



Report and Recommendation of the President to the Board of Directors

Project Number: 42182
March 2009

Proposed Loan and Technical Assistance Grant
Socialist Republic of Viet Nam: Renewable Energy
Development and Network Expansion and
Rehabilitation for Remote Communes Sector Project

CURRENCY EQUIVALENTS

(as of 18 February 2009)

Currency Unit – dong (D)

D1.00 = \$0.00006

\$1.00 = D17,490

ABBREVIATIONS

ADB	–	Asian Development Bank
ADF	–	Asian Development Fund
CDM	–	Clean Development Mechanism
EMDF	–	ethnic minority development framework
EMDP		ethnic minority development plan
EVN	–	Vietnam Electricity
GDP	–	gross domestic product
ICB	–	international competitive bidding
IEE	–	initial environmental examination
LDU	–	local distribution unit
MOF	–	Ministry of Finance
MOIT	–	Ministry of Industry and Trade
NCB	–	national competitive bidding
PC 1	–	Power Company 1
PC 2	–	Power Company 2
PC 3	–	Power Company 3
PMB	–	project management board
PPC		provincial people's committee
REREPMB	–	Rural Electrification and Renewable Energy Project Management Board
SEDP	–	Socio-Economic Development Plan
TA	–	technical assistance

WEIGHTS AND MEASURES

GWh	–	gigawatt-hour (1,000,000 kWh)
km	–	kilometer
kV	–	kilovolt (1,000 volts)
kWh	–	kilowatt-hour (1,000 watt-hours)
MW	–	megawatt (1,000,000 watts)
MVA	–	megavolt-ampere (1,000,000 volt-ampere)

NOTE

In this report, "\$" refers to US dollars.

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LOAN AND PROJECT SUMMARY

Borrower	Socialist Republic of Viet Nam
Classification	<p>Targeting classification: Targeted intervention (geographical poverty issues [TI-G])</p> <p>Sector: Energy</p> <p>Subsector: Renewable energy</p> <p>Themes: Economic growth, social development, environmental sustainability</p> <p>Subtheme: Human development</p>
Environment Assessment	Category B. An initial environmental examination was completed for a core subproject, and an environmental assessment and review framework was prepared.
Project Description	<p>The primary objective of the sector Project is to develop rural electrification and renewable energy in Viet Nam to benefit ethnic minority communities inhabiting remote and poorer parts of the country. The Renewable Energy Development and Network Expansion and Rehabilitation for Remote Communes Sector Project consists of two investment components: (i) mini-hydropower plants in mountain provinces, and (ii) network expansion and rehabilitation of distribution networks serving poor provinces.</p> <p>Component 1 of the Project will develop about 5–10 grid-connected run-of-river mini-hydropower plants with 7.5 megawatts (MW) or less capacity, totaling 30 MW in Lai Chau, Dien Bien, and several other provinces in northern and central Viet Nam. Electricity connections will be provided to about 60–75 villages in poor, remote ethnic minority areas in northern Viet Nam, and about 100 gigawatt hours (GWh) of renewable energy to the national grid. The Project will provide a sustainable financing mechanism to remote mountainous provinces in underdeveloped provinces in northern and central Viet Nam to finance rural electrification through revenues from the sale of electricity, generated using renewable energy resources, to the national grid.</p> <p>Component 2 of the Project will support the Government's ongoing special program of supporting rural electrification of poor provinces inhabited by ethnic minorities by which the Government provides 85% of the funding and EVN 15%. The Government is providing more than \$70 million to regional power distribution companies of Viet Nam Electricity (EVN) to electrify more than 100,000 households in five provinces in the Central Highlands. The Government intends to extend this program to five more provinces in the northern mountain areas (i.e., Dien Bien and Lai Chau), Mekong Delta (Tra Vinh and Soc Trang), and central Viet Nam (Quang Tri). This is estimated to require about \$90 million; the proceeds from component 2 will be allocated for financing the Government's program in these additional five provinces. Approximately 100,000 poor households in about 1,000 villages are expected to receive electricity under this component.</p>

The Project will include an associated technical assistance (TA) grant for capacity building for renewable energy development.

Rationale

Access to electricity increased rapidly in Viet Nam from 51% of households in 1996 to more than 91% in 2008. In 2007, more than 97% of the country's communes were connected to the national grid. However, 278 communes are not yet connected. The Government's long-term development strategy for rural electrification envisages a combined effort, with EVN taking responsibility for extending the medium voltage network to rural areas, and the provincial and district authorities taking a lead role in investing and operating low voltage distribution systems in remote areas. However, recently the Government decided to transfer the development of low voltage networks to EVN to expedite the electrification of remote parts of the country populated by poor and vulnerable ethnic minorities.

Component 1 of the Project promotes the use of renewable and distributed energy sources to provide electricity to these remote communes. The development of mini-hydropower projects in remote parts of northern Viet Nam will reduce generation at polluting centralized thermal power plants, and reduce transmission and distribution losses. These mini-hydropower plants are expected to be connected to the national grid, thus providing (i) additional clean energy to the national grid, (ii) access to electricity to remote areas and (iii) a sustainable financing source for further rural electrification from revenues generated by selling electricity generated by mini-hydropower plants to the grid. The Project will contribute to the institutional development of renewable energy and rural electrification.

The rapid roll-out of Viet Nam's rural electrification during 1993–2005 was facilitated by (i) EVN taking responsibility for extending medium voltage lines to commune centers (i.e., a commune is an administrative entity in Viet Nam with 5–6 villages and about 1,000–2,000 households), and (ii) local residents acting through village organizations (i.e., cooperatives) taking responsibility for the low voltage network. However, this approach has resulted in poorly constructed low voltage networks with poor service quality and high distribution losses. Many villages without electricity are officially classified as electrified when only the commune center is provided with electricity. Component 2 of the Project is to expand the rural distribution network to connect villages without electricity and to rehabilitate the existing poorly constructed low voltage networks serving poor communes. The use of Asian Development Fund funding and concessionary onlending terms and state budget transfers from the Ministry of Finance (MOF) to regional executing agencies is justified for the Project, based on the low per capita investment and low consumer density in rural areas that result in low financial returns to the utility.

Impact and Outcome The impact of the Project is to promote pro-poor and balanced economic development of remote mountainous communes and poor communes through the sustainable use of electricity and renewable energy in an affordable manner.

The outcome of the Project is provision of reliable and affordable supply of electricity to remote mountainous and poor communes.

Project Investment Plan The investment cost of the Project is estimated at \$197.6 million including taxes and duties of \$20.0 million. The total cost includes physical and price contingencies, and interest and other charges during implementation.

Financing Plan The Government has requested a loan of SDR 102,161,000 (\$151,000,000 equivalent) from the Asian Development Fund to finance the Project. The loan will have a 32-year maturity, including a grace period of 8 years, a 1% interest charge during the grace period and 1.5% during the amortization period. The counterpart funds will be provided by the executing agencies funded through their internal cash generation.

(\$ million)		
Source	Amount	%
Asian Development Bank	151.0	76.4
Power Company 1	21.9	11.1
Power Company 2	8.9	4.5
Power Company 3	15.8	8.0
Total	197.6	100.0

Allocation and Relending Terms Component 1, to be implemented in selected northern and central provinces by Power Company 1 (PC 1) and Power Company 3 (PC 3), is allocated \$61 million. MOF will onlend the proceeds of the Asian Development Bank (ADB) loan allocated for component 1 to PC 1 and PC 3 pursuant to a subsidiary loan agreement with terms and conditions acceptable to ADB. The funds allocated for component 2 for provinces included in the Government's special program for rural electrification will be provided to PC 1, Power Company 2 (PC 2), and PC 3 on grant basis through the state budget. The total fund allocation for component 2 will be \$90 million. For those provinces not included in the Government's special program, funds will be onlent.

Period of Utilization 30 June 2016

Estimated Project Completion Date 31 December 2015

Executing Agencies Power Company 1, Power Company 2, and Power Company 3 of EVN

Implementation Arrangements

Ministry of Industry and Trade (MOIT) will set up a steering committee to coordinate and monitor implementation of both project components. Approval of the technical design, contract award, installation supervision, and approval of payments will be undertaken by PC 1, PC 2, and PC 3. ADB will administer the associated TA grant. The consultants will work closely with MOIT to provide policy-related technical support, and with the executing agencies to support project implementation.

Procurement

Procurement of goods and works to be financed by ADB will be procured in accordance with ADB's *Procurement Guidelines* (2007, as amended from time to time). Contracts for works valued at more than \$2 million equivalent will be procured through international competitive bidding. Small packages of works valued at less than \$2 million equivalent, but more than \$100,000 equivalent will be procured through national competitive bidding procedures. For works less than \$100,000 equivalent, shopping procedures may be used. Contracts for goods valued at more than \$500,000 equivalent will be procured through international competitive bidding. Goods costing less than \$500,000 equivalent but more than \$100,000 will be procured through national competitive bidding. Smaller packages for goods valued at less than \$100,000 may be procured through shopping procedures.

Consulting Services

The consulting services requirement of technical and safeguard support for subproject preparation will be provided through the associated TA grant. ADB will select and engage these consulting services in accordance with ADB's *Guidelines on the Use of Consultants* (2007, as amended from time to time).

Project Benefits and Beneficiaries

The main beneficiaries of the Project are the residents of communes targeted to receive access to electricity under the Project. Access to reliable and affordable electricity supply will contribute to improved quality of life; reduced indoor air pollution; increased time available for leisure, income generation, and educational activities in the targeted communes. Availability of electricity will have a major impact on improving the productivity of industrial and commercial activities. This will result in general improvement of the commune's economy and improve the incomes and living conditions of residents. In remote mountain areas, the availability of electricity to ethnic minority communities will facilitate provision of social services, such as health and education, in a more efficient manner.

The mini-hydropower plants will provide the bulk of the generated electricity to the national grid. This will be an inexpensive and clean source of electricity for the distribution network, reduce transmission and distribution losses, and improve the voltage profile of the network. The Project will reduce greenhouse gas emissions by reducing the generation at centralized thermal power plants because of the contributions of the mini-hydropower plants. To improve the financial viability of the subprojects, these global environmental benefits are expected to be captured through the Clean Development Mechanism.

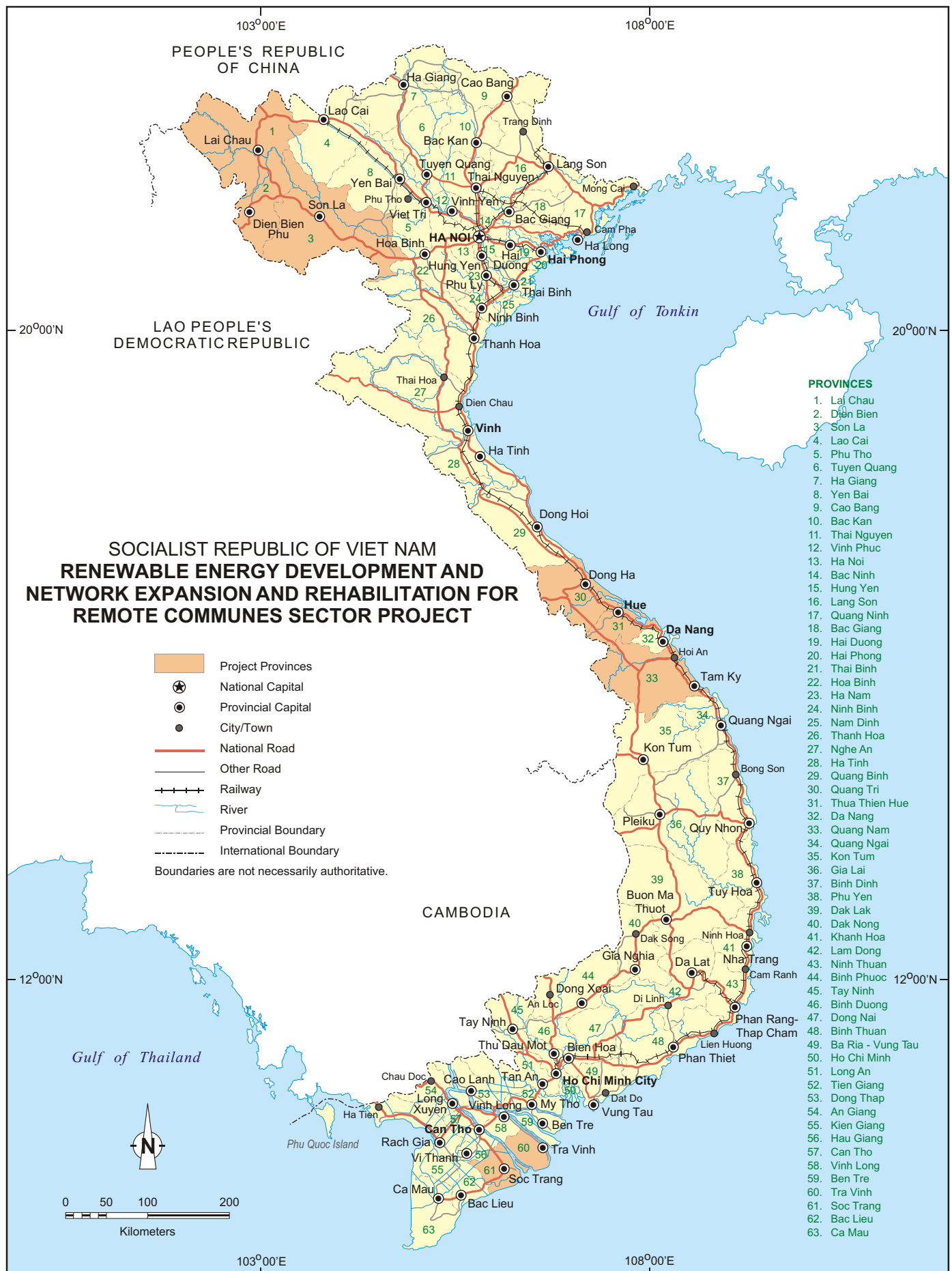
Risks and Assumptions

The project design assumes that the executing agencies will form provincial joint-stock companies to take over operation of the mini-hydropower projects financed under the Project. These entities will be provided with capacity building during project implementation through the associated TA grant. The newly set up joint-stock companies are assumed to have the necessary technical expertise to operate the mini-hydro plants in a satisfactory manner.

The hydrological risk will be minimized by collecting on-site field data for a minimum of 12 months and correlating with adjacent river basin long-term data during the technical design. The design and construction supervision will be undertaken by technical consultants recruited under the associated TA grant. The financial viability of the mini-hydropower projects critically depends on the feed-in tariff to the national grid. The Government has instituted a feed-in tariff regime based on the avoided cost of generation in the national power system. This is assumed to provide adequate financial return to the joint-stock companies. No major social or environmental risks are associated with the Project as the mini-hydro projects to be included are required to meet the environment and resettlement categorization B or C. The resources are made available to promote productive use of energy in mountain areas to increase the societal benefits of the Project to poor and vulnerable ethnic minority communities.

Technical Assistance

An advisory TA will be provided to MOIT and the executing agencies (PC 1, PC 2, and PC 3) for the Capacity Building of Renewable Energy Development. The TA, comprising of three separate components, will (i) prepare a renewable energy law to promote development of renewable energy through appropriate fiscal and policy incentives; (ii) provide capacity building in sustainable small hydropower plant planning, implementation and operation, including preparations for CDM registration; and (iii) promote productive use of energy and income generation activities in mountain areas. The cost of the TA is estimated at \$2.9 million. The TA will be financed through the Climate Change Fund (\$1.6 million) and the Technical Assistance Special Fund (\$0.9 million). The Government and the executing agencies will finance \$400,000 equivalent in kind.



I. THE PROPOSAL

1. I submit for your approval the following report and recommendation on (i) a proposed loan to the Socialist Republic of Viet Nam for the Renewable Energy Development and Network Expansion and Rehabilitation for Remote Communes Sector Project, and (ii) proposed technical assistance (TA) on a grant basis for Capacity Building of Renewable Energy Development. The design and monitoring framework for the Project is in Appendix 1.

II. RATIONALE: SECTOR PERFORMANCE, PROBLEMS, AND OPPORTUNITIES

2. Viet Nam has been one of the fastest growing economies in Asia for the last two decades, with real gross domestic product (GDP) growth averaging about 8.0% per annum during 2003–2007; per capita GDP increased to \$817 in 2007 from \$441 in 2002. Although the country has experienced high inflation due to energy and food price and supply problems, long-term growth prospects remain positive. Viet Nam has achieved remarkable progress in socioeconomic development since 1993. The reduction of national poverty from 58% in 1993 to less than 20% by 2007 is unprecedented. However, the poverty rate remains at more than 50% in northern mountain provinces inhabited by ethnic minority communities. The lack of infrastructure facilities and nonfarm income generation activities are major contributors to the persistent poverty in these isolated areas.

3. The Government's strategy to reduce poverty to 10%–11% by 2010 is outlined in the Socio-Economic Development Plan (SEDP) for 2006–2010 approved by the National Assembly in 2006. The SEDP acknowledges the critical importance of environmentally sustainable, equitable, and regionally balanced pro-poor growth to maintaining the achievements of Viet Nam's socioeconomic development. Although the recent global financial crisis, domestic inflationary pressures, and the Government's corrective measures are expected to slow GDP growth to around 6%–6.5% during 2008–2010; Viet Nam will likely achieve the socioeconomic targets set in the SEDP. The country strategy and program for Viet Nam 2007–2010¹ prepared by the Asian Development Bank (ADB) is closely aligned with the SEDP and ADB's long-term strategic framework 2008–2020 (Strategy 2020). It promotes inclusive pro-poor economic growth through investments in rural infrastructure to remove development barriers in poorer regions of the country. It also encourages promoting environmentally sustainable investments, especially in the energy sector through cleaner and renewable forms of energy.

A. Performance Indicators and Analysis

4. The power generation capacity of Viet Nam increased by more than 50% during 2002–2007 to reach over 13,000 megawatts (MW); it needs to double in the next 5 years to meet projected annual demand growth of 15% during 2008–2012. However, with the recent economic slowdown in Viet Nam, GDP growth for 2008 is expected to slow to 6.5% from estimated initially 8.5%, likely resulting in a reduction of power demand growth to around 12%. Viet Nam's present generation capacity is insufficient to meet dry season demand. The power shortage in the dry season is more than 1,500 MW due to lower capacity in hydropower plants. While demand is essentially driven by industrial load growth, residential power consumption is also increasing. During the last 5 years, performance of the power industry has been good, with sound financial performance, reduced system losses, and service quality. The detailed analysis of the power subsector is provided in Appendix 2.

¹ ADB, 2007, *Country Strategy and Program for Viet Nam 2007–2010*, Manila.

5. Access of households to electricity has increased rapidly in Viet Nam from 51% in 1996 to over 91% of households in 2008. The Government's long-term development strategy for rural electrification envisages a combined effort, with Viet Nam Electricity (EVN) taking the responsibility for extending the medium voltage network to rural areas, and the provincial and district authorities taking a leading role in investing and operating low voltage distribution systems in remote areas. More than 97% of the country's communes are connected to the national grid. However, 278 communes in mountain areas in the northern and central regions and eight island districts are not yet connected. Regional variations in the electrification rate are significant: the northwestern and northeastern regions have low rates of electrification. Provincial rates of household electrification are 36% in Lai Chau, 58% in Dien Bien, 58% in Ha Giang, and 65% in Cao Bang. Poverty rates in these provinces are also significantly higher than the national average due to lack of productive investment opportunities and underdeveloped infrastructure.

6. The electricity supply mix of Viet Nam is dominated by conventional sources with large hydropower accounting for 32%, gas 46%, and coal 17%. Renewable energy comprising bagasse cogeneration and small hydro (i.e., less than 30 MW) contributes only 1.5% of total electricity generation. As a result of several recent policy reforms, the contribution of small grid-connected hydro is changing quickly; the Ministry of Industry and Trade (MOIT) identified more than 42 operating projects, 70 under construction, and a pipeline of more than 200 identified projects. Some 380 small hydro projects (less than 100 kilowatts) have been built in remote areas to provide local electricity supply where grid connections are absent. Most of these off-grid schemes are run by cooperatives and operate with various degrees of success (at least one third are no longer in operation, and are in various stages of abandonment). Many of these off-grid supplied villages are provided with grid electricity. A policy framework is needed to facilitate the connection of existing off-grid mini-hydropower plants to the grid.

B. Analysis of Key Problems and Opportunities

1. Key Challenges for Power Sector Development

7. **Meeting Demand Growth.** Viet Nam's electric power industry faces tremendous challenges. To maintain the growth momentum of a rapidly industrializing economy, a massive expansion of the power system is required over the next decade. At the same time, the country is embarking on a major power sector reform program, designed to establish new institutional arrangements, restructure the dominant vertically integrated electricity utility (i.e., EVN), and gradually develop a competitive power market. Policy makers face major challenges from pressure to meet soaring power loads, to urgently mobilize investment for new capacity construction, and to ensure that the new corporate configurations and institutions being created for the reformed and restructured power industry will best serve long-term needs.

