# 終了時評価調査結果要約表（英文）

<table>
<tr><th colspan="2">Outline of the Project</th></tr>
<tr><td>Country: Islamic Republic of Pakistan</td><td>Project title: The Project for Improvement of Training Capacity on Grid System Operation and Maintenance</td></tr>
<tr><td>Issue/Sector：Electricity</td><td>Cooperation scheme: Technical Cooperation Project</td></tr>
<tr><td>Division in charge: Energy and Mining Division 1, Energy and Mining Group, Industrial Development and Public Policy Dept.</td><td>Total cost: (As of June 2014)　0.31 billion JPY</td></tr>
<tr><td>Period of Cooperation:<br>(R/D)　February 2011 to March 2014<br>(Extension)　March 2014 to December 2014</td><td rowspan="2">Partner Country’s Implementing Organization:<br>Ministry of Water and Power (MoWP),<br>National Transmission and Despatch Company (NTDC)</td></tr>
<tr><td>Supporting Organization in Japan:<br>Asia Kyodo-Sekkei Consultant Co., Ltd.</td></tr>
<tr><td colspan="2">Related Cooperation:<br>‘Load Dispatch System Upgrade Project’ (L/A in 2005), ‘Dadu-Khuzdar Transmission System Project’ (L/A in 2006), ‘Punjab Transmission Lines and Grid Stations Project (I)’ (L/A in 2008), ‘National Transmission Lines and Grid Stations Strengthening’ (L/A in 2010), ‘Energy Sector Reform Program’ (L/A in June 2014)</td></tr>
<tr><td colspan="2">1-1 Background of the Project<br>National Transmission and Despatch Company (hereinafter referred to as NTDC) has Technical Service Group (TSG) as only training institution for technical staff in high voltage grid system in Pakistan. TSG has utilized training manuals and equipment supported by Canadian International Development Agency (CIDA) during the 1980’s and they have not been upgraded since then. Most of instructors in TSG were not familiar to the up-to-date advanced technology in grid system with latest equipment, using obsolete teaching materials, equipment, and facilities. Therefore, improvement and modernization of training equipment and enhancement of training capacity of the instructors are urgent issues to be tackled. While the Government of Japan provided several ODA loans for Pakistan for strengthening the transmission and substation facilities, it was necessary to improve the capacity of NTDC and Distribution Companies (DISCOs) for efficient operation and management of these facilities and stable electric power supply. In this situation, the Government of Pakistan requested to the Government of Japan for the technical cooperation project with a view to strengthening training capacity through review and improvement on training materials and replacement of training equipment.<br>In response to this request, JICA has conducted Detailed Planning Survey for “the Project for Improvement of Training Capacity of Grid System Operation and Maintenance” (hereinafter referred to as “the Project”) in July 2009. Following the survey, the Project was launched in March 2011 in order to improve training capacity on grid system operation of Technical Service Group (TSG) of NTDC. Project outputs are to renew the equipment, curriculum, syllabi, curricula, and textbook, and to formulate basic</td></tr>
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policy, annual training plan, and long-terms strategy of TSG.

This Terminal Evaluation Survey was conducted 6 months prior to project termination in order to evaluate the outcome of the activities and the results of the Project, by which the recommendation to the activities will be lead to be done in the remained period of the Project and lessons learned will be shared for other similar projects in the future.

**1-2 Project Overview**

The Project aims to improve training capacity on grid system operation and maintenance of TSG, NTDC under the Ministry of Water and Power(MoWP) by upgrading training equipment and facilities, conducting training of trainers (TOT) in Japan and upgrading syllabi/ curricula and training materials, and thereby to contribute to improvement in capacity of engineers and technicians engaged in operations and maintenance of grid systems in Pakistan.

(1) Overall Goal

The capacity of engineers and technicians engaged in operations and maintenance (O&M) of Grid Systems in Pakistan is improved.

(2) Project Purpose

Training Capacity of Training Service Group (TSG) on Grid System O&M is improved.

