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TRUNG SON HYDROPOWER PROJECT

Meeting Vietnam's Energy Demands
in a Sustainable Way



Photo by: World Bank





OVERVIEW

Trung Son Hydropower Project (TSHPP) is a US\$411.57 million medium-sized hydropower development located in Northwest Vietnam that will supply least-cost electric power for domestic consumption in an environmentally and socially sustainable manner. The project will also contribute to the climate change agenda in Vietnam by avoiding CO₂ emissions of about 1 million tons per year (net) taking into account the additional low emissions from its reservoir.

TSHPP will enable Vietnam to add an additional 260MW of electricity-generating capacity to service power expansion and meet energy demands of Vietnamese society as the country continues its economic growth, while ensuring key conditions like energy security and climate change are contemplated. The project responds to and is circumscribed into the integrated hydrological basin studies conducted as part of developing the Energy Master Plan for Vietnam and its subsequent revisions and is part of a broader World Bank energy assistance strategy for the country.

Trung Son Hydropower Project was approved by the World Bank Board of Executive Directors on April 26th, 2011, and is the first World Bank investment project under IBRD lending conditions to the Government of Vietnam. The World Bank is providing financial support in the form of a loan of US\$330 million payable with a 27 year maturity and a grace period of 6 years.

CHALLENGES

Vietnam's annual growth rate of 7-8% during the period of 1996-2010 has led to an increasing demand for power. Electricity consumption in Vietnam has been growing at 15% annually for the past several years. Chronic power shortages are affecting the agricultural, industrial and services sector, while many houses still have no reliable supply of electricity. To meet this demand—estimated at an installed capacity of 39GW by 2020, compared to 15.8 GW in 2008—the Government is developing a range of power sources, including hydropower.

As climate change impacts create increasing national concern, a series of hydropower plants that provide clean, renewable and low-cost energy have been planned. Vietnam is keen to improve the social and environmental performance of these projects, and Trung Son Hydropower Project is an opportunity to show

the progress Vietnam has made in developing a legal and policy framework that complies with the Bank's safeguards policies.

The World Bank has a history of involvement in Vietnam's power sector dating to the early 1990s. The US\$330 million IBRD loan for TSHPP includes support for equipment, civil works and technical assistance. A sum of US\$26 million is reserved for improved resettlement, livelihood development, support for ethnic minorities and environment protection. Through the project, the World Bank will also provide technical support to Vietnam Electricity (EVN), the state-owned power utility, in improving the performance of its hydropower projects in dam safety and operations as well as in adopting international standards in social and environmental practices.





