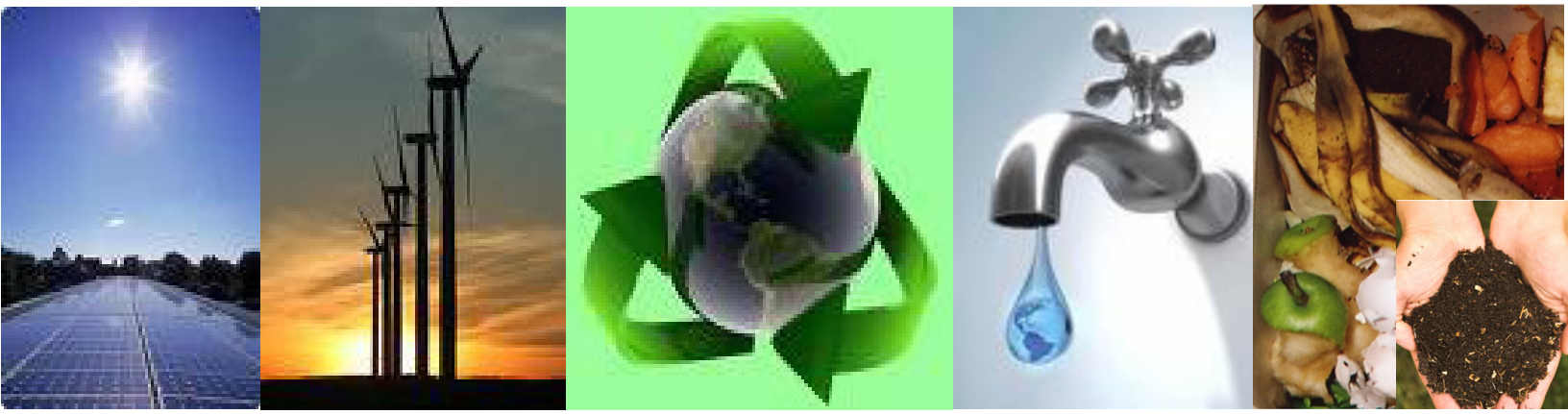
# Montclair State University
# Environmental Assessment:
# MOU SemiAnnual Report
# June 27, 2013



## Environmental Protection Agency
## Region 2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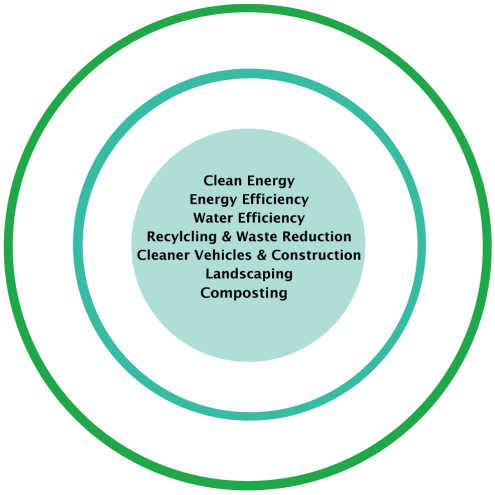
## Accomplishments

**Reductions of 107,552 MTCO2e**




## Memorandum of Understanding

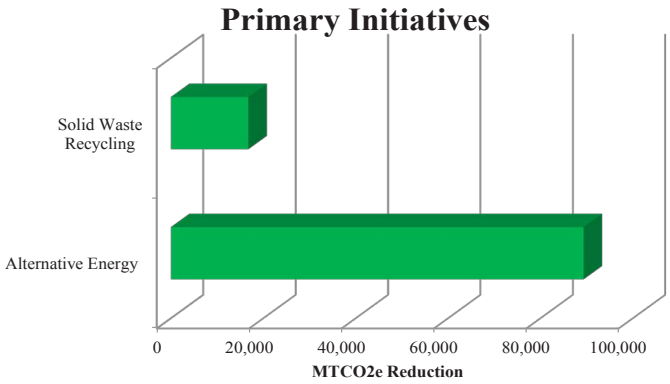
On June 17, 2008, Montclair State University signed a Memorandum of Understanding (MOU) pledging to become an environmental steward by implementing a number of green initiatives that would reduce its carbon footprint and further improve our planet's environment. This partnership with the United States Environmental Protection Agency (EPA) and Montclair State University has resulted in reducing energy, water and solid waste production across campus operations.

