ESM 271 Carbon Footprints and Carbon Accounting

Instructor: Sangwon Suh
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Course hours: Tuesday, Thurs, 1:00pm – 2:15pm
Oct 27th – Dec. 1

Course credit: 2 credit

Course location: Bren 1510

Final exam: No final exam. Carbon footprint report is the final evaluation

Assessment:

Homework (2 X @15%):	30%
Presentation (group work):	30%
Report (group work):	40%

Office hours: Tuesday 10:30-11:30am, Wednesday 10-11am.

Course schedule

Week 1: Introduction to carbon accounting

- Scope 1, 2, 3 emissions
- Standards and protocols for organizational, supply-chain and product footprinting

Introduction to the GHG report (group project)

Reading material: WRI/WBCSD Corporate GHG protocol (Standard: http://www.ghgprotocol.org/files/ghgp/public/ghg-protocol-revised.pdf).

Homework 1 (due by Nov 5th):

(a) Form a group of up to 5 students. Each group will be assigned to one of the following 5 groups.

Group#	Scope		Examples
1	1	Fuel-related emissions	Natural gas combustion, on-site fuel combustion, gas combustion for vehicle operation
2		Non-fuel emissions / sinks	Refrigerant leakages, land use and land use change, biological sequestration
3	2	Electric utility-related emissions	Electricity use
4	3	Faculty air travel	Flights used by Bren faculty
5		All other scope 3	Employee committing, purchased goods and services, capital goods, non-flight faculty travel such as ground and lodging, meals

(b) Contact relevant people including Sage Davis, Kim Fugate, and Jordan Sager, schedule a meeting, and acquire necessary data for Bren School's carbon footprint. You will need to figure out what information you will need to complete your task. Bren school is your CLIENT.
(c) Assess the quality of the data that you acquired in terms of e.g., (1) relevance, (2) completeness, (3) consistency, (4) transparency, and (5) accuracy.
(d) Submit a 2-page progress report describing the following:
    a. Meeting date and attendees.
    b. Data requested and acquired.
    c. Your assessment of the data quality.
    d. Describe your methodology to calculate the emissions assigned to your group: include how you would like to draw the boundary, how the data acquired will be used, what allocation method, if any will be applied, what emission factors to be used, etc.

Week 2: Scope 1&2 emissions

- How to calculate scope 1 emissions
- eGRID
- Additional data for different technologies
- Consequential thinking
- Process flow diagram

Week 3: Scope 1 and 2 emission calculation in practice. Guest lecture by Jordan Sager, UCSB Department: Physical Facilities

Homework 2 (due by Nov 10): A progress report that describes the first draft calculation of GHG emissions of the client (up to 5 pages). Include

- Description of the client
- Background and objective
- Boundary setting
- Data, methodology and factors used
- Results

Week 4: Scope 3 emissions

- Introduction to GHG protocol categories

Week 5: Interpretation, validation, and verification of the carbon footprint results

- Identification of hotspots
- Envisaging the effect of changes
- Identification of effective strategies to reduce carbon footprint
- Sensitivity analysis
- Uncertainties

Week 6 (Nov 29th Dec 1st): 15 min presentation + 5 min discussion of the project. Describe the methodology, main results, and interpretation of the results, and discuss how the analysis can be improved.

Final report due Dec 8th. Maximum 20 pages including all the references. Include the items in HW2. In addition discuss:

- Interpretation of the results (key contributors in terms of the fuel type, gas type, and/or input type, and the quality of the results using the criteria used in HW1).
- Limitations, future improvement opportunities/future research.
- Discuss the target areas to reduce client's GHG emissions.