

Did The World Bank Fudge Figures to Justify Nam Theun 2?

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As Asian countries grapple to find alternative fuel sources to high-priced oil, some bad economic decisions are being made. That appears to be the case with the World Bank's recent decision to fund the construction of the giant Nam Theun 2 dam in Laos.

When the World Bank approved US\$270 million in grants and guarantees for the controversial one thousand megawatt Nam Theun 2 (NT2) hydroelectric dam in Laos on 31 March of this year, most of its Directors were convinced that the project's economic benefits outweighed its environmental and social downsides. But there is evidence that Bank staff fudged its economic appraisal¹ of the dam, and that erroneous assumptions account for more than the alleged economic benefit of the project. A team comprising Thai university economists and an independent public interest energy analyst became aware of the Bank's erroneous assumptions and their impact in the course of a lengthy correspondence with the Bank.

The World Bank appraisal concludes that "the decision to purchase NT2 power offers significant savings to the regional power system", and that building NT2 will produce savings of \$188 million over the lifetime of the dam compared with using natural gas-fired generation to produce the same amount of electricity. About 95% of NT2's electricity will be sold to Thailand.

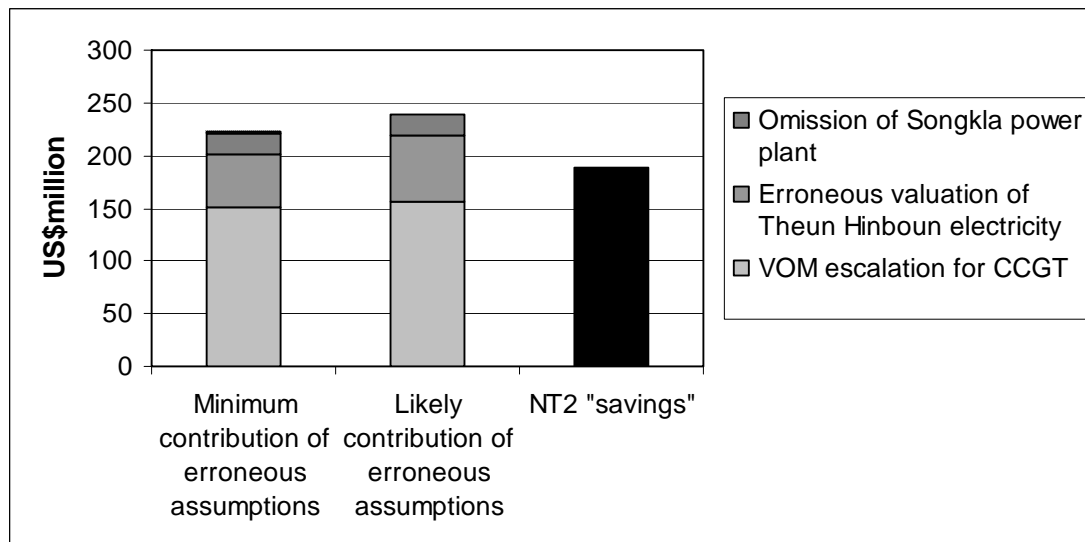


Figure 1: Contribution of erroneous assumptions significantly exceeds the claimed US\$188 million economic benefit of the project.

One striking finding was that in the final version of the appraisal, released just a week before the Board met, the Bank staff had quietly jacked up the "variable operations and maintenance (VOM)" cost estimates for the gas-fired alternative by 1240 percent compared to draft version assumptions. The change (from \$0.564/MWh to

\$7.000/MWh) is only discernable by comparing draft and final versions of two tables, printed in tiny font.²

The doctored figure is a whopping 1310 percent higher than the Thai electricity authority’s estimate of \$0.5358/MWh.³ The Bank’s alteration pushes the estimate for total operations and maintenance cost of the gas-fired alternative to the dam to more than triple Thai benchmarks, and more than double the highest international benchmarks that the public interest researchers could find.⁴

By making electricity from natural gas appear more expensive, alterations to the natural gas VOM assumptions account for US\$156 million of NT2’s claimed \$188 million savings.⁵ Revealingly, this amount is more or less what was needed to offset rising costs and declining benefits that the final draft had to accommodate, including a US\$101 million increase in NT2 project development costs⁶ and removal of an unwarranted⁷ \$20 million NT2 greenhouse gas credit.⁸

