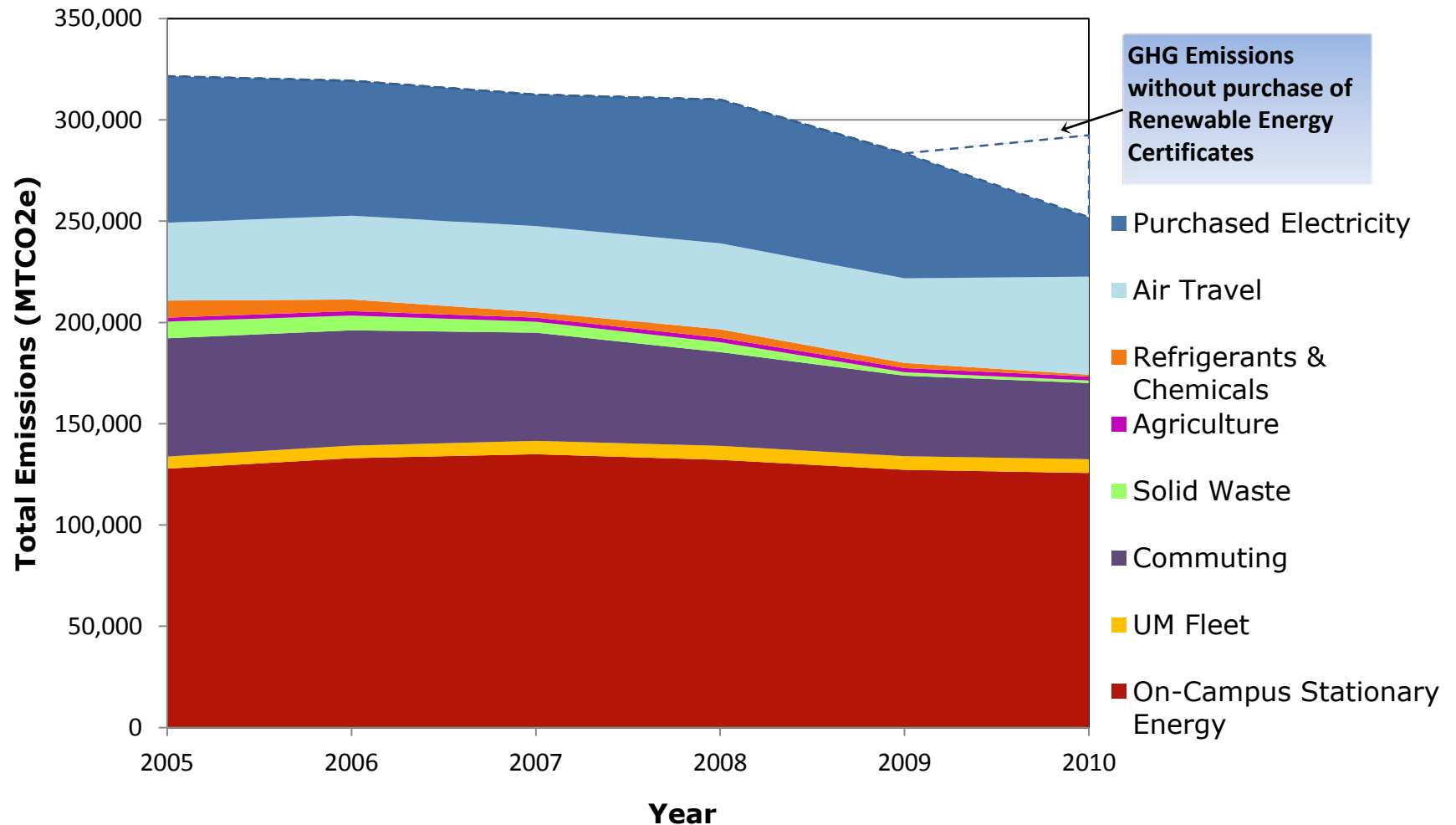
Transportation ↑ 5.2%

Energy ↓ 18.0%

Other sources ↓ 34.5%

2010

Total Emissions:
251,956 MT-CO$_2$e

Other Sources
4%

Purchased
Electricity
12%

Transportation
37%

Combined Heat
& Power Plant
(CHP)
47%

GHG Emissions by Source

GHG Emissions by Source

Renewable Energy Certificates

What is a REC?

Property rights to the additional environmental benefit (pollution prevention) of renewable energy; One REC can is used to neutralize the GHG emissions from one megawatt-hour(MWh) of commodity electricity.


= standard electricity
(only electricity generated)

+ REC = renewable electricity
(electricity + REC)
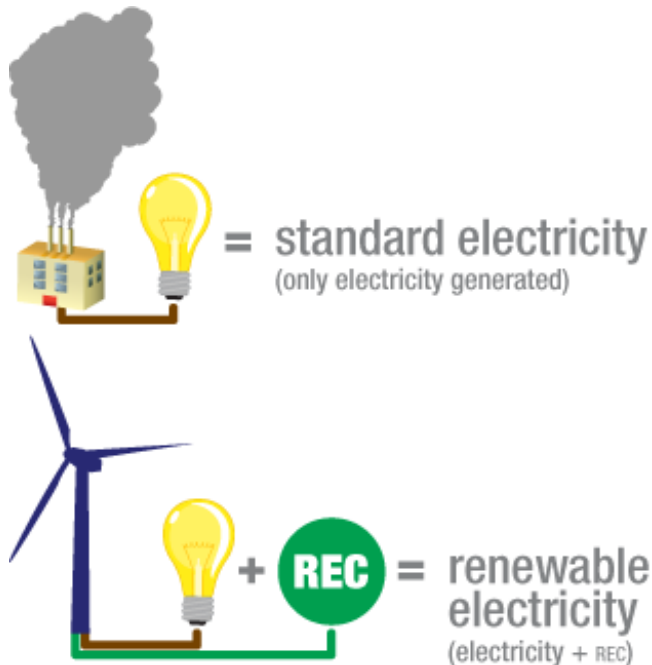
RECs made a significant impact in 2010:

- 66,250 RECs were purchased, mostly funded by the Student Sustainability Fee
- 62% of emissions from purchased electricity was neutralized (40,470 MT-CO_2e)
- Without the REC purchase:
  - 3.2 % increase in overall GHG emissions (GHGs)
  - Purchased electricity comprises 24% of GHGs
  - 13% increase in GHGs from purchased electricity
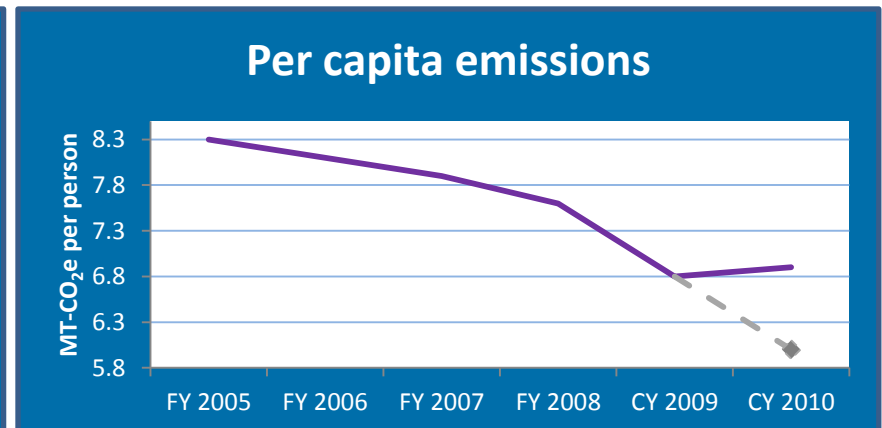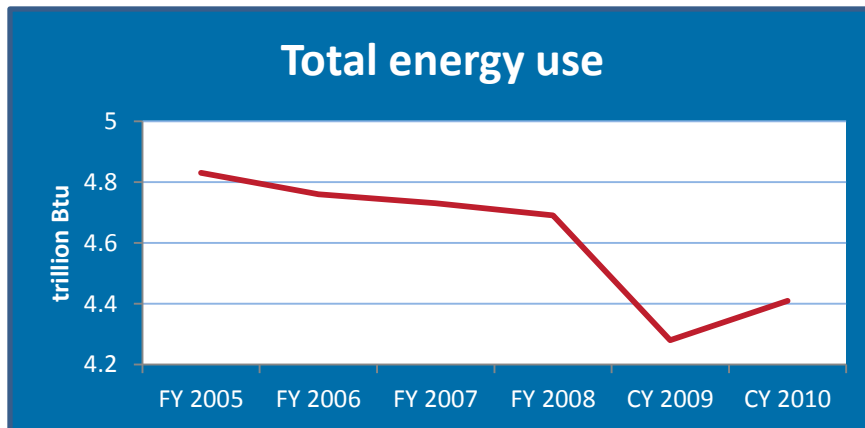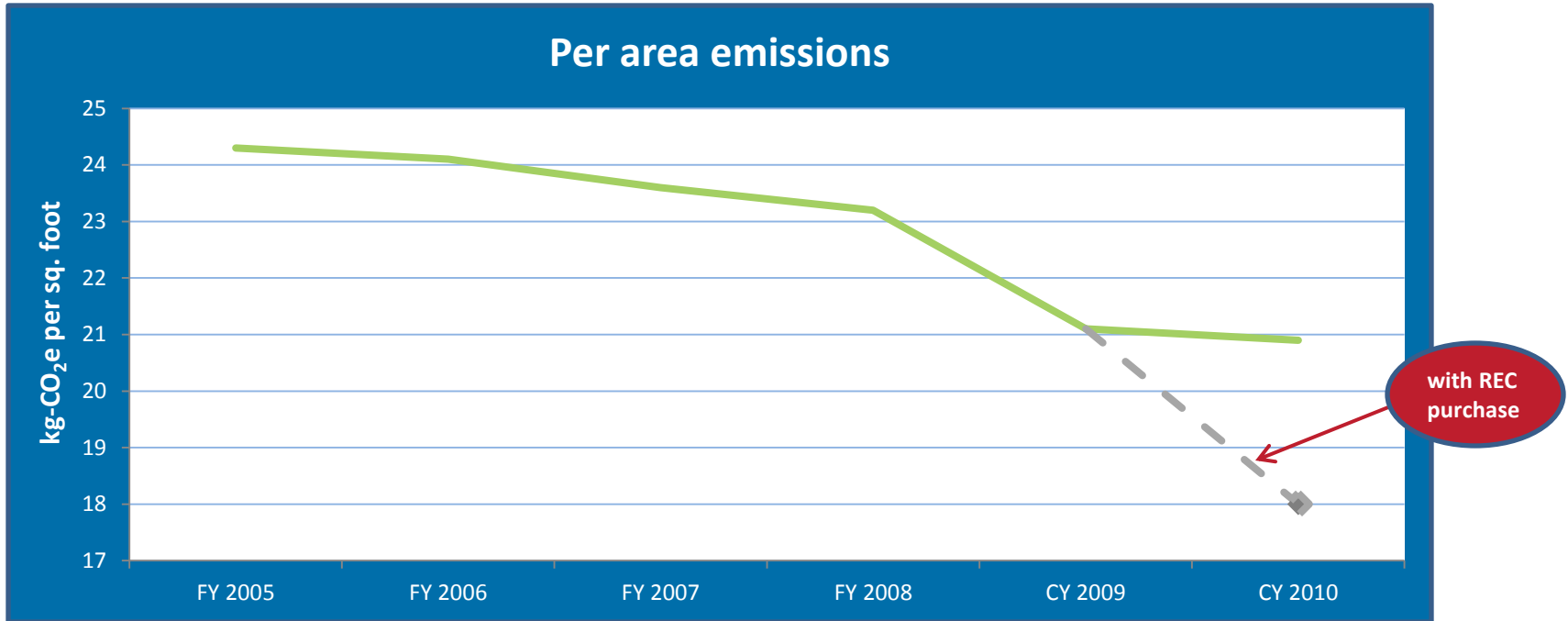
Energy & Emissions Intensity

