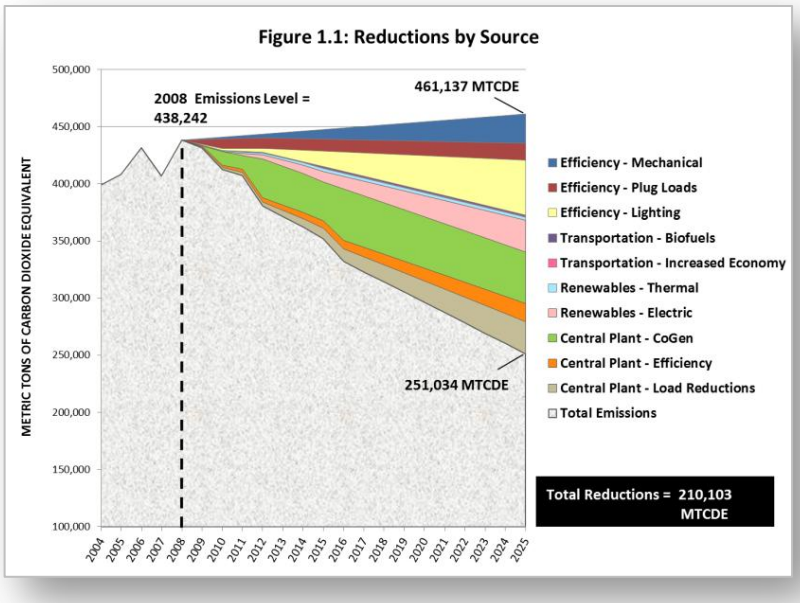
THE 2012 JOHNS HOPKINS UNIVERSITY GREENHOUSE GAS REPORT

Background

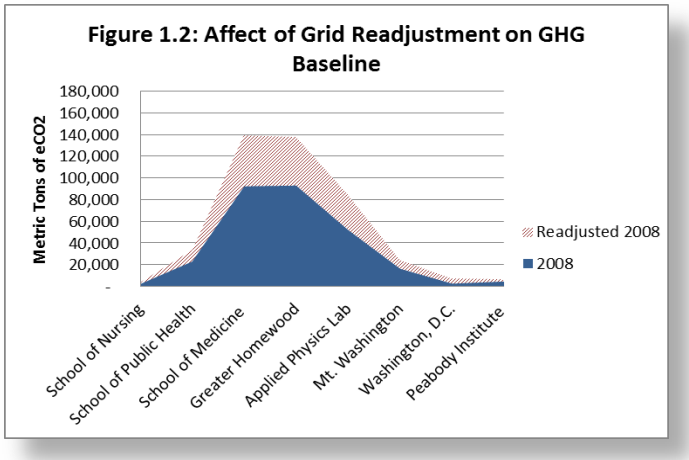
In 2008, the Task Force on Climate Change completed its task of developing a set of recommendations intended to reduce significantly the university's exposure to climate change risks over the following 15 years. The long-term strategy emphasized reducing the risks through three main strategies: (1) reduce energy consumption at the point of use through aggressive energy efficiency efforts, utilizing new technologies and pursuing streamlined operational approaches; (2) targeting fuel-switching opportunities to reduce the reliance on grid-supplied electricity; and (3) engaging building occupants through behavioral outreach and educational means to help realize energy savings.



Implementation Plan

The recommendations of the Task Force were followed in 2009 with a specific set of strategies for meeting the identified reduction goals, defined as reducing University emissions by 141,600 metric tons, or roughly 51% below expected 2025 "business as usual" levels. The Task Force had identified ten areas of opportunity – each capable of contributing a "slice" of reductions to the overall reduction target (Figure 1.1).

