

Assignment 4: Environmental Case Study

Geo 9 2007
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You have been asked by a top executive (VP of Strategic Planning) at a Fortune 500 company to prepare a talk and a written 'brief' on an environmental question of great economic, political, and social impact. You will give this brief to your boss and a panel of 40 of your co-workers. Being the environmental scientist on staff, you are given a team of experts to work with, a meagre research budget (\$49,352.00), and a short deadline to complete this project. In a few weeks you will be expected to present a pre-review outline of your project, a 5-10 minute group oral presentation, and a 3 page brief on the topic. In your pre-review outline, you will be asked to supply a list of the references you propose to use, as well as a 'general' article on your talk that will be appropriate for your peers to read in anticipation of your briefing. Your oral presentation will consist of ~5 powerpoint slides, none of which will have typed-in text on them.

In putting together this brief, you are acutely aware that your boss already knows a lot about this topic, and has very limited time. Co-workers who attend your briefing will have already read a general article on the topic. Thus you will need to be succinct, you will need to skip generalizations and general overviews, and you will need to back your points up solidly. The VP will want to know, as succinctly as possible, what new ideas and proposals you generate, and what your proposed solutions/assessments are. You know you must be prepared to defend your assessments of your environmental case studies, and to do so with quantitative scientific, economic, and/or engineering data.

General suggestions: Be very specific in your briefing. Give specific examples when describing effects, patterns, processes, etc. Don't generalize. Cite references and sources throughout. Avoid emotional, political, social (e.g., NIMBY) and other rationales and arguments. Avoid editorial references. In your briefs, don't present general information about the topic. Don't demonstrate your knowledge of the subject if it is peripheral to the topic at hand. Below are some hints to help you get you started organizing your briefing. By no means should these be viewed as encompassing all of the aspects of your case study. Nor should the be viewed as encompassing the most important aspects of your case study. In the process of working on your case study, you will likely identify these aspects.

Brief:

- bullet points
- skip the English-paper treatment
- write it like a proposal
- reference it – presume the VP won't believe a single unreferenced or un
- fonts, borders

Figures separate (i.e., not included in 3 pages)

References separate (i.e., not included in 3 pages)

- can be augmented or changed later
- peer-reviewed
- government, agency reports (and I don't mean "The Sierra Club" or "The Cato Institute", "The Heritage Foundation" "or other such nonscientific, politically driven agencies)

Presentation:

Bad Slides:

- lots of text on them
- small images
- pixelated images
- dpi too small (scanning: 300 dpi)
- scanning (descreen)

Good Slides:

- support your oral presentation
- don't replace oral portion of briefing

1. MA Wind Power – Blowing wind out the Kennedy’s and Bush’s arses?

Your case study question: Presuming that market conditions and material costs remain the same as they are today, under what scientific and environmental circumstances is wind power a viable energy generation strategy for Massachusetts?

Hints: In addressing this topic, you may wish to assess what specific regions are appropriate for wind-power. What type(s) of turbines and arrays are needed to optimize harvesting of wind there? How much energy can be generated? At what cost? How long will implementing this take? What scientific roadblocks exist in this process? What environmental hazards will result from the installation of these resources? Estimate the scope and nature of environmental hazards that will result from the usage and maintenance of these resources.

2. CA Wind Power – Enough about the stalled turbines and dead birds!

Your case study question: Presuming that market conditions and material costs remain the same as they are today, under what scientific and environmental circumstances is wind power a viable energy generation strategy for California?

Hints: What new areas are appropriate for wind-power? What existing windfields are ripe for turbine/field replacements and overhaul? What type(s) of turbines and arrays are needed to optimize harvesting of wind there? How much energy can be generated? At what cost? How long will implementing this take? What scientific roadblocks exist in this process? What environmental hazards will result from the installation of these resources? Estimate the scope and nature of environmental hazards that will result from the usage and maintenance of these resources.

3. Fuel Cell Cars – Big oil’s “environmental” scam?

Your case study question: Under what scientific and environmental circumstances, if any, will fuel cell cars be practical to utilize in U.S. society?

Hints: In considering this issue, you may wish to assess the environmental impact(s) of fuel cell cars. You may wish to include analyses of fuel cell (i.e., hydrogen) sources, fuel distribution networks, and car production.

4. Biodiesel Vehicles – Big ag’s “environmental” scam?

Your case study question: Under what scientific and environmental circumstances, if any, will fuel cell cars be practical to utilize in U.S. society?

Hints: In considering this issue, you may wish to assess the environmental impact(s) of fuel cell cars. You may wish to include analyses of fuel cell (i.e., hydrogen) sources, fuel distribution networks, and car production.

