Community-Based Research Project: Reducing Campus GHG Emissions

[Note: This project was assigned in the course Practicum in Sustainability – Reducing Dickinson's Carbon Footprint, taught by Neil Leary in fall 2012 at Dickinson College. It is a semester long community-based research project that accounted for half of students' grades.]

SUST 301 is a Service Learning course that features a community-based research (CBR) project in which students work together as a consulting team to assist Dickinson College in meeting its climate neutrality commitment. Community-based research is a form of research that is collaborative between a community and a team of researchers and serves a need of the community. For our CBR project, the community that we will serve is the Dickinson College community, collaborating primarily with the Office of Campus Operations. The need that we will fill is the collection, analysis, and communication of information to help support decision-making by College officers about greenhouse gas (GHG) emission reduction strategies. Participation in this authentic problem-solving project will help students attain course learning goals.

Early in the semester our consulting team (i.e. our class) will meet with employees of the Office of Campus Operations to learn the college's information needs for facilitating decision-making about greenhouse gas emission reductions and to discuss how we can help. Desired outcomes of the meeting are a shared understanding of the college's needs, a tentative list of research topics, and a set of questions to be researched under each topic.

Following the meeting with college staff, research topics will be assigned to members of the team. Over the course of the semester, each team member will prepare and submit a research plan, a progress report, a draft report, and a final report, and will present her/his findings and recommendations. In addition, the consulting team will discuss, synthesize, agree and present priority recommendations of the entire team. The individual and team presentations will be made at a forum at the end of the semester that will include members of the President's Commission on Environmental Sustainability (PCES) and be open to the entire Dickinson community.

Team members will share their research plans with relevant staff of the Office of Campus Operations and other members of the Dickinson community for feedback, and are expected to make adjustments to their plans as needed. Relevant stakeholders and experts, both on- and off-campus, should be consulted for information and guidance, and apprised of progress during the conduct of the research. Each stakeholder and expert consulted should receive a copy of your research plan, progress report, draft report and final report.

Examples of possible research topics:

- Combined Heat & Power (CHP) using renewable energy source
- Solar PV expansion
- Solar thermal
- Geothermal
- Biogas production using food waste at farm
- Waste Vegetable Oil (WVO) – technical and market issues for expanding use of WVO in central energy plant
- Behavioral changes – residence halls, academic buildings, administrative buildings
- Lucid energy dashboard – how can we use data from energy monitoring systems to motivate behavior change
- Policies for new residence hall
- Employee commuting
- Building retrofits or recommissioning
- Air travel – carbon offsets

- Biddle Field house – research best practices for high performing athletic field houses, feasibility of 'net-zero' field house
- CO2 capture for Algae farm

Each component of the research project is described below. Collectively they will account for 50% of your course grade. A rubric describing how the project will be evaluated will be provided on Moodle. Read it – often! Due dates for each component of the project, and point values out of 100 total possible, are as follows (dates subject to change):

- Sep 14: Research plan (5 points)
- Oct 31: Progress report (5 points)
- Nov 16: Draft report (10 points)
- Dec 7: Individual and team presentations (5 points each)
- Dec 15: Final report (70 points)

Research plan: the research plan should include a project title; a description of the research problem or question to be investigated; statement of how outcomes of the research project are expected to be used for the benefit of the Dickinson community; summary of the types of information to be collected; description of the analysis to be performed; a bibliography of printed and online resources to be used in the research; and a list of stakeholders and experts to be consulted during the research.

Progress report: the progress report should provide a brief summary of work completed to date, including summaries of information collected, analyses performed, consultations with stakeholders and experts, and challenges to be overcome. It should also include an updated bibliography. The progress report, not including the bibliography, should be roughly 2 pages.

Draft report: the draft report should be as complete as possible. A complete report would include the following: a statement of the research problem and why it is important; summary of what Dickinson has already done to limit emissions in your topic area; summary of consultations with stakeholders and experts and how these consultations informed your work; description of option(s) analyzed; description of criteria used to evaluate options and methods of analysis; results of analysis; recommendations; and bibliography.

Final report: the final report should include all the elements noted for the draft report. The report should be written in a style and quality consistent with that of a professional consultant's report. It should be at least 10 pages long and no more than 15 pages, not including the bibliography (11 pt font, 1 inch margins, 1.5 line spacing).

Team presentation: all members of the class will collaborate to agree on a prioritized set of recommendations, prepare a presentation of the joint recommendations and justifications, make a 20 minute presentation to the Dickinson community and PCES, and respond to questions. Not every student must present, but each student must have a role in the team presentation. It is up to the team to decide how to assign tasks for the team presentation. Each member will write a 1-paragraph description of his/her contribution to the team presentation; the paragraphs will be compiled into a single document to be shared with all members of the team.

Individual presentation: Each student will present the findings and recommendations of her/his research at an open forum at the end of the semester. Presentations will be 10 minutes, to be followed by 5 minutes of discussion with the audience.