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Energy of the future: nuclear energy

Najla Minichelli Zogheib*

The nuclear energy has been an alternative to complement the energy matrix in Brazil. Today, unfortunately, we just have 2.7% of our matrix based in nuclear energy. But the Energy National Plan forecasts an increasing to 4.9% until 2030 with the construction of a new plant in Rio de Janeiro (Angra III) and some others that we can just see its drafts. Despite being a clean energy, there are a lot of people who is completely against the idea of this kind of energy, whether because of its price or its risk of contamination.

I think that Brazil just not enlarge the use of this kind of energy because our society is still scared about safety when we talk about nuclear energy. What people really don't know is that the new nuclear reactors produced nowadays are said to be perfectly safe, with much higher security measures. According to Edmundo Montalvão, Legislative Consultant of the Senate since 2002 and with a degree in Electrical Engineering, these reactors now have a system of passive cooling that allows the safety of people around a plant even in face of a disaster. And these systems are independent of human intervention or electricity! They are reactors with longer life cycle, greater thermal efficiency and greater robustness.

A U.S. study about accidents in nuclear power plants says that 0.26 in 200,000 worker hours cause any trouble to the industry. Meanwhile this number for U.S. private industry is 3.1 in 200,000 worker hours.

Nuclear power is the only of producing renewable energy enough to meet the growing global demand. Uranium is a highly concentrated source of energy so you need much less uranium than oil or coal for example. It is easily portable and not too expensive.

Yes, I said "not too expensive". In the long run, nuclear energy is really worth. The construction of the plant is really expensive, but the spending with this kind of energy after its implementation is low. In Brazil it could be highlighted by the fact that we have the sixth bigger reserves of uranium ore, feedstock for enriched uranium used in power generation. And we should take into account that only 30% of estimated deposits, however, are known and mapped. The country can assume the second position in 10 years. This availability of the

natural resource could be considered a positive externality for the implementation of nuclear energy as a bigger part of the Brazil's energy matrix.

Nuclear energy does not pollute anything the environment. At least, not with greenhouse gases. The only result of this energy source is nuclear waste. But the amount of waste cannot be compared with the amount of gases that other sources of energy release in the atmosphere. This waste has been put in appropriate places. New researches show that armored walls of cement or lead prevent the residue to contaminate the environment. In these compartments, the waste is still in contact with water and air, what decreases its radioactivity, making it less dangerous during the years.

A study from the University of Lisboa, in Portugal, compares the costs of 1 MWh of nuclear energy with 1 MWh of energy generated from gas combined cycle. Even if we consider the external costs of producing this kind of energy (what they do in the research), nuclear energy is really worth.

	Nuclear	Gas combined cycle
Private costs (€/MWh)	34 to 38	38 to 45
External costs (€/MWh)	2 to 7	10 to 40
Social costs (€/MWh)	36 to 45	48 to 85

Adapted from: https://dspace.ist.utl.pt/bitstream/2295/576760/1/Dissertacao_53649.pdf

The external cost of nuclear energy represents just 1% of its cost, while, for example, external costs of coal can represent 50% of its cost.

According to the builders of the new Angra III, including all the negative externalities, the price of the nuclear energy would be around R\$ 148.65/MWh (nearly \$74/MWh). This is a good price when compared with biomass (R\$ 151.66/MWh), or thermal generation from fossil fuels (R\$ 167,67/MWh).

For the year of 2013, Brazilian government provides the exemption of millions of dollars to encourage the construction of new nuclear energy plants. This subsidy will help the suppliers to produce this energy even cheaper, because it will help the building companies and the power distribution ones.

With all the information we have nowadays, and all this data presented, it is possible to say that nuclear energy is very competitive. It is cheaper and totally safe. Accidents like Chernobyl can no longer happen.

The change is already being done. But I think the nuclear energy defenders should fight more and show the world how much this technology has developed. Besides this, Brazil has a huge potential for this source of energy. We should follow the example of France that has, today, more than 78% of its matrix based on nuclear energy. Decrease our greenhouse gases emissions and improve energy efficiency. That is what everybody is looking for!

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