Internal Ex-Post Evaluation for Grant Aid Project for Environment and Climate Change

conducted by Tajikistan Office: October 2024

Country Name	**The Project for Introduction of Clean Energy by Solar Electricity Generation System**
Republic of Tajikistan	

I. Project Outline

Background	Tajikistan has the largest hydropower generation capacity in Central Asia due to its abundant water resources, however, the ratio of developed hydropower to the potential was only 5%. On the other hand, electricity consumption had been higher than electricity generation, and Tajikistan had not been able to cope with peak demand in wintertime. In this context, the country had made the construction of new hydropower generation plants a top priority, however, the development of power generation facilities from other energy sources was also needed.
Objectives of the Project	To increase power generation capacity, diversify power sources, and raise awareness of people of Tajikistan for utilization of renewable energy by procuring photovoltaic (PV) system and related equipment in central Dushanbe and providing technical assistance, and thereby contributing to demonstration of Japan's initiatives for promoting collaborative efforts by both developed and developing countries against climate change.
Contents of the Project	1. Project Site: (1) DIAKOV Hospital (Currently, National Medical Center Shifobakhsh), (2) Research Institution of Obstetrics gynecology and perinatology (Currently Republican Scientific-Research Institute of Obstetrics, Gynecology and Perinatology, Dushanbe: SRIOGP and (3) Maternity Hospital No.1 of Dushanb (a site for the additional procurement) 2. Japanese side (1) Original Scope: 120 kW PV generation system (installed at National Medical Center Shifobakhsh) and 40kW PV generation system (installed at SRIOGP) (PV modules, installation devices, electricity facility cables, junction boxes, connection boxes、power conditioners, display boards, Data management and monitoring systems, transformers, cables, etc.) (Note: Although the ex-ante evaluation sheet mentions that the capacity is 140 kW in total, the final capacity was 120 kW and 40 kW respectively.) (2) Additional procurement (The output was added by using the residual amount of the E/N limit amount) (i) PV system (34.286kW) at Maternity Hospital No.1 (ii)Phase rotating boards for SRIOGP and National Medical Center (installed at cubicles under the original contract). The phase rotating boards were additionally procured, because the systems under the original contract stopped due to frequent phase rotation abnormalities. 3. Tajikistan side: Clearing of the installation site and transplanting of trees for the equipment to be procured under this project

Project Period	E/N Date	February 4, 2010	Completion Date (ex-ante)	March 2011	Completion Date (actual)	Original Scope: August 20, 2012 (Completion of installation) Additional procurement: June 8, 2019 (Completion of installation)
	G/A Date	February 4, 2010				
Project Cost	E/N Grant Limit / G/A Grant Limit: : 450 million yen			Actual Grant Amount: 403 million yen		
Executing Agency	Ministry of Health and Social Protection of the population					
Contracted Agencies	Main Contractor(s): Marubeni Corporation (Original scope), Marubeni Protechs Corporation (Additional procurement) Main Consultant(s): INGEROSEC Corporation					

II. Result of the Evaluation

< Special Perspectives Considered in the Ex-Post Evaluation >

The project was scheduled to be completed in March 2011; however, the original scope was completed in 2012 and the additional procurement was completed in 2019. Since the target year was three years after the completion of the project, the project effectiveness was verified based on the actual results in 2015 for the original scope and in 2021 for the additional procurement, respectively.

1 Relevance/Coherence

[Relevance]

<Consistency with the Development Policy of Tajikistan at the Time of Ex-Ante Evaluation >

The project was consistent with the development policy of Tajikistan at the time of ex-ante evaluation. Tajikistan formulated the "National Development Strategy 2015", a long-term strategy aimed at achieving the goals of the Millennium Development Goals by 2015, in which Tajikistan identified infrastructure, energy and industrial development in the production block and sustainable environment in the social block as priority areas.

<Consistency with the Development Needs of Tajikistan at the Time of Ex-Ante Evaluation >

The project was consistent with the development needs of Tajikistan for the renewable energy at the time of ex-ante evaluation. As mentioned in the "Background" above, Tajikistan had relied on the hydropower generation; however, the electricity consumption had been higher than the generation, and the development of power generation facilities from other energy sources was needed.

<Appropriateness of Project Design/Approach>

No problem attributed to the project design/approach was confirmed.

<Evaluation Result>

In light of the above, the relevance of the project is ③[1].

[Coherence]

<Consistency with Japan's ODA Policy at the Time of Ex-Ante Evaluation>

The project was consistent with the Japan's ODA policy to Tajikistan at the time of ex-ante evaluation. Development of basic social services (including social infrastructure development) was one of the priorities under the Country Assistance Program to Tajikistan. Also, the Government of Japan introduced a scheme of "Program Grant Aid for Environment and Climate Change" in 2008 aiming at support for developing countries to take adaptation and mitigation measures against the adverse effects of the climate change.

