

January 6, 2010

HE Mr Nguyen Tan Dung
Prime Minister of Vietnam

Your Excellency

We understand that on November 25, 2009 Vietnam's National Assembly approved government plans to build four nuclear power reactors.

According to the November 26, 2009 edition of the Wall Street Journal, the nuclear power plants are expected to cost around 200 trillion Vietnamese dong, or US\$11.3 billion. This works out to a cost of \$2,825 per kilowatt. This is a very low figure compared to recent international estimates. Even if low labor costs in Vietnam are taken into account, we doubt very much whether Vietnam could build a nuclear power plant so cheaply.

Cost estimates for construction of nuclear power plants have risen steeply over the past few years. The nearer power companies come to actually ordering new nuclear power plants, the higher the projected cost becomes. Some countries and power companies that intended to order new nuclear power plants suspended their plans when they discovered how much they would cost. Recent estimates for the overnight cost of constructing nuclear power plants are in the order of US\$4,000 per kilowatt. Total costs are much greater than this and if there are delays costs will rise even further.

The Appendix to this letter provides a selection of recent cost estimates for various types of power plant in a range of countries. The estimates are not directly comparable, because it is often unclear precisely what is included. However, they illustrate clearly that the cost anticipated by the Vietnamese National Assembly is very low.

In view of the discrepancy between the reported cost estimate for Vietnam's planned nuclear power plants and international cost estimates, we recommend that, before committing themselves any further, the Vietnamese government and National Assembly thoroughly review recent literature relating to the cost of constructing nuclear power plants.

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Appendix

Recent Cost Estimates for Construction of New Nuclear Power Plants

United States

1. Update of the 2003 MIT Future of Nuclear Power, Massachusetts Institute of Technology, 2009

The estimate in the MIT 2003 study was widely treated as an authoritative indication of the likely cost of constructing nuclear power plants. MIT 2003 estimated overnight costs at \$2,000 per kilowatt. In 2009 MIT published an update of the 2003 study. The overnight cost estimate in MIT 2009 was \$4,000 per kilowatt. MIT 2009 concludes as follows:

“The 2003 study identified the challenges to greater deployment and argued that the key need was to design, build, and operate a few first-of-a-kind nuclear plants with government assistance, to demonstrate to the public, political leaders, and investors the technical performance, cost, and environmental acceptability of the technology. After five years, no new plants are under construction in the United States and insufficient progress has been made on waste management. The current assistance program put into place by the 2005 EPACT has not yet been effective and needs to be improved. The sober warning is that if more is not done, nuclear power will diminish as a practical and timely option for deployment at a scale that would constitute a material contribution to climate change risk mitigation.”

2. Nuclear News Flashes, Platts, November 20, 2009

The overnight cost estimate (\$12.1 billion) in the following quote represents \$4,500 per kilowatt for two 1,350MW ABWRs to be built by Toshiba at the South Texas Project Nuclear Power Plant.

“CPS Energy may further reduce its ownership interest in two new units planned for the South Texas Project if the estimate for the expansion's overnight cost cannot be reduced to about \$9 billion from the current \$12.1 billion, executives with NRG Energy said November 19. NRG is CPS' partner in the project to build the new units.”

3. New Nuclear Generating Capacity: Potential Credit Implications for U.S. Investor Owned Utilities, Moody's Corporate Finance, May 2009

“Nuclear generating capacity, however, is not without its risks. The technology is very costly, potentially reaching over \$7,000 per kilowatt (kw) of capacity – by some estimates almost twice as much as new, scrubbed coal-fired power plants and three times as much as new, combined cycle natural gas power plants. In addition, the complexity and long-term construction horizon associated with building a new nuclear plant expose a utility to “material adverse change” conditions related to political, regulatory, economic and commodity price environments, as well as technology developments associated with supply and demand alternatives.”

4. Testimony by Florida Power & Light Company (FPL) to the Florida Public Service Commission in regard to FPL's petition to determine the need for construction of Turkey Point Nuclear Units 6 & 7 (October 16, 2007).

A table entitled “Project Total Cost Estimate Range” on the second last page of the submission estimates overnight costs between \$3,108 and \$4,540 per kilowatt and total project costs of between

\$5,492 and \$8,071 per kilowatt in 2007 US\$. The lower estimate “includes reduced escalation to 2007, reduced owner scope and cost, and low-range transmission integration estimate”, while the higher estimate “includes increased escalation to 2007, full owner scope and cost, and high-range transmission integration estimate”.