Total energy use
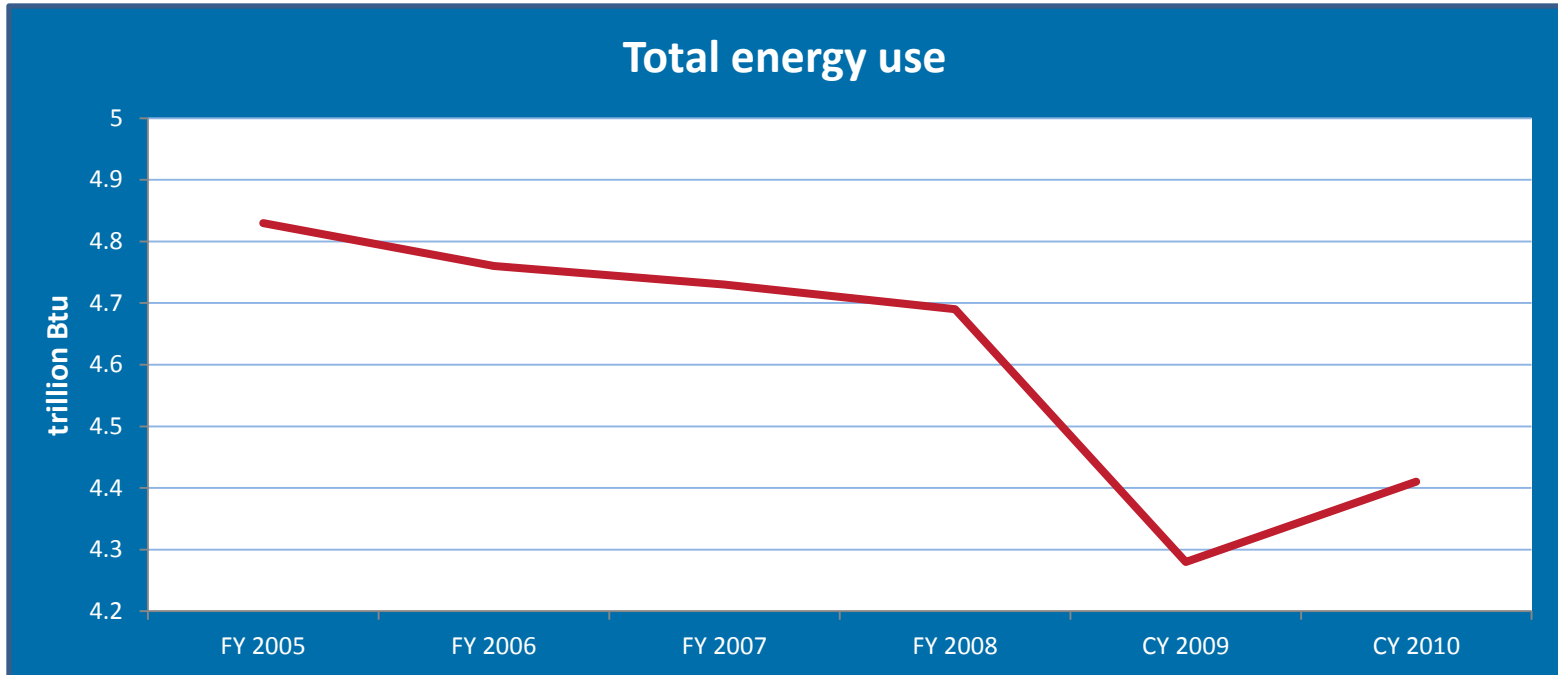
- **Includes purchased electricity (without reduction from REC purchase) and fuel use for all stationary and mobile sources**

- **2.9 % increase in 2010 because of campus growth and rising air travel**

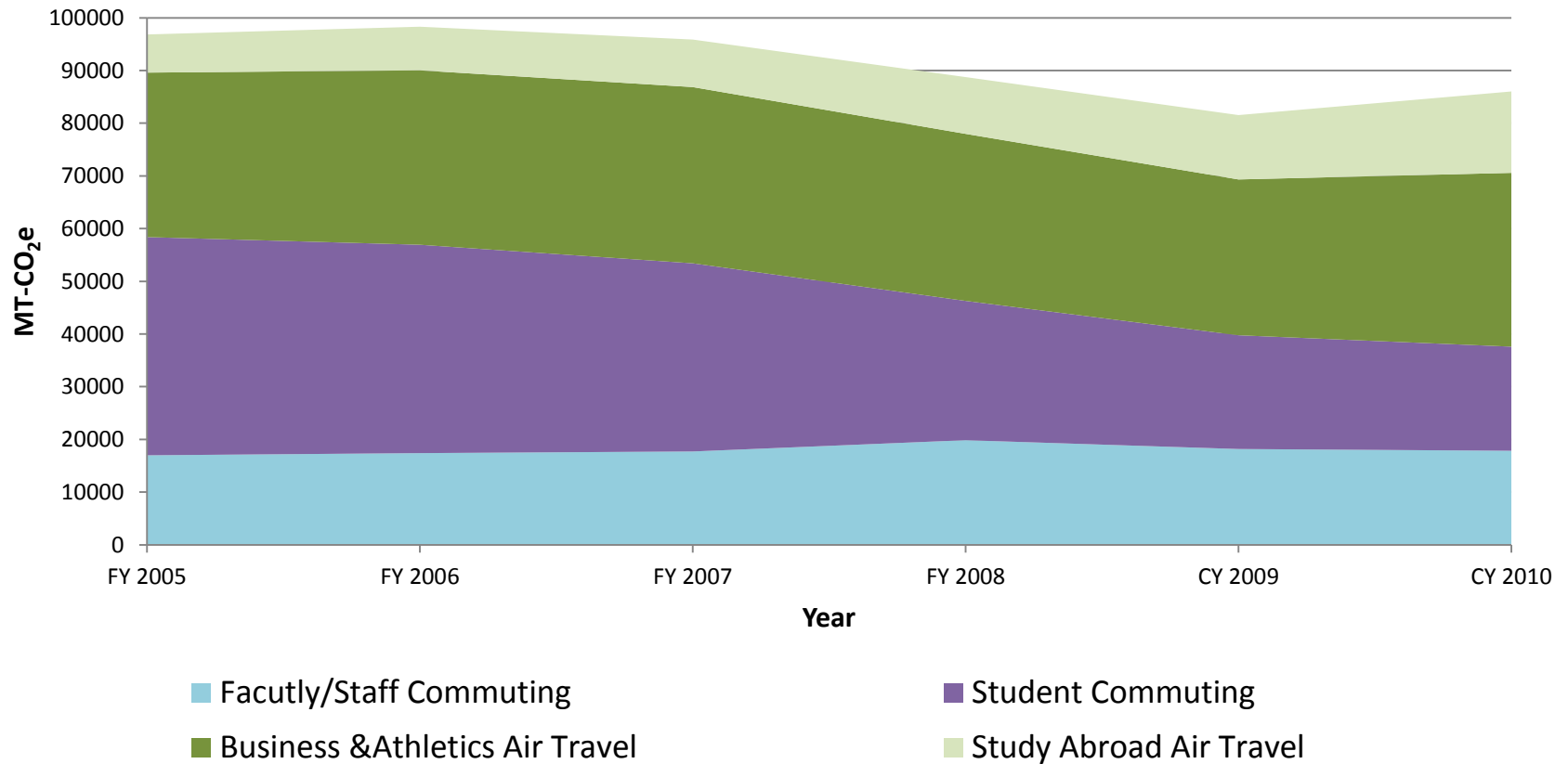- **8.7 % decrease since 2005**

Energy & Emissions Intensity

Per capita emissions

Total energy use
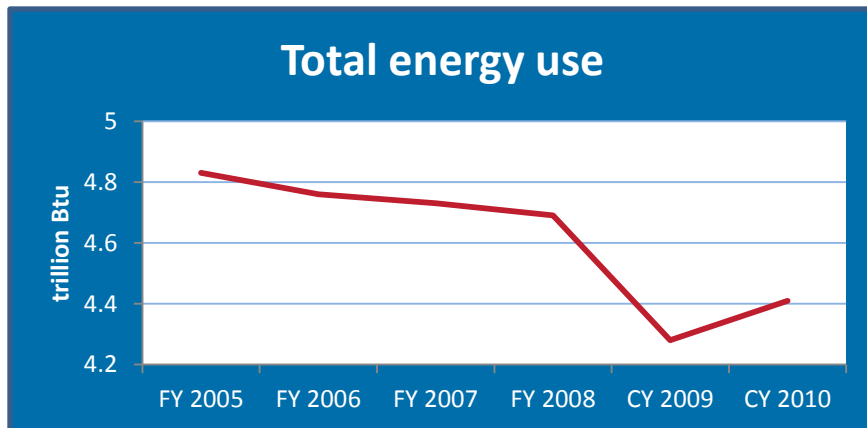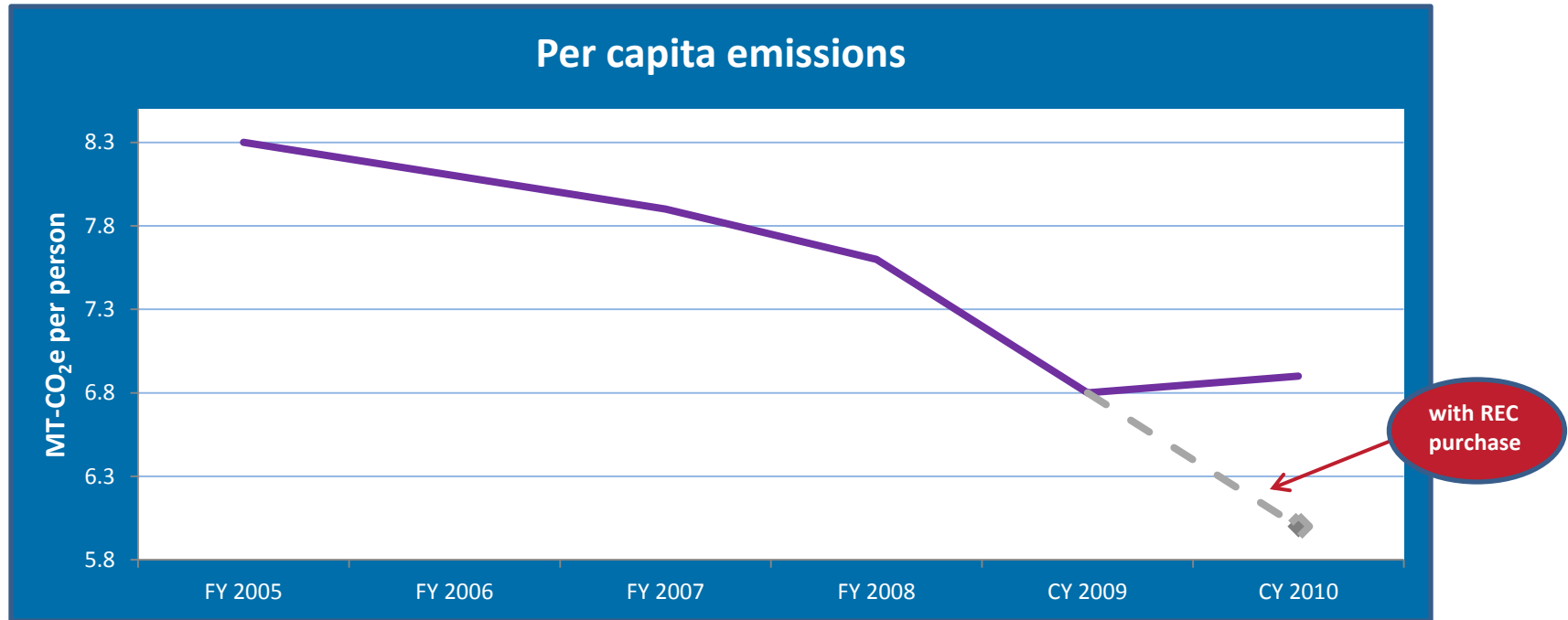
The REC purchase maintained the downward trend begun in 2008