8. **Mobilizing Investment.** Funds for investment must be mobilized from all sources, including greater self-financing from the domestic power industry itself and large-scale development of independent power producers. Total power sector investment requirements will exceed \$3 billion per year during the next 10 years. Mobilizing this financing and scaling up project implementation is an immense challenge for the country. EVN's substantial investments in generation capacity, transmission and distribution network, and a portion of rural low-voltage distribution, will total \$2.4 billion–\$2.5 billion per year (in constant terms). Although the bulk of investments are in generation capacity additions, transmission investments will continue to be substantial in 2008–2010, as EVN seeks to complete the transmission backbone in main load centers in Hanoi and Ho Chi Minh City. The power

distribution sector does not require major investments. However, additional investments are required to improve service quality and extend the coverage in more remote parts of the country.

2. Key Opportunities and Challenges in Rural Electrification

9. The first challenge in bringing access to electricity to the remaining households without electricity is resource mobilization, which must be considered in the context of the overall scale of investment requirements for the power sector. Nongovernment sources of finance and domestic bond issuance to supplement EVN's own resources relate mainly to power generation and transmission projects. In particular, foreign direct investments are targeted at larger thermal power plants, and local private sector investments support small and medium-sized hydropower. The investment requirement for rural electrification and network expansion to reach 100% electrification in the country from the current 91% requires total investments in the range of \$3 billion over the next 10 years. Due to the unattractive financing returns of rural electrification, availability of concessionary financing will remain a critically important factor.

10. For some poor provinces (Central Highlands) where the connection rate is significantly below average, the Government has introduced a special program to promote rural electrification. Under this program, 85% of the cost is provided from the state budget to EVN and 15% is borne by executing agencies through their own resources. However, how to mobilize the necessary resources in a sustainable manner over the next 10 years remains the main issue. A rural electrification fund has been proposed as a mechanism for cross-subsidization of rural power distribution due to high cost structures inherent to low load densities of urban consumers. The existing mechanism of cross-subsidy through adjustments in the bulk supply tariff to EVN power distribution companies is not transparent and will have to be phased out with the introduction of the competitive generation market in 2010.

11. The second challenge is institutional reform. About two thirds of the low voltage distribution networks in rural areas are owned by local distribution units (LDUs), comprising village cooperatives and other consumer organizations that receive electricity from EVN's medium-sized voltage system. The LDUs are responsible for operation and maintenance of the low voltage systems, billing, and collections. Until 2004, many LDUs consisted of commune electricity groups and other informal entities, which are now required to become formal legal entities (cooperatives or joint-stock companies). They require consolidation and capacity building to develop into efficient commercial utilities capable of providing good quality electricity supply to rural areas. Due to the poor performance of these entities, the Government recently decided to transfer the low voltage networks to EVN in a phased manner, and entrust EVN with the responsibility of extending low voltage networks in areas inhabited by poor ethnic minorities.

3. Opportunities and Challenges for Renewable Energy Development

12. The Government recently established a policy framework to facilitate development of renewable energy generation projects by requiring EVN to purchase electricity based on standard power purchase agreements using the avoided cost of power generation. The prospects for attracting significant private investment into renewable energy generation have improved as a result. While the large state-owned enterprises and foreign investors focus on large thermal and hydropower generation projects, smaller joint-stock companies will need to play a growing role in small hydro schemes (less than 30 MW) if the very ambitious targets set by the sixth power development master plan are to be met (2,500 MW of renewable energy including small hydropower plants [less than 30 MW] by 2015, and 3,000 MW by 2020).

13. The realization of this challenge will depend upon several issues yet to be satisfactorily solved. Viet Nam's track record in attracting carbon finance into the small hydro sector is poor (particularly when compared with the People's Republic of China and India), with only two projects approved for the Clean Development Mechanism (CDM). Financing of small hydropower projects through the commercial banking system is still largely confined to balance sheet lending rather than project finance and, more importantly, rarely offering loan tenors of more than 10 years. Without tenors of around 15 years, inadequate debt service coverage ratios will prevent project financing. While international financial institutions can potentially provide longer loan terms, the amount of such support from domestic commercial banks will remain limited.

14. The prospects for other grid-connected technologies are less certain. The tariff required to make wind projects financially viable is more than double that provided by the avoided cost tariff, and providing subsidy support to such projects has little justification given the large unexploited resource potential of small hydropower and biomass. Some biomass, especially bagasse cogeneration and wind, may be enabled by the likely increase in avoided cost tariff due to changes to Viet Nam's fuel mix in power generation and increasing use of imported coal and gas for power generation. However, in the short term these technologies will require subsidy support. Such support depends upon a sustainable source of revenue, particularly if lenders are to view the subsidy revenue as credible. For this reason, a renewable energy fund is proposed, funded by a universal charge (as in the Philippines) levied on electricity consumption, and anchored in a proposed new renewable energy law.

15. The greatest challenge concerns the use of renewable energy for off-grid rural electrification. Network expansion in the remaining un-electrified areas implies costs exceeding \$0.50/kilowatt hour (kWh) because of small loads. Thus micro-hydro (i.e., less than 200 kW capacity) based schemes are generally the least cost option. Experience with isolated small hydropower plants operated by district authorities has not been good (paras. 20–21). Another issue is how to ensure the financial sustainability of the schemes due to low demand and poor payment history. Options are to provide support for a district or provincial operation and maintenance support entity; or bundle the sales from the mini-hydropower plants to the grid as proposed in the Project.

4. Government Strategy and Policy Dialogue

16. A comprehensive government strategy for renewable energy is articulated in the renewable energy master plan, the draft of which is presently under consideration by the Government, and is expected to be approved during 2009. The next stage of this strategy is the enactment of renewable energy law, incorporating the key recommendations of the renewable energy master plan and this would be supported by the technical assistance component of the proposed Project. While several possible options for funding have been proposed (including the use of a natural resource tax and consumption tax on electricity and petroleum uses) under the overall direction of the Electricity Regulatory Authority of Viet Nam, efficient disbursement of subsidies will be a main challenge. In the case of grid-connected renewable energy projects, subsidies are proposed to be given only to technologies with costs below the economic avoided cost (around D1,100/kWh), but above the financial avoided cost (around D700/kWh). This will enable biomass, landfill gas, and bagasse cogeneration to receive subsidies from the proposed renewable energy fund. The renewable energy master plan proposes that these subsidies be competitively bid out.

17. Achieving the 100% electrification target will be constrained mainly by availability of resources. Many of the areas with low electrification rates are ethnic minority areas. The Project will make a significant contribution to these efforts by supporting rural electrification in the remote mountain areas in the north and central regions, as well as in the poor parts of the Mekong Delta in south, by financing the Government's efforts to extend grid electrification. The Government's strategy is outlined in Appendix 3.

5. External Assistance to Renewable Energy and Rural Electrification

18. External assistance to the power sector is outlined in Appendix 4. External assistance to renewable energy has focused on off-grid electrification mainly through small hydro projects (World Bank Remote Area Rural Electrification with a scheme in Muong Te; Viet Nam–Sweden renewable energy program with four pilot projects). A World Bank project for financing a private sector grid connecting small hydro projects (Renewable Energy Development Program) through commercial banks will start in 2009; and as part of preparation of this Project, the World Bank supported some of the policy reforms to encourage renewable energy development (i.e., standardized power purchase agreement based on avoided cost tariff). The Government of the Netherlands is supporting a program to encourage household use of biogas for cooking and lighting.

19. The World Bank has led the external assistance for rural electrification. The Rural Electrification I project (completed in 2007 with a total investment of \$150 million) financed the connection of more than 500,000 households. Rural Electrification II (commenced in 2006 with \$200 million, supplemented with an additional \$250 million in 2008) addresses the strengthening of EVN's medium voltage network to support rural electrification, rehabilitation of existing low voltage systems owned and operated by LDUs, and development of institutions and participants to ensure service delivery. The Rural Distribution project (approved in 2008 with \$150 million) focuses on improving medium voltage systems (22 kilovolts [kV] and 35 kV) and supports the corporate development of the power company.

6. Lessons

20. By 2005, 507 small hydropower stations (i.e., capacity less than 10 MW) with total installed capacity of about 100 MW had been installed in Viet Nam. About one third of these power plants are not working, abandoned for various reasons. Most of the others are operating at below the rated capacity. The first reason for this situation is poor maintenance, a consequence of lack of operator training, difficulties in retaining trained staff (partly due to low salaries and better employment opportunities in the big cities), lack of spares, and poor inventory policy. Second, commissioning procedures have often been poor; in many cases equipment did not conform to specifications and manuals for operation and maintenance were either not provided or provided in languages other than Vietnamese. Third, and most importantly, these problems have proven difficult to resolve because the entities responsible for plant operation lack financial capacity. Off-grid schemes that depend entirely (or mostly) on tariff revenue from poor domestic households cannot cover operating costs, and subsidy commitments from the Government are ad hoc and often late. With no policy framework to facilitate the connection of small plants to the grid, local authorities viewed the arrival of the grid as removing their political commitment to maintain small hydropower plants. However no technical reason indicates why a well-functioning small hydro project cannot continue to operate and sell surplus power into the grid.

21. These lessons are incorporated to the project design, which is based on the concept of combining remote area electrification with the development of mini-hydro power plants of sufficient size that warrant grid connection, thereby providing a sustainable operating cash flow. The participation of EVN's power companies as executing agencies ensures adequate technical expertise and ongoing support for operation and maintenance. The Project will also set up provincial subsidiaries of executing agencies with the mandate to operate the mini-hydropower plants; they will be provided with capacity building on preventive maintenance under the associated technical assistance. To combat the issue of equipment not complying with prescribed specifications, the technical assistance consultants will assist the executing agencies carry out a thorough evaluation of technical bids, and inspections during manufacturing and erection.

7. ADB Sector Experience Strategy

22. ADB has approved four ordinary capital resources loans² totaling \$1,676 million and three Asian Development Fund (ADF) loans³ amounting to \$186.3 million for Viet Nam's power sector. The ADF loans were primarily for expansion and rehabilitation of distribution networks in urban areas. The two ordinary capital resources loans approved in 2004 and 2005 finance expansion of the 500 kV high voltage transmission systems in northern Viet Nam. More recently, ADB has focused on power generation. For example, the Mong Duong 1 Thermal Power Project and Song Bung 4 Hydropower Project (footnote 1) are financing power generation facilities using domestic coal and hydro resources in an environmentally sustainable manner. ADB has also supported private sector investment in power generation by providing direct loans and political risk guarantees for the Phu My 2.2 gas-fired power project in 2002 and the Phu My 3 project in 2003.⁴

23. ADB has assisted Viet Nam through a series of TA projects⁵ to facilitate policy reforms including the new Electricity Law and laid the framework for power sector restructuring. During 2005 and 2006, ADB approved a series of advisory TA projects to improve the crosscutting

² ADB. 2004. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the Socialist Republic of Viet Nam for the Northern Power Transmission Sector Project*. Manila (Loan 2128-VIE, approved on 13 December); ADB. 2005. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the Socialist Republic of Viet Nam for the Northern Power Transmission Expansion Sector Project*. Manila (Loan 2225-VIE, approved on 21 December); ADB. 2007. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the Socialist Republic of Viet Nam for the Mong Duong 1 Thermal Power Project*. Manila (Loan 2353-VIE, approved on 2 October); and ADB. 2008. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the Socialist Republic of Viet Nam for the Song Bung Hydropower Project*. Manila (Loan 2429-VIE, approved on 26 June).

³ ADB. 1972. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the Socialist Republic of Viet Nam for the Saigon Power Project*. Manila (Loan 0108-VIE, for \$6.3 million, approved on 14 November); ADB. 1995. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the Socialist Republic of Viet Nam for the Power Distribution Rehabilitation Project*. Manila (Loan 1358-VIE, for \$80 million, approved on 8 June); and ADB. 1997. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the Socialist Republic of Viet Nam for the Central and Southern Viet Nam Power Distribution Project*. Manila (Loan 1585-VIE, for \$100 million, approved on 27 November).

⁴ ADB. 2002. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan and a Partial Risk Guarantee to the Socialist Republic of Viet Nam for Mekong Energy Company Ltd. (Phu My 2.2 Power Project)*. Manila (Loan 1856-VIE, for \$50 million and \$25 million partial risk guarantee, approved on 2 July); and ADB. 2003. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan and a Partial Risk Guarantee to the Socialist Republic of Viet Nam for Phu My BOT Power Company*. Manila (Loan 1923-VIE, for \$40 million and \$35 million partial risk guarantee, approved on 18 October).

⁵ ADB. 2001. *Technical Assistance to the Socialist Republic of Viet Nam for Road Map for Power Sector Reform*. Manila (TA 3763-VIE, for \$400,000, approved on 6 November); ADB. 2006. *Technical Assistance to the Socialist Republic of Viet Nam for Power Market Design*. Manila (TA 4768-VIE, for \$500,000, approved on 1 March 2005).

social and environmental issues of the power sector, promote energy efficiency in the industry sector, and develop a benefit sharing mechanism for people affected by hydropower projects.

24. Socially inclusive and environmentally sustainable economic growth is a key pillar in ADB's country strategy for Viet Nam. The competitiveness of Viet Nam's economy, especially the industry sector, depends on the availability of a cheap and reliable supply of electricity. ADB's power sector strategy aims to help the Government meet the challenge of increasing demand for electricity in a financially, environmentally, and socially sustainable manner. The large investment requirement of the power sector requires concerted efforts from both public and private sector investors. A significant proportion of the public sector investments will be financed through multilateral or bilateral financing, and ADB will increasingly leverage cofinancing from other financiers in the sector. ADB will also assist public sector entities in the sector to access international capital markets by providing advisory and risk-sharing instruments such as guarantee instruments.

25. In the context of the Government's strong drive to increase the share of renewable energy in total electricity generation and the low prevalence of renewable energy in Viet Nam's current electricity generation mix, opportunities for financing renewable energy and energy efficiency investments will be actively pursued. ADB will actively promote the adoption of clean and more efficient technologies for new power generating projects, particularly the application of supercritical and ultra-supercritical technologies in coal-fired power plants, combined cycle gas turbines, and renewable technologies such as wind and small hydro. The Project will be ADB's first investment in the renewable energy subsector in Viet Nam.

8. Rationale for the Project

26. The focus of ADB's country strategy and program for Viet Nam is on supporting pro-poor economic growth, social equity and balanced development, and sustainable management of the environment. ADB has been a major financier of energy in Viet Nam, financing high voltage power transmission and large-scale power generation projects to address infrastructure bottlenecks inhibiting the economic growth of the country. The Project is aimed at equitable and balanced development of the country to support the supply of electricity to mountainous and poor communities that have lagged the rest of the country in overall socioeconomic development. ADB is also committed to the development of renewable and clean energy sources to meet the rapidly growing demand for energy in a sustainable manner. The Project is consistent with the sector development objectives of ADB's energy strategy for Viet Nam.

27. The Project is aimed at addressing several barriers to the development of renewable energy and electrification of remote communes. It will provide concessionary financing to develop renewable energy to provide affordable electricity to communities living in mountainous and remote poor communes. The grid-connected mini-hydro projects in the four provinces with the least access to electricity in the country will use locally available hydro resources to supply electricity to the communes in remote areas and provide excess electricity to the national grid. The cash surplus from sales to the national grid will be utilized to indirectly subsidize network expansion into remote areas. The Project will support the expansion of medium and low voltage networks in communes to villages without access to electricity by providing concessionary financing, as the financial returns to utility of rural electrification are not attractive.

III. THE PROPOSED PROJECT

A. Impact and Outcome

28. The impact of the Project will be the promotion of pro-poor and balanced economic development of remote mountainous communes and poor communes through the sustainable use of electricity and renewable energy in an affordable manner. The outcome of the Project will be provision of reliable and affordable supply of electricity to remote mountainous and poor communes.

B. Outputs

29. The Project comprises two main components and an associated TA grant for capacity building for renewable energy development in Viet Nam. The detailed description of subprojects is provided in Appendix 5, and the subproject selection criteria are provided in Appendix 6.

1. Loan Component 1: Mini-Hydro Development for Rural Electrification

30. The Project will finance the development of about 5–10 mini-hydropower plants, each with a capacity of less than 7.5 MW in Lai Chau, Dien Bien, and several other northern and central provinces. The Project will also finance the connection of these mini-hydropower plants to the national grid and the expansion of the low voltage network to supply nearby un-electrified villages. This component of the Project is expected to contribute over 30 MW of combined generation capacity to the national power system, and extend the medium voltage power network in remote areas of Viet Nam by about 50–100 kilometers (km). In addition to the development of mini-hydropower plants, the Project will finance the electrification of villages that are located close to the existing medium voltage network. Low voltage transformers will be installed and the low voltage network extended by about 75–100 km. An additional 25–50 villages and about 3,000–5,000 households are expected to be provided with electricity. Through the associated TA grant administered by ADB, the Project will strengthen the technical and administrative operation and maintenance capability of small hydropower plants of PC1 and PC3.

2. Loan Component 2: Network Expansion and Rehabilitation for Poor Communes

31. The Government has initiated a special program of rural electrification. Under this program, the state budget provides financing to EVN's Power Company 2 (PC 2) and Power Company 3 (PC 3) to finance 85% of the cost of rural electrification in five selected provinces in the Central Highlands. The Government intends initially to extend this program to include four additional provinces (i.e., Soc Trang and Tra Vinh in the south, and Dien Bien and Lai Chau in the north). Component 2 of the Project will finance the proposed government financing in these provinces. This financing will cover the expansion of the rural distribution network to connect villages that do not have access to electricity and rehabilitation of the existing poorly constructed low voltage networks serving remote communes. The project scope includes (i) expansion of the medium voltage network by about 800–1,000 km, (ii) 2,000 to 2,500 km of medium to low voltage substations totaling 35 to 40 megavolt-amperes (MVA), and (iii) 2,500 to 3,000 km of low voltage distribution lines to provide electricity to about 100,000 households in more than 1,000 villages.

32. MOIT will submit the final list of provinces to be included in the Government's Special Program for Rural Electrification to ADB before loan effectiveness. The Government will onlend any surplus funds over and above the funds allocated for the provinces included in the Special Program, to the respective executing agency on term and conditions outlined in para. 38 to electrify communes not included in the special program to be selected in accordance with the selection criteria in Appendix 6.

C. Special Features

1. Cost Recovery of Power Supply to Difficult Areas

33. One of the main issues for power utilities serving sparsely populated rural areas with low per capita consumption of electricity is the low financial viability of grid extensions. In Viet Nam, off-grid technologies such as micro hydro and solar power have poor financial rates of return, and provide unreliable and poor quality electricity supply. The Project is designed to address this issue by sharing the cost of grid expansion with mini-hydropower plants and using the revenues from electricity sales of these plants to subsidize expansion of the grid to communities. The proposed approach will use locally available hydro resources for the benefit of local communities, and provide surplus renewable energy to the national power network. The economic and financial analyses of a core subproject under component 1 are summarized in Supplementary Appendixes A and B. The detailed economic analysis is in Supplementary Appendix C.

2. Clean Development Mechanism

34. The Project involves several mini-hydropower plants in remote areas, which will result in reduced transmission and distribution losses, as well as replacement of energy generated at thermal power plants. The proposed mini-hydropower plants are run-of-river type and will not result in methane emissions. They will reduce grid losses by being close to demand centers at the end of relatively long and weak transmission systems. As overall capacity increases with the completion of several large hydropower and thermal power plants towards the end of the proposed Project in 2014-15, prevailing system power shortages will be minimized by the time sub projects financed under the proposed project are commissioned. The small hydropower plants to be built under the Project are therefore expected to replace the thermal power generation. They will also meet the additionality criteria of the CDM executive board as they face investment barriers due to the high cost of construction in remote areas and lower economies of scale compared with large-scale hydropower plants. Assistance will be provided for the preparation of project design documents for submission to the CDM executive board for each province included in component 1 (several mini-hydropower plants will be located in a given province).

3. Pro-Poor Geographic Targeting

35. The Project is designed with a special focus on geographically targeting poor communities for electrification. Sites will be selected for development of mini-hydro and network expansion subprojects by stipulating that at least 50% of households receiving electricity through a subproject shall have income level below the national poverty rate. The medium voltage lines for connecting the mini-hydropower plants will be routed to maximize the connection of households without electricity. For poor households (i.e., those with a monthly income of less than D200,000 [\$13] per capita as per the Government's definition of poverty), subsidized grid connection will be provided to ensure they receive the benefits of electrification.

4. Promotion of Productive Use of Energy and Income Generation Activities

36. Electrification has a poverty reduction potential only if poor and near-poor households can afford and have capacity to benefit. In very poor communities, most people do not have the necessary economic or technical capacity to use electricity to improve their lives and livelihoods. The Project will promote the productive use of electricity through the associated TA. A nongovernmental organization will be contracted to implement this component to undertake the following activities:

- (i) support poor households' access to microfinance credits for income generation; and
- (ii) provide borrowers with TA and capacity building for utilizing the loans efficiently to improve their livelihoods.

