

The World Bank

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT
INTERNATIONAL DEVELOPMENT ASSOCIATION

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Dear Dr. Greacen, Khun Decharut and Dr. Chalotorn:

Subject: NT2 – Project Economic Analysis

I am writing to respond to the claims in your letter (dated March 29, 2005) to the World Bank's Executive Directors that the World Bank has purposefully used "suspicious assumptions" and "changes [that] systematically favor NT2" in its economic analysis of the NT2 project. This letter explains why these claims are unfounded.

The Bank's economic analysis draws on actual market prices in ascribing real economic values and costs. Market prices are constantly changing and, therefore, it is standard practice for the bank to adjust its assumptions and economic analysis periodically to reflect such changes and to remain up to date. There have been two significant changes that are reflected in the Bank's new economic analysis for the NT2 project: (i) an increase in global oil prices and futures prices, which also influence gas prices; and (ii) an increase in the cost of capital goods related to the power sector.

In order to ensure the accuracy of its economic analysis, during the second half of 2004 and the first few months of 2005, the Bank revisited all of the major assumptions for its economic and commercial analysis. Each of these assumptions was retested and adjusted individually based on the respective merits. The consultations process of August-September 2004, during which the Bank received views and advice from a broad spectrum of knowledgeable people, contributed to some of the revisions. Some of the changes in assumptions were substantial, others less so.

Cost of Natural Gas. *The economists state that the Bank increased the cost of natural gas without justification.* The major sources of changed natural gas values between the Bank's August 2004 Interim Economic Analysis and the March 2005 Project Economic Analysis are (i) a minor recalibration of the gas price determination formula to more accurately reflect current market costs in 2004, (ii) an increase in the World Bank's oil price forecast, which partially impacts the price of natural gas because the price of heavy oil has about a 30% share in the gas price indexing formulae of current contracts, and (iii) a revised treatment of gas pipeline transportation costs. For the economic costing of natural gas, items (i) and (ii) caused the value to increase, while item (iii) caused it to decrease. These changes were almost offsetting, such that

there is very little difference between the values for natural gas used last August compared with those used this year. Notwithstanding the information in Table 15 of the RLEC report, the Bank used a gas price of US\$2.27/mmbtu from 2015 onward. It is important to note that the Bank has looked at both spot market prices *and* long-term price trends in carrying out its analysis and has used sensitivity analysis to test the robustness of the project to changes in these prices.

Increased Cost of Gas Turbines. *The economists state that the Bank changed gas turbine costs from the previous economic analysis without justification.* The Bank carried out further due diligence on the capital costs of gas turbines (GT) and combined cycle gas turbines (CCGT). This included getting actual prices of CCGT projects recently completed in the Southeast Asian region. As a result, the GT capital cost increased from US\$ 250/kW to US\$ 310/kW and the CCGT capital cost estimate increased from US\$ 450/kW to US\$ 510/kW. For the CCGT capital cost, this represents a 13 percent increase above the previous estimated capital cost and reflects booming demand for capital investment in power generation in Asian markets and the resulting increase in the cost of capital equipment, factors which have also affected the capital cost of the NT2 project.

Valuing the Reduction in Firm Power from the Theun Hinboun Project. *The economists state that the Bank has mis-valued the reduction in firm power from the Theun Hinboun project.* The planning, design and construction of the Theun Hinboun (THB) project was predicated on the knowledge that the NT2 project – once constructed - would draw water from THB, which has used the incremental water available as a result of the delayed implementation of NT2 to generate additional power for export to Thailand. When NT2 is commissioned, there will be a reduction of energy but not of peak capacity from THB. The small (less than two-tenths of one percent of Thai energy demand) reduction of energy supply from THB is a supply displacement and replacement issue - not an element of incremental consumer demand. Therefore, it will be replaced by a minor increase of energy production from existing thermal power plants, at a lower marginal economic cost, estimated to be the recurrent operating and fuel costs of that capacity, because there will be no capital charges. In contrast, NT2 would provide a significant expansion of capacity designed to meet higher Thai power demand which would be valued, in economic terms, at the retail consumer's willingness to pay.

Accounting for 1,225 MW of Additional DSM and 274 MW of Renewable Energy. *The economists state that the Bank has given no accounting to the 1,499 MW of additional least-cost DSM and renewable energy.* The study on energy conservation, demand side management (DSM) and renewable energy in Thailand by Danish Energy Management is the last of the consulting studies that the World Bank commissioned as part of its due diligence on the economic aspects of the Nam Theun 2 Hydroelectric Project. The final version of this paper, which was commissioned in April 2004, was posted last week on the Bank's website. The Bank commented on earlier drafts of the paper in June and October 2004, and in January and March 2005.

The study estimates that in the period from 2002 to 2011, energy efficiency (EE) and DSM could provide as much as 1,225 MW beyond the 982 MW of DSM already included in EGAT's Power Development Plan (PDP) of August 2002, the planning base for the Bank's NT2 project economic analysis. The study also estimates that this energy would be less expensive than additional electricity supply from any source.

The Bank's economic analysis for the NT2 project recognizes these findings (see the interim and the final analysis on this website, posted respectively in August 2004 and March 2005). However, that analysis observes that it is uncertain how much of these estimated amounts of DSM/EE beyond those already included in EGAT's PDP might actually occur in the planning

period to 2011, because their achievement would depend on the independent and uncertain decisions of millions of Thai electricity consumers. During the first DSM program (a seven-year period from 1995 to 2001), EGAT achieved 638 MW in DSM savings, averaging about 90 MW annually. EGAT's current program assumes comparable results, totaling 982 MW of DSM/EE savings from 2002 to 2011. The author's assumption that EGAT could achieve an additional 1,225 MW of DSM/EE savings during the period assumes a 145 percent annual increase over the rates of uptake previously achieved and currently projected by EGAT. While such a result would be highly desirable, this is a rate of progress that cannot be predicted with reasonable assurance, given the potential institutional and funding uncertainties cited by the author.

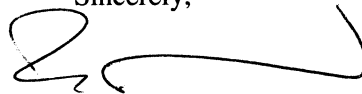
The Bank recognizes that DSM/EE savings are a desirable outcome and should be encouraged; indeed, it pioneered DSM project support in Thailand in the 1990s. But there are practical constraints on the pace of implementation. In the event that all of the prospective DSM/EE savings were to be realized in the planning period, the author and the Bank conclude that it would delay the optimal NT2 commissioning date by about a year. This, however, does not destroy the project's long-term economic viability. The Bank's analysis concludes that NT2 would still be economically viable, with an economic rate of return (ERR) of 14.6 percent instead of an ERR of 16.3 percent.

The study also estimates that 274 MW of renewable energy projects would be likely to provide electricity at commercial costs below that of NT2. This amount fits within EGAT's supply planning parameters over the time period that includes NT2's commissioning date.

Omission of Committed Upgrades and Overestimation of Plant Retirements. The economists state that the Bank omitted committed upgrades and overestimated plant retirements. The supply program adopted in the Bank's analysis is economically optimized with dynamic programming related to the demand forecast used. All prospective plants that are not firmly and irrevocably contracted are treated as candidates for inclusion in the optimized supply program. This treatment is technically correct and realistically reflects the flexibility available to EGAT for adjusting its supply program over the remainder of the decade and beyond, in order to achieve a reasonable balance between demand and supply including required reserves.

I trust that this responds adequately to your expressed concerns.

Sincerely,



Ian C. Porter
Country Director, Lao PDR and Thailand
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cc: World Bank Executive Directors