

## ADVANTAGES AND DISADVANTAGES OF RENEWABLE ENERGY SOURCES

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**Annotation:** This thesis provides detailed information about renewable energy sources and provides clear facts about the benefits of these energy resources. In addition, this thesis also discusses the advantages and disadvantages of renewable energy.

**Key words:** Renewable energy, solar panels, cedar shingles, wind energy, hydroelectric dams, hydropower, wave energy, biofuel.

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Renewable energy is obtained from natural resources such as sunlight, water flows, wind, tides and geothermal heat, which are renewable (replenished naturally), as well as from biofuels: wood, vegetable oil.

Following, there are information about the advantages and disadvantages of renewable energy sources.

Currently, the production of renewable energy sources, despite its high environmental friendliness and promise, is limited. The development of technologies based on it has a number of costs that have to be taken into account.

Solar energy

Pros:

When you install solar panels on your home, you generate your own electricity, become less dependent on the electrical grid, and reduce your monthly electricity bill.

Recent studies have shown that property values increase after installing solar panels. The solar panels themselves are becoming cheaper.

The sun shines everywhere on Earth, which means solar energy is a good option for every country, although there are differences by region and how much sunlight they receive. Solar energy is harnessed through an ever-evolving array of technologies, including radiant light, photovoltaics, concentrated solar power (CSP), concentrator photovoltaics (CPV), solar architecture, and artificial photosynthesis.<sup>1</sup>

Minuses:

Solar panels are not suitable for all types of roofs. Some roofing materials installed in older homes, such as slate or cedar shingles, may not be suitable for solar panel installation.

Solar power does not work at night. Solar households rely on utility grids for electricity at night and in other situations when sunlight is limited.

The initial cost of installing and using solar energy is very high because a person has to pay for the entire system—batteries, wires, solar panels, and so on.

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<sup>1</sup> Philibert, Cédric. *Solar energy perspectives*, International Energy Agency, Organisation for Economic Co-operation and Development, Paris: OECD/IEA, 2011. ISBN 978-92-64-12458-5.

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## Wind energy

### Pros:

Wind turbines, which generate large amounts of electricity using wind, are almost as efficient as solar panels. Wind energy is particularly attractive to the residential real estate market. Areas where the wind is stronger and more constant, such as the sea and high mountains, wind farms are the most suitable places for this type of energy production. Modern wind power plants produce energy close to the nominal capacity of 600 kW to 9 MW. The power available from the wind is a function of the cube of the wind speed, so as the wind speed increases, the power output increases up to the maximum power output at a given station.<sup>2</sup>

### Minuses:

Wind is not the most reliable source of energy; at its low strength, turbines typically operate at about 30% capacity. In calm weather, you may find yourself without electricity.

Wind energy can only be used in places where the wind speed is high. Since strong winds mainly blow in remote, uninhabited areas, it is necessary to build power lines to provide electricity to residential buildings in the city. And this requires additional investment.

## Hydropower

### Pros:

Most hydroelectric dams—storing large amounts of water in reservoirs—almost always have a reserve from which energy can be drawn. In this sense, hydroelectric power is a more reliable and stable source of energy than wind and solar energy. Hydropower is produced in 150 countries. In 2010, the Asia-Pacific region produced 32% of global hydropower. Of the top 50 countries for the share of electricity generated from renewable sources, 46 are primarily hydroelectric.<sup>3</sup>

Storage hydroelectric power plants are capable of generating electricity on demand, allowing hydroelectric power plants to replace traditional dispatchable generators such as coal and gas plants.

### Minuses:

Hydroelectric storage plants interrupt the natural flow of a river system. This leads to disruption of animal migration routes and problems with water quality.

Hydroelectric power plants are large infrastructure projects involving the construction of a dam, reservoir and power-generating turbines, which require significant capital investment.

## Wave energy.

### Pros:

Wave energy is predictable and you can determine the amount of energy that can be produced.

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<sup>2</sup> “Analysis of Wind Energy in the EU-25”. European Wind Energy Association.

<sup>3</sup> “Renewable Electricity Capacity and Generation Statistics, June 2018”.

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Waves have a higher energy output than, for example, wind, and this makes wave energy more efficient.

Once installed, the appropriate power plants have minimal operating costs, making them more attractive to invest in.

Minuses:

Although it is clean energy, its use poses a danger to marine life and changes the seabed and the habitat of some of its inhabitants.

Wave energy only benefits power plants built in cities near the ocean.

Biofuel

Pros:

One of the main advantages of biofuel is its relatively low cost.

Biofuel feedstocks are not limited. Unlike fossil fuels, biofuel resources are renewable.

Minuses:

Biofuels produce much less energy than fossil fuels, for example.

Biofuels are not environmentally friendly because they produce CO<sub>2</sub> emissions.

Renewable energy sources help fight climate change, which is becoming more destructive. Wind, solar, water and other energy sources will be good substitutes for fossil fuels in the future.

The growing sector is creating jobs today, making power grids more resilient, expanding energy access in developing countries and helping lower energy bills. These factors have contributed to the growing popularity of renewable energy in recent years. The advantages of each type of alternative energy source definitely outweigh the disadvantages.

Overall, the advantages of using renewable energy sources outweigh the disadvantages. Although the initial cost of establishing a network of renewable technologies might be higher, over time, the expenses will be offset. Considering the lateral influencers of using renewable energy, postponing the process of shifting toward 100% renewable is not a wise course of action.

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