

# Technologies to assist in the energy transition to the next century

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<https://www.cambridge.org/core/journals/mrs-energy-and-sustainability/article/technologies-to-assist-in-the-energy-transition-to-the-next-century/E6133136FC2EBCFF5C1A4C1C70E7F258>

**So far, we have seen humanity destroy the Earth.**

Removal of the upper fertile soil layer, mining, extensive agriculture and dense buildings very much destroy the primary crust of the earth's surface in which groundwater was formed in the previous millennia.

The generation of electrical and thermal energy leads to thermal emissions into the atmosphere, as well as carbon dioxide emissions, which cause the greenhouse effect.

**Besides, there is one more source of extremely negative impact on the environment.**

# Today total global electricity generation is 27,000 TWh.

Approximately 10% of electricity generated by mankind is dissipated into heat, which directly warms the planet, and from 30% to 50% of electricity goes to earth owing to an excess night generation. As night consumption is much lower than day consumption, this electricity is discharged into the ground, i.e. circa 13,000 TWh per year. How much is it?

An average of 44 lightning strikes are created in 1 second on Earth; so for a year it is about  $1.4 \times 10^9$  lightning. The energy of one lightning averages 5 billion J, or  $1.3 \times 10^3$  kWh. Then the electrical energy of all lightning, which is discharged into the ground during the year, reaches  $2 \times 10^{12}$  kWh = 2 TWh.

**Thus, the amount of electrical energy entering the ground is 1,300 times greater than the electrical energy from the discharge of all lightning.**

This large discharge of electrical energy into the ground leads to corrosion of the surface of the Earth – changes the physicochemical characteristics of the earth's crust and lithosphere, first of all resulting in their heating, which may be a major factor in the growth of average temperature on the Earth. Moreover, such destruction can be a major factor in dehydration of the earth's crust.

**Therefore, a specific problem arises:  
it is necessary to stop the night generation of electricity  
so that it is not discharged into the ground.**

# OUR PROPOSAL HOW TO SOLVE THE PROBLEM

**1.** The renewable energy sources based on growing biomass and any wastes containing carbon are able to substitute the total electric power grid for a series of local electric power grids along the whole country, which will make it possible to reduce the consumption of energy raw materials about three times.

