

Ex-Ante Evaluation (for Japanese ODA Loan)**1. Name of the project**

Country: The Socialist Republic of Viet Nam

Project: Second Power Transmission and Distribution Network Development Project

Loan Agreement: July 4, 2015

Loan Amount: 29,786 million yen

Borrower: The Government of the Socialist Republic of Viet Nam

2. Background and Necessity of the Project**(1) Current Development State and Issues of the Power Sector in Viet Nam**

Viet Nam achieved a high annual average GDP growth rate of 6.6% between 2000 and 2013. Since the global financial crisis in 2008, the GDP growth rate has slowed down, forecast to hover in the high 5% range until 2024, but the demand for electricity has continued to rise even after the crisis. The peak demand also increased sharply from 16,048MW in 2010 to 21,545MW in 2013.

Although a high priority has been given to the construction of new power transmission lines for new power plants being built to satisfy the growing electricity demand, the improvement of the existing systems has lagged. Therefore, the load factor of transmission, substation, and distribution facilities is rising. Moreover, due to the lack of backup lines caused by the delay in the construction of double track lines, power cut-off occurs during the maintenance and replacement of facilities or when an accident occurs. Such frequent power outages have a serious impact not only on everyday life but also on economic activities, disrupting the stable operation of factories.

(2) Development Policies for the Power Sector in Viet Nam and the Priority of the Project

“The National Master Plan for Power Development for the 2011-2020 (PDP-7)”, formulated by the Government of Viet Nam, aims to increase the installed capacity by 2.5 times from 29,485MW in 2013 to 75,000MW in 2020 to meet the expanding electricity demand.

As to the development of power transmission, substation, and distribution facilities, the focus is placed on how to keep up with the development of power plants to optimize investment across the entire power system and how to strengthen the backup capacity of the transmission and distribution networks to improve the reliability of power supply. The PDP-7 also aims to enhance the reliability and quality standards of power systems by installing 110kV transmission lines and distribution networks in harmony with the development of higher voltage transmission lines.

Based on the direction of the PDP-7, this Project is designed to improve the reliability and quality of electricity supply.

(3) Japan and JICA's Policy and Operations in the Power Sector

Japan's Country Assistance Policy for the Socialist Republic of Viet Nam (December 2012)

lists power sector support as part of the “Stable Energy Supply and Energy Conservation Program” under the priority area of “Promotion of Economic Growth and Strengthening International Competitiveness.” JICA’s Country Analysis Paper for Viet Nam also identifies stable power supply as one of the key issues. Thus, this Project is consistent with the policy and analysis of the Japanese Government and JICA.

Since the resumption of assistance to Viet Nam in 1992, JICA has implemented several ODA Loan projects, contributing to the expansion of electricity generation (approx. 3,000MW), the installation and improvement of transmission lines (approx. 120km) and distribution lines (approx. 1,300km), and the expansion of substation capacity (approx. 2,000MVA). JICA has also carried out technical cooperation projects to develop an energy master plan and electric power technical standards and promote capacity building.

(4) Other Donors’ Activity

The World Bank and the Asian Development Bank are supporting the enhancement of electricity generation, transmission, and distribution capacity and power sector reforms. Moreover, the German Development Bank (KfW) is supporting renewable energy development.

(5) Necessity of the Project

Designed to construct and rehabilitate power transmission, substation, and distribution facilities to ensure the stable and efficient supply of electricity, this Project is in line with the development policies of the Vietnamese Government as well as the assistance policies of the Japanese Government and JICA. Therefore, it is highly necessary and relevant for JICA to implement this Project.

3. Project Description

(1) Project Objective

The project is to construct and reinforce power transmission and distribution facilities. This will ensure a stable power supply in major Vietnamese cities and industrialized zones and meet the rapidly rising power demand; thereby contributing to the stable economic activity of the country.

