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|-----------------------------|-------------------------------------------------------------------------------|
| Country Name                | <b>The Project for Master Plan Study on National Power System Development</b> |
| Federal Republic of Nigeria |                                                                               |

**I. Project Outline**

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|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|----------------------------------------------------|
| Background                  | In Nigeria, planned power outages constantly occurred throughout the country due to insufficient capacity in power generation, transmission, and distribution. Since the limited capacity of the power sector was considered as an impediment to the country's economic growth, a stable power supply was an urgent issue for the country. In order to promote power sector development, the government of Nigeria implemented power sector reform including privatization of power generation and distribution under the "Electric Power Sector Reform Act 2005"; however, the stable power supply in the country had not yet been realized.                                                                                                                                                                                           |              |                                                    |
| Objectives of the Project   | The project aims at formulation of a Master Plan (M/P) on national power system development for 25 years, covering power demand forecast, power generation development, power system development and investment plan, and to implement technical transfer to the staff of the Federal Ministry of Power, Works and Housing (FMPWH) and the Transmission Company of Nigeria (TCN), thereby contributing to the stable power supply in Nigeria.<br>1. Expected Goals through the proposed plan <sup>1</sup> : Priority Projects listed in the M/P are implemented smoothly.                                                                                                                                                                                                                                                               |              |                                                    |
| Activities of the Project   | 1. Project Site: Abuja<br>2. Main Activities: i) review of the power sector, ii) primary energy analysis, iii) power demand forecast, iv) preparation of power development plan, v) revision of transmission network expansion plan, vi) assessment of environment social impacts, vii) formulation of master plan on national power system development, viii) technical transfer of power demand forecast, minimum cost development planning, and power system analysis.<br>3. Inputs (to carry out above activities)<br><div style="display: flex; justify-content: space-between;"> <div> Japanese Side<br/> 1) Mission members: 15 persons<br/> 2) Trainees Received: 10 persons </div> <div> Nigerian Side<br/> 1) Staff Allocated: 10 persons<br/> 2) Facility and equipment: Office space with necessary equipment </div> </div> |              |                                                    |
| Project Period              | (ex-ante) December 2014–June 2016<br>(actual) February 2015–February 2019<br>(Extension: February 2017–February 2019)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Project Cost | (ex-ante) 200 million yen, (actual) 216million yen |
| Implementing Agency         | Federal Ministry of Power, Works and Housing (FMPWH) (Since 2019 Federal Ministry of Power (FMP))<br>Transmission Company of Nigeria (TCN)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |              |                                                    |
| Cooperation Agency in Japan | Yachiyo Engineering Co., Ltd.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |              |                                                    |

**II. Result of the Evaluation**

## &lt; Special Perspectives Considered in the Ex-Post Evaluation &gt;

- The indicator 2 on Utilization Status of the Proposed Plan at the Time of Ex-post Evaluation was set based on the recognition that the approval of the M/P by the government of Nigeria was indispensable for the implementation of the M/P at the time of ex-ante evaluation. Although the M/P was not approved by the government, it has been partly utilized by FMP and TCN. Therefore, while the ex-post evaluation assessed the achievement of Indicator 2 itself set at the time of ex-ante evaluation, it also evaluated the Effectiveness/Impact and the Utilization Status of the Proposed Plan at the Time of Ex-post Evaluation from multiple perspectives, based on the fact whether the M/P was utilized or not.
- In the project summary, the indicator for the expected goal is "progress of the priority projects in the M/P". However, the final report of the project does not clearly mention the priority projects in the M/P though the lists of the proposed projects are attached in the Annex. Therefore, the ex-post evaluation checked the progress of the proposed project in the lists, including the revised lists.

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| 1 Relevance/Coherence                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| [Relevance]<br><Consistency with the Development Policy of Nigeria at the Time of Ex-Ante Evaluation ><br>The project was consistent with the development policy such as "Seven - Point Agenda" and "Nigeria Vision20: 2020" focusing on the power sector development as one of the priorities at the time of ex-ante evaluation.<br><Consistency with the Development Needs of Nigeria at the Time of Ex-Ante Evaluation ><br>The project was consistent with the development needs of Nigeria for stable power supply through sufficient power system development at the time of ex-ante evaluation.<br><Appropriateness of Project Design/Approach><br>The project design/approach was appropriate. No problem attributed to the project design/approach was confirmed.<br><Evaluation Result><br>In light of the above, the relevance of the project is ③ <sup>2</sup> . |

<sup>1</sup> 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).

<sup>2</sup> ④ : very high, ③ : high, ② : moderately low, ① : low

[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 Nigeria at the time of ex-post evaluation. One of the priority areas of "Country Assistance Policy for Nigeria (2012)" was development of key infrastructure including electric power facilities which contributes to the power system expansion and the stable power supply in Nigeria.