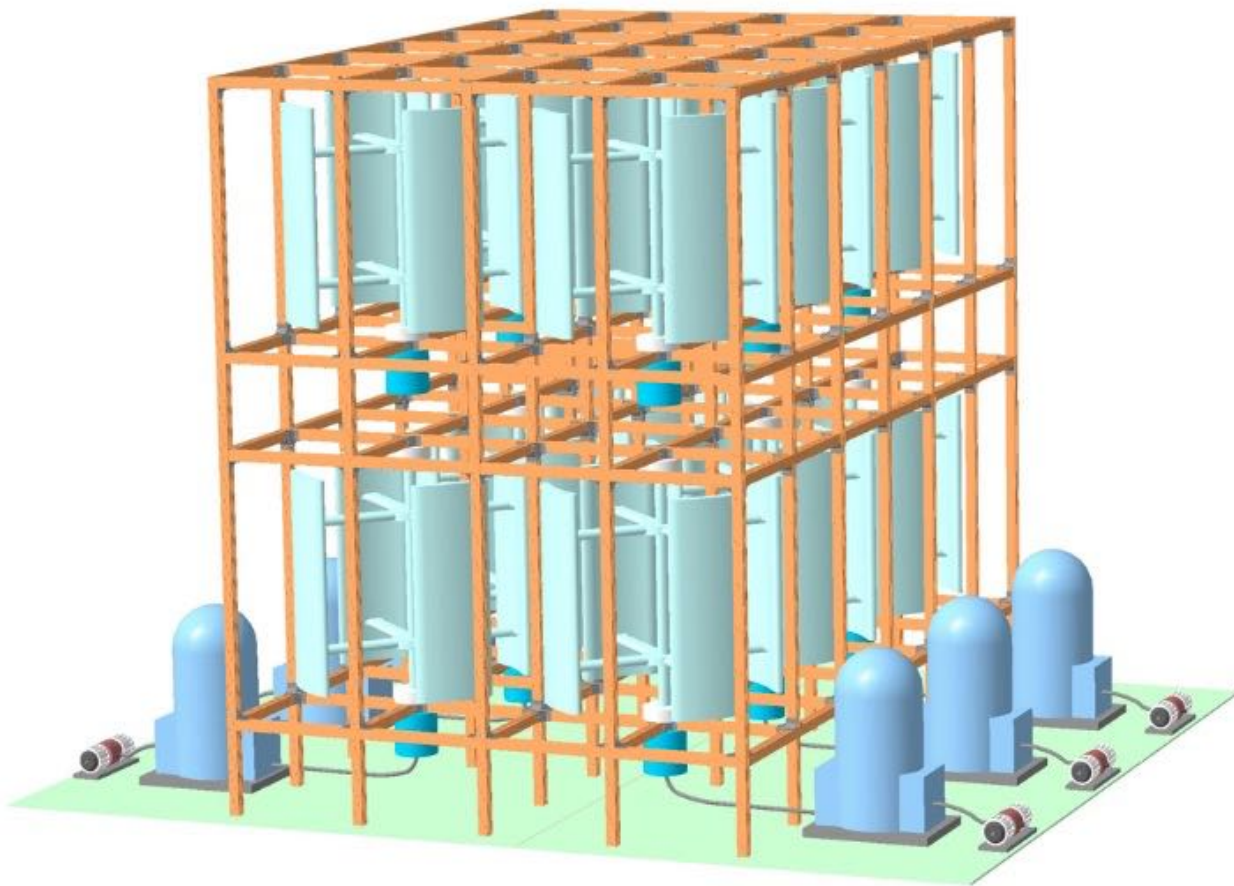
Energy recovery from waste treatment and growing biomass is of great significance for the energy management and sustainable energy supply.

**Small-scale gasifiers.** They will convert dry and wet municipal solid waste<sup>^</sup> medical waste and biomass available into a syn-gas. It is advisable to adjust a serial output of gasifiers (with a processing capacity of 50, 100, 200, 400 and 1000 kg per hour). Carbon processing depth is up to 99%. They can operate at 20% power and can also be easily turned off at night and run in the morning.