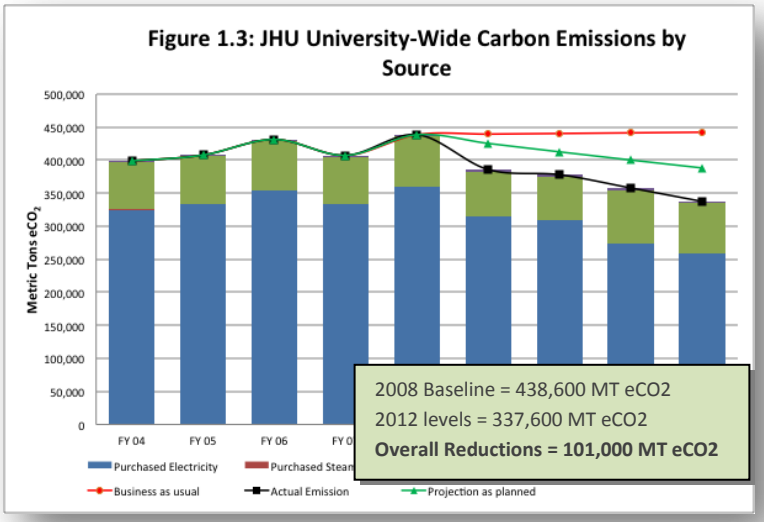
To develop the Implementation Plan, staff further examined each of these slices and populated a list of energy conservation projects (ECMs) that could be utilized. The process began with an intensive data collection phase, including university-wide benchmarking analysis and physical building audits. Staff solicited existing information from each of the divisions, and complemented that data with new analyses. Potential ECM projects were evaluated for their financial viability through a net present value (NPV) analysis that also considered their energy and carbon reductions values.



Readjusting the Baseline

Over the past few years, better data has become available from the regional electricity grid operator (PJM) that more accurately reflects

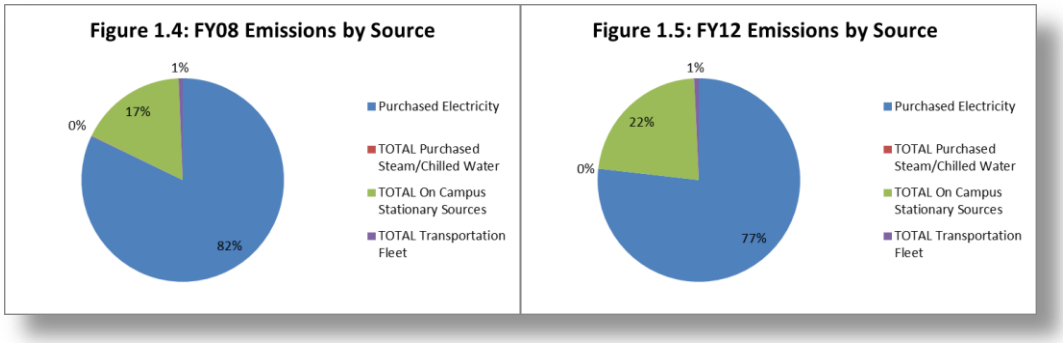
the emissions coming from electricity generators in the area. Since we purchase electricity from the grid, the changes are significant to JHU's carbon footprint. Figure 1.2 shows the readjustment of the 2008 baseline based on the more accurate PJM grid data.



Progress through First Five Years

Total Emissions

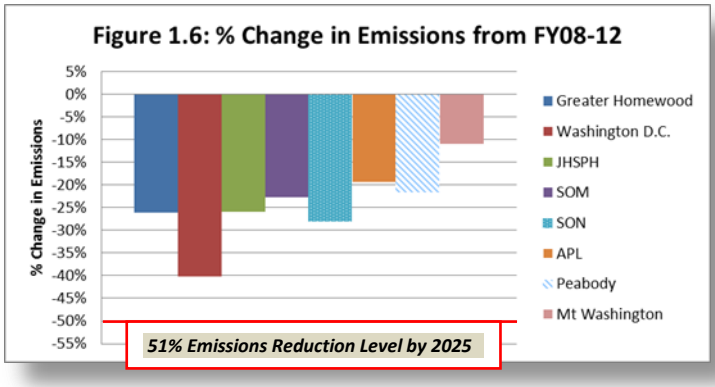
Concluding the 2012 fiscal year, university emissions were 101,000 metric tons lower than the 2008 baseline. This represents a 30% decrease in emissions, significantly below the planning trend line (the trajectory that shows whether we are on target to meet the long-term goal). The progress is the result of the aggressive energy and GHG reduction efforts on all campuses, as well as a reduction of coal used to generate electricity from the regional grid. Other emissions reductions can be contributed to the shift towards more natural gas usage instead of electricity. This shift is reflected in Figures 1.4 and 1.5 which show a decrease in the total percentage of electricity use from fiscal year 2008 to 2012.