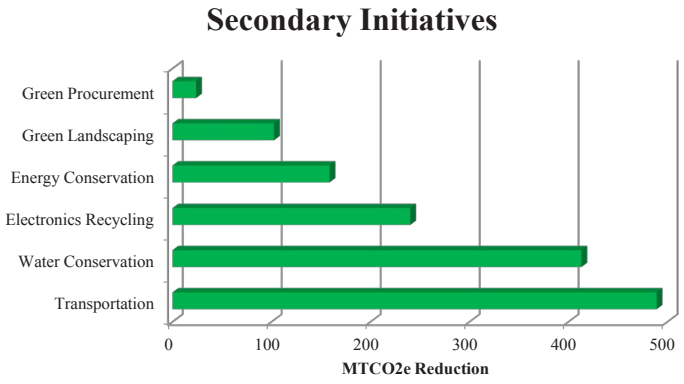
## Reduction in Environmental Footprint

In the last five years, Montclair State 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 107,552 MTCO2e* and saved an estimated $11.8 million in operating expenses.

*Metric Ton Carbon Dioxide Equivalent

| Environmental Metrics | Total Sector (MTCO2e) |
|---|---|
| Energy Conservation | 158.7 |
| Alternative Energy | 89,353.4 |
| Water Conservation | 413.2 |
| Solid Waste | 16,771.9 |
| Green Procurement | 23.8 |
| Green Landscaping | 102.6 |
| Electronics Recycling | 240.2 |
| Transportation | 489.2 |
| Total (MTCO2e) | 107,552.8 |




## 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 107,552 MTCO2e represent ?
The organization's effort is equivalent to any one of the following:

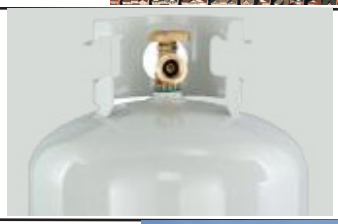
- Annual greenhouse gas emissions from 22,407 vehicles

- Carbon dioxide emissions from 12,057,489 gallons of gasoline

- Carbon dioxide emissions from 250,123 barrels of oil consumed

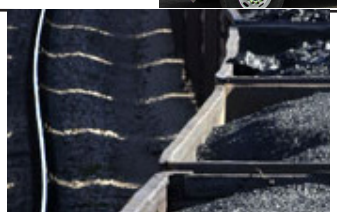
- Carbon dioxide emissions from the energy use of 5,535 homes for one year

- Carbon dioxide emissions from 4,481,367 propane tanks used for home barbeques



- Carbon dioxide emissions from gasoline carried by 1,419 tanker trucks


- Carbon dioxide emissions from burning 462 railcars' worth of coal (approx. 7 miles long)