5. Photovoltaics – Fueling hippie shacks out in the woods?

Your case study question: Presuming that market conditions and material costs remain the same as they are today, under what scientific and environmental circumstances are photovoltaic arrays a viable energy generation strategy for Amherst College?

Hints: In addressing this issue, you may wish to assess what the college’s capacity is for implementing photovoltaic arrays, where they might be sited, what types of arrays are available or emerging in 2008 (NOT in future years), and the cost-benefit analysis

of such arrays given current usage, transmission and conversion losses, and related factors.

6. China's Sea Level Impact: From killing miners to acidifying the oceans?

Your case study question: Presuming that China continues expanding its economy and its usage of fossil fuels, what will be the effects of this growth on global sea level in the year 2100 and beyond?

Hints: You may wish to evaluate the different predictions for the country's usage of fossil fuels over the 21st century. What are the extreme, moderate, and conservative estimates? The latter may presume a linear growth in line with today's trajectory, followed by slowed growth and possibly plateauing of energy needs. What is the mix of hydrocarbon resources available within the country, and what resources are being imported from elsewhere? Integrate these into IPCC-type global climate models and determine sea level rise scenarios due *only* to this country's impact in the year 2100 and 2200. Overlapping these onto the sea level rises already predicted based on fossil fuel usage elsewhere, what regions will be most affected by the growth of this emerging economy? Are the greatest effects due to thermal effects of water expansion, or to other factors?

7. India's Sea Level Impact: Outsourcing the demise of Bangladesh?

Your case study question: Presuming that China continues expanding its economy and its usage of fossil fuels, what will be the effects of this growth on global sea level in the year 2100 and beyond?

Hints: You may wish to evaluate the different predictions for the country's usage of fossil fuels over the 21st century. What are the extreme, moderate, and conservative estimates? The latter may presume a linear growth in line with today's trajectory, followed by slowed growth and possibly plateauing of energy needs. What is the mix of hydrocarbon resources available within the country, and what resources are being imported from elsewhere? Integrate these into IPCC-type global climate models and determine sea level rise scenarios due *only* to this country's impact in the year 2100 and 2200. Overlapping these onto the sea level rises already predicted based on fossil fuel usage elsewhere, what regions will be most affected by the growth of this emerging economy? Are the greatest effects due to thermal effects of water expansion, or to other factors?

8. Middle East Hydrocarbons: Fueling the US & Russian defense industry?

Your case study question: Presuming that usage continues at present levels, what will the environmental impact be of consuming most of the remaining hydrocarbons in the Middle East during the remainder of this century?

Hints: What types of hydrocarbons are present, in what quantities, and how easy will they be to extract? How does transportation and refining impact your assessment? How are they used and by whom? How easy are they to extract? You may wish to use one or two countries (other than Saudi Arabia) as "case studies" to illustrate your points, because there are such varied resources available within the two major oil-producing regions of the Middle East.

9. ANWR Hydrocarbons: Caribou killers or fueling China's growth?

Your case study question: What will be the environmental impact of extracting and using the hydrocarbon resources of the ANWR during the remainder of this century?

Hints: Consider exploration, extraction, transportation, refining, and usage impacts of these hydrocarbons. What types of hydrocarbons are present, in what quantities, and how easy will they be to extract? How are they used and by whom? How easy are they to extract? You may wish to use the North Slope in formulating your estimates for the ANWR region.

10. Arctic Hydrocarbons: Sucking oil from amidst polar bears?

Your case study question: What will be the environmental impact of extracting and using hydrocarbon resources in the Arctic Ocean?

Hints: Consider exploration, extraction, transportation, refining, and usage impacts of these hydrocarbons. What types of hydrocarbons are present, in what quantities, and how easy will they be to extract? Are there any hydrocarbons currently being extracted in the Arctic Ocean (i.e., not on land, using directional drilling of the seafloor)? How will these resources be used and by whom? How easy are they to extract? What is the quantity, location, type(s) of hydrocarbons in the Arctic Ocean? When will drilling likely proceed and under what conditions?

DUE DATES:

Outline: October 31st

References: November 7th

<u>Topic</u>	<u>PPT Slides Due</u>	<u>Oral Presentation & Brief</u>
Hydrocarbons (Middle East, ANWR, Arctic)	Nov 12	Nov 14
Sea Level Impacts: China & India	Nov 16	Nov 26
'Green' Vehicles: Fuel Cell & Biodiesel	Nov 26	Nov 28
Photovoltaics	Nov 26	Dec 5
Wind Energy: MA & CA	Nov 26	Dec 10