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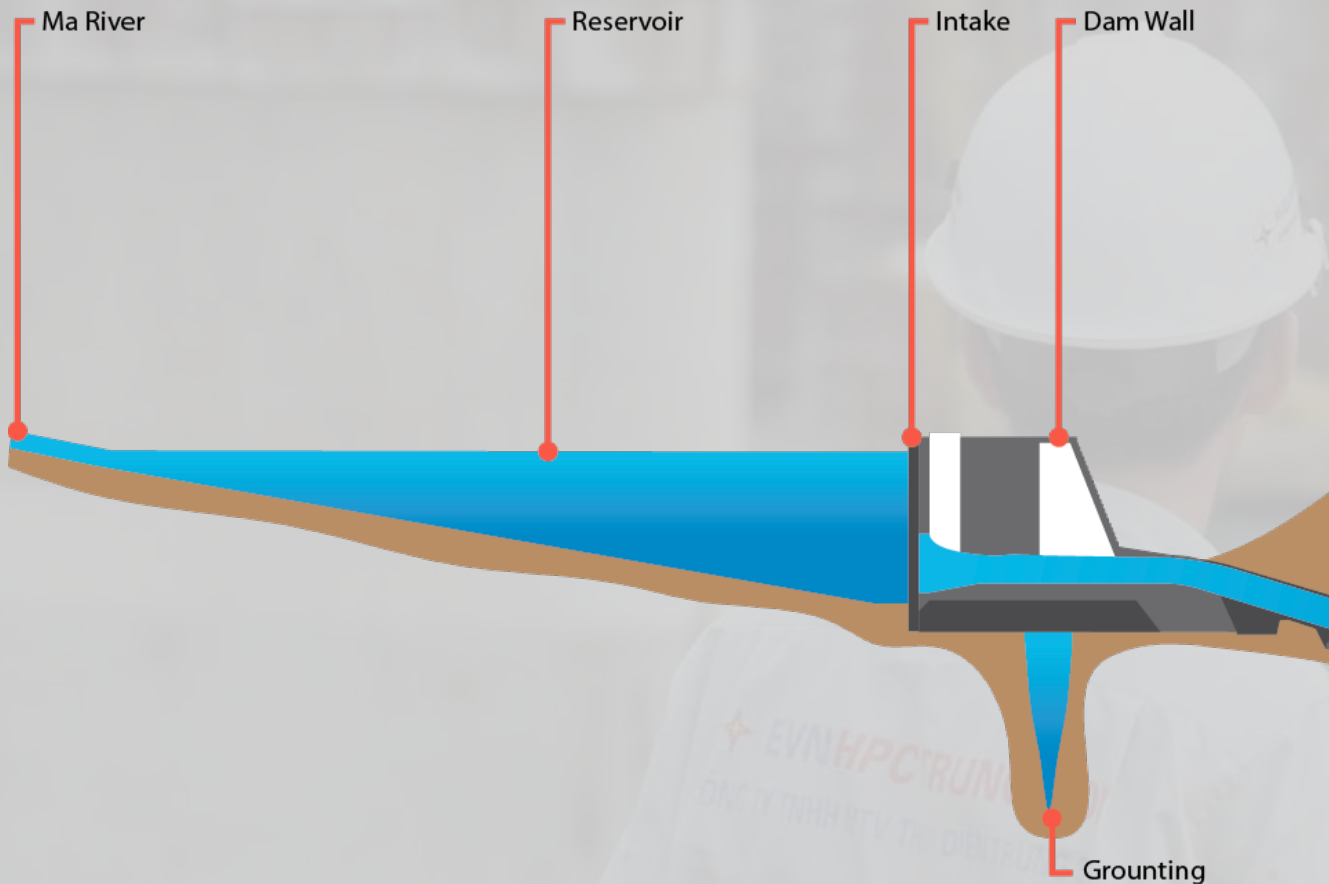
APPROACH

TSHP implementation is being undertaken by the Trung Son Hydropower Company (TSHPCo), a wholly owned subsidiary of EVN. It is responsible for ensuring the entire project is implemented according to both Government and World Bank requirements as well as international best practices. The TSHPCo has a dedicated website (<http://www.trungsonhp.vn>) where all relevant information on the project is publicly available and regularly updated.