Canada

“Areva disputes EPR cost figure as Canadians grapple with risk issue”, *Nucleonics Week*, Platts, July 23, 2009

The Ontario provincial government said that the province cannot afford to buy two new reactors for Ontario Power Generation's Darlington station at prices the vendors submitted. The quote below suggests a price of US\$6,600 per kilowatt for two 1,650MW EPRs. Areva disputed this estimate, but it is nevertheless true that price was the major factor in the Ontario government's decision to halt its construction plans. The other bidders were Atomic Energy of Canada Ltd. (AECL) and Westinghouse. No figure was cited for the Westinghouse bid, but the AECL bid was said to be even higher than Areva's.

“Citing anonymous sources, the Toronto Star reported July 14 that Areva had proposed to build two 1,650-MW-class EPRs at Darlington for C\$23.6 billion (about US\$21 billion). The newspaper said Areva's bid included C\$7.8 billion (US\$6.9 billion) for the two reactors and C\$15.8 billion for the “rest of the plant,” for a total of C\$7,375 (about US\$6,600) per kilowatt installed. The paper said that figure was based on Areva's bid for its first US-EPR at Calvert Cliffs-3.”

Finland

“With reactor building dome installed, Olkiluoto-3 moves to next phase”, *Nucleonics Week*, Platts, September 10, 2009

Areva is building the first ever EPR at Finland's Olkiluoto Nuclear Power Plant. Due to design, licensing, legal and quality control problems, the project is well behind schedule and over cost. Areva took a big risk in offering a fixed price turnkey contract for this first of a kind project. Now it is attempting to recover some of the cost overruns by seeking compensation from TVO for “delay and disruption”.

“On August 31, Areva announced it anticipated losses related to completion of the Olkiluoto-3 project of Eur2.3 billion, compared to an original contract price of Eur3 billion. The unit was supposed to enter commercial service in May 2009 but the vendor consortium's most optimistic date is now mid-2012.”

UK

New Nuclear – The Economics Say No, Citi Investment Research and Analysis (Citigroup Global Markets), 9 November 2009

The UK government has pledged not to subsidize construction of nuclear power plants, but the Citigroup report concludes that nuclear power plants will not be economically viable without government support. Based on current exchange rates, the Euro cost estimate in the following quote represents a range of about US\$3,800 to US\$5,300.

“The latest evidence suggests a cost range of €2,500/kW to €3,500/Kw. For a 1,600MW unit, that means a construction cost of up to €5.6bn. We see very little prospect of these costs falling and every likelihood of them rising further.”

United Arab Emirates

S. Korea signs nuclear deal worth potential US\$40 bln with UAE, Yonhap News, December 27, 2009

The price of the recently signed deal between South Korea and the United Arab Emirates works out at about \$3,600 per kilowatt. According to media reports the contract covers design, construction and early operating expenses.

“South Korea signed a US\$20 billion deal with the United Arab Emirates to build four nuclear power plants in the oil-rich country...Under the deal, the South Korean-led consortium will build four 1,400-megawatt light water nuclear reactors by 2020 in Sila, some 330 kilometers west of the UAE capital.”

China

New Nuclear – The Economics Say No, Citi Investment Research and Analysis (Citigroup Global Markets), 9 November 2009

Very little information is available on the cost of nuclear power plants in China, but the following quote suggests that costs were grossly under-estimated at first.

“...the first AP-1000 unit under construction, in SanMen China, is running significantly over its \$1,000/KW construction cost target and is expected to be over \$3,500/KW target on current estimates.”

Turkey

“Turkey starts over as nuclear power plant tender scrapped”, Sunday’s Zaman, 22 November 2009

Turkish Electricity Trading and Contracting Company (TETAS) held a tender for the construction and first 15 years of operation of a nuclear power plant on Sept. 24, 2008. A consortium composed of Russian companies Atomstroyexport and Inter RAO UES and the Ciner Group’s Park Teknik won the tender as the sole bidder. However, TETAS was forced to cancel the bid. It appears that price was a major factor in the decision. The price quoted is per kilowatt-hour and it includes operational costs, so it is not directly comparable with a pure construction price per kilowatt. Nevertheless, it illustrates how a country attempting to introduce nuclear power for the first time was forced to reconsider when confronted with the real life costs involved.

“Upon loud criticism over the high price of the bid, the consortium had lowered its offer. The new price was \$0.134-\$0.154 per kilowatt hour (kWh), 27 percent lower than its original bid but still approximately double the current rates.”