

Country Name	The Project for Improvement of Training Capacity on Grid System Operation and Maintenance
Islamic Republic of Pakistan	

I. Project Outline

Background	National Transmission and Dispatch Company (NTDC) had Technical Service Group (TSG) as only training institution for technical staff in high voltage grid system in Pakistan. However, most of instructors in TSG were not familiar with the up-to-date advanced technology in grid system with latest equipment, using obsolete teaching materials, equipment, and facilities.												
Objectives of the Project	The project aimed to improve training capacity of TSG on Grid System operation and maintenance (O&M) in Pakistan, through (i) upgrading TSG's training equipment and facilities, (ii) acquiring advanced technology and training management skills suitable for existing Grid System O&M by TSG instructors through training of trainers (TOT) in Japan, (iii) upgrading TSG's syllabi/ curricula and training materials properly based on the technical knowledge and skills acquired through TOT, and (iv) upgrading TSG's training systems, thereby improving capacity of engineers and technicians engaged in O&M of Grid Systems.												
	<ol style="list-style-type: none"> Overall Goal: The capacity of engineers and technicians engaged in O&M of Grid Systems in Pakistan is improved. Project Purpose: Training Capacity of TSG on Grid System O&M is improved. 												
Activities of the Project	<ol style="list-style-type: none"> Project site: The whole country, Pakistan. Main activities: (i) Upgrading of training equipment and facilities and preparation of O&M plan, (ii) Development of syllabi, curricula and materials for TOT and conducting TOT in Japan, (iii) Upgrading of syllabi, curricula and materials for training at TSG, and (iv) Development/upgrading of TSG's Basic Policy of training program, annual training plan, and long-term training strategy, and establishment of TSG's training evaluation and monitoring system. Inputs (to carry out above activities) <table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">Japanese Side</td> <td style="width: 50%;">Pakistani Side</td> </tr> <tr> <td>1) Experts: 12 persons</td> <td>1) Staff allocated: 32 persons</td> </tr> <tr> <td>2) Trainees received: 32 persons</td> <td>2) Building and facilities: Office space for experts, etc.</td> </tr> <tr> <td>3) Equipment: Training equipment</td> <td>3) Local cost</td> </tr> <tr> <td>4) Local cost</td> <td></td> </tr> </table> 			Japanese Side	Pakistani Side	1) Experts: 12 persons	1) Staff allocated: 32 persons	2) Trainees received: 32 persons	2) Building and facilities: Office space for experts, etc.	3) Equipment: Training equipment	3) Local cost	4) Local cost	
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Project Period	March 2011- December 2014 (Extension: March 2014-December 2014)	Project Cost	(ex-ante) 377 million yen, (actual) 354 million yen										
Implementing Agency	Ministry of Water and Power (MoWP)(*); National Transmission and Dispatch Company (NTDC) *MoWP was reorganized to Power Division, Ministry of Energy in August 2017.												
Cooperation Agency in Japan	Asia Kyodo-Sekkei Consultant Co., Ltd.												

II. Result of the Evaluation

<Special Perspective Considered in the Ex-Post Evaluation>

- Although the target figures of Indicator 1 and 2 of the Project Purpose are not mentioned in the logical framework, they were 3.0 (full mark 4.0) according to the Project Completion Report. Therefore, in the ex-post evaluation, 3.0 shall be used as the target figures for these Indicators.
- At the time of project completion, achievement status of Indicator 3 for Overall Goal ("80% and more of the engineers and technicians (ex-trainees) improved their capacity") was agreed to be judged based on the number of training courses which were rated over 80% for "Total Average" of the overall course evaluation sheet (based on ratings given by trainees and their supervisors) of the training evaluation system developed by the project. In order to apply the same perspective as that of the project completion, the same method shall be applied to the ex-post evaluation.

1 Relevance

<Consistency with the Development Policy of Pakistan at the time of Ex-Ante Evaluation and Project Completion>

At the time of ex-ante evaluation and project completion, the project was consistent with the national development plans of Pakistan (the Vision 2030, the Poverty Reduction Strategy Paper (PRSP) II (2009), the Medium-term Development Framework (MTDF) (2005-2010), the Framework for Economic Growth (2010-2013), and the 11th Five Year Plan (2013-2018)) describing the necessity to address securing the stable supply of power and bottlenecks of grid system. The project was also consistent with the National Power Policy (2013), targeting to reduce the transmission and distribution losses by which it would develop an advanced grid system with international standard, at the time of project completion.

<Consistency with the Development Needs of Pakistan at the time of Ex-Ante Evaluation and Project Completion >

At the time of ex-ante evaluation, the increase in power supply did not keep pace with the increase in power demand associated with economic growth. The power loss rate was 24%, of which the power loss on transmission and distribution was 22%. Therefore, it was important to support the transmission and distribution field for the purpose of power loss reduction as a measure against serious power shortage. Changes in the needs were not reported at the time of project completion.

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

At the time of ex-ante evaluation, the project was consistent with the Country Assistance Program for the Islamic Republic of Pakistan (February 2005), which included "Achievement of balanced regional socio-economic development" as one of the three priority directions.

