

THE FUTURE OF THE NUCLEAR INDUSTRY

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The purpose of this paper is to learn about the advantages and disadvantages of nuclear power, to analyze its prospects and figure out the ways of overcoming its limitations.

In today's world humanity faces the problem of greenhouse effect, that is caused by the emission of carbon dioxide into the atmosphere. To decrease this emission people need to use kinds of fuel, that won't cause air pollution. One of them is nuclear power. It has become very popular in the last century, and now it is a vital part of our modern world, by the way, in France nuclear energy provides 75% of electricity. Nevertheless, it still has some problems, that must be resolved for nuclear power to have a future. Therefore we'll examine them in details:

1. High cost. There is no question, that the cost of nuclear power is way too high in comparison with the cost of alternative sources of energy, e.g. fossil fuels or renewables, which makes it less attractive.

2. Waste disposal. For example, US currently stores nuclear wastes underwater, but plans to eventually move it to a repository at Yucca mountain in the State of Nevada. France also plans to store its wastes deep underground. Though countries like these have a big experience of transporting nuclear waste, the issue of safely moving it all to storage continues to set many people on edge.

3. Potential security risks stemming from proliferation. We all remember Fukushima and Chernobyl accidents, the worst nuclear disasters in history. For many people, the dangers are high enough to choose other sources of energy instead of nuclear.

4. Adverse environmental and health effects. Primarily the release of radiation by nuclear power plants and nuclear reactors into the surrounding areas is known to have hazardous effects on people's health residing there.

The main advantage of nuclear power is that it doesn't emit CO₂ into the atmosphere, which is very important nowadays, when the problem of global warming and greenhouse effect is urgent as never before. The nuclear industry is also a big business. The Nuclear Energy Institute estimates that industry plant owners, suppliers and related companies generate around 50\$ billion in revenue each year and provide 100,000 jobs. But all mentioned flaws threaten nuclear power to become an energy option of the past. In addition, there are other non-carbon sources of energy, such as renewables. In order to have a future in the field of nuclear energy, the entire industry needs an overhaul—including how regulatory structures and energy markets are constructed, as well as how nuclear reactors are designed, financed and built.

This study offers some recommendations to make nuclear energy option viable.

1. There are plenty of ways to mitigate high costs of nuclear power and, over time, it would dramatically improve competitiveness. Furthermore, there is a good way, like offering a limited production tax-credit to 'first movers' - private sector investors who successfully build new nuclear plants. This tax credit is extendable to other carbon-free electricity technologies and is not paid unless the plant operates.

2. Giving countries that forego proliferation- risky enrichment and reprocessing activities a preferred position to receive nuclear fuel and waste management services from nations that operate the entire fuel cycle.

3. Advanced nuclear. It is the umbrella term used to describe novel research on smaller reactor design, that incorporate alternative nuclear fuels and cooling systems. Some advanced designs reuse existing nuclear waste as fuel; or use fuel that does not require enrichment, which reduces security concerns associated with nuclear energy. The goal is to simplify the construction process and to mass-produce reactors that could be installed with regular equipment, which would save money throughout the entire process. However, this idea is still in concept phase and it's estimated it could take more than a decade before it's a viable option.

I believe, that nuclear industry is a very perspective source of energy, if it's able to overcome its difficulties. It's carbon free, works 24/7, and, comparing to fossil fuels, which are limited, will run out not soon. Also, big masses of people don't realize all its advantages, most of them see only disadvantages, like, accident dangers or radiation. Besides, of course, emerging technologies come to the rescue. It means, that it's pretty hard to predict, what will happen to nuclear industry in the future, because we don't know, how far the science will go. Humanity might find out ways to produce nuclear power avoiding all its dangers. Then again, many reactors won't be due to retire until between 2030 and 2050. Around the world, almost 200 reactors will retire by 2040.

Therefore, we might have to wait for a while until we find out what will happen: more technologically advanced nuclear renaissance or nuclear power will become a bygone and give way to renewables.

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