Energy & Emissions Intensity

Per area emissions

kg-CO$_2$e per sq. foot

with REC purchase

FY 2005 FY 2006 FY 2007 FY 2008 CY 2009 CY 2010

Total energy use

trillion Btu

FY 2005 FY 2006 FY 2007 FY 2008 CY 2009 CY 2010

Per capita emissions

MT-CO$_2$e per person

FY 2005 FY 2006 FY 2007 FY 2008 CY 2009 CY 2010

Transportation Emissions

Major Sources over Five Years

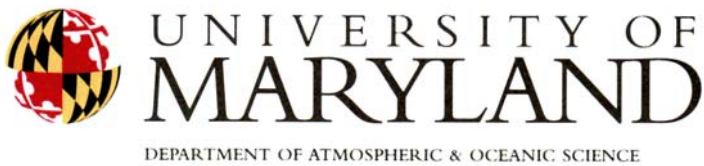# Transportation Emissions

Major Sources of Emissions

Legend:
- Study Abroad Air Travel
- Business &Athletics Air Travel
- Student Commuting
- Facutly/Staff Commuting

2008: 95,649 MT-CO2e
- UM Bus & Vehicle Fleet 7%
- Faculty/Staff Commuters 21%
- Air Travel 44%
- Student Commuters 28%

2010: 92,836 MT-CO2e
- UM Bus & Vehicle Fleet 8%
- Faculty/Staff Commuters 19%
- Air Travel 52%
- Student Commuters 21%
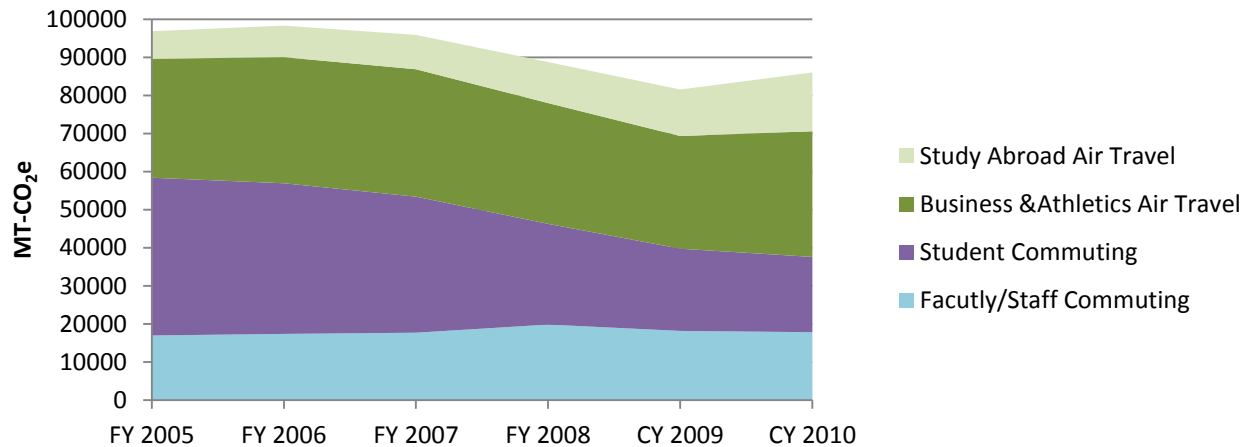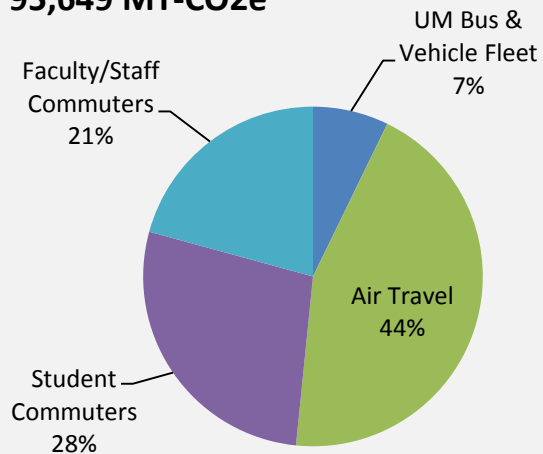
UNIVERSITY OF
MARYLAND
DEPARTMENT OF ATMOSPHERIC & OCEANIC SCIENCE
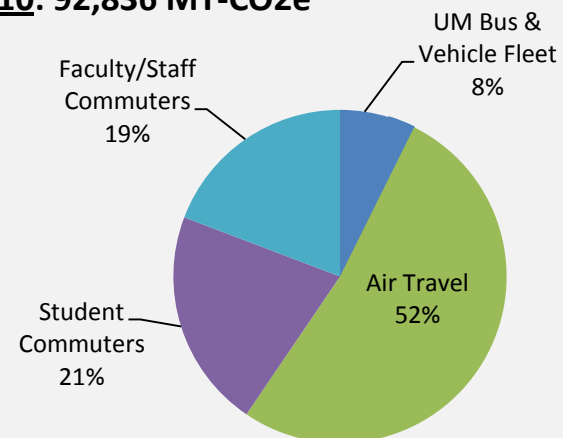
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20 September 2011

Comments on Carbon Footprint of the University of Maryland: GHG Inventory 2010

Congratulations and much thanks to Sally DeLeon and her team for authorship of an outstanding, information rich, compelling document, to the many folks who provided data to this report, and to those who have worked so hard to achieve an 11.1 % reduction in the UMd carbon footprint for CY 2010 relative to CY 2009 and a 21.5% reduction with respect to the FY 2005 baseline. Job well done!

The following comments are offered in the spirit of collegiality, in the interest of our shared goal of improving upon the tremendous present accomplishment.

I. RECs

The report established the primary action taken to reduce the UMd carbon footprint is the use of ~$100,000 raised by the undergraduate Student Sustainability Fee to purchase 66,000 RECs (renewable energy credits). This purchase allowed UMd to claim, in the accounting, that 66,000 MWh of purchased electricity was "carbon neutral". By my accounting, UMd purchased 115,182 MWh of electricity in 2010. I found this number by multiplying 69,800 MT-CO_2e (Table 3) by 1 MWh/(0.606 Mt-CO_2e) (Box 2). If my estimate of the UMd purchase of electricity is correct, then 57% of the purchased electricity was offset by RECs.

My concern, quite simply, is that the offset of CO_2 release by the purchase of RECs is likely ***not sustainable*** due to two factors:

   a) the present price of RECs is at an all time low and almost certainly will rise in the future;

   b) the continuation of $100,000 per year depends for this purpose depends on the good graces of the UMd undergraduate population

Regardless, ***information about the REC purchases should be included in the report, so that the students have a transparent means to understand what projects are supported by their fee!***

Let me focus just on the price of RECs. If we divide the money spent on RECs by the number of RECs purchased, this works out to a purchase price of ~$1.5 / REC. This price is consistent with the price of RECs in Md and Pa given by DOE in the chart below, which is from:

http://apps3.eere.energy.gov/greenpower/markets/certificates.shtml?page=5

Carrying the math forward, UMd paid 0.15 cents / kWh (less than a penny!) for each REC, whereas the retail rate for electricity in Md is about 12 cents / kWh and the wholesale rate is about 6 cents / kWh. How can this disparity exist? Because RECs are not true purchase of electricity … *RECs are intellectual property rights to claim the environmental benefit for renewable energy that someone else has purchased*.
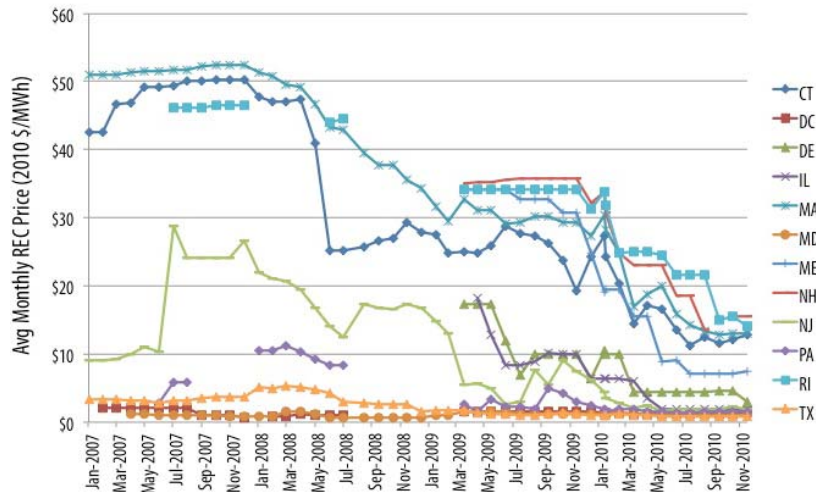
Note, from the above chart, that the price of RECs in many other states is much higher than the price in Md. Apparently, many of the RECs that UMd purchased in 2010 were from Texas, which also has extremely low prices at the present time.

Had the university bought RECs from many other states, or should the price of RECs in the PJM market rise, the $100,000 allocated to RECs would offset a smaller fraction of purchased electricity.

What is a REC? Simply put, a REC is a commercial product allowing one to obtain intellectual rights to displacement of carbon from the grid. The generators of renewable energy are paid twice: once by those who purchase the electrons (either from a PPA such as in the Severn building or from compensation for excess electricity placed into the grid by the local utility (in our case Pepco), and a ***second time*** for the intellectual right to claim displacement of carbon. In the best of worlds, the ability to sell RECs provides financial incentive to either fund an otherwise too costly project (as is the case for most solar PV projects) and in the worst of worlds (i.e., when RECs exchange hands for 0.15 cent / kWh) RECs provide fodder for the view that this transaction does not represent a meaningful displacement of carbon. I can not emphasize this more strongly: **providers of RECs are paid twice, once by the purchaser of the electrons and again by the purchaser of the intellectual rights to the carbon displacement. UMd has only bought intellectual rights …**_UMd has not actually purchased "clean electrons", as far as I can tell from this report_**.**

In Maryland, there are three types of RECs: Tier I Solar, Tier I Non-Solar (wind, biomass, etc), and Tier II (hydroelectric). Tier II RECs will expire due to legislation favoring solar, wind, biomass, etc over hydroelectricity. The present price of Tier I **Solar** RECs (**SRECs**) in Md is at a near all time ***low*** of $200 / SREC. If the student fee had been used for SRECs rather than

RECs, the $100,000 would have purchased only 500 SRECs, which would have offset ~0.4% of the total purchased electricity. Hence, *the most notable accomplishment of the 2010 GHG inventory is a result of the extremely low price of RECs at this point in time*, plus the availability of $100,000 and the political will and bureaucratic wisdom to spend the funds in this manner.

The factors that drive the price of RECs are complex. I do not pretend to understand the present market. But, in part, the low price of RECs and the high price of SRECs in Md is driven by a large demand for SRECs by utilities, due to the Md's Renewable Portfolio Standard (RSP) that now requires a percentage of the energy utilities supply ***must originate from in-state solar generated electricity*** (see http://www.statestat.maryland.gov/GDU/10RenewableEnergyDeliveryPlan.pdf) The utilities pay a penalty if they fail to meet a quote for renewable energy in their portfolio. Utilities are competing for Md SRECs, driving up their price. Large utilities are largely not competing for RECs in Md and Pa at the present time, keeping their price low. This is a consequence of state legislation! It may only be a matter of time before utilities compete for RECs as well as SRECs; another chart in the Md RSP document projects that the 20% supply of renewable energy from Md utilities, in 2020, will be supplied largely by wind. If offshore wind does not come to fruition in Md, there will be tremendous future demand for RECs from utilities. It is a challenge to predict any market, and I do not pretend to have any special insight. But given the price of RECs in many other states and the disparity of prices for SRECs and RECs within Md driven by legislation, I surmise that by 2020, the price of RECs in Md will be much higher than the price today. If this comes to pass, then the progress reported in the 2010 document will require a "much higher" student fee to sustain.

