



**Monmouth University**  
**Environmental Assessment:**  
**MOU SemiAnnual Report**  
**August 6, 2013**



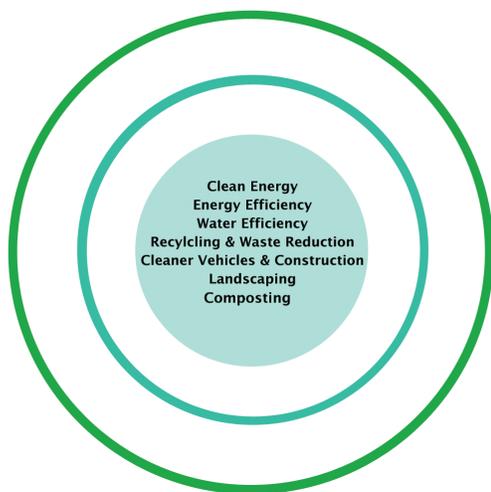
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**Region 2**

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## Accomplishments

Reductions of 34,116 MTCO<sub>2</sub>e



## Memorandum of Understanding

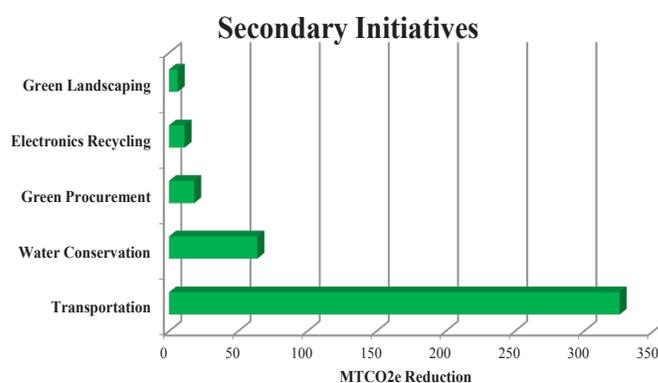
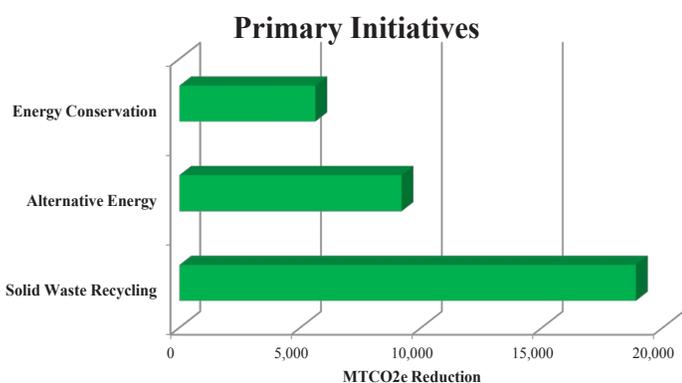
On January 16, 2009, Monmouth University signed a Memorandum of Understanding (MOU) pledging to become an environmental steward by implementing a number of green initiatives that would reduce its carbon footprint and further improve our planet's environment. This partnership with the United States Environmental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

## Reduction in Environmental Footprint

In the last several years, Monmouth University has provided nine 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 34,116 MTCO<sub>2</sub>e\* and saved an estimated over \$2.3 million in operating expenses.

\*Metric Ton Carbon Dioxide Equivalent

Environmental Metrics	Total Sector (MTCO <sub>2</sub> e)
Energy Conservation	5,620.8
Alternative Energy	9,185.8
Water Conservation	63.8
Solid Waste Recycling	18,885.4
Green Procurement	18.2
Green Landscaping	6.3
Electronics Recycling	11.2
Transportation	325.6
Total (MTCO <sub>2</sub> e)	34,116.9



## 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 MTCO<sub>2</sub>e.

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 MTCO<sub>2</sub>e 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 34,116 MTCO<sub>2</sub>e

## Greenhouse Gas Equivalencies

What does the reduction of 34,116 MTCO<sub>2</sub>e represent ?  
The organization's effort is equivalent to any one of the following:

- Annual greenhouse gas emissions from 7,108 vehicles



- Carbon dioxide emissions from 3,824,765 gallons of gasoline



- Carbon dioxide emissions from 79,342 barrels of oil consumed



- Carbon dioxide emissions from the energy use of 1,756 homes for one year



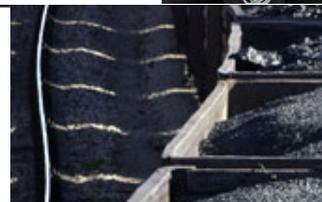
- Carbon dioxide emissions from 1,421,538 propane tanks used for home barbeques



- Carbon dioxide emissions from gasoline carried by 450 tanker trucks



- Carbon dioxide emissions from burning 147 railcars' worth of coal (nearly 2 1/4 miles long)