In the last five years, the university has shifted 5% of its total energy consumption from grid-purchased electricity to natural gas. This shift is positive for JHU's overall carbon footprint because natural gas and other stationary sources are cleaner forms of energy than electricity. New co-generation facilities at Homewood and the East Baltimore campuses have had significant benefits in shifting our energy from electricity to natural gas, reflecting in our GHG levels.

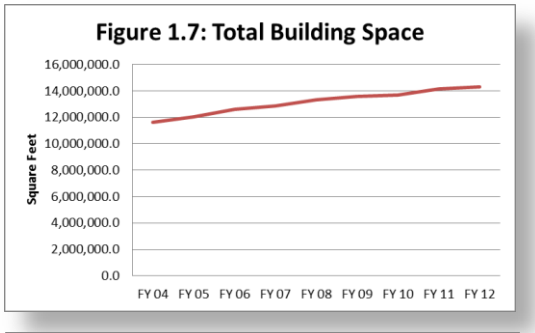
Campus Progress

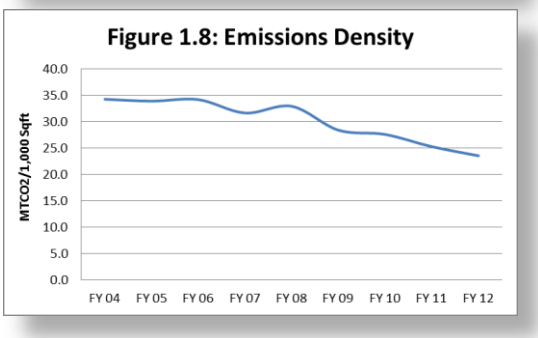
Each campus at the university has contributed to this decrease in emissions. Figure 1.6 shows each division's progress in reducing GHG emissions as a total percentage from the 2008 baseline.



According to the figure, each campus is trending positively in reducing their carbon footprint. Currently, the Washington, D.C. campus, which also includes the Montgomery County Campus numbers for the sake of

simplicity, has the highest percentage of emissions reductions at 40%. As of fiscal year 2012, the Mt. Washington campus has had the smallest percentage of reductions at 11% due in large part to the addition of the new Keswick building acquired in 2011. As the building becomes fully occupied in 2013, we anticipate their numbers increasing again.

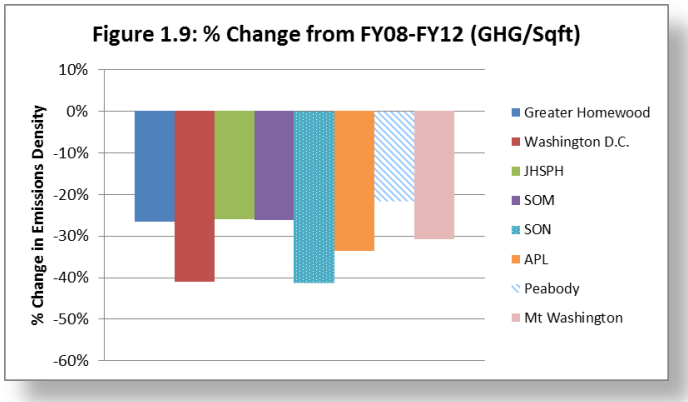




Emissions Density

Emissions reductions have occurred even while the university continued growing; since 2008, the university added more than 1 million square feet. Figure 1.7 demonstrates the growth of the university and Figure 1.8 demonstrates the decrease in emissions per 1,000 square feet over the same time period. The progress is the result of the aggressive energy and GHG reduction efforts on all campuses. New construction projects and major renovations on each campus must reach a minimum of LEED Silver certified or the Baltimore City building standard equivalent. With this standard, university project managers, engineers, and architects have become creative on how new buildings and renovations can have a smaller impact overall.

Of the eight campuses that make up the university's carbon footprint, almost all have added at least one new building since the commitment was set in 2008. Adding additional square footage to a campus creates a challenge to find ways to reduce the total emissions, but each campus continues to manage this challenge. Figure 1.9 demonstrates the individual campus' progress in emissions density from the 2008 baseline. Further detail on each of the campus' progress can be found in the individual campus spotlight reports.



Examples of Current Strategies in Process

Since 2008, the university has undertaken a number of measures to keep on schedule with carbon reductions.

