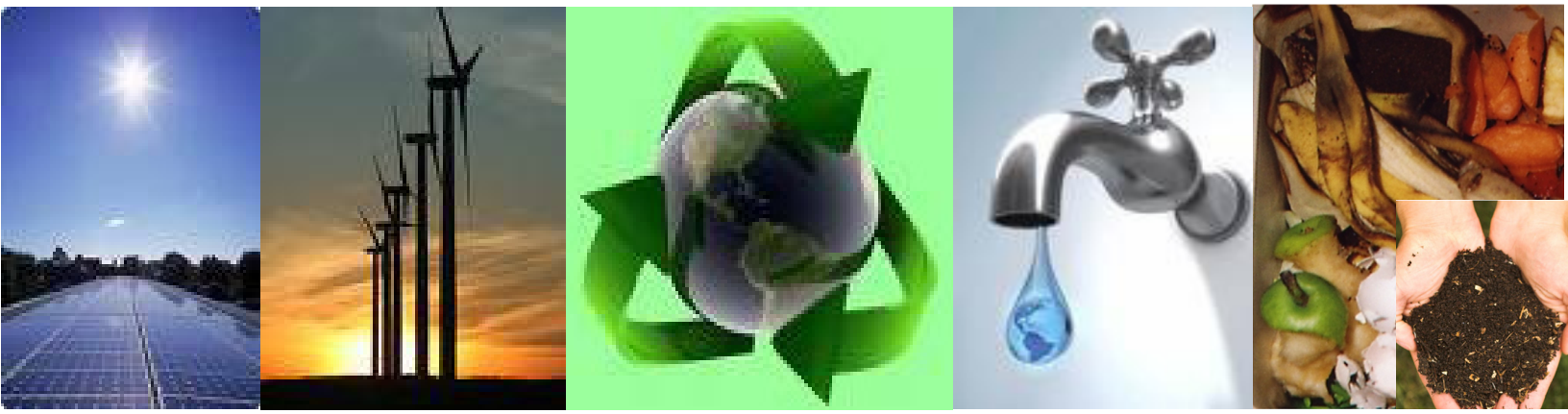
Monmouth University
Environmental Assessment:
Final MOU SemiAnnual Report
March 4, 2014



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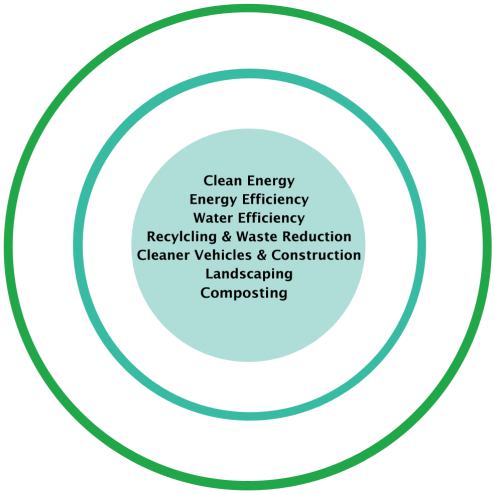
Accomplishments

Reductions of 36,683 MTCO2e



Memorandum of Understanding

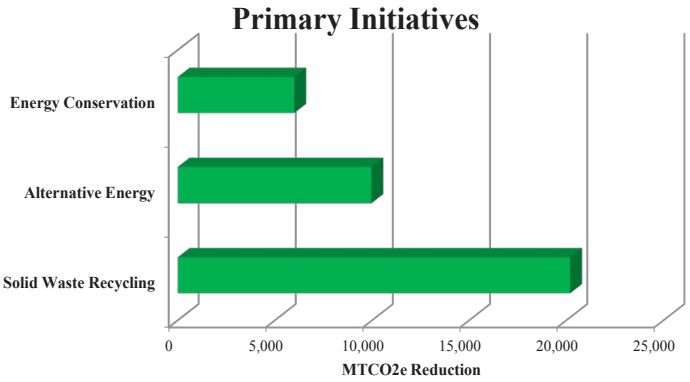
On January 16, 2009, Monmouth University signed a Memorandum of Understanding (MOU) pledging to become an environmental steward by implementing a number of green initiatives that would reduce its carbon footprint and further improve our planet's environment. This partnership with the United States Environmental Protection Agency (EPA) and Monmouth University has resulted in reducing energy, water and solid waste production across campus operations. Monmouth has met the agreed to reporting requirements under the terms and conditions of the MOU. This report concludes the five year MOU agreement between Monmouth and the EPA.

