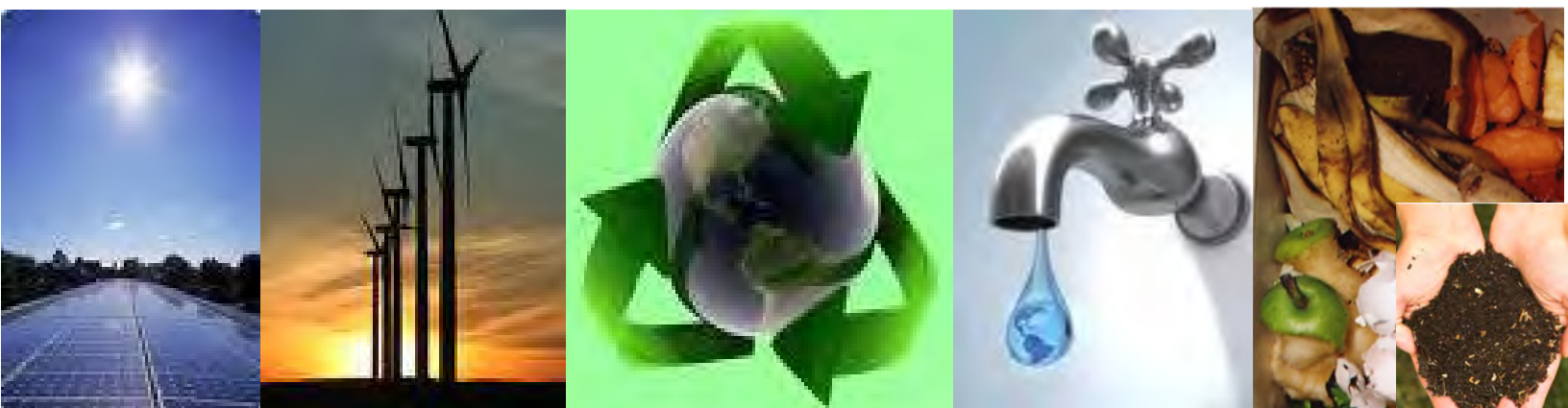




Rutgers University
Environmental Assessment:
MOU SemiAnnual Report
November 4, 2011



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Region 2

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Accomplishments

Reductions of 136,471 MTCO₂e



Memorandum of Understanding

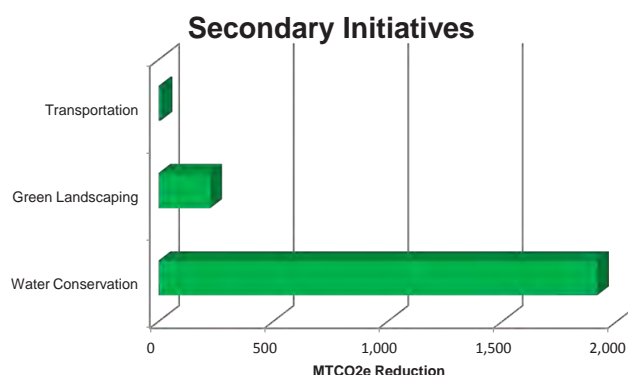
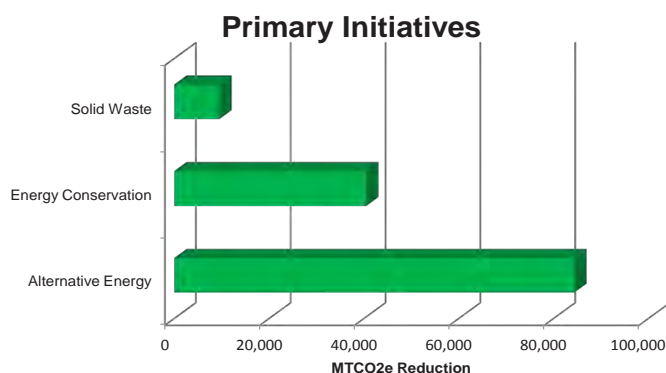
On November 3, 2009, Rutgers University signed a Memorandum of Understanding (MOU) pledging to become an environmental steward by implementing a number of green initiatives that would reduce its carbon footprint and further improve our planet's environment. This partnership with the United States Environmental Protection Agency (EPA) and Rutgers University has resulted in reducing energy, water and solid waste production across campus operations.

