**EAS 375**

**Fossil Fuels, Energy and Society**

**Fall 2012**

**Final Questions**

1. Many conscience people truly believe that we can break our dependence on foreign oil by quickly developing alternative energy sources, such as biofuels, wind, and solar energy. **What are basic fallacies in this believe that we can easily replace our dependence on foreign oil by using alternative energy sources?**

A completely transition from fossil fuels to renewable energy is hard to execute. The renewable energy presented several challenges that needed to be addressed in implementation.

* Biofuel: current agricultural land is not sufficient for both transportation fuel and food. Farm production is slow.
* Solar power is not economically viable. It costs significantly higher. Its low efficiency and considerable investments in both land and technology prevent it from being a viable choice.
* Wind power have challenges in both construction and maintenance.
* Nuclear power is too dangerous and it will produce disposal radioactive waste.
* The fossil fuel is easy for transportation and utilization, and now it is a major part of the economy.

2. Coal powered generation produces about 50% of our electrical needs in the United States, but there a number of environmental consequences associated with the use of coal. While past legislative efforts were designed to reduced air pollution have been successful, they have also resulted in a number of unintended environmental consequences, such as mountain top mining. There are environmental groups that want to stop the building of any new coal generation plants and shutdown existing plants. Proponents of the coal-powered generation maintain that the new “clean coal” technologies will address and virtually coal pollution problems. The mantra of the anti-coal movement is “there is not such thing as clean coal.” **Will clean coal technologies solve the problems of pollution and supply the needed electrical energy that will need in the future? In answering this question, discuss the positive and negative aspects of clean coal power plants.**

No. Although it has some positive effects such as:.... it still suffers from several issues.

Positive:

* enhance the efficiency of coal use
* enhance the environmental acceptability of coal extraction, preparation and use.

Negative:

* only some of the pollutants are removed. Still, a large amount of CO2 are emitted into the atmosphere, and lots of solid waste must be handled.
* Coal is not just dirty to burn. It is also dirty to mine. The process of extraction of coal such as mountain top mining and strip mining is harmful to environment.
* Clean coal is more expensive to use compared to traditional coal. So there won’t be a large market to clean coal to replace the traditional coal.

3. New technologies in the natural gas industry have shown that tight shale gas in the United States will provide enough natural gas to last until the end of the 21st century and has dramatically changed the energy equation. It is also clear that natural gas from tight shales will have a major affect on the global energy markets and geopolitical relations between producing and consuming nations. **Discuss how this new source of natural gas will affect transportation and electrical generation needs in the United States**

* increase use of natural gas for transportation will reduce oil imports
* Natural gas will account for larger portion of electricity generation in the future

**How it will lessen our dependence on imported oil.**

* production of unconventional gas, especially shale, has increased sharply over the last several years, in terms of annual production and economically recoverable reserves
* Tight shale production reduces need for energy from Middle East and other foreign exporters
* It will reduce sales and income for exporting nations. Exporting nations need to rethink the future of their resources and look for new markets

**Environmental:**

* shale drilling has some environmental impacts such as affecting water quality and producing chemically contaminated waste water.

4. If we begin to close or prevent the construction of new coal generation plants, we will not be able to meet our increasing demand for electricity by 2020. Most people believe that green power will be able to meet our future electrical needs; however, this is clearly not possible in the near future. To bridge this gap between demand and supply of electricity, the only practical alternative is nuclear power. Unfortunately, many people consider nuclear power unacceptable because of perceived dangers from nuclear accidents, terrorist activities, and the disposal radioactive waste. **Discuss the new technologies that are currently being developed to reduce accidents and disposal of radioactive waste.**

The use of fast breeder reactor

-use more enriched fuel

-produce less trans-uranic waste

-Can be used to destroy high level nuclear waste

-Expensive

On site storage (submergence)

-Keep spent fuel rods under water for it to the reactive materials to decompose and to cool down (10-12 years)

Vitrification

-Transforms waste into glass

Can bury low level radioactive waste

High level radioactive waste

-Geological disposal (In the mountain basin)

-Reprocess waste into non-toxic forms

5. It is clear that we will continue to use fossil fuels for locomotion and power generation in near the future, but we will be able to reduce our dependence on fuels as we gradually transition to alternative energy sources during the 21st century. We are going to face a number of hurtles as we make the transition to alternative energy sources. **Discuss how we might address these hurtles and how we might best address the environmental impacts as we make this transition.** Remember all alternative energy technologies have some environmental impact.