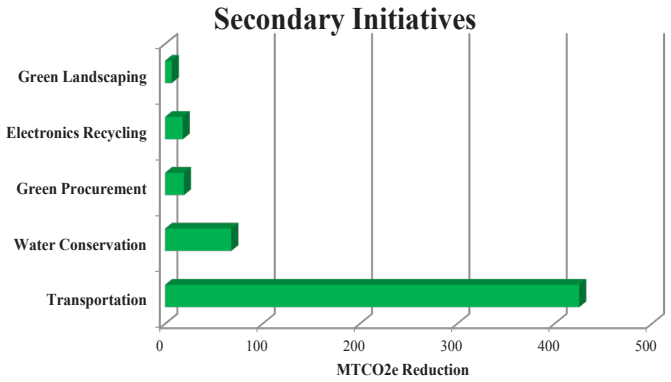
Reduction in Environmental Footprint

Under the five year term of the MOU, Monmouth University has provided ten 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 36,683 MTCO2e* and saved an estimated over $2.1 million in operating expenses.

*Metric Ton Carbon Dioxide Equivalent

Environmental Metrics	Total Sector (MTCO2e)
Energy Conservation	5,995.4
Alternative Energy	9,961.1
Water Conservation	68.0
Solid Waste Recycling	20,189.5
Green Procurement	19.3
Green Landscaping	6.8
Electronics Recycling	18.1
Transportation	425.5
Total (MTCO2e)	36,683.7





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) and the EPA Pollution Prevention (P2) GHG Conversion Tool which convert standard metrics for electricity, green energy, fuel use, chemical use, water use, and sustainable materials management into MTCO2e.

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 36,683 MTCO2e represent ?
The organization's effort is equivalent to any one of the following:

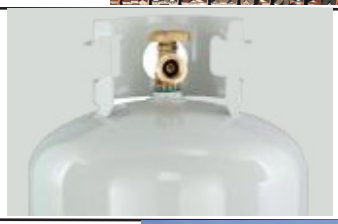
- Annual greenhouse gas emissions from 7,642 vehicles

- Carbon dioxide emissions from 4,112,522 gallons of gasoline

- Carbon dioxide emissions from 85,311 barrels of oil consumed

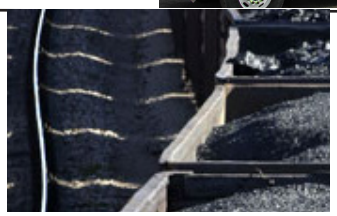
- Carbon dioxide emissions from the energy use of 1,832 homes for one year

- Carbon dioxide emissions from 1,528,487 propane tanks used for home barbeques



- Carbon dioxide emissions from gasoline carried by 484 tanker trucks

- Carbon dioxide emissions from burning 158 railcars' worth of coal (nearly 2.4 miles long)