(2) Project Site/Target Area

The whole Viet Nam territory

(3) Project Components

Among the 95 sub-projects planned by power corporations to develop transmission, substation, and distribution facilities, the top 52 priority sub-projects will be supported through this Project. They will be selected by taking the following into account: how urgent the need is to satisfy the electricity demand; how much the project can benefit industrial parks and clusters; how mature the plan is; and whether there are any negative environmental or social effects. Details are as below:

- 1) Construction of substations (expansion of substation capacity, etc.)
- 2) Construction of power transmission and distribution lines (construction of double track

lines, replacement to thicker wires, replacement of old lines, etc.)

(4) Project cost

37,721 million yen (Loan Amount: 29,786 million yen)

(5) Project Implementation Schedule

March 2015 to April 2018 (38 months in total). The project is completed with the completion of construction works (April 2018).

(6) Project Implementation Structure

1) Borrower: The Government of the Socialist Republic of Viet Nam

2) Guarantor: None

3) Executing Agencies: 5 power distributors affiliated to the Electricity of Vietnam (EVN): Northern Power Corporation, Central Power Corporation, Southern Power Corporation, Hanoi Power Corporation, and Ho Chi Minh City Power Corporation

4) Operation and management system: In principle, the subsidiaries of power corporations will be responsible for operation and maintenance.

(7) Environmental and Social Considerations/Poverty Reduction/Social Development

1) Environmental and Social Considerations

① Category: FI

② Reason for Categorization: The project is classified as Category FI, according to the JICA Guidelines for Environmental and Social Considerations (published in April 2010), because its sub-projects cannot be specified to JICA's approval of funding and because those sub-projects are expected to have a potential impact on the environment.

③ Other/Monitoring: In this Project, the implementing agencies will categorize their sub-projects in accordance with the laws and regulations of Viet Nam and the JICA Guidelines for Environmental and Social Considerations and take measures required according to the category. None of the sub-projects falls under the Category A.

2) Promotion of Poverty Reduction: None in particular.

3) Promotion of Social Development (e.g. Gender Perspective, Measures to Prevent Infectious Diseases Including AIDS, Participatory Development, Consideration for Handicapped, etc.): This Project is classified as a gender integrated project because the Government of Viet Nam agrees to keep gender balance in resident meetings and interviews that will take place if the Project entails land acquisition.

(8) Collaboration with Other Schemes / Donors: None in particular.

(9) Other Important Issues: None in particular.

4. Targeted Outcomes

(1) Quantitative Effects, Operation and Effect Indicators

1) Operation and Effect Indicators

1. Northern Power Corporation: Expansion of Quang Chau substation (110 kV)

Indicators	Baseline (Actual value in 2014)	Target (2020) [two years after project completion]
(i) Improvement of load factors		
Peak load value gauged by the percentage to rated current	110%	73%
Average load value gauged by the percentage to rated current	97%	68%
(ii) Improvement of power supply reliability		
System Average Interruption Duration Index (SAIDI): the duration of power outages per user per year	1,631.12	978.62
System Average Interruption Frequency Index (SAIFI): the frequency of power outages per user per year	6.63	3.978
(iii) Reduction of the power loss		
Technical losses in 110kV systems in the target areas of sub-projects	5.25%	5.0%

2. Central Power Corporation (CPC): Expansion of distribution networks in Hoa Vang and Cam Le Districts

Indicators	Baseline (Actual value in 2014)	Target (2020) [two years after project completion]
(i) Improvement of load factors		
Peak load value gauged by the percentage to rated current	0%	80%
Average load value gauged by the percentage to rated current	0%	50%
(ii) Improvement of power supply reliability		
System Average Interruption Duration Index (SAIDI): the duration of power outages per user per year	4,390.5	2,200
System Average Interruption Frequency Index (SAIFI): the frequency of power outages per user per year	29.3	11
(iii) Reduction of the power loss		
Technical losses in MV and LV systems in the target areas of sub-projects	6.66%	4.0%

3. Southern Power Corporation: Expansion of Can Duoc Substation (220kV) and transmission lines

Indicators	Baseline (Actual value in 2014)	Target (2020) [two years after project completion]
(i) Improvement of load factors		