What should UMd do? There are many companies that provide, on a 1 to 2 year contractual basis, purchased electricity guaranteed to originate from Renewable Sources. As I write, 15 companies show up by selecting "Government" and "Pepco" and clicking "Search" on this URL:

>   http://webapp.psc.state.md.us/intranet/supplierinfo/electricsupplier_new.cfm

I am sure most, if not all, of these companies would ***benefit tremendously*** from entering into a long term contract, with UMd, for the provision of renewable energy! I am not privy to how much UMd pays for its purchased electricity. Almost certainly, offsetting 57% of the purchased electricity by signing a contract for renewable energy will cost a lot more than the present expenditure of $100,000 for purchase of 66,000 RECs. This expenditure works out to 0.15 cents (less than a penny) per kWh! The "mark up" on renewable energy by suppliers is likely more than 0.15 cents per kWh. Nonetheless, the signing of a long-term contract for provision of a certain fraction of the university's purchased electricity, from renewable sources, is a ***sustainable*** way to proceed. Simply put, in the future, replicating the goals of 2010 will likely cost much more than the $100,000 that has led to the highly notable, present accomplishment.

II. Air Travel

Page 5 of the report states:

> **In 2012 and beyond, institutional innovation and creativity will be needed to enable UMD to meet its Climate Action Plan targets.**

While I do not pretend this suggestion is innovative or creative, it is offered nonetheless as and additional steps UMd could take to meet Carbon Footprint goals in 2012 and beyond.

The report states:

> **Increasing air travel is having a significant impact on campus GHG emissions. The Climate Action Plan specifies near term priority strategies of exploring how video conferencing facilities could be better promoted and used as substitutes for certain types of campus business travel, and how local sources of carbon offsets might be developed to address transportation related emissions that UMD cannot otherwise reduce. Imminent progress on these two strategies is needed.**

There are a myriad of companies that provide carbon offset for air travel. See, for example:

http://www.businessweek.com/bwdaily/dnflash/content/mar2008/db20080321_437700.htm

UMd should consider expenditure of funds for carbon offset of air travel. I have learned from Mark Stewart that this was considered when the Climate Action Plan was written in 2008/2009, but was not implemented because some grant money could not be used for this purpose.

The University could set up a voluntary suggested action that was part of the "check list" for university related travel booked by Travel On, Globetrotter, and Omega World Travel and the other affiliated travel agents. In turn, we would ask these travel agencies to collect data and report. Most employees get generous "per diem" when on travel … if folks are asked to give some of this back, to offset the carbon used for their travel, I suspect there would be wide-spread participation. If the lawyers managers sign off, the carbon offset upon air flight could be mandatory. If the contract managers did not allow grants to pay for this, and assuming UMd enters into a long term contract for renewable energy (point I) and no longer needs to spend the student fee on purchase of RECs, then the student fee could be put toward carbon offsets for air travel.

Another measure UMd could consider is implementation of a "no fly zone" for reimbursed travel: i.e., requiring faculty, staff, or students to take some means other than airplanes to meetings within a certain radius, such as New York, to Pittsburgh, to Virginia Beach. While draconian, many schools and agencies in Europe have instituted such measures, albeit the train system is a little better there than here ☺. Such a measure would certainly make the community aware of the tremendous toll on atmospheric CO_2 that is caused by air travel. A measure such as this could be made more palatable by provision of free transit, using a UMd car service, to and from the New Carrolton Amtrak station and the various Bus Stops (Bethesda, Greenbelt, DC near Capitol) that service the NY area.

Other minor points:

III. Green Cars

Page 26 of the report states:

> **Collection of data about faculty and staff vehicles is underway for 2011 through the DOTS new vehicle registration program. This data will reveal average fuel efficiencies for faculty and staff vehicles and thus enable a more accurate estimate of emissions from faculty and staff commuting.**

The GHG Inventory should tout the Low Emissions Vehicles Discount program that is presently in place and data from this program should appear in future Inventories.

Also, students should be allowed to benefit from driving Low Emissions Vehicles, by being able to purchase of permits in areas otherwise reserved for faculty and staff.

IV. Building Retrofits

Facilities Maintenance has done a remarkable job with the installation of low energy lights, motion sensors, and strict control over thermostats. It would be quite helpful, in future inventories, if the trade off between dollars expended versus energy use offset could be quantified. This would require separate metering of specific buildings. Do not know if this is viable, but thought I would throw out this suggestion.

In many offices in the Computer and Space Sciences Building, the next obvious step that must be undertaken is an improvement of the windows. Hopefully this will happen sometime between now and 2020.

Please contact me if you'd like to discuss!

Respectfully,

Ross Salawitch

Aynsley Toews
Office of Sustainability

What is the Green Office Program?

- A voluntary, self-guided program that supports and rewards offices for taking action.
- Focus on personal actions – what you can do (behavior change).
- Program was designed by a U of M advisory committee.
- Checklists and tools guide participants through three levels of certification.
- An opportunity to become "Green Office Certified."

Why a Green Office Program?

- Draws together many existing sustainability initiatives.

- Support and encourage sustainable practices.

- Further integrate sustainability into campus culture.

- Promote campus policies that support sustainability.

- Moving towards carbon neutral will require technology-based solutions and behavior change.

- Support the Strategic Plan and the Climate Action Plan.
- Every job is a green job – being green is part of Terp culture.
- Actions of 45,000 people can make a big impact.
- Conserve water, save energy and minimize waste.
- Save money.
- Lead by example.

University of Maryland
green office

The path to Green Office Certification

1 GO Rep

2 GO Audit

3 GO Pledge

4 Get GOing

5 GO Certification

University of Maryland
green office

Green Office Representative

Responsibilities:

- Voluntary position to represent your office

- Liaison between your office and Office of Sustainability

- Allocate time to implement Green Office program

- Attend training session

- Requires supervisor support

- Sets a baseline

- Completed by student interns

Green Office Pre- and Post-Audit

Name of Office:		
GO Rep:		
Building:	Surveyor:	
Room numbers:	Department/College:	
Number of staff in office (including full-time, part-time, students and interns):		
Date:		
Signature:	☐ Pre-Audit	
		☐ Post-Audit
	Date:	

PART 1: SURVEY QUESTIONS (20 Questions)

A. General Questions: Ask the GO Rep.
Answer Yes or No to each of the following questions

1. Does office participate in "Can the Can"?
2. Does office practice single

- Sign the participation pledge.
- Tool for program kick-off.

3 levels – Bronze, Silver and Gold

bronzechecklist

sustainable**umd**   terps leave **small** footprints

It is time to decide where to focus your green efforts. Review the checklist below and select the 23 actions (75 percent) you would like to focus on. The Bronze level actions are easy to carry out, require low time commitment and cost next to nothing. As you progress through the Silver and Gold levels, they will get increasingly more challenging. Doing a really good job of implementing your initiatives will generate momentum for your program that can be harnessed in subsequent GO Checklists as you expand to other initiatives.

Participation category:

☐ 1. Our office has signed the Green Office Participation Pledge.

☐ 2. We have completed our Green Office Pre-Audit.

☐ 3. We include sustainability topics as a regular agenda item at staff meetings.

☐ 4. We host sustainability special events (potluck, films, lunch and learns).

☐ 5. Our workplace website includes a link to the Office of Sustainability and information about our progress towards becoming Green Office certified.

☐ 6. We reward and recognize participation in sustainability initiatives including the Green

Meetings and events category:

☐ 16. We use reusable mugs/cups including at office meetings and events.

☐ 17. We have made our meetings paper-free.

☐ 18. We have decreased the amount of giveaways/ freebies at special events.

Transportation category:

☐ 19. We carpool, take the shuttle, bike or walk to on-campus meetings.

☐ 20. We calculate and track our commuter carbon footprint and share with our office.

Waste and recycling category:

- Logos
- Power Point presentations
- Website links
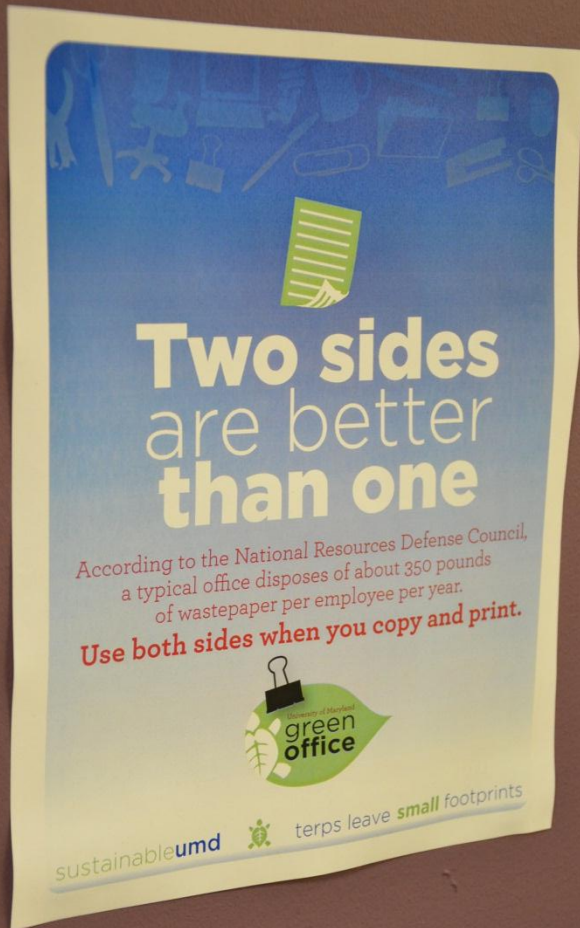
- Stickers
- Posters
- Incentives
- Green purchasing guide
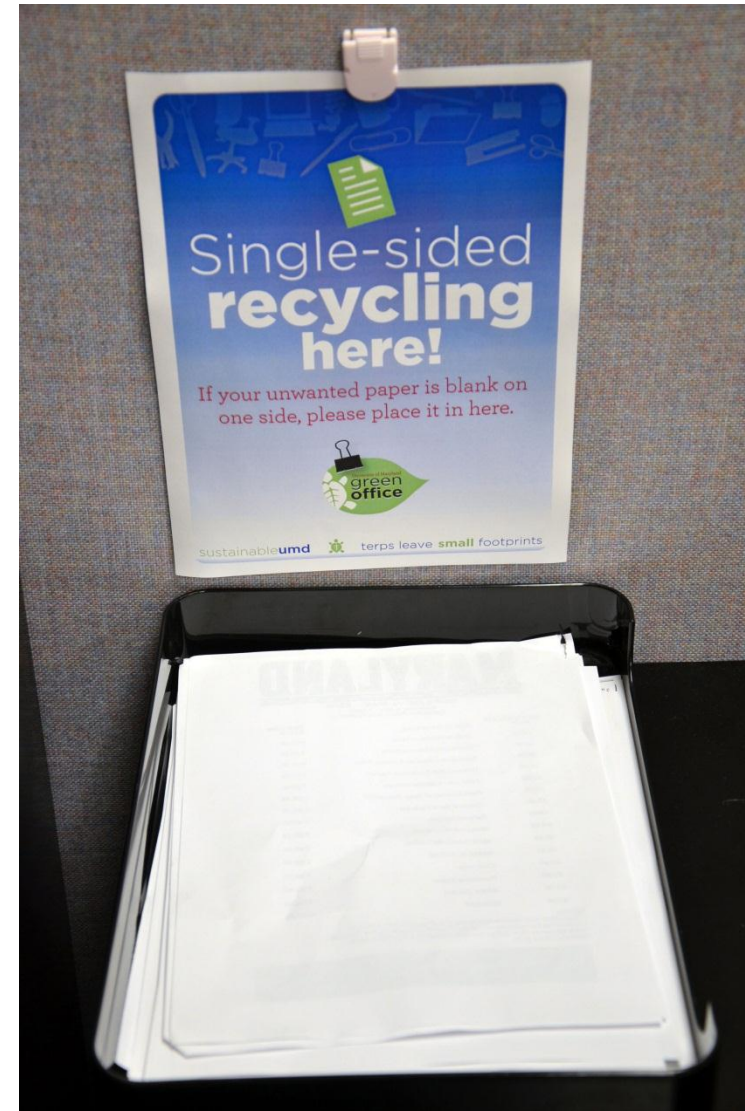
Humanities and Social Sciences, McKeldin

Projects and Activities

Green Office Program

The Humanities and Social Sciences Librarians, located on the 4th and 5th floors of McKeldin Library, have made a commitment to the Green Office Program administered by the University of Maryland's Office of Sustainability. To attain bronze-level status, we have identified things we already do, such as recycling, turning off overhead lights, and packing waste-free lunches. Also, many of us use public transportation, bike, or carpool to get to work. We also selected some new activities to improve our office's sustainability plan, like saving paper through double-sided printing, bundling plastic grocery bags for recycling, tracking our commuter carbon footprint to share with colleagues, and unplugging seldom used devices that are "power vampires."