Environmental Metrics	Jan 2009 MOU / Jul 2009 Update	Jan/Jul 2010 Updates	Jan/Jul 2011 Updates	Jan/Jul 2012 Updates	Jan 2013 Update	Jul 2013 Update	Jan 2014 Update	Total Conversion (MTCO2e)	Cost Savings (Est.)
Energy Conservation									
Total Savings (MTCO2e)	***583.1***	***1,195.5***	***1,200.0***	***1,204.2***	***604.2***	***604.2***	***604.2***	***5,995.4***	***$1,055,093***
Misc. Energy Conservation	813,748.2 kwh	1,627,496.4 kwh	1,627,496.4 kwh	1,627,496.4 kwh	813,748.2 kwh	813,748.2 kwh	813,748.2 kwh	5,793.9	$1,019,627
Motors and Transformers									
Lighting Project Fixtures									
High Temp Hot Water Pipe Replacement									
HVAC, Chiller & Electrical									
Bulb Replacement (CFLs) Total 1156	5150 kwh	51,550 kwh	57,800 kwh	57,800 kwh	28,900 kwh	28,900 kwh	28,900 kwh	184.4	$32,453
Bulb Replacement (LEDs) Total 185				6012.5 kwh	6012.5 kwh	6012.5 kwh	6012.5 kwh	17.1	$3,013
Gas Savings									
Fuel Oil Savings									
Alternative Energy									
Total Savings (MTCO2e)	***1,823.4***	***1,083.9***	***1,615.6***	***2,067.9***	***1,092.4***	***1,126.9***	***1,151.1***	***9,961.1***	***$696,698***
On-Site Solar	2,216,907 kwh	303,281 kwh	519,152 kwh	538,485 kwh	223,246 kwh	271,675 kwh	237,536 kwh	3,068.9	$540,078
Rooftop Solar				325,940 kwh	325,940 kwh	325,940 kwh	284,568 kwh	898.8	$158,177
On-Site Wind									
On-Site Geothermal									
On-Site Combined Heat and Power									
Purchase of Green Energy/	344,006 kwh	1,219,006 kwh	1,750,000 kwh	2,040,051 kwh	985,064 kwh	985,064 kwh	1,094,570 kwh	5,993.4	($1,557)
Water Conservation/WaterSense									
Total Savings (MTCO2e)	***6.8***	***13.6***	***13.6***	***13.6***	***6.8***	***6.8***	***6.8***	***68.0***	***$58,797***
Miscellaneous Water Conservation	851,083 gal	1,702,166 gal	1,702,166 gal	1,702,166 gal	851,083 gal	851,083 gal	851,083 gal	20.0	$17,295
Low Flow/Hands Free Faucets (1,000)	250,000 gal	500,000 gal	500,000 gal	500,000 gal	250,000 gal	250,000 gal	250,000 gal	5.9	$5,080
Low Flow Toilets (661)	1,322,000 gal	2,644,000 gal	2,644,000 gal	2,644,000 gal	1,322,000 gal	1,322,000 gal	1,322,000 gal	31.1	$26,864
Low Flow Shower Heads (409)	470,350 gal	940,700 gal	940,700 gal	940,700 gal	470,350 gal	470,350 gal	470,350 gal	11.1	$9,558
Low Flow Urinals									
Waterless Urinals									
Solid Waste Recycling									
Total Savings (MTCO2e)	***1,938.3***	***3,757.0***	***4,629.9***	***4,872.7***	***2,316.3***	***1,371.2***	***1,304.1***	***20,189.5***	***$274,660***
Mixed Recyclables	4.55 tons					464.4 tons	465.75 tons	2,617.2	$37,388
Pallets / Wood Recycled									
Recycled C & D Waste									
Cardboard	407 tons (1,628 cu yd)	805.5 tons	1017.5 tons	1043 tons	493.5 tons (1,974 cu yd)			11,713.8	$150,660
Mixed Metal				24.4 tons	16.75 tons	17.86 tons		234.3	$2,361
Mixed paper	182 tons (416 cu yd)	343.8 tons	400.6 tons	419.12 tons	195.56 tons (447 cu yd)			5,424.6	$61,643
Mixed Plastic (construction/non-construction,sharp containers)									
Recycled bottles (glass/plastic)	54.2 tons (485 cu yd)	118.2 tons	156.7 tons	160.7 tons	75.4 tons (675 cu yd)			199.6	$22,608
Mixed Organics									
Blue Wrap									
Food Donation (Waste diversion)									

