

Country Name	Project for Formulation of Power System Master Plan in Dar es Salaam and Review of the Power System Master Plan 2012
United Republic of Tanzania	

I. Project Outline

Background	<p>In Tanzania, the power demand supporting its economic growth was increasing by more than 10% every year. However, new installation of power facilities and maintenance of existing facilities were not necessarily properly performed. Because of that, many of the facilities owned by the Tanzania Electric Supply Company Limited (TANESCO), which was a sole power supplier throughout the country, became aged and placed under chronic overload. As a result, TANESCO was forced to purchase electricity from independent power producers (IPPs), and it caused serious deficit in its account. In 2007, the government of Tanzania developed a vision for 25 years period starting 2008 entitled the “Power System Master Plan (PSMP)” to improve the situation. However, despite its update in 2012, PSMP was inadequate as a master plan in terms of its power demand forecast, power supply development planning, power system analysis, and system planning due to insufficient solid data-based studies. As for Dar es Salaam, the capital city of Tanzania, JICA implemented a study of the “Rehabilitation of Power Distribution Facilities in Major Cities of Tanzania” in 2002 and formulated the master plan for upgrading the power transmission and distribution system in the city. However, the plan had not been updated since then, and has not responded to the increasing power demand in Dar es Salaam.</p>								
Objectives of the Project	<p>Through reviewing PSMP 2012 and formulating PSMP for Dar es Salaam, the project aimed to contribute to smooth implementations of power development projects for stable power supply in Tanzania.</p> <p>Expected goals through the proposed plan¹: Through the implementation of projects planned in the updated PSMP, power supply in Tanzania will be stabilized, and financial status of TANESCO will be improved.</p>								
Activities of the Project	<ol style="list-style-type: none"> 1. Project Site: whole of Tanzania and Dar es Salaam area 2. Main Activities: <ol style="list-style-type: none"> (1) Main activities for reviewing PSMP 2012; 1) basic data collection and analysis, 2) power demand forecast, 3) power development plan, 4) power system analysis, 5) environmental social consideration survey, and 6) update of PSMP 2012. (2) Main activities for formulating PSMP for Dar es Salaam; 1) basic data collection and analysis, 2) power demand forecast, 3) power system analysis, 4) environmental social consideration survey, and 6) formulation of PSMP for Dar es Salaam. 3. Inputs (to carry out above activities) <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">Japanese Side</td> <td style="width: 50%;">Tanzanian Side</td> </tr> <tr> <td>(1) Mission members: 10 persons</td> <td>(1) Staff allocated: 33 persons</td> </tr> <tr> <td></td> <td>(2) Facilities and equipment: project office</td> </tr> </table> 			Japanese Side	Tanzanian Side	(1) Mission members: 10 persons	(1) Staff allocated: 33 persons		(2) Facilities and equipment: project office
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	(2) Facilities and equipment: project office								
Project Period	May 2014 - March 2016	Project Cost	Ex-ante: 309 million yen, Actual: 417 million yen						
Implementing Agency	Ministry of Energy and Miner (MEM) (the current Ministry of Energy (MOE) restructured in October 2017), Tanzania Electricity Supply Company (TANESCO)								
Cooperation Agency in Japan	Yachiyo Engineering Co., Ltd.								

II. Result of the Evaluation

<Special Perspectives Considered in the Ex-Post Evaluation>

- In this ex-post evaluation, JICA made an evaluation judgment by analyzing information acquired by sending and collecting questionnaires, and through telephone and e-mail interviews with persons concerned. No field survey was conducted due to the incidence of COVID 19.

1 Relevance

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

The “National Energy Policy” was formulated in 2003. In order to implement the policy, PMSP was prepared in 2008 and updated in 2012. In line with PMSP 2012, the government of Tanzania announced the “Electricity Supply Industry Reform Strategy and Roadmap 2014-2025” in 2014. It specified various measures to improve the power supply in the country including the increase of generation capacity and electricity connection ratio, and others. Therefore, the project was consistent with the development policy of Tanzania at the time of ex-ante evaluation.

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

Despite its updating in 2012, PSMP was not necessarily adequate as a master plan in terms of power demand forecast, power supply development planning, power system analysis, and system planning due to insufficient data-based analysis and unsophisticated analytical methods applied. Besides, the master plan for Dar es Salaam was formulated in 2002 and has not been updated. Updating of master plans for power system including expansion, rehabilitation, and new plans that reflected the increasing power demand was indispensable. Therefore, the project was consistent with the development needs of Tanzania at the time of ex-ante evaluation.

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

In the Japan’s “Country Assistance Policy for the United Republic of Tanzania” (June 2012), the infrastructure development in the areas including electricity and energy sustaining economic growth and poverty reduction was raised as one of the three priority areas. Special focus was given on the assistance considering environment conservation such as the reduction of greenhouse gas emissions and sustainable

¹ The degree of achievement of expected goals is not to be assessed in principle at the time of ex-post evaluation, since it is defined as the medium-to-long-term goals which will be attained as a result of crystallizing the proposed plan (“output” of the project).

use of resources. Therefore, the project was consistent with the Japan's ODA policy for Tanzania at the time of ex-ante evaluation.