We will update our site as we check more items off the list. Be sure to stop by the University of Maryland's Sustainability website for more recommendations and to learn more about the Green Office program!

Send us your comments | Privacy Policy

- This "certified" logo can be placed on your website

- Name on greenoffice.umd.edu certification listing

- Office certificate

Performing Arts Library

Pilot Office Participation

288 staff in 16 different offices:

- Clarice Smith Performing Arts Center Library (8 staff)

- DOTS (45 staff)

- Environmental Safety (45 staff)

- Hornbake Library (10 staff)

- McKeldin Library (10 offices, 143 staff)

- Office of the Provost (17 staff)

- Office of the VP for Administrative Affairs (20 staff)

University of Maryland
green office

- Quantitative and qualitative online and phone survey of participants
- Very positive feedback:

  - 83% **"The program structure is easy to follow."**
  - 85% **"As our office GO Rep, I feel well equipped to implement this program."**
  - 100% **"The tools provided were useful in helping us implement the program."**
  - 100% **"The Bronze checklist provided us with a variety of actions from which to choose."**
  - 85% **"The Bronze level tools have assisted me in implementing the GO Program."**
  - 92% **"The tools are well suited to their respective actions."**

General Comments:

"Really easy to follow -- easy to implement"

"Some of the tools are great: trash/recycle posters are especially awesome. The leaf-testudo & small footprints slogan are great! Subtle, clean, not too preachy."

"Since a lot of the items are things many of us are already doing, it seems "easy" to implement, ie, not onerous. Well thought out!"

"As Aynsley said - it takes a little bit more effort to get some folks to accept/agree to practice sustainability! I wish the GO program would be mandatory not voluntary."

University of Maryland
green office

- Post checklists and tools on website

- Develop web registry of participating offices

- Complete tools for Silver and Gold

- Develop GO Rep training schedule

- Soft launch campus-wide in October

- Articles – Between the Columns, Diamondback

- F.Y.I.

- Sustainability e-Newsletter

Aynsley Toews
Office of Sustainability
atoews@umd.edu
5-7533

FY2011 University Sustainability Fund Grant Recipients: Project Status Updates

September 2011

Sphagnum Moss Swimming Pool Water Treatment System, $64,717.67

All grant money was spent and project is complete. The Moss Water Treatment System was installed for the indoor pools at Eppley Recreation Center on August 29, 2011. Financial savings generated by the project will be used for future sustainability projects at ERC, which may include the installation of a moss treatment system for the outdoor pool.

Maryland Educational Solar Array, $30,000

$15969.85 of grant money was spent on wiring, roof-access punch-through, racking, ballasts, bench equipment, diagnostic equipment, and connectors. Remaining grant money will be used to buy additional batteries, conduit, patch-bay, additional lab bench equipment, connectors, and possibly adding wind power to the lab.

Public Health Garden, $15,460

$12,242 was spent on Eco-Goats to clear unwanted vegetation, construction of the upper terrace, and storage shed. The remaining $3,218 of the grant will support the final preparation for the teaching garden component of the Public Health Garden, which will include compost and soil, benches and/or seating area, educational signage, shade structure, and storage space. This final preparation for the teaching garden will be complete by December 2011.

Guilford Bioretention Facility, $9,000

All grant money was spent and project is complete. The bioretention system was completed in July 2011, after several implementation steps. In January 2011, students and Facilities Management officials worked together to excavate and fill the bioretention structure with the appropriate gravel and soil mixtures, which laid the foundation for landscaping work in March, April, May, June and July. Grant money was spent on bioretention soil, gravel, mulch, and the transportation of these materials.

WaterShed Constructed Wetlands, $4,500

All grant money was spent and project is complete. The constructed wetlands were built and operational over the summer and were disassembled and transported to DC, along with the rest of WaterShed, for the Solar Decathlon competition. The final resting place of WaterShed and the wetlands is unknown. As of August 2011, the Solar Team was looking for someone to purchase the house.

"Youngest Terps Go Green" Education and Outreach, $4,450

The Center for Young Children used their entire grant to pay for the installation of motion-activated faucets (total cost $5,096.39), however, grant money was not supposed to be used for any facilities improvement. The original award letter from Ann Wylie to Francis Favretto, Director of CYC, stated that "the Council has specifically approved funding to develop the website, recycling video and video on the 'green school journey' as outlined in your proposal. It is recommended that you contact Frank Brewer, Asst. V.P. – Facilities Management (405-3205) to identify funds for the proposed facility improvements." The Office of Sustainability is working with Dr. Favretto to resolve this discrepancy.

Rooftop Community Garden, $4,450

All grant money was spent but project is not yet complete. Grant money was used to purchase doors and card-swipe for rooftop access, railing, and other life safety devises. A few other life safety devises must still be installed before the rooftop space can be accessed by the public. Project coordinators expect to have the space open by mid October 2011.

Reclaimed / Recycled Costumes and Sets, $1,500

Grant money has not been used yet – funds will be used for set and costume construction for one concert in October 2011, and another concert in March 2012.

St. Mary's Garden, $1,050

Most of the grant money was spent on re-building the outdoor compost bin, compost buckets for individual apartments, drip irrigation system (seeper barrel and seeper hose), and construction of a wooden raised bed in the Side Garden. Remaining grant money will soon be spent on a rainwater collection system in the Side Garden and bio bags for apartment compost collecting.

University of Maryland
sustainability fund

2010 GRANT RECIPIENTS

- **Sphagnum Moss Swimming Pool Water Treatment System** – $64,717.67
  - *Campus Recreation Services*
- **Maryland Educational Solar Array** – $30,000
  - *Department of Electrical and Computer Engineering*
- **Public Health Garden** - $15,460
  - *The Institute of Applied Agriculture and the Public Health Garden Club*
- **Guilford Run Bioretention Facility** – $9,000
  - *Maryland Sustainability Engineering*
- **WaterShed Constructed Wetlands** – $4,500
  - *Center for Use of Sustainable Practices, School of Architecture*
- **"Youngest Terps Go Green" Education and Outreach** – $4,450
  - *Center for Young Children*
- **Rooftop Community Garden** – $4,450
  - *Rooftop Community Garden Club and Dining Services*
- **Reclaimed/Recycled Costumes and Sets** – $1,500
  - *M.F.A. Candidates in Dance*
- **Compost System Upgrade and Drip Irrigation Installation** – $1,050
  - *St. Mary's Garden Club*

University of Maryland
sustainability fund

SUSTAINABLE SIGNS

- To foster outreach and education for the Sustainability Fund projects.
- **Utilized used aluminum signs** donated by the State Highway Administration
- To represent sustainability in project promotion itself.
- Design by Professor Audra Buck-Coleman's ARTT 352 three-dimensional graphic art class
- Direction from Scott Munroe, UMD Landscape Architect
- UMD Graphic and Sign Shop printed and mounted onto the refurbished highway signs
- UMD Landscape Services installed the signs

Maryland Educational Solar Array

HIGHLIGHTING THE POWER OF EDUCATION: *One of the first in the United States as a dedicated instructional tool, A.V. Williams' solar array is directly connected to class and research labs in the building. When not used for research, the array adds power to the University grid.*

TURNING SUNLIGHT INTO POWER:

Each solar panel in the array is made up of photovoltaic cells, which are hit by photons from the sun. Electrons in the cells absorb the light energy, which frees them.

As in a battery, the free, negatively charged electrons are attracted to the positive "side" of the cell, but an electric field prevents them from moving there directly. Instead, the electrons flow through a circuit to reach the positive side of the cell.

This flow of electrons through the circuit is a direct current. After an inverter converts the direct current to alternating current, the flow can be used to power various devices.

The array only has 20 panels but is able to provide enough power for 20 desktop computers, 80 laptops, or 186 CFL light bulbs.
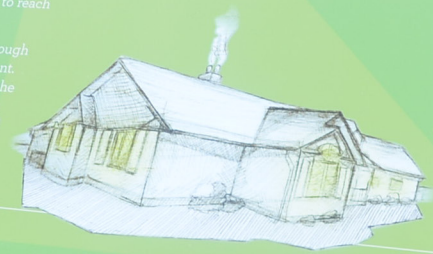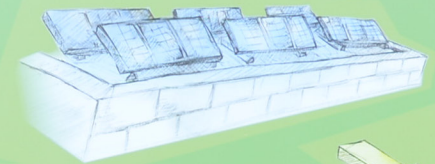
Energy
Using the power generated in meaningful ways

Curriculum
The array is used to teach courses on alternative energy

terps leave small footprints
SUSTAINABILITY.UMD.EDU

UNIVERSITY OF MARYLAND

St. Mary's Language House Garden

SUSTAINABLE AGRICULTURE is the ability of a farm to produce food indefinitely, without causing irreversible damage to ecosystem health. Waste becomes a nutrient source that eliminates the need for production of new resources, saving money, time, and energy.
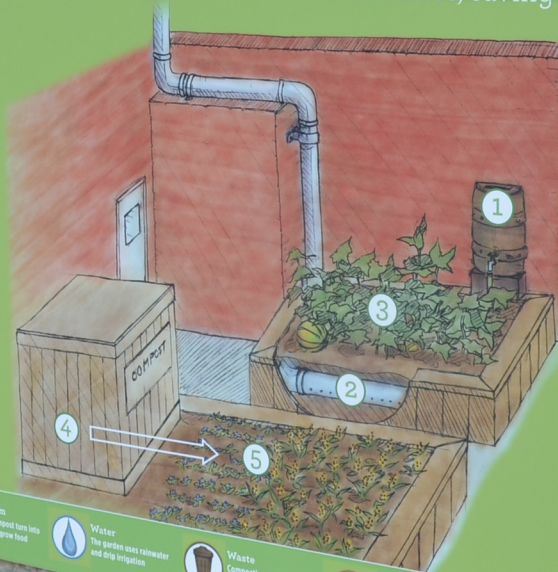
THE NUTRIENT CYCLE:

1. Rainwater runoff from the roof of St. Mary's is collected and stored in rainwater barrels.

2. Stored water is then used with drip-irrigation pipes to bring water directly and steadily to plant roots.

3. The plants grown provide food for the St. Mary's Garden Club members.

4. Composting is highly sustainable; both food waste products and unnecessary or unwanted plant parts are composted.

5. The resulting compost is excellent fertilizer for next year's crop. This fertilizer is not only sustainable, but more natural and much cheaper than store-purchased fertilizer.