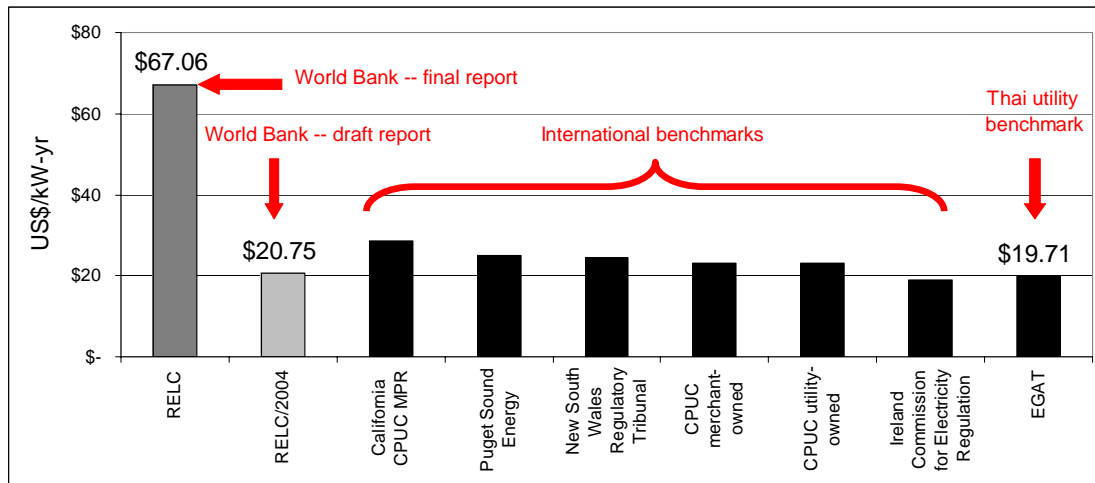


Figure 2: World Bank final report value for natural gas combined cycle turbine (CCGT) VOM costs compared with the value used in the draft (RELC/2004) report, international benchmarks, and Thai benchmark.

The researchers found that the Bank’s economic analysis of NT2 contained a number of other incorrect assumptions that cast the decision to build the dam in a more favorable light.

First, the analysis covered up the extent to which NT2 would actually reduce the economic benefits from electricity production of another dam, Theun Hinboun, from which it will divert water. The Bank inexplicably valued each unit of electricity produced by Theun Hinboun at only 1/3 that of each unit produced by NT2. That makes NT2 look \$51 to \$63 million more attractive than it would have otherwise.⁹

Second, the Bank’s analysis neglected to take into account four power plants totaling 2800 megawatts to be built by Thailand’s electricity authority. In the event that future demand for electricity in Thailand is low, constructing NT2 would mean that these power plants lie idle, accruing costs but not providing benefits. The Bank’s economic

appraisal of NT2 considers a scenario in which electricity demand is low, but it fails to include these power plants. Including just one of these “omitted but committed” power plants would reduce overall NT2 savings by another US\$20 million.¹⁰

Third, the Bank failed to incorporate the results of a study it itself had commissioned that found that it would be cheaper to invest in 1225 megawatts of energy conservation, and 216 megawatts of renewable energy than to build NT2.¹¹ It is hard to know exactly how much this inflates the “savings” attached to NT2, since the calculation would require re-running the entire economic model, and the Bank has not made the spreadsheets and relevant data publicly available.

Adding the impact of the errors discussed above, the total is at least US\$220 million, far exceeding the project’s US\$188 million alleged savings.

In addition, the Bank makes repeated false claims that its economic modeling considered “only downside risks” that “could be expected to pose the greatest test to project viability, i.e., conditions of lower than expected demand, lower than expected fuel prices, and higher than anticipated NT2 capital costs.” In fact, the Bank based its risk assessment on the assumption that construction costs could be “low”, yielding an economic windfall for the with-NT2 scenario. If the Bank’s analysis actually employed its purported scenario selection then NT2 would look an additional \$51 million more costly.¹² The false claim is particularly astounding when one considers a World Commission on Dams finding based on 248 large dam projects that on average dams cost 54% more than projected.¹³ Given the historical record, it is very questionable to have included a windfall “low construction cost” scenario as having a 25% probability of occurrence in the modeling. But it is much worse to have included it in the modeling while repeatedly claiming it was excluded.

This is not the first time that the Bank has biased an economic appraisal in ways that unreasonably favor a dam project. In 1992 the World Bank commissioned Wapenhans Report identified “pervasive appraisal optimism” as a key reason for the Bank’s poor decreasing portfolio quality. “Many Bank staff perceive appraisals as marketing devices for securing loan approval”, the official Report observed, and “funding agencies perceive an ‘approval culture’ in which appraisal becomes advocacy”.¹⁴

A few years later, the World Bank’s economic appraisal process for the Arun 3 dam in Nepal was so flawed that a Bank Division Chief, Martin Karcher, resigned in protest over the project. He warned that the Bank’s economists expected Nepali consumers to pay electricity rates that were seven times higher than the rates in Washington, D.C. “Obviously, if you use these kinds of values, then any project becomes feasible and justified,” Karcher said in an interview, “The analysis merely serves to justify the project after the fact.”¹⁵

Partially due to criticisms and partially due to increasing private investments in developing country infrastructure building, by the mid-1990s the Bank had for the most part sworn off these types of projects. The Bank’s endeavor to fashion itself as standard bearer of corporate governance was not nearly as lucrative as lending money for big infrastructure, however. And in the wake of power sector crises in India,

Indonesia, and the Philippines that were precipitated by World Bank-led privatization initiatives, many governments declined Bank advice on power sector liberalization. At the same time, some of the Bank's good ideas on improving accountability and transparency in power sector governance collided with vested interests in developing countries. Now the Bank is back in the infrastructure game, with NT2 as a test case.