Reduction in Environmental Footprint

Rutgers University has provided four updates documenting its green initiatives. The EPA has analyzed the submitted information and generated an environmental footprint for the organization. Due to the progressive green efforts of the organization, the university has managed to reduce its carbon footprint by 136,471 MTCO₂e* and saved an estimated \$11,665,000 in operating expenses.

*Metric Ton Carbon Dioxide Equivalent

Environmental Metrics	Total Sector (MTCO ₂ e)
Energy Conservation	40,467.7
Alternative Energy	84,365.5
Water Conservation	1,914.6
Solid Waste	9,490.0
Green Landscaping	225.0
Trnsnsportation	8.6
Total (MTCO ₂ e)	136,471.3



Measurement and Continuous Improvements

EPA uses these environmental conversion models to calculate metric tons of carbon dioxide equivalents:

Greenhouse Gas Equivalencies (GHG) Calculator converts GHG reductions into scenarios that can be easily communicated to the public.

eGRID Version 1.1 (2007) which converts standard metrics for electricity, green energy, fuel use, chemical use, water use, and sustainable materials management into MTCO₂e - using 'non-baseload' regional factors.

The EPA WARM Model which helps calculate GHG emission reductions from several different waste management practices, including source reduction, recycling, combustion, composting and landfilling.

The EPA Pollution Prevention (P2) Cost Calculator that estimates cost savings associated with GHG reductions.

Certain environmental data points cannot be converted to MTCO₂e because scientific models do not currently exist.

As methodologies improve, environmental assessments will be updated to include any new GHG reduction estimates.

Accomplishments

Reductions of 136,471 MTCO₂e

Greenhouse Gas Equivalencies

What does the reduction of 136,471 MTCO₂e represent ?

The organization's effort is equivalent to any one of the following:

- Annual greenhouse gas emissions from 26,759 vehicles



- Carbon dioxide emissions from 15,299,473 gallons of gasoline



- Carbon dioxide emissions from 317,375 barrels of oil consumed



- Carbon dioxide emissions from the energy use of 11,816 homes for one year



- Carbon dioxide emissions from 5,686,304 propane tanks used for home barbeques



- Carbon dioxide emissions from gasoline carried by 1,800 tanker trucks



- Carbon dioxide emissions from burning 743 railcars' worth of coal (over 11 1/4 miles long)