D. Project Investment Plan

37. The project investment cost is estimated at \$197.6 million, including taxes and duties of \$20 million. The summary cost estimates are shown in Table 1 and detailed project cost estimates by expenditure category, executing agency, and financing source is shown in Appendix 7.

Table 1: Project Investment Plan
(\$ million)

Item	Amount ^a
A. Base Cost^b	
1. Component 1	
a. North Viet Nam (executed by PC 1)	43.3
b. Central Viet Nam (executed by PC 3)	26.9
2. Component 2	
a. North Viet Nam (executed by PC 1)	33.9
b. Central Viet Nam (executed by PC 3)	33.9
c. South Viet Nam (executed by PC 2)	33.9
Subtotal (A)	172.0
B. Contingencies^c	24.6
C. Financing Charges during Implementation	1.1
Total (A+B+C)	197.6

^a Includes taxes and duties of 10% equivalent to \$20 million.

^b In mid-2008 prices.

^c Physical contingencies computed at 10%. Price contingencies for foreign and local currency in US dollars computed at 6.8% in 2008, 0.7% in 2009, 1.4% in 2010, 0.4% in 2011, and 0.5% in 2012 onward. Interest during construction is computed at 1% for Asian Development Fund loan interest during implementation.

Source: Asian Development Bank estimates.

E. Financing Plan

38. The Government has requested a loan of SDR 102,161,000 (\$151,000,000 equivalent) from the ADF to help finance the Project as it geographically targets poor communes. The loan will have a 32-year maturity period including a grace period of 8 years, and an interest rate of

1% during the grace period and 1.5% during the amortization period. The Ministry of Finance (MOF) will onlend the component 1 proceeds to the executing agencies (i.e., Power Company 1 [PC 1] and PC 3) with a repayment period of 27 years including a grace period of 7 years and interest rate of 2.5% subject to Government approval. MOF will provide the loan proceeds allocated for provinces included in the Government's Special Program for Rural Electrification under component 2 to PC 1, PC 2, and PC 3 on grant basis. EVN proposes that MOF onlend the funds allocated for component 2 for provinces not included in the Special Program for Rural Electrification to the PC 1, PC 2, and PC 3 with a repayment period of 27 years including a grace period of 7 years and interest rate of 2.5%, subject to Government approval.

39. ADB financing will cover 100% of the eligible expenses including taxes incurred in procuring equipment, materials, and civil works for implementing the Project; the taxes are not excessive, amounting to less than 10% of the total project cost. The counterpart funds to be provided by the executing agencies will finance resettlement expenses, bank charges, and project management costs including the services of national consultants required for project preparation and supervision. The indicative breakdown of cost estimates by project component, executing agency, and cost item; and the proposed financing arrangements for each cost item is provided in Appendix 7; ADB funding is summarized in Table 2.

Table 2: Financing Plan
(\$ million equivalent)

Source	Amount	%
A. Component 1		
1. Asian Development Bank	61.0	30.9
2. Power Company 1	12.9	6.5
3. Power Company 3	6.8	3.5
Subtotal (A)	80.8	40.9
B. Component 2		
1. Asian Development Bank	90.0	45.5
2. Power Company 1	8.9	4.5
3. Power Company 2	8.9	4.5
4. Power Company 3	8.9	4.5
Subtotal (B)	116.8	59.1
Total	197.6	100.0

Source: Asian Development Bank estimates.

F. Implementation Arrangements

1. Project Implementation

40. For component 1, PC 1 will be the executing agency in northern Viet Nam and PC 3 the executing agency in central Viet Nam. For component 2, PC 1, PC 2, and PC 3 will be the executing agencies in their respective geographic areas. MOIT will assign the Rural Electrification and Renewable Energy Project Management Board (REREPMB), currently responsible for implementation of the ongoing World Bank Rural Energy Project, overall coordination of project implementation. MOIT will set up a steering committee chaired by a vice minister comprising representatives EVN, PC 1, PC 2, and PC 3 to monitor and provide guidance and direction to project implementation. The provincial people's committees of the respective projects will be asked to give a no objection to sub-project proposals.

41. The power companies will entrust project implementation in each region to the project management boards (PMBs), staffed with full-time personnel. PC 1 and PC 3 will each recruit national consulting firms financed through counterpart funds to prepare feasibility studies for selected subprojects. The international consultants will provide capacity building to PMBs to review selection of subprojects, the feasibility studies, technical design, and bid documents prepared by the executing agencies' national consultants for component 1 of the Project. The subprojects to be included in component 1 should satisfy the subproject selection criteria in Appendix 6. PC 1 and PC 3 will submit the feasibility study including the (i) technical assessment, (ii) financial and economic analyses, and (iii) necessary safeguard documents such as initial environmental assessment to ADB for approval before preparing the bidding documents. PC 1 and PC 3 will approve the technical design of each subproject. PC 1 and PC 3 will also submit to ADB for approval the resettlement plan for each subproject under component 1 before the award of each civil works contract.

42. Each executing agency will implement component 2 through their provincial units and the PMB of each executing agency. The selection of subprojects will be undertaken in close collaboration with the PPCs in accordance with the selection criteria outlined in Appendix 6. The power companies will submit a simple subproject selection report to MOIT and ADB for approval for each province to be included in the Project. Upon approval of the subproject selection, the power companies will entrust implementation of subprojects in each province to their provincial units, and the PMB of each power company will be responsible for supervising implementation and reporting progress to MOIT. Each power company will recruit national consulting firms financed through counterpart funds to prepare feasibility studies for selected subprojects; the international consultants (para. 41) will monitor progress.

2. Implementation Period

43. The Project will be implemented from June 2009 to December 2015. The detailed implementation schedule is in Appendix 8. The identification and selection of subprojects to be included in component 1 will be completed in 2009. The feasibility studies, including the hydrological measurements, will be undertaken in 2010 and the technical designs and bidding documents will be completed by June 2011. The civil work contracts and equipment supply contracts are expected to be awarded for component 1 by December 2011, and project construction will be carried out during 2012–2014; commissioning will be variable depending on the subproject, but would start mid-2014.

44. PC 2 can commence the procurement of equipment and civil works contracts for component 2, immediately for Soc Trang and Tra Vinh provinces as the feasibility studies are already approved. The civil works under component 2 for Soc Trang and Tra Vinh provinces will commence in the third quarter of 2010 and be completed by the end of 2012. The feasibility studies and bidding documents for component 2, to be implemented by PC 1 and PC 3, will be prepared during June 2009–December 2010, and procurement will be undertaken during the first half of 2011. The civil works and installations of the rural electricity network in PC 1 and PC 3 areas will be undertaken from October 2011 to December 2013.

3. Procurement

45. Procurement of works, goods and services will be in accordance with *ADB's Procurement Guidelines* (2007, as amended from time to time). The electromechanical equipment for the mini-hydropower plants, and equipment and materials for medium and low voltage distribution lines and substations will be procured in several packages using

international competitive bidding procedures. The civil work contracts for construction of the mini-hydropower plants and installation of medium and low voltage distribution lines will be awarded using international competitive bidding or national competitive bidding procedures (NCB) acceptable to ADB and will be subject to selective post review. The NCB procedures will be applied for work contracts below \$2 million and equipment contracts below \$500,000; shopping will be allowed for procurement of goods and services with a contract price less than \$100,000. The NCB procedures will be in accordance with ADB's *Procurement Guidelines*, as well as its NCB Annex applicable to Viet Nam (Supplementary Appendix D). The procurement plan for the Project is in Appendix 9 and shows details of the immediate procurement for the next 18 months, and estimates for the Project overall. As the list of sub-projects to be financed under the sector Project is finalized in the early stages of project implementation, the procurement plan will be updated to include that information.

4. Consulting Services

46. The executing agencies will recruit consultants financed by them (Appendix 7) to prepare feasibility studies, detail design documents, and bidding documents; and supervise construction. These consultants will be recruited and engaged in 2009 according to Vietnamese guidelines. Consulting services required for technical and safeguard support for subproject preparation and capacity building will be provided through the associated TA grant administered by ADB. These consulting services will be selected and engaged in accordance with ADB's *Guidelines on the Use of Consultants* (2007, as amended from time to time).

5. Anticorruption Policy

47. ADB's *Anticorruption Policy* (1998, as amended to date) was explained to and discussed with the Government and the executing agencies. Consistent with its commitment to good governance, accountability, and transparency, ADB reserves the right to investigate, directly or through its agents, any alleged corrupt, fraudulent, collusive, or coercive practices relating to the Project. To support these efforts, relevant provisions of ADB's *Anticorruption Policy* are included in the loan regulations and the bidding documents for the Project. In particular, all contracts financed by ADB in connection with the Project shall include provisions specifying the right of ADB to audit and examine the records and accounts of the executing agencies and all contractors, suppliers, consultants, and other service providers as they relate to the Project. EVN has handled several ADB projects, and is familiar with ADB procedures and anticorruption measures. These projects helped establish clear procedures and practices for procurement of equipment and civil works. There have not been any major audit issues or suspicion of fraud. As a parent company, EVN is expected to oversee PCs on these measures adequately implemented; Governance risks will be further minimized by providing detailed Project information on a project website, using detailed procurement plans, regular project reviews, and providing information and training for EAs' staff not familiar with ADB's policy and procedures. Spot-checking will also be done to check adherence to the Policy.

6. Disbursement Arrangements

48. Disbursements will be according to ADB's *Loan Disbursement Handbook* (2007, as amended from time to time) and detailed arrangements agreed between the Government, executing agencies, and ADB. The disbursements for civil works, goods, and equipment procured through international competitive bidding will be made by direct payment and commitment procedures. Each executing agency will set up one imprest account soon after loan effectiveness at banks acceptable to ADB. The imprest accounts will be established, managed,

replenished, and liquidated in accordance with ADB's *Loan Disbursement Handbook* and detailed arrangements agreed to by the Government, executing agencies, and ADB. The maximum amount to be maintained in each imprest account will not exceed 10% of the grant or loan funds made available to each power company from the ADB loan, or 6 months of expenditures to be funded through their respective imprest accounts, whichever is less.

49. The statement of expenditures procedure will be used to reimburse eligible expenditure and liquidate advances to the executing agencies; records will be maintained to substantiate the payments made through statement of expenditures. Payments under statement of expenditures will be limited to \$100,000 per payment. The executing agencies will prepare withdrawal applications and submit them to MOF for endorsement. Disbursement arrangements are shown in a flow chart in Supplementary Appendix E. The executing agencies financial management capacity is deemed adequate since PC 2 and PC 3 have previously received ADB funding, and all three executing agencies are presently implementing World Bank-financed rural electrification projects.

7. Accounting, Auditing, and Reporting

50. Each executing agency will maintain records and accounts that identify the goods and services financed from the loan proceeds, resources received, expenditures incurred, including the use of counterpart funds for implementing the subprojects included in the Project. Separate accounts for subprojects will be established and maintained at each executing agency in accordance with internationally accepted accounting standards. Auditors acceptable to ADB will audit annual project accounts maintained at executing agencies for activities undertaken in relation to the Project. Audit coverage will include separate opinions on (i) utilization of the imprest accounts; (ii) statement of expenditures, including whether the amount claimed is duly supported and verified; and (iii) whether the executing agencies are operating the imprest accounts in accordance with ADB procedures. The audit reports, management letter, and related financial statements will be submitted to ADB not later than 6 months after the end of the fiscal year to which they relate, or the project closing date, if earlier. The financial performance and financial management analysis of the executing agencies is provided in Supplementary Appendix F.

8. Project Performance Monitoring and Evaluation

51. Project progress and performance will be monitored by a steering committee to be set up by MOIT, comprising representatives of each of the executing agencies and EVN. The committee will use a comprehensive project performance monitoring system. Each executing agency will submit quarterly progress reports to REREPMB. These reports will record (i) progress made, (ii) problems encountered during the review period, (iii) steps taken or proposed to remedy the problems, (iv) proposed program of activities, and (v) progress expected for the following quarter. REREPMB and MOIT will ensure that these reports are submitted to ADB in a timely manner. Within 6 months of physical completion of the Project, the executing agencies will submit to ADB a project completion report describing (i) physical progress of the Project, (ii) actual costs incurred in relation to cost estimates, (iii) results of capacity-building activities, (iv) outcome of safeguard efforts, (v) preliminary assessment of achieved benefits, and (vi) other relevant project implementation matters requested by ADB.

52. Project benefit monitoring activities will entail periodic monitoring of the benefits and impacts of electrification in a representative number of selected subprojects. Socioeconomic baseline data for a sample set of communes will be established at the commencement of the

Project. The set of communes will include communes selected for inclusion in the Project and similar communes not included in the Project for electrification. The socioeconomic status of these communes will be monitored after project completion to assess the impact of electrification on the socioeconomic well-being of the communes. This will be undertaken independently as part of the project completion report to be prepared by executing agencies using a framework consistent with the Project's design and monitoring framework.

9. Project Review

53. Apart from regular reviews, ADB and the Government will undertake a comprehensive review within 18 months of loan effectiveness when the first batch of subprojects will be in the construction stage. A midterm review will be undertaken within 36 months of loan effectiveness. These reviews will include (i) a comprehensive evaluation of project implementation arrangements; (ii) detailed evaluation of the scope and implementation process, and progress of subprojects; and (iii) possible reallocation of loan proceeds. Remedial action will be instituted as required.

IV. TECHNICAL ASSISTANCE

54. A \$2.9 million advisory TA project will be provided with the sector loan for Capacity Building of Renewable Energy Development. The TA will be financed through the Climate Change Fund (\$1.6 million) and Technical Assistance Special Fund (TASF-IV, \$0.9 million). The Government will provide \$29,000 in kind and the power companies \$371,000 also in kind (Appendix 10). ADB will be the executing agency for the TA, and PC1, PC 2, PC 3 and MOIT will be the implementing agencies. The TA consultants will be selected and engaged in accordance with ADB's *Guidelines on the Use of Consultants*. The disbursements will be made in accordance with ADB's *Technical Assistance Disbursement Handbook*.⁶ The TA is expected to commence in August 2009 and finish in December 2015. The TA comprises the following components (a detailed description of the TA is provided in Supplementary Appendix G and a summary in Appendix 10).

- (i) Develop a policy framework for renewable energy development in Viet Nam by supporting the Government in developing a new renewable energy law and implementing decrees and guidelines. The consultants will propose specific incentives to be included in the law to facilitate renewable energy technologies such as wind. One international and one national individual consultant will undertake this with 4 person-months of international consultant input and 8 person-months of national consultant input. MOIT will be the implementing agency for this component of the TA.
- (ii) Capacity building in sustainable small hydropower plant planning (including preparation of feasibility studies, technical designs, and ADB-compliant bidding and safeguard documents); implementation and operation of the power companies and its provincial subsidiaries; and operation and preventive maintenance of small hydropower plants. The TA consultants will assist the Government in preparing the CDM project design documents. The consultants will also undertake capacity building on preparing ethnic minority development plans for rural electrification projects at provincial level. An international firm of consultants will undertake this work with 56 person-months of international consultants input and 54 person-months of national consultant input. The full

⁶ ADB. 2008. *Technical Assistance Disbursement Handbook*. Manila.

technical proposal format and quality- and cost-based selection (80:20) will be used to select the consulting firm. PC 1, PC 2, and PC 3 will be the implementing agencies for this component.

- (iii) Assist people receiving electricity under the Project to develop income-generating activities using electricity and help in accessing microfinance for such activities. A nongovernmental organization will undertake this with 70 person-months of staff input. The bio-data technical proposal format using the fixed-budget selection method will be used to select the NGO. PC 1, PC 2, and PC 3 will be the implementing agencies for this component.

V. PROJECT BENEFITS, IMPACTS, ASSUMPTIONS, AND RISKS

55. The overall impact of the Project will be the achievement of pro-poor and balanced economic development of remote and isolated communes in Viet Nam through the sustainable use of energy, and in particular, renewable energy. To achieve this impact, the Project will provide a reliable and affordable supply of electricity to remote communes through mini-hydropower plants and grid expansion. The Project will promote productive use of electricity for income-generating activities. It is also expected to result in global environmental benefits by reducing Viet Nam's greenhouse gas emissions by replacing some of the fossil fuel-based power generation capacity with run-of-river mini-hydropower plants. However, the realization of these overall objectives is subject to certain risk factors associated with technical, policy, institutional, social, financial, economic, and environmental aspects.

A. Assumptions and Risk Factors

1. Technical

56. As the subprojects under the Project comprise mini-hydropower plants and grid expansion of medium voltage and low voltage networks, no major technical risks are associated with project implementation given Viet Nam's long history of constructing mini-hydropower plants. However, hydrological records of small tributaries where the proposed mini-hydropower plants are located may not be available. The hydrological measurements will be taken for 12 months and then correlated with long-term rainfall records and flow records of neighbouring river basins to estimate the hydrology and economic viability of the subprojects during the detailed feasibility studies to be undertaken during project implementation. PC 1 and PC 3 are responsible for implementing this component, and have expertise in constructing and operating power distribution lines and in operating small hydropower plants (i.e., less than 60 MW). However, the mini-hydropower projects are exposed to hydrological risk in the context of climate change and the possibility of extreme climate events, such as flash floods, storms, and landslides in remote mountainous areas. The associated TA grant will ensure that the mini-hydropower projects financed under the Project will be designed using state-of-the-art low maintenance technologies; training on preventive maintenance will be provided to the implementing agencies.

2. Policy and Institutional

57. Viet Nam's policy framework for renewable energy development is evolving. The recent decision by the Government to provide a standard power purchase agreement based on an avoided cost tariff principle has encouraged many private sector investors to enter the sector. However, these private sector investors have no incentive to route the medium voltage lines connecting the mini-hydropower projects so that they benefit local communities without access

to electricity. The Project assumes the public sector executing agencies (i.e., PC 1 and PC 3) will address this issue due to their obligation, as a public utility, to electrify rural areas. Provincial subsidiaries are proposed to take over the operation of mini-hydropower plants in each province with PC 1 and PC 3 retaining a majority stake. This will improve the financial viability of electricity supply to remote areas as the provincial units of power companies are receiving some of their electricity from the embedded mini-hydropower plants.

3. Environment and Resettlement

58. Given the nature and magnitude of the proposed mini-hydropower projects to be included in component 1, adverse environmental impacts are not expected to be significant and mitigation measures will be implemented to minimize negative impacts. Construction of the mini-hydropower plants and grid expansion will entail vegetation loss. However, adverse impacts on biodiversity are expected to be minor since the area to be cleared for each subproject is relatively small. Further, the subprojects will not be located in ecologically protected areas. Other potential impacts associated with the construction of mini-hydropower plants include siltation due to surface run-off, erosion of exposed areas, and increased noise due to site works and equipment operation. Operation impacts may include changes in the stream hydrological regime that could influence the aquatic ecosystems in terms of water quality and population structure of aquatic organisms. The Project will reduce global greenhouse gas emissions due to replacement of expensive thermal power generation with a renewable and clean source of energy through run-of-river mini-hydro plants. An environmental assessment and review framework was prepared to guide the preparation of component 1 subprojects Supplementary Appendix H. The initial environmental examination (IEE) for a core subproject under component 1 is summarized in Supplementary Appendix I.

59. A short resettlement plan was prepared for the core subproject, Nam Nghe mini-hydropower. Nine households will be affected due to permanent impacts on their agricultural land. No stream uses or fishing activities occur on the proposed reservoir and downstream area, therefore, the subproject will not affect any livelihood or socioeconomic activities of local residents. The resettlement impacts of the remaining component 1 subprojects are not expected to be significant as only subprojects with involuntary resettlement categorization B will be included in the Project. A short resettlement plan will be prepared in accordance with the resettlement framework for these subprojects. A summary resettlement plan and framework is presented in Supplementary Appendix J. The resettlement framework and resettlement plan are shown in Supplementary Appendixes K and L, respectively.

4. Ethnic Minorities

60. Ethnic minorities are the major beneficiaries in the northern mountain project provinces of Dien Bien and Lai Chau where subprojects under component 1 are likely to be located. In Muong Te District, Lai Chau province, where the core subproject is located, poverty is high with 61% of households and almost 97% of the total population living in poverty. The population comprises 14 ethnic minority groups. In Dien Bien province, five ethnic minority groups make up more than 98% of the population. For preparation of the ethnic minority development plan (EMDP) for all subprojects under component 1, an ethnic minority development framework (EMDF) was prepared (Supplementary Appendix M, a summary is in Supplementary Appendix N). The EMDF will ensure that culturally appropriate implementation of the Project and social and economic benefits of electrification accrue to ethnic minorities and potentially adverse impacts are avoided. An EMDP was prepared for a selected subproject in component 1 of the Project in accordance with the EMDF (Supplementary Appendix O). The EMDF supports

promoting productive use of electricity and will focus on providing poor households with extra support to improve their livelihoods through new opportunities with electrification.

