Minimum greenhouse gas emissions

Nuclear power plants emit the least carbon during operation: the median emission is 12 g of CO2 equivalent per kilowatt-hour, the same as for wind energy, while the analog median for hydropower is twice as high, 24 g / KWh, and for solar energy about 45 g / KWh . Of course, all this is negligible compared to the shocking 490 g / KWh for natural gas and 820 g / KWh for coal-fired power plants. This is the world median, the combustion of low-quality lignite, such as that in Serbian thermal power plants, produces over 900 g / KWh of equivalent.

The highest reliability from the point of view of the power grid

Nuclear energy is flexible enough to be able to supply modern power grids without complicated maneuvers – and the losses associated with them. It does not vary depending on the time of day, season, clouds, temperature, pressure, precipitation, drought, etc.

Highest energy density per unit area used

In the case of nuclear energy, the energy density per unit area used is over 1000 W / m2 as standard, significantly higher than other renewable sources such as solar (5–20 W / m2) or wind energy (typically 2–3 W / m2). In practice, this means that, unlike hydropower plants (large and small), wind farms, solar power plants or fields necessary for biodiesel production, nuclear power plants can be built at virtually any location chosen as suitable for other reasons (eg for more even regional development, reduction of losses in electricity transmission, etc.).

Huge energy reserves

Even if we limit ourselves to today’s known uranium reserves mined in the standard way, the amount of electricity that could be extracted by existing types of reactors is sufficient for more than 100 years of today’s consumption levels. In the last ten years, new reserves have been discovered, so it is not impossible for this number to increase significantly. The so-called “Breeder” reactors that would be able to process unused uranium-238 and turn it into fuel for further fission would increase these reserves to enough for thousands of years.

High level of safety at work

Contrary to the propaganda of the anti-nuclear lobby, the nuclear industry is one of the safest activities. According to the data of the World Labor Organization, the number of injuries at work in the nuclear industry is lower than in the film industry (!) Or banking (!!), and for an entire order of magnitude less than injuries at work in construction. If we measure safety through the number of deaths of workers in industry per unit of energy produced, nuclear energy is about 2,500 times safer than burning coal, 30 times safer than hydropower and about 4 times safer than wind energy.

Low maintenance costs

According to the best available data, the average maintenance costs of a nuclear power plant are only about one third of the analogous costs of maintaining a coal-fired power plant of the same installed capacity! This assessment includes the safe disposal of processed nuclear fuel and the high earnings of employees in the nuclear industry. Of course, skeptics will say that cheap maintenance is partially covered by the far higher costs of the initial investment (the so-called up-front capital cost) of building a nuclear installation, which is certainly true. However, two other factors should be kept in mind here: 1. Nuclear energy scales far better with both installed power and time, ie. it becomes cheaper the more we use it and the longer we use it 2. a good part of both the initial investments and the maintenance costs of nuclear reactors are a consequence of the extremely high regulation of this market.

Low opportunity costs

When you build a thermal power plant, you are forced to occupy huge railway or road capacities for delivering fuel and transporting slag and ash, capacities that could otherwise be used to transport tourists, students or business people; not to mention that you have made a huge area near the thermal power plant unsuitable for healthy living and work. All of this is not the case with nuclear power plants that use very small amounts of fuel, which is usually refilled once every five years or for a similarly long period of time, and does not impose any special logistical requirements.

Favorable workforce structure

Even uranium mines today are largely automated and use underground ore dissolution and other advanced techniques to make them more efficient and minimize human labor and health risks. In contrast, coal miners have become almost an iconography of the traditional worldview, as well as boiler burners, oil well workers and the like – their slow disappearance, and the replacement by some robotic teleoperators, automated excavators and controllers with doctoral degrees is a kind of culture shock, especially for persons of conservative beliefs, especially in societies dominated by traditionalist values. Nuclear energy, which provides jobs for (in relative terms) more masters and doctors of science than virtually any other industry, is far more in line with this global civilization trend than fossil fuel energy, and in part even renewable hydropower and wind energy.

Water mobility

Unlike “clean” alternatives, ships can be propelled by nuclear reactors very easily and efficiently, with extremely low fuel consumption and enormous autonomy, as well as

minimal environmental disruption to fragile ocean ecosystems. Solar power plants are absolutely immobile, while the use of wind energy for propulsion at sea has been known for thousands of years – and quite inappropriate when it comes to modern ships with a displacement of tens and hundreds of thousands of tons.

Encouraging the development of science and technology – with an emphasis on nuclear fusion

Nuclear fusion is, in the long run, the only truly lasting solution to all of humanity's energy problems. Once it is realized as commercially viable, and ecologically it is one of the cleanest possible sources, people will never need any other source of energy on any spatial and temporal scale. In order for that to happen, it is necessary to have a large number of highly trained and capable nuclear physicists and engineers – and they can be reached through the market through the expansion of the existing nuclear energy. It is no wonder that ITER, the largest experimental fusion reactor today and the most expensive R&D project in human history, was built in France, the country that gets the most electricity from conventional nuclear power plants and has the best schools for nuclear physicists and engineers in the world.

Source: talas.rs