Photo by: Mai Ky/World Bank, 2012

PROJECT LAYOUT





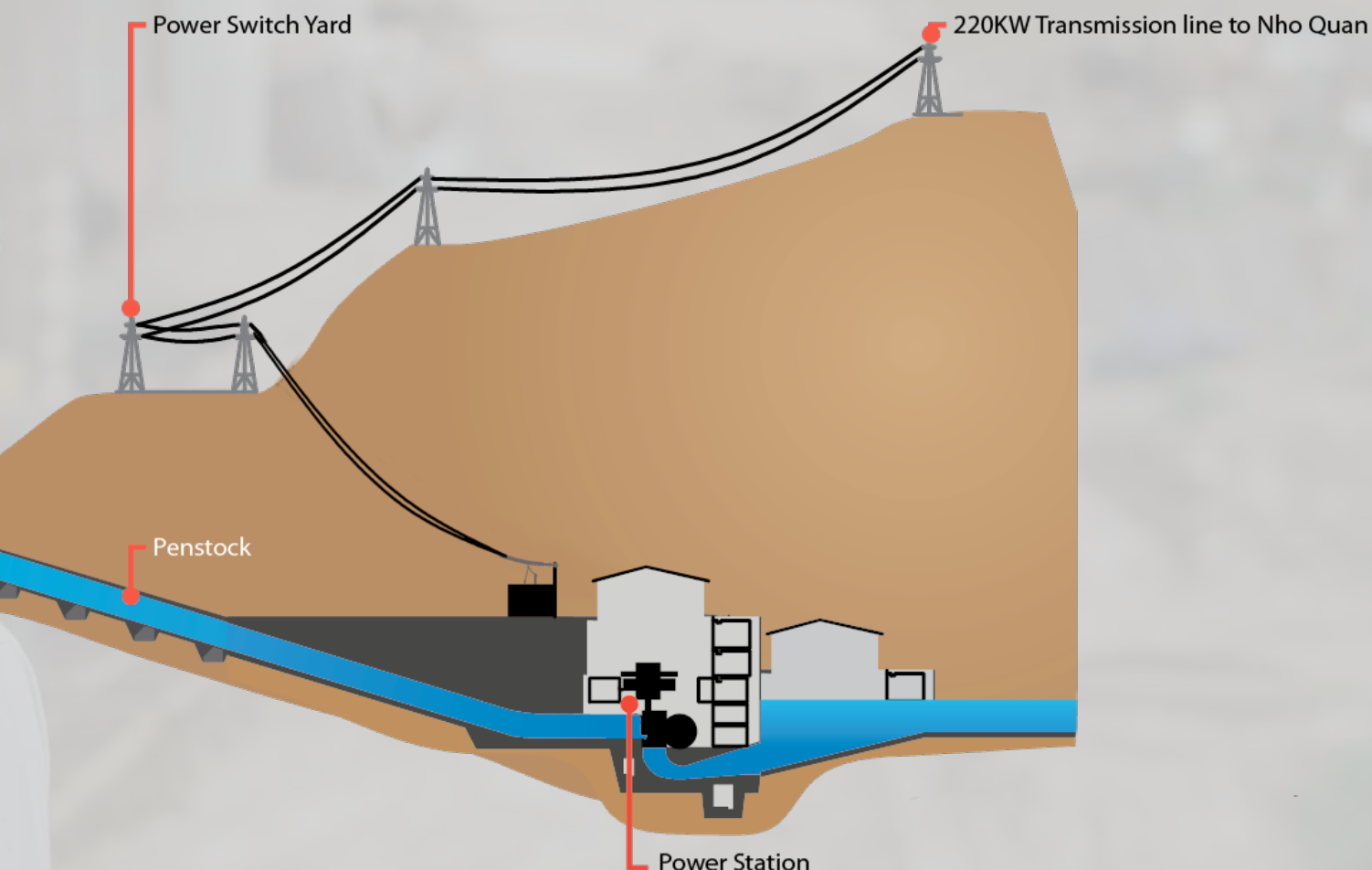
TSHPP includes the development, construction, and operation of the power plant using water from the Ma River and releasing it into the same basin. The project dam site is located 48 km from the border with Lao PDR in Son La, Thanh Hoa and Hoa Binh provinces in northwestern Vietnam. The main features of the project include:

- 84.5 meter-high dam on the Ma River;
- 13.13 square-kilometer reservoir;
- Powerhouse containing four 65 MW Francis turbines (260 MW installed capacity) each designed for a maximum water head of about 72 m;
- 65 kilometer-long 220-kV transmission line to the Vietnamese national grid;
- Over 20 kilometer access road connecting the road system to the project site;
- Social, environmental and community relations programs to mitigate project impacts to impacted populations of about 10,000 people. Of these, over 7,000 people

are directly impacted in the main projects area.

Trung Son Hydropower Project also has a robust, multi-layer monitoring and evaluation framework consisting of the following elements:

- *Project Technical Advisory Panel (PTAP)* to advise on technical construction, operations, and dam safety issues during the construction phase of the project.
- *Panel of Environmental and Social Experts (POE)*, to advise on environmental and social issues as well as the independent grievance process.
- *Independent Monitoring Consultants (IMC)* to independently review activities by both contractors and TSHPCo.
- *Regular World Bank Supervision* to monitor technical, fiduciary, procurement, social and environmental safeguards compliance.