(3) Expected Outputs

1) TSG's training equipment and facilities are upgraded.
2) TSG instructors acquire advanced technology and training management skills that are suitable for existing grid system operations and maintenance, through the Training of Trainers (TOT) in Japan.
3) TSG's syllabi, curricula and training materials are properly upgraded based on the technical knowledge and skills acquired through TOT.
4) TSG's training systems are upgraded.

(4) Inputs (As of June 2014)

Japanese side: Total cost 0.31 billion JPY

1) Short-term Experts: 9 Experts Total 36.13 Man Month
(3 Training Planning Experts worked only in Japan, 4.01 Man Month)
2) Training in Japan: 32 Counterpart Personnel
3) Equipment: Local procurement: Contract amount of Local Currency: 61,519,958 Rs.
Procurement in Japan: 49,251,861 JPY
4) Local Cost: 969,170 JPY

Pakistani side:

1) Counterpart Personnel: currently 31 persons
2) Building and Facilities:
- Office spaces for JICA experts were allocated and air conditioner was installed.
- Rooms and spaces for installation and storage of the Equipment were secured.
3) Local Cost: “PC-1”budget in total 45 million Rs and disbursed in total 15.8 million Rs

| **2. Evaluation Team** | | |
|---|---|---|
| **Members** | 1. Mr. Fuyuki Sagara (Team Leader) Advisor, Energy and Mining Division 1, Industrial Development and Public Policy Department, JICA<br>2. Mr. Yoshihiro Ozaki (Evaluation Planning) , Representative, JICA Pakistan Office<br>3. Ms. Risako Imai (Evaluation Analysis), Consultant, Kokusai Kogyo Co., Ltd. | |
| **Period of Evaluation** | 7 June 2014 to 21 June 2014 | **Type of Evaluation:** Terminal Evaluation |

## 3. Results of Evaluation

### 3-1. Current Achievement of the Project

#### (1) Likelihood of Achievement of the Project Purpose

By the end of December 2014, Project Purpose is likely to be achieved.

Verifiable indicators of the Project Purpose were amended in September 2012 at the time of Mid-term review. Thereafter the Project introduced the rating evaluation system by using Evaluation sheet #1 and #2 by trainees to measure 1) Overall usefulness of the course, 2) Quality and volume of training course books and materials, and 3) Application on the job. In addition, Evaluation sheet #3 has been used to get feedback and evaluation by Grid System Operation (GSO) managers (supervisors of trainees) focused on 1) Overall satisfaction and 2) Applicability to the Job.

#### (2) Current Achievement of the Outputs

As to Output 1 regarding upgrading training equipment, installations of all the equipment were completed and O&M plan for the equipment was also formulated, therefore Output 1 has been almost achieved. Upgrading of training facilities, which is also an indicator for Output 1 to be carried out by TSG, is under procedure of budget execution in NTDC/TSG to be completed in the remaining period. In Output 2, total 32 C/P personnel (28 instructors and 4 managers) participated in Training of Trainers (TOT) and gained advanced technology in teaching suitable skills for existing grid system O&M, consequently TSG action plans, annual plan and training strategy were also being formulated. Due to the delay in delivery of the equipment procured in Japan, it was also delayed in improving training text books on the newly equipment, however, Output 3 was completed on the re-scheduled plan. Output 4 has been almost achieved as formulation of TSG's basic policy, annual training plan and long-term strategy has been completed and approved by NTDC officially. Training monitoring system based on the feedback sheet from both trainees and their supervisors has also been introduced in TSG since 2012 and is now under discussion to make it more functional. By revising its feedback system, further improvement is expected to be made during the remaining period of the Project.

#### (3) Prospects for Achievement of Overall Goal

The Overall Goal is an intended outcome brought by the Project and expected to be achieved within three years after completion of the Project. At this moment, the Overall Goal has been mostly achieved. Indicator 1 (Overall Goal) was set as 476 trainees per year by 2017, while 469 trainees per year were received to TSG trainings as of 2013. This figure reaches 98.5% of the indicator. In addition, TSG Annual Report 2013 showed that overall average rating for the trainings was 3.4 (target rate is 3.0/full rate 4.0). Regarding Indicator 3, the further quantitative evaluation survey is planned to be conducted in the remaining period of the Project, while Japanese experts observed, at the time of Terminal Evaluation, almost all the ex-trainees improved their capacity in grid system O&M after taking the TSG training courses. NTDC/TSG has been allocating its own budget for TSG training courses regularly even during the Project period and it is highly likely that they can continue the budget allocation after the Project. Moreover, the policy, annual plan, strategy and implementation procedure of the trainings are well established in TSG. From these viewpoints, it is highly expected that the Overall Goal will be achieved.

