

## **Clark University Greenhouse Gas Emissions Update: 2010**

### Clark University on Track for Carbon Reduction and Carbon Neutrality Goals

#### Background

In June 2007 President Bassett signed the American College and University Presidents Climate Commitment (ACUPCC), making Clark University a charter signatory to an exciting initiative aimed at mobilizing the resources of colleges and universities in efforts to reduce greenhouse gas emissions. The core goal of the commitment is to achieve climate neutrality with net zero greenhouse gas emissions, also known as carbon neutrality. The Clark University Environmental Sustainability Task Force (CUES) accepted the task of developing a Climate Action Plan to lead the University toward its goal of climate neutrality.

In December of 2009 Clark University released the Climate Action Plan, detailing strategies for the University to reduce its greenhouse gas emissions while strengthening many of its existing sustainability practices. The plan sets two goals: an interim goal of reducing emissions to 20 percent below 2005 levels by 2015. The second goal is to achieve climate neutrality (net zero greenhouse gas emissions) by the year 2030. Making progress toward this ambitious goal requires a willingness on the part of all members of the Clark University community to make this a priority for many years to come.

Strategies within the Climate Action Plan to reduce emissions include the following:

- Study and manage building and energy systems, such as increased efficiency of lighting, heating and cooling systems;
- Consideration of strategic fuel use choices;
- Manage the physical campus "footprint" by using existing space more efficiently and designing new and renovated buildings with improved use of energy resources;
- Manage information technology and equipment purchasing;
- Seek ways to reduce travel by Clark employees and students, encouraging green commuting practices and video- and teleconferencing;
- Promote social and behavioral awareness and innovation within and outside the classroom and among faculty and staff.

#### Greenhouse Gas Emissions Inventory

In order to effectively manage carbon footprint and emission reduction strategies, a Greenhouse Gas (GHG) Emissions Inventory has been conducted annually utilizing the Campus Carbon Calculator from Clean Air-Cool Planet, a leading non-profit organization in the field.

In the Inventory, inputs are recorded for Scope 1 sources (on-site combustion, such as boilers and vehicle use); Scope 2 sources (off-site combustion, such as purchased electricity) and certain Scope 3 sources (other combustion such as commuting) according to ACUPCC guidelines. The six greenhouse gases inventoried are those included in the Kyoto Protocol: carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), hydro fluorocarbons (HFCs), perfluorocarbons (PFC), and sulfur hexafluoride (SF<sub>6</sub>). Of these six, CO<sub>2</sub> (produced during the combustion of all fossil fuels) and HFCs (gases that are used in

refrigerants and air conditioners) have been shown to be the primary gases emitted on campus. For ease of understanding and comparison, all inventoried greenhouse gases are converted to a common measure: carbon dioxide. The Campus Carbon Calculator multiplies fuel use and other inputs by updated emissions factors to determine the amount of metric tons of carbon dioxide equivalent (MT CO<sub>2</sub>e) added to the atmosphere by campus operations. The results of past inventories have been reported to ACUPCC and shared with University administration.