61. Although communes and villages with ethnic minorities are likely to be included in component 2 of the Project, the impacts on indigenous people due to provision of electricity are not significant.⁷ However, ethnic minority development plans will be prepared for each province taking part in component 2 to ensure that project benefits accrue to the ethnic minorities. This includes the selection of poor communes and villages to be included in the Project, and provision of subsidized electricity connections to poor households.

5. Poverty

62. Lack of electricity is one of the contributing factors to poverty and poor services along with isolated location, poor road and market access, and low education in the mountainous areas included in the Project. Income generation is based on low-production, small-scale agriculture based on manual labor due to lack of electricity, poor economic conditions, and low education. Electricity will enable some improvements in agriculture, animal breeding, and food processing. Although, electricity is a crucial prerequisite for economic and social development and poverty reduction in rural areas, electrification has a poverty reduction potential only if poor and near-poor households can afford and have the capacity to benefit from it. In very poor communities, most people do not have the necessary economic or technical capacity to make use of electricity to improve their lives and livelihoods.

63. Rural electrification contributes to household income by improving production and business opportunities (lighting, electrical appliances and machines like refrigerators, water pumps, and agricultural machines). The economic benefit potential is especially high for small businesses, which currently depend on expensive diesel generation. Electricity also contributes to better conditions for improving health care, education, and social life; and contributes to more evening time that can be used for studying (by school children and adults attending training activities), income generation activities such as making handicrafts, and social activities and entertainment.

64. The Project will focus on communes considered too remote to be connected to the national grid, but have potential for electrification using renewable energy sources in the northern mountainous areas through mini-hydropower development. The Project will also provide electricity connections to poor communes in northern, central and southern Viet Nam through grid expansion. The Project aims at equitable and balanced development in its focus on remote and poor communes that are lagging the rest of the country in overall socioeconomic development and have a relatively higher household poverty rate. The main beneficiaries of the Project are residents of communes in the project area that do not have access to electricity. The Project will provide subsidized electricity connections to poor households, subsidized energy efficiency bulbs for the households, and an awareness and motivational campaign for safe and productive use of electricity; and facilitate access to microfinance from the Social Policy Bank for poor households of mountainous communes for income-generating activities.

65. During project preparation, poverty and social analyses were completed for one of the subprojects (i.e., core subproject in northern Viet Nam) under component 1 and for several communes to be included in component 2, in two provinces in central and southern Viet Nam. The findings were incorporated in the project design to ensure that the poor are capable of

⁷ As per definition provided in ADB. 2006. *Operations Manual*. Section F3: Indigenous Peoples. Manila (para. 5).

benefiting from electrification. A comprehensive consultation and participation strategy prepared for the Project is included as the Supplementary Appendix P. The summary poverty reduction and social strategy for the Project is provided in Appendix 11.

6. Gender Strategy

66. Ethnic minority women in the mountainous region live in remote locations, and have very limited contact and information outside their own communities. Women play a significant role in agriculture, livestock rearing, and collection of forest products. Lack of electricity increases their workload. Access to electricity can improve agriculture productivity, and enhance opportunities for income-generating activities for women. Electricity in public places will increase security for women and enable their participation in evening social gatherings. Electricity will improve health services, especially maternal health facilities, in the communes. Overall, women's living conditions, work, and income generation can be improved through electrification, both directly and through cumulative impacts, but gains will depend on their ability to afford improvements (e.g., household electric appliances and production machines). A gender strategy prepared for the overall Project focuses on activities to ensure women benefit from electrification and the prevention of harmful impacts during construction, particularly in poor and vulnerable communes to be included in the two project components. Details of the social assessment, including a gender strategy (Supplementary Appendix Q), are included in the summary poverty reduction and social strategy (Appendix 11).

B. Overall Assessment of the Sector Project

67. The selection criteria of subprojects to be included in component 1 are to ensure that the mini-hydro projects have a financial rate of return that exceeds the weighted average cost of capital. The economic rate of return will exceed the threshold of 12%, as economic benefits valued at avoided economic cost of power generation exceed the financial benefits valued at avoided financial cost. The attached TA will minimize the technical risk factors by building on the experience of the executing agencies. Component 2 does not pose any technical or implementation risk factors. The overall selection criteria of the subprojects for component 2 ensure that they meet a minimum economic return, while focusing on poor and remote parts of the country inhabited by ethnic minorities. The Project takes specific measures to ensure the benefits of electrification reach the poor and vulnerable segments of the society. Hence, the overall benefits of the Projects are in excess of the risk factors.

VI. ASSURANCES AND CONDITIONS

A. Specific Assurances

68. In addition to the standard assurances, the Government and executing agencies have given the following assurances, which are incorporated in the legal documents:

1. Subproject Selection

69. The subprojects under components 1 and 2 will be screened and selected in accordance with the criteria and procedures agreed between the Government and ADB and with strong support by the benefiting communities, as outlined in Appendix 6.

2. Policy Issues

70. By the end of the project period, the Government will take necessary administrative and/or regulatory measures (i) to establish simplified procedures for approval, licensing, and connecting of embedded renewable generation projects connected to the medium voltage network having a capacity less than 30 MW, and (ii) to establish a transparent subsidy mechanism to promote renewable energy development and support electrification of remote and difficult areas.

3. Financial Issues

71. The Government will ensure, through appropriate tariff adjustments and other means, that EVN, PC 1, PC 2, and PC 3 maintain (i) a self-financing ratio of 25% or above, (ii) a debt service coverage ratio of 1.5 or above, and (iii) a long-term debt-equity ratio of 70:30 or less. The Government will also ensure that adequate tariff increases are proposed by EVN and processed by the relevant authorities of the Government in a timely and effective manner.

4. Resettlement and Environmental Issues

72. The Government and executing agencies will ensure that only subprojects that fall within category C (no impacts) or category B (no significant impacts) on involuntary resettlement and the environment will be permitted under the Project. The screening and categorization of the subprojects will be done in accordance with the agreed resettlement framework and environmental assessment and review framework. In the event that any resettlement impacts are unavoidable for a particular subproject, the Government will prepare a resettlement plan for such subproject following the detailed design and in accordance with the agreed resettlement framework and ADB's *Policy on Involuntary Resettlement Policy (1995)*.

73. The Government will ensure that project activities comply with (i) applicable laws and regulations of Viet Nam; (ii) ADB environment policies and regulations, specifically ADB's *Environment Policy (2002)*; (iii) agreed environmental assessment and review framework; and (iv) environmental mitigation measures and environmental monitoring plan as set out in the IEE to be approved by ADB. The Government will also ensure preparation of IEEs for noncore environment category B subprojects consistent with ADB's *Environment Policy*.

74. The Government will ensure that resettlement plan and IEE will be publicly disclosed in places accessible to all affected people prior to submission to ADB for its review and approval, all in accordance with ADB's *Public Communications Policy (2005)*. Approval by ADB of the resettlement plan and IEE for each category B subproject will be a precondition to the award of contracts for civil works.

75. The Government will ensure that civil works contractors are not issued a notice of possession of site for construction work for any involuntary resettlement under a category B subproject until the executing agencies have satisfactorily completed, in accordance with the approved resettlement plan, compensation payment and relocation to new sites, and have ensured that rehabilitation measures are in place and the area required for civil works is free of all encumbrances.

5. Poverty

76. The Government will ensure the project benefits accrue to the poorer segments of ethnic minorities living in the target provinces. The Government will ensure poor households⁸ in provinces under the special program are provided with subsidized electricity connections fee at \$40 or half the cost of connection, whichever is lower. The executing agencies will provide the house wiring for electric bulbs and sockets as part of connection. The Government will take appropriate measures that the poor households will be consulted for, and participate in, the Project during subproject implementation.

6. Ethnic Minority Development

77. The executing agencies will undertake social analysis for all the subprojects to be included in component 1 and for a sample of communes of each province to be included in component 2 of the Project. Based on the social analysis, the Government will ensure that EMDPs are prepared for all subprojects under component 1 and provincial EMDPs for each province included in component 2 that have significant impacts on ethnic minorities as per the EMDF. The Government will ensure that the EMDPs are submitted to ADB for review and approval. The Government will also ensure that the EMDPs will be disclosed to the affected ethnic minorities prior to such submission and provide ADB with sufficient information so that it can be posted on the ADB website. The poor ethnic minority households will also be provided with subsidized electricity connections (para. 78).

7. Gender

78. The Government will ensure that the gender strategy provided in the EMDP and summary poverty reduction and social strategy to maximize project benefits to women is implemented. It will include the following specific actions: (i) hold separate meetings for planning productive use of the electricity component with representatives from the Women's Union and women community leaders on community management boards, (ii) provide capacity building training to women on productive use of electricity and awareness raising campaign on safe electricity, (iii) provide ethnic minority households headed by women with subsidized electricity connections (para. 78), and (iv) register the replacement land in the names of both the husband and wife in cases where land acquisition has taken place.

8. Other Social Matters

79. The Government will cause PC 1, PC 2, and PC 3 to (i) cause contractors to comply with all applicable labor laws and related international treaty obligations, and to not employ child labor; (ii) cause contractors to provide safe working conditions for male and female workers; and (iii) carry out, in the campsites and the subproject villages, education and awareness campaigns for HIV/AIDS and anti-trafficking of women and children, in coordination with the agencies working on the national program of HIV/AIDS prevention.

9. Operation and Maintenance of Project Facilities

80. The Government will ensure that each PC will carry out the annual budget allocation that fully covers costs for the operation and maintenance of any Project facilities.

⁸ The poor are defined as having an income below the national poverty line (D200,000 per person per month as of 2008 poverty line).

B. Conditions for Loan Effectiveness

81. The Government will sign separate subsidiary loan agreements, relating to the onlending of funds allocated for component 1, with PC 1 and PC 3 in substance and form satisfactory to ADB.

C. Conditions for Disbursement of Funds for Component 2

82. No disbursement will be made from the portion of the loan to support a particular province under the Government's Special Program for Rural Electrification, until the Government issues a decision stipulating such province is included in the special program for rural electrification.

83. No disbursement will be made from the portion of the loan to support a particular province not included in the Government's Special Program for Rural Electrification until subsidiary loan agreements relating to the onlending of funds are signed in substance and form satisfactory to ADB.

VII. RECOMMENDATION

84. I am satisfied that the proposed loan would comply with the Articles of Agreement of the Asian Development Bank (ADB) and recommend that the Board approve

- (i) the loan in various currencies equivalent to Special Drawing Rights 102,161,000 to the Socialist Republic of Viet Nam for the Renewable Energy Development and Network Expansion and Rehabilitation for Remote Communes Sector Project, from ADB's Special Funds resources with an interest charge at the rate of 1.0% per annum during the grace period and 1.5% per annum thereafter; a term of 32 years, including a grace period of 8 years; and such other terms and conditions as are substantially in accordance with those set forth in the draft Loan and Project Agreements presented to the Board; and
- (ii) the provision of technical assistance not exceeding the equivalent of \$2,500,000, on a grant basis, to the Government of Viet Nam for Capacity Building of Renewable Energy Development.

Haruhiko Kuroda
President

6 March 2009

DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets and/or Indicators	Data Sources and/or Reporting Mechanisms	Assumptions and Risks
Impact Promotion of pro-poor and balanced economic development of remote mountainous communes and poor communes through the sustainable use of electricity and renewable energy in an affordable manner	Over 20% reduction in poverty rates in the districts to be provided with electricity under the Project by 2020	Economic reports and sector statistics of the provincial people's committees	Assumption Provision of electricity through renewable energy sources and grid expansion will lead to broad economic development in the remote parts of targeted provinces.
Outcome Provision of reliable and affordable supply of electricity to remote, mountainous, and poor communes	5,000 households provided with electricity by the mini-hydropower plants developed under the Project by 2016 More than 100,000 households provided with electricity by the grid expansion component of the Project by 2016 Addition of over 500 MW of grid-connected renewable energy including small hydro (i.e., less than 30 MW) capacity by 2016 Annual generation of 100 GWh of energy and 125,000 tons of annual greenhouse gas emissions abated because of the Project by 2016 75% of households headed by women in the targeted communes are provided with electricity by 2016	Annual project implementation reports and project completion reports Progress reports submitted by executing agencies CDM facility assessment reports and validation reports to be prepared for subprojects during project implementation Post project completion socioeconomic surveys to be undertaken	Assumptions The provision of electricity will result in improved income generation opportunities to the targeted communities. The project implementing agencies will target the poor and remote communes for electrification under the Project. The electricity generated through renewable energy and grid expansion is affordable to the targeted communities. The feed-in tariff for grid-connected mini-hydro plants will be adjusted to compensate for potential increases in construction cost. Risk Hydro resource availability and impacts are unpredictable because of extreme climate events Maintenance of the mini-hydropower plants is weak during operations resulting in lower output
Outputs 1. Installation of 5–10 mini-hydropower plants to electrify	30 MW of mini hydropower capacity installed	Quarterly and annual reports and project completion reports	Assumption The implementing agencies have the necessary technical

Design Summary	Performance Targets and/or Indicators	Data Sources and/or Reporting Mechanisms	Assumptions and Risks
<p>mountainous communes</p> <p>2. Electrification of 1,000 villages through grid expansion</p>	<p>Expansion of medium voltage network by 500 km and low voltage network by 1,300 km</p> <p>Over 2 GWh of energy consumed in the predictive sectors in the targeted communities</p>		<p>expertise to implement the subprojects in a timely and efficient manner due to the TA provided.</p> <p>Risk The communities in the targeted areas are not capable of starting business enterprises to utilize electricity for productive purposes.</p>
<p>Activities with Milestones</p> <p>1. Mini Hydropower Systems</p> <p>1.1 Selection of subprojects completed by September 2009</p> <p>1.2 Detailed feasibility studies completed by June 2010</p> <p>1.3 Detailed technical designs completed by December 2010</p> <p>1.4 Bid documents and CDM documents completed by June 2011</p> <p>1.5 Procurement and contract award completed by June 2012</p> <p>1.6 Commissioning completed by December 2014</p> <p>2. Network Expansion and Rehabilitation</p> <p>2.1 Selection of villages and communes for grid expansion completed by September 2009</p> <p>2.2 Detailed design and bid documents for grid expansion and rehabilitation completed by September 2010</p> <p>2.3 Contracts awarded by March 2011</p> <p>2.4 Commissioning completed by December 2012</p>			<p>Inputs</p> <ul style="list-style-type: none"> • ADB ADF loan: SDR 102,161,000 (\$151 million) • Technical assistance grant: \$2.5 million, equivalent (\$1.6 million from the Climate Change Fund and \$0.9 million from TASF), and \$0.4 million from the Government and executing agencies • Counterpart funds of \$46.6 million from PC 1, PC 2, and PC 3

ADB = Asian Development Bank, ADF = Asian Development Fund, CDM = Clean Development Mechanism, GWh = gigawatt hour, MW = megawatt, PC = power company, SDR = Special Drawing Rights.

POWER SUBSECTOR ANALYSIS

A. Institutional Overview

1. The Ministry of Industry and Trade (MOIT) has policy and supervisory responsibilities for energy, both as the line ministry and as the ministry with oversight responsibility for state-owned companies. MOIT is responsible for supervising implementation of government policy, and recommending and drafting major policy reforms for government adoption. MOIT has specific responsibility to implement the Government's policy of full electrification by 2020 and promoting renewable energy generation.

2. Viet Nam Electricity (EVN), the main power utility of Viet Nam, is organized as a holding company, with a series of wholly owned subsidiaries. EVN owns the strategic power plants, holds majority shareholding stakes in partially privatized power plants, and invests as the sole investor or in partnership with other public and private investors in new power plants. Key subsidiaries include three regional power companies that are in charge of power transmission and distribution from 110 kilovolts (kV) and less in northern Viet Nam (Power Company 1 [PC 1]), southern Viet Nam (Power Company 2 [PC 2]), and central Viet Nam (Power Company 3 [PC 3]); and power distribution companies responsible for power distribution in large cities such as Hanoi, Ho Chi Minh City, Hai Phong, and Dong Nai. The power companies each maintain their own financial accounts and have a high degree of managerial and financial autonomy. Other key entities under EVN include the Power Transmission Company responsible for high voltage (500 kV and 220 kV) power transmission; four power engineering consulting companies; the National Load Dispatch Center; and subsidiaries engaged in noncore activities such as equipment manufacturing, telecommunications, real estate, and financial services.

3. Viet Nam's far-reaching power sector reform program was launched with passage of the forward-looking Electricity Law in late 2004 and establishment of the new Electricity Regulatory Authority of Viet Nam under the oversight of the Minister of Industry. The country's efforts to restructure the power industry and develop a competitive power market are a long-term proposition. The objectives of Viet Nam's power sector reform are to maximize efficiency through competition in the power industry and to expand mobilization of investment and managerial resources from outside the current state-operated system, in order to minimize costs and provide reliable, high-quality service to consumers. As described in the recently approved road map, the reform process is expected to span 20 years, and proceed through (i) a preparatory phase and initial "trial" market, followed by operation of a competitive market for supply from generators to a single buyer; (ii) a second phase introducing a wholesale competitive market for bulk supply to distribution companies and large users; and (iii) a final phase introducing retail competition.

4. In rural areas, local communities own and operate the low-voltage electricity distribution systems in most areas. The basic approach adopted for rural electrification in Viet Nam has been for EVN's power companies to develop the medium-voltage network, and for local communities to develop the low-voltage system (although EVN has undertaken this role for about one fifth of Viet Nam's communes). Provincial people's committees have oversight for rural electrification in their provinces, and provide substantial financial support for the local share of investment. Until 2004, local power distribution was handled by informal commune electricity groups or other informal entities in about two thirds of Viet Nam's electrified communes. According to Government regulations, however, all of these entities are now required to convert to formal legal entities, such as cooperatives or joint-stock companies. As of the end of 2007, 39% of electrified communes were supplied by EVN's power distribution

subsidiaries, 54% of the communes by cooperatives, 4% of the communes by joint-stock companies, and only 3% by informal entities.

B. Power Sector Performance

5. Performance of Viet Nam's power industry, managed primarily by EVN, has been quite good during recent years. The industry kept pace during the last decade with extraordinary increases in demand, maintaining basic service for its customers most of the time. EVN has maintained strong financial viability, while keeping costs to consumers quite low by international standards. Dramatic increases in rural access and steady reductions in transmission and distribution losses are particularly notable achievements. The challenge for the future is to meet the rapidly expanding demands of the economy and population, with minimum disruption, hopefully with further improvements in service quality and without unreasonable increases in costs to consumers

6. Electricity generation in Viet Nam grew at annual compounded rate of 13.7% during 1995–2007 and since 2000 the annual growth rate has exceeded 15%. Electricity generation has grown by three fold during the last 8 years to reach 67 terawatt hours in 2004 compared with 23.7 terawatt hours in 1999. The forecasted gross domestic product (GDP) growth exceeding 7% for 2005–2010 coupled with the increasing share of industrial output in Viet Nam's GDP will maintain the growth momentum in electricity demand. The reserve margin becomes very low during the dry season and this becomes even worse in northern Viet Nam as most of the generation capacity in northern Viet Nam is hydro.

Table A2: Historic Demand and Generation Data (2005-09)

Item	2005	2006	2007	2008	2009
Annual demand (gigawatt-hour)	53,400	59,800	67,100	75,400	84,600
Peak demand in dry season (megawatt)	9,018	10,157	11,235	12,782	14,286
Growth in annual demand (%)	15.2	11.9	12.3	12.3	12.3
Installed capacity	10,907	11,714	13,419	16,383	19,084
Dry season available capacity	9,018	10,243	11,288	13,346	17,173
Reserve margin in dry season (%)	4	1	0	4	20.0

Source: Ministry of Industry and Trade.

7. Access to electricity in rural areas increased dramatically during 1996–2004, marking one of the most successful recent rural electrification programs in the world. The number of rural households with access to electricity increased from 50.7% in 1996 to 92% in 2007. Rural household access rates are expected to increase during the next several years, although achievement of access among the final 5% of rural households will not be easy. The success of Viet Nam's program lies especially with the commitment of the Government to rural electrification, and the definition and systematic implementation of national plans as a matter of priority, as well as public investment and support to match community funds.

8. Transmission and distribution losses in EVN's system have fallen steadily over the last decade to 12.2% in 2007. This is not unreasonable for a system such as Viet Nam's at its current stage of development, especially given the heavy role of low-voltage residential consumers, but further improvement is possible. In the future, the Electricity Regulatory Authority of Viet Nam must monitor efficiency indicators carefully against various benchmarks. Management of consumer accounts receivable has been exceptionally effective for a developing country, with accounts receivable in 2007 equivalent to only about 17 days of sales. Nontechnical losses, including theft, are low compared with many countries. Widespread

anecdotal evidence points to substantial improvements in the quality of electricity service over the last 10 years, with basic service for most customers in urban or periurban areas becoming noticeably more reliable. However, systematic statistical monitoring of service interruptions and voltage drops, by service area and customer voltage, is lacking.

