



Rutgers University
Environmental Assessment:
MOU SemiAnnual Report
November 27, 2012



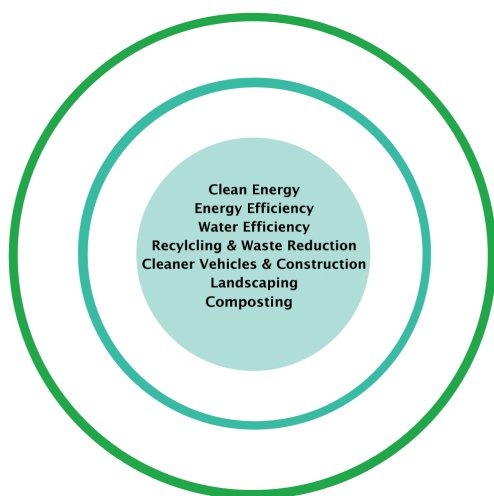
Environmental Protection Agency
Region 2

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Accomplishments

Reductions of 194,797 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.

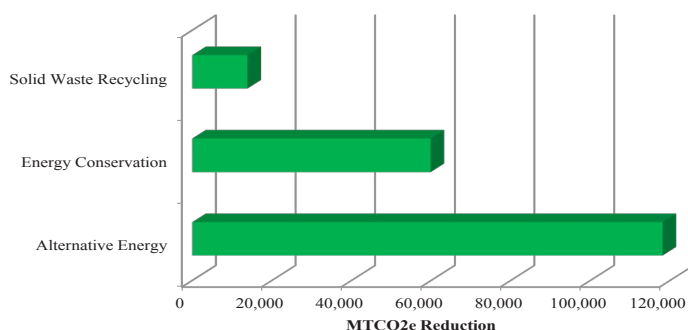
Reduction in Environmental Footprint

Rutgers University has provided six 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 194,797 MTCO₂e* and saved an estimated \$22,955,000 in operating expenses.

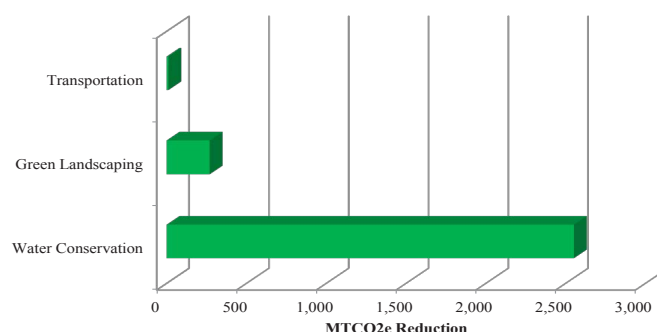
*Metric Ton Carbon Dioxide Equivalent

Environmental Metrics	Total Sector (MTCO ₂ e)
Energy Conservation	59,871.8
Alternative Energy	118,165.4
Water Conservation	2,252.8
Solid Waste	13,881.1
Green Landscaping	315.0
Transportation	11.4
Total (MTCO ₂ e)	194,797.4

Primary Initiatives



Secondary Initiatives



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 194,797 MTCO₂e



Greenhouse Gas Equivalencies

What does the reduction of 194,797 MTCO₂e represent ?

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

- Annual greenhouse gas emissions from 38,196 vehicles



- Carbon dioxide emissions from 21,838,274 gallons of gasoline



- Carbon dioxide emissions from 453,017 barrels of oil consumed



- Carbon dioxide emissions from the energy use of 16,866 homes for one year



- Carbon dioxide emissions from 8,116,558 propane tanks used for home barbeques



- Carbon dioxide emissions from gasoline carried by 2,569 tanker trucks



- Carbon dioxide emissions from burning 1,061 railcars' worth of coal (over 16 miles long)