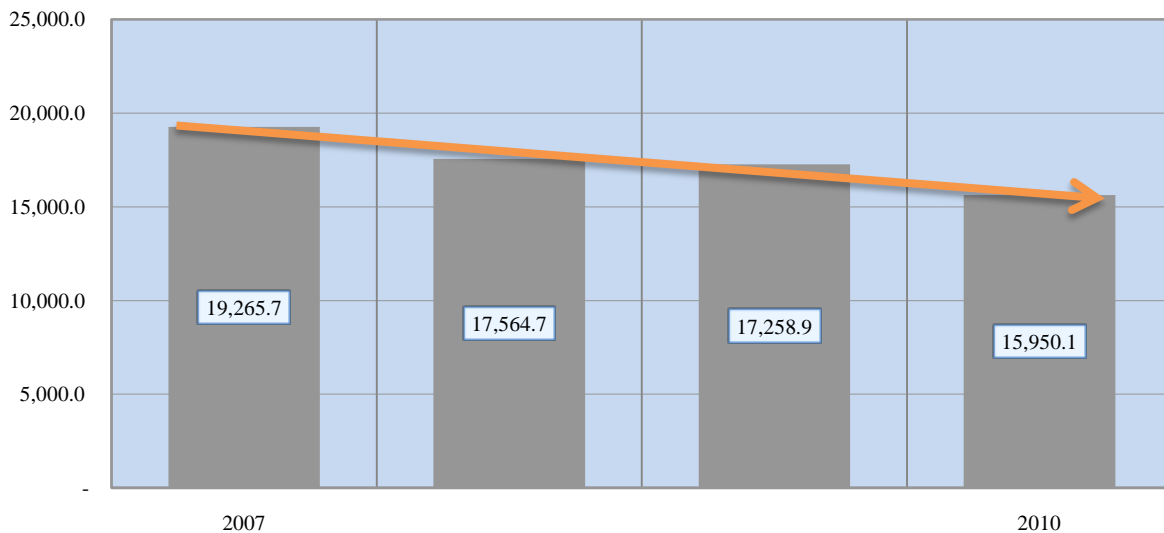
### Greenhouse Gas Emissions Inventory Update: 2010

As of the calendar reporting year 2010, Clark University is on track to meet and exceed its interim goal of a 20 percent reduction over 2005 emissions levels by 2015, and therefore closer to the ultimate goal of climate neutrality.

### Total Greenhouse Gas Emissions in Metric Tonnes of Carbon Dioxide Equivalencies

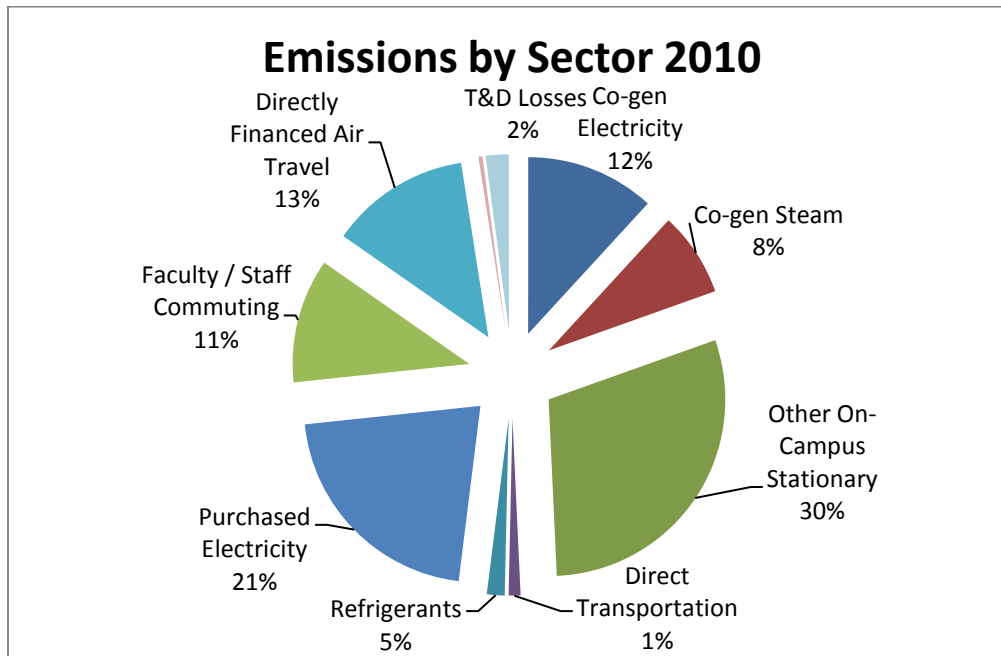
Total GHG emissions in 2010 were 15,950.1 MT CO<sub>2</sub>e. This represents a 7.6% decrease from total 2009 GHG emissions of 17,258.9 MT CO<sub>2</sub>e, and continues the year-to-year trend that Clark has achieved since the baseline year of 2005.