Ecosystem
Rain and compost turn into nutrients to grow food

Water
The garden uses rainwater and drip irrigation

Waste
Composting returns nutrients to the soil

Food
Herbs and vegetables model urban agriculture

terps leave **small** footprints
SUSTAINABILITY.UMD.EDU

UNIVERSITY OF MARYLAND

Sphagnum Moss Water Treatment

INNOVATION: This project enhances swimming pool water quality naturally with Sphagnum Moss, a soft leafy plant that grows in bogs and helps prevent the growth of bacteria and other waterborne contaminants.
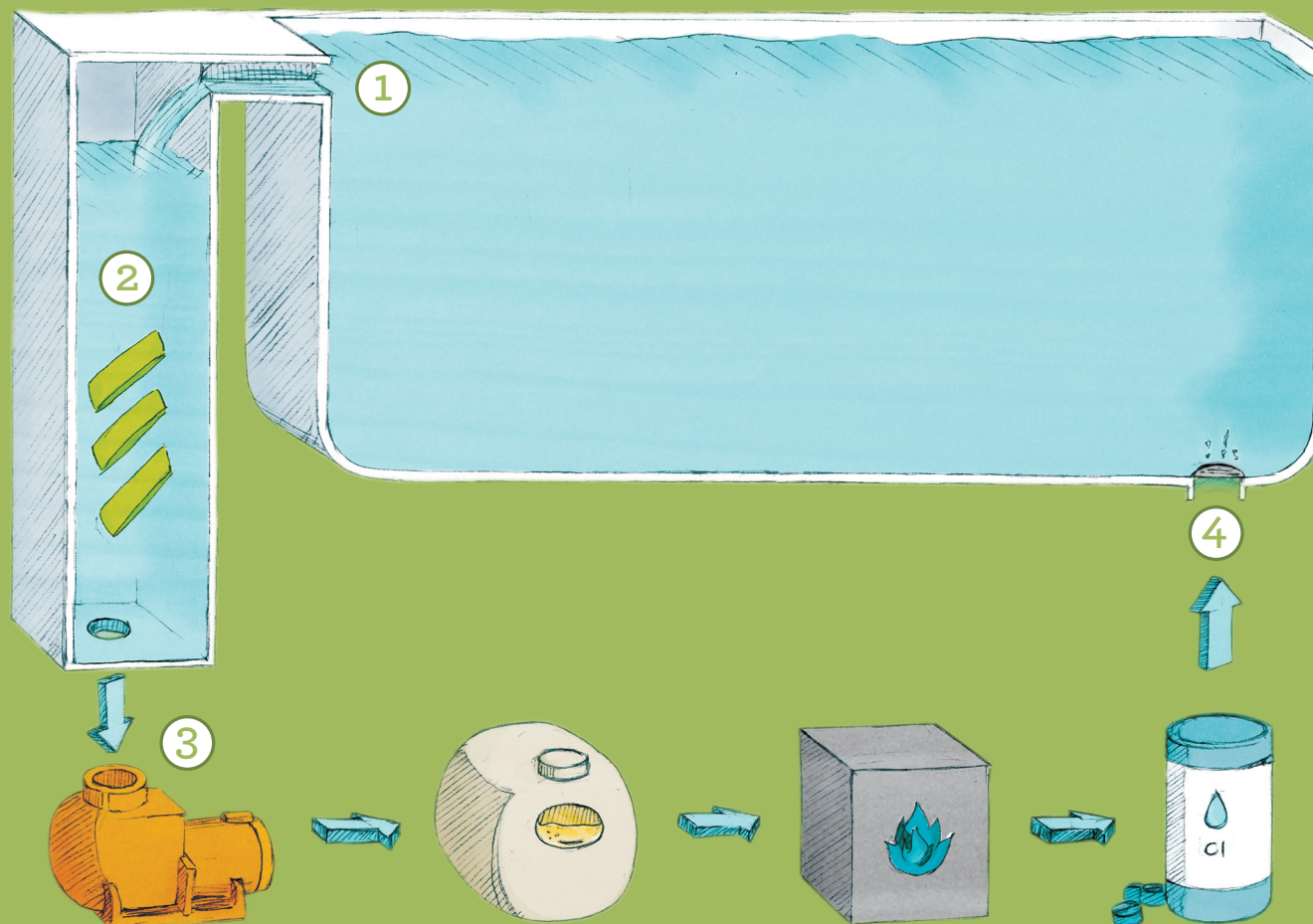
WATER TREATMENT PROCESS:

1. Water begins the cleaning process.

2. Water filters through chambers of moss.

3. Water travels through the pool's pre-existing filtration and chemical treatment system.

4. Filtered water returns to the pool.

A University of Maryland Sustainability Fund Project

Public Health Garden

A STUDENT TEACHING AND COMMUNITY GARDEN: This project demonstrates sustainable agriculture and environmental best practices in support of public, environmental, and community health.

THE PUBLIC HEALTH GARDEN MISSION:

- Exemplify the values of environmental stewardship, agricultural sustainability, physical activity, balanced diets, and environmental health

- Serve as a living classroom where faculty, staff, and students can engage in experiential education on issues directly related to agricultural, public, environmental and community health

- Become a central meeting point and community building tool for the School of Public Health and the UMD community

JOIN US BY CONTACTING
publichealthgarden@gmail.com

Water
Reuse parking lot runoff for irrigation

Ecosystem
Protect and create ecosystem

Food
Boost awareness of local fresh produce

Curriculum
Institute of Applied Agriculture Partnership

terps leave **small** footprints
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UNIVERSITY OF
MARYLAND

Guilford Run Bioretention Facility

RUNNING A CLEAN GARDEN: *Bioretention facilities are also known as rain gardens. This facility filters runoff water before it flows into the local creek of Guilford Run, which feeds into the Anacostia Watershed. The Maryland Sustainability Engineering (MSE) students brought this facility to life.*

HOW IT WORKS:
Storm water runoff from Parking Lot 1 washes into the garden facility, eventually exiting as filtered water through the underdrain pipe.

Because of the slope of the site, MSE designed the facility to have two tiers, or two garden cells at different heights. It maximizes the filtering capacity to accept runoff from 3.5 acres of land.

ABOUT MSE:
MSE is comprised of students who peered into their own community and identified the need for strong partnerships and creative engineering in order to solve pressing local problems, such as improving the health of the Anacostia watershed.

Curriculum
Direct application of sustainable engineering

Water
Filters water runoff from the campus parking lot

Community
The facility helps keep the Anacostia watershed healthy

terps leave small footprints
SUSTAINABILITY.UMD.EDU

UNIVERSITY OF MARYLAND

Rooftop Community Garden

A STUDENT TEACHING GARDEN: This rooftop garden provides students with a place to learn about sustainable living, cultivate flowers, vegetables, and herbs, and build an urban community.

GREEN CITY COMMUNITIES:
The garden is made possible by various student and facility groups working together to develop urban sustainability at the University of Maryland.

Rooftop gardens provide a place for relaxation and involvement away from busy campus life. Everyone can use the garden for plant cultivation, as a study area or just a place to hang out with friends.

HOW THE GARDEN WORKS:
The wooden crates that house the plants were built using recycled shipping pallets. Plants are grown in organic medium from dining services, regional facilities, and the garden itself. Organic waste is composted on-site using worms as well as conventional methods. The rooftop garden provides excellent sunlight, easy access to pollinators like bees, protection from weeds, and convenience for visiting gardeners.

terps leave **small** footprints
SUSTAINABILITY.UMD.EDU

UNIVERSITY OF MARYLAND

Community
Open to students, faculty, and staff

Food
Vegetables, fruits, and herbs provide healthy alternatives

Ecosystem
Plants offset campus carbon footprint

Transportation
Growing on-site eliminates transportation costs of food

DEVELOPING A CAMPUS STANDARD FOR WASTE SIGNAGE

- This semester, Dining Services and Residential Life implemented waste signage designed by the Office of Sustainability.
- Through collaboration with various departments, we addressed the lack of uniformity in communication and signs for waste management.
- Now we have switched to universal, campus-wide signage, using the SustainableUMD branding.
- Emphasis on single stream recycling
- Helps mark and identify bins easier, helping to move towards our goal of 75% in waste diversion by 2013 outlined by the Climate Action Plan.
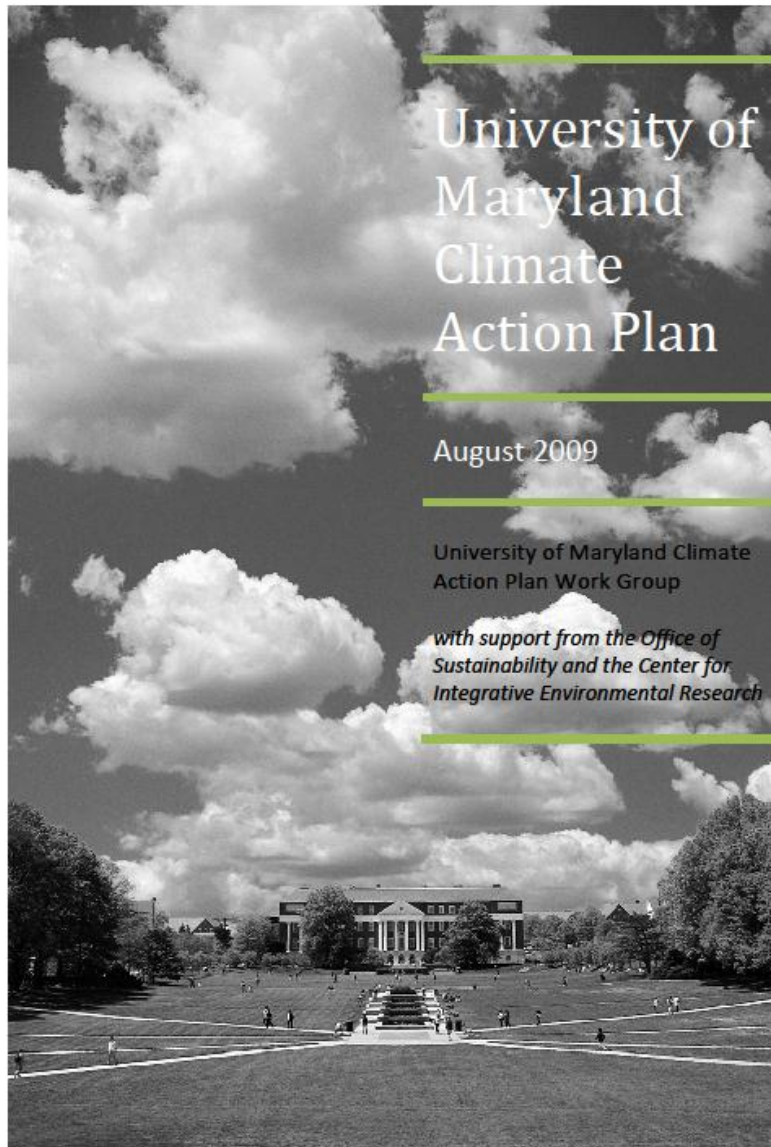
Join the **EAT IN**-itiative