9. The tariff was D880 per kilowatt hour (kWh) in 2004 (\$0.056/kWh). This is lower than the average retail price today in most countries. The financial position of EVN has remained sound with unit revenue remaining stable during the last few years through 2007, covering all of its direct and indirect costs, but this revenue will not be sufficient for the future. Viet Nam's power tariff is sophisticated in structure, with rates varying by voltage level and consumer type, and offering time-of-day rates for major consumers. Urban residential rates increase progressively with increasing consumption. Rural rates are cross-subsidized by other consumers. Both average urban residential rates and rural residential rates are modestly cross-subsidized by higher rates for industry and commerce.

C. Main Power Sector Issues

1. Meeting Power Demand

10. The demand for electric power is the paramount challenge for Viet Nam's power industry. Key drivers of the country's economic growth, especially manufacturing, and commercial and service industries, are highly dependent upon power supply. Reliable electricity service is essential for light industries to remain competitive with similar industries in neighboring countries. Electricity has also become an expected basic element in the livelihood of most people, and an essential part of increasing standards of living. The power shortages experienced in the dry seasons of 2005–2008 clearly reinforced a priority focus on meeting demand throughout Viet Nam's power industry, with highly visible national attention. The capacity shortfall was estimated at some 1,500–2,000 MW during peak load. The shortage was caused by the coincidence of severe drought conditions; reducing hydropower production, with an extremely thin reserve margin in the overall system, due to an inability to develop new capacity over a short time to meet the higher than expected surges in power demand.

11. Viet Nam's overall strategy is to develop existing hydropower resources and the coal and gas plants, subject to the availability of domestic fuel resources, relatively quickly as both exploitable domestic coal supplies and offshore gas supplies entail supply constraints. The availability of domestic coal for the power industry is capped by domestic resource limits, given current technology, and exports. Expanding the gas supply requires not only field and pipeline development, but also exploration and firming up of reserves.

12. **Coal-Based Power Generation.** Assessment of best balances between coal- and gas-fired power is a key long-term planning issue, which is highly sensitive to future relative fuel price and supply expectations. With the country's coal resources limited, the Government's strategy is to strictly cap exports, in favor of expanding domestic supply—essentially to postpone the expected eventual need for coal imports. Although high-quality anthracite obtains a premium price on the international market, domestic coal prices for power generation are maintained below international prices. At current domestic coal prices, power generation from domestic coal is significantly less expensive than combined-cycle, gas-based power generation at capacity factors exceeding 50%–60%. However, in economic terms, considered from the perspective of the country as a whole, the value of domestic coal used for power generation is higher than its current price, as it can be exported for more money, which would accrue to Viet Nam. However, development of large-scale power generation using Viet Nam's offshore natural gas resources requires aligning the interests of a series of institutional participants, and major

upfront financing and long-term commitments. On the gas exploration and development side, for the longer term Viet Nam must maintain an attractive framework for international companies to continue exploration and firm up reserves, as much potential remains unexplored. Once the main options for generation from domestic coal and gas have been exploited, thermal power generation using imported coal is expected to be the most cost-effective option.

13. **Gas-Based Power Generation.** PetroVietnam Gas Corporation, PetroVietnam's subsidiary charged with natural gas operations, is a central entity, holding the Government's shares in field production facilities, retaining the sole rights in most cases to buy offshore gas and sell gas to end-users, and charged with gas transmission system development (although this may be in cooperation with international companies). Upstream gas exploration and development is undertaken in joint-venture or production-sharing arrangements between PetroVietnam Gas Corporation and international petroleum companies. On the power generation side, development of independent power producers (IPPs) with investors independent of EVN is essential for a large portion of the power generation capacity, due to EVN's limited financing capacity. Finally, the Government (aside from its ownership position of PetroVietnam and EVN) must play key roles: sanctioning the specific development arrangements and providing some type of partial risk coverage for electricity sale arrangements to outside investors.

14. **Hydropower Development.** With goals to provide almost 6,000 MW over the medium term, Viet Nam's program to develop its many medium-sized hydro sites will provide a core contribution to the overall power development program in each of the three geographic regions. Particular advantages include development of a source of domestic renewable energy quite separate from international energy price and security risks, and benefits from associated water control in many cases. Although economics vary by site, costs are generally quite competitive with the thermal power options in Viet Nam. Viet Nam has made substantial progress during the last 5 years in upgrading its reservoir resettlement and environmental assessment practices. Current policies provide a reasonably well-structured set of legal and regulatory requirements. Financial commitments for resettlement work in new projects are now substantial. The most difficult issues, including restoration of livelihoods for ethnic minorities that may be affected by reservoir development, are complex in every country, and require concerted efforts in consultation with local residents throughout implementation.

15. **Renewable Energy Development.** Viet Nam's renewable energy development program is growing, and can provide an increasing contribution in the future. Development has focused especially on off-grid power supply in isolated areas; but small hydro facilities, in particular, can also provide an important source of renewable energy to the grid. Wind power generation may also provide a small contribution. Viet Nam plans to develop nuclear energy capacity over the long term. Both MOIT and EVN have developed demand-side management and energy efficiency programs in recent years. Load management programs and energy efficiency promotion and investment programs are proven means to address capacity constraints that are far less expensive than new capacity. Such efforts can yield results relatively quickly in some cases, but do require sophisticated institutional development, which has proved challenging in most countries.

2. Financing the Investment

16. Annual power sector investment requirements to meet power demand during 2005–2010 are expected to be over \$3 billion. The country seeks to mobilize investment through a variety of vehicles, from both domestic and foreign sources, to meet this challenge. The two basic categories include EVN's contribution to investment from its own resources and different

types of borrowing, and independent investment, primarily by IPPs. Financing of new investment through the current EVN system, including sub entities, is essential for key parts of the construction effort, including the network, most of the hydropower program, and selected elements in the thermal power program. EVN exhibited strong financial performance during 2002–2007, allowing a substantial self-financing contribution to the investment program.

17. With increased costs stemming in part from power shortages, and the sharp increases in investment requirements, self-financing ratios will plummet unless EVN's unit sales revenue increases substantially. The corporation is proceeding to borrow from a wide variety of sources, including by issuing bonds. However, EVN will reach borrowing limits very quickly, unless revenues are increased (or a major injection of equity is made, which is unlikely). Overextension of borrowing above internationally recognized ratios would be highly imprudent, as maintenance of EVN's creditworthiness is essential for any sustainable investment mobilization effort. Average retail power prices must be increased quickly to cover greater costs but also, especially, to expand revenues for financing the massive power sector expansion. Ultimately, consumers must contribute to the financing of the new capacity to meet their needs. Power prices in Viet Nam are relatively low by international standards, including industrial tariffs, especially in the residential sector.

18. Clearly, dramatic increases in power sector investment from outside EVN will be required to meet overall sector investment requirements. Viet Nam is pursuing a full range of IPP arrangements in its efforts to meet the huge and rapid increases in power demand. IPP arrangements for new power plants include (i) build-operate-transfer or build-operate-own ventures wholly owned by other public-owned Vietnamese entities, (ii) joint-venture build-operate-transfer or build-operate-own arrangements, involving EVN investment with other participants (local public or foreign), and (iii) build-operate-transfer arrangements wholly owned by foreign parties, either public or private. In addition, new joint-stock company IPPs are being created from EVN's partial divestiture of existing power plants. In the case of Viet Nam, few public entities have the resources and interest to make major power generation investments, and are, for the most part, limited to the state-owned fuel supply companies or large construction companies.

SECTOR ROAD MAP FOR RENEWABLE ENERGY AND RURAL ELECTRIFICATION SECTORS

A. General Policy Framework

1. The general policy framework for renewable energy needs improvement, as does coordination among ministries.

1. Actions Taken

2. The Electricity Law includes provisions for “preferential pricing” for renewable energy (though without defining precisely what that means)

2. Actions Proposed (by Draft Renewable Energy Master Plan)

3. Establish a renewable energy fund (to provide stable funding for off-grid renewable energy schemes, subsidies for grid-connected schemes, and support for renewable energy resource data development and research and development).

4. Enact a renewable energy law (to provide authority for the renewable energy fund). The Project includes a technical assistance component to assist in preparing the renewable energy law, and detailed supporting decrees for implementation, (e.g., criteria for disbursement of subsidies to off-grid schemes, and introduction of competitive processes for subsidies to grid-connected projects).

5. Create a new and separate office within the Ministry of Industry and Trade (MOIT) for the promotion of renewable energy (the renewable energy development office funded by a budget allocation from the renewable energy fund). This office would be responsible for promotion, planning, and policy coordination; and provide assistance to prepare and implement sustainable off-grid renewable energy schemes.

6. Institute improved procedures for stakeholder consultation.

B. Grid-Connected Renewable Energy

1. Remove Financial Barriers for Economically Viable Renewable Technologies

a. Actions Taken or Under Way

7. A standardized power purchase agreement was introduced to replace ad hoc negotiation of power purchase agreements (decision issued in July 2008).

8. An avoided cost tariff was introduced, applicable to all qualifying renewable energy small power producers who can meet the grid code (capacity no greater than 30 MW), decision issued July 2008; first tariff expected to be issued early 2009 (and then updated each year under the jurisdiction of Electricity Regulatory Authority of Viet Nam).

9. Introduce a distribution code to stipulate technical standards for grid connection of renewable energy projects.

10. Prepare a World Bank-supported refinancing program to provide 20-year loan tenors, which will enhance financial viability of capital-intensive renewable energy projects (participating banks selected for the Project will continue to deal with project developers in the usual manner, and will bear the full credit risk, but can obtain refinancing from the Ministry of Finance on a long-term basis using the World Bank loan proceeds).

b. Actions Remaining

11. Resolve the lack of transparency in allocation of sites. Few countries have competitive bidding for small hydro projects (and those that tried, such as Brazil, soon gave up). However, the present process encourages hoarding of sites, and MOIT and provincial authorities should allow some kind of competitive process in the selection of developers.

12. Improve and formalize benefit-sharing procedures for small hydro projects. The Asian Development Bank has supported the development of benefit sharing for larger hydropower plants, but small hydropower plants of less than 30 MW are to be exempt. In some instances small off-grid electrification schemes have been preempted by larger cascade developments, but with no requirement to provide electricity to local communities.

2. Improve the Prospects for Carbon Finance

13. Viet Nam's track record is poor compared with other countries with similar small hydro resource endowments (only two projects approved, dozens of project design documents (PDDs) are stuck at various stages of approval). Many problems need to be addressed, including inconsistencies in emission factor calculations, poor argumentation for additionality, and lack of technical capacity for PDD preparation. A significant problem is buyers' preference for large-scale projects: the transaction costs for both buyers and sellers are high, and a single small project of 2–10 MW has difficulty attracting interest of potential buyers.

a. Actions Taken or Under Way

14. MOIT is about to issue guidelines for calculation of emission coefficients (along the lines of a similar process in the People's Republic of China)

15. MOIT is negotiating with the Carbon Finance Unit of the World Bank to provide an umbrella facility for carbon financing

b. Actions Remaining

16. The present national approval procedure by the Designated National Authority for PDDs is long and cumbersome, with open-ended time frames and obscure criteria that create problems for developers. The steps required include

- (i) issuance of regulations specifying the time that a PDD is open for comments from ministry representatives;
- (ii) electronic consultation and request for review process;
- (iii) permanent Designated National Authority staff work solely on CDM projects; and
- (iv) the Designated National Authority publishes a monthly or quarterly newsletter in Vietnamese that provides update information regarding CDM procedures as well as domestic, regional, and international carbon markets.

3. Introduce Support Schemes for Renewable Energy Technologies Other than Small Hydro

17. The avoided cost tariff will unlikely enable technologies other than small hydro projects and some bagasse projects. However, many biomass projects (plus some geothermal and landfill gas) are viable at the economic avoided cost of the buyer.

a. Actions Required

18. Providing a subsidy in a cost-effective manner to renewable energy technologies requires a carefully designed competitive system. Two options are proposed for renewable energy: competitive award of concession fee for the right to sell into the grid at the economic price or bidding for a subsidy.

19. For subsidies to be bankable (i.e., to be considered in a lender's assessment of project financing), a subsidy agreement with similar commercial standing as power purchase agreements is required.

20. Quite apart from the poor economics of grid-connected wind power, data on the wind resource remains poor, and multiyear data at 60 meters height is simply not available (or is claimed to be proprietary). Data on the geothermal resource is similarly poor. Without adequate data (in the public domain), drawing conclusions about the desirability of Government policies to encourage these technologies is difficult.

C. Off-Grid Renewable Energy

21. The current subsidy policy is biased against off-grid projects. While grid-connected domestic rural consumers have a tariff cap of D700/kWh, with the implied subsidy carried on the books of the power companies, in off-grid systems much higher tariffs are common, largely because subsidy support from the Government is reluctantly provided (under ad hoc arrangements, or commitments contingent upon availability of funds). Yet, off-grid systems serve some of Viet Nam's poorest households, raising doubts about the equity of the present tariff policy. The problem is aggravated by the reluctance of development partners to provide operating subsidies; while capital investment is provided (as in the case of the Viet Nam–Sweden renewable energy program); no support is given to provide operating subsidies.

1. Actions Required

22. Review the present tariff policy that caps the tariff for domestic consumers connected to the national grid, but not for off-grid customers. Establish a mechanism to provide subsidies for off-grid (and offshore island) customers. (For example, the Ly Son wind-diesel hybrid scheme, proposed for inclusion in the proposed Asian Development Bank project, was dropped for lack of a sustainable source of subsidy support). A rural electrification fund has been proposed as a cross-subsidy mechanism in favor of the power companies with a significant burden of high-cost rural customers. Whether this mechanism will be available to cover the subsidy requirements of off-grid customers' needs to be settled.

23. Establish policies and procedures for providing capital subsidies to off-grid renewable energy schemes (as would be adopted by the proposed renewable energy fund). Subsidies should only be provided where at least one of the following conditions is present:

- (i) the scheme is bundled with small hydro project rehabilitation or a new small hydro project connected to the grid to provide sustainable finance for the off-grid scheme;
- (ii) the scheme is provided support by a district wide or province wide support entity that provides technical expertise and support for operation and maintenance includes some significant productive use (to provide remunerative customers, and improve project economics by increasing load factors); and
- (iii) a program is being initiated to promote productive use in rural areas, to include a mechanism for financing electric equipment.

EXTERNAL ASSISTANCE TO THE POWER SUBSECTOR

Project	Funding Source	Amount (million)	Year
Loans			
Saigon Power Project	ADB	\$6.3	1972
Power Distribution and Rehabilitation Project	ADB	\$80.0	1995
Central and Southern Viet Nam Power Distribution Project	ADB	\$100.0	1997
Northern Power Transmission (Sector) Project	ADB	\$120.0	2004
Northern Power Transmission Expansion Sector Project	ADB	\$360.0	2005
Mong Dung 1 Thermal Power Project	ADB	\$28.0	2007
Song Bung 4 Hydropower Project	ADB	\$198.0	2008
Rural Electrification Project	AFD	€19.0	2000
Rural Electrification Project in South	AFD	\$23.0	2001
Northern Power Transmission Project	AFD	€40.0	2004
Phi My Thermal Power Plant Project	JBIC	¥61,932.0	1993–1998
Phi Lai Thermal Power Plant Project	JBIC	¥72,826.0	1993–1998
Ham Thuan–Da Mi Hydropower Project	JBIC	¥53,074.0	1993–1997
Da Nhim Power Plant Rehabilitation Project	JBIC	¥7,000.0	1996
O Mon Thermal Power Plant and Mekong Delta Transmission Network Project	JBIC	¥43,819.0	2000–2006
Dai Ninh Hydropower Project	JBIC	¥33,172.0	1998–2003
Phi My–Ho Chi Minh City 500 kV Transmission Line Project	JBIC	¥13,127.0	2000
Ninh Binh II Thermal Power Plant	JBIC	¥33,864.0	2004–2005
Nghi Son Thermal Power Plant	JBIC	¥20,943.0	2006
Power Sector Loan	JBIC	¥3,190.0	2003
O Mon Thermal Power Plant Unit 2 Construction Project	JBIC	¥27,547.0	2003
Dai Ninh Hydropower Project (III)	JBIC	¥19,142.0	2004
Thad Mo Hydropower Station Extension Project	JBIC	¥5,972.0	2003
Small-Scale Pro-poor Infrastructure Development Project	JBIC	\$44.0	1997–2006
Power Sector Rehabilitation and Expansion Project	World Bank	\$165.0	1995
Power Development Project	World Bank	\$180.0	1996
Transmission, Distribution, and Disaster Reconstruction	World Bank	\$199.0	1998
Rural Energy Project	World Bank	\$150.0	2000
System Energy, Equalization and Renewable Energy Project	World Bank	\$225.0	2002
Second Rural Energy Project	World Bank	\$220.0	2004
Second Transmission and Distribution	World Bank	\$220.0	2005

Project	Funding Source	Amount (million)	Year
Construction of Song Hahn Multipurpose Hydropower Plant	Sida	SKr213.0	1995
Ha Tin 500 kV Substation	Sida	SKr55.0	1998
Power Distribution Project in Central Area	Sida	SKr60.0	1999
Upgrading Rural Substations	Sida	SKr60.0	2000

ADB = Asian Development Bank, AFD = Agence Française de Développement, kV = kilovolt, JBIC = Japan Bank for International Cooperation, Sida = Swedish International Development Cooperation Agency.

Sources: ADB, AFD, JBIC, Sida, and World Bank.

TECHNICAL DESCRIPTION OF SUBPROJECTS

A. Small Hydropower Projects

1. The Renewable Energy for Remote Communes Sector Project is based on three propositions: (i) that the scale of small hydro subprojects to serve small groups of remote households is generally uneconomic because the load factor of mainly domestic consumption is very low; (ii) the poor scale economies of small generating units imply high costs/kilowatt (kW); and (iii) electrifying these households by grid expansion requires long lines to serve small loads, and therefore is equally uneconomic. The proposed solution is to promote small hydro subprojects of sufficient size to make a grid connection economic (and selling to the grid at the new avoided cost tariff), but to divert some proportion of the output to electrify local households at the national consumer tariff. Since grid sales are expected to account for the bulk of the revenue, the financial sustainability of the subprojects is assured.

2. Consultants fielded by the Asian Development Bank (ADB) first screened, through a desk study, potential hydropower sites based on subproject proposals from the provincial people's committees of Lai Chau Province and Dien Bien Province, served by Power Company 1 (PC 1). Later, Viet Nam Electricity (EVN) requested that Quang Nam and Hue provinces served by Power Company 3 (PC 3) also be included in the Project's scope of work. The selection criteria for the long-list of subprojects was that (i) the installed capacity should range between 500 kW and 6,000 kW;¹ (ii) an existing (or planned and sure to come) 35 kV line should be within about 20 km of the proposed power plant; (iii) unserved households should be close to the power plant and along the route of the proposed medium voltage (MV) transmission line; (iv) the institution arrangements must allow the local population to benefit from the revenue resulting from the generated electricity; and (v) minimal relocation and resettlement should result (i.e., the small hydropower plant should be within ADB's category B environment classification).

3. Hydrological records for Lai Chau and Dien Bien were not available for any of the proposed sites, so assumptions had to be made on regional considerations in terms of adopted flow duration curves and average runoff. However, rainfall is high in this part of Viet Nam exceeding 2,500 millimeters/year and resulting in an annual runoff modulus exceeding 60 liters/second/square kilometer (km²) in many parts of Lai Chau Province.^{2,3} About 72% of the rain falls during May to August, with highest runoff being 1 month later. For indicative design purposes, a design flow of 40 liters/second/km² was adopted for subprojects in Lai Chau province and 30 liters/second/km² in Dien Bien Province. Maps with a scale of 1:50,000 were used to identify potential sites and estimate available head.⁴ Four proposed subprojects had heads ranging between 10 and 15 meters (m). The remaining subprojects had more suitable heads of between 35 m and 185 m. As an initial approximation, the turbines were dimensioned to operate at full capacity between 4,500 and 5,200 hours per year. Following the desk study, the consultant visited the best sites to verify the suitability of the dam site and powerhouse locations, approximate alignment of waterways, and available head.

4. Tentative cost estimates based on desk studies and verifications on site were made for four subprojects: Nam Nghe 1, Na Say, Ta Con, and Na Son hydropower subprojects. The unit

¹ The upper limit was subsequently increased to 7.5 MW when EVN requested inclusion of projects under PC 3.

² NWCR, Viet Nam Water Resources Atlas, Institute of Hydro Meteorological Services. Hanoi

³ Mean annual rainfall in Hue and Quang Nam provinces' mountainous areas range between 3,200 and 3,600 mm with about 63% falling during September to December. The annual runoff modulus is in the range 60–80 liters/second/km², with about 68% of the annual runoff occurring during October–December.

