

Group Project Proposal

EGR 305. Engineering Systems Economics and Optimization

Department of Civil and Environmental Engineering

Duke University

due: 4pm 2019-10-17 in the EGR305 IN-box in Room 118 Hudson

Follow the requirements listed in the [syllabus](#).

For this project proposal, you are asked to work with your group to merge parts of your individual project pre-proposals into a single group project proposal. Group assignments were based on a grouping of common topics in your pre-proposals and are listed on the next page. Share your pre-proposals with your team member(s), identify your common or overlapping threads of interest, and synthesize these interests into a decision-oriented project question.

The project should involve the use of at least three of the following broad methods covered in class:

1. Cost-Benefit Analysis: Cash-Flow, Tradeoffs Over Time, Discounting, NPV, etc.
2. Market Analysis: Supply-Demand in Public Projects, Consumer Surplus, Market Failures, Externalities, Public Goods, etc.
3. Economics of the Firm: Cost and Production, Economies of Scale, Pricing Strategies, Allocation of Resources, etc.
4. Engineering Risk Analysis: Probability and Uncertainty, Decision Trees, Influence Diagrams, Value of Information, Probabilistic Modeling / Monte Carlo Simulation, etc.
5. Risk Based Decision Making: Risk Perception and Attitude, Utility Functions, Risk Premium, etc.
6. Non-Monetary and Multi-Attribute Valuation: Health and Safety, Value of Life, Ecosystem Services, Contingent Valuation, Multiattribute Value Analysis/Tradeoff Weights, etc.
7. Life Cycle Analysis: Energy Analysis, Material Analysis, Carbon Footprint, Industrial Ecology, Sustainability, etc.

As in the pre-proposal, describe a workplan for addressing your project topic. Describe the elements of the decision (be specific) that you plan to address, the decision alternatives you plan to consider, and the major considerations for judging the decision outcome. Be clear about which of the three broad methods above you expect to employ. List seven references (news articles, journal papers, technical reports). All projects should also consider the practicalities, intangibles, and ethics involved in the decision. The full proposal should be about two single-spaced pages.

Project results will be presented in the form of a poster and a brief supporting report.

Project Themes and Teams

- carbon tax and renewables at institutional and national scales:
Jade Grimes, Zoe McDonald, Alex Week
- service projects with sustainable effects:
Rachael Lau, Kate White
- renewable energy:
Marco Gonzales, Renata Starostka
- sustainability: Camden Ford, Sarah Mosier, Carolyn Rossman
- regional transportation infrastructure (light rail, highway, rapid rail):
Caroline Heitmann, Benjamin Lawrence, Vivian Qi
- is recycling worth it?
Kemunto Okindo, Amanda Cabot, Evan LaCombe

Non-exhaustive list of generic candidate topics.

- Should [federal or state department] have built the [infrastructure project]?
- Should [county department or regional utility] adopt [an alternative to] [current method of service]?
- What is a fair price for trading rights to eject [pollutant] into the [ecosystem]?
- What can be done to reduce [natural hazard impacts] in [region]?
- How can [organization's procedures] be made more sustainable?
- What should be done about [industry's] pollution in [region]?

Five elements of the proposal grading rubric: 5=A+, 4=A, 3=B, 2=C, 1=D

- name, course, date
- specific decision clearly stated as a question and a list of possible alternative decisions
- three methods to be employed
- seven references
- references listed in a standard format, not only a web-link, e.g.,
Author, "Title," *Journal*, *Book*, *Website*, volume, pages, year published or date retrieved,