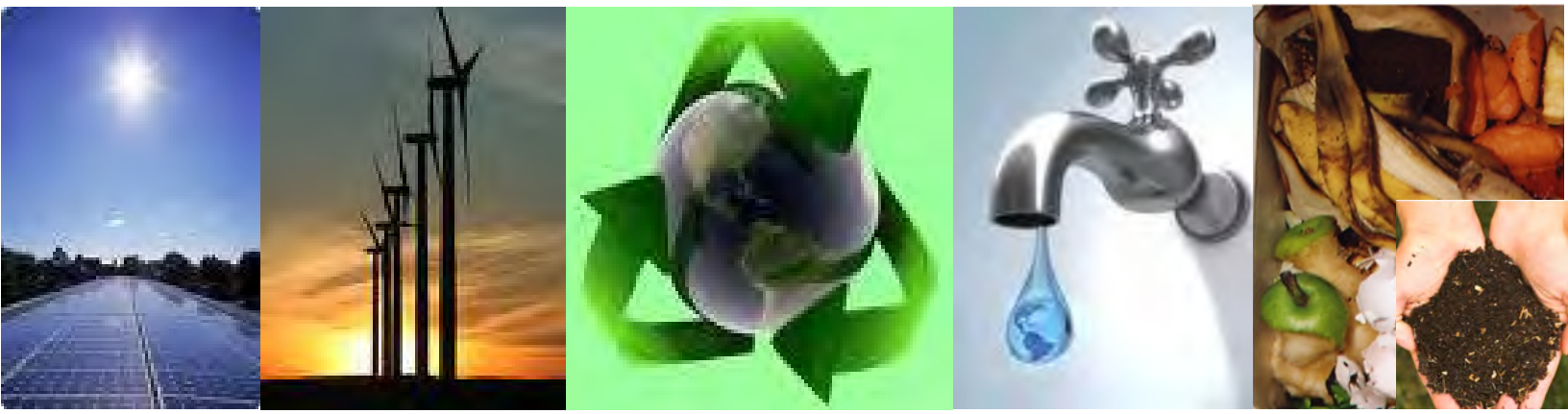
Rutgers University
Environmental Assessment:
MOU SemiAnnual Report
May 29, 2012



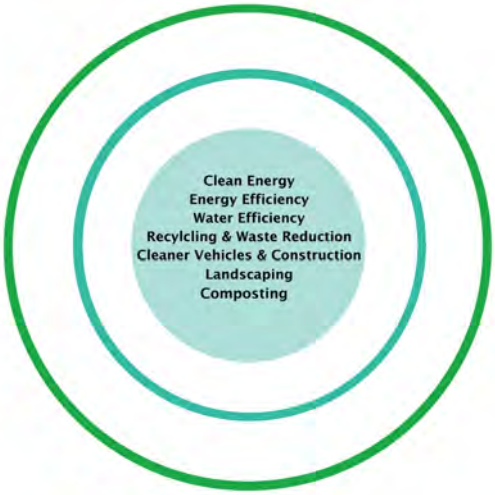
Environmental Protection Agency
Region 2

Andrew Bellina, PE
Senior Policy Advisor
212-637-4126

Jose Pillich
Michael Wanser
Research Analysts

Accomplishments

Reductions of 165,709 MTCO2e



Memorandum of Understanding

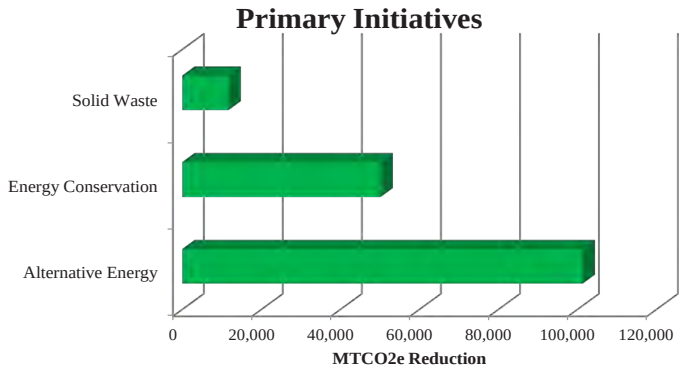
On November 3, 2009, Rutgers University signed a Memorandum of Understanding (MOU) pledging to become an environmental steward by implementing a number of green initiatives that would reduce its carbon footprint and further improve our planet's environment. This partnership with the United States Environmental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