<Evaluation Result>

In light of the above, the relevance of the project is high.

2 Effectiveness/Impact

<Status of Achievement of the Project Purpose at the time of Project Completion>

The Project Purpose had been achieved by the time of project completion. Through the project, the training courses of TSG had been upgraded. In 2014, average evaluation rating by trainees in terms of “overall usefulness of the course”, “quality and volume of training course books and materials” and “application on the job” was 3.4 (Indicator 1), and the average evaluation rating by Grid System Operation (GSO) managers i.e. supervisors of the trainees, in terms of “overall satisfaction” and “applicability to the job” was also 3.4 (Indicator 2).

<Continuation Status of Project Effects at the time of Ex-post Evaluation>

The project effects were continued at the time of ex-post evaluation. The TSG’s basic policy of training program and long-term training strategy (2013-2022) developed by the project were still utilized. The TSG’s training evaluation and monitoring system established by the project, including the Standard Operational Procedures (SOP) developed and approved through the project, was functional. In 2018, the average evaluation rating by the trainees in terms of “overall usefulness of the course”, “quality and volume of training course books and materials” and “application on the job” was 3.6 and so was the average rating by the GSO managers in terms of “overall satisfaction” and “applicability to the job”.

<Status of Achievement for Overall Goal at the time of Ex-post Evaluation>

The Overall Goal was partially achieved in the target year (2017) because one of the Indicators was not achieved due to external factors while the other two were achieved at higher level than planned. The achievement status was not changed in the subsequent year (2018).

Compared to the base year (2011), the annual number of trainees did not increase by 30% in 2017 as planned but decreased by 18% in the same year and by 20% in 2018 (Indicator 1) despite TSG had disseminated the upgraded training courses to potential organizations such as distribution companies (DISCOs). According to TSG, the number could not be increased because many of field offices of NTDC and DISCOs could not afford to send their staff to the training between 2015 and 2018 due to heavy business pressure created by aggravated power shortage coupled with staff shortage resulted from a ban on new recruitment in public entities from 2013 to 2018. The bottleneck situations, however, were likely to be improved because the ban on new recruitment had been lifted in the current government (July 2018 onwards) and, in the last couple of years, 10,000 to 12,000 MW installed capacity was added in the grid which would help in improvement of power shortage from 2019 onwards. TSG considered that the number of trainees was likely to increase from 2019 onwards, taking into account of new training programs initiated in 2018 and 2019 (For details, please see Technical Aspect of “Sustainability”). On the other hand, the average evaluation rating by the trainees and the GSO managers on overall achievement after the training was 3.4 in 2017 and 3.6 in 2018, both of which exceeded the target score i.e. 3.0 (Indicator 2), and 100% of the engineers and technicians, who took the training courses, improved their capacity in 2017 and 2018, which exceeded the target ratio i.e. 80% (Indicator 3).

<Other Impacts at the time of Ex-post Evaluation>

Various positive impacts were observed at the time of ex-post evaluation. All the curriculum upgraded by the project were publicly available at the website of NTDC and anyone could access them online. There were synergetic effects with Japanese yen loan projects for the power sector in Pakistan¹ because the staff working at the grids constructed by these projects had been trained at the TSG Training Centers (T/Cs). As to impact on gender, capacity of three female instructors working at TSG T/C in Lahore had been improved through the project.

<Evaluation Result>

Therefore, the effectiveness/impact of the project is high.

Achievement of Project Purpose and Overall Goal

Aim	Indicators	Results								
(Project Purpose) Training Capacity of TSG on Grid System O&M is improved.	1. Average evaluation ratings by trainees are improved, in terms of "Overall usefulness of the course", "Quality and volume of training course books and materials" and "Application on the job"	Status of the Achievement: achieved (continued) (Project Completion) <Average evaluation rating by trainees on overall usefulness of the course, quality and volume of books and materials, and application on the job>								
		<table border="1"> <tr> <th>2011</th> <th>2012</th> <th>2013</th> <th>2014</th> </tr> <tr> <td>N/A</td> <td>3.3</td> <td>3.1</td> <td>3.4</td> </tr> </table>	2011	2012	2013	2014	N/A	3.3	3.1	3.4
		2011	2012	2013	2014					
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2015	2016	2017	2018							
3.6	3.6	3.4	3.6							
(Overall Goal) The capacity of	1. By the year 2017, about three years after	Status of the Achievement: achieved (continued) (Project Completion) <Average evaluation rating by GSO managers on overall satisfaction and applicability to the job>								
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2015	2016	2017	2018							
3.7	3.4	3.3	3.6							
		(Ex-post Evaluation) not achieved <Number of trainees in one year>								
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2011	2015	2016	2017	2018						

¹ “Load Dispatch System Upgrade Project” (Loan Agreement (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), and “Energy Sector Reform Program” (L/A in 2014).

