ENRG3310: Introduction to Energy and Sustainability

Midterm II

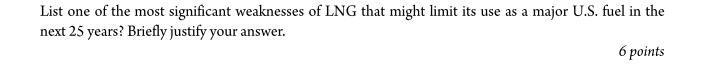
Prof. Joseph A. Pratt & Prof. Ognjen Š. Miljanić

October 31, 2013

Name:			Student ID	Student ID Number:	
	Last	First			
		Total n	umber of points is 200.		
COAL-1.	—20 points According to the El	IA, what are coal's lon	g-term prospects in the U.S.? In the world?	4 points	
		that will have to be used in a carbon-constr	solved before carbon capture and storage crained world?	an be used to make	
				4 points	
	What has been the	impact of the shale ga	s revolution on the key market for coal in th	e U.S.? 2 points	
				2 points	
	List one of the mos 25 years? Briefly jus	-	ses of coal that might limit its use as a major	U.S. fuel in the next	
	,	, ,		10 points	
	BONUS: Name the	e largest coal producir	ng basin in the U.S.		
	OIL—20 points				
2.	Define "easy oil".			2 points	
	According to Yergin	n, has the production	2		
		YES	NO	2 points	

According to Deborah Gordon, which general category of fuel is most likely to replace easy oil if globa markets alone shape energy use in the future?				
	2 points			
Which three examples did the lecture use to illustrate important types of "broadening" of the of easy or conventional oil?	production			
(1)	3 points			
(2)				
(3)				
Which region led the world in the production of easy oil from 1901 to the 1950s?				
	1 point			
List one of the most significant weaknesses of easy oil that might limit its use as a major U.S. fue next 25 years? Briefly justify your answer.				
next 23 years: Drieny justiny your answer.	10 points			
BONUS: What is the name of the largest developed oil field in the world?				
UNCONVENTIONAL OIL—20 points				
3. How do the analyses of Yergin and Gordon differ on the environmental impacts of oil sands?				
	2 points			
Define "proved reserves" of oil.				
	2 points			
Making use of Gordon's article, define unconventional oil?	3 points			

Lis	ist three factors cited in class lectures that shape the future of unconventional oil.	
	(1)	3 points
	(2)	
	(3)	
	ist one of the most significant weaknesses of unconventional oil that might limit its use as a mastel in the next 25 years? Briefly justify your answer.	ajor U.S. 10 points
BONUS: V	What is the concluding argument in "The Key to Keystone"?	
UNCON	VENTIONAL NATURAL GAS—20 points	
4. W	Tho is generally regarded as the father of modern fracking? What role did government play?	2 points
	That is the opinion of the author of "Bonanza" about the prospects for quick development of sutside the U.S.?	shale gas
Ou	aside the 0.0	2 points
	est one of the most significant weaknesses of shale gas that might limit its use as a major U.S. fuext 25 years? Briefly justify your answer.	ıel in the
		6 points
In	the past LNG prices generally have been closely tied to the price of which other fuel?	2 points
W.	That does "Bonanza" predict as the "probable" way gas prices will be set in twenty years?	2 points



BONUS: Which nation was the world's largest exporter of LNG in 2011?

FUTURE OF FOSSIL FUELS—20 points, if necessary, use the back of this page

5. Assume that climate change is miraculously solved tomorrow morning. Which fuel (coal, oil, or natural gas) do you think will be the dominant fossil fuel in U.S. markets in 2050? Why? Be sure to cite the most significant strengths of the fuel you choose. (Note: Include unconventional oil and gas in the general categories of oil and natural gas).

20 points

6.	Describe, in as much detail as you can, how is nuclear energy produced: what is the fuel, how do we get energy out of it, how much do we need of the fuel, what are the health and environmental consequences of using this fuel and technology.
	25 points
7.	In 2000, China consumed 7 million barrels of oil per day, with the annual growth of 7.5%. The United States consumed about 21 million barrels per day, increasing by about 1.4% annually. If these rates hold, how long will it be before China overtakes the United States in oil consumption?
	30 points

8.	Succinctly define, in your own words, the following concepts:	4×5 points = 20 points
	Critical Mass (in nuclear reactions)	+^3 points = 20 points
	Pumped Storage	
	Diesel Fuel	
	Kilowatt-hour (kWh)	
9.	What causes acid rains and what are their consequences? Be very specific in your fuels cause acid rain, how, what are the consequences of these rains, and how ominimized.	
10.	What causes nitrogen oxides (NOx) emissions and what are their consequences? answer: describe which fuels cause NOx emissions, how and when, what are the emissions, and how can they be minimized.	