

# A question of electricity at madagascar

[Science](#), [Physics](#)



## **Should Madagascar have its own nuclear power plant to generate its electricity?**

Compared to other sources of energy, nuclear power can produce enormous amounts of energy while causing minimal harm to the environment. This energy can then be used to produce electricity for a large city or even a small country. While there still remain uncertain factors about its manageability, scientists truly believe that nuclear power plants are the future resources we will need to depend on.

One way that this enormous amount of energy is released is through nuclear fission. Nuclear fission is the splitting of a uranium atom by firing a beam of neutrons to the atom. It then splits into two and the neutrons that were broken off would cause a chain reaction. You can think of it as having a room full of loaded mousetraps. Imagine there was a Ping-Pong ball on each of the mousetraps. As soon as you fire one ball and trigger a mousetrap, all the other mousetraps will start triggering as well. The heat caused by this chain reaction is what allows us to produce electricity. Basically, the heat is used to create pressurized steam, which is then used to rotate turbines that are connected to a generator.

Another way to release this gigantic energy is through nuclear fusion. Nuclear fusion is the merging of multiple nuclei to form a heavier nucleus. This phenomenon can naturally occur in nature. However, it only happens in the cosmos between stars and unlike nuclear fission, nuclear fusion has no limit to fusing. The fact that it is 3-4 times more powerful than a nuclear fission makes it a lot harder to store. To this day, scientists haven't found an

element that can withstand such energy for storage and use. An example of an occurring nuclear fusion is our sun. It constantly merges with other gases (mostly hydrogen) around it. This causes it to heat up and release very powerful solar flares every 11 years. This is the reason why it has no limit to fusing because after it has cooled down, it repeats this process over and over again.

In Madagascar, the current main sources of electricity are coal and hydroelectric plants. Before the coal is burnt, it is first sent into a machine that grinds the coal into powder. The coal powder is then burnt and mixed with hot air to help the coal burn more efficiently. The steam that is then released from the boiler, powers the turbines. This allows the turbines to spin and power the generator. However, unlike water, coal is a nonrenewable resource. In hydroelectric plants for instance, running water is mandatory. A hydroelectric station converts the energy flowing from the water into electricity that can be used in homes and factories. This is be done by building a reservoir or simply using a cascade to build a turbine that will power the generator once it is spun by the running water.

The efficiency of a nuclear power plant, hydroelectric power plant and coal all differ. A nuclear power plant's efficiency for instance depends on its heat. However on average, it is 91% efficient and does not emit any carbon dioxide. Hydroelectric power plants on the other hand are 85-90% efficient (depending on how fast and how much water turns the turbine). Lastly, coal can only be as efficient as 60-70% due to the lack of heat.

With efficiency comes cost. A nuclear power plant's cost, ranges from \$300-\$500 million dollars. In 2013, the average non-fuel O&M (operations and maintenance) cost for a nuclear power plant was 1. 51 cents/ kWh. A hydroelectric power plant costs \$2. 2 million to build and produces an average of 0. 85 cents per kilowatt-hour. Meanwhile, the average cost for a diesel/ coal plant in 2012 was 2 cents per kilowatt-hour.

Coal, hydroelectric power plants, and nuclear power plants all have environmental impacts. As a matter of fact, on the long run coal greatly endangers our whole planet (causes urban smoke, contributes to global warming, responsible for 93% of the sulfuric dioxide and many more problems). The smoke it produces can worsen health conditions for some people. In the meantime, hydroelectric power plants can set an unbalance in nature when a dam needs to be built (flood risks, affect ecosystems, accumulation of toxic materials). Finally, nuclear power plants can have a disastrous effect on an enormous surface area, depending on how far the radioactivity stretches. This radioactivity makes it uninhabitable for a majority of the living creatures, including humans.

In my opinion, Madagascar should not yet have a nuclear power plant. It is a country that is somewhat developing and because of government corruption and the lack of education, it is not a wise decision to do so. If there is a meltdown or an accident that occurs, the radioactivity emitted by the nuclear power plant could wipe out animal species that only exist in Madagascar. This can also cause tourists to lose interest in coming to visit Madagascar and cause the rate of unemployment to rise. Furthermore, if

such a scenario occurs, because of the lack of education the people will not know what to do. For the moment being, the only “ best” alternative for nuclear power plants, are hydroelectric power plants. The country should rely more on hydroelectric power plants rather than coal to generate their electricity. However, Madagascar should definitely think of working towards having a nuclear power plant but until it is economically stable it shouldn't possess one.

Nuclear power plants are a great source of energy and unlike coal; they do not contribute to carbon dioxide. They possess more advantages than drawbacks thus, allowing it to be a resource that we will need to master for the daily usage for our future technologies. Madagascar for example, will need to stop relying on coal/ diesel as a source of energy for electricity. Not only is it contributing to global warming and pollution but it only causes more problems that the future generations will have to solve.