<Collaboration/Coordination with other JICA's interventions>

Any collaboration/coordination between the project and other JICA's intervention was not clearly planned at the time of ex-ante evaluation.

<Cooperation with other institutions/ Coordination with international framework>

Any the cooperation/coordination with other development partners, NGOs, universities, private companies, and global frameworks was not clearly planned at the time of ex-ante evaluation.

<Evaluation Result>

In light of the above, the coherence of the project is ②.

[Evaluation Result of Relevance/Coherence]

In the light above, the relevance/coherence of the project is ③.

2 Effectiveness/Impact

<Effectiveness>

The project objectives were partially achieved, as it is difficult to verify whether the project achieved the target due to the lack of consistent data.

The PV systems were installed in National Medical Center, SRIOGP (original scope) and Maternity Hospital No.1 (additional scope), however, data on the annual net power generation was not accurate. The data management and monitoring systems installed had some lacking data as each of the institutions at different times had problems with cable connections. These problems were noticed and fixed much later than they appeared. They did not regularly monitor power generation information so that problems were not able to be fixed in a timely manner. There was no documentation on monitoring the condition of the equipment and the repairs carried out. However, the problem was fixed at National Medical Center and Maternity Hospital No. 1 at the time of ex-post evaluation.

As for SRIOGP, cables and connections and power conditioners (4 sets) were damaged as a result of construction works near the site; however, proper repair work has not been carried out, as the technical staff of SRIOGP has not either have sufficient skills to repair the damages or comprehend the response to the error (The system did not record power generation data). JICA requested SRIOGP to fix the system error which was found out at the time of ex-post evaluation. However it took long time to fix the problem due to the state budget (The fix is completed in August 2023).

As for the awareness of the people, the visitors at each institutions have opportunity to see the PV system. National Medical Center has more than 20,000 visitors annually who can see the PV system, since it is located in a prominent place on the territory of the center. At SRIOGP, more than 13,000 visitors annually had the opportunity to see the PV system, since it is located right at the entrance to the institute. At Maternity Hospital No.1, the PV system is located in the backyard of the hospital and visitors have limited access to the site. However, more than 15,000 visitors annually were able to see the panel (monitor) displaying data on electricity generation installed in the lobby of the hospital.

<Impact>

Although the project was expected to contribute to the demonstration of Japan's initiatives for promoting collaborative efforts by both developed and developing countries against climate change, few impacts have been observed, as these institutions are not mandated to promote renewable energy agenda.

No negative impact on the natural environment has been observed. There have been no land acquisition and resettlement. No negative impact on social aspect has not been observed.

<Evaluation Result>

In light of the above, the effectiveness/impact of the project is ②.

Quantitative Effects

(original scope)

Indicator	Ex-ante Year 2010 (Baseline)	Target Year 2013	Year 2013 1 year after the project completion	Year 2015 3 years after project completion	Ex-post Year 2021	Source
1 Net power generation (kWh/year)	0	150,000	80,927.3	22,501.8	137,321.3	Annual report generated by the system
(Breakdown) 1-1 National Medical Center	0	n.a.	42,582.6 *1	11,132.7 *1	119,082.6 *1	Annual report generated by the system
1-2 SRIOGP	0	n.a.	38,344.7 *2	11,369.1 *2	18,238.7 *2	Annual report generated by the system
2 CO2 emission reduction (t/year) *3	0	92	25 *3	7 *3	43 *3	Monitor information of the system
3 Reduction in electricity cost	0	45 (10,000 yen/year	21,551 TJS/year *4 (Ref: (295,943yen/year)*	6,886 TJS/year *4 (Ref: (94,560yen/year)*	75,719 TJS/year *4 (1,039,788yen/y	Calculated based on electricity tariffs for the respective year

[1] ④ : very high, ③ : high, ② : moderately low, ① : low

			5	5	ear)*5	

*1 Data missing for some months.
*2 Data missing for some months.
*3 Unit amount of 1kWh=3.17 kg(Co2) was determined based on monitor information of the system which shows electricity generations and CO2 emission reduction on the day.
*4 Calculated based on electricity tariffs for the respective year (0.2663in 2013, 0.3060in 2020, 0.5514 in 2021).
*5 Based on the exchange rate as of 4 July, 2022.

(additional procurement)

Indicator	Ex-ante Year 2010 (Baseline)	Year 2019 Year of completion	Year 2020 1 year after the project completion	Ex-post Year 2021	Source
1.Net power generation (kWh/year) at Maternity Hospital No.1	0	27,836.6 (from May to December 2019)	45,126.3	27,778.3 (Data from May to July 2021 not available)	Annual report generated by the system

3 Efficiency

Although the project cost was within the plan (the ratio against the plan: 90%), the project period considerably exceeded the plan (the ratio against the plan: 235%) (Original scope). Out of the actual project period, it was needed much time for the bidding process for unknown reasons.