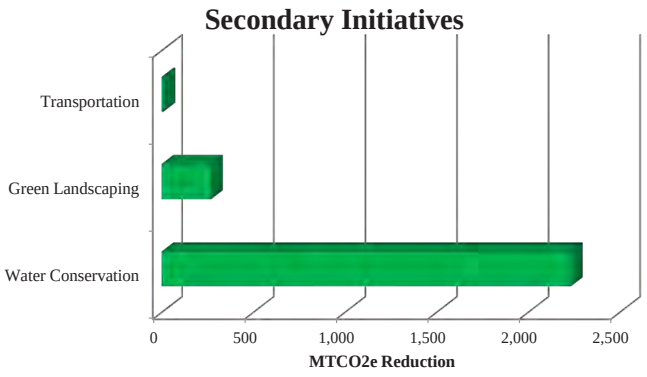
Reduction in Environmental Footprint

Rutgers University has provided five 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 165,709 MTCO2e* and saved an estimated $20,469,000 in operating expenses.

*Metric Ton Carbon Dioxide Equivalent

Environmental Metrics	Total Sector (MTCO2e)
Energy Conservation	50,169.9
Alternative Energy	101,340.4
Water Conservation	2,233.7
Solid Waste	11,685.5
Green Landscaping	270.0
Transportation	10.0
Total (MTCO2e)	165,709.4





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.

Greenhouse Gas Equivalencies

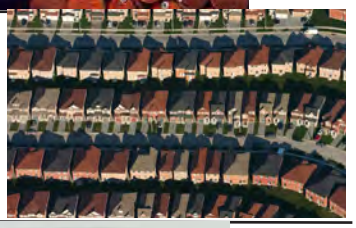
What does the reduction of 165,709 MTCO2e represent ?
The organization's effort is equivalent to any one of the following:

- Annual greenhouse gas emissions from 32,492 vehicles

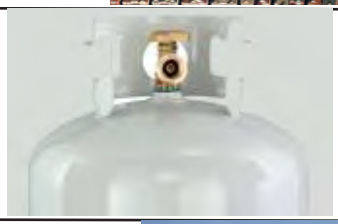
- Carbon dioxide emissions from 18,577,287 gallons of gasoline

- Carbon dioxide emissions from 385,371 barrels of oil consumed

- Carbon dioxide emissions from the energy use of 14,347 homes for one year

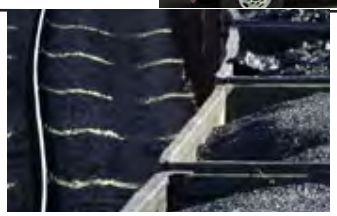


- Carbon dioxide emissions from 6,904,558 propane tanks used for home barbeques



- Carbon dioxide emissions from gasoline carried by 2,186 tanker trucks

- Carbon dioxide emissions from burning 902 railcars' worth of coal (13 2/3 miles long)



Environmental Metrics	Nov 2009 MOU	May 2010 Update	Nov 2010 Update	May 2011 Update	Nov 2011 Update	May 2012 Update	Total Conversion (MTCO2e)	Cost Savings (Est.)
Energy Conservation/Energy Star								
Total Savings (MTCO2e)	***9,017.0***	***6,214.5***	***5,832.5***	***9,702.0***	***9,702.0***	***9,702.0***	***50,169.9***	***$6,985,138***
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	1,094,476.5 kwh	5,810.4	$790,650
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	14,400.9	$1,959,613
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	29,958.6	$4,234,875
HVAC, Chiller & Electrical								
Bulb Replacement (CFLs)								
Bulb Replacement (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***	***101,340.4***	***$11,833,646***
On-Site Solar	874,235 kwh	880,201 kwh	831,926 kwh	652,652 kwh	869,093 kwh	955,681 kwh	3,840.4	$522,583
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	97,500.0	$11,311,063
Purchase of Green Energy/Green Power								
Water Conservation/WaterSense								
Total Savings (MTCO2e)	***638.2***	***319.1***	***319.1***	***319.1***	***319.1***	***319.1***	***2,233.7***	***$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	127,500,000 gal	2,233.7	$1,398,477
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***	***11,685.5***	***$177,428***
Mixed Recyclables (includes Wastewise)	591 tons	591 tons	591 tons	762 tons	652 tons	765 tons	11,342.2	$158,080
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 (bottles, construction/non-construction, sharp containers)								
Blue Wrap								
Can / Bottle Recycling								
Mixed Organics								
Food Donation (Waste diversion)								

Environmental Metrics	Nov 2009 MOU	May 2010 Update	Nov 2010 Update	May 2011 Update	Nov 2011 Update	May 2012 Update	Total Conversion (MTCO2e)	Cost Savings (Est.)
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***	***270.0***	***$72,000***
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)	270.0	$72,000
Green Space								
Re-use of Collected Stormwater								
On-Site Re-use of Compost								
Moisture Sensing Sprinklers								
Number / Acres of Trees								
Reflective Roof								
Synthetic Turf								