**3-2. Summary of Evaluation Results**

**(1) Relevance**

Relevance of the Project is high and it is expected to be the same until the end of the Project.

The Project is consistent with National Development Plans ("Vision 2030", "Poverty Reduction Strategy Paper II：PRSP II, 2009" and "Medium Term Development Framework：MTDF, 2005-2010 and extended) and with National Power Policy 2013. These plans describes the necessity to address securing the stable supply of power and bottlenecks of grid system while the National Power Policy targets to reduce the transmission and distribution losses by which it will develop an advanced grid system with international standard.

This project is also consistent with the development needs of NTDC. The approach and design of the project is deemed appropriate. As many transmission reinforcement projects funded by development partners have been intensively implemented, it has been critical to enhance the engineers and technicians' skills on grid system O&M. However, TSG training capacity was very limited due to obsolete training materials and equipment, and also trainers' capacity was limited on new equipment. Old training system has not been revised since Canadian International Development Agency (CIDA) supported in the 1980's. Thus, TSG was in urgent needs of improvement of its training capacity. This project attempts to improve the training system and institutional function as well as to support capacity development of the individuals including managers and trainers. Through this approach, the Project has contributed to solve various issues in TSG.

This project also conform with Japanese ODA policy as it is identified as a project contribute to efficient and sustainable supply of power which is captured in the "Improvement of Economic Infrastructure", one of the priority areas of Japanese assistance policy towards Pakistan.

**(2) Effectiveness**

At the time of the Terminal Evaluation, effectiveness of the Project is observed to be high.

Although it was delayed in activities such as equipment procurement and revision of textbooks for the new equipment, all the outputs have been almost achieved with the 9 month extension of the Project period; consequently it should be said that 'Training Capacity of TSG on Grid System O&M is improved' will be fulfilled by the end of the Project period. Moreover, instructors and managers became aware of necessity for improvement of training courses after TOT in Japan and they were motivated further to achieve the project purpose. Project design was successful in inviting not only trainers but also managerial personnel for TOTs in Japan and it contributed the effective implementation of the Project, since the various counterparts from different positions all travelled together, stayed together, and shared the same vision for the future TSG training center through learning the good practice of training center at Shikoku Electric Company in Japan.

When selecting training equipment provided by the Project, the Project prioritized equipment in high training needs from the area of protection and instrumentation (P&I) such as relay and testing tool for grid station. It was also considered to procure the same producer's equipment with the one procured under Japanese ODA loan. This can benefit trainees since they can apply what they learned in the training directly to actual work on site. At the time of Terminal Evaluation, there was no external factor which

would possibly impede the Project.

**(3) Efficiency**

Examining performance of the Project, efficiency of the Project is moderate to high.

By the time of the Terminal Evaluation, the inputs by both Japan and Pakistan sides were mostly conducted as planned except equipment procurement in Japan. For the Japanese side, quality, quantity and timing of dispatch of the Japanese experts are mostly fair to conduct the activities and to produce the outputs as planned. For the Pakistani side, personnel, facilities, and budget for the Project have been allocated as planned. The Project was affected by the delay in delivery and installation of the procured equipment due to transportation insurance issue in Pakistan, which resulted in loss in cost efficiency by extending 9 months to complete the Project Purpose. However, each Output was achieved as activities were mostly completed on the re-scheduled plan during the extension period.

**(4) Impact**

1) Achievement of Overall Goal

It is observed that training capacity of TSG on grid system O&M is being improved. As a result, the two indicators of Overall Goal, namely "increase of the trainees" and "high average rating for the trainings", are already showing the positive result. Thus, it is highly possible that the Overall Goal will be achieved.