## Emissions 2007-2010 in MT CO<sub>2</sub>e



## Sources of Greenhouse Gas Emissions on Campus

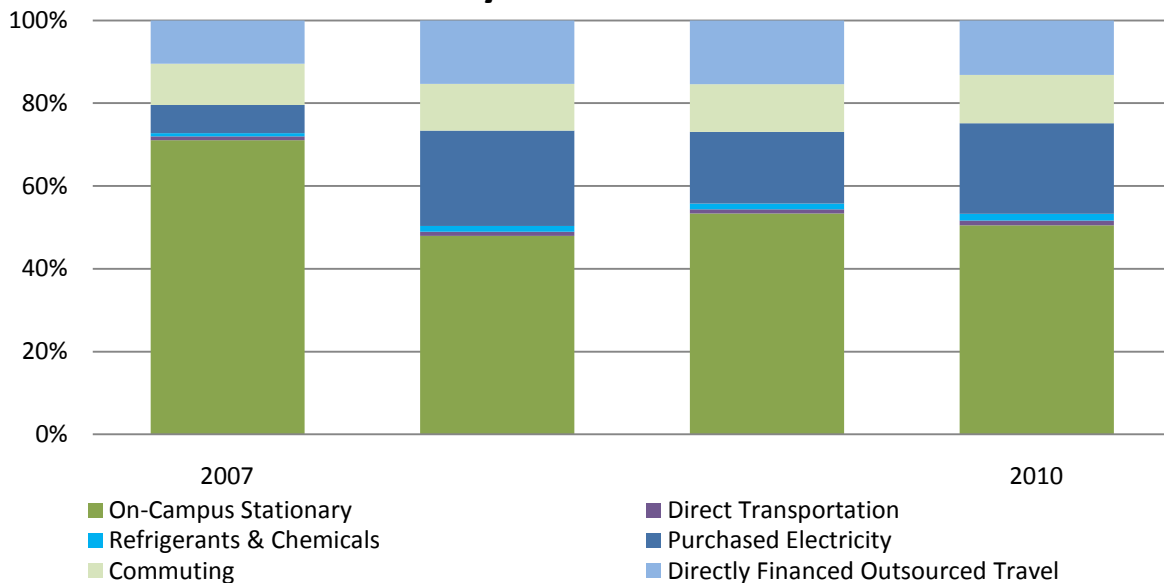
As in prior GHG inventories, the major source of Clark's greenhouse gas emissions is the fuel consumed to operate our steam heat boilers and the cogeneration plant; this sector is termed On-Campus Stationary and comprised 50% of all emissions in 2010. The second largest sector is found in the operations of the electric utility which supplies Clark's demand for electricity beyond that which is produced on-site by the cogeneration plant. This sector is termed Purchased Electricity and comprised 21% of all emissions in 2010. Other major contributors are commuting (11%) and directly financed outsourced travel, primarily air travel of faculty and staff (13%). Air travel produces a large amount of emissions due to the magnified effects of fuel combustion at high altitudes. Smaller sources of emissions included refrigerant leakage, utility-based transportation and distribution losses, and on campus transportation, all 5% or less.



Implementing the carbon management strategies of the Climate Action Plan will produce continual decreases in all recorded emitting sectors and gases. In 2010 a significant decrease in On Campus Stationary Source emissions resulted from a strategic shift in fuel used to power the steam heat boilers and the cogeneration plant from #6 fuel oil to natural gas.

