LECTURE 10: SUSTAINABLE DEVELOPMENT

A. Climate change:

Scientists point to the dangers of **climate change**, in particular **global warming**. This is the rise in temperatures in the atmosphere and the sea caused by emissions of **carbon dioxide** and other **greenhouse gases** from the burning of **hydrocarbon** or **fossil fuels** such as oil and coal. Some say that the earth cannot sustain much further **industrialization**.

The **Kyoto protocol** of 1997 was designed to put the **United Nations climate change convention** into effect. This originally aimed to cut emissions to five percent below 1990 levels by 2020. Some businesses complain that these targets will increase their costs, but

See section C below.

B. Sustainability:

Sustainability is the idea that the economy should be organized in ways that can be continued without causing **irreversible damage** to the environment or **depletion** of **natural resources**. Businesses should be run not for **short-term profit**, but in a way that takes account of the **long-term interests** of society and the environment. (See also lectures 8 and 10)

Developing countries are trying to attain the living standards of the industrialized world. Some warn that, in addition to the dangers of global warming, the world's natural resources are not sufficient for this.

Others argue that renewable, non-polluting energy sources such as wind power will allow further economic growth without causing damage to the environment. Some argue that nuclear energy still has a role to play.

These are some of the issues surrounding sustainable development in the global economy.

C. The triple bottom line:

SustainAbility [1], a consultancy, says that the triple bottom line (TBL) makes corporations concentrate not just on the economic value they add, but also on the environmental and social value they add - and destroy. (See Lecture 7) The TBL is used to sum up the values, issues, and processes that companies must pay attention to in order to minimize any harm resulting from their activities and to create economic, social, and environmental value. The three lines represent society, the economy, and the environment. Society depends on the economy - and the economy depends on the global ecosystem, whose health represents the ultimate bottom line.

[1] - www.sustainability.com

10.1 ***Complete the article, which contains words from A and B opposite, with a-e below.***

Energy's future is trapped in the fossil fuel past	
In his State of the Union address, President George W. Bush proposed a $1.5bn (£900m) government research and development programme to replace the internal combustion engine with hydrogen-powered fuel cell cars. (1) ..... To be sure, the shift to fuel cells and a hydrogen economy will be as significant and far-reaching in its impact on the global economy and society as the steam engine and coal in the 19th century and the switch to the internal combustion engine and oil in the 20th century. (2) ..... Most commercial hydrogen today is extracted from natural gas but it can also be extracted front coal and oil. Even the nuclear industry has weighed in, arguing that nuclear power can be used to extract hydrogen.	The White House's enthusiasm for hydrogen suddenly becomes understandable. (3) ..... There is. however, another way to get hydrogen. Renewable sources of energy - wind, photovoltaic, hydrogen, geothermal, and biomass - can be harnessed to produce electricity and that electricity, in turn, can be used to electrolyse water, separating the hydrogen from the oxygen for storage and later use in a fuel cell. (4) ..... Why twice? Because electricity generated from renewable sources of energy cannot be effectively stored. If the sun is not shining, the wind stops blowing, or water stops flowing because of drought, electricity slops being produced and the economy stops. (5) ..... ***Financial Times.***

a. By using some of the electricity generated by renewables to electrolyse water and extract hydrogen, society obtains stored energy to use at a future date,
b. Hydrogen is the lightest, most plentiful element in the universe. When it is used to generate power, heat, and light, the only by-products are water and heat. But what Mr. Bush did not mention was that hydrogen has to be extracted from either fossil fuels or water,
c. If fossil fuels and even nuclear power can be harnessed to produce hydrogen, the Bush administration can have its cake and eat it too.
d. While some applauded his call to create a clean, non-polluting energy source for the 21st century, many environmentalists were less enthusiastic. That is because there is both more and less to his announcement than meets the eye.
e. While this second approach frees us from fossil fuel dependency and is the solution environmentalists have dreamt of for years, it currently costs more to extract hydrogen with renewable energy. Thar is because electricity has to be generated twice, first to create the electricity to electrolyse the water and grab and store the hydrogen and then to use the hydrogen to power the fuel cell.

10.2. ***Look at the following keywords from the article and find words which can go before or after them to form 'word combinations. Two of them have been done for you as examples.***

1. generate	Electricity
2. …….....	
3. …….....	
4. …….....	

Generate	5. Electricity
	6. …….....
	7. …….....
	8. …….....

Harness	9. …….....
	10. …….....
	11. …….....

10.3. ***Over to you:*** Are you optimistic or pessimistic about the capacity of the planet for future growth? Why/Why not?