engineers and technicians engaged in O&M of Grid Systems in Pakistan is improved.	completion of the project, number of trainees in one year will be increased by more than 30%. (357/year:2010-2011 ⇒ 476/year).	(Base Year)			(Target Year)		
		No of trainees	357	339	316	294	286
		Rate of change compared to base year		-5%	-11%	-18%	-20%
2. Average rating by trainees and GSO managers on overall achievement after the training course will be kept 3.0 and more.	(Ex-post Evaluation) achieved <Average rating by trainees and GSO managers on overall achievement>	2015	2016	2017 (Target Year)	2018		
		3.7	3.5	3.4	3.6		
3. 80% and more of the engineers and technicians (ex-trainees) improved their capacity	(Ex-post Evaluation) achieved <Ratio of engineers and technicians who improved their capacity>	2015	2016	2017 (Target Year)	2018		
		Total number of training courses (=A)	18	20	20	23	
		Number of training courses which were rated 80% or more in "Total Average" of "% of Achievement" in the evaluation sheet #4 attached to the approved SOP (=B)	18	20	20	23	
		Ratio (=B/A)	100%	100%	100%	100%	

Source: Terminal Evaluation Report; Project Completion Report; questionnaire and interview survey with TSG; training record of TSG

3 Efficiency

Although the project cost was within the plan (ratio against the plan: 94%), the project period exceeded the plan (ratio against the plan: 125%) because of the delay of the delivery of some equipment due to financial procedural reasons that were beyond control of TSG and the consequent delay of some activities using the equipment. The Outputs of the project were produced as planned. Therefore, the efficiency of the project is fair.

4 Sustainability

<Policy Aspect>

National development plans/policies mentioned in "Relevance" (the Vision 2030, the PRSP II (2009) and the 11th Five Year Plan (2013-2018), and the National Power Policy (2013)) were still valid at the time of ex-post evaluation.

<Institutional Aspect>

In 2018, TSG was reorganized into TSG North and TSG South, but its roles and roadmap were unchanged. At that time, T/Cs in Lahore and Islamabad (Tarbela) became part of TSG North having headquarter in Lahore, and T/C in Faisalabad, which had been a separate T/C under unified TSG, was merged with T/C Lahore to consolidate and enhance training quality established through the project. As of March 2019, the number of instructors was 37 at T/C Lahore and 10 at T/C Islamabad. Although there were 6 vacancies in total (as compared to 5 at the time of ex-ante evaluation), TSG considered the number as sufficient because the training courses had been implemented as planned.

<Technical Aspect>

TSG sustained technical capacity to provide the upgraded training at the time of ex-post evaluation. Although most of the instructors trained by the project had been either retired or transferred, the relevant skills and knowledge had been transferred to the successors by using the materials prepared under the project such as the SOP and on the job training. All of the equipment provided under the project were utilized and maintained in good condition, too. Moreover, training quality and utility of TSG had been enhanced since the project completion. Under a grant aid project of JICA ("The Project for Strengthening Training Center on Grid System Operations and Maintenance" (2016-2018)), a training simulator was provided to T/C Lahore and a training facility for the simulator was constructed. TSG started a new training program using the simulator in 2018. TSG also commenced a new training program on safety for DISCOs in 2019 with initiative of Ministry of Energy and NTDC. In developing and implementing the new programs, the skills and knowledge transferred as well as the materials developed through the project were applied. The training quality and utility of TSG was expected to be further strengthened through establishment of a model grid station at T/C Lahore, which was planned by NTDC.

<Financial Aspect>

The budget for TSG had been provided by NTDC. Total budget of TSG for training for grid system O&M, including the O&M cost for the provided equipment, increased annually from 110 million rupees (Rs) in 2016 to 134 million Rs in 2018. According to TSG, the necessary budget had been secured.

<Evaluation Result>

Therefore, the sustainability of the effect through the project is high.

5 Summary of the Evaluation

The project achieved the Project Purpose of improving training capacity of TSG on grid system O&M and the effects of the project continued. The Overall Goal of improving capacity of engineers and technicians engaged in O&M of Grid Systems was partially achieved because the annual number of trainees decreased due to external conditions (i.e. aggravated power shortage from 2015 to 2018 and staff shortage at GSOs resulted from a ban on new recruitment until 2018) while the training quality was maintained at higher level than planned. Regarding the sustainability, no problems were observed in terms of policy, institutional, technical, and financial aspects. As for the efficiency, the project cost exceeded the plan. Considering all of the above points, this project is evaluated to be highly satisfactory.

III. Recommendations & Lessons Learned

Lessons Learned for JICA:

After the project completion, a training simulator was provided to the TSG T/C in Lahore under a Japanese grant aid and a model grid

station is planned to be built at the same T/C by NTDC, the implementing agency. The higher management of NTDC appreciates and values this state of the art facility and is determined to utilize the TSG training facility to the maximum by providing adequate resources for maintenance and further development. Provision of the training simulator increased the quality and utility of training provided by TSG, and construction of model grid station would further increase them. Combination of different schemes of JICA (Technical Corporation and Grant Aid) and complimentary budget allocation by the implementing agency is a good example to enhance impact of intervention and to ensure ownership of facilities.



Provided equipment at TSG T/C in Lahore



Provided equipment at TSG T/C in Islamabad (Tarbela)