

Full Course Title: Sierra Club: *The Environmental and Energy Impacts of Plug-in Electric Vehicles.*

Course Title for Registration System: Sierra Club: *The Environmental and Energy Impacts of Plug-in Electric Vehicles.*

Course Number: SIPAU9000.034

Faculty Advisor: Ion Bogdan Vasi

Columbia Email Address:

Credits: 3

Course Overview:

Brief description of client:

This capstone workshop will assist Sierra Club's campaign to promote electric vehicles. The main goal is to understand the environmental and energy impacts of plug-in electric vehicles in different regions of the United States.

The market for electric vehicles (EVs) is currently small but will probably grow fast. President Barack Obama's administration aims to have 1 million EVs on the road by 2015, while a Bloomberg report estimates that plug-in electric vehicles will rise to 1.5 million in the U.S. by 2020. Research thus far has made clear that electric vehicles are cleaner overall than gasoline powered vehicles in nearly all, if not all, parts of the country, regardless of the source of electric power in any particular electric grid (with cleaner grids leading to cleaner charging of electric vehicles, but nearly all EVs being cleaner than nearly all gasoline powered vehicles). However, regional maps about electricity and emissions are thus far only broken down into 10 to 26 regions at the most. What no one has yet done is to break down electricity emissions (CO₂ and other harmful emissions) further by city or county or state and then make much more specific "well to wheels" comparisons among electric vehicles, plug-in hybrid electric vehicles, hybrid electric vehicles, and traditional gasoline powered vehicles in each given city/county/state. This information, added to oil savings, will be a valuable addition to the researchers, consumers, government agencies, and corporations interested in automobiles, electricity, petroleum reduction, and the environment.

Summary of project (one paragraph):

The estimated growth of the EV market raises two important questions: 1) what are the impacts on the EVs for the environment? 2) what are the impacts of the EVs for the electric grid? This capstone seminar for SIPA students in the Energy and Environment concentration will address these questions. The client for the seminar is Sierra Club, which has recently launched a *Go Electric* campaign to promote a switch to electric vehicles as one important way to reduce emissions and dependence on oil.

Deliverables to client:

Students will produce high-resolution maps of the electricity mix in the United States, which will inform potential EV owners, government agencies, corporations, and others about the environmental consequences of using electricity versus gasoline for transportation. Students will also create recommendations for utilities and local governments to promote off-peak charging as well as increased opportunities to rely on renewable and more efficient sources of power.

Special skills/knowledge needed by team members:

Experience using the ArcGIS system for managing solutions through the application of geographic knowledge is preferred.

Initial meeting(s) with your student team in early December, if applicable: TBD

Dates for meetings with client, if already scheduled):

Field component (if applicable – e.g., travel to Washington DC, interviews in NYC – you must secure approval from Dan McIntyre if you expect to travel outside of NYC]

Student selection: [All eligible students may apply for up to three workshops through a special online application process in late October / early November. Assignment of students will be coordinated by the Office of Faculty and Curriculum, and relevant faculty will be consulted about team membership for their workshop(s).]

Grading (students receive an individual grade): [Here is a sample for grading determination – please specify to students how their grade will be determined]

Grades for the workshop will be based on the following criteria:

Quality of individual written work (10%)

Quality of participation in class, Peer review (20%)

Feedback from the client (20%)

Overall professionalism, including timeliness, ability to work with team, etc. (20%)

Quality of team's final report and briefing (30%)

Readings: [Please indicate if there will be readings. Note if they will be available **for purchase** in the bookstore on reserve in the library. If readings are on reserve in the library, the instructor will need to provide the library with a clean photocopy at least two weeks before the beginning of class); on Courseworks (clean photocopy will have to be given to electronic reserves **at least** two weeks before class); in a course reading pack at the IAB copy center. For more details, please consult:

http://sipa.columbia.edu/resources_services/faculty_curriculum/handbooks.html

***Academic Integrity Statement*:** [The statement below *must* appear on all syllabi.]:

The School of International & Public Affairs does not tolerate cheating and/or plagiarism in any form. Those students who violate the Code of Academic & Professional Conduct will be subject to the Dean's Disciplinary Procedures. Cut and paste the following link into your browser to view the Code of Academic & Professional Conduct online.

http://sipa.columbia.edu/resources_services/student_affairs/academic_policies/deans_discipline_policy.html

Please familiarize yourself with the proper methods of citation and attribution. The School provides some useful resources online; we strongly encourage you to familiarize yourself with these various styles before conducting your research:

http://sipa.columbia.edu/resources_services/student_affairs/academic_policies/code_of_conduct.html

Violations of the Code of Academic & Professional Conduct should be reported to the Associate Dean for Student Affairs.