> Personal attitude towards energy production and transition from fossil fuels to alternative energy sources

> Government needs to compromise and solve the problems with people or groups with extreme environmentally based attitude (Greenpeace, etc) to make sure that all the energy projects go well

> Improve the efficient use of energy, and develop and improve alternative energy technologies.

> The development of renewable energy technologies requires other natural resourves as well, such as land. At present 99% of our food supply comes from land. The availability of land is holding back the transition to alternative energy.=>efficient use of land and develop new technologies to produce food and reduce its dependence on land.

6. *[WENYU]* For the last 40 years, we have been told that the United States is on the precipice of a catastrophic oil crisis and that changes were going to have to make to reduce our dependence on foreign oil. The only things that have changed since the 1970’s have been our continued increase in oil consumption and the failure of the government to develop any practical solutions to solve our oil consumption problems. **Why has the federal government fail to address the problem of increasing oil consumption?** When the federal government did pass laws to address oil consumption in the 1960’s and 1970’s, it was not to control consumption oil, but to protect the U.S. consumer from high gasoline prices and to keep the voters happy. These attempts by the federal government to control the price and production of oil have proved to be misguided. Governmental price controls have increased, not only, our consumption of oil, but also reduce domestic exploration. **Discuss possible solution that the federal government could institute to reduce our dependence on foreign oil and overall consumption.**

**Why has the federal government fail to address the problem of increasing oil consumption?**

* Government have not taken on board the four underlying oil production factors(transportation, residential, commercial and industrial) which clearly show there is a problem.
* Government and multi-lateral agencies have failed to recognize the imminence and scale of the global oil supply crunch, and most of them remain completely unprepared for its consequences.
* For most of the past decade, the International Energy Agency held an over-confident view about future oil production.
* Government didn’t distinguish politics and industry while making energy development plans.

**Discuss possible solution that the federal government could institute to reduce our dependence on foreign oil and overall consumption.**

* Reduce our domestic use of oil by:
  + Explore conservation
  + Expand public transportation
  + Increased oil use efficiency
  + Alternative fuels
* Reduce our demand for imported oil
  + Develop more of our own domestic sources
* Develop technology to produce the unconventional oil
* Synthetic fuel -- Coal to Oil
* Oil Shale
* Biofuels

7. *[WENYU]* A great deal of research and federal funding together with federal subsidies has been directed towards the development of biofuels in order to reduce our dependence of imported oil. The media and proponents of biofuels have implied that new biofuel technologies will free us from our dependence on foreign oil and for the need for exploration for any new oil resources in North America. Biofuels are promoted as being environmentally friendly, produce green jobs, and to reduce pollution. To the public this sounds like the ideal solution to our oil problem. While the use of biofuels might reduce some of our oil imports, it will never replace oil as the primary source of transportation and will present a new environmental and social problems that are not usually discussed in the media. **Discuss the advantages and disadvantages of biofuels in solving our transportation needs.**

Concept

* Convert corn, sugar or other biomass into fuel
* Dilute or replace gasoline / diesel

Forms:

* Ethanol (Alcohol)
* Biodiesel

Advantages

* Farm economics; jobs
* reduced pollution, cleaner exhaust
* reduce trade deficit by reduce dependence on oil import, energy security

Disadvantages

* Ethanol has lower energy density than gasoline (1 Btu ethanol = .75 Btu Gasoline)
* Amount of oxygen is different, when using on current vehicles, will cause poor performance and engine component damage.
* Entire USA corn production = 24 billion gallons of Ethanol. The gasoline usage is 140 Billion Gal/year. We would also reduce our food and have nothing to eat.