<Evaluation Result>

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

2 Effectiveness/Impact

<Status of Achievement for the Objectives at the time of Project Completion>

The objectives of the project were achieved by the time of project completion by reviewing and updating PSMP 2012 and formulating PSMP for Dar es Salaam.

<Utilization Status of the Proposed Plan at the time of Ex-post Evaluation>

The proposed plan by the project have been utilized. The updated PSMP 2012 (hereinafter PSMP 2016) and the PSMP for Dar es Salaam formulated by the project have been utilized after the completion of the project (Indicator 1). More than 80% of the feasibility studies for power development projects and a certain number of power system development projects planned in the PSMP 2016 have been conducted by TANESCO by the time of ex-post evaluation (Indicator 2). Moreover, power system development projects in the country and Dar es Salaam have been implemented based on the PSMPs.

<Status of Achievement for Expected Goals through the Proposed Plan at the time of Ex-post Evaluation>

The expected goal through the proposed plan prepared by the project has been partially achieved. Out of 131 projects planned in the PSMPs to be operated by 2020, 47 projects (36%) have been completed and operating at the time of ex-post evaluation. The financial status of TANESCO has improved as stated below in '4. Sustainability'.

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

The project was classified as Category B according to the JICA's "Guidelines for Environmental and Social Considerations" (April 2010). No pilot project was implemented in the project. According to the interview survey of MOE, neither negative impact such as noise, dust, vibration, cutting tree nor land acquisition and resettlement associated with the construction works of the projects planned in PSMPs has been reported. As for a positive impact, due to the power system development including the projects planned in PSMPs, the total amount of power produced in the main grid in the country increased from 1,375.74 MW in 2012 to 1,601.84 MW in 2019, which was the growth of about 16 percent. No negative impact on natural, social and economic environment has been observed.

<Evaluation Result>

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

Status of Achievement of Outputs, Utilization Status of the Proposed Plan, and Expected Goals through the Proposed Plan

Aim	Indicators	Results
Utilization Status of the Proposed Plan: Updated PSMP is approved by MEM, and the feasibility studies for technical, economic, financial, and environmental aspects of the power development and power system development projects planned in the updated PSMP are conducted by TANESCO and other related agencies.	Indicator 1: Updated PSMP 2012 is approved by the government of Tanzania and published.	(Ex-post Evaluation) Achieved PSMP 2012 was reviewed and updated by the project and approved by MEM (current MOE) in 2016 and published on the website of MEM in 2017. In addition, PSMP for Dar es Salaam was also formulated by the project and approved and published by MEM in the same years.
	Indicator 2: Feasibility studies for the power development and power system development projects planned in the updated PSMP are started.	(Ex-post Evaluation) Achieved Out of 36 feasibility studies for the power development projects (power plant projects) planned in PSMP 2016, 29 feasibility studies (81%) have been started by the time of ex-post evaluation. Delays were caused by prolonged financing arrangements and project consultants' procurement procedures. Discussions with development partners for project financing have been continued. As for the feasibility studies for power system development projects (sub-stations, transmission lines and distribution lines), the information about the plans of feasibility studies and their cessions and additions has been changing and the fixed data were not available. However, more than 40 power system development projects were completed, from which it can be assumed that at least the feasibility studies required for those power system projects were conducted.
Expected Goals through the Proposed Plan: Through the implementation of projects planned in the updated PSMP, power supply in Tanzania will be stabilized, and financial status of TANESCO will be improved. (not to be assessed)	Indicator: Detail studies are conducted in the feasibility studies for economic, technical, environmental and social aspects of the projects, and power development and power system development are implemented.	(Ex-post Evaluation) Partially achieved In terms of power development and power system development projects planned in PSMP 2016, 20 projects out of 93 projects (22%) that were planned to be operated by 2020 have been completed and operated. Additionally, regarding those in PSMP for Dar es Salaam, 27 projects out of 38 (71%) have been completed and operating at the time of ex-post evaluation. Although it was not stated in the indicator, the financial status of TANESCO has improved as stated below in '4. Sustainability'.

Source: MOE, TANESCO

3 Efficiency

While the project period was within the plan (the ratio against the plan was 100%), the project cost exceeded the plan (the ratio against the plan was 135%). The outputs were produced as originally planned by the end of extension period of the project. Therefore, the efficiency of the project is fair.