⁴ Head: difference in elevation between water level at head pond and water level at power plant tailrace

costs ranges between \$882/kW (rehabilitation) and \$2,500/kW (new construction). The cost estimates for other hydropower plants are based on unit costs of around \$2,000/kW–\$2,200/kW. The costs of transmission lines at 35 kV are based on estimated distance between the power plant and the nearest connection to the grid. Distribution line costs (0.4 kV) are based on the average per household connection cost (including local MV line, low voltage [LV] lines and step-down transformers) of the four subprojects listed.

5. In Lai Chau Province, the consultants identified eight power subprojects (one with two alternatives) totaling 13.8–16.8 MW of installed capacity.⁵ The potential mean annual generation would be about 67–80 GWh at a total cost of \$40 million–\$46 million, including \$10 million for 182 km of 35 kV MV transmission lines. The subprojects would provide electricity to about 2,174 households that would require about 1.5 GWh⁶ of electricity per year, leaving about 65–78 GWh available for sale to the EVN grid. Providing electricity to all 2,174 households would require an investment of about \$3 million in distribution facilities.⁷ This corresponds to about 7% of the cost of the power plant and transmission line to the grid. To provide electricity to all the households with grid-connected small hydro would therefore require about \$43 million–\$49 million.

6. In Dien Bien Province, the consultant identified 10 subprojects totaling 19.6 MW of installed capacity. The potential mean annual generation would be about 81 GWh at a total cost of \$44 million, including \$0.9 million for 20 km of MV transmission lines. The subprojects would provide electricity to about 5,665 households, requiring about 4 GWh of electricity per year, leaving about 77 GWh available for sale to the EVN grid. To provide electricity to all 5,665 households would require an investment of about \$7.7 million in distribution facilities. This corresponds to about 17% of the cost of the power plant and transmission line to the grid. To electrify all communes with grid-connected small hydro would require about \$52 million.

7. Since the cost of the proposed subprojects of about \$100 million exceeds the available funds under the proposed ADB loan (about \$60 million), a representative number of subprojects from Lai Chau and Dien Bien had to be selected. Subprojects were ranked according to (i) levelized costs of generation, (ii) energy available for sale to the grid (will increase revenues for further rural electrification), (iii) number of households close to the subproject that could be electrified, and (iv) an attractiveness factor⁸ (reflecting technical ranking) (Table A5.1). Since subprojects are small and unlikely to affect many people, the negative social and environmental impact was not considered at this stage, although it will need to be considered during the feasibility studies. The following subprojects were selected to be included in the Project.

⁵ The hydropower potential of small hydropower projects in Lai Chau and Dien Bien is much higher than the list here, but many subprojects have been reserved by the private sector, and memorandums of understanding and development licenses have already been issued.

⁶ Assumes consumption of 740 kWh/household per year or 2 kWh/day, equivalent to about 200 watts average domestic load.

⁷ This assumes an average unit cost of \$1,360 per household. This cost is based on estimates for Ta Con, Na Son, Na say, and Nam Nghe 1 hydropower projects and includes local MV lines. Without the MV line the unit cost for LV voltage alone, but including step-down transformers, is \$550/household.

⁸ The “attractiveness factor” $AF = f \cdot \sqrt{P \cdot H}$, where P: design capacity (will give higher energy output at a given site and valuable peaking capacity), H: available head (high head projects are normally lower unit cost than low head projects), and f: plant factor (high value will indicate higher utilization). The higher the number, the more attractive the subproject.

Table A5.1: Shortlist^a

Item	Energy Output (GWh)	Total Cost (\$ million)	Levelized Costs (\$/kWh)	Energy for Grid (GWh)	Households to be Provided with Electricity (\$ million)	Attractiveness Factor
Lai Chau Province						
Nam Nghe1b, 2.8 MW	17.0	8.74	0.059	16.8	256	561
Nam Ha B	8.1	4.91	0.068	7.9	298	195
Nam Ngoc	8.7	6.43	0.083	8.3	457	225
Nam So	9.7	5.22	0.062	9.5	260	166
Total	43.5	25.30		42.5	1,271	166-561
Dien Bien Province						
Na Son (Na Phat)	9.9	5.57	0.060	9.5	555	102
Sinh Phing	4.6	3.40	0.062	4.0	796	207
Nam Huoi Ku	15.7	9.67	0.063	14.8	1,237	449
Nam He	24.0	14.86	0.073	23.6	500	285
Total	54.2	33.50		51.9	3,088	102-449

GWh = gigawatt hour, kWh = kilowatt hour, MW = megawatt.

^a EVN requested that (i) Aroang hydropower plant in Hue Province with an estimate installed capacity of 7.2 MW and an investment cost of \$7.5 million; and (ii) Dakpring hydropower plant with an estimate installed capacity of 8 MW and an investment cost of \$9.1 million, also be considered under the Project.

Source: Asian Development Bank consultants, 2008.

B. Nam Nghe 1 Small Hydropower Subproject

8. The Nam Nghe 1 small hydropower plant is located on the Nam Nghe River in Hua Bum commune, Muong Te district, in Lai Chau Province. With an annual precipitation of 2,500 millimeters/year and a catchment of 35 km², the mean annual flow is estimated at 2.8 cubic meters (m³)/second (s), ranging between an average of 0.7 m³/s in March and 8.5 m³/s in July. The firm flow (90%) is estimated at 0.54 m³/s. The power plant tentatively consists of a concrete overflow weir on the Nam Nghe River with a maximum height of about 14 m but with little pondage, a 1,400 m long headrace canal lined with reinforced concrete on the right bank of the river, a 340 m long steel penstock, and a powerhouse. The available head is 185 m. The powerhouse, on the right bank of the Nam Nghe River and close to the confluence with the Nam Bum River, will be located within some rice fields, which will require compensation. It will contain two Pelton-type turbines with a design discharge of 1.9 m³/s, giving a total capacity of 2.8 MW. The estimated annual energy output is 17.0 GWh. Firm power is estimated at 0.8 MW, which corresponds to 19 MWh/day of generation. The subproject will be optimized during the technical design following more in-depth engineering studies including detailed topographic surveys, and hydrological and geological studies.

9. Five hamlets within 10 km of the power plant have a total of 136 households and one border post with 35 border guards, who will benefit from the local 0.4 kV LV distribution. Along the way to Muong Te, two more hamlets with about 94 households will be electrified. A 35 kV transmission line will transmit power to a substation east of Muang Te town, some 12 km west of the power plant. The annual consumption by the 230 households is estimated at 0.2 GWh (613 kWh/day), leaving 16.8 GWh for sales to the grid at Muong Te. In the driest months, the power plant will be able to generate 19,000 kWh/day, resulting in a surplus to be sold to the grid. Muong Te is scheduled to be connected at 35 kV to the EVN grid in 2009, before the commissioning of the Nam Nghe 1 power plant.

10. The cost of the power plant is estimated at \$8.2 million including the 35 kV transmission line to Muong Te, while the local transmission and distribution system is estimated at \$0.54 million, totaling \$8.74 million.

11. Before bidding, a full feasibility study must be conducted to confirm the feasibility of the subproject. Consultants will conduct further detailed investigations such as topographic surveying and mapping, geological and hydrological investigations, detailed cost estimation, and optimization of installed capacity. Following approval of the feasibility study, bid documents will be prepared for civil works construction and equipment supply packages. The subproject will take 2 to 3 years to build.

C. Network Expansion and Rehabilitation of Distribution Network Serving Poor Provinces

12. The Government has initiated a special program of rural electrification to improve the electrification rate of poor provinces inhabited by ethnic minorities—where the rate is significantly lower than the national average. Under this program, the state budget provides financing to Power Company 2 (PC 2) and PC 3 to cover 85% of the cost of rural electrification in five selected provinces in the Central Highlands.

13. The Government intends to extend this component to cover five additional provinces (i.e., Soc Trang and Tra Vinh provinces in the south, Quang Tri Province in the center and Dien Bien and Lai Chau provinces in the north), with a total of 733,681 households. The current electrification rate is 83.5%, varying between 36.0% in Lai Chau province and 97.3% in Quang Tri province. Of the 129,563 households not yet connected, 66,837 will be connected by 2015 raising the electrification rate to 92.6%. Component 2 of the Project will finance the proposed government financing in these five provinces. This component will finance the expansion of the rural distribution network to connect villages without electricity and to rehabilitate the existing low voltage network in poorly constructed low voltage networks serving remote communes. The project scope is expected to include the expansion of the MV network by about 900 km of MV lines (at 22 kV and 35 kV), about 1,100 medium to low voltage substations with a total capacity of 31 MVA, and about 2,500 km of low voltage (0.4 kV) distribution lines to provide electricity to about 67,000 households, and improve supply to a further 55,000 households in more than 1,000 villages. The total cost will amount to about \$57 million, or \$468 per connected household. Table A5.2 provides the main data for each province being considered included in the Project and the overall total.

Table A5.2: Basic Statistics

Item	Units	Province					Total
		Soc Trang	Tra Vinh	Quang Tri	Lai Chau	Dien Bien	
Households	No.	267,380	237,663	102,307	55,304	71,027	733,681
Connected to grid	No.	243,492	209,648	99,268	19,930	40,059	612,397
	%	87.7	86.8	97.3	36.0	57.0	83.5
Not connected	HH	32,887	28,015	2,769	35,374	30,518	129,563
To be connected	HH	20,388	19,923	1,639	17,070	7,817	66,837
Strengthen existing grid	HH			54,780			54,780
Target electrification rate	%	95.1	94.1	99.9	66.9	68.0	92.6
Required Facilities							
22 kV/35 kV lines	Km	304	207	115	220	42	888
Substations	No.	499	418	37	83	39	1,076
	MVA	10.8	7.4	3.6	5.6	3.3	31
0.4 kV lines	Km	867	654	666	242	86	2,515
Costs	D million	305,377	226,983				964,136
	\$ million	18.0	13.4	7.9	14.4	3.2	56.9
Average unit cost	\$/HH	880	670	150	841	409	468

HH = households, km = kilometer, MVA = mega-volt ampere, No. = number, \$ = US dollar.

Source: Viet Nam Electricity, 2008.

D. Network Expansion for Tra Vinh Province Subproject

14. The economy of Tra Vinh in the Mekong Delta is agriculture-forestry based. Agriculture, forestry, and fisheries account for more than 60% of the total gross domestic product (GDP). However, the shares of construction, industry, and commerce are increasing. In 2007, the province's total GDP was D6,111 billion, almost 14% higher than the previous year. Of Tra Vinh's 1.05 million population, 31% are Khmer (about 328,000). Annual per capita income in 2007 was D9 million, lower than the national average. The province has 61,000 households living under the national poverty line; 29,500 of these are Khmer.

15. Tra Vinh Province receives electricity from the national grid via the Vung Liem–Tra Vinh 110 kV line. Two substations provide electricity in Tra Vinh Province: the 110/22 kV Tra Vinh substation and the 110/22 kV Duyen Hai substation. The Tra Vinh MV network consists of three-phase and single-phase 22 kV line totaling about 2,000 km.

16. Between 2000 and 2007, the rural electrification rate in Tra Vinh Province increased from 50% to 86%; in 2000 only 96 communes (95,300 households) had access to grid electricity. In 2007, the corresponding numbers are 102 communes with 204,000 households. Table A5.3 shows the rates of access to grid electricity by districts for total households and for Khmer households.

Table A5.3: Connection Rates by District

District	Total HH	No. Khmer HH	% HH with Access to Grid	% Khmer HH with Access to Grid
Tra Vinh town	20,948	4,340	92.2	87.7
Cang Long	38,367	2,305	95.7	76.4
Chau Thanh	31,571	10,262	87.2	77.9
Cau Ke	27,559	8,423	80.5	72.5
Cau Ngang	31,900	11,626	80.2	75.0
Duyen Hai	21,684	3,543	84.8	67.7
Tieu Can	26,118	8,231	87.1	74.8
Tra Cu	39,516	24,101	86.9	88.5
Total for Province	237,663	72,831	87.0	80.0

HH = household.

Source: Power Company No 2.

17. PC 2 has carried out a feasibility study, and proposed that the Government extend the grid to unserved communes. The objective of the subproject is to extend the MV and LV network in 83 communes of seven districts in Tra Vinh Province to provide electricity to 19,923 households, most of which belong to the Khmer ethnic group, the poorest people in the province. The subproject will increase the province rural electrification rate from the current 87% to 94%, and will specially target Khmer ethnic households by bringing their electrification rate from the current 80% to 93%.

18. The subproject consists of an MV component and an LV component. For MV (22/15 kV), single circuit distribution lines will be built to connect seven districts, currently not connected to the grid, to the existing MV grid. The MV component will build one 0.5 km three-phase MV line and 206 km of single-phase lines. The MV component includes also 418 transformers in seven districts (22/15 kV for 3-phase and 12.7/8.6 kV for single-phase). The LV component consists of 636 km distribution lines and 19,923 drop-down transformers and meters for the corresponding number of households.

19. The cost of the subproject is estimated at \$7.9 million.

20. The average consumer electricity tariff in the province is D550 per kWh, while the buying price is D635/kWh. Distribution losses are 7%. The operation and maintenance costs are estimated at 2% of the capital investment costs. For the economic analysis, PC 2 values the benefits of provision of electricity at the estimated cost of energy not served (15 times the consumer tariff). The subproject is economically viable with the economic internal rate of return at 18.6% and present value equal to D103 million.

SUBPROJECT SELECTION CRITERIA AND APPROVAL PROCEDURES

A. Component 1: Mini-Hydro Development for Rural Electrification

1. Selection Criteria

1. The subproject should include the following features:
 - (i) Be technically feasible and have a capacity less than 7.5 megawatts (MW). Institutional arrangements for ownership, project implementation, and operation and maintenance should be acceptable to the Asian Development Bank (ADB).
 - (ii) Be financially and economically viable after taking into account the cost of grid connection and grid expansion to serve local communes. The financial internal rate of return should exceed the weighted average cost of capital.
 - (iii) Have strong community support based on in-depth consultations with beneficiaries.
 - (iv) Not have major resettlement impacts requiring relocation of households or extensive land acquisition. It should be categorized as category B or category C under ADB's *Involuntary Resettlement Policy* (1995).
 - (v) Not have major environment impacts. It should not involve transfer of water from one sub basin to another, and should not be located in environmentally sensitive areas such as national parks and protected areas. It should be categorized as category B or category C under ADB's *Environment Policy* (2002).
 - (vi) Enable electrification of a minimum of 100 households per MW of installed capacity. (i.e., a 5 MW mini-hydropower project should enable the connection of at least 500 households).
 - (vii) Have undertaken a poverty and social analysis, which has been submitted to ADB as part of the subproject feasibility report. Over 50% of households receiving electricity under the Project should have an income below the national poverty rate.

2. Subproject Approval Procedure

2. The subproject approval should follow the following procedure
 - (i) International consultants will review the feasibility study of each component 1 subproject and their recommendations will be incorporated in the feasibility study as appropriate.
 - (ii) The feasibility study and Project safeguard documents, including the initial environment examination report will be approved by the executive agencies.
 - (iii) ADB approves each subproject base on submitted feasibility study.

B. Component 2: Network Expansion for Poor Communes

1. Selection Criteria

3. The subproject should include the following features:
 - (i) At least 50% of households receiving electricity through a sub-project shall have an income level below the national poverty rate.

- (ii) To ensure the economic viability of the proposed rural electrification subprojects, the average cost per electrified household in each province will be less than \$1,500.
- (iii) The network expansion subproject should be environment category C (i.e., no adverse environmental impacts) based on ADB's *Environment Policy* and minimal resettlement impacts.

2. Approval Procedure

4. The subproject approval should follow the following procedure

- (i) The PCs, in consultation with the provincial people's committee, proposes the list of communes to be included in component 2 of the Project in each province.
- (ii) MOIT provides no objection to the list of communes.
- (iii) ADB approves the list of communes.

DETAILED COST ESTIMATES
Table A7.1: Detailed Cost Estimates by Component

Item	D Billion			\$ Million			% of Base Costs
	FX	LC	Total	FX	LC	Total	
A. Investment Costs	566.6	2,338.6	2,905.2	33.53	138.38	171.90	100%
1. Component 1 - Grid Connected Small Hydropower	210.0	766.3	976.3	12.43	45.34	57.77	34%
a. Nam Nge Small Hydropower Project (Lai Chau) (PC1)	24.7	98.5	123.2	1.46	5.83	7.29	4%
Hydropower plant	20.4	63.8	84.2	1.21	3.78	4.98	3%
Construction	0.0	61.6	61.6	0.00	3.64	3.64	2%
Equipment	20.4	2.3	22.6	1.21	0.13	1.34	1%
Transmission line to grid and local distribution network	4.3	24.5	28.9	0.26	1.45	1.71	1%
Construction (including poles)	0.0	20.2	20.2	0.00	1.20	1.20	1%
Materials	4.3	4.3	8.7	0.26	0.26	0.51	0%
Resettlement and environmental conservation	0.0	10.1	10.1	0.00	0.60	0.60	0%
b. Other Small Hydropower Project in Lai Chau and Dien Bien Provinces (PC1)	102.7	377.0	479.7	6.08	22.31	28.39	17%
Hydropower Plant	65.7	226.4	292.1	3.89	13.39	17.28	10%
Construction	0.0	219.1	219.1	0.00	12.96	12.96	8%
Equipment	65.7	7.3	73.0	3.89	0.43	4.32	3%
Transmission line to grid and local distribution network	37.0	100.0	136.9	2.19	5.92	8.10	5%
Construction (including poles)	0.0	95.9	95.9	0.00	5.67	5.67	3%
Materials	37.0	4.1	41.1	2.19	0.24	2.43	1%
Resettlement and environmental conservation	0.0	50.7	50.7	0.00	3.00	3.00	2%
c. Small Hydropower Project in Quang Nam and Hue Provinces (PC3)	82.6	290.7	373.3	4.89	17.20	22.09	13%
Hydropower Plant	63.5	218.9	282.4	3.76	12.95	16.71	10%
Construction	0.0	211.8	211.8	0.00	12.53	12.53	7%
Equipment	63.5	7.1	70.6	3.76	0.42	4.18	2%
Transmission line to grid and local distribution network	19.1	51.5	70.6	1.13	3.05	4.18	2%
Construction (including poles)	0.0	49.4	49.4	0.00	2.92	2.92	2%
Materials	19.1	2.1	21.2	1.13	0.13	1.25	1%
Resettlement and environmental conservation	0.0	20.3	20.3	0.00	1.20	1.20	1%
2. Component 2 - Grid Extension and Rehabilitation	356.6	1,055.4	1,412.0	21.10	62.45	83.55	49%
a. Northern Viet Nam (PC1)	118.9	351.8	470.7	7.03	20.82	27.85	16%
MV transmission line extension and LV distribution	118.9	321.4	440.3	7.03	19.02	26.05	15%
Construction (including poles)	0.0	308.2	308.2	0.00	18.24	18.24	11%
Materials	118.9	13.2	132.1	7.03	0.78	7.82	5%
Resettlement and environmental conservation	0.0	30.4	30.4	0.00	1.80	1.80	1%

Item	D Billion			\$ Million			% of Base Costs
	FX	LC	Total	FX	LC	Total	
b. Central Viet Nam (PC3)	118.9	351.8	470.7	7.03	20.82	27.85	16%
MV transmission line extension and LV distribution	118.9	321.4	440.3	7.03	19.02	26.05	15%
Construction (including poles)	0.0	308.2	308.2	0.00	18.24	18.24	11%
Materials	118.9	13.2	132.1	7.03	0.78	7.82	5%
Resettlement and environmental conservation	0.0	30.4	30.4	0.00	1.80	1.80	1%
c. Southern Viet Nam (PC2)	118.9	351.8	470.7	7.03	20.82	27.85	16%
MV transmission line extension and LV distribution	118.9	321.4	440.3	7.03	19.02	26.05	15%
Construction (including poles)	0.0	308.2	308.2	0.00	18.24	18.24	11%
Materials	118.9	13.2	132.1	7.03	0.78	7.82	5%
Resettlement and environmental conservation	0.0	30.4	30.4	0.00	1.80	1.80	1%
Common Costs	0.0	516.9	516.9	0.00	30.58	30.58	18%
Project management costs	0.0	134.8	134.8	0.00	7.98	7.98	5%
Design and supervision	0.0	382.1	382.1	0.00	22.61	22.61	13%
B. Contingencies	88.6	327.3	415.8	5.24	19.36	24.60	14%
1. Physical Contingencies	56.7	195.7	252.3	3.35	11.58	14.93	9%
2. Price Contingencies	31.9	131.6	163.5	1.89	7.79	9.67	6%
C. Financing Charges During Implementation	18.7	0.0	18.7	1.11	0.00	1.11	1%
Interest During Construction (ADF Loan)	18.7	0.0	18.7	1.11	0.00	1.11	1%
Total Project Costs (A+B)	673.9	2,665.8	3,339.8	39.88	157.74	197.62	115%

FX = foreign currency, LC = local currency, LV = low voltage, MV = medium voltage, PC = Power Company No.
Source: Asian Development Bank staff estimates.