Environmental Metrics	Nov 2009 MOU	May 2010 Update	Nov 2010 Update	May 2011 Update	Nov 2011 Update	Total Conversion (MTCO2e)	Cost Savings (Est.)
Energy Conservation/Energy Star							
Total Savings (MTCO2e)	9,017.0	6,214.5	5,832.5	9,701.9	9,701.9	40,467.7	\$5,633,290
Miscellaneous Energy Conservation							
Motors and Transformers	2,188,953 kwh	1,094,476.5 kwh	1,094,476.5 kwh	1,094,476.5 kwh	1,094,476.5 kwh	4,980.2	\$677,700
Lighting Project Fixtures (Bulbs and Ballast)		3,797,699 kwh	3,797,699 kwh	3,797,699 kwh	3,797,699 kwh	11,520.6	\$1,567,690
High temp Hot water Pipe replacement, therms saved	1,386,600 therms	472,000 therms	400,000 therms	1,129,300 therms	1,129,300 therms	23,966.9	\$3,387,900
HVAC, Chiller & Electrical							
Bulb Replacement (CFLs, LEDs)							
Gas / Fuel Oil / Steam Savings							
Alternative Energy							
Total Savings (MTCO2e)	16,913.0	16,917.5	16,880.9	16,745.0	16,909.1	84,365.5	\$4,423,957
On-Site Solar	874,235 kwh	880,201 kwh	831,926 kwh	652,652 kwh	869,093 kwh	3,115.5	\$423,957
On-Site Wind / Geothermal							
On-Site Combined Heat and Power (13 MW)	54,446,982 kwh	60,448,200 kwh	35,688,800 kwh	46,060,400 kwh	28,252,600 kwh	81,250.0	\$4,000,000
Purchase of Green Energy/Green Power							
Water Conservation/WaterSense							
Total Savings (MTCO2e)	638.2	319.1	319.1	319.1	319.1	1,914.6	\$1,398,477
Miscellaneous Water Conservation	255,000,000 gal	127,500,000 gal	127,500,000 gal	127,500,000 gal	127,500,000 gal	1,914.6	\$1,398,477
Low Flow / Hands Free Faucets							
Low Flow Toilets / Shower Heads							
Low Flow / Waterless Urinals							
Solid Waste/Industrial Materials Reuse/Green Products							
Total Savings (MTCO2e)	1,792.2	1,797.9	1,841.7	2,186.9	1,871.2	9,490.0	\$146,828
Mixed Recyclables (includes Wastewise)	591 tons	591 tons	591 tons	762 tons	652 tons	9,146.7	\$127,480
Re-Use/Purchase of Materials with Recycled Content							
Pallets Waste Avoided/Wood Recycled							
Use of Recycled Steel / Iron during Construction							
Use of Recycled Plastic / Aluminum during Construction							
Use of Recycled Concrete / Asphalt during Construction							
Use of Coal Combustion Products							
Steel Recycled during Deconstruction							
Concrete / Asphalt Recycled							
Ceiling tiles Recycled	25 tons					11.4	\$1,000
Carpet recycled	11.727 tons		19.56 tons			225.9	\$1,251
Recycled C & D Waste (Construction Waste)		410 tons	17.42 tons			106.0	\$17,097
Cardboard (construction/non-construction/sharp containers)							
Mixed Metal (construction/non-construction)							
Paper, Mixed							
Plastic, Mixed (bottles, construction/non-construction)							
Mixed Organics							
Food Donation (Waste diversion)							
Biosolids & Food Waste Recycling / Composting							
Fluorescent Bulbs							
Waste Oil Recycled							
Magazines/ThirdClass Mail							
Newspaper / Office Paper							
Textbooks / Phonebooks							
Dimensional Lumber							

Environmental Metrics	Nov 2009 MOU	May 2010 Update	Nov 2010 Update	May 2011 Update	Nov 2011 Update	Total Conversion (MTCO ₂ e)	Cost Savings (Est.)
Fly Ash							
Aluminum Cans / Glass							
HDPE / LDPE / PET							
Appliances / Non-Ferrous Metals							
Fats, Oils, Grease							
Green Landscaping							
Total Savings (MTCO₂e)	45.0	45.0	45.0	45.0	45.0	225.0	\$60,744
Green Roofs / Reflective Roof							
Porous Pavement							
Grass							
Low/no mow area	10 Acres (1/2 yr)	10 Acres (1/2 yr)	10 Acres (1/2 yr)	10 Acres (1/2 yr)	10 Acres (1/2 yr)	225.0	\$60,744
Re-use of Collected Stormwater							
On-Site Re-use of Compost							
Moisture Sensing Sprinklers							
Number / Acres of Trees							
Synthetic Turf / Native Plants							
Leaves Composted							
Electronics / EPEAT							
Total Savings (MTCO₂e)							
Recycling of Electronics							
Re-Use/Donation of Used Computers							
Toner/Ink Recycling and Use of Recycled Ink							
Battery Recycling							
Purchase of EPEAT Products							
Transportation							
Total Savings (MTCO₂e)	2.9	1.4	1.4	1.4	1.4	8.6	\$2,300
Hybrid Vehicles							
Electric Vehicles	2	2 (1/2 yr)	2 (1/2 yr)	2 (1/2 yr)	2 (1/2 yr)	8.6	\$2,300
Biodiesel Vehicles	48						
Clean Construction Vehicles							
LNG Vehicles	3						
Alternate Fuel Vehicles (Zipcar)							
Smartway Transporters							
Bike Racks							
LEED Projects		4 buildings	4 buildings	4 buildings	4 buildings		
Total Savings (MTCO₂e)							
Silver - 10%							
Gold - 17%							
Platinum - 20%							
MTCO₂e Savings							
Total (MTCO₂e)	28,408.3	25,295.4	24,920.6	28,999.3	28,847.8	136,471.3	\$11,665,596
Energy	9,017.0	6,214.5	5,832.5	9,701.9	9,701.9	40,467.7	\$5,633,290
Alternative Energy	16,913.0	16,917.5	16,880.9	16,745.0	16,909.1	84,365.5	\$4,423,957
Water	638.2	319.1	319.1	319.1	319.1	1,914.6	\$1,398,477
Solid Waste	1,792.2	1,797.9	1,841.7	2,186.9	1,871.2	9,490.0	\$146,828
Landscaping	45.0	45.0	45.0	45.0	45.0	225.0	\$60,744
Transportation	2.9	1.4	1.4	1.4	1.4	8.6	\$2,300



