

## Ex-Ante Evaluation (for Japanese ODA Loan)

Private Sector Investment Finance Division,  
Private Sector Partnership and Finance Department, JICA

### 1. Name of the Project

Country: Kingdom of Cambodia

Name of the Project: Kampong Chhnang Solar Power Project

Loan Agreement: August 25, 2021

Borrower: Prime Road Alternative (Cambodia) Company Limited

### 2. Background and Necessity of the Project

#### 1. Development Relevance of the Project

##### (1) Current State and Issues of the Electricity Sector in Cambodia and the Project's Relevance to the Development Policies of the Cambodian Government

During the past decade, Cambodia's average annual real GDP growth rate has been high, at around 7%, and as the country grew steadily, electricity demand in Cambodia grew rapidly, at an annual rate of 18% on average, from 695 GWh in 2003 to 8,650 GWh in 2018. Cambodia had equipment capable of generating 2,177 MW of electricity in 2018 with its power sources consisting of hydraulic power (61%), coal-burning thermal power (25%), diesel power (12%), and renewable energy (2%). Since it could not meet demand with domestic power sources alone, the country began to import electricity from Thailand in 2007, Vietnam in 2009, and Laos in 2010, and in 2018, it depended on imports for about 16% of the electricity supplied. Partly because the substantial lack of power supply capabilities often caused planned and unplanned blackouts in the dry season of 2019 (March to May), the Cambodian government has encouraged independent power producers (IPP) to develop power sources in the country as it strives to strengthen the domestic power supply system. By promoting not only hydroelectric power generation, which involves draught risks, and thermal power generation, which entails fund procurement risks as it becomes increasingly large scale, but also renewable energy, including photovoltaic power generation, it aims at meeting electricity demand, which is expected to continue rising sharply, while pushing for the diversification of power sources.

Cambodia has not introduced the Feed in Tariff system as Thailand and Vietnam have, and acquiring relatively large tracts of land involves risks. For these and other reasons, photovoltaic power generation projects have not actively been carried out in the country. The Project will be a model photovoltaic power generation project in which Electricite du Combodge (EDC) encourages active participation by investors through the provision of land and incidental equipment such as power transmission and distribution networks, and this is expected to contribute to the spread of photovoltaic power generation in the country in the future.

In its Electric Power Development Plan of 2015 (fiscal 2008 to 2020), the Cambodian government positioned electricity as one of the sectors to which it would give top priority as

it aimed at becoming a middle-income country by 2021. It has also revised its Electricity/Energy Master Plan (fiscal 2020 to 2030), and the revised Plan calls for the government to raise power supply capabilities, including reserve ones, to 12,000 MW by 2030 and increase photovoltaic power generation to up to 1,800 MW by introducing 100 MW power stations annually. In the Nationally Determined Contributions (NDC) it formulated in accordance with the Paris Agreement, the government has announced that it will promote the development of renewable energy as part of its measures to reduce greenhouse gas emissions. As described above, it is striving to bolster the power supply capabilities and at the same time is promoting diversification of power sources in the country in concrete terms as part of its policy. The Project, which aims at increasing the country's power supply capabilities, diversifying its power sources, and furthermore supporting efforts to mitigate climate change by constructing a large-scale photovoltaic power station in the province of Kampong Chhnang, close to Phnom Penh, which has high demand and a large amount of solar radiation, is consistent with the policy of the Cambodian government.

## (2) Relevance to Japan's and JICA's Assistance Policies

The Government of Japan's Development Cooperation Policy for the Kingdom of Cambodia (July 2017) defines support for industrial promotion as one of the priority sectors and it would work to develop a stable power supply system, an important element of overseas direct investment promotion. Furthermore, in the JICA's Country Analysis Paper for Cambodia (March 2014) states that it is necessary to consider a future power source structure taking measures to cope with power shortages in the dry season into account. This is because hydroelectric power generation represents half of the electricity generated in the country, and the Project is consistent with these policies and analysis. In the Phnom Penh Transmission and Distribution Expansion Project (ODA loan) and its Phase 2 (ODA loan), JICA provided support to contribute to stable power supply through the development of power transmission, distribution, and transformation equipment. In addition, it is considered that the Project encourages green investments by business operators in the ASEAN region, contributing to the ASEAN overseas investment and finance initiatives announced by Prime Minister Shinzo Abe at the Japan-ASEAN summit meeting in November 2019, as well as from the perspective of stimulating independent development making the most of domestic energy resources, it contributes to the pursuit of economic prosperity in the Free and Open Indo-Pacific strategy.

## 2. Necessity of Assistance with Private-Sector Investment Finance

The Project is a photovoltaic IPP project, for which there are only a small number of precedents in Cambodia, and it is expected to act as a catalyst for similar projects by private business operators in the years to come. On the other hand, since it is difficult for ordinary financial institutions to grant long-term loans using the project finance method

because this project involves a risk of the EDC performing power purchase agreements, the necessity of providing assistance through the Private-Sector Investment Finance is high.

### **3. Project Description**

#### (1) Project Objective

The Project is designed to help meet the brisk power demand in the Kingdom of Cambodia with renewables by constructing photovoltaic power stations there.

#### (2) Project Site / Target Area

Province of Kampong Chhnang, Kingdom of Cambodia

#### (3) Project Components

Construction and operation of a photovoltaic power station (rated capacity: 60 MW) and power transmission and distribution equipment and other facilities. In accordance with the 20-year Power Purchase Agreement (PPA) with the Borrower, the EDC has the duty of purchasing all of the electricity generated.