4 Sustainability

<Policy Aspect>

PSMP in itself is the power system development policy of the government of Tanzania, and it has been constantly updated every four years since 2008. Power system development projects in the county are ongoing at the time of ex-post evaluation based on PSMP 2016. Currently, MOE is undertaking necessary revisions on PSMP 2016 to update it to PSMP 2020. PSMP 2020 will prepare the plans for 25

years composed of the short-term (2020-2024), mid-term (2025-2034) and long-term (2035-2044) focusing on the improvement of availability and affordability of power through the introduction of new energy aiming at the expansion of access to electric power.

<Institutional/Organizational Aspect>

There has been no institutional change in TANESCO during and after the project. According to TANESCO and MOE, the total number of staff of TANESCO is over 7,000 and it's sufficient for its power system development activities.

<Technical Aspect>

The knowledge and skills learned in the project have been utilized in TANESCO for the revision of PSMP 2016, preparation and undertaking of feasibility studies, supervision and coordination of projects' implementations, discussion and negotiation for financing, and others. The revision of PSMP 2016 to update it to PSMP 2020 is conducted mainly by the staff members of TANESCO who were involved in the project and other technical staffs of the related government agencies without any foreign assistance. Technical and administrative staff members of TANESCO have been attending a variety of short-term and long-term training and study programs supported by development partners including JICA and seeking to maintain and improve their technical skills.

<Financial Aspect>

Production of electricity has increased due to executions of the projects planned in PSMP 2016 and PSMP for Dar es Salaam, thus the income from power selling has increased while the purchase of electricity from IPPs has decreased. In addition, TANESCO has implemented measures recommended in the PSMPs including the introduction of low-cost power generation such as natural gas and hydraulic power, and increase of power utility rate. Because of these, the financial status of TANESCO has been improved (see Table 1). As for financial resources for power system development, although the projects planned in PSMPs have been implemented by the budget from the government and concessional loans from JICA, the World Bank and others, significant number of projects have been delayed due to the limited funds. TANESCO keeps discussing and negotiating with various development partners including JICA and the World Bank, and seeking for other financing instruments including public-private partnership (PPP) and private finance initiative (PFI).

Table 1. Profit and loss of TANESCO

unit: million TSh*

Year	2016	2017	2018	2019
Total operating revenue	1,544,210	1,557,063	1,639,530	1,765,097
Total operating expenditure	1,893,765	1,822,360	1,752,053	1,799,325
Operating profit or loss	-349,555	-265,297	-112,523	-34,228

* TSh: Tanzanian Shilling

<Evaluation Result>

In light of the above, some problems have been observed in terms of the financial aspect of the implementing agency. Therefore, the sustainability of the effectiveness through the project is fair.

5 Summary of the Evaluation

The objectives of the project were achieved by the time of project completion by preparing PSMP 2016 and PSMP for Dar es Salaam. PSMPs have been utilized for power system development in the country, thus implementation of feasibility studies and projects planned in PSMPs have been steadily progressing although they tend to be delayed due to financial constraints. As for sustainability, although some problems have been observed in terms of the financial aspect, sustainability of other aspects are high. As for efficiency, the project cost exceeded the plan. Considering all the above points, this project is evaluated to be satisfactory.

III. Recommendations & Lessons Learned

Recommendations for Implementing Agency:

- In order to accelerate implementations of the projects planned in PSMPs, it is recommended that MOE and TANESCO accelerate discussions and negotiations with international financiers including development partners, and try to find and employ all possible financing instruments including PPP, PFI, and others.

Lessons Learned for JICA:

- Implementations of the projects planned in the master plans have been delayed mainly due to financial constraints. Funding could be a critical factor in project implementations for most developing countries. For a development planning project, adding to technical and social analysis and planning, availability analyses, strategy formulations, and scheduling for financing would be indispensable components to draft a more concrete and viable master plan. If a project incorporates a specific financing strategy in a master plan including seeking various financing instruments such as PPP and PFI and starts its initial activities with the initiative of implementing agency, it might increase the feasibility of implementation of the projects planned in the master plan.
- Currently, five years after the completion of the project, TANESCO, the counterpart agency of the project, is updating its master plan without any foreign assistance but with the experience of the project. Since a master plan is subject to be updated periodically to cope with social, technical, and economic changes in the country and overseas, an agency in charge is expected to be able to revise and update a master plan by its own effort. Therefore, with a view to update the master plan in future, it is suggested that a development planning project includes capacity development component for the implementing agency to be able to revise a master plan by itself including social, technical, economic and financial analysis and planning.
- This project included, not only the increase of electric power selling and the decrease of purchase of electricity from other electric power providers, but also the introduction of low-cost power generation and review of power utility rate in the master plan with a view to improve the financial status of the implementing agency (electric company). After this project, the financial status of the implementing agency has improved, to which the execution of the projects planned in the master plan contributed. Since the electric power generation project is a business which directly produces income, it is recommended that a development planning project to formulate a power system development master plan also focuses on the financial effects in addition to social and technical development effects.



Cable laying at the site of
Shinyanga Backbone Transmission Investment Project



Tower erection at the site of
Kenya-Tanzania Power Interconnection Project