| Environmental Metrics | Jun 2010 Update | Dec 2010 Update | Jun 2011 Update | Dec 2011 Update | Jun 2012 Update | Dec 2012 Update | June 2013 Update | Total Conversion (MTCO2e) | Cost Savings (Est.) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| **Energy Conservation/Energy Star** | | | | | | | | | |
| ***Total Savings (MTCO2e)*** | ***32.0*** | ***16.0*** | ***18.8*** | ***21.1*** | ***21.1*** | ***23.0*** | ***26.7*** | ***158.7*** | ***$26,781*** |
| Miscellaneous Energy Conservation | | | | | | | | | |
| Motors and transformers | | | | | | | | | |
| Lighting Project Fixtures (Bulbs and Ballast) | | | | | | | | | |
| High Temp Hot Water Pipe Replacement | | | | | | | | | |
| HVAC, Chiller & Electrical | | | | | | | | | |
| Bulb Replacement (CFLs) | | | 150 bulbs | 275 bulbs | 275 bulbs | 375 bulbs | 375 bulbs | 26.9 | $4,542 |
| Bulb Replacement (LEDs) | 663 Fixtures | 663 Fixtures | 663 Fixtures | 663 Fixtures | 663 Fixtures | 663 Fixtures | 820 Fixtures | 131.8 | $22,239 |
| Gas / Fuel Oil / Steam Savings | | | | | | | | | |
| | | | | | | | | | |
| **Alternative Energy** | | | | | | | | | |
| ***Total Savings (MTCO2e)*** | ***12,067.4*** | ***9,472.6*** | ***10,327.8*** | ***10,327.8*** | ***10,327.9*** | ***10,428.6*** | ***10,272.5*** | ***89,353.4*** | ***$11,454,154*** |
| On-Site Solar | 1,712 kwh | 1,712 kwh | 1,712 kwh | 1,712 kwh | 1,779 kwh | 137,436 kwh | 106,000.9 kwh | 190.9 | $32,227 |
| On-Site Wind | | | | | | | | | |
| On-Site Geothermal | | | | | | | | | |
| On-Site Combined Heat and Power (4.3MW) | 15,897.5 MWh | 15,897.5 MWh | 15,897.5 MWh | 15,897 MWh | 15,897.5 MWh | 15,897.5 MWh | 15,897.5 MWh | 59,125.0 | $10,484,147 |
| Purchase of Green Energy/Green Power | | 5,518,000 kwh | 5,518,000 kwh | 5,518,000 kwh | 5,518,000 kwh | 5,518,000 kwh | 5,339,267.7 kwh | 24,445.3 | ($6,092) |
| Energy Returned to the Grid | 1,772.9 MWh | | 1,152 MWh | 1,152 MWh | 1,152 MWh | 1,152 MWh | 1,152 MWh | 5,592.1 | $943,872 |
| | | | | | | | | | |
| **Water Conservation/WaterSense** | | | | | | | | | |
| ***Total Savings (MTCO2e)*** | | | ***82.6*** | ***82.6*** | ***82.6*** | ***82.6*** | ***82.6*** | ***413.2*** | ***$96,234*** |
| Miscellaneous Water Conservation | | | | | | | | | |
| Low Flow/Hands Free Faucets | | | | | | | | | |
| Low Flow Toilets (985) | | | 1,970,000 gal | 1,970,000 gal | 1,970,000 gal | 1,970,000 gal | 1,970,000 gal | 24.1 | $20,016 |
| Low Flow Shower Heads (670) | | | 770,500 gal + 100,500 kwh | 770,500 gal + 100,500 kwh | 770,500 gal + 100,500 kwh | 770,500 gal + 100,500 kwh | 770,500 gal + 100,500 kwh | 382.5 | $70,792 |
| Low Flow Urinals (42) | | | 96,600 gal | 96,600 gal | 96,600 gal | 96,600 gal | 96,600 gal | 1.2 | $981 |
| Waterless Urinals (35) | | | 437,500 gal | 437,500 gal | 437,500 gal | 437,500 gal | 437,500 gal | 5.4 | $4,445 |
| | | | | | | | | | |
| **Solid Waste Recycling** | | | | | | | | | |
| ***Total Savings (MTCO2e)*** | ***246.8*** | ***246.8*** | ***246.8*** | ***232.8*** | ***225.0*** | ***224.2*** | ***14,767.2*** | ***16,771.9*** | ***$241,022*** |
| Mixed Recyclables (includes WasteWise) | 88 tons | 88 tons | 88 tons | 83 tons | 80.2 tons | 80 tons | 5274..01 tons | 16,764.2 | $239,488 |
| Pallets Waste Avoided/Wood Recycled | | | | | | | | | |
| Steel Recycled during Deconstruction | | | | | | | | | |
| Concrete / Asphalt Recycled during Deconstruction | | | | | | | | | |
| Recycled C & D Waste (Construction Waste) | | | | | | | | | |
| Cardboard (construction/non-construction/sharp containers) | | | | | | | | | |
| Mixed Metal (construction/non-construction) | | | | | | | | | |
| Paper, Mixed | | | | | | | | | |
| Plastic, Mixed (bottles, construction/non-construction, sharp containers) | | | | | | | | | |
| Blue Wrap | | | | | | | | | |

