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The buildings in which we live, work, and play protect us from nature's extremes, yet they also affect our health and environment in countless ways. Constructing, operating, and maintaining buildings involve large amounts of energy. More than 90% of that energy is supplied by fossil fuels such as oil, coal and natural gas. Using the energy, mainly from burning fossil fuels leads to emission of carbon dioxide (CO₂), the most widespread greenhouse gas. Extra greenhouse gases we are putting into the atmosphere are causing global warming and climate change.

Buildings account for:

- 39 percent of total energy use;
- 68 percent of total electricity consumption;
- 38 percent of the carbon dioxide emissions.

Apparently, reducing the energy use of buildings is fundamental to the effort to slow the pace of global climate change.

The practice of using healthier and more energy-efficient models of design, construction and maintenance is called sustainable or "green" building. Sustainable buildings are designed to reduce the overall impact of the built environment by:

- Efficient use of energy, water, and other resources;
- Protecting occupant health and improving employee productivity;
- Reducing waste, pollution and environmental degradation.

The concept of sustainable building can be traced to the energy crisis in the US in 1970s. 1979 is identified as a year when yearly supplies of oil per head of global population reached its peak. As a result, renewable sources of energy received serious attention.

Special notice here is given to energy of the sun. The sun provides more energy in an hour than all the coal mines and oil wells do in a year. This energy is limitless and pollution free. Currently there are several methods of using solar energy in buildings. These methods are aimed at reducing the energy needs of buildings and increasing their ability to generate their own energy.

The first method is using solar hot water systems. It is the most cost-effective method of using solar energy. It can provide more than 50% of the energy need for hot water. The systems are simply composed of solar heat col-

lectors where a fluid is heated by the sun and pumped to a tank, where it heats water for hot water use. Solar heat collectors sit on the rooftops of buildings.

The second method is converting energy of the sun into electricity. Solar electricity is produced with photovoltaic (PV) cells. PV panels installed on the roof during the day absorb sunlight and create solar energy. This is then converted into standard household electricity. The cost of the cell is high though it is very effective in providing energy to small, remote villages.

The third method is passive solar heating. It does not require electrical or mechanical equipment, and may rely on the design of the house. For instance, a building can be partly heated by the sun directly through the windows. This requires that the building is oriented to face the equator and has larger windows on the southern side. Good insulation should be used as well to reduce heat loss.

The fourth method is called "daylighting". Daylighting is the practice of using windows, light tubes, and other means to bring daylight into a building interior. A tube lined with highly reflective material leads the light rays through a building, starting from an entrance-point located on its roof or one of its outer walls. The entrance point has the function of collecting and reflecting as much sunlight as possible into the tube.

There are examples of sustainable building all over the world. The plus energy "Sun Ship" in Freiburg, utilizes the most up-to-date building technology. Some aspects that make this building particularly unique are its vacuum insulated walls, photovoltaic panels on the roof, office spaces entirely flanked with windows. It's minimized energy use and maximized energy generation makes possible that the building produces more energy than uses and therefore brings actual profit. The Co-operative Insurance Tower is the second-tallest building in Manchester, England. The tower has three of its four sides completely clad in photovoltaic cells. But since the building is huge it only provides 10% of required energy. The first house partially powered by solar energy in Belarus is situated in Minsk. The building has solar panels installed on its roof. The panels are under hardened glass; neither rains nor hailstorms nor winds can affect them. The system costs approximately 28 million rubles (\$9,300). It is cost-effective with payback period about five years. The solar panels have a minimum expected life of 20 years, with the capacity guaranteed to lose 10 or 15 percent in 15 years.

Solar energy is the ultimate power source, since everything on the earth owes its existence to the sun. As we reach the end of oil reserves, deal with the problematic concerns of global warming and pollution, solar energy gains prominence. The described above methods provide solar technologies that can be integrated in building design. If each of these is employed in a regular home the cost savings in the long term will be huge, as will the reduction of environmental impact through lower electricity usage.