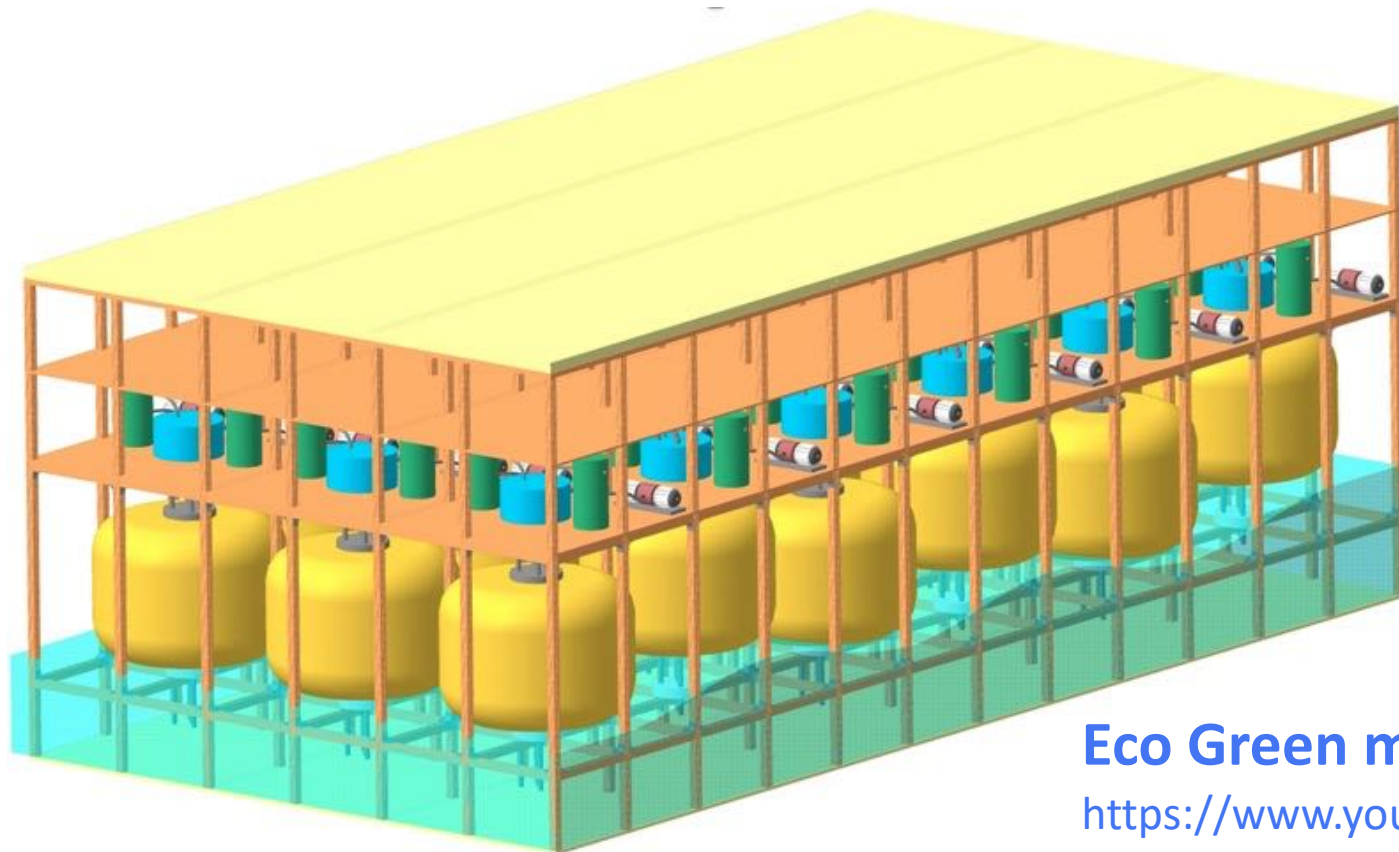


**2. Wind power plant.** Peculiar vessels with the compressed air are located on the ground around the turbines. The vessels accumulate the energy of wind in the compressed air. When electric energy is needed, the air jet goes to the impeller of the generator and rotates its rotor generating electricity.



The blades are located on the vertical axis, the height of the tower is 8-15 m; possible location of the blades in 2-3 tiers. Generated power is 3 to 10 kW.

**3. Marine wave power plant.** The plant can include a number of the cells, for example, from 4 to 8,000 cells. Floats store the energy of sea waves in special cylinders located on the platform. The electric power is generated when the air jet goes to the impeller of the generator and rotates its rotor generating electricity. A capacity of a plant can be from a few MW to 250 MW and above. The plant can also produce technical and drinking water.



