HYDROELECTRIC JUNIOR

The water cycle, generated by the sun, which determines the evaporation of water, the formation of clouds and the consequent precipitation, offers man an extraordinary source of renewable energy, second only to biomass. There are two mechanisms to draw energy from fresh water: water wheels and hydroelectric power plants. The former produce mechanical energy, the latter electricity. Water is an energy source that offers numerous advantages: it is abundant, renewable and clean. Moreover, it has an efficiency of over 80% in the production of electricity. It is also possible to harness energy from salt water, exploiting the energy of the movement of water (waves, tides, and currents) and thermal energy (heating of water bodies) by creating artificial basins and equipment that exploits temperature differences. However, these technologies are not well developed yet and in some cases have only just been experimented.

Both Greeks and Romans used water mills to grind wheat. In France, close to Arles, an important port that supplied wheat to Rome, some water mills with eight wheels have been found, that simultaneously exploited the same watercourse (310 B.C.). The use of hydroelectric power spread throughout Europe in the 12th and 13th century. The birth of water turbines, which date back to the end of the 19th century, offered the possibility of harnessing the electrical energy developed by water. Modern hydroelectric power stations today are formed by five elements: a system to collect water, penstocks, a turbine, a generator and a system to control and regulate the water flow. The collection system mainly consists of a barrage or a dam. Once collected, the water passes through sturdy penstocks, reaches the turbines and spins their blades rapidly. The turbines are connected to a generator that converts mechanical energy into electrical energy. Once exploited, the water returns to its natural course without having been modified in its characteristics. Today it is possible to harness power also from the sea, exploiting at least five kinds of energy that are present: in currents, waves, tides, tidal streams and in the thermal gradient between the depths and the surface of the sea