Environmental Metrics	Nov 2009 MOU	May 2010 Update	Nov 2010 Update	May 2011 Update	Nov 2011 Update	May 2012 Update	Nov 2012 Update	Total Conversion (MTCO2e)	Cost Savings (Est.)
Energy Conservation									
Total Savings (MTCO2e)	9,017.0	6,214.5	5,832.5	9,702.0	9,702.0	9,702.0	9,702.0	59,871.8	\$7,857,023
Misc. 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	1,094,476.5 kwh	1,094,476.5 kwh	6,640.4	\$903,600
Lighting Project Fixtures (Bulbs and Ballast)		3,797,699 kwh	3,797,699 kwh	3,797,699 kwh	3,797,699 kwh	3,797,699 kwh	3,797,699 kwh	17,281.1	\$2,351,535
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	1,129,300 therms	1,129,300 therms	35,950.4	\$5,081,850
HVAC, Chiller & Electrical									
Bulb Replacement (CFLs,LEDs)									
Gas Savings									
Fuel Oil Savings									
Steam Savings									
Alternative Energy									
Total Savings (MTCO2e)	16,913.0	16,917.5	16,880.9	16,745.0	16,909.1	16,974.8	16,825.0	118,165.4	\$12,939,025
On-Site Solar	874,235 kwh	880,201 kwh	831,926 kwh	652,652 kwh	869,093 kwh	955,681 kwh	758,141 kwh	4,415.4	\$600,823
On-Site Wind									
On-Site 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	48,317,100 kwh	24,810,100 kwh	113,750.0	\$12,338,202
Purchase of Green Energy									
Water Conservation									
Total Savings (MTCO2e)	638.2	319.1	319.1	319.1	319.1	319.1	319.1	2,552.8	\$1,864,636
Misc. Water Conservation	255,000,000 gal	127,500,000 gal	127,500,000 gal	127,500,000 gal	127,500,000 gal	127,500,000 gal	127,500,000 gal	2,552.8	\$1,864,636
Low Flow/Hands Free Faucets									
Low Flow Toilets									
Low Flow Shower Heads									
Low Flow Urinals									
Waterless Urinals									
Solid Waste Recycling									
Total Savings (MTCO2e)	1,792.2	1,797.9	1,841.7	2,186.9	1,871.2	2,195.6	2,195.6	13,881.1	\$208,028
Mixed Recyclables (includes Wastewise)	591 tons	591 tons	591 tons	762 tons	652 tons	765 tons	765 tons	13,537.8	\$188,680
Pallets Waste Avoided/Wood Recycled									
Steel Recycled during Deconstruction									
Concrete / Asphalt Recycled during Deconstruction									
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 (construction/non-construction, sharp containers)									



Environmental Metrics	Nov 2009 MOU	May 2010 Update	Nov 2010 Update	May 2011 Update	Nov 2011 Update	May 2012 Update	Nov 2012 Update	Total Conversion (MTCO2e)	Cost Savings (Est.)
Blue Wrap									
Can / Bottle Recycling									
Mixed Organics									
Food Donation (Waste diversion)									
Biosolids & Food Waste Recycling / Composting									
Fluorescent Bulbs									
Ceiling tiles Recycled	25 tons							11.4	\$1,000
Carpet recycled	11.727 tons		19.56 tons					225.9	\$1,251
Waste Oil Recycled									
Magazines/ThirdClass Mail									
Newspaper									
Office Paper									
Textbooks									
Phonebooks									
Dimensional Lumber									
Fly Ash									
Aluminum Cans									
Glass									
HDPE / LDPE / PET									
Appliances									
Non-Ferrous Metals									
Fats, Oils, Grease									
Green Procurement									
Total Savings (MTCO2e)								0.0	\$0
Purchase of Materials with Recycled Content (paper,tile,carpet,etc)									
Purchase / Use of Compost Socks									
Purchase of EPEAT Products									
Use of Recycled Steel during Construction									
Use of Recycled Iron during Construction									
Use of Recycled Plastic during Construction									
Use of Recycled Aluminum during Construction									
Use of Recycled Concrete / Asphalt during Construction									
Use of Coal Combustion Products									
Green Landscaping									
Total Savings (MTCO2e)	45.0	45.0	45.0	45.0	45.0	45.0	45.0	315.0	\$84,000
Green Roofs									
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)	10 Acres (1/2 yr)	10 Acres (1/2 yr)	315.0	\$84,000
Green Space									