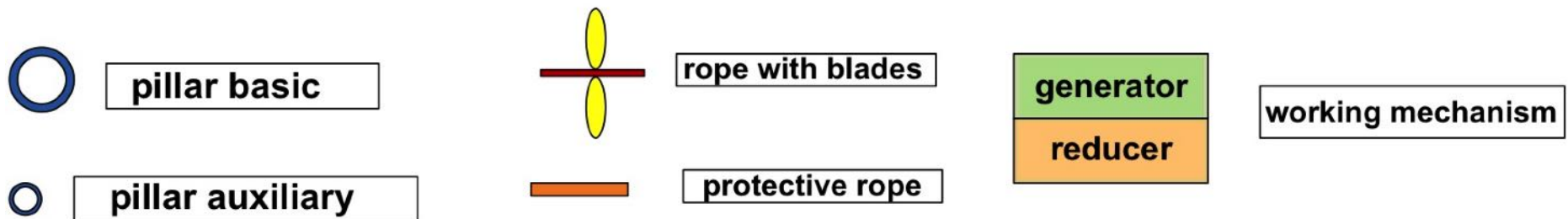
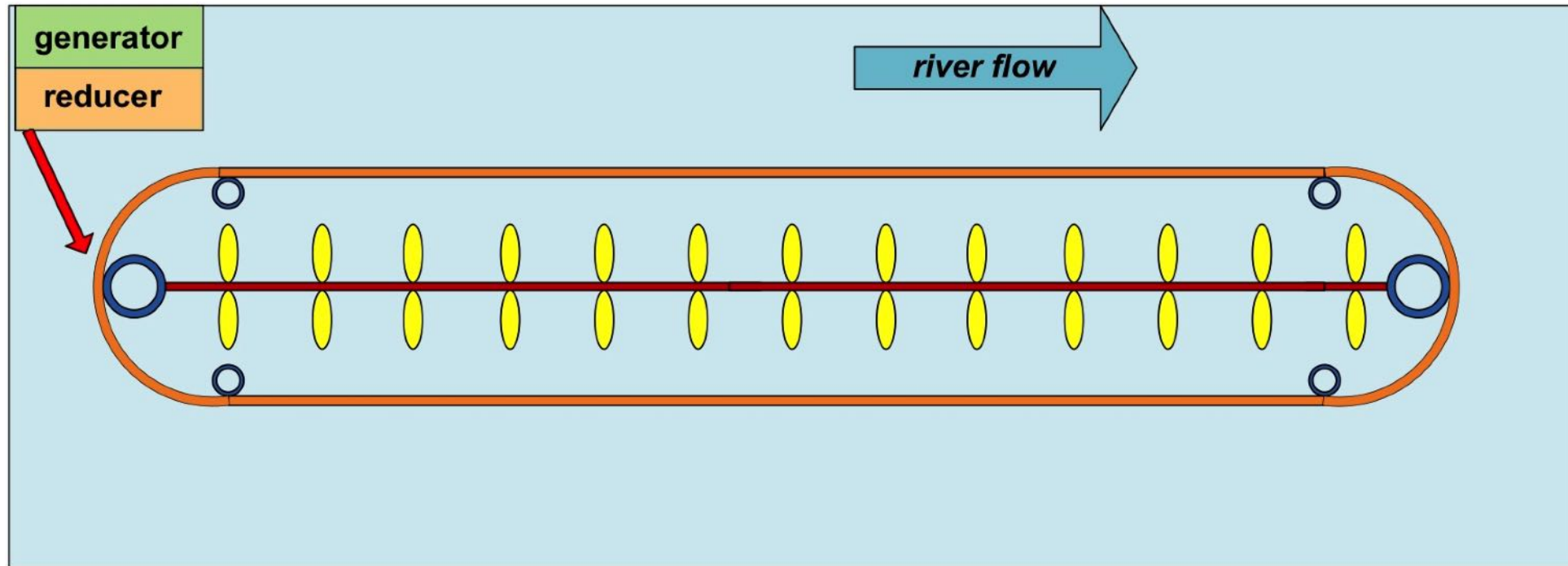
The cost of electricity generated by such a marine wave plant will not exceed € 0.01.

**Eco Green marine energy**

[https://www.youtube.com/watch?v=FrVmb-wiCYE&feature=emb\\_logo](https://www.youtube.com/watch?v=FrVmb-wiCYE&feature=emb_logo)



**4. River power plant.** A multiple river power plants can be mounted in parallel or in series. Such river electricity is not subsidised either. Power generated by one turbine can be graded from 30 to 120 kWh.



The air-conditioners and refrigerators are functioning on the refrigerant and the compressor. All the refrigerants like the chlorofluorocarbons and similar cause ozone depletion, and the other group containing hydrofluorocarbons bring about super-greenhouse effect.

On the other hand there is the other approach for cooling/heating based on the Peltier effect at which a heat flux is created at the junction of two different types of materials. A Peltier cooler, or thermoelectric cooler, transfers heat from one side of the device to the other, with consumption of electrical energy, depending on the direction of the current. A Peltier cooler does not have a vapor-refrigerant, circulating liquid and moving parts; it has a very long life, invulnerability to leaks, small size, and flexible shape.

**The best solution is a cooler operating on thin film Peltier effect. The cost of refrigerators and air conditioners will fall 10 times and we can expect double energy savings.**