VERMONT SUMMER PROGRAM
2019 TERM 4 1:00 to 4:00 pm--afternoon session
July 22-August 3, 2019

OIL AND GAS: PRODUCTION, PIPELINES AND THE ENVIRONMENT

by
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DAY 1:

Come to class with the following information, legibly written on an index card or piece of paper:

- ***Your name, including any nickname you prefer to go by. Give first and last name only***
- ***Your home state or country***
- ***Your home law school***
- ***Your career goal, if known already***
- ***Your undergraduate university and degree(s) with your major field of study***
- ***Any work or practice experience that you have had to date, in any field***
- ***Any special goal that you have for this course or reason for taking it***

Topic 1: The Future of the Energy Industry in an Era of Globalization and Climate Change (first half of class).

In advance of class:

Visit this BP link for an artistic, two-minute overview of BP's energy outlook through 2040: https://www.bp.com/en/global/corporate/energy-economics/energy-outlook/videos.html#animation. What two technologies pop up briefly at the end as solutions to "more energy, less carbon?" Then, scroll to the BP video on reducing carbon emissions (50 seconds long!) at https://www.bp.com/en/global/corporate/energy-economics/energy-outlook/videos.html#carbon-emissions-video. BP's Evolving Transition (ET) scenario projects the path the world will likely follow. BP's Rapid Transition (RT) path to zero carbon emissions aligns with the Paris Agreement goal of keeping global temperature from rising more than 2 degrees (or 1.5 degrees to be on the safe side). Then go to the actual BP Energy Outlook 2019 posted at https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/energy-outlook/bp-energy-outlook-2019.pdf and **read pp. 56-67 on Carbon Emissions**. Will the world meet the Paris goal? Compared to its 2018 Outlook, what factors caused the greatest revisions to BP's 2019 Outlook?

BP's Evolving Transition projection of future energy supply and demand is similar to that of other major oil companies and gov't agencies, such as the US Energy Information Administration (EIA) and the Int'l Energy Agency: a consensus forecast of the most likely future.

ExxonMobil (XOM) states in its Energy Outlooks that it uses its projections of the future as the basis of its current business decisions. After reading the selected pages of XOM's 2018 Outlook (indicated below), prepare the answer to this question as **MEMO 1,** due in hard copy on the first class day:

**** * * Memo 1: Some investment analysts warn that citizens and pension funds should not invest in the stocks of oil companies because their assets (which consist largely of proved petroleum reserves in the ground that are economically profitable to recover and produce) will be "stranded" by 2040; that is, these assets will have no value because the world has moved beyond petroleum. XOM (and others) argue to the contrary.***

Question: Why do XOM (and other major oil companies) think that their reserves will not be stranded because of climate change policies? Memo 1 is your answer to this question, due in hard copy at the start of Day 1.

Before writing your Memo 1 answer, go to ExxonMobil's website and open its 2018 Outlook at: **http://cdn.exxonmobil.com/~/media/global/files/outlook-for-energy/2018/2018-outlook-for-energy.pdf,** also posted as **TWEN Item 1-1.** Look at the following pages as background for writing Memo 1:

- P.13. How dependent is the world expected to be on oil, gas and coal in 2040? _____.
- P. 26 on renewables in electricity generation. Note the difference between capacity and utilization. What game-changing technology could alter this projection?
- Pp. 30-31. What is the main driver of increasing carbon emissions? _____What is the main driver decreasing such emissions? _____
- P. 35. What are the projected sources of future world liquids supply? What is "tight oil?" What are "NGLs?" Note that "biofuels" is not the same as "biomass" in XOM's Outlook. Biofuels are advanced technology fuels like ethanol or oil from algae. Are other regions of the world expected to produce tight oil by 2040 to compete with North America? _____
- P. 12 and p. 19: Has global electricity generation shifted away from coal by 2040? ____ Do households still use wood and animal dung (biomass) for heating and cooking? Where in the world does energy demand surge? ____
- P. 36. Is the world running out of recoverable petroleum resources? If all investment in new drilling stopped, what happens to global liquids supplies by 2040? _____
- P. 39. What countries depend on importing gas by pipeline or by LNG tanker? Has North America become a gas exporter? ____ Is Europe free of gas imported from Russia? ____Geopolitics plays an important role here.
- Pp. 42-43: Are EVs (electric vehicles) a game changer by 2040 in this sensitivity analysis? What is the 100% EV impact on carbon emissions, electricity demand, and natgas demand? _____