Environmental Metrics	Jul 2010 Update	Jan 2011 Update	Jul 2011 Update	Jan 2012 Update	Jul 2012 Update	Jan 2013 Update	Jul 2013 Update	Total Conversion (MTCO2e)	Cost Savings (Est.)
<b>Energy Conservation/Energy Star</b>									
<b>Total Savings (MTCO2e)</b>	<b>625.5</b>	<b>625.5</b>	<b>625.5</b>	<b>625.5</b>	<b>630.0</b>	<b>630.0</b>	<b>630.0</b>	<b>5,620.8</b>	<b>\$948,756</b>
Miscellaneous Energy Conservation	2,776,509 kbtu	2,776,509 kbtu	2,776,509 kbtu	2,776,509 kbtu	2,776,509 kbtu	2,776,509 kbtu	2,776,509 kbtu	5,436.6	\$917,664
Motors and Transformers									
Lighting Project Fixtures (bulbs and ballast)									
High Temp Hot Water Pipe Replacement									
HVAC, Chiller & Electrical									
Bulb Replacement (CFLs)	1156 bulbs	1156 bulbs	1156 bulbs	1156 bulbs	1156 bulbs	1156 bulbs	1156 bulbs	170.8	\$28,832
Bulb Replacement (LEDs)					185 bulbs	185 bulbs	185 bulbs	13.4	\$2,260
Gas Savings									
Fuel Oil Savings									
<b>Alternative Energy</b>									
<b>Total Savings (MTCO2e)</b>	<b>720.6</b>	<b>894.0</b>	<b>790.6</b>	<b>1,067.8</b>	<b>1,088.3</b>	<b>1,139.0</b>	<b>1,174.9</b>	<b>9,185.8</b>	<b>\$631,447</b>
On-Site Solar	95,730 kwh	329,218 kwh	189,934 kwh	254,645 kwh	283,840 kwh	223,246 kwh	271,675 kwh	3,023.4	\$510,281
Rooftop Solar					325,940 kwh	325,940 kwh	325,940 kwh	725.9	\$122,521
On-Site Wind									
On-Site Geothermal									
On-Site Combined Heat and Power									
Purchase of Green Energy/Green Power	875,000 kwh	875,000 kwh	875,000 kwh	1,183,770 kwh	856,281 kwh	985,064 kwh	985,064 kwh	5,436.4	(\$1,355)
<b>Water Conservation/WaterSense</b>									
<b>Total Savings (MTCO2e)</b>	<b>7.1</b>	<b>7.1</b>	<b>7.1</b>	<b>7.1</b>	<b>7.1</b>	<b>7.1</b>	<b>7.1</b>	<b>63.8</b>	<b>\$52,917</b>
Miscellaneous Water Conservation	851,083 gal	851,083 gal	851,083 gal	851,083 gal	851,083 gal	851,083 gal	851,083 gal	18.8	\$15,565
Low Flow/Hands Free Faucets (1,000)	250,000 gal	250,000 gal	250,000 gal	250,000 gal	250,000 gal	250,000 gal	250,000 gal	5.5	\$4,572
Low Flow Toilets (661)	1,322,000 gal	1,322,000 gal	1,322,000 gal	1,322,000 gal	1,322,000 gal	1,322,000 gal	1,322,000 gal	29.2	\$24,178
Low Flow Shower Heads (409)	470,350 gal	470,350 gal	470,350 gal	470,350 gal	470,350 gal	470,350 gal	470,350 gal	10.4	\$8,602
Low Flow Urinals									
Waterless Urinals									
<b>Solid Waste Recycling</b>									
<b>Total Savings (MTCO2e)</b>	<b>1,838.9</b>	<b>2,655.0</b>	<b>1,974.9</b>	<b>2,556.4</b>	<b>2,316.3</b>	<b>2,316.3</b>	<b>1,371.2</b>	<b>18,885.4</b>	<b>\$256,030</b>
Mixed Recyclables (includes Wastewise)							464.4 tons	1,313.1	\$18,758
Pallets Waste Avoided/Wood Recycled									
Recycled C & D Waste (Construction Waste)									
Cardboard (construction/non-construction/sharp containers)	405.5 tons (1,622 cu yd)	580 tons (2,318 cu yd)	437.5 tons (1,750 cu yd)	549.5 tons (2,198 cu yd)	493.5 tons (1,974 cu yd)	493.5 tons (1,974 cu yd)		11,713.8	\$150,660
Mixed Metal (construction/non-construction)				7.65 tons	16.75 tons	16.75 tons	17.86 tons	234.3	\$2,361
Mixed paper	157.9 tons (361 cu yd)	233 tons (533 cu yd)	167.6 tons (383 cu yd)	223.56 tons (511 cu yd)	195.56 tons (447 cu yd)	195.56 tons (447 cu yd)		5,424.6	\$61,643
Mixed Plastic (construction/non-construction,sharp containers)									
Recycled bottles (glass/plastic)	62.4 tons (559 cu yd)	87.9 tons (787 cu yd)	68.8 tons (616 cu yd)	85.3 tons (764 cu yd)	75.4 tons (675 cu yd)	75.4 tons (675 cu yd)		199.6	\$22,608
Mixed Organics									
Blue Wrap									
Food Donation (Waste diversion)									