| Environmental Metrics | Jun 2010 Update | Dec 2010 Update | Jun 2011 Update | Dec 2011 Update | Jun 2012 Update | Dec 2012 Update | June 2013 Update | Total Conversion (MTCO2e) | Cost Savings (Est.) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| Can / Bottle Recycling | | | | | | | | | |
| Mixed Organics | | | | | | | | | |
| Food Donation (Waste diversion) | | | | | | | | | |
| Biosolids & Food Waste Recycling / Composting | 4,200 lbs | 4,200 lbs | 4,200 lbs | 4,000 lbs | 4,200 lbs | 2,000 lbs | | 7.7 | $1,534 |
| Fluorescent Bulbs | | | | | | | | | |
| Ceiling Tiles Recycled | | | | | | | | | |
| Carpet Recycled | | | | | | | | | |
| 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)*** | | | ***11.9*** | | ***11.9*** | | | ***23.8*** | ***$2,880*** |
| Purchase of Materials with Recycled Content (Paper) | | | 1440 cs 30% PC | | 1440 cs 30% PC | | | 23.8 | $2,880 |
| 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)*** | ***17.1*** | ***9.2*** | ***9.2*** | ***9.8*** | ***9.8*** | ***8.6*** | ***9.8*** | ***102.6*** | ***$1,951*** |
| Green Roofs | | | | | | | | | |
| Porous Pavement | | | | | | | | | |
| Grass | | | | | | | | | |
| Low/no mow area | | | | | | | | | |
| Re-use of Collected Stormwater | | | | | | | | | |
| On-Site Re-use of Compost / Mulch | 12,000 lbs | 12,000 lbs | 12,000 lbs | 12,000 lbs | 12,000 lbs | | 12,200 lbs | 12.6 | |
| Moisture Sensing Sprinklers (40) | | | | 240,000 gal | 240,000 gal | 240,000 gal | 240,000 gal | 2.4 | $1,951 |
| Number / Acres of Trees | 190 trees | 190 trees | 190 trees | 190 trees | 190 trees | 190 trees | 190 trees | 87.7 | |
| Reflective Roof | | | | | | | | | |
| Synthetic Turf | | | | | | | | | |
| Native Plants | | | | | | | | | |
| Leaves Composted | | | | | | | | | |