EAT IN
the dining hall

Do Not
use disposables

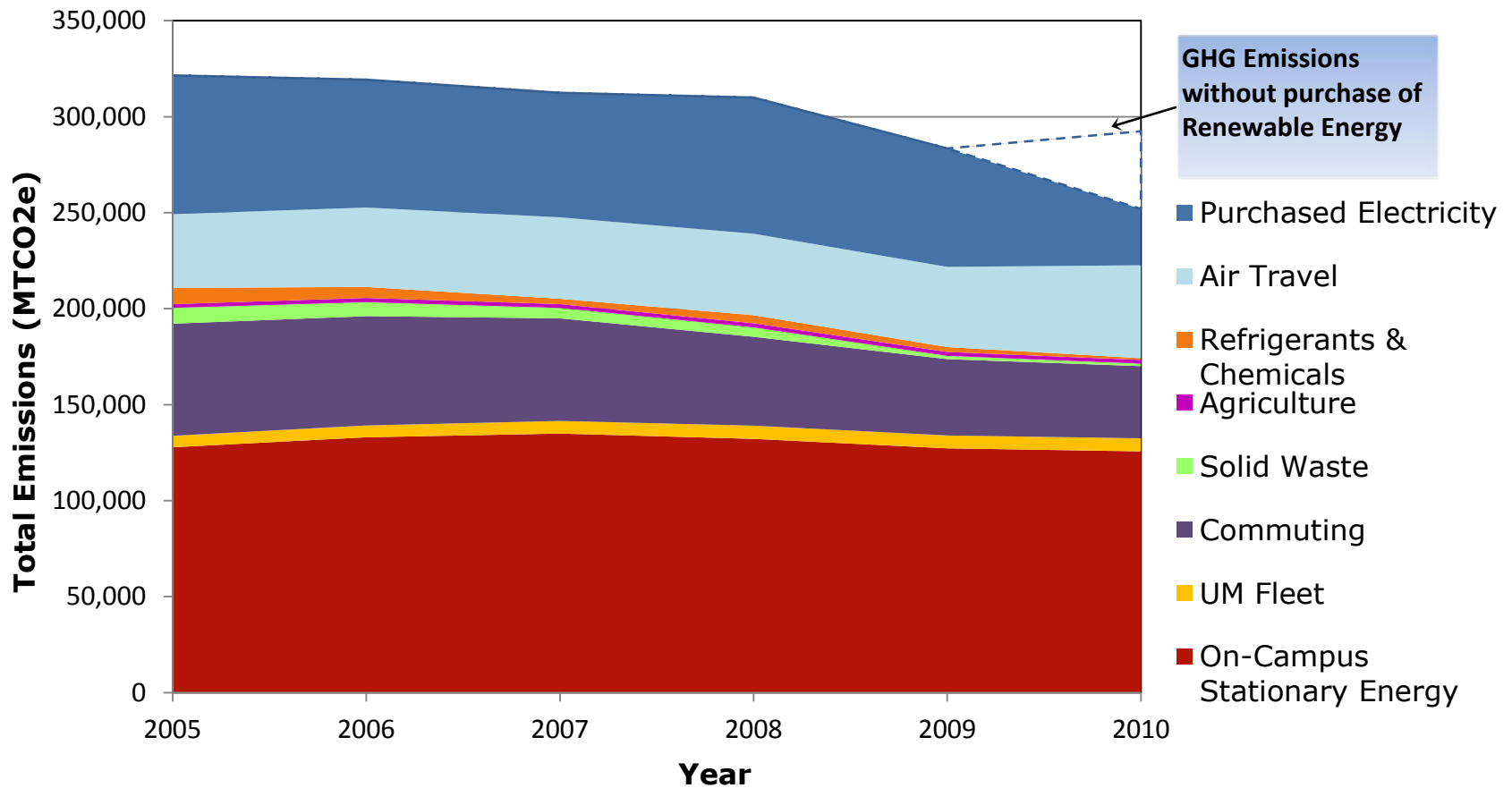terps leave **small** footprints

CAP Status Report
## September 2011

GHG Emissions by Source

GHG Targets:
2012, 2015, 2020, 2025, 2050

Fiscal Year	GHG Emissions (MTCO2e)	Reduction Achieved	UM Reduction Goals	State of Maryland Goals
2005 (baseline)	321,544		N/A	N/A
2010	251,956 (292,792 w/o RECs)	22% below 2005 levels (9% w/o RECs)	N/A	N/A
2012	273,312	?	15% below 2005 levels	10% below 2006 levels
2015	241,158	?	25% below 2005 levels	15% below 2006 levels
2020	160,772	?	50% below 2005 levels	25%-50% below 2006 levels
2025	128,618	?	60% below 2005 levels	N/A
2050	0	?	100% below 2005 levels	90% below 2006 levels

Ahead of schedule so far due to 2010 REC Purchase…
without RECs the University is slightly behind its targets:
(CAP projected 288,886 MT-CO$_2$e as on track for 2010).

UMD Climate Action Plan Progress
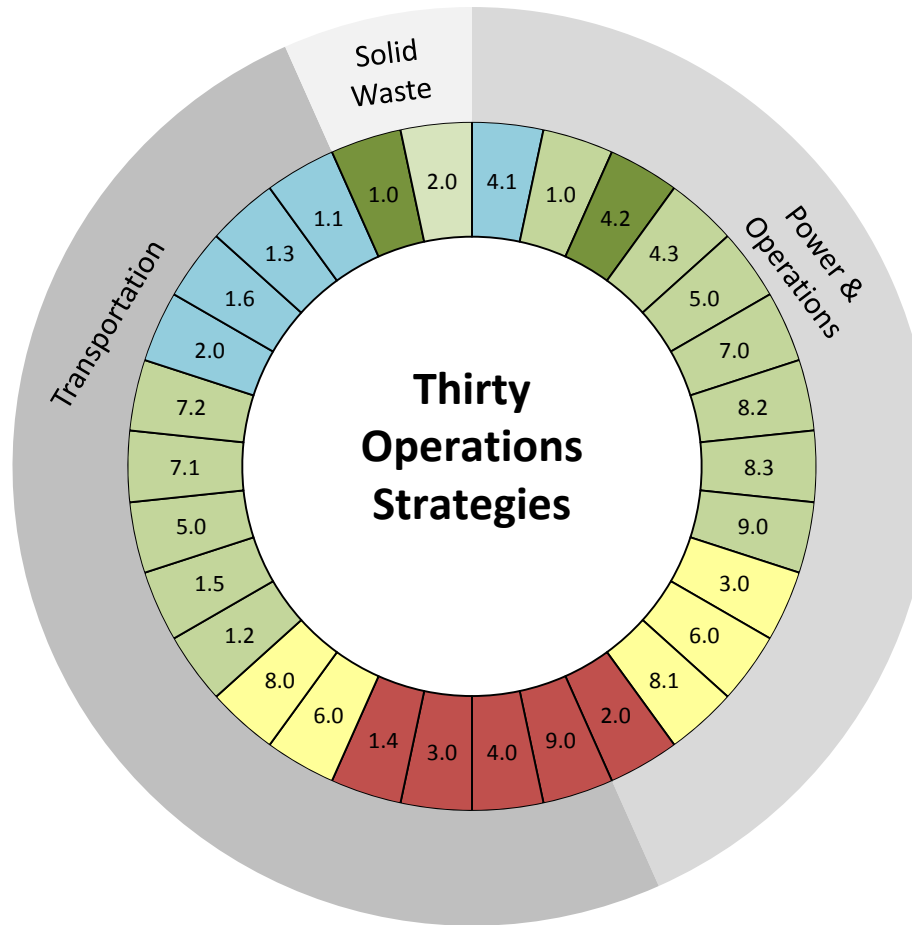
Solid Waste

Power & Operations

Transportation

Thirty Operations Strategies

On track Complete or almost complete

Little or no progress

Revision may be needed

Research underway

Carbon Neutral New Construction

(PO 2.0)

New Facilities =

additional energy consumption and GHG emissions

For example, Severn and IBBR added 7,308 MT-CO$_2$e to UMD's carbon footprint

Carbon neutrality =
a commitment to invest in renewable technologies (on-site or off-site) that will produce an amount of energy that is equivalent to the new buildings' energy requirements

Transportation Strategies

❑ Support for faculty/staff telecommuting (TN 3.0)

❑ Promote virtual meetings (TN 4.0)

❑ Use of vanpools for commuting (TN 1.4)

❑ Carbon offset strategies (TN 9.0)

Transportation Targets

- Reduce demand for commuter permits
  - Eliminate 4190 permits by 2015 (2008 baseline)
  - Achieved: cumulative reduction of 566 permits
- Issues/challenges:
  - Loss of permit revenue
  - Student population growth
  - Faculty and staff demand is stagnant

Operations Strategies

➢ Energy Conservation- Behavior Modification (PO 3.0)

➢ Computer System Modification: Thin Client Systems in existing work stations (PO 8.1)

➢ Explore how landscaping practice could reduce mowing, leaf blowing, etc. (TN 6.0)

➢ Improve fuel efficiency of fleet by procuring hybrid technology (TN 8.0)

UMD Climate Action Plan Progress
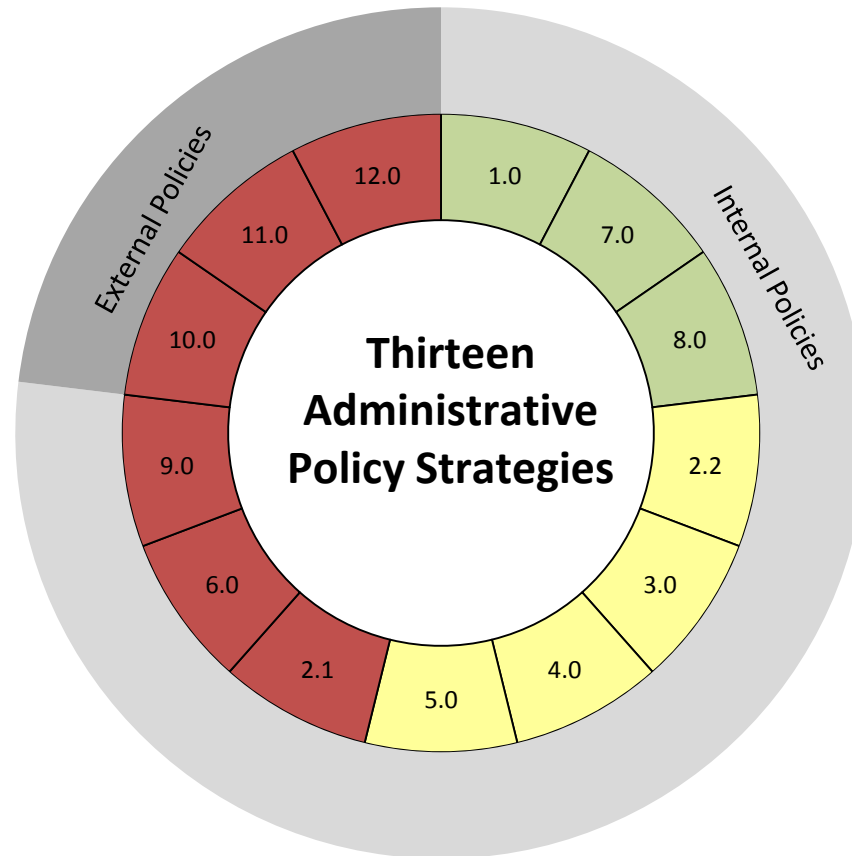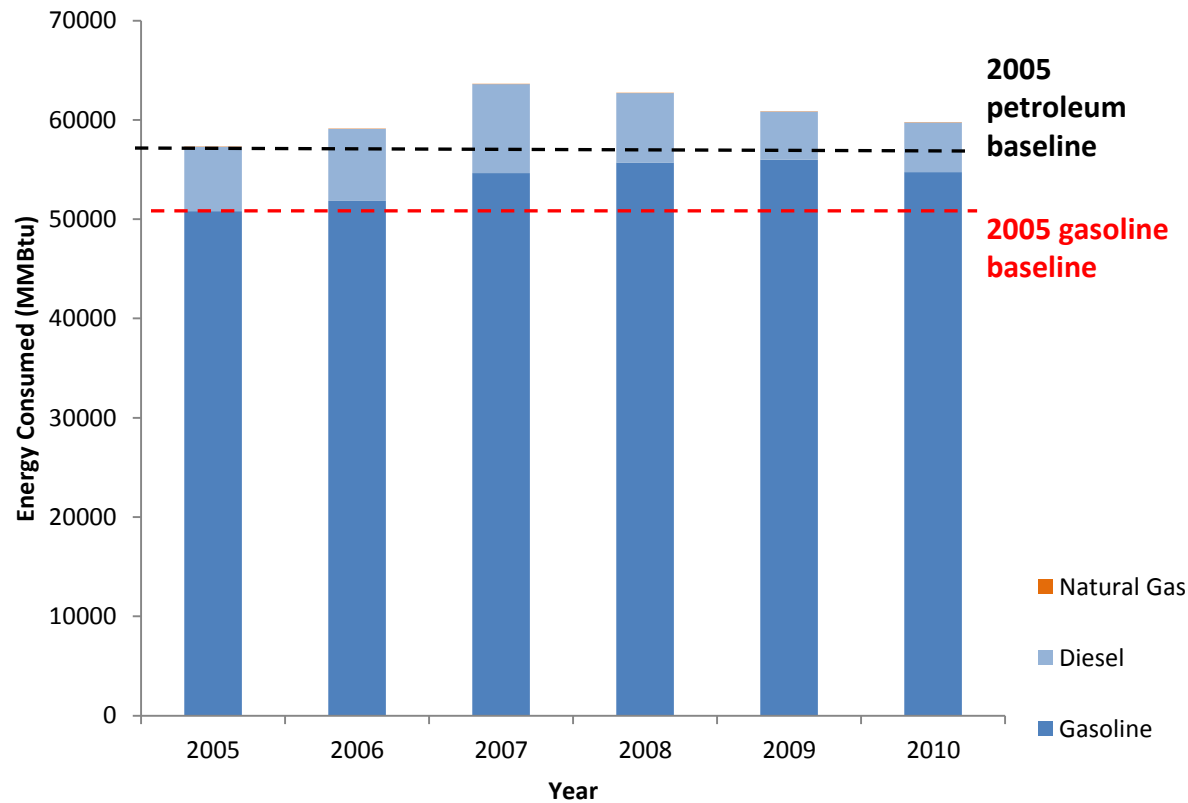