Environmental Metrics	Jan 2009 MOU / Jul 2009 Update	Jan/Jul 2010 Updates	Jan/Jul 2011 Updates	Jan/Jul 2012 Updates	Jan 2013 Update	Jul 2013 Update	Jan 2014 Update	Total Con-version (MTCO2e)	Cost Savings (Est.)
Biosolids and Food Waste Recycling / Composting									
Fluorescent Bulbs									
Ceiling Tiles Recycled									
Carpet Recycled									
Waste Oil Recycled									
Magazines / Third Class Mail									
Newspapers									
Office Paper									
Phonebooks									
Textbooks									
Dimensional Lumber									
Fly Ash									
Aluminum Cans									
Glass									
HDPE / LDPE / PET									
Appliances									
Non-Ferrous Metals									
Green Procurement									
Total Savings (MTCO2e)	***7.9***	***7.9***	***1.0***	***0.4***	***0.5***	***0.5***	***1.2***	***19.3***	***$2,143***
Purchase of Materials with Recycled Content (Paper)	24 tons 30% PC	24 tons 30% PC	3 tons 30% PC					16.8	$2,040
Purchase / Use of Compost Socks									
Purchase of EPEAT Products									
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									
Bottle-less Water Coolers (Hydration Station)				800 lbs	950 lbs	950 lbs	2430 lbs	2.5	$103
Green Landscaping									
Total Savings (MTCO2e)	***1.7***	***1.1***	***1.1***	***1.1***	***0.6***	***0.6***	***0.6***	***6.8***	***$0***
Green Roofs									
Porous Pavement	38,000 sf	38,000 sf	38,000 sf	38,000 sf	38,000 sf	38,000 sf	38,000 sf	6.8	
Grass									
Low/no mow area									
Re-use of Collected Stormwater									
On-Site Re-use of Compost / Mulch									
Moisture Sensing Sprinklers									
Number / Acres of Trees									
Reflective Roof									
Synthetic Turf									
Native Plants									
Leaves Composted									

Environmental Metrics	Jan 2009 MOU / Jul 2009 Update	Jan/Jul 2010 Updates	Jan/Jul 2011 Updates	Jan/Jul 2012 Updates	Jan 2013 Update	Jul 2013 Update	Jan 2014 Update	Total Con-version (MTCO2e)	Cost Savings (Est.)
Electronics Recycling									
Total Savings (MTCO2e)						***11.2***	***6.9***	***18.1***	***$422***
Recycling of Electronics						13,045 lbs	4747 lbs	14.2	$356
Re-Use/Donation of Used Computers						621 lbs	2662 lbs	3.9	$66
Toner/Ink Recycling and Use of Recycled Ink									
Battery Recycling									
Mass Transit									
Total Savings (MTCO2e)									
Miles Avoided									
Transportation									
Total Savings (MTCO2e)	***8.7***	***5.8***	***103.7***	***103.7***	***51.9***	***51.9***	***99.9***	***425.5***	***$41,153***
Hybrid Vehicles	3 cars	3 cars	4 cars	4 cars	4 cars	4 cars	4 cars	41.5	$14,513
Electric Vehicles									
Biodiesel Vehicles									
Clean Construction Vehicles									
LNG Vehicles									
Alternate Fuel Vehicles (ZipCar)			1 car	1 car	1 car	1 car	2 cars	384.0	$26,640
Smartway Transporters									
Bike Racks									
LEED Projects									
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)	***4,369.8***	***6,064.8***	***7,564.9***	***8,263.7***	***4,072.6***	***3,173.2***	***3,174.8***	***36,683.7***	***$2,128,966***
Energy	583.1	1,195.5	1,200.0	1,204.2	604.2	604.2	604.2	5,995.4	$1,055,093
Alternative Energy	1,823.4	1,083.9	1,615.6	2,067.9	1,092.4	1,126.9	1,151.1	9,961.1	$696,698
Water	6.8	13.6	13.6	13.6	6.8	6.8	6.8	68.0	$58,797
Solid Waste	1,938.3	3,757.0	4,629.9	4,872.7	2,316.3	1,371.2	1,304.1	20,189.5	$274,660
Green Procurement	7.9	7.9	1.0	0.4	0.5	0.5	1.2	19.3	$2,143
Green Landscaping	1.7	1.1	1.1	1.1	0.6	0.6	0.6	6.8	$0
Electronics	0.0	0.0	0.0	0.0	0.0	11.2	6.9	18.1	$422
Transportation	8.7	5.8	103.7	103.7	51.9	51.9	99.9	425.5	$41,153

