CAN SUN POWER BE USED?

Hold out your hand towards a sunbeam. It feels warm, does it not? No wonder, for only a little more than eight minutes ago it left the sun's surface whose temperature is about 6000°C. In that short period of time it has travelled about 93 million miles on its way to the earth in order to light your room, to cause the trees to grow, to produce wind energy and to create a lot of irreplaceable and wonderful things.

The energy the earth constantly receives from solar radiation is about 35,000 times the annual energy consumption of mankind. However, only a minute part of it is being utilized so far. As a matter of fact, the conversion of solar radiation directly into electric power by some efficient means has been the aim of Ukrainian and foreign scientists, inventors, and engineers for at least one hundred years.



Sun energy can be employed on the one hand directly as heat for space heating, water heating and certain other purposes and on the other hand it might be utilized for the production of electricity. In the latter case, the electric current can be obtained as follows: 1) by using fuel for thermal power plants since the sun is known to be the primary source of all energy stored in fuel; 2) by heating boilers or air heaters in thermal power plants with sunbeams concentrated by collectors; 3) by converting radiation into electric voltage by means of thermocouples or photovoltaic cells.

Generally speaking, sun energy can be utilized in the form of falling or running water. The heat of the sun annually



evaporates millions of tons of water from the oceans, seas, and rivers, lifting it high into the air. The water vapour is then carried away to various parts of the earth where some of it falls as rain, the latter (now, water again) in its turn flowing into rivers and back into oceans. Provided we construct a dam across the river, we create a reservoir, a so-called man-made sea. From the reservoir or the water-fall water may be directed to the hydroelectric station which houses the turbines, the generators as well as other suitable and necessary equipment. The force of the falling water rotates the blades of the turbine, the latter driving the electric generator. In this manner, the mechanical energy of running water, sometimes called white coal, is turned into electrical energy. However, we have just observed it to receive its power from the sun. For want of space it is impossible to mention here all our achievements in this important field of science.

Of course, scientists all over the world will continue to look for ways and means of making more efficient semiconductors. At the same time, they will do their best to find new methods of converting sun energy directly into electricity. Who knows, you or a friend of yours will perhaps be the one to come out with the best possible answer to the problem under consideration.

Active Words and Expressions

blade – турбінна лопать
boiler– обігрівач
consumption– споживання
to feel – відчувати
for want of – з-за нестачі
radiation – радіація
receive – одержувати
sunbeam – сонячне проміння
space– космос
thermal power station – ТЕС

to grow – вирощувати
to hold out– утримувати
in this manner– таким чином
wonderful– чудовий
man-made – штучний
a lot of– багато

Answer the following questions

1. Where is used the coal from the mines?
2. Where is used the energy of the waterfalls?
3. Where is used the energy of the wind?
4. Where is used the energy of the tides of the sea?
5. Where is used the energy of the sun?

Exercises

1.Translate the following sentences:

1. It is not difficult to distinguish the properties of a solid from those of a gas. *2.* It takes more heat to warm a large container than it is required to warm a small one. 3. When a vapour becomes completely evaporated it is said to be dry. 4. If vapour is superheated, it behaves as a gas. 5. The flow of current interested scientists for a long time; at first they thought it to be a liquid. 6. It is the sun that is an unlimited source of energy. 7. A wind-driven rotor is constructed in such a way that the wind blowing upon it makes it rotate.

2. Translate the following questions and answer them:

1. Яка температура поверхні сонця? 2. Скільки сонячної енергії отримує людство? 3. Чи можна безпосередньо використовувати сонячну енергію? 4. Як можна отримати електрику від сонця? 5. Як можна створити штучне море? 6. Де встановлюють сонячні батареї? 7. Над якою проблемою працюють науковці всього світу?

