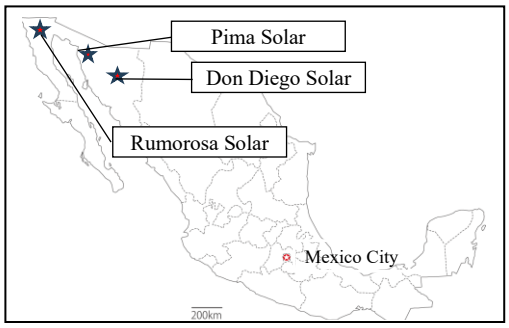
United Mexican State

FY2023 Ex-Post Evaluation Report of Private-Sector Investment Finance

"Photovoltaic Power Generation Project in Mexico"

External Evaluator: Toshihisa Iida, OPMAC Corporation

1. Project Description



Project Location (source: Evaluator)

Rumorosa Solar (source: the Borrower)

1.1 Project Outline

Mexico is one of the largest Carbon Dioxide (CO_2) emitters in Latin America, and at the twenty-first session of the Conference of the Parties (COP21) of the United Nations Framework Convention on Climate Change (UNFCCC) in 2015, the Mexican government set a target of reducing its CO_2 emissions by 22% compared to the projected business-as-usual levels in 2030. Of Mexico's CO_2 emissions, the power generation sector accounts for 44%. Two of the challenges for Mexico in fulfilling its commitment under COP21 were breaking away from a reliance on oil- and gas-fired power generation and promoting renewable energy. The National Electric System Development Program (El Programa de Desarrollo del Sistema Eléctrico Nacional (PRODESEN) (2018-2032), established by the government of Mexico, calls for the development of 70 GW of new power sources by 2032, of which 26.6 GW will consist of photovoltaic and wind power generation, taking into account the shutdown of existing power plants due to obsolescence. In addition, the Energy Transformation Law enacted in 2015 called for an increase in the share of renewable energy to 35% of the country's electricity generation by 2024 and to 50% by 2050. Meanwhile, although the country is an oil-producing country and exports electricity, it also depends on electricity imports from the U.S. As of 2016, it exported 1,968 GWh of electricity and imported 2,233 GWh, making imports larger than exports and contributing to the trade balance deficit, which has made improving energy self-sufficiency a challenge.

The Project was designed to increase the supply of electricity, promote renewable energy, and diversify power sources in Mexico through support for IEnova's photovoltaic power generation projects, thereby contributing to a mitigation of the impact of climate change.

2. Outline of the Evaluation Study

2.1 External Evaluator

Toshihisa Iida, OPMAC Corporation

2.2 Duration of Evaluation Study

This ex-post evaluation study was conducted with the following schedule.

Duration of the Study: August 2023 - December 2024

Duration of the Field Study: January 14 - February 3, 2024, June 11 - 18, 2024

2.3 Constraints During the Evaluation Study

(1) Constraints on the collection of information

Under the JICA security measures (Mexico) at the time of the ex-post evaluation (July 20, 2023 and April 28, 2024), out of the three power plant sites covered by the Project, the evaluator was only able to visit Don Diego Solar. The other two power plants were handled through online interviews. In addition, even at Don Diego Solar, direct visits to the surrounding communities were not allowed due to security concerns. Therefore, interviews with stakeholders in the surrounding communities were conducted in coordination with the Borrower mainly with ones with whom the Borrower has a relationship. Thus, it should be noted that the project benefits, such as qualitative effects and impacts, were determined based on matters confirmed through a limited number of interviews (Rumorosa Solar: 1, Pima Solar: 3, Don Diego Solar: 3). The information obtained may not necessarily be representative.

(2) Analysis of Efficiency

The project period was not defined in the JICA documents at the time of the appraisal. In addition, the period from the date of loan agreement to the disbursement of funds was short. Therefore, in this ex-post evaluation, the project period was defined as the period from the start of the construction of the first power plant to the start of the operation of the last power plant among the three power plants supported by JICA.

3. Conclusion

The Project was designed to support IEnova's photovoltaic power generation project in Mexico, to increase the country's electricity supply, promote renewable energy, and diversify its power sources, thereby contributing to mitigating the impact of climate change. The results of the evaluation are as follows.

Relevance: At the time of the appraisal and the ex-post evaluation, under the Mexican

government's National Development Plan, increasing energy self-sufficiency and increasing the percentage of renewable energy was a priority for the government. It is also consistent with development needs. At the time of the ex-post evaluation, it was confirmed that the implementation of the photovoltaic power project contributed to a certain extent to Greenhouse gas (GHG) emissions reduction, and thus to the Project objective. Therefore, there is no problem with the logic of the Project to achieve the Project objectives. and the project plan and approach are appropriate.

Coherence: The Project was consistent with Japan's development cooperation policy at the time of the appraisal. No linkage between JICA's other schemes was confirmed. As for the collaboration and coordination with the co-financing institutions, appropriate collaboration was achieved with them, including joint project site surveys. The loans of the co-financing institutions were executed as planned and a total of five power plants of the Borrower's Solar Power Project have been constructed and are operating on schedule, which is confirmed to contribute to strengthening the country's electricity supply capacity, promoting renewable energy and power source diversification, and ultimately mitigating climate change. In addition, the Project is in line with the Mexican government's international commitments to reduce GHG emissions. Furthermore, it was confirmed that the necessity for support through Private-Sector Investment Finance was considered to be high to meet the Borrower's funding needs.

Efficiency: The project output (the construction of solar power plants) was almost in line with the plan. Although the actual project cost was slightly higher than planned, the project period was within the plan.

Effectiveness: The operational and effect indicators set for the Project (annual power generation, maximum power generation capacity, and annual CO_2 emission reductions) were mostly achieved or achieved as planned. There was a certain contribution to the creation of jobs for construction workers and service provides from the local communities during construction, to the companies' strategies of the off-takers to convert their electricity sources to renewable energy, and to the reduction of GHG emissions to which the Mexican government had committed themselves.

Impact: Some of the workers employed during the construction period were confirmed to have applied the experience and skills built up at the construction sites of the Project to work on other solar power construction sites, and the Project is also considered to have had a certain effect in creating further employment and providing opportunities for increased income for local communities, including those of indigenous immigrants. No negative impact on environmental impacts were identified. In addition, the

Borrower provided social and economic needs of the neighboring communities through Corporate Social Responsibility (CSR) activities, and their social and economic contributions were confirmed.

Sustainability: The national development plans, the energy sector plans, etc., at the time of the ex-post evaluation emphasize the achievement of sustainable energy self-sufficiency, increased use of clean energy, and the promotion of renewable energy generation in order to meet the increasing electricity demand. The operation and maintenance of the solar power plants developed by the Project is carried out by the staff of each power plant, and the status of operation and maintenance is monitored by the Borrower's headquarters. In addition to the technical operation and maintenance of the power plants, systems have also been established to monitor the environment around the power plants, communicate with local communities, and proactively implement CSR activities for the local community. At each power plant, staff with sufficient educational backgrounds, technical experience, and knowledge are assigned as O&M staff to maintain an appropriate level of technical expertise. There are no particular problems with financial sustainability. Environmental, social, health and safety monitoring systems have been established at each power plant, and there have been no particular problems identified to date. No major problems have been observed in the operation and maintenance status of the Project.

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