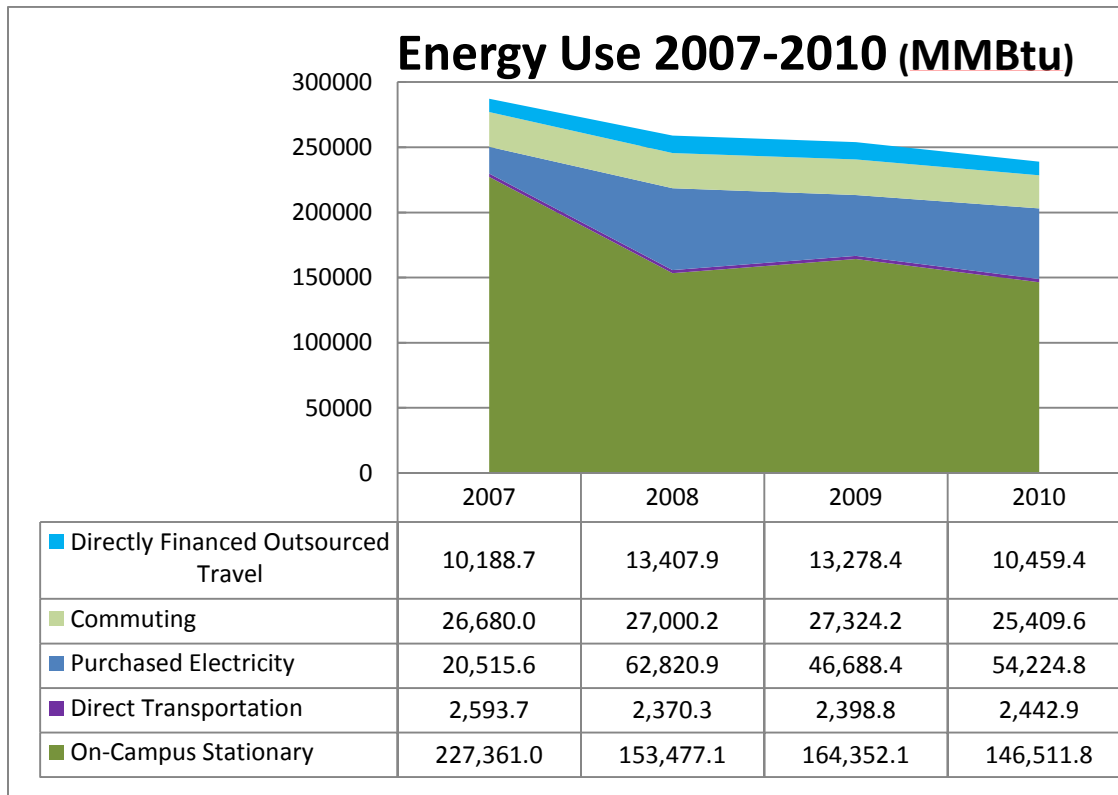
Each annual greenhouse gas inventory will also reflect year-to-year changes in weather and other uncontrollable conditions. For example, in 2010, an unforeseen failure of the cogeneration plant required that all campus electricity was purchased during the period of plant repairs. The volume of emissions from purchased electricity was 14% greater in 2010 than in 2009. (In prior years, the cogeneration facility has produced up to 90% of Clark's electricity needs; in 2010 the cogeneration plant supplied 65% of Clark's needs).

### % Emissions by Sector 2007-2010



## Energy Use on Campus

The goals of the Climate Action Plan are expressed in terms of metric tons of carbon dioxide equivalents (MT CO<sub>2</sub>e) and carbon footprint management strategies. As there is a direct relationship between energy used and MT CO<sub>2</sub>e produced, it can also be helpful to examine the inventory in terms of a standard unit of energy measurement, therms. This is expressed in million British thermal units, or MMBtu's. Energy management strategies such as improvements to lighting efficiency and power management systems will reduce greenhouse gas emissions as they reduce electrical use and costs. If the measured sectors are shown in therms, the same trend toward achieving Clark's interim goal of 20 percent reduction by 2015 is evident.



## Conclusion

It is clear from the 2010 data and examining the results of our annual Greenhouse Gas Inventories that Clark University is on track to meet or exceed its interim goal of reducing emissions 20 percent below 2005 levels by 2015. Additional energy management systems and a range of efficiency measures are currently being implemented or under investigation; the results of these strategic initiatives may be evident in future inventory calculations. Clark's Climate Action Plan provides a roadmap to effectively achieve our interim goal, however there is still much to be accomplished that will require the commitment and ingenuity of the entire Clark community if we are to continue to reduce our emissions and lower our footprint – all the way to climate neutrality.