2011

Rutgers University Additional Green MOU Accomplishments and Cost Savings

Rutgers University is an award-winning, nationally recognized leader in recycling - over 67% of the university's waste is diverted from landfills. The University will be transitioning to single stream recycling to help simplify the process by allowing all recyclable material to be co-mingled in one container.

The Rutgers Climate and Environmental Change Initiative is a university-wide endeavor that addresses one of the most pressing issues of our time. The Initiative is guided by three major goals:

- To understand the mechanisms that drive global and regional climate change
- To predict the future of the climate system as well as the impacts of change, including a focus on a densely populated, coastal society
- To inform society about the causes and consequences of climate change

Just as climate change cannot be mitigated by one community acting on its own, these goals can only be accomplished through the cooperation of experts from the natural, social, and political sciences. The Climate and Environmental Change Initiative is therefore a multidisciplinary research, education, and outreach effort that draws from the strengths in many departments at Rutgers and facilitates collaboration across a broad range of disciplines from oceanography to sociology and from ecology to economics.

The Initiative focuses on six research and educational themes:

- Climate Change: Past, Present, and Future
- Impacts on Coastal Environments, Infrastructures and Communities
- Education and Outreach
- Impacts on Freshwater Resources, Ecosystems and Agriculture
- Impacts on Human Health
- Human Dimensions

U.S. Department of Energy Solar Decathlon 2011

The Solar Decathlon is an international design/build competition hosted biannually by the U.S. Department of Energy. The Solar Decathlon challenges 20 college teams from around the globe in 10 evaluated categories to design, build, and operate the most livable, energy-efficient, solar-powered house. The winner of the competition is the team that best blends aesthetics and modern conveniences with maximum energy production and optimal efficiency, while being sensitive to cost.

Rutgers University and the New Jersey Institute of Technology have partnered to submit a Team New Jersey entry in the Department of Energy's 2011 Solar Decathlon competition. The Team New Jersey entry featured the design and development of a zero-energy model home that incorporated and demonstrated best-practice, market-ready innovations and technologies. This collaboration, led by the multidisciplinary RU Center for Green Building (RCGB) and the NJIT College of Architecture and Design, involved students, faculty, and staff from a number of relevant disciplines spread across these two senior units of New Jersey's public university system. Team New Jersey also featured close involvement and support of several of New Jersey's leading solar power technology manufacturers, commercial home building companies and materials suppliers, and the State of New Jersey. Team New Jersey's Solar Decathlon entry was designed and built to operate in a sustainable, cost-efficient, zero-energy fashion using active solar photovoltaic and solar thermal systems, plus other innovative design features.