The value of speeding up nuclear energy operations

Solange Monteiro

IN THE PUBLICATION *Nuclear Energy* released by FGV Energy on April 27, industry representatives revealed their expectations about the future of nuclear energy, which currently accounts for 2.74% of Brazil’s electric power. Luiz Carlos Barata, executive secretary of the Mines and Energy Ministry, who has since been confirmed as the new director general of the National Grid Operator (ONS), said that the 2050 National Energy Plan (PNE), now nearing completion, should call for construction of more nuclear power plants—without specifying, however, how many and their location. The 2030 PNE planned for four more units besides Angra 3 and among possible sites are Pernambuco, Espírito Santo, and Sergipe states. According to Barata, execution of these projects will be “slower than planned” because the economy’s recession has reduced demand for electricity, adding, however, that “we have two nuclear power plants today that are working wonderfully well, and there is no doubt that the government intends to build new plants.”

To achieve this expansion, Barata acknowledged, it will be necessary to review how the construction and financing of nuclear plants is regulated, and open them to private participation. “Today the government believes that operation of nuclear power plants should be the responsibility of Eletronuclear, but not construction and financing,” he said. Nuclear industry representatives are advocating for more speed and clarity in government signals to the market about resumption of the Brazilian Nuclear Program. Pedro Figueiredo, president of Eletronuclear, said that if it continues to take a long time to build each plant, the goal of adding four more will be compromised: “Angra 1 (640 MW) started operations in April 1982 and Angra 2 (1,350 MW) in 2000, but in the best scenario Angra 3 (1,400 MW) will not be in operation until 2020. With an interval of 20 years it is impossible to think of retaining a Brazilian Nuclear Program.”
Work on Angra 3 was stopped in late 2015 because of irregularities; if the investigation is not completed by August, Figueiredo said, Eletronuclear cannot guarantee commercial operation of the plant will start on time. What needs to be done is to complete the internal investigation, set a new budget for assembling electromechanical equipment, cancel contracts, and hold new tenders, because “only then can we return to the banks for financing.” According to the current PNE, if the other four planned power plants are to start up by 2030, plans must be defined by next year, since they entail complex programming, ranging from contracting large equipment to site licensing and definition of energy sales conditions—all of which are essential, experts say, to attract private investment.

Brazil's nuclear power is competitive
Costs recorded in 2015, for a gross power generation of 14.8 million MWh

 Source: Eletronuclear.

Industrial development
Antonio Muller, president of the Association for the Development of Nuclear Activities, pointed out that the requirement to reduce greenhouse gas emissions has again raised interest in nuclear power generation projects worldwide. In 2015, according to World Nuclear Association data, 69 plants were being constructed. Muller pointed out that “even the United States, which has not invested in the nuclear sector for 30 years, is extending the lives of its nuclear plants and building new ones.” He noted that new licensing models have emerged to guide the demand for financing, because nuclear plants require intensive capital investment. “The technology has also advanced, reducing both the time to construct nuclear power plants—some can be built in 48 months—and their cost. While in the
“Angra 1 (640 MW) started operations in April 1982 and Angra 2 (1,350 MW) in 2000, but in the best scenario Angra 3 (1,400 MW) will not be in operation until 2020. With an interval of 20 years it is impossible to think of retaining a Brazilian Nuclear Program.”

Pedro Figueiredo

United States the cost of one installed kW can reach US$5,000,” he said, “in Asia the cost of some projects is only US$1,700.”

In Brazil, breaks in the continuity of the nuclear program, which requires planning and long-term investment, has slowed the training of workers and technical staff. Aquilino Martinez, professor at Alberto Luiz Coimbra Institute of Graduate Studies and Research in Engineering (Coppe/UFRJ), said that “Today there is no skilled labor available for new nuclear projects … . The professionals currently working in the nuclear industry were trained in the 1970s and 1980s.” Figueiredo said that lack of investment has also prevented Brazil from catching up technological developments in the world nuclear industry, noting that “South Korea began its nuclear industry at the same time we did. Today South Korea already sells its own nuclear reactors, and we continue to be left behind.” In 2009, South Korea won the contract to build and operate reactors in the United Arab Emirates, at a cost estimated at US$40 billion, that are expected to be in operation by early 2017. “If you look at the success stories, such as South Korea, you will see heavy investment in professionals and research institutes and universities that supports the absorption of technology,” agreed Admiral Luciano Pagano Junior, technical and commercial director of the Brazilian Navy’s Nuclear Program.

João Carlos Tupinambá, president of Nuclear Industries of Brazil (INB), argued that if the national industry is to catch up with advanced nuclear technology there must be a stable regulatory environment for exploitation of Brazilian uranium reserves and enrichment of uranium for export, which can be done without necessarily breaking the government monopoly of the nuclear sector. “Today uranium is the best currency to attract large players in this market. … Everyone wants uranium and is willing to trade technology for it,” he said.

Tupinambá described the licensing process for opening up the Catité mine in Bahia state, which has the capacity to produce 3,500 metric tons of uranium for 14 years, and the consortium for phosphate and uranium in Santa Quiteria in Ceará state. With only 30% of its territory being prospected, he pointed out Brazil already has perhaps the most uranium reserves in the world. And, he added, Brazil is one of the few countries in the world that can dominate the full cycle of uranium enrichment—a process that accounts for about 35% of the cost of processing nuclear fuel. “When we deploy the sixth cascade enrichment plant, we will be able to enrich about 33% of the uranium needed to fuel Angra 1,” he concluded.