- An aggressive focus on energy conservation measures has resulted in the completion of over 150 conservation projects. Working with BGE, the university was able to receive nearly $3.5 million in energy rebates, where were largely reinvested in further energy savings measures. These measures reduced an estimated 10,000 MT eCO_2.
- A new cogeneration facility at the Homewood campus, at the cost of $8 million, displaces 25 million kWh that would otherwise come from the regional electricity grid, accounting for an additional 12,000 $MTeCO_2$.

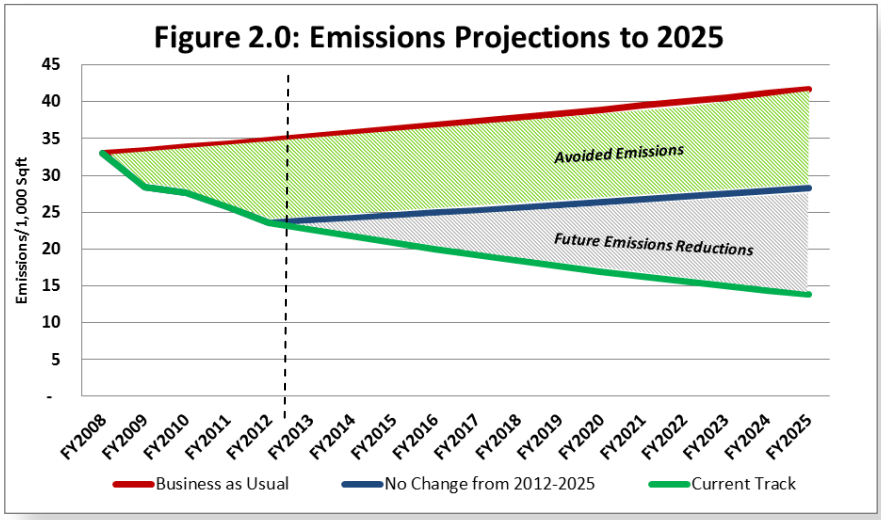
- The installation of the largest solar project in Baltimore, with solar panels on seven buildings, will displace tens of thousands of metric tons of greenhouse gases over its lifespan.
- New buildings, such as the Undergraduate Teaching Lab on the Homewood campus are designed to consume 50% less energy than comparable buildings without compromising function, comfort, or safety.
- Student activities, such as those in the Sustainable Hopkins Infrastructure Program (SHIP) have produced over $1 million in energy and resource conservation project proposals, the majority of which have been approved and are in various stages of implementation.

To learn more about other smaller projects and campus initiatives, please see our collection of sustainability initiatives.

Moving Forward

Emissions Projections and University Initiatives Through 2025

The university has made positive progress since the initial Task Force on Climate Change goal was set but there is still more to do. There are still significant opportunities to install more renewable energy, continue to make lighting upgrades, recommission buildings, and shift grid-powered electricity to on-site generation or to less polluting alternatives. Figure 2.0 designates the emissions projections to 2025. ***The red line represents a "business as usual" projection.*** This is line is based on historical data and continues the upward trend of increased energy consumption we experienced through the early part of the 2000s. This historical trend projection shows where we would be in the absence of energy and GHG reductions strategies following the 2008 commitment. ***The green line represents the university's actual emissions*** per square foot from 2008 until 2012. The green line continues past 2012 demonstrating where we will be if we continue current levels of progress. ***The blue line depicts the growth in carbon emissions if the university does not continue to actively seek ways to reduce.*** In order for the university to be successful in reaching their 2025 goal, the shaded gray area of emissions reductions must be achieved.



Financial Savings

Over the past five years, the University has invested heavily in projects to improve energy efficiency and reduce carbon emissions. While first costs are barriers to these kinds of investments, the results are often positive in the projects are implemented. Over the past five years, campuses have invested in a wide range of energy efficiency projects, many of which produced additional rebates from Baltimore Gas and Electric's (BGE) Smart Saver's rebate program.

Figure 2.1 demonstrates the amount of savings from avoided energy costs in fiscal year. The red line reflects the amount of actual energy consumed from the 2004 fiscal year through the 2012 fiscal year. The blue line demonstrates an estimated business as usual projection calculated using actual 2004 to 2008 energy levels. The distance between these two lines in reflects the theoretical energy savings coming from the combination of projects over the past five years. Based on current energy costs, the university saved an estimated $7.4 million dollars in avoided energy costs during fiscal year 2012.