BENEFITS

The project's development objective is linked to supply of the least-cost electric power in a safe and environmentally and socially sustainable way. Direct benefits include:

- Improvement in living conditions for over 2,000 people that will be relocated;
- Livelihood restoration activities for over 7,000 people whose household are affected by the project;
- US\$2 million for specific environmental programs that go further than the EMP, including US\$700,000 for the protection of 3 natural biodiversity preserves in the Project areas;
- Continuous consultations with villagers on their preferences related to the social change;
- Employment opportunities for Vietnamese workers during construction years;
- Improved road access for villagers and surrounding areas, including 25 km access road connecting the Project site;
- Increase Vietnam's power supply with an additional 1019GW a year; while CO2 emissions of about 1 million tons per year will be avoided;
- Provide flood control benefits through a water storage capacity of 112 million m3.



WORLD BANK CONTRIBUTION

The World Bank is providing financial support in the form of a loan of US\$330 million payable with a 27 year maturity and a grace period of 6 years. The loan includes support for equipment, civil works and technical assistance. The project is composed of four components and the IBRD funding allocation is distributed as follows:

- *The Dam and Ancillary Construction Component*, providing the basis on which least cost electric power is generated. The total cost is estimated at US\$262.86 million, of which IBRD will provide US\$233.76 million.
- *The Transmission Line Component* is the means by which the power generated is moved to electricity consumers. The total cost for this component is US\$18.61 million, of which IBRD will provide the full amount.
- *The Social and Environment Impact Mitigation Component* ensures the environmental sustainability and socially responsible construction and operation of the Trung Son Hydropower Plant. The total cost for this component is estimated at US\$35.47 million, of which IBRD will provide US\$16.53 million.
- *The Capacity Development and Scale-up Component* scales up the impact of the environmental sustainability and socially responsible construction of the plant by leveraging the knowledge gained to other projects in Vietnam. The total cost is estimated at US\$3.0 million, of which IBRD will provide the full amount.