Environmental Metrics	Nov 2009 MOU	May 2010 Update	Nov 2010 Update	May 2011 Update	Nov 2011 Update	May 2012 Update	Nov 2012 Update	Total Conversion (MTCO2e)	Cost Savings (Est.)
Re-use of Collected Stormwater									
On-Site Re-use of Compost									
Moisture Sensing Sprinklers									
Number / Acres of Trees									
Reflective Roof									
Synthetic Turf									
Native Plants									
Leaves Composted									
Electronics / EPEAT									
Total Savings (MTCO2e)								0.0	
Recycling of Electronics									
Donation of Used Computers									
Toner/Ink Recycling and Use of Recycled Ink									
Battery Recycling									
Mass Transit									
Total Savings (MTCO2e)								0.0	
Miles Avoided									
Transportation									
Total Savings (MTCO2e)	2.9	1.4	1.4	1.4	1.4	1.4	1.4	11.4	\$3,066
Hybrid Vehicles									
Electric Vehicles	2	2 (1/2 yr)	2 (1/2 yr)	2 (1/2 yr)	2 (1/2 yr)	2 (1/2 yr)	2 (1/2 yr)	11.4	\$3,066
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	4 buildings	4 buildings		
Total Savings (MTCO2e)								0.0	
Silver - 10%									
Gold - 17%									
Platinum - 20%									
MTCO2e Savings									
Total (MTCO2e)	28,408.3	25,295.4	24,920.7	28,999.4	28,847.8	29,237.8	29,088.0	194,797.4	\$22,955,778
Energy	9,017.0	6,214.5	5,832.5	9,702.0	9,702.0	9,702.0	9,702.0	59,871.8	\$7,857,023
Alternative Energy	16,913.0	16,917.5	16,880.9	16,745.0	16,909.1	16,974.8	16,825.0	118,165.4	\$12,939,025
Water	638.2	319.1	319.1	319.1	319.1	319.1	319.1	2,552.8	\$1,864,636
Solid Waste	1,792.2	1,797.9	1,841.7	2,186.9	1,871.2	2,195.6	2,195.6	13,881.1	\$208,028
Landscaping	45.0	45.0	45.0	45.0	45.0	45.0	45.0	315.0	\$84,000
Transportation	2.9	1.4	1.4	1.4	1.4	1.4	1.4	11.4	\$3,066



2012

Rutgers University Additional Green MOU Accomplishments and Cost Savings

Climate and Environmental Change Initiative

The Rutgers Climate and Environmental Change Initiative is a university-wide endeavor that addresses one of the most pressing issues of our time. This multidisciplinary research, education and outreach effort draws from the strengths in many departments at Rutgers and facilitates collaboration across a broad range of disciplines. 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.

Center for Environmental Prediction

CEP's mission:

- To facilitate close interaction among Rutgers researchers in atmospheric, oceanic, earth, and environmental sciences and to raise the visibility of this research throughout the scientific community and with the general public;
- To participate actively in undergraduate and graduate education at Rutgers, with emphases on promoting links between the atmospheric, oceanic, earth, and environmental sciences curricula and on providing enhanced student research and travel opportunities;
- In recognition of our responsibility to the state of New Jersey, to provide weather and climate data and advice to its citizens and to study the impacts of climate, environmental, and land-use change on its stakeholders;
- To communicate these scientific findings and impact scenarios to policy makers and expert groups, with the goal of working toward solutions for the issues we all face together.

The Rutgers Energy Institute

The Rutgers Energy Institute was formed in the summer of 2006 and is committed to serving the New Jersey community and beyond through four main objectives:

- Research - Integrate basic research and real-world application to advance energy technologies that address biofuels, solar and wind energy, efficient energy use, and energy policy
- Education - Train the next generation of leaders in energy research through multidisciplinary graduate and undergraduate programs that blend science, technology, economics, and policy
- Outreach - Facilitating colloquia, workshops and seminars that stimulate interdisciplinary conversations on energy research and technologies, exploring energy topics most relevant to the Rutgers community, local businesses, homeowners, and politicians.
- Advisory body - Provide objective information and advising the local, state, and national policy makers on energy technologies, alternative energy strategies and policy options.