Outputs were produced as planned. Although pruning at National Medical Center was the obligation of the Tajikistan side, it has not been carried out. In order for the effective use of the system, minimizing the influence of the shadow of the trees is desirable and the management of the Centre was reminded of this issue at the time of ex-post evaluation.

In the light above, the efficiency of the project is ②.

4 Sustainability

< Institutional/Organizational Aspect>

According to the management of each of the institutions, one person has coped with O&M (Operation and Maintenance) of PV systems. At SRIOGP, it was confirmed that the resources has not been sufficient at the time of ex-post evaluation, as SRIOGP has not taken any measures for necessary repair.

<Technical Aspect>

National Medical Center and Maternity Hospital No.1 have had sufficient technical skills to undertake O&M. However, O&M staff at SRIOGP has not had sufficient technical skills and knowledge to conduct proper O&M. The equipment has worked partially because the staff did not know how to repair/fix the equipment. The cables and connections were damaged as a result of construction works near the site, but proper repair work has not been carried out due to the lack of technical skills, knowledge and budget. At the time of ex-post evaluation, they have been trying to contact local specialists for a professional assessment of the damage and its repair, however, they have had limited capacity to fix the issue. JICA requested SRIOGP to repair the damages, but the repair work has not done instantly. Repairs were finally carried out after a request through the Ministry of Health and the reprovisioning of information on the technical staffs.

There has been no training system at each institution, the person who was trained during the project implementation has still worked and staff turnover did not affect. The manual exists has been properly utilized by the person in charge of O&M at each of National Medical Center and Maternity Hospital No.1. On the other hand, the manual has not been utilized at SRIOGP, though the manual has existed.

<Financial Aspect>

The institutions have not allocated budget for O&M. The institutions have only covered the wages of electricians, whose duties also include the repair of photovoltaic systems. In the future, the repair, if required, depends on the amount of allocated funds from the state budget.

According to the management of SRIOGP, they have had very limited budget for construction and renovation works. During the past two years they have been focused on the issues related to the pandemic and have not devoted enough time to this issue.

<Current Status of Operation and Maintenance>

National Medical Center and Maternal Hospital No.1 have conducted regular and necessary maintenance, while SRIOGP has not conducted proper O&M due to lack of knowledge.

All institutions have kept sufficient number of spare parts provided by the project.

<Environmental and Social Aspect>

No issue on environmental and social aspect by the operation of the PV system has been observed and it has not been necessary to take any countermeasures.

<Evaluation Result>

In light of the above, some problems have been observed in terms of the institutional/organizational, technical and financial aspects. Therefore, the sustainability of the project effects is ②.

5 Summary of the Evaluation

The project partially achieved the project objectives, as the data on the net power generation was not complete and cannot be verified. Many visitors to the target institutions have had the opportunity to see the PV system. As for the Sustainability, some problems have been observed in terms of the institutional/organizational, technical and financial aspects. As for the efficiency, the project period significantly exceeded the plan.

Considering all of the above points, this project is evaluated to be partially satisfactory.

III. Recommendations & Lessons Learned

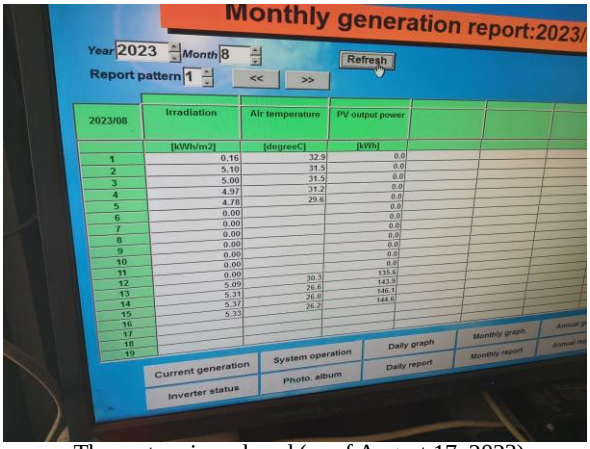
Recommendations to Executing Agency:

PV system error at SRIOGP has not been fixed for a long time. Proper monitoring of the system output and timely actions are essential for its

effectiveness. SRIOGP is recommended to fix all technical issues on timely manner.
Lessons Learned to JICA:
Need to make clear what should be done in case of error (repairment, inform to JICA) when transfer the system.
* JICA Tajikistan Office checked with the hospital and JICA HQs afterwards and found that the contact information had shared with the SRIOGP at the time of completion of installation. However, the person in charge at each hospital were not aware of information and JICA Tajikistan Office re-requested SRIOGP to fix the problem appropriately. Also, after requesting to fix the problem from JICA Tajikistan Office, it was confirmed that the equipment was repaired, and the system was working properly as of August 2023.

PV on Republican Scientific-Research Institute of Obstetrics, Gynecology and Perinatology

Control Panel of National Medical Center Shifobakhsh



The system is replaced (as of August 17, 2023)