2) Positive impacts

- It is expected to enhance the motivations of TSG and GSO personnel for further improvement of trainings. It is also predicted that GSO engineers and technicians can conduct inspection of new equipment by their own capacity without outsourcing this work. This can contribute to 1) efficient operation and maintenance of grid station, and 2) improvement and expansion of grid system supported by donor agencies, including JICA.
- It is notable that a workshop was held in 21 April 2014 in Islamabad by TSG and Japanese Expert Team inviting development partners to disseminate the outcomes of the Project and advertise the TSG training centers that are equipped with the latest equipment and offering trainings on Grid O&M.
- Synergy effect is expected in enhanced O&M capacity of TSG and JICA loan projects that are improving 7 grid systems in Pakistan. The Project selected the training equipment strategically so that the O&M skills enhanced by the Project can be applied to the O&M of above-mentioned new grid systems.
- As a result of 1)Stipulation of TSG policy, 2)the completion of the revision of textbooks, 3) installation of latest equipment, and 4) improvement of teaching skills of the instructors, NTDC decided and approved to build the office building for trainers and training facilities (new hostel and classrooms) which can accommodate larger number of trainees by using NTDC own budget. The construction is expected to commence FY2014 onwards and completion of the buildings will be expected in FY2016.
- Results of the interviews revealed that TSG is being recognized with good reputation as high technology training institute with excellent trainers trained in Japan and up-to-date training equipment. This gives confidence and higher motivation to the trainers in TSG as a sole training institute where trainees can learn Grid System O&M in Pakistan.

3) Negative impacts

At the time of the Terminal Evaluation, there was no negative impact identified.

**(5) Sustainability**

At the time of the Terminal Evaluation, it is predicted that the Project would be sustainable for foreseeable future in the following aspects.

1) Policy /institutional aspect

It is not predicted any policy or institutional change that may affect the sustainability of TSG.

2) Organization aspect

Since TSG is an only organization to provide O&M training in high voltage grid system, the function and roles of TSG will remain the same. Although there might be some internal organization change and personnel transfers, there will not be a drastic change to TSG.

3) Technical aspect

Instructors and managers have applied technical knowledge acquired by the Project through TOTs in Japan to their work. Also they are disseminating the gained skills and knowledge to other colleagues and trainees through daily work and training. Therefore, it is predicted the technical knowledge and the skills obtained in the Project will be maintained in their organization.

4) Financial aspect

At the initial stage of the Project, national budget for the Project (PC-1) had already been allocated. Annual budget for TSG training courses has been also allocated regularly by NTDC/TSG during the Project period and annual TSG budget in last fiscal year was executed as the same amount of planned budget. Thus, the financial sustainability of TSG will likely be assured for foreseeable future after the Project completion.

**3-3. Promoting Factors**

(1) Project Design

TSG instructors are high educated in general and have ability to solve issues by utilizing what they learned in the Project. Thus, the design of the Project which is aiming to enhance self-development under their own initiative through formulating and implementing action plans greatly contributed to promote ownership of Pakistani side for the Project implementation.

(2) Implementation Process

One promoting factor observed in implementation process of the Project was that TOT participants were also in charge of formulating action plans and implementing these plans. Another promoting factor was that one of 1st TOT participants was promoted from Chief Engineer TSG to General Manager TSG and furthermore, he currently works as Managing Director at NTDC and has been promoting the Project from management side. More than 30 TSG personnel including trainers and managers participated in TOT in Japan, which enhanced in setting a clear organizational vision among them and motivated them to work together towards organizational capacity development.

**3-4. Hindering Factors**

(1) Project Design

During Mid-term review, it was reported as one hindering factor that PDM was not well understood because the level of achievement was not well clarified in PDM. This took time to create mutual understanding on coverage of contents of syllabi, curricula and training materials among project members.

(2) Implementation Process

In the middle of the Project implementation, Work Plan was not well managed for both activities of

Pakistan and Japanese sides in terms of starting new courses and conformed schedule of equipment procurement. Consequently, the Project gradually delayed in schedule. As for training feedback cycle, schedule for collection, analysis and feedback of the sheets were not clearly stipulated, therefore, some delays of monitoring schedule were observed.

