Unit 5 Energy today

Text A Energy today

Prosperity for everyone on Earth by 2050 will require a sustainable source of electricity equivalent to 3 to 5 times the commercial power currently produced. Because of the low average incomes in developing countries, however, this energy must be provided at one-tenth the present total cost per kilowatt-hour. Solar-power stations constructed on the moon from common lunar materials could provide the clean, safe, low-cost commercial electric energy needed on Earth.

Currently, commercial energy production on Earth raises concerns about pollution, safety, reliability of supply, and cost. These concerns grow as the world's nations begin to expand existing systems to power a more prosperous world. Such growth could exhaust coal, oil, and natural gas reserves in less than a century, while the production and burning of these fossil fuels pollute the biosphere. Expanding nuclear fission power would require breeder reactors, but there is intense political resistance to that idea because of concerns about proliferation, nuclear contamination of the environment, and cost. Thousands of large commercial fusion reactors are highly unlikely to be built by 2050. Terrestrial renewable systems (hydroelectric, geothermal, ocean thermal, waves, and tides) cannot dependably provide adequate power. Using wind power would require capturing one-third of the power of the low-level winds over all the continents.

Although energy coming directly to Earth from the sun is renewable, weather makes the supply variable. Very advanced technologies, such as 30 % efficient solar cells coupled with superconducting power transmission and storage, imply solar arrays that would occupy selected regions totaling 20 % of the area of the United States. Studies funded by the World Energy Council project that terrestrial solar energy will provide less than 15 % of the electric power needed for global prosperity by 2050.

EXECISE 1

Выпишите незнакомые слова и составьте словарь, аналогичный предлагаемому в предыдущих уроках.

EXECISE 2

Переведите текст и составьте по одному вопросу к каждому абзацу.

EXECISE 3

Дайте названия абзацам.

EXECISE 4

Выделите главную идею каждого абзаца и прочтите предложение, которое является главным для каждого абзаца.

EXECISE 5

Перескажите текст.

Text B Oil

In Canada, oil has been extracted from tar sands since 1978 and here the costs have dropped from $28 per barrel to just $11. For comparison the price of a barrel of oil was $27 in 2000.

The US Energy Information Agency estimates that today it will be possible to produce about 550 billion barrels of oil from tar sands and shale oil at a price below $30, i.e. that it is possible to increase the present global oil reserves by 50 percent. And it is estimated that within 25 years we can commercially exploit twice as much in oil reserves as the world's present oil reserves. Should the oil price increase to $40 per barrel we will probably be able to exploit about five times the present reserves.

The total size of shale oil resources is quite numbing. It is estimated that globally there is about 242 times more shale oil than the conventional petroleum resources. There is more than eight times more energy in shale oil than in all other energy resources combined – oil, gas, coal, peat and tar sands. This stunning amount of energy is the equivalent of our present total energy consumption for more than 5,000 years.

Consequently, there is no need for any immediate worry about running out of fossil fuels. A proportion of the fossil fuels, however, are probably only accessible at a higher price. Still, there is good reason to believe that the total energy share of our budget – even if we continue to depend solely on fossil fuels – will be dropping. Today the global price for energy constitutes less than 2 percent of the gross domestic product (GDP), and yet if we assume only a moderate continued growth in GDP this share will in all likelihood continue to drop. Even assuming truly dramatic price increases on energy of 100 percent, by the year 2030 the share of income spent on energy will have dropped slightly.

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Text C Nuclear energy

Nuclear energy constitutes six percent of global energy production and 20 percent in the countries that have nuclear power. Despite growth in Asia, the prospects for this sector spell stagnation until 2010 and a minor recession after that. This recession is mainly caused by perceived problems of security as stressed by the accidents at Three Mile Island and Chernobyl which undermined many people's confidence in this energy source.

Ordinary nuclear power exploits the energy of fission by cleaving the molecules of uranium-235 and reaping the heat energy. The energy of one gram of uranium-235 is equivalent to almost three tons of coal. Nuclear power is also a very clean energy source which, during normal operation, almost does not pollute. It produces no carbon dioxide and radioactive emissions are actually lower than the radioactivity caused by coal-fueled power plants.

At the same time nuclear power also produces waste materials that remain radioactive for many years to come (some beyond 100,000 years). This has given rise to great political debates on waste deposit placement and the reasonable of leaving future generations such an inheritance. Additionally, waste from civilian nuclear reactors can be used to produce plutonium for nuclear weapons. Consequently, the use of nuclear power in many countries also poses a potential security problem.

For the moment there is enough uranium-235 for about 100 years. However, a special type of reactor – the so-called fast-breeder reactor – can use the much more common uranium-238 which constitutes over 99 percent of all uranium. The idea is that while uranium-238 cannot be used directly in energy production it can be placed in the same reactor core with uranium-235. The uranium-235 produces energy as in ordinary reactors, while the radiation transforms uranium-238 to plutonium-239 which can then be used as new fuel for the reactor. It sounds a bit like magic, but fast-breeder reactors can actually produce more fuel than they consume. Thus it is estimated that with these reactors there will be sufficient uranium for up to 14,000 years. Unfortunately these reactors are more technologically vulnerable and they produce large amounts of plutonium that can be used for nuclear weapons production, thus adding to the security concerns.

Nuclear power, however, has barely been efficient in the production of energy and this is probably the major reason why its use has not been more widespread. It is difficult to find unequivocal estimates of the total costs since there are so many different variables that can affect the calculations, but typically the price hovers around 11-13 cents for one kilowatt-hour (kWh) in 1999 prices. This should be compared with an average energy price for fossil fuels of 6.23 cents.

In the longer run, the primary focus is no longer on fission energy but rather on fusion energy. This technology aims at fusing two hydrogen atoms into a single atom of helium. A single gram of fuel can develop the same energy as 45 barrels of oil. Fuel comes basically from ordinary sea water and thus supply is virtually infinite. Moreover, there will be very little radioactive waste or emissions. However, fusion demands astronomical temperatures and despite investments above $20 billion we have still only managed to achieve 10 percent of the laser power necessary for producing energy. Consequently it is supposed that fusion energy will be commercially available only after 2030 or perhaps only well into the twenty-second century.

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