An independent investigation should be conducted into the irregularities in the NT2 economic appraisal and the World Bank should reconsider its role in the NT2 project. No one would disagree that NT2 provides beneficial fuel diversity for Thailand, which currently relies on natural gas for 70% of electricity production. But at what cost? The argument to build the project should be based on facts, not fudged numbers. It is not too late to correct the errors and evaluate the project on its true merits. Canceling the Nam Theun 2 is still likely to be better than committing Thai ratepayers to an economically inferior choice. Investors are affected as well, as many of the World Bank's bogus figures strongly inflate the commercial appraisal of the project.

The Bank should have put the bulk of its power sector assistance towards helping Thailand and its neighbors to establish competent and empowered independent regulatory authorities to ensure that EGAT and other power sector players consistently act in the public interest. Instead, it appears that the Bank is part of the problem by using voodoo economics studies to champion dubious massive infrastructure megaprojects that developing country citizens will have to pay for for decades to come. If the Bank's primary goal is to fight poverty then this is the wrong way to go about it.

The economic appraisal discussed above is Robert Vernstrom, *Nam Theun 2 Hydro Power Project Regional Economic Least-Cost Analysis: Final Report* March, 2005 at <http://siteresources.worldbank.org/INTLAOPRD/Resources/RELC-2005-final.pdf>.

The draft version of the economic appraisal report is available at: <http://siteresources.worldbank.org/INTLAOPRD/491761-1094074854903/20251513/Economic.pdf>.

This article with full references is available at www.palangthai.org/docs/NT2EconMalfeasRefs.pdf.

The researcher's calculations of the impact of the Bank's erroneous assumptions are available at www.palangthai.org/docs/NT2EconMalfeas.xls

An archive of correspondence with the World Bank Country Director for Lao PDR and Thailand (cc'd to Bank Board) concerning these issues is available at www.palangthai.org/docs/RemarkableAssumptions.pdf.

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- ¹ Robert Vernstrom, 2005. *Nam Theun 2 Hydro Power Project Regional Economic Least-Cost Analysis: Final Report* (RELC). <http://siteresources.worldbank.org/INTLAOPRD/Resources/RELC-2005-final.pdf>. A draft version (RELC/2004) of the report was widely circulated and is available at: <http://siteresources.worldbank.org/INTLAOPRD/491761-1094074854903/20251513/Economic.pdf>.
 - ² See Tables 13 and 15 in RELC and in RELC/2004
 - ³ Price Waterhouse Coopers (2004). Thailand: Electricity Power Tariff Energy Planning and Policy Office -- Inception Report -- Annexes C, table C.6.-E. Bangkok, Thailand.
 - ⁴ Calculations and references at: www.palangthai.org/docs/NT2EconMalfeas.xls on the worksheet "Benchmark VOM"
 - ⁵ Calculations and references at: www.palangthai.org/docs/NT2EconMalfeas.xls on the worksheet "Inflated gas VOM"
 - ⁶ Table 17 in RELC and RELC/2004.
 - ⁷ The Bank-commissioned study: Laplante, B. (2005). Economic analysis of the environmental and social impacts of the Nam Theun 2 Hydroelectricity Power Project states: "reduced emissions may be partially or totally offset by the production of GHG [greenhouse gases] from the reservoir". Page 55. http://siteresources.worldbank.org/INTLAOPRD/147273-1092045101973/20377067/e-s_economic_analysis.pdf
 - ⁸ RELC/2004 page 44 includes \$1.91 million/yr in carbon credits. This text dropped in the RELC.
 - ⁹ Calculations and references at: www.palangthai.org/docs/NT2EconMalfeas.xls on the worksheet "Erroneous TheunHin valuation"
 - ¹⁰ Calculations and references at: www.palangthai.org/docs/NT2EconMalfeas.xls on the worksheet "Omitted Songkla". Land purchase for the Songkla 700 MW combined-cycle natural gas power plant was approved on 28 October, 2004. The Cabinet approved the project in June 2005, and construction commenced in July 2005. Bangkok Post (2005). "Gas-fired power plant gets cabinet approval." Bangkok Post: 5. 8 June. <http://www.BangkokPost.net>
 - ¹¹ du Pont, P. (2005). Nam Theun 2 Hydropower Project (NT2) Impact of Energy Conservation, DSM, and Renewable Energy Generation on EGAT's Power Development Plan. Bangkok. <http://siteresources.worldbank.org/INTLAOPRD/Resources/DSMmarch2005.pdf>
 - ¹² Calculations and references at: www.palangthai.org/docs/NT2EconMalfeas.xls on the worksheet "NT2 cap cost scenarios"
 - ¹³ World Commission on Dams (2000). Chapter 2: Technical, Financial and Economic Performance. The Report of the World Commission on Dams. London, Earthscan Publications Ltd. Page 41. <http://www.dams.org/report/contents.htm>.
 - ¹⁴ IBRD, Effective Implementation: Key to Development Impact [Wapenhans Report], November 3, 1992, p. 14
 - ¹⁵ Environmental Defense The World Bank and Large Dams: Failure to Learn from History. http://www.environmentaldefense.org/documents/3011_Gambling_Dams.pdf