#### (4) Estimated Project Cost

43.6 million U.S. dollars (including the 4.1 million U.S. dollars loaned by JICA)

#### (4) Schedule

September 2021: Construction initiated

October 2022: Construction completed

#### (5) Project Implementation Structure

1) Borrower: Prime Road Alternative (Cambodia) Company Limited

2) Executing Agency: Same as above

3) Operation and Maintenance System: Outsourced to CACS Engineering and Uper Energy Singapore by concluding O&M agreements with the two firms

#### (6) Cooperation and Sharing of Roles with Other Donors

##### 1) Japan's Assistance Activities

The ODA loan-based Phnom Penh Transmission and Distribution Expansion Project (L/A signed in July 2014; 6.48 billion yen), ODA loan-based Phnom Penh Transmission and Distribution Expansion Project (Phase 2) (L/A signed in May 2018; 9.216 billion yen), etc.

##### 2) Other Donors' Assistance Activities

The ADB already has experience in financing a 10 MW photovoltaic power generation project by a private power generator in Cambodia. Based on this experience, in order to promote photovoltaic power generation projects in Cambodia's electricity sector using the IPP bidding method, the ADB provided the EDC with bidding support advisory services, including a feasibility study for this project, as part of its technical cooperation (Office of Public-Private Partnership at the ADB). The ADB also granted sovereign loans for the construction by the Cambodian government of power transmission lines that connected this project area and grids (the ADB's regional

department). Thus, the Bank has provided comprehensive support to realize this project, which is the largest-ever photovoltaic power generation undertaking by the successful IPP bidder.

(7) Environmental and Social Consideration / Cross-Sectoral Issues / Gender Category

1) Environmental and Social Consideration

(i) Category: B

(ii) Reason for Categorization: The Project's potential adverse impacts on the environment are deemed insignificant as defined by the JICA Guidelines for Environmental and Social Considerations of April 2010 ("the JICA Guidelines"), in terms of sector description, project description, and site description.

(iii) Environmental Permit: The permit was obtained after the completion of an environmental impact assessment (EIA) as required by Cambodia's relevant laws.

(iv) Anti-Pollution Measures: The Project will take measures to mitigate the impacts on air quality, water quality, noise levels, and solid waste during construction and when in operation so as to meet domestic and international environmental standards.

(v) Natural Environment: The project area is not situated in or near any sensitive areas such as a national park. Therefore, the adverse impact on the natural environment is expected to be minimal.

(vi) Social Environment:

The Project will involve acquiring approximately 95 ha of land. This acquisition will be implemented through negotiations in line with Cambodian laws and the JICA Guidelines, and therefore, there will be no involuntary resettlement. Land acquisition will be undertaken by the EDC, and the acquired land will be leased to the Borrower. No particular opposition was raised against the implementation of the Project in the public consultation process.

(vii) Other/Monitoring: The sponsor, Project Implementation Consultant Services (PIC), as well as the EPC and O&M contractors will monitor the impact on air quality, noise levels, water quality, and solid waste during construction and when in operation according to the environmental monitoring plan.

2) Cross-Sectional Matters: By constructing and operating a photovoltaic power station, this project aims at promoting the spread of renewable energy and diversification of power sources in Cambodia, thus contributing to mitigating the effects of climate change.

3) Category of Gender: GI (Gender mainstreaming needs assessment and analysis project)

Reason for Categorization: Although gender mainstreaming needs were confirmed in the appraisal process, the Project stopped short of including any specific activity that would contribute to gender equality or women's empowerment.

4) Other Important Issues: None in particular

<b>4. Targeted Outcomes</b>
-----------------------------

### (1) Quantitative Effects

Co2 emission reductions(ton/year) will be measured

Indicator	Baseline	Target (2 years after loan disbursement completion)
Maximum output (MW)	0	60 (MW)

### (2) Qualitative Effects

Promotion of photovoltaic power generation, mitigation of effects of climate change, and sustained economic development in Cambodia

## 5. Lessons Learned from Past Projects

### (1) Evaluation Findings of Similar Past Projects

The ex-post evaluation of a similar project in Mongolia notes that aging grid facilities and the failure to meet surging demand resulted in an inadequate capacity of the existing facilities after connecting to the Central Energy System, temporarily affecting power transmissions. The lesson learned for future projects is that it will be useful to analyze the grid capacity in a feasibility study or the like and take such analyses into account in accessing project feasibility.

### (2) Lessons for the Project:

It has been decided that the Project will examine the capacities of power plants that will be connected to the local grids in the future and the installed capacity of these grids, with the help of the technical advisor as necessary. It has also been found that the grids have the capacity to receive power from not only the wind farms to be constructed under the Project but also neighboring power plants.

## 6. Evaluation Results

The Project is relevant to some of the issues facing Cambodia as well as the country's development policies. It is also consistent with Japan's and JICA's assistance policies. Additionally, the Project will contribute to three of the SDGs: Goal 7 (clean energy), Goal 13 (climate action), and Goal 17 (partnership). Therefore, it is highly necessary for JICA to support the implementation of the Project.

## 8. Plan for Future Evaluation

### (1) Indicators to be Used

As shown in Section 4 of this evaluation sheet.

### (2) Timing:

An ex-post evaluation will be conducted two years after loan disbursement completion.

End