Environmental Metrics	Jul 2010 Update	Jan 2011 Update	Jul 2011 Update	Jan 2012 Update	Jul 2012 Update	Jan 2013 Update	Jul 2013 Update	Total Conversion (MTCO <sub>2e</sub> )	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									
<b>Green Procurement</b>									
<b>Total Savings (MTCO<sub>2e</sub>)</b>		<b>1.0</b>		<b>0.2</b>	<b>0.2</b>	<b>0.5</b>	<b>0.5</b>	<b>18.2</b>	<b>\$2,094</b>
Purchase of Materials with Recycled Content (Paper)		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)				400 lb	400 lb	950 lbs	950 lbs	1.3	\$54
<b>Green Landscaping</b>									
<b>Total Savings (MTCO<sub>2e</sub>)</b>	<b>0.6</b>	<b>6.3</b>	<b>\$0</b>						
Green Roofs									
Porous Pavement	38,000 sf	6.3							
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	Jul 2010 Update	Jan 2011 Update	Jul 2011 Update	Jan 2012 Update	Jul 2012 Update	Jan 2013 Update	Jul 2013 Update	Total Conversion (MTCO <sub>2e</sub> )	Cost Savings (Est.)
<b>Electronics/EPEAT</b>									
<b>Total Savings (MTCO<sub>2e</sub>)</b>							11.2	11.2	\$0
Recycling of Electronics							13,045 lbs	10.4	
Re-Use/Donation of Used Computers							621 lbs	0.7	
Toner/Ink Recycling and Use of Recycled Ink									
Battery Recycling									
<b>Mass Transit</b>									
<b>Total Savings (MTCO<sub>2e</sub>)</b>									
Miles Avoided									
<b>Transportation</b>									
<b>Total Savings (MTCO<sub>2e</sub>)</b>	2.9	51.9	51.9	51.9	51.9	51.9	51.9	325.6	\$412,763
Hybrid Vehicles	3 cars	4 cars	37.6	\$13,163					
Electric Vehicles									
Biodiesel Vehicles									
Clean Construction Vehicles									
LNG Vehicles									
Alternate Fuel Vehicles (ZipCar)		1 car	288.0	\$399,600					
Smartway Transporters									
Bike Racks									
<b>LEED Projects</b>									
<b>Total Savings (MTCO<sub>2e</sub>)</b>									
Silver - 10%									
Gold - 17%									
Platinum - 20%									
<b>Misc. - Further Clarification</b>									
<b>Total Savings (MTCO<sub>2e</sub>)</b>									
NOX (equipment only)									
NOX (includes vehicles)									
<b>MTCO<sub>2e</sub> Savings</b>									
<b>Total (MTCO<sub>2e</sub>)</b>	3,195.6	4,235.0	3,450.5	4,309.4	4,094.3	4,145.2	3,247.3	34,116.9	\$2,304,007
Energy	625.5	625.5	625.5	625.5	630.0	630.0	630.0	5,620.8	\$948,756
Alternative Energy	720.6	894.0	790.6	1,067.8	1,088.3	1,139.0	1,174.9	9,185.8	\$631,447
Water	7.1	7.1	7.1	7.1	7.1	7.1	7.1	63.8	\$52,917
Solid Waste	1,838.9	2,655.0	1,974.9	2,556.4	2,316.3	2,316.3	1,371.2	18,885.4	\$256,030
Green Procurement	0.0	1.0	0.0	0.2	0.2	0.5	0.5	18.2	\$2,094
Green Landscaping	0.6	0.6	0.6	0.6	0.6	0.6	0.6	6.3	\$0
Electronics	0.0	0.0	0.0	0.0	0.0	0.0	11.2	11.2	\$0
Transportation	2.9	51.9	51.9	51.9	51.9	51.9	51.9	325.6	\$412,763



2013

## Monmouth University Additional Green MOU Accomplishments and Cost Savings

### *GreenPower Partnership*

Monmouth University is performing a Green House Gas Inventory for the campus. Once completed, this inventory will be used to set reduction goals. Monmouth is also looking to establish an Energy Master plan.

### *ENERGY STAR Building & Plant Partnership*

The University committed to a 1.3 megawatt target for the PJM Demand Response program with Hess Corporation for the period of June 2013 to May 2014. During the summer of 2012, Monmouth University performed well by overshooting its obligated percentage of capacity reduction.

### *GreenScapes Partnership*

The following practices are employed on the Monmouth 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.

### *Sustainable Design, Construction and Operations Practices*

All future construction projects will consider LEED certification early in the design process.

Monmouth continues to use green cleaning products wherever possible in campus facilities. Green cleaning products include glass cleaner, all-purpose cleaner, and floor cleaner. In addition, the University is using zinc-free floor wax and green seal stripper. Where possible, the maintenance crew is stripping floors with just water and an abrasive pad.