On track | Revision needed | Little or no progress

Internal Policy Strategies

☐ Carbon Neutral New Buildings (2.1)

☐ Telecommuting Options for Employees (6.0)

☐ Campus Petroleum Fuel Reduction Goal (9.0)
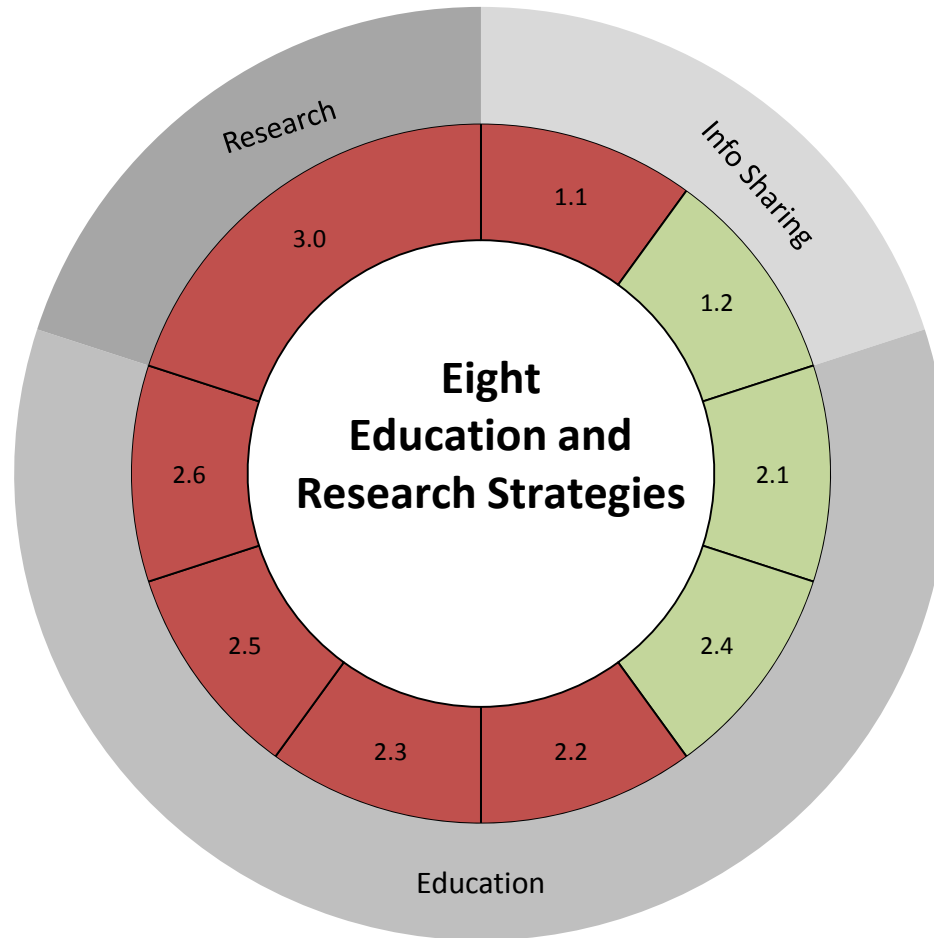
Campus Petroleum-based Fuels (9.0)

Internal Policy Strategies

➢ Carbon Neutral Grounds and Landscaping (2.2)

➢ LEED Silver and Gold Cost Benefit Analysis (3.0)

➢ Energy Conservation Behavior Modification (4.0)

External Policy Proposals

❑ Cost Savings returned to University

❑ Additional Capital Investment for Energy Efficient Buildings

❑ Energy Policy Act Flexibility

- No measurable progress has been made on State and Federal policy making

- Issues and challenges:
  - No coordinated strategy for implementation
  - New technologies not incorporated fast enough

UMD Climate Action Plan Progress

Eight
Education and
Research Strategies

Research

Info Sharing

Education

1.1
1.2
2.1
2.4
2.2
2.3
2.5
2.6
3.0

On track   Little or no progress

Information Sharing Strategies

☐ Direct student projects to address campus-relevant research questions (100 hrs/year) (1.2)

Education Strategies

❑General Education Goals (2.2, 2.3)

- Learning outcomes to guide creation of new General Education courses

- CORE review of sustainability literacy graduation requirement

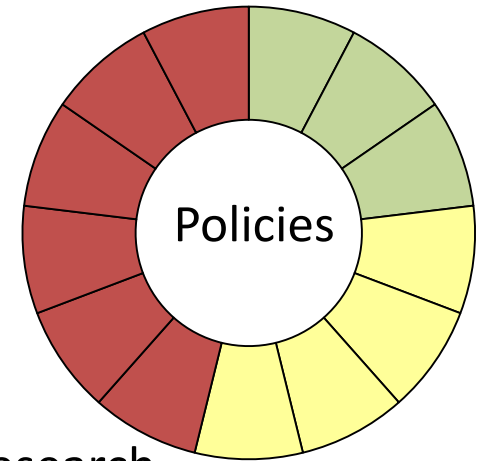❑Sustainability minor, major, undergraduate, and graduate degrees (2.5)

❑Active learning programs (financial support) (2.6)
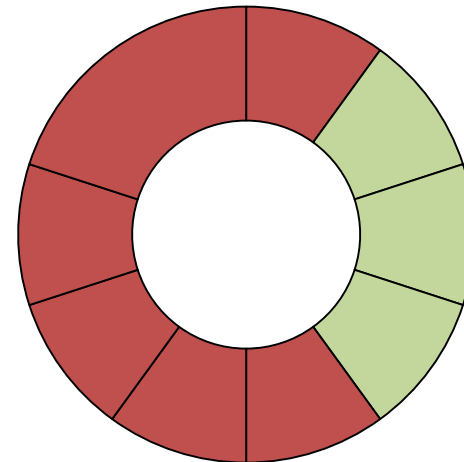
Research Strategies

- General lack of ownership and management
- No inventory of climate-related and sustainability-related research opportunities

UMD Climate Action Plan Status

Operations

Policies

Education & Research

Legend:
- On track
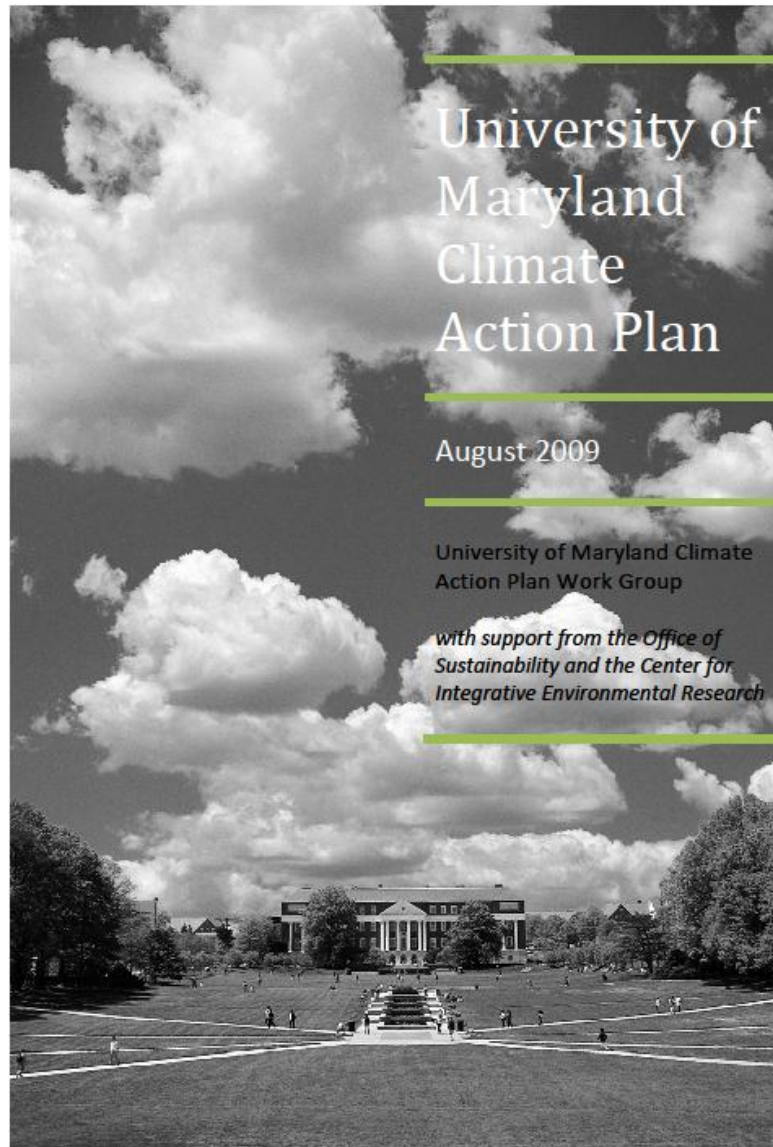- Complete or almost complete
- Little or no progress
- Revision may be needed
- Research underway

Overarching Implementation Issues

- Lack of clear ownership for many strategies
- Few specific targets with dates
- Accountability is muddled
- Financial challenges, especially for transportation

Questions & Discussion

Power and Operations Strategies

✓ **Existing Building Retrofits** (1.0)

- Energy Performance Contract to reduce energy consumption by 22% in nine buildings: estimated savings of 4,100 MT-CO_2e annually
- Classroom lighting retrofit
- Hallway lighting retrofit in 24 buildings since 2008; reduced energy consumption by 73% in retrofitted hallways; estimated savings of

✓ **On-Campus Renewable Energy** (4.0)

- Biofuel Combined Heat and Power Plant under study for the Utilities Master Plan
- Maryland Educational Solar Array on AV Williams received a grant from U.S.F.
- 0.631 MW of photovoltaics installed on the Severn Building in 2011

✓ **Renewable Portfolio Standard (RPS)** (5.0)

- 5.525% renewable energy assumed for purchased electricity in 2010
- 4.51% renewable energy assumed for purchased electricity in 2009

Power and Operations Strategies

✓ **Off-site Renewable Energy to Offset Growth** (7.0)

- Three 20-year Power Purchase Agreements executed in 2010; approximately 15% of purchased electricity will come from these projects.

✓ **Computer System Modification** (8.2 and 8.3)

- Virtualization of servers is ahead of schedule; within OIT alone 480 servers are virtual (57%). A broader survey will be conducted by OIT during Fall 2011.
- Configuration of EPA Energy Star Settings is on track; New desktop computers come pre-configured to run with these settings. Mechanisms to prevent alteration of these settings and encourage further implementation and tracking are in consideration (OIT policy) or pilot stages (Green Office Program).

✓ **Investment in Certified Carbon Offsets** (9.0)

- 66,250 MWh of Renewable Energy Certificates were purchased in 2010 to neutralize 62% of purchased electricity.

Internal Policy Proposals

Significant progress has been achieved on:

- ✓ Environmentally Preferable Procurement Policy (1.0)

- ✓ Energy Star Computer Settings (pre-configuration settings in place, policy to prevent alteration of settings is under consideration) (5.0)