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NUCLEAR POWER PLANT PROJECTS IN VIETNAM

Vietnam has been considering to develop nuclear power for peaceful purposes based on modern, verified technology since 1995, and firm proposals surfaced in 2006 [1]. However in January 2014 it was reported that Vietnam had decided to delay construction by six years [3].

The race to diversify beyond its primarily Hydro and Coal energy mix, is driven largely by the country's growing energy demand, which is expected to increase annually by 16%, i.e. from 16 GW (2010) to 30 GW (2015). Another factor is the challenges it faces in identifying new suitable hydro power project sites [2].

Its first ever nuclear power projects will be implemented in two major sites in Ninh Thuan Province. The 4 X 1000 MW Ninh Thuan 1 site[4] at Phuoc Dinh, will be built in collaboration with Russian State company - Atomstroyexport, and will set the stage for the foundation of Vietnam's first ever nuclear power plant unit (estimated completion - 2020). The Japanese consortium - JINED will construct the second site - 4 X 1000 MW Ninh Thuan 2 at Ninh Hai district [5].

The Ninh Thuan 1 Nuclear Power Plant (NPP) is a planned nuclear power plant at Phuoc Dinh in Thuan Nam District, Ninh Thuan Province, Vietnam. It will consist of four 1,200 MWe VVER pressurised water reactors. The plant will be built by Atomstroyexport, a subsidiary of Rosatom. It will be owned and operated by state-owned electricity company EVN. Fuel will be supplied and used fuel will be reprocessed by Rosatom. The feasibility study will be carried out by E4 Group.

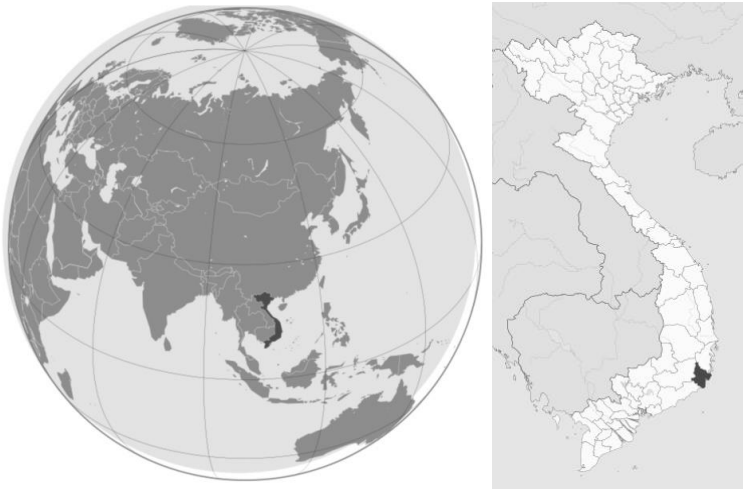
The plant will be built based on a nuclear power development plan, approved by the Vietnamese government in 2007. In 2009, Vietnam's National Assembly approved a resolution on investment policy for the project. On 31 October 2010, Vietnamese government and Rosatom signed a construction agreement.

Works to prepare the construction site started in December 2011.[4] Construction to be start by 2014 and the first unit to be commissioned by 2020.[1] The construction is financed by the US$8 billion loan from Russia. Unit 2 will be commissioned in 2021, unit 3 in 2023 and unit 4 in 2024[6].

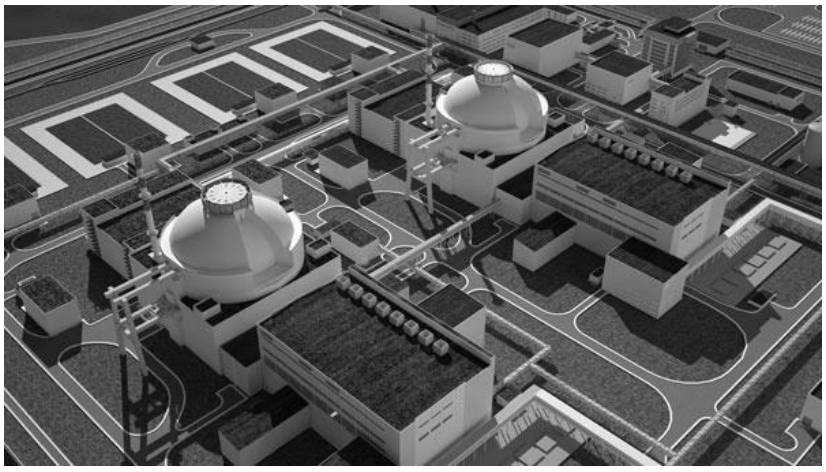
The 1 GW reactor unit no. 1 at Ninh Thuan 1, will be commissioned and connected to the national grid by 2020, which at that time will represent 1.5% of

the projected total output of 52 GW. In June 2010, Vietnam announced that it plans to build 14 nuclear reactors at eight sites in five provinces by 2030, to satisfy at least 15 GW nuclear power (i.e. 10% share) of the estimated total demand of 112 GW. An ambitious strategy to increase the nuclear share to 20-25% by 2050 has also been outlined.

The initial schedule was for construction start in 2014 and operation from 2020, but commencement has been delayed to 2017 or 2018. Experts said that the delay will help Vietnam have more time to prepare carefully for the project, particularly human resource training. Vietnam has sent many students to study nuclear energy in Russian and others countries to meet the needs of experts for projects NPP and the atomic energy projects later.



Pic. 1. Location of Ninh Thuan 1 Nuclear Power Plant



Pic. 2. Perspective of The Ninh Thuan 1 Nuclear Power Plant

	Major fields	Quantity (person for 2 NPPs	Implementation arrangement
1	Nuclear power	420	*-198 students studied in Russian since 2006 will graduate from 2013, in which 100 will work for EVN* *-Graduated 2 years before COD to go to the training enter at the NPPs.* *-Prioritizes are the local students in Ninh Thuan and the neibouring areas.* *- Abroad training: in nuclear power related majors principally for Ninh Thuan 2 NPP. (15 in Tokai-Japan)* *- Indigenous training: for the trainees who work in Ninh Thuan 2 NPP and the technicians for 2 NPPs*
2	Nuclear physics + Nuclear engineering	80	
3	Chemical engineering	64	
4	Control and automotive techniques	22	
5	Electrical + Mechanic electronics + Mechanics techniques	140	
6	Information technology	16	
7	Other	142	
	Total	**884**	

Pic. 3. Training Human Resource Project for Ninh Thuan 1 NPPs

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