- Pp. 48-50. Pursuing a 2 degree pathway. XOM compares 13 models of 2 degree scenarios that project the energy mix in 2040. What energy sources will the world use by 2040 if it follows a 2 degree path? Are oil and gas still in the mix? ____[1]

TWEN Item 1-2: Shell Energy Scenarios to 2050: **Scramble v. Blueprints** (selected pages only). Shell's energy scenarios are purposefully quite different from the typical energy outlooks written by other oil companies or by governments. Rather, the scenarios tell stories, presented as narratives, about possible future paths, based on input from many political schools of thought and from experts in the social sciences, world religions, climate change, and socio-economic trends around the globe (such as rising inequality). This Item 1-2 compares the Scramble path scenario with the Blueprint path. **Read only these pages of the report (citations are to page numbers at the bottom of the report): Foreword on p. 4; Introduction pp. 6-8; pp. 13-15; 20-22; and 25-37**.

This Shell report was written in 2008-2009, before the global financial crisis was in full effect. Oil prices were soaring and it seemed that the world would be short of oil forever. Shell's previous scenario had focused on the effect of 9/11 (the World Trade Center attacks) and the corporate financial scandals of Enron and other large corporations that had seriously tarnished the image of capitalism and free markets. This earlier scenario portrayed three global paths: (1) "Flags" (rising nationalism, closing borders to free flows of labor, capital and technology); (2) "Open Doors" (the opposite of Flags--an embrace of globalization and markets as bringing economic development); and (3) "Low-Trust Globalization" (globalization is inevitable, but is not trusted). The "Scramble" path in the Scenario you are reading represents a Flags approach to solving global energy issues, and the Blueprints path takes a collaborative "Open Doors" approach to such issues, especially climate change.

I will show a Powerpoint that covers the broader geopolitical issues and trends in energy that affect world energy markets today, using material from these three sources and others. We will then discuss in class:

- What implications do the ExxonMobil, BP and Shell future outlooks have for US national energy policy? Do you strongly disagree with any of these projections? Why? What would alter the long-term trends?
- Do you think the consensus forecasts by ExxonMobil, BP and others is BAU (Business as Usual) --an evolutionary change over the next 20+ years, or a revolutionary change?
- What geopolitical events have transpired that you would characterize as evidencing the world is heading down the Scramble versus Blueprint path?

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[1] ***Optional:*** A critical assessment by Carbon Tracker of ExxonMobil's position that it can manage the risk of future carbon policies appears at http://www.carbontracker.org/in-the-media/exxon-is-business-as-normal-the-right-strategy/, titled "Response to Exxon: An Analytical Perspective (2014)." The authors think XOM is discounting the risks with an over-optimistic view of the future role of hydrocarbons. CarbonTracker has released a report "2 Degrees of Separation: Transition Risk for Upstream Oil and Gas in a Low Carbon World," which assesses the risks to 69 oil companies of stranded assets in a scenario that posits countries adopt policies to assure earth's temperature does not rise more than 2 degrees. Will governments actually implement policies that achieve this 2 degree goal? What do the XOM and BP outlooks imply?

Day 1: (continued) 2d half of class

In the Coursepack: EEE4: "Oil and Gas Chapter 4."

- **Pp. 132-151 (20 pp**) covering terminology,[2] the oil and gas business, early history, and the oil and gas lease.
- Time permitting, we will answer the questions on page 151 (but no Memo required). Who knows what a DUC is?
- **TWEN Item 2** is a list of facts about the upstream oil industry. Have a guess at the number of wells drilled in the US/North America in the past 150 years before looking at this item! Read these pages with a cup of coffee sometime during this course.
- **TWEN Item 3** is a typical oil and gas lease used for decades in the U.S. Most case law precedent involving disputes between Lessees and Lessors derived from a lease like this one. More recent leases used in shale plays may have different language for certain provisions, but the basic property right remains the same. For example, several months often pass between the time a well is drilled and the time it is completed (fractured). Suppose the primary term of a lease ends after the well is drilled, but not completed; what will happen to the lease, absent a modification?
- **TWEN Item 4:** The federal OCS lease is even shorter (a mere 3 ½ pages), but it is also a fee simple determinable. Find the provisions that make it so..

[2] A good glossary of terms used the oil and gas is available at: **http://www.eia.gov/tools/glossary/.** Look up terms that you do not understand as you read. And, be sure to ask in class if I use a term that you do not understand.