Peak load value gauged by the percentage to rated current	81%	57%
Average load value gauged by the percentage to rated current	39%	35%
(ii) Improvement of power supply reliability		
System Average Interruption Duration Index (SAIDI): the duration of power outages per user per year	3,079.1	2,771.2
System Average Interruption Frequency Index (SAIFI): the frequency of power outages per user per year	10.3	9.6
(iii) Reduction of the power loss		
Technical losses in 220kV systems in the target areas of sub-projects	1.18%	1.03%

4. Hanoi Power Corporation: Expansion of Cau Dien Substation (110kV) and transmission lines

Indicators	Baseline (Actual value in 2014)	Target (2020) [two years after project completion]
(i) Improvement of load factors		
Peak load value gauged by the percentage to rated current	90.1%	75.5%
Average load value gauged by the percentage to rated current	54.4%	45.22%
(ii) Improvement of power supply reliability		
System Average Interruption Duration Index (SAIDI): the duration of power outages per user per year	1,533	1,055
System Average Interruption Frequency Index (SAIFI): the frequency of power outages per user per year	17.12	11.78
(iii) Reduction of the power loss		
Technical losses in 110kV systems in the target areas of sub-projects	1.18%	0.93%

5. Ho Chi Minh City Power Corporation: Expansion of Hoc Mon Substation II and transmission lines

Indicators	Baseline (Actual value in 2014)	Target (2020) [two years after project completion]
(i) Improvement of load factors		
Peak load value gauged by the percentage to rated current	90%	79%
Average load value gauged by the percentage to rated current	72%	63%
(ii) Decrease in the frequency and duration of power outages		

System Average Interruption Duration Index (SAIDI): the duration of power outages per user per year	2,499.70	2,050.61
System Average Interruption Frequency Index (SAIFI): the frequency of power outages per user per year	20.99	17.40
(iii) Reduction of the power loss		
Technical losses in 110kV systems in the target areas of sub-projects	1.00%	0.97%

2) Internal Rate of Return

Based on the conditions below, the economic internal rate of return (EIRR) of the project is 18.88% and the financial internal rate of return (FIRR) is 11.11%.

【EIRR】

Cost: Project cost (tax excluded), operation and maintenance cost

Benefit: economic value by decreasing power loss

Project life: 20 years

【FIRR】

Cost: Project cost, operation and maintenance cost

Benefit: Increase of return by decreasing power loss

Project life: 20 years

- (2) Qualitative Effects: Greenhouse gas emission reduction by decreasing the power loss (mitigation) and more reliable operation of factories by providing stable power supply

5. External Risk Factors and Control

None in particular.

6. Lessons Learned from Past Projects

In the “Power Transmission and Distribution Network Development Project” in Viet Nam, multiple sub-projects were carried out in parallel. Moreover, the selection of sub-projects and their scope of work were changed frequently. Therefore, it was difficult to monitor the individual sub-projects in a proper manner or at a proper time.

In this Project, a monitoring sheet will be developed to check the details and progress of each sub-project. The Executing Agencies will be required to submit the monitoring sheet at the end of every quarter and at the time of application for the replacement of sub-projects so that project members can monitor the situation and progress of sub-projects. In order to encourage power corporations to submit the monitoring sheet in a proper manner and at a proper time, JICA and the responsible parties have agreed that when the monitoring sheet is not submitted, the replacement application can be rejected.

7. Plans for Future Evaluation

- (1) Indicators for Future Evaluation

- 1) Improvement of load factors
 - (i) Peak load value gauged by the percentage to rated current (%)
 - (ii) Average load value gauged by the percentage to rated current (%)
- 2) Improvement of power supply reliability
 - (i) System Average Interruption Duration Index (SAIDI): the duration of power outages per user per year (hour)
 - (ii) System Average Interruption Frequency Index (SAIFI): the frequency of power outages per user per year (times)
- 3) Technical loss of the system in the target areas of sub-projects
- 4) Economic internal rate of return (EIRR) (%)
- 5) Financial internal rate of return (FIRR) (%)

(2) Timing

Two years after the completion of the project.