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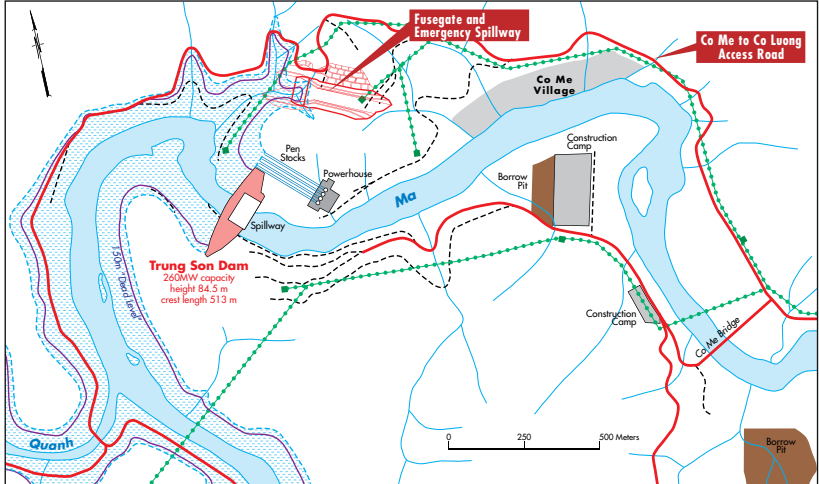
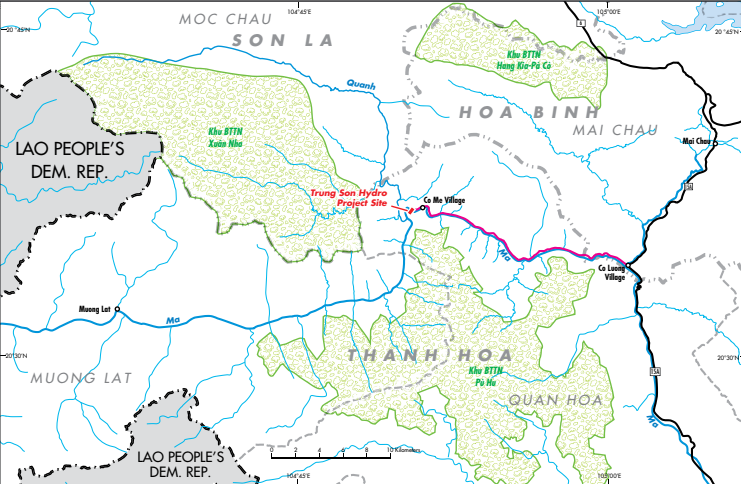
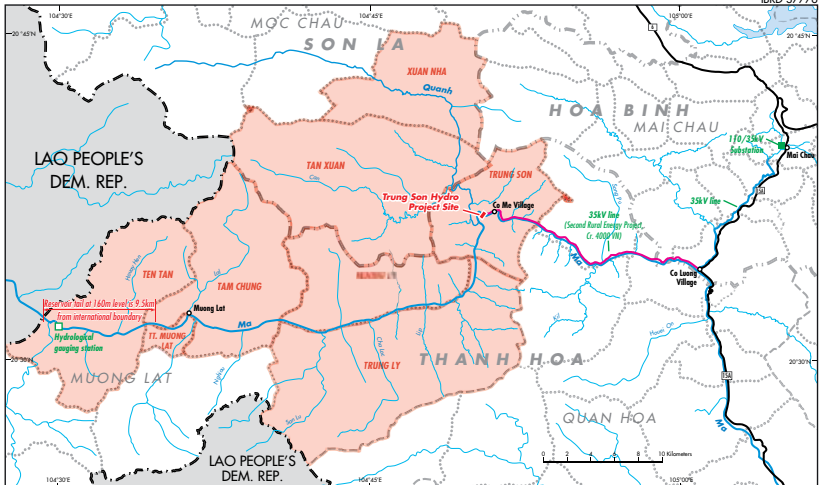
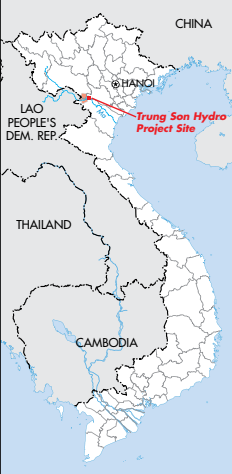
Toward the Future

The TSHPP is a good example of a well-designed, medium-scale hydropower project prepared according to international good practices in technical design incorporating comprehensive environmental, social and dam safety elements. Given Vietnam's plans to develop other medium scale hydropower projects in the coming years, the first hydropower project that the World Bank is financing in Vietnam can serve as a good practice example upon which subsequent projects can be developed and implemented. In addition, the Trung Son Hydropower Project can become an example of how hydropower can help support Vietnam's development in an economically, environmentally and socially sustainable way.

VIETNAM TRUNG SON HYDROPOWER PROJECT Map 2: Area of Project Activities

- PROJECT DAM SITE
- CORE RDP PROJECT AREA
- FUTURE RESERVOIR (160 meter contour)
- DEAD LEVEL (150 meter contour)
- PROJECT ROAD
- TEMPORARY ROAD/USED ONLY DURING CONSTRUCTION PHASE OF THE PROJECT
- MAIN ROADS
- 35 KV TRANSMISSION LINES
- BORROW PITS
- NATURE AREAS
- COMMUNE BOUNDARIES
- DISTRICT BOUNDARIES
- PROVINCE BOUNDARIES
- INTERNATIONAL BOUNDARIES

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For more information about the Trung Son Project, please visit:

<http://www.worldbank.org/en/country/vietnam>
and
<http://www.trungsonhp.vn>
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