| Environmental Metrics | Jun 2010 Update | Dec 2010 Update | Jun 2011 Update | Dec 2011 Update | Jun 2012 Update | Dec 2012 Update | June 2013 Update | Total Conversion (MTCO2e) | Cost Savings (Est.) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| **Electronics/EPEAT** | | | | | | | | | |
| ***Total Savings (MTCO2e)*** | ***31.3*** | | ***41.3*** | ***44.6*** | ***41.3*** | ***39.3*** | ***42.4*** | ***240.2*** | ***$1,349*** |
| Recycling of Electronics | | | 145 units | 86 units | 145 units | 100 units | 150 units | 5.0 | $125 |
| Re-Use/Donation of Used Computers | 2800 computers | | 250 computers | 600 computers | 250 computers | 150 computers | 275 computers | 48.3 | $822 |
| Toner/Ink Recycling and Use of Recycled Ink | | | 906 cartridges | 906 cartridges | 906 cartridges | 900 cartridges | 925 cartridges | 185.4 | $363 |
| Battery Recycling | | | 250 batteries | 150 batteries | 250 batteries | 50 batteries | 268 batteries | 1.6 | $39 |
| | | | | | | | | | |
| **Mass Transit** | | | | | | | | | |
| ***Total Savings (MTCO2e)*** | | | | | | | | ***0.0*** | ***$0*** |
| Miles Avoided | | | | | | | | | |
| | | | | | | | | | |
| **Transportation** | | | | | | | | | |
| ***Total Savings (MTCO2e)*** | ***18.0*** | ***9.0*** | ***73.9*** | ***183.9*** | ***75.3*** | ***75.3*** | ***26.8*** | ***489.2*** | ***$59,150*** |
| Hybrid Vehicles | | | | | | | | | |
| Gasoline/Ethanol Vehicles | 3 | 3 | 19 | 19 | 19 | 19 | | 282.0 | $4,400 |
| Electric Vehicles | | | 12 | 16 | 13 | 13 | 19 | 102.8 | $54,750 |
| Biodiesel Vehicles | | | | 13 | | | | 104.4 | |
| Clean Construction Vehicles | | | | | | | | | |
| LNG Vehicles | | | | | | | | | |
| Alternate Fuel Vehicles (ULSDF) | | | 2 | 2 | 2 | 2 | 3 | | |
| Smartway Transporters | | | | | 2 | 2 | 2 | | |
| Bike Racks | | | 42 | 42 | 42 | 42 | 42 | | |
| | | | | | | | | | |
| **LEED Projects** | | | | | | | | | |
| ***Total Savings (MTCO2e)*** | | | | | | | | ***0.0*** | ***$0*** |
| Silver - 10% | | | 1 bldg | | | | | | |
| Gold - 17% | | | | | | | | | |
| Platinum - 20% | | | 1 bldg | | | | | | |
| | | | | | | | | | |
| **Misc. - Further Clarification** | | | | | | | | | |
| ***Total Savings (MTCO2e)*** | | | | | | | | ***0.0*** | ***$0*** |
| NOX (equipment only) | | | | | | | | | |
| NOX (includes vehicles) | | | | | | | | | |
| | | | | | | | | | |
| **MTCO2e Savings** | | | | | | | | | |
| ***Total (MTCO2e)*** | ***12,412.6*** | ***9,753.6*** | ***10,812.3*** | ***10,902.6*** | ***10,794.8*** | ***10,881.5*** | ***25,228.1*** | ***107,552.8*** | ***$11,883,521*** |
| Energy | 32.0 | 16.0 | 18.8 | 21.1 | 21.1 | 23.0 | 26.7 | 158.7 | $26,781 |
| Alternative Energy | 12,067.4 | 9,472.6 | 10,327.8 | 10,327.8 | 10,327.9 | 10,428.6 | 10,272.5 | 89,353.4 | $11,454,154 |
| Water | 0.0 | 0.0 | 82.6 | 82.6 | 82.6 | 82.6 | 82.6 | 413.2 | $96,234 |
| Solid Waste | 246.8 | 246.8 | 246.8 | 232.8 | 225.0 | 224.2 | 14,767.2 | 16,771.9 | $241,022 |
| Green Procurement | 0.0 | 0.0 | 11.9 | 0.0 | 11.9 | 0.0 | 0.0 | 23.8 | $2,880 |
| Green Landscaping | 17.1 | 9.2 | 9.2 | 9.8 | 9.8 | 8.6 | 9.8 | 102.6 | $1,951 |
| Electronics | 31.3 | 0.0 | 41.3 | 44.6 | 41.3 | 39.3 | 42.4 | 240.2 | $1,349 |
| Transportation | 18.0 | 9.0 | 73.9 | 183.9 | 75.3 | 75.3 | 26.8 | 489.2 | $59,150 |

2013

# Montclair State University Additional Green MOU Accomplishments and Cost Savings

## Green Buildings

Montclair State University (MSU) has one of their buildings (University Hall) certified under the LEED (Leadership in Environmental and Energy Design) program.