2014

Monmouth University Additional Green MOU Accomplishments and Cost Savings

Monmouth University will once again be participating in Recyclemania in 2014. The university will be participating in the Benchmarking Division and is planning to expand its involvement with Recyclemania as much as possible and include student involvement in this year's event.

GreenPower Partnership

Monmouth University is developing a Green House Gas Inventory for the campus. Once completed, this inventory will be used to set reduction goals for their Carbon Footprint. The university is also looking to establishing an Energy Master plan.

ENERGY STAR Building & Plant Partnership

Monmouth University has installed a campus-wide building control system expansion and consolidation. The project ties several existing individual building control systems into a centralized control interface, and will have the capability to tie future control systems into the centralized interface. In addition utility sub-metering capabilities have been installed in all major campus buildings so that each utility will be separately metered at each of the buildings.

GreenScapes Partnership

The following practices are employed on campus:
• Bedding trays and plant containers from annuals and other greenery are recycled and reused for the next planting season
• Plastic commercial containers are triple rinsed and recycled
• Used oil and tires from vehicles and equipment are recycled
• Equipment is cleaned with compressed air whenever possible
• Recycling receptacles are provided next to trash receptacles
• Mulch is placed over a plant's root zone to reduce moisture evaporation and conserve water
• Grass cycling-grass clippings are left in place when mowing
• Areas in need of treatment are spot treated whenever possible
• Mulch is used around trees and in flowering beds as weed prevention
• An Integrated Pest Management (IPM) program has been implemented
• Organic, bio-based, or slow-release fertilizers have been utilized
• Weeds are hand cultivated
• Drought tolerant plants are used
• The Web based irrigation system covers approximately 6 acres. The system allows access control from a wireless handheld device, a computer with network capabilities, or a PDA. The network control service allows water savings based on weather and transpiration values. The controller automatically adjusts the irrigation operating schedule to coincide with the local conditions.

Transportation

The new Long Branch Community Shuttle service went into service on Tuesday, September 3 with a kickoff ceremony in front of the MU Health Center. The shuttle runs Monday to Friday every half hour. Among other stops within the City of Long Branch, the shuttle make stops at Monmouth University (Health Center), Long Branch Train Station, Brookdale Community College (Broadway campus), Long Branch Pier Village, and West End. Each jitney can accommodate 20 passengers and will be equipped with a wheelchair lift for handicapped riders. It will cost $1 to ride the shuttle, but be offered FREE of charge to Monmouth University Students and Employees with a Monmouth ID.
The University has installed an electric car charging station. The station is available to the campus community and to the general public. The charging station is part of the ChargePoint America Network - anyone can access charging station locations on-line.

Energy Efficiency

The University has installed a new TurboCore chiller in the Student Center. The Student Center Absorption Chiller has been replaced. The Chiller is being replaced with a magnetically driven (frictionless) chiller. This replacement will be extremely energy efficient and should save the university approximately 35 % on the buildings energy usage. Historically during the summer months both boilers had to operate to supply the old absorption chiller 240 degree water to generate chilled water. These boilers operate on natural gas and typically would use approximately 24,716 Dekatherms (Dtherms) to generate chilled water for comfort cooling. During the new chillers first cooling season the natural gas usage for the cooling season was reduced by 21,000 Dtherms. Electric usage for this same time period was reduced by approximately 21%.