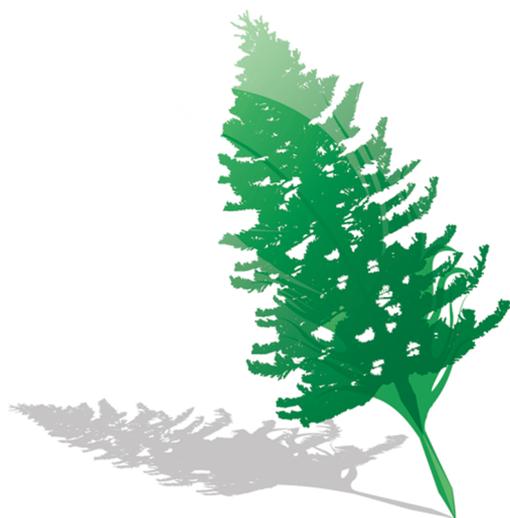


## Is Vietnam Ready for Nuclear Power?

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Vietnam's demand on power supply is increasing rapidly along with economic growth. It is a matter of urgency for Vietnam to find alternative energy source other than fossil fuel in order to minimize the influence on local climate. Currently the world's largest nuclear power market exists in emerging economies and developing countries as those countries are in great need of relatively cheap energy to drive its economic growth. But nuclear power, neither cheap nor safe, is putting those countries in a dilemma. As the hot spot of the nuclear power market shifted from "advanced technology" to "economic affordability", how to find a comprehensive nuclear power solution for developing countries with specific requirements poses a serious question to the international community.

Demand on power supply grows by 14% per year and the growth is expected to reach 15% in Vietnam until 2015.<sup>1</sup> Vietnam relies on hydro power, which accounts for 36.04% of national power supply in 2009. Short of other energy resources, it will be very difficult for Vietnam to meet the country's power demand in the future only with hydro power and power converted from fossil fuels (such as oil, coal and natural gas).<sup>2,3</sup> Nuclear power supply, an efficient option that addresses power shortage without emitting greenhouse gases, is still a powerful attraction to developing countries represented by Vietnam. Vietnam announced its ambitious nuclear power program that is scheduled to grow from one reactor in 2020 to 10 reactors by 2030 in which nuclear contribution to the national grid will be 1.5% in 2020, 8% in 2030, and 20–25% by 2050.<sup>1,3</sup> Vietnam's first nuclear power plant, located at Phuoc Dinh, is supplied by Atom Story Export from Russia. Its second, at Vinh Hai, is supplied by JAPC from Japan. As a developing country, the only thing Vietnam could do is to make nuclear power an

integral part of the national grid and at the same time ensure its safety and security.

Russia and Japan promised to provide aid package to Vietnam in order to meet Vietnam's requirements on funds, technology, nuclear fuel, power plant construction and operation, etc., as Vietnam does not have the basic elements to develop nuclear power on its own.

Developing countries as Vietnam must put nuclear safety and security on the first place and conduct researches on nuclear accidents in history, for example, Chernobyl, Fukushima, etc., the influence of natural disasters on nuclear power plants prior to developing nuclear energy. To keep a nuclear power plant running smoothly and safely, it is also necessary to build a team of nuclear experts, engineers, professionals, and operators.

It takes years or decades for a country to master the essence of nuclear science and technology, depending on a country's existing infrastructure. Since nuclear professionals are scarce in developing countries, Vietnam should add more nuclear engineering courses in colleges and universities to enlarge the scope of basic nuclear education and professional training. Government should invest more funds to support domestic training institutions and conduct cooperation programs with foreign counterparts to develop its indigenous nuclear professionals.

The location of nuclear power plant is very important. According to local meteorological experts, the nuclear power plant in Ninh Thuan province is under the threat of tsunami. To minimize the influence of tsunami, the government should build a tsunami and earthquake warning center and establish a tsunami forecast system.

Even if the nuclear power program is kicked off with sufficient funds and technologies, any delay in the phase of engineering construction will bring about disastrous and unimaginable consequences to a developing country like Vietnam. In the case of France's EPR project, EDF announced a revised cost estimate of EUR 6 billion caused by delay, set against cost estimate of EUR 5 billion in 2010.<sup>4</sup>

A lesson learned from the Fukushima experience shows the way the Government and Nuclear Safety Agency supervise and regulate the management and operation of a nuclear power plant is of great importance to its safety and security. We think that it is difficult to establish a perfect nuclear management system with high safety standards in such a short period of time. A former director of the Dalat Nuclear Research Institute emphasized a bad safety culture is prevailing in every field of the country, as is shown by frequent traffic accidents in

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Vietnam.<sup>2</sup> Slack and nontransparent management of a nuclear power plant will form collusion between supervisors and operators and, finally, lead to a nuclear accident similar to what happened in Fukushima. The consequences of a nuclear accident are hard to imagine in developing countries since they do not have any capabilities to cope with the disaster.

In general, nuclear power programs in developing countries is subject to financial and technical restrictions as well as challenges as the absence of skilled engineers and technicians, the disposal of radioactive wastes, the influences on the environment and the risk of nuclear proliferation. Any country who wants to develop nuclear power should first make a practical plan tailored to its specific conditions and build the safety culture with stringent safety standards. Necessary support from industrial, economic, social, and R&D must be mobilized during the phase of nuclear infrastructure construction. Besides that, nuclear power programs require the beneficial interaction between the nuclear administrator and the mass media in order to publicize in a timely manner the situation in the nuclear power plant. The nuclear administrator can reduce public doubts and win public support by making nuclear information transparent.

In conclusion, nuclear safety and security should be given the first priority. Vietnam must have an independent agency with legal authorities and high sense of responsibility to draft and enforce the laws about nuclear safety and security.<sup>5</sup> When nuclear reactors are in operation, the administrating agency must work independently and stay vigilant. All these are will help Vietnam make peaceful use of nuclear energy.

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### Notes

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