Environmental Metrics	Nov 2009 MOU	May 2010 Update	Nov 2010 Update	May 2011 Update	Nov 2011 Update	May 2012 Update	Total Conversion (MTCO2e)	Cost Savings (Est.)
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								
Mass Transit								
Total Savings (MTCO2e)								
Miles Avoided								
Transportation								
Total Savings (MTCO2e)	***2.9***	***1.4***	***1.4***	***1.4***	***1.4***	***1.4***	***10.0***	***$2,683***
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)	10.0	$2,683
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		
Total Savings (MTCO2e)								
Silver - 10%								
Gold - 17%								
Platinum - 20%								
Misc. - Further Clarification								
Total Savings (MTCO2e)								
NOX (equipment only)								
NOX (includes vehicles)								
MTCO2e Savings								
Total (MTCO2e)	***28,408.3***	***25,295.4***	***24,920.7***	***28,999.4***	***28,847.8***	***29,237.8***	***165,709.4***	***$20,469,372***
Energy	9,017.0	6,214.5	5,832.5	9,702.0	9,702.0	9,702.0	50,169.9	$6,985,138
Alternative Energy	16,913.0	16,917.5	16,880.9	16,745.0	16,909.1	16,974.8	101,340.4	$11,833,646
Water	638.2	319.1	319.1	319.1	319.1	319.1	2,233.7	$1,398,477
Solid Waste	1,792.2	1,797.9	1,841.7	2,186.9	1,871.2	2,195.6	11,685.5	$177,428
Landscaping	45.0	45.0	45.0	45.0	45.0	45.0	270.0	$72,000
Transportation	2.9	1.4	1.4	1.4	1.4	1.4	10.0	$2,683

2012

Rutgers University Additional Green MOU Accomplishments and Cost Savings

As New Jersey's land-grant university, Rutgers has a fundamental commitment to improving agricultural viability and environmental health in the nation's most densely populated state.

- Barnegat Bay Shellfish Restoration Program
- Center for Energy, Economic, and Environmental Policy (see below for further information)
- Center for Green Building (see below for further information)
- Center for Turfgrass Science
- Center for Urban Restoration Ecology
- Center for Vector Biology
- Climate and Environmental Change Initiative
- Digital Meadowlands
- EcoComplex (see below for further information)
- Harmful Plants Gallery
- Highlands Regional Information System
- Institute of Marine and Coastal Sciences
- Jacques Cousteau National Estuarine Research Reserve
- Lawn and Garden Resources
- National Center for Neighborhood and Brownfields Redevelopment
- New Jersey Agricultural Experiment Station
- New Jersey Environmental Digital Library
- New Jersey State Climatologist
- New Jersey Water Resources Research Institute
- Philip E. Marucci Center for Blueberry and Cranberry Research and Extension
- Pinelands Field Station
- Rutgers Cooperative Extension
- Rutgers Energy Institute (see below for further information)
- Rutgers Gardens
- Snyder Research and Extension Farm

Center for Energy, Economic, and Environmental Policy
The Center conducts applied research to evaluate and help develop energy policy at the state, regional, national, and international levels. The Center works to strengthen energy, economic and environmental public policy. In addition, the Center collaborates with policy experts and stakeholders in the private, public, and non-profit sectors throughout our region and across the country.

Center for Green Building
The New Jersey Green Building Manual (NJGBM or Manual) is a comprehensive web-based document that provides economic and environmental best practices for green building. The NJGBM is organized into four sections – New Commercial, Existing Commercial, New Residential and Existing Residential – each of which contains best practice strategies and case studies that illustrate how these strategies have been implemented in New Jersey within a "lessons learned" framework.

EcoComplex
The EcoComplex is RUTGERS University's Environmental Research and Extension Center. The EcoComplex is dedicated to moving science from the lab to real-world applications in our state's businesses and industries, and to promoting New Jersey as a center for environmental innovation and enterprises.

Rutgers Energy Institute
REI integrates Rutgers' expertise in science, engineering, economics, and policy, putting it at the forefront of alternative energy research. The annual Energy Symposia provide the opportunity to learn about the new methods, processes, and initiatives being developed by energy thinkers at Rutgers, in New Jersey, and across the country. REI also co-sponsors Solar Exchange East 2012 which offers the opportunity for discovery and dialogue on the latest emerging topics, innovations and trends within the solar industry.