Table A7.2: Detailed Costs by Financier

Power Company 1	Component 1 - Small Hydro			Component 2 - Grid Extension			Total Financing				
	Total	ADB	Financed	Total	ADB	Financed	Total	ADB	Financed by		
	Cost	Financed	by PC	Cost	Financed	by PC	Cost	Financed	%	PC	%
A. Investment Costs											
1. Civil Works	23.5	23.5	0.0	18.2	18.2	0.0	41.7	41.7	100.0	0.0	0.0
2. Equipment	5.7	5.7	0.0	0.0	0.0	0.0	5.7	5.7	100.0	0.0	0.0
3. Transmission (materials)	2.9	2.9	0.0	7.8	7.8	0.0	10.8	10.8	100.0	0.0	0.0
4. Resettlement and Environmental Conservation	3.6	0.0	3.6	1.8	0.0	1.8	5.4	0.0	0.0	5.4	100.0
5. Project Management Costs	2.0	0.0	2.0	1.6	0.0	1.6	3.6	0.0	0.0	3.6	100.0
6. Design and Supervision	5.7	0.0	5.7	4.5	0.0	4.5	10.2	0.0	0.0	10.2	100.0
Subtotal (A)	43.4	32.1	11.3	33.9	26.1	7.8	77.3	58.1	75.2	19.1	24.8
B. Contingencies	6.2	4.6	1.6	4.8	3.7	1.1	11.1	8.3	75.2	2.7	24.8
C. Financing Charges (IDC of ADF Loan)	0.3	0.3	0.0	0.2	0.2	0.0	0.5	0.5	100.0	0.0	0.0
Total Financing PC1	49.9	36.9	12.9	38.9	30.0	8.9	88.8	66.9	75.4	21.9	24.6

Power Company 2	Component 1 - Small Hydro			Component 2 - Grid Extension			Total Financing				
	Total	ADB	Financed	Total	ADB	Financed	Total	ADB	Financed by		
	Cost	Financed	by PC	Cost	Financed	by PC	Cost	Financed	%	PC	%
A. Investment Costs											
1. Civil Works	0.0	0.0	0.0	18.2	18.2	0.0	18.2	18.2	100.0	0.0	0.0
2. Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3. Transmission (materials)	0.0	0.0	0.0	7.8	7.8	0.0	7.8	7.8	100.0	0.0	0.0
4. Resettlement and Environmental Conservation	0.0	0.0	0.0	1.8	0.0	1.8	1.8	0.0	0.0	1.8	100.0
5. Project Management Costs	0.0	0.0	0.0	1.6	0.0	1.6	1.6	0.0	0.0	1.6	100.0
6. Design and Supervision	0.0	0.0	0.0	4.5	0.0	4.5	4.5	0.0	0.0	4.5	100.0
Subtotal (A)	0.0	0.0	0.0	33.9	26.1	7.8	33.9	26.1	76.9	7.8	23.1
B. Contingencies	0.0	0.0	0.0	4.8	3.7	1.1	4.8	3.7	76.9	1.1	23.1
C. Financing Charges (IDC of ADF Loan)	0.0	0.0	0.0	0.2	0.2	0.0	0.2	0.2	100.0	0.0	0.0
Total Financing PC2	0.0	0.0	0.0	38.9	30.0	8.9	38.9	30.0	77.0	8.9	23.0

	Component 1 - Small Hydro			Component 2 - Grid Extension			Total Financing				
	Total Cost	ADB Financed	Financed by PC	Total Cost	ADB Financed	Financed by PC	Total Cost	ADB Financed	%	Financed by PC	%
Power Company 3											
A. Investment Costs											
1. Civil Works	15.5	15.5	0.0	18.2	18.2	0.0	33.7	33.7	100.0	0.0	0.0
2. Equipment	4.2	4.2	0.0	0.0	0.0	0.0	4.2	4.2	100.0	0.0	0.0
3. Transmission (materials)	1.3	1.3	0.0	7.8	7.8	0.0	9.1	9.1	100.0	0.0	0.0
4. Resettlement and Environmental Conservation	1.2	0.0	1.2	1.8	0.0	1.8	3.0	0.0	0.0	3.0	100.0
5. Project Management Costs	1.2	0.0	1.2	1.6	0.0	1.6	2.8	0.0	0.0	2.8	100.0
6. Design and Supervision	<u>3.5</u>	<u>0.0</u>	<u>3.5</u>	4.5	0.0	4.5	8.0	0.0	0.0	8.0	100.0
Subtotal (A)	26.9	20.9	6.0	33.9	26.1	7.8	60.7	46.9	77.3	13.8	22.7
B. Contingencies	3.8	3.0	0.9	4.8	3.7	1.1	8.7	6.7	77.3	2.0	22.7
C. Financing Charges (IDC of ADF Loan)	<u>0.2</u>	<u>0.2</u>	<u>0.0</u>	0.2	0.2	0.0	0.4	0.4	100.0	0.0	0.0
Total Financing PC3	30.9	24.1	6.8	38.9	30.0	8.9	69.8	54.1	77.4	15.8	22.6
Total Project	80.8	61.0	19.8	116.8	90.0	26.8	197.6	151.0	76.4	46.6	23.6

ADB = Asian Development Bank, ADF = Asian Development Fund, IDC = interest during construction, PC = power company No.
Source: ADB estimates.

IMPLEMENTATION SCHEDULE

Item	2009				2010				2011				2012				2013				2014			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Loan Approval	*																							
Loan Effectivity				*																				
Component 1 - Small Hydro																								
Power Company 1																								
Recruitment of Consultants																								
Identification and Ranking																								
Feasibility Studies																								
Bidding Documents																								
Procurement																								
Implementation																								
Commisisoning																								
Power Company 2																								
Recruitment of Consultants																								
Identification and Ranking																								
Feasibility Studies																								
Bidding Documents																								
Procurement																								
Implementation																								
Commisisoning																								
Component 2 - Grid Extensions																								
Power Company 1																								
Recruitment of Consultants																								
Identification and Ranking																								
Feasibility Study																								
Bidding Documents																								
Procurement																								
Implementation																								
Power Company 2																								
Identification and Ranking																								
Feasibility Study																								
Bidding Documents																								
Procurement																								
Implementation																								
Power Company 3																								
Recruitment of Consultants																								
Identification and Ranking																								
Feasibility Study																								
Bidding Documents																								
Procurement																								
Implementation																								

Source: Asian Development Bank estimates.

PROCUREMENT PLAN

Project Name: Renewable Energy and Network Expansion and Rehabilitation for Remote Communes Sector Project	Loan (grant) Number _____
Loan Amount: \$151 million	Executing Agency: Power Company 1 (PC 1), Power Company 2 (PC 2), and Power Company 3 (PC 3)
Date of First Procurement Plan (<i>loan (grant) approval date</i>) March 2009	Date of this Procurement Plan: 25 February 2009

A. Section 1: Process Thresholds, Review, and 18-Month Procurement Plan

1. Project Procurement Thresholds

1. Except as the Asian Development Bank (ADB) may otherwise agree, the following process thresholds shall apply to procurement of goods and works

Procurement of Goods and Works	
Method	Threshold
International Competitive Bidding for Works ^a	\$2,000,000
International Competitive Bidding for Goods ^a	\$500,000
National Competitive Bidding for Works ^a	< \$2,000,000
National Competitive Bidding for Goods ^a	< \$500,000
Shopping for Works	< \$100,000
Shopping for Goods	< \$100,000

^a ADB. 2006. *Project Administration Instructions*. Section 3.04: Local Procurement. Manila (revised April 2008, para. 3 dealing with national competitive bidding).

2. ADB Prior or Post Review

2. Except as ADB may otherwise agree, the following prior or post review requirements apply to the various procurement and consultant recruitment methods used for the Project.

Procurement of Goods and Works		
Procurement Method	Prior or Post	Comments
International Competitive Bidding for Works	Prior	
International Competitive Bidding for Goods	Prior	
National Competitive Bidding for Works	Post	First contract to be prior review
National Competitive Bidding for Goods	Post	First contract to be prior review
Shopping for Works	Post	

Procurement Method	Prior or Post	Comments
Shopping for Goods	Post	
Recruitment of Consulting Firms		
Firms		Consultants financed by an executing agency will be recruited by the executing agency using national regulations. Consultants financed under the TA will be recruited by ADB.
Recruitment of Individual Consultants		
Individual Consultants		Consultants financed by an executing agency will be recruited by the executing agency using national regulations. Consultants financed under the TA will be recruited by ADB.

3. Goods and Works Contracts Estimated to Cost More Than \$1 Million

3. The following table lists goods and works contracts for which procurement activity is either ongoing or expected to commence within the next 18 months.

General Description	Contract Value	Procurement Method	Prequalification of Bidders (Y/N)	Advertisement Date (quarter/year)	Comments
PC 1		ICB/NCB	N	Q1/2011	None before 2011
PC 2					
MV transmission and LV distribution lines civil works	\$4 million	ICB/NCB	N	Q4/2009	Component 2 25% of total scope for PC 2: several contracts
Materials for MV transmission and LV distribution lines	\$1.75 million	ICB/NCB	N	Q4/2009	Component 2 25% of total scope for PC 2
PC 3		ICB/NCB	N	Q1/2011	None before 2011

LV = low voltage, MV = medium voltage, PC = Power Company No, Q: Quarter.

4. Consulting Services Contracts Estimated to Cost More Than \$100,000

4. The following table lists consulting services contracts for which procurement activity is either ongoing or expected to commence within the next 18 months.

General Description	Contract Value	Recruitment Method ¹	Advertisement Date (quarter/year)	International or National Assignment	Comments
PC 1	Tbd	National regulations	Q3/2009	National	Feasibility and detailed design consultants financed by the executing agency: one each for components 1 and 2
PC 2	Tbd	National regulations	Q3/2009	National	Detailed design and supervision consultants financed by the executing agency: for component 2
PC 3	Tbd	National regulations	Q3/2009	National	Feasibility and detailed design consultants financed by the executing agency: one each for components 1 and 2
TA consultants for mini hydropower component	\$1.9 million	QCBS (80/20)	Q3/2009	International	Implementation supervision consultant financed by ADB
TA consultant for Energy Law	\$0.24 million	Individual consultants	Q3/2009	International and National	One international and one national consultant

ICB = international competitive bidding, LV = low voltage, MV = medium voltage, NCB = national competitive bidding, PC= Power Company No, QCBS = Quality and Cost Based Selection, Tbd = to be decided, Q = Quarter.

5. Goods and Works Contracts Estimated to Cost Less than \$1 Million and Consulting Services Contracts Less than \$100,000

5. The following table groups smaller-value goods, works, and consulting services contracts for which procurement activity is either ongoing or expected to commence within the next 18 months.

General Description	Value of Contracts (cumulative)	Number of Contracts	Procurement / Recruitment Method ¹	Comments
Tbd	Tbd	Tbd	Tbd	

Tbd = to be decided.

A. Section 2: Project Procurement Plan**1. Indicative List of Packages Required Under the Project**

6. The following table provides an indicative list of all procurement (goods, works, and consulting services) over the life of the project. Contracts financed by the Government and others should be indicated, with an appropriate notation in the comments section.

Power Company 1					
General Description	Estimated Value (cumulative)	Estimated Number of Contracts	Procurement Method	Domestic Preference Applicable	Comments
Component 1: Small Hydro					
Goods					
Hydropower plant electromechanical equipment	\$8 million	4-6	ICB	—	2011: number of subprojects tbd in 2010
MV transmission and LV distribution materials	\$3 million	2-4	ICB	—	2011: number of subprojects tbd in 2010
Works					
Civil works for dams, waterways and power plant	\$18 million	4-6	ICB/NCB	—	2011: number of subprojects tbd in 2010
MV transmission and LV distribution lines	\$7 million	2-4	ICB	—	2011: number of subprojects tbd in 2010
Component 2: Network Expansion					
Goods					
MV transmission and LV distribution materials	\$8 million	Tbd	ICB	—	2011
Works					
MV transmission and LV distribution lines	\$18 million	Tbd	ICB/NCB	—	2011
General Description	Estimated Value (cumulative)	Estimated Number of Contracts	Recruitment Method	Type of Proposal	Comments
Consulting Services	\$11 million	2	Vietnamese regulations		2009: financed by executing agency

ICB = International competitive bidding, LV = low voltage, MV = medium voltage, NCB = national competitive bidding, Tbd = to be decided.

Power Company 2

General Description	Estimated Value (cumulative)	Estimated Number of Contracts	Procurement Method	Domestic Preference Applicable	Comments
Component 2 – Network Expansion					
Goods					
MV transmission and LV distribution materials	\$8 million	Tbd	ICB	-	2011
Works					
MV transmission and LV distribution lines	\$18 million	Tbd	ICB/NCB	-	2011
General Description	Estimated Value (cumulative)	Estimated Number of Contracts	Recruitment Method	Type of Proposal	Comments
Consulting Services	\$4.5 million	1	Vietnamese regulations		2009: Financed by executing agency

ICB = international competitive bidding, LV = low voltage, MV = medium voltage, NCB = national competitive bidding, Tbd = to be decided.

Power Company 3

General Description	Estimated Value (cumulative)	Estimated Number of Contracts	Procurement Method	Domestic Preference Applicable	Comments
Component 1 – Small Hydro					
Goods					
Hydropower plant electromechanical equipment	\$4 million	1–2	ICB	-	2011: number of subprojects tbd in 2010
MV transmission and LV distribution materials	\$1.3 million	1	ICB	-	2011: number of subprojects tbd in 2010
Works					
Civil works for dams, waterways, and power plant	\$13 million	1–2	ICB/NCB	-	2011: number of subprojects tbd in 2010
MV transmission and LV distribution lines	\$3 million	1–2	NCB	-	2011: number of subprojects tbd in 2010

ICB = international competitive bidding, LV = low voltage, NCB = national competitive bidding.

General Description	Estimated Value (cumulative)	Estimated Number of Contracts	Procurement Method	Domestic Preference Applicable	Comments
Component 2: Network Expansion					
Goods					
MV transmission and LV distribution materials	\$8 million	Tbd	ICB	-	2011
Works					
MV transmission and LV distribution lines	\$18 million	Tbd	ICB/NCB	-	2011
General Description	Estimated Value (cumulative)	Estimated Number of Contracts	Recruitment Method	Type of Proposal	Comments
Consulting Services	\$7 million	2	Vietnamese regulations	-	2009: financed by executing agency

ICB = international competitive bidding, LV = low voltage, MV = medium voltage, NCB = national competitive bidding, Tbd = to be decided.

Technical Assistance

General Description	Estimated Value (cumulative)	Estimated Number of Contracts	Recruitment Method²	Type of Proposal³	Comments
TA consultants for mini-hydropower component	\$1.9 million	One	QCBS	FTP	Implementation supervision consultant financed by ADB
TA consultant for energy law	\$0.24 million	Two	2 individual consultants	BTP	One international and one national consultant
NGOs for income generating activities	\$0.13 million	One	QBS	BTP	One NGO

BTP = bio-data technical proposal, FTP = Full technical proposal, QBS = quality-based selection, QCBS = quality and cost based selection, TA = technical assistance.

TECHNICAL ASSISTANCE DESCRIPTION, COST ESTIMATES, AND OUTLINE TERMS OF REFERENCE

A. Part 1: Technical Assistance to Prepare the Renewable Energy Law and Related Decrees

1. Background

1. The Government of Viet Nam is considering the enactment of a renewable energy law. It would declare the main Government objectives for renewable energy, and provide the necessary legal authority for establishing a renewable energy fund, the proposed mechanism for providing subsidies to renewable energy development.¹ A law is required to provide the authority and legal certainty of subsidy support to renewable energy development, without which subsidy and support payments will not enable project investment by the private sector. The law will also provide the necessary mandate for the Ministry of Industry and Trade (MOIT) to assume the central role in renewable energy promotion and development, and to take the lead in policy coordination (the present lack of which is an important constraint to project development). Finally, in the event that the Government establishes binding targets for renewable energy, the law provides the authority for setting penalties for noncompliance.

2. Scope of Work

2. The Asian Development Bank (ADB) will recruit one international and one national individual consultant to provide technical assistance to MOIT for 12 person-months (4 person-months of international consulting inputs and 8 person-months of national consulting inputs). The consultants will report to MOIT and ADB. The selected international consultant will need to be a senior expert of international stature in energy policy.

3. Terms of Reference

3. The international consultant will assist the Government in preparing a renewable energy law, and in drafting the set of implementing decisions. The consultant will (i) consider experience in other countries to prepare an analysis of alternative ways of funding the renewable energy fund; (ii) prepare a series of papers outlining the advantages and disadvantages of alternative policy choices; and (iii) assist in drafting the law and the implementing decisions. An important part of the consultancy will be to propose efficient mechanisms for the disbursement of subsidies, to be stipulated in the implementation decrees.

4. Implementation Arrangements

4. MOIT will be the Implementing Agency and provide counterpart staff, office space, and furniture without cost to the consultant. The executing agencies will also provide available documentation.

¹ A similar law is currently being drafted (with ADB support) in the area of energy efficiency.

B. Part 2: Capacity Building for Mini-Hydropower Development

1. Background

5. Component 1, Mini Hydropower Projects for Rural Electrification in Mountainous Provinces, will be carried out by two executing agencies² in Lai Chau, Dien Bien and Son La (under Power Company 1 [PC 1]); and Quang Nam and Hue provinces (both under PC 3). The work will be carried out in two stages for each component in each province: preconstruction and construction. Component 2, Network Expansion and Rehabilitation of Distribution Networks Serving Poor Communes, will be carried out in the operations areas of PC 1 in northern Viet Nam (Lai Chau and Dien Bien provinces), PC 2 in southern Viet Nam (Tra Vinh and Soc Trang provinces), and PC 3 in central Viet Nam (Quang Tri province).³ The network expansion and rehabilitation will be to facilities owned by each power company. The consultants will provide capacity building in undertaking mini hydro power development in an environmentally and technically sustainable and socially inclusive manner to regional level and provincial level staff.

2. Scope of Work

6. Each executing agency will finance and recruit national consultants to prepare the feasibility studies, technical design, and bidding documents; and supervise implementation of the selected subprojects. ADB will recruit an international consulting firm to provide capacity building to the executing agencies and their regional project management boards in mini hydro development. The consultants will provide knowledge transfer to the executing agency staff during the Project implementation and provide training on preventive maintenance of mini hydro facilities. The assistance will be for 110 person-months of consulting services (56 person-months of international consulting inputs and 54 person-months of national consulting inputs). The consultants will report to the power companies and to ADB. Specialists should have the following expertise: team leadership in renewable energy and rural electrification projects planning; small hydropower planning, design, and construction; medium voltage transmission and low voltage distribution design; rural electrification economics; financial and institutional analysis; environment; resettlement, gender, ethnic minorities, social development, and poverty analysis; CDM document preparation; capacity building on preventive maintenance; and monitoring and evaluation.

3. Terms of Reference

a. Stage 1: Preconstruction

7. Under component 1 the consultant will provide capacity building to the executing agencies' project management boards responsible for project implementation to group subprojects in each province for feasibility study, procurement, and implementation separately for each component according to a predetermined set of selection criteria.

8. The consultant will provide capacity building in all technical aspects of (i) project preparation and technical design; and (ii) bid document preparation ensuring that they comply with ADB requirements. The consultant will also provide training and guidance to the executing agencies to prepare necessary documentation for CDM registration.

² The executing agencies for component 1 are PC 1 and PC 3; and for component 2 are PC 1, PC 2, and PC 3

³ Additional provinces could be included later subject to availability of funds.

9. In accordance with ADB's *Environment Policy* (2002), *Environmental Assessment Guidelines* (2003), and *Public Communications Policy* (2005); the consultant will (i) help prepare the initial environmental examination (IEE) as required of the proposed hydropower subprojects, associated transmission lines, and substations, considering the likely impacts associated with preconstruction and construction activities, as well as the long-term impacts during operation; and (ii) as part of the EIA and IEE, assist in preparing an environmental management plan (EMP) detailing environmental mitigation measures to address each identified impact and an environmental monitoring program to be implemented during various project phases. The EMP will identify specific costs, institutional responsibilities, schedule and time frame, location, and monitoring parameters. The consultant will also (i) conduct an assessment of current institutional capability to implement the EMP and propose any necessary capacity building program; and (ii) provide guidance to the EAs to conduct consultations with groups to be affected (local residents, local officials, people's organizations, and other stakeholders) by the Project. For category B projects, the public consultation will be conducted at least once. The consultant will train the EAs in (i) documenting the results of the consultation in the IEE; (ii) ensuring that the cost for implementing mitigation measures, monitoring plan, and environmental management capacity strengthening activities are included in the subproject cost; and (iii) preparing the terms of reference for any further detailed environmental assessments, if required, in consultation with all concerned. The consultants will provide assistance in coordination during district, provincial and national consultation workshops.

