<u>Report Review:</u> FY2016 GHG Emissions Inventory for Loyola University Chicago

<u>Description:</u>

This report provides the results of an internal review of the FY2016 Greenhouse Gas Inventory for Loyola University Chicago. Assessment materials and findings were shared by Director of Sustainability, Aaron Durnbaugh, with the Internal Reviewers during a meeting and through digital files. The three reviewers asked questions about the process and then reviewed the materials providing their observations, critiques and recommendations for future inventories in the Summary and Comments listed below. Aaron Durnbaugh responded to comments, where appropriate, and those are included in Responses below. Overall the reviewers stated that the results are "as detailed and thorough as necessary."

<u>Internal Reviewers:</u>   Dr. Brian M. Ohsowski, Teaching Faculty at Loyola University Chicago
Expertise: Biostatistics and Restoration Ecology

Zach Waickman, MBA, Biodiesel Lab Manager at Loyola University Chicago
Expertise: Green Business Management and Alternative Fuels

Ping Jing, Ph.D., Assistant Professor at Loyola University Chicago
Expertise: Atmospheric science

Summary:

The FY2016 Greenhouse Gas (GHG) Emissions Inventory report summarizes total GHG emissions contributed by Loyola University Chicago Lakeside and satellite campuses. The calculations provided by the Director of Sustainability, Aaron Durnbaugh, relies upon the University of New Hampshire Sustainability Institute Campus Carbon Calculator. Report calculations are reported using the v9 2016 Campus Carbon Calculator. (BO)

The 2016 results provided, to the best of my knowledge, have been thoroughly researched and values supplied are up-to-date with the most accurate information available. Two overarching comments arose during the vetting process (see below). (ZW)

The 2016 results are as detailed and thorough as necessary. The 2016 results are also more complete compared to earlier annual reports by including energy use and carbon footprint from the Maywood campus. This is an important addition because medical and laboratory buildings are known to be more energy intensive than classrooms. My comments start at #8. They are more for future consideration. (PJ)

Comments:

1. In the report, previous year estimates of GHG emission rely upon a lag of information supplied by the Emissions & Generation Resource Integrated Database (eGRID). *As power grid information becomes available, are the previous year calculations of GHG emissions updated to reflect the most accurate historical emission data?*
2. *What procedures are in place to apply updates/modifications from the current calculations to previous years? Separate of new data lines, how are assumptions and factors updated on older model years to maintain a high degree of accuracy when analyzing trends?*
3. The inclusion of trees and compost have been included in the carbon offset calculations. *How are these values calculated? How are trees defined in these offsets? What carbon sequestration*

calculations are used to calculate these values? Are all natural landscapes included in these offset values?

4. A portion of the Cuneo Campus is slated for sale, but the trees on that portion of the property are included in carbon offset calculations. *What is the timing of that sale? If completed, how can those trees be removed from the offset calculation?*

5. Emissions of sewer water is accounted for the Lakeside campuses, but Cuneo and LUREC are on septic systems. *What (if any) metric are available to account for septic system emissions*?

6. Travel, specifically air travel, is accounted for in numerous LUC accounting codes: 6302 (development/fund raising), 6303 (instruction/program travel, includes athletics), 6310 (professional development/meetings/conferences), 6314 (recruiting, including athletics (student)), and 6315 (recruiting, including athletics (faculty/staff)). *Is air travel in all of these accounts included in the current calculations? If not, what process can be put in place to include them both going forward and in past GHG calculations?*

7. Student travel is not included in calculations for LUREC and Cuneo campuses. *Is there campus specific data available, or data derived from our average student travel profile that could applied to these campuses?*

8. The carbon intensity at Maywood in 2016 was 24.93, which is much higher than 14.88 and 16.92 of Lakeshore and Maywood, respectively. *I wonder how it looks like when compared with the national average medical buildings.* Adding Maywood may make our target of carbon reduction more challenging to reach.

9. *Has LUC divested from fossil fuels? How do Loyola's financial choices affect the carbon footprint?*

10. I didn't see in the spreadsheets the results normalized by weather conditions (HDD and CDD).

RESPONSES (AD)

1. As shared with the Internal Reviewers, this year's inventory uses the most up to date eGRID data (2014 release) and this informs the 2014-16 information. **One step that I will take is confirm that 2008 baseline is using the most accurate information available, as this is what we use for comparisons. This will be implemented for the FY17 inventory.**

2. While I see the interest in updating old inventories, I think it is only realistic (and meaningful) to update our baseline (2008) and the immediately previous year (in this case 2015). These are the only ones we use for comparisons.

3. We use actual tree counts by size class for the three campuses (LSC, LUREC, Cuneo) with significant urban forests. Sequestration rates are estimated using two methods and we take the mean of these estimates. One estimate is the average sequestration of a single tree in the City of Chicago (UFORE, 2007) and the other is the North Carolina State University Carbon Calculator (http://www.carboncalculator.ncsu.edu/). Natural landscapes, ornamental, turf or soils are not included. This estimate of annual carbon sequestration is an opportunity for improved and ongoing data input if faculty and students are interested in supporting this work.

4. The status of the Cuneo property is "as of" FY2016. **We will consider future changes to the property in future inventories.**

5. The role of septic systems in contributing greenhouse gases for the purpose of this inventory is considered to be "de minimus", however, this could be a useful project for faculty or students to consider and would certainly improve future data collection.

6. Included in this summary is 6302, 6303 and 6310. It is a worthwhile suggestion to include the 6314 and 6315 and we will make a note to include this in the data request for FY2017.

7. In considering our overall inventory, this information is "de minimus". Regarding those campuses specifically, we do have survey data for students responding that their primary campus is "Cuneo" and this could be calculated if of interest. No students have LUREC as a primary campus.

8. This is a good point and consistent with the findings of research intensive facilities using more energy resources. We are aware of the outsized impact that adding Health Sciences campus will have on our targets. To be clear, our goal for Carbon Neutrality is for the Lakeside Campuses only. A Climate Action Plan for the LUREC, Cuneo, or Health Sciences campuses may be a future development if the Loyola community is interested in taking action.

9. Loyola has not divested from fossil fuels. This action would not have an impact to our tracking of our greenhouse gas inventory. In some reporting this can be included in Scope 3 emissions, however this is not the standard or practice in higher education.

10. Heating and Cooling Degree Days are not used in the standard greenhouse gas emissions calculations. The two standard normalizing factors are area and full time student equivalents. Heating and Cooling Degree Days can be used to normalize GHG emissions if they are estimated for their impact on the specific actions (usually energy necessary for heating and cooling). We show HDD&CDD Days, as well as other normalizing factors, to suggest other variables. In past years we have demonstrated GHG emissions normalized by HDD&CDD Days but this is always clearly labelled as such with accompanying assumptions.

I would like to thank the three reviewers for their thoughtful review and helpful comments. I have bolded the actions in my response above.