**3-5. Conclusion**

It is concluded that the Project Purpose will be achieved by the end of the Project, if the improvement on training facilities is completed by TSG as scheduled.

The relevancy of the Project is high, since the Project is consistent with the development plan, needs of NTDC and the Japanese ODA policy. Effectiveness of the Project is high as the Project Purpose has been almost achieved. Although the Project experienced the delay in delivery of the equipment procured in Japan due to the transportation insurance issues in Pakistan, quality of the activities in the Project was fully secured by the extension of the Project period. Positive impacts are already observed and synergy effects are expected in O&M of grid systems improved by JICA loan scheme. At this moment, sustainability of the Project effects is likely to be assured for the near future.

**3-6. Recommendations**

(1) For the Project

***Strengthening of Training Evaluation and Monitoring System***

At the time of the Terminal Evaluation, the collection rate of evaluation sheet by trainees' managers and supervisors (Evaluation Sheet #3) was approximately 50%. To supplement the evaluation feedback, TSG's Standard Operating Procedure (SOP) stipulated Follow-up Service to check the effectiveness of the trainings at the respective grid stations as part of sustainable evaluation system. It is recommended to increase the number of feedback sheets by announcing in the regular meetings with DISCOs that supervisors are required to submit the feedback sheet, as proposed by the Japanese Experts.

It is also recommended to quantitatively analyze the level of improvement in training capacity of TOT participants in comparison with the beginning of the Project and just before completion of the Project. The result of the analysis should be compiled before the end of the Project.

(2) For NTDC/TSG

***Plan and Allocation of Necessary Budget***

Before the Project terminates, it is recommended to clarify the necessary budget for maintenance on new equipment installed by the Project and reflect it to budget planning from next fiscal year 2014. It is also recommended for TSG to speed up the process of improvement of hostels, office environment, and vehicles for OJT (instruments and trainees) to maximize the Project effects.

***Dissemination to the Government, Development Partners and DISCOs***

One dissemination workshop on the outcomes of the Project was held inviting also development partners in April 2014. It is important for TSG to continuously appeal to the government and development partners to further promote capacity development activities for grid O&M. In order to increase the number of trainees, it is recommended to hold regular stakeholders meetings (DISCOs) and seminars and conduct advertisement

to potential organizations to apply for TSG trainings to inform the training course enhanced by the Project.

(3) For JICA

***Continuous Support for Capacity Development of Grid System O&M***

This Project has targeted to enhance training capacity to operate and maintain Grid System, and the Project is observed to almost fulfill its purpose. Therefore, it will be effective to continue the support to TSG/NTDC for further improvement of grid system O&M by utilizing skills and knowledge gained through the Project, as the needs and hope for further improvement of grid system O&M is still observed.

**3-7. Lessons Learned**

(1) ***Effective Training in Japan for Organizational Capacity Development with Elaborated Needs Assessment***

From strategic point of view, the Project selected not only trainers but also managerial personnel for TOT in Japan, which led to deeper understanding and setting common target of the Project for technical counterparts and managerial personnel as well. This is a good practice which implies that, if the implementing of the training in Japan is implemented for both engineers and managers together, and if elaborated needs assessment is conducted in advance, it would contribute more to enhance the effectiveness of the Project. This practice can be applied also to other developing countries/regions where long term dispatch of the Japanese expert is difficult.

(2) ***Minimizing the Delay in Equipment Procurement***

Dual insurance issues caused the delay in delivery of the equipment procured in Japan. It affected the delay of the schedule of the Project for 6 month. Thus, in case of equipment procurement for Pakistan, it should be discussed with the Government of Pakistan at the initial planning phase of the Project and clarified which country should take responsibility on transportation insurance.

(3) ***Budget Allocation by C/P***

For this Project, C/P applied for the project budget (PC-1) before launching the Project. This led to the smooth implementation of the Project with avoiding any local cost constraint. Thus, it is deemed important that timely application of PC-1 budget would contribute to the smooth implementation even in case of other projects in Pakistan.

- End -