University Perspective

In 2007, JHU committed to reduce its greenhouse gas emissions (GHGs) by 51% by 2025. Data was baselined at 2008. This includes emissions derived from electricity, natural gas, heating oil, and gasoline and diesel fuels consumed by university owned properties and vehicles. In addition to carbon dioxide: methane (CH4), nitrogen dioxide (N2O), and refrigerants are measured and normalized based on their global warming potentials as metric tons of carbon dioxide equivalent (MTCO2e). Grid purchased energy, electricity and natural gas, uses the local PJM emissions factors. PJM is the interconnection manager and wholesale energy market for the Northeast and North-central USA.

Raising the Profile.

The presence of “Hopkins Eco-Smart,” the umbrella of environmental sustainability efforts at Johns Hopkins University, is growing. More and more, sustainability is ingrained into processes and initiatives across the University. For the first time, the Idea Lab included a sustainability challenge alongside community and diversity. Not only is the emblematic Acorn appearing more frequently at JHU, it’s a visible seed of change in the community. In October, Johns Hopkins was a sponsor for the annual Association for the Advancement of Sustainability in Higher Education (AASHE) conference that was held in Baltimore. From workshops, panel presentations, keynotes, tabling, tours and social outings, JHU connected and empowered sustainability officers from peer institutions across the country.

Total Energy:
JHU is growing. This is seen in the building footprint, up 11% since FY08, and the total energy consumption, measured in MMBTU, up 4%. Total energy consumption is on a downward trend, dropping 3% since FY15.

Energy Density:
Given this considerable growth - by nearly 1.3M square feet - energy use per square foot tells an important story, normalizing energy consumption with growth. This highlights that JHU’s buildings are becoming more efficient, though still above the average EUI for colleges, 131 kBtu/sq ft.

Greenhouse Gas Emissions:
Even with increasing energy use, GHG emissions have been steadily decreasing, down 6.4% from FY15 and 35% from the FY08 baseline. While showing progress, when comparing effects attributed to internal efforts as opposed to grid improvements, this uncovers a need for a more robust analysis and implementation plan.

Social Cost of Emissions:
The social cost of emissions is the estimated economic cost of damages caused by climate change, such as decreased agricultural productivity, diminished human health, and property damage. Early estimates from the EPA show expected costs at $40/MTCO2e, in 2016 dollars, which is the figure we used. However, more recent studies, such as by Stanford, value carbon much higher. Stanford calculated $220/MTCO2e. This values our FY16 carbon footprint at $62,685,480.
by the numbers:

**Total Energy Consumption**
In FY08, APL consumed 409,165 MMBTU, and in FY16 it consumed 428,137 MMBTU, a 4.6% increase from baseline, but a 3% decrease from FY15. While many energy conservation measures have been undertaken, the campus has grown significantly in size since FY08, which has led to additional energy demand.

**Energy Density**
In FY16, APL consumed 173 kBTU/sq ft, following a downward trend from 209 kBTU/sq ft in FY08 and 178 kBTU/sq ft in FY15. For comparison purposes, ENERGYSTAR provides benchmarking data for EUI. APL has a mix of spaces that include technical facilities, offices, and support space. The benchmarks range from office space, with a benchmark of 67.3 kBTu/sq ft to physical laboratory facilities at about 300 kBTu/sq ft.

**Greenhouse Gas Emissions**
APL’s emissions have dropped by 31% since FY08, from 85,150 MTCO2e to 59,080 MTCO2e. This is also a 11% reduction from FY15. This is equivalent to the carbon captured by 24,678 acres of forest, or half the area of Acadia National Park.

**Waste Diversion**
APL had an estimated diversion rate of 36% in FY16, which was down slightly compared with previous years. By comparison, the average rate for the entire university was 43%.

**Domestic Water Consumption**
Domestic water consumption was approximately 69,507,000 gallons in FY16. This is over 24.5 gallons per square foot. The university consumed an estimated 316,500,000 gallons in all of its owned buildings, or about 22 gal/sq ft. With its lab intense facilities, APL accounts for about 15% of all energy use and 19% of water use.

**Rethinking Waste**
APL generates a variety of wastes. To promote diversion, they formed, the Conservation, Reuse, and Recycling Committee. From continuing their Earth Day tradition of collecting personal electronic and hazardous waste, to conducting a comprehensive assessment of bin infrastructure – determining the amount, placement, pairing and signage that will encourage participation in recycling – the CRR is connecting the mission of APL to provide “critical contributions to critical challenges with systems engineering and integration, technology research and development, and analysis,” with their day to day operations.