MSU has applied for LEED Certification for 3 additional buildings:
John J. Cali School of Music Department Building
New School of Business Building
Recreational Center

## Green Purchasing

MSU purchases 100% recycled paper to use in their copy machines. The University also purchases roll paper towels and toilet paper that are made out of recycled materials. MSU also purchases green cleaning supplies. In fact, 80% of all cleaning products used on the campus are green cleaning supplies including glass cleaners, all purpose cleaners, neutral disinfectant floor cleaner, floor stripper, floor wax, and carpet shampoo.

## Energy

***Existing Combined and Power Co-generation Plant:*** The Co-generation plant produces thermal energy (steam) and electricity. The cogeneration facility has a yearly production of over 32 million kilowatt hours. Excess energy is sold back to the local distribution utility company under their existing buy back tariff. The co-generation plant generates more than 160 million pounds of steam every year. The majority of buildings on campus use energy produced by the co-generation plant for heating in winter and cooling in the summer.

***Planned New Combined Heat and Power Co-generation Plant:*** A new state-of-the-art combined heat and power co-generation plant and its related infrastructure improvements will replace the campus' existing energy plant, which began generating steam in the 1940s and providing electricity as a co-generation plant in 1993. The new plant will provide natural gas-fired electric generation, chilled water, and steam for heat. The steam, condensate, and chilled water will be delivered to and returned from campus buildings via the new energy distribution system. The majority of the campus' electricity requirements will be satisfied by the onsite plant, which will be designed to operate continuously producing electric power of approximately 5.4 megawatts.

## Waste Management

***Organic/Food Waste Composting***
Food scraps are collected from two kitchens on campus. The scraps are processed in an in-vessel aerobic digester after being mixed with wood chips (which serve as a bulking agent and carbon source for the bacteria that biologically decompose the food scraps). The compost is then used for landscaping projects around campus.

***Electronic waste***
The office of Information Technology at MSU has established a computer life-cycle replacement program to keep all computers for faculty and staff and those in public and teaching computer labs up to date. An inventory of all computers at MSU was compiled and a replacement program plan was created. The goal of the program was to replace the computers in the public and teaching labs and provide all faculty and staff members with one primary computer. The Office of Information Technology does three-year leases on the facilities computers. MSU has agreements with DELL, IBM and Hewlett Packard to send back old computers to the manufacturers so they can be recycled. MSU contracts with a computer and electronics recycling firm to properly handle the retirement of all E-waste that is not leased or returned to the supplier at the end of the life-cycle. In 2007, MSU launched a recycling program in collaboration with "Charitable Emporium.com, Inc." to recycle all brand name ink toner cartridges.

## Transportation

To promote the use of public transportation and reduce the number of single occupant vehicles driven to campus, MSU and NJ Transit have partnered to offer full-time undergraduate and graduate students a 25% discount on a rail, bus, or light rail monthly pass when they enroll online through NJ TRANSIT's Quik-Tik program.
***Buses*** - MSU's shuttle fleet runs on low sulfur diesel fuel. In addition to MSU's shuttle fleet, five bus lines currently operate on campus - four from NJ Transit and one private carrier.
***Trains*** - There are two train stations adjacent to MSU's campus - Montclair State University station at the north end and Montclair Heights station at the south end.
***Alternative fuel vehicles*** - MSU has electric vehicles for staff to use on campus as an alternative to diesel powered golf carts. These vehicles are used by various shops/ departments within Facilities and Dining Services.
***Bicycle*** – MSU encourages students, faculty and staff to use bicycles. There are several bicycles racks on campus.

## Water Use Reduction

Montclair State University has employed a program to reduce water usage at the University. MSU installed waterless urinals in the bathrooms located in University Hall in 2004. The waterless urinals use Ecotrap which consists of a lightweight biodegradable fluid called Blue Seal. The liquid traps the odors and sediment drops to the bottom of the trap to help prevent the pipes from clogging. The waterless urinals do not overflow and have reduced water usage by 45,000 gallons per year for each urinal. MSU has also reduced water usage by planting drought resistant and native plants for all newly constructed buildings. The facility does not need to install sprinkler systems or irrigation systems to water these plants.