10. The consultant will, for each district in which subprojects will be developed under the Project, (i) guide the EA prepare a sample-based social impact assessment, including gender analysis to provide adequate information, including any potential impacts on ethnic minorities; provide mitigation measures and affirmative activities to ensure that ethnic minorities are safeguarded during construction and project implementation; (ii) guide the EA prepare a resettlement plan for each subproject if it will result in social impacts that will trigger ADB's *Involuntary Resettlement Policy* (1995) and include a gender strategy in each resettlement plan; and (iii) train the EA review and assess the risk of the spread of HIV/AIDS and other sexually transmitted diseases during construction;

b. Stage 2: Construction

11. The consultant will provide capacity building to PC 1, PC 2, and PC 3 and its project management boards, as required, (i) to evaluate the bids under components 1 and 2 as per ADB Guidelines, and (ii) during contract negotiations if necessary.

12. The consultant will provide capacity building on construction monitoring of the facilities under component 1 to ensure the timely progress of the works, that the works are carried out in accordance with the design and specifications, and that the quality of works meets the required standards and specifications. The consultant will provide capacity building to the executing agencies under component 1, as required in the supervision of the equipment suppliers to ensure the timely progress of the works, to ensure that the works are carried out in accordance with the design and specifications and that the quality of supply and installation works meets required standards and specifications. The consultants will also provide capacity building in setting up provincial entities to assume responsibility for operation and maintenance of mini-hydropower plants developed under the Project, and provide assistance in preparing operation and maintenance manuals and procedures.

c. Monitoring and Evaluation

13. To ensure proper implementation of all ethnic minority development activities according to the Project's ethnic minority development framework, monitoring and evaluation will be conducted for the ethnic minority stakeholders benefiting from the Project.

14. The consultant will provide capacity building in monitoring implementation of the environmental management plan (EMP) of the EIA by the contractors, and implementation of the resettlement and ethnic minority development plan. The consultant will provide experienced and qualified specialists on environment and resettlement to assist EVN. The scope of work includes (i) assist PC 1 in establishing the environment management unit (EMU) and setting up procedures for monitoring compliance of contractors with EMU requirements; (ii) train the EAs prepare a detailed program to implement the EMPs during construction, including (a) environment properties that require supervision, work under supervision, and monitoring frequency in correlation with Viet Nam and international standards; (b) collection of social data; (c) assistance to the EMU in monitoring the specific aspects as outlined in the EMPs; (d) details of mitigation measures applied during project implementation; and (e) regular reports and final reports on the environment for impact assessment; (iii) review regular reports made by the third party monitoring agency and assist EVN and/or power companies to perform necessary measures in response to comments and recommendations indicated in these reports; (iv) guide the EAs prepare regular reports for EVN and ADB on progress in implementing the EMP; and (v) coordinate with the EMU of power companies, local authorities, and contractors to minimize adverse impacts on social and natural environment issues, and address them as required.

C. Part 3: Promoting Productive Use of Electricity

1. Scope of Work

15. ADB will recruit a Non-governmental organization (NGO) to provide assistance to the executing agencies during project implementation to promote safe productive use of electricity. The assistance will be for 70 person-months of consulting services (national consulting inputs). The NGO will report to the power companies and to ADB. NGO staff should have the following expertise: team leadership in renewable energy and rural electrification, micro-credit finance, non-farming development, ethnic minority livelihood, gender and health issues of rural communities, and an expert in safe use of electricity in rural areas.

2. Terms of Reference

16. The overall tasks for an NGO will be to (i) cooperate and support relevant capacity building training of the provincial project management unit in planning and implementing the project activities following ADB's social guidelines; (ii) provide capacity building training for the CMB to implement the subproject-specific ethnic minority development plan and undertake other relevant tasks; (iii) implement the project HIV/AIDS/human trafficking prevention program; (iv) implement the project gender strategy; accordingly ensure that gender issues are addressed in all project activities and that ethnic minority women are provided relevant support to participate and benefit from the Project; (v) undertake motivational work to improve ethnic minority households' awareness of safe electricity use and possibilities in utilizing electricity; (vi) conduct needs assessment for microcredit schemes for the ethnic minority households for women and men; (vii) identify loan schemes for men and women; (viii) prepare proposal with the men and women borrowers to secure loans from the Social Policy Bank and Women's Union; (ix) support poor and near poor households' access to microcredit through available microcredit channels especially from the Social Policy Bank, and Women's Union and provide them with

technical support for efficient utilization of the loans for to improve household incomes through electricity; (x) cooperate with the Social Policy Bank and Women's Union and facilitate their work in the project villages; (xi) provide capacity building and support to mass organizations in their facilitating role toward poor households in accessing microcredit; and (xii) provide district agricultural extension centers with relevant capacity building according to training needs assessment in giving poor ethnic minority households technical support in production and income-generation development activities.

Table A.10: Cost Estimates and Financing Plan
(\$'000)

Item	Small Hydro Project Implementation	Energy Law	Income- Generating Activities	Total	Financing Source
A. Climate Change Fund and Technical Assistance Special Fund^a					
1. Consultants					
a. Remuneration and Per Diem					
i. International Consultants	1,118	100	-	1,218	CCF
ii. National Consultants	187	32	56	275	CCF
b. International and Local Travel	425	34	33	492	TASF
c. Reports and Communications	35	10	5	50	TASF
4. Miscellaneous Administration and Support Costs	55	11	12	78	TASF
5. Training, Seminars, and Conferences	85	30	30	145	TASF
6. Representative for Contract Negotiations	5	-	-	5	TASF
7. Contingencies ^b	190	33	14	237	
Subtotal (A)	2,100	250	150	2,500	
B. Power Company Financing					
1. Office Accommodation ^c	21	-	2	23	
2. Transport ^d	105	-	8	113	
3. Remuneration and Per Diem of Counterpart Staff	200	-	14	214	
4. Others	21	-	2	23	
Subtotal (B)	347	-	25	371	
C. Government Financing					
1. Office Accommodation ^c	-	3	-	3	
2. Remuneration and Per Diem of Counterpart Staff	-	24	-	24	
3. Others	-	3	-	3	
Subtotal (C)	-	29	-	29	
Total	2,447	279	175	2,900	

^a Administered by the Asian Development Bank.

^b Contingency amount is composed of \$107,000 (CCF) and \$130,000 (TASF).

^c The executing agencies and the Ministry of Industry and Trade will provide furnished office space for the consultants including telephone line and internet connection.

^d The executing agencies will provide vehicles for site surveys.

Source: ADB Staff estimates.

SUMMARY POVERTY REDUCTION AND SOCIAL STRATEGY

Country/Project Title: Viet Nam/Renewable Energy Development and Network Expansion and Rehabilitation for Remote Communes Sector Project
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Lending/Financing Modality:	Sector Loan	Department/ Division:	Southeast Asia Department/ Infrastructure Division
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I. POVERTY ANALYSIS AND STRATEGY

A. Linkages to the National Poverty Reduction Strategy and Country Partnership Strategy

Viet Nam has been one of the fastest growing economies in Asia for the last two decades, with real gross domestic product (GDP) growth averaging 8.0% per annum during 2003–2007; per capita GDP increased to \$817 in 2007 compared with \$441 in 2002. Although the country has suffered from high inflation due to high energy and food prices and supply bottlenecks, the long-term growth prospects remain positive. Viet Nam has achieved remarkable progress in socioeconomic development since 1993. The reduction in the national poverty rate from 58% in 1993 to less than 20% by 2007 is unprecedented. However, poverty remains at over 50% in northern mountain provinces inhabited by ethnic minority communities. The lack of infrastructure facilities and nonfarm income generation activities has contributed to the persistent poverty in these isolated areas. The country strategy and program of the Asian Development Bank (ADB) for Viet Nam focuses on supporting pro-poor economic growth, social equity and balanced development, and sustainable environment management. One of the key challenges for poverty reduction in Viet Nam's Socio-economic Development Plan (SEDP) is to provide the basic services and infrastructure needed to ensure the access to markets needed to attract private investment and create jobs. ADB's country strategy to help the Government reduce poverty by implementing SEDP targets is particularly focused on promoting pro-poor, economic growth. Provision of basic infrastructure is one of the prerequisites. The Government's poverty reduction strategy emphasizes support for poor, remote, isolated, and ethnic minority areas.

The potential for electricity to facilitate communication, income generation, and economic growth is part of the Government's poverty reduction strategy. Currently 91.5% of households in Viet Nam are connected to the national power grid system. The Government plans to extend the system to connect about 96% of villages. Those remaining unconnected are communes in remote mountain, central, and southern provinces, often inhabited by ethnic minorities with 40%–70% of the population living under the national poverty line. The Project contributes to the Government's objective of ensuring electricity to 100% of households by 2012. The Project is targeted to connect more than half of the remaining villages without access to electricity with mini-hydro schemes and network expansion. It will thus contribute to the Government's goal of promoting pro-poor and balanced economic development of remote and isolated mountainous and isolated communes using renewable energy.

B. Poverty Analysis

Targeting Classification: Targeted intervention (geographical poverty issues [TI-G])

1. Key Issues

The Project is designed with a special focus on geographically target poor communities for electrification in the northern, central, and southern provinces. It will include remote communes and unelectrified communes of these provinces. Electrification of communes and villages without access to electricity is one of the criteria for selecting sites for development of mini-hydropower plants and network expansion under the Project. Given Viet Nam's rate of electrification of over 90%, the remaining communes and villages to be electrified under the Project are likely to be poor communes with little access to infrastructure such as electricity. Component 2 for grid extension and rehabilitation is specifically targeted for communes that are officially classified as poor to receive government assistance under Program 135 for poverty reduction and rural infrastructure development or at least 50% of households receiving electricity through a subproject shall have income level below the national poverty rate. The Project will support the Government's effort to provide all households in the country with electricity by 2020 as part of rural infrastructure provision in the Government's SEDP. The Project will contribute indirectly to poverty reduction by providing electricity to households, and improving socioeconomic and living standards in high-poverty geographic areas. Social and poverty impact assessment for the central and southern communes has not been completed yet. Social and poverty assessment for mountainous communes indicates that electricity is mainly used for household purposes such as lighting. The scope for productive use of electricity in the mountainous communes is limited, especially in ethnic minority dominated areas.

2. Design Features

The poor households (i.e., those having a monthly income of less than D200,000 (\$13) per capita will receive free electricity connections. The Project thus contributes particularly to inclusive social development by improving living conditions, and to a lesser extent to pro-poor economic growth through some additional potential for income generation of poor remote mountain communities through productive use of electricity. Under the productive use of electricity component, ethnic minority individual households or groups will be supported to get access to microfinance from the existing microfinance program of the Social Policy Bank. Microfinance will be used for productive activities and to create income-earning opportunities through small businesses. The productive use of electricity component will be limited to the subprojects under component 1 (mini-hydro). A nongovernment organization (NGO) will be recruited to facilitate implementation of microfinance activities.

II. SOCIAL ANALYSIS AND STRATEGY

A. Findings of Social Analysis

Lack of electricity is a major development constraint for the project-targeted communes for household living standards, economic activities, and service delivery. In remote mountain communities, currently households produce electricity through micro-hydropower generators and use kerosene lamps for lighting. Government services such as schools and commune health care stations have no access to electricity. Income generation is based on low-production, small-scale agriculture based on manual labor. Electricity provision can potentially contribute to improving living and production conditions, given that people can afford and will have the capacity to utilize electricity. Electricity can make improvements in agriculture, animal breeding, and food processing. Microfinance can help households buy machinery for wood processing, agriculture, small business, and construction. Electrification will provide better lighting, security, and comfort; and increase participation of household members in evening social events in and around the villages. Local public services like education and health care facilities will potentially be improved through stable electricity provision.

A household's ability to benefit from electricity, preparedness for electrification, and willingness to pay for electricity depends on its socioeconomic condition. Ethnic minority households in mountainous areas often lack motivation for electrification and are not willing to pay for its use. Pricing of electricity will be the most important factor for poor households to connect and use electricity. Minimizing the cost of electricity connection to poor households through the Project might motivate poor households to electrify their houses. Electrification is an important infrastructure for improving living conditions; however, electricity provision needs to be combined with other development efforts, resources, skill training, access to capital such as microfinance, irrigation facilities, provisions for agriculture, employment opportunities, road networks, market access, and access to basic services for sustainable improvement of the living conditions of remote communities.

The project activities for the mountainous communities include (i) motivational and awareness raising campaign on safe use of electricity, conservation, and promotion of productive use of electricity; (ii) subsidized grid connection to all poor households; (iii) access to energy-efficient bulbs; (iv) support to microfinance access for poor households from the Social Poverty Bank and Women's Union for the subprojects; and (v) technical support to borrowers in utilizing the loans in an efficient way. In the communes, a community management board (CMB) will be formed with participation of commune leaders and representatives from the Women's Union, other mass organizations, village leaders, and women leaders to facilitate implementation of these activities. An NGO will be recruited to build capacity of the CMB and to implement the activities together with the CMB. The NGO will provide support to poor households in selecting activities and identifying microfinance needs for these. The microfinance program will be targeted to the communes with mini-hydro plants in component 1 and concentration of ethnic minorities as part of the ethnic minority development plan. Although electricity would lead to socioeconomic development of the remote communities, exposure of these remote communities with the outside world can also increase risks of HIV/AIDS, sexually transmitted diseases (STDs), and human trafficking. To counter any risk of HIV/AIDS or STDs, a prevention of HIV/AIDS and human trafficking program is included in the Project. The construction laborers, and women and men from the subprojects will be targeted for this program.

B. Consultation and Participation

1. Stakeholders were consulted in the subproject locations in Lai Chau using a sample household survey; interviews with individuals; and focus group meetings with key stakeholders from different categories such as men and women, from different occupational groups such as small business owners, education and healthcare providers, local administration, and regional development authorities. A project consultation plan was prepared for the subprojects. Consultations have to involve formal commune and commune leaders and traditional ethnic minority leaders, men and women from the communities, mass organizations, and relevant officials.

2. What level of consultation and participation (C&P) is envisaged during the project implementation and monitoring?

☐ Information sharing ☒ Consultation ☐ Collaborative decision making ☐ Empowerment

3. Was a C&P plan prepared? ☒ Yes ☐ No

A Project C&P strategy was prepared to guide preparation of subproject specific C&P plans (Supplementary Appendix P).

C. Gender and Development

1. Key Issues

This gender analysis is limited to the subproject area of the northern mountainous region. In the mountainous ethnic minority communities, women's social status is generally lower and mobility is less than for Kinh women. Lower education, remote location, and lack of road networks have resulted in ethnic minority women having few contacts outside their own community. Women's economic role is related to subsistence agriculture, collecting non-timber forest products, and animal breeding. Lack of electricity for pumping water and irrigation facilities is a constraint for women's work in agriculture. Living standards, social services, and income generation suffer from lack of roads, transportation, electricity, and employment opportunities. The poorest households in general are the ones relying on small-scale agriculture; they lack financial resources and capacity for broadening their income generation base. The most vulnerable households among these are those headed by women. Access to electricity and income-earning activities is an important factor for their socioeconomic situation. Access to electricity might provide women with opportunities for small business, trade, and agricultural tools. Mechanization of agricultural tools and electric appliances might lessen their drudgery. If

electricity is provided in public places through street lighting, this will contribute to women's security, mobility, and participation in different social events in the evening.

Electricity will improve health care services and maternal care for women. Refrigeration supports better access to and quality of medicines, vaccines, and blood bank products, which potentially improve health security for women, men, and children. This development, however, is dependent on public sector investment and human resource capacity. Project construction for the mini-hydro component will bring outside male workers to local areas, possibly from different cultural environments and with different cultural habits. The presence of workers may potentially increase the risk for women and girls to be exposed to STDs and HIV/AIDS. Electrification may also increase the number of restaurants, karaoke bars, and nighttime activities. In some subproject areas, electrification will, in the long run, open up for development of tourism, this can pose potential risk of sexual exploitation of women and girls.

2. Key Actions

☒ Gender plan ☐ Other actions/measures ☐ No action/measure

The Project's gender strategy is related to the following project activities: (i) CMB, (ii) awareness campaign on safe use of electricity and conservation; (iii) productive use of electricity through microfinance; (iv) HIV/AIDS, STDs, and human trafficking program; and (v) resettlement. However, the gender strategy in component 2 (network expansion) is limited to an awareness campaign on safe use of electricity and conservation; and an HIV/AIDS, STDs, and human trafficking program. The gender strategy including the HIV/AIDS and human trafficking prevention campaign will be implemented by the NGO to be recruited under the associated TA. The following are specific measures to ensure women's involvement in the project activities and that they benefit from the Project:

- (i) Inclusion of representatives of the Women's Union and two women leaders from ethnic minority communities including one women leader from a poor household in the CMB; capacity building training for women CMB members for planning, implementing, and monitoring project activities (productive use of electricity, awareness of safe use of electricity, and conservation).
- (ii) Ensure (a) female households, ethnic minority women, and poor women receive subsidized grid connection of electricity; (b) separate meeting with women's groups for awareness campaign on safe use of electricity; and (c) participation of ethnic minorities, female households, and poor women in the awareness campaign.
- (iii) Train Women's Union members to facilitate campaign on HIV/AIDS, STDs, and human trafficking program; the HIV/AIDS, STDs, and human trafficking program should targeted women's groups in the villages; the information and educational material for campaign on HIV/AIDS, STDs, and human trafficking program and motivational campaign on safe use of electricity should be relevant to the ethnic minority culture in the subproject area.
- (iv) Conduct a needs assessment for women-specific activities through microfinance; conduct meetings with women's groups to provide information on the microfinance program and its potential for income generation; provide skill training to women borrowers for productive use of microfinance; specifically target households headed by women and poor women for income improvement activities.
- (v) In subprojects, include a resettlement plan gender strategy to ensure that women are consulted separately for loss of inventory, land acquisition, compensation, and logistics.
- (vi) In cases where land allocation is required, register the land in both the husbands and wife's name; and pay compensation to both men and women.
- (vii) Ensure that ethnic minority women and poor women participate actively in all the relevant project activities mentioned and have equal access to project benefits; ensure the project monitoring system develops gender disaggregated monitoring indicators for resettlement, awareness and motivational campaign on safe use of electricity, awareness campaign on HIV/AIDS and human trafficking, and microfinance for productive use of electricity.
- (viii) Provide capacity building and awareness for the project implementation unit on gender and ethnic minority issues; recruit a national gender specialist for 24 person-months as part of the consultant team to work with the project NGO and project implementation unit to prepare an action plan to operationalize the above measures to address gender issues in the relevant project activities.

III. SOCIAL SAFEGUARD ISSUES AND OTHER SOCIAL RISKS			
Issue	Significant/Limited/ No Impact	Strategy to Address Issue	Plan or Other Measures Included in Design
Involuntary Resettlement	Impact depending on each subproject setting and design; households may lose productive assets	If subproject will lead to loss of land, a compensation plan has to be prepared	<input type="checkbox"/> Full Plan <input checked="" type="checkbox"/> Short Plan <input checked="" type="checkbox"/> Resettlement Framework <input type="checkbox"/> No Action
Indigenous Peoples	Subprojects located in northern mountainous areas, central and southern provinces	Ethnic minority development plan was prepared for one subproject in northern mountainous area and an ethnic minority development framework was prepared for the subprojects. The framework will be updated after the impact assessment is completed for the subprojects of central and southern provinces.	<input checked="" type="checkbox"/> Plan <input type="checkbox"/> Other Action <input checked="" type="checkbox"/> Indigenous Peoples Framework <input type="checkbox"/> No Action
Labor <input type="checkbox"/> Employment opportunities <input type="checkbox"/> Labor retrenchment <input checked="" type="checkbox"/> Core labor standards		The construction contracts will include provision of fair wages, equal wages for men and women for equal work, and basic facilities in the construction camp.	<input type="checkbox"/> Plan <input type="checkbox"/> Other Action <input type="checkbox"/> No Action
Affordability	Significant for poor household's ability to benefit from the Project	The main affordability issue is the poor household's ability to pay for the initial connection cost and house wiring as this may cost up to \$200 per household. (i.e., equal to 20%–25% of average annual household income). Hence, poor households will be provided subsidized connections at \$40. The monthly electricity bills are expected to range from \$1 to \$2, this amount is less than the expenditure on kerosene.	<input checked="" type="checkbox"/> Action Included in the Project Component <input type="checkbox"/> No Action
Other Risks and/or Vulnerabilities <input checked="" type="checkbox"/> HIV/AIDS <input checked="" type="checkbox"/> Human trafficking <input type="checkbox"/> Others(conflict, political instability, etc), please specify	Limited impact	Awareness campaign for preventing HIV/AIDS and human trafficking is prepared.	<input type="checkbox"/> Plan <input checked="" type="checkbox"/> Other Action <input type="checkbox"/> No Action
IV. MONITORING AND EVALUATION			
Are social indicators included in the design and monitoring framework to facilitate monitoring of social development activities and/or social impacts during project implementation? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			