3.Continue the sentences according to the text:

1. The energy the earth constantly receives from …
2. The conversion of solar radiation directly …

3. Sun energy can be employed on …
4. … and rivers, lifting it high into the air.
5. The water vapour is then carried away …
6. The force of the falling water rotates …
7. … is turned into electrical energy.
8. Scientists all over the world …

4. Put *some, any, no* or their derivatives into each gap.

1. Have you …relations? — No, I haven't .., I have …relations. 2. Has she…nephews or nieces? — She has … nephews. 3. She has …sisters, she has only brothers. 4. Do you know…about Chinese art? 5. They have …cousins in Kyiv. 6. Have you … brothers? - No, I haven't .., I have …brothers. 7. I have …good friends. 8. We didn't know…about his problems: he told us … 9. Have you got …interesting books? 10. Have you …friends in Britain? 11. He has…English books in his bookcase. 12. Did you meet …on your way to school? 13. Have you got …pencils in your bag? 14. Do we have…chalk on the blackboard?

SOLAR POWER

The sun is our most important source of energy, by far. It warms the earth's atmosphere, vaporizes water from the oceans, and drives the resulting clouds by means of winds to the continents, where they cause rains and livers. These drench the thirst of people, animals and of plants, which draw their energy directly from the sun and pass it on to us when we eat them. That has been going on since prehistoric times. Now it can do a little more, it could provide all the energy

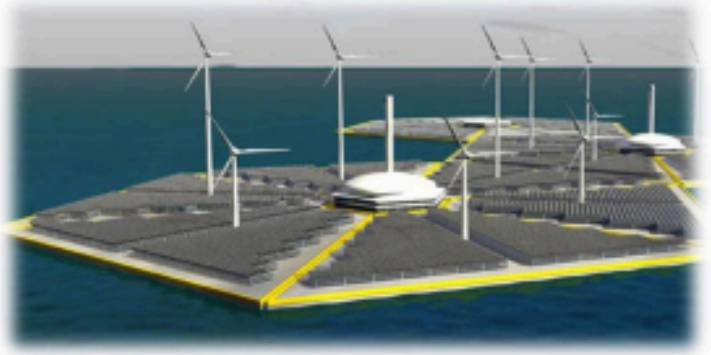


needed by a modem industrial society worldwide for the indefinite future; which no "conventional" energy source could do. It could do it easily, without the pollution and hazards associated with those exhaustible sources. Most people still would like that, especially if they knew that it can be done profitably.

They are not supposed to be aware of that, and a major effort is expended to make them believe that it would require economic sacrifices rather than benefits.

In the 1970s, there was widespread enthusiasm, and a genuine grassroots movement emerged in the U. S. in anticipation of an imminent transition to an economy based on the solar sources of energy that came in the wake of the first "oil shock" and boycott (1973). There are some, who fear a transition to solar power, and they are very powerful and determined. Instead of being confined to a few small "niche markets", new solar technologies could easily have supplied a double-digit percentage of energy used by now. All that we maintained at the time was that it could be very substantial starting profitably almost immediately. It is the prime example of confluence, rather than conflict, of environmental and economic wellness. It is essential for sustainable development worldwide, i. e. also in industrial countries. The main key to serious direct solar energy is that the sunlight first be focused, concentrated.

Inexpensive, high-grade focusing devices could have been available by easy mass-production in the 70s.



There have been problems associated with solar progress. Of those generally cited, some are real, some phony. The former can induce easy rejection or a search for solutions or ways to bypass the problems. An example for direct solar energy (SE) is that the sun does not always shine even in California. There are various ways to tackle that problem. A claim made that SE is more dangerous than nuclear fission power, because installers fall of ladders, is a good example of the phony kind. That is not to say that working for SE cannot be dangerous.

Some aspects of SE constitute a problem for some but a boon to others. Probably the main example cited as problem is its "diffuse" nature. To the extent that means that the sun shines on every field and roof, rather than concentrating its blessings onto where only giant regional utilities and polluting energy companies tied to them have access to it, it can be an advantage for many more people than associated with those companies.

Without first concentrating the sunlight, however, it would really be too diffuse for important uses such as solar (absorption) cooling, thermal electricity generation or substantial cost-effective photovoltaic power. That explains the special hostility to availability of inexpensive concentrators by those in control. It could have led to major solar proliferation long ago.

Active Words and Expressions

deliberate - добре обміркований
obstruction - перешкода
drench - зрошувати
pollution- забруднення
profitably - прибутково
sacrifice -жертва
genuine- істинний
anticipation - очікування
imminent -неухильний
grassroots - база, початок
to confine - обмежувати
niche markets – ринкові ніші
phony- фальшивий
boon - благо
diffuse - неуважний