<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 cooperation/coordination with other partners 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

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

The objectives of the project were mostly achieved as planned by the project completion. By the time of project completion, the "power system development plan for 2014-2038" (Output 1) and "Manual for planning and revising the M/P" (Output 2) were prepared by the project. Capacity development in the power demand forecast, the evaluation of least cost power generation and a review of the M/P for FMP and TCN staff (Output 3) was conducted.

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

The M/P has been partially utilized by the time of ex-post evaluation. The revision of the M/P by FMP and TCN was scheduled to be implemented 5 years after project completion and the project was completed in 2019. Therefore, it is not verified that the M/P has been reviewed (Indicator 1). In addition, although the other evaluation indicator is to confirm whether the M/P has been approved as a national long-term plan or not, the approval process for the M/P has been delayed due to the impact of COVID-19 pandemic which began in 2020 and the process is still underway; therefore, the M/P has not been approved by the government. However, at the time of ex-post evaluation it was confirmed that the M/P has been utilized as a tool for policy formulation by FMP and transmission network planning by TCN, respectively, it is judged that the M/P has been partially utilized based on a multi-faceted perspective of the overall utilization status of the proposed plan (Indicator 2).

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

The expected goal through the proposed plan has been partially achieved at the time of ex-post evaluation. At the time of ex-post evaluation, TCN has been implementing part of the projects identified in the M/P partly through financial supports from development partners, such as the French Development Agency (Agence Française de Développement: AFD), African Development Bank (AfDB) and the World Bank (WB). Reinforcement of High Voltage Ring Around Abuja Projects (Lot1-6) funded by AFD are currently in progress and is expected to be completed by December 2022. All 26 transmission expansion projects funded by AfDB are in the phase of preparation. Among 15 projects funded by WB, 1 project was completed, 11 projects are currently in progress and 3 projects are in the phase of preparation.

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

No negative impact has been confirmed as of ex-post evaluation.

<Evaluation Result>

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

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

| Aim                                                                                                                                                            | Indicators                                                                                                                                                         | Results                                                                                                                                                                                                                                                                                         | Source      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| (Utilization Status of the Proposed Plan)<br>1) The staff of FMP and TCN are able to regularly and efficiently revise the master plan prepared by the project. | Indicator 1<br>The master plan prepared by the project is revised by FMP and TCN.                                                                                  | Status of Utilization: Not verified (Ex-post Evaluation)<br>The review has to be carried out after 5 years, however the project was completed in 2019, therefore it has been yet the time to conduct the review of the national master plan.                                                    | FMP         |
| 2) The master plan prepared by the project is approved by the government of Nigeria as a national long-term plan.                                              | Indicator 2<br>The master plan prepared by the project is approved by the government of Nigeria as a national development plan.                                    | Status of Utilization: Not approved (Ex-post Evaluation)<br>The approval of the M/P by the government of Nigeria was delayed due to the impact of the COVID-19 pandemic and is still ongoing. However, some of the project plans identified in the M/P are still being utilized by FMP and TCN. | FMP         |
| (Expected Goals through the Proposed Plan)<br>Implementation of the priority projects in the M/P                                                               | Indicator 1<br>Progress of the priority projects for development of power generation and transmission facilities based on the master plan prepared by the project. | Status of Achievement: Partially achieved (Ex-post Evaluation)<br>TCN has been implementing part of the projects identified in the M/P through financial supports from development partners, such as AFD, AfDB and WB.                                                                          | FMP and TCN |

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| 3 Efficiency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <p>The project cost slightly exceeded the plan (the ratio against the plan:108%) and the project period considerably exceeded the plan (the ratio against the plan:267%) At the time of project implementation, the Nigerian electricity sector was in the middle of a transition process. Therefore, it was necessary to coordinate with a wide range of relevant organizations in order to formulate a formal development plan, which required the extension of the planned period. Outputs were produced as planned.</p> <p>In the light above, the efficiency of the project is ②.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 4 Sustainability                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <p>&lt;Policy Aspect&gt;</p> <p>As mentioned above, for the utilization of the M/P prepared by the project and the implementation of the power system development plan, FMP has made efforts to get the official approval of the M/P at the highest level of the Government Council, but the steps necessary for adopting the plan were disrupted due to the effects of COVID-19 and unfortunately not much progress has been recorded since the COVID-19 pandemic; besides the process to approve the power system development plan is underway. Even though, the M/P has been a tool for policy formulation by FMP in terms of power system planning.</p> <p>&lt; Institutional/Organizational Aspect&gt;</p> <p>There has been no change in the institutional structure for the power system development in Nigeria. FMP has been responsible for policy formulation and has 12 staff members who are responsible for the M/P. TCN is a structured organization with two units for implementation of planned projects for power system development in Nigeria. The Project Implementation Unit (PIU) has responsibility for implementation of donor funded projects and the Engineering Department has responsibility for implementing projects funded by the Internally Generated Revenue (IGR) and other sources. TCN has sufficient number of the staff (80-100 staff members) in the relevant departments who are responsible for implementation of the projects proposed by the M/P. As a mechanism for coordination there is periodic meeting between the ministry and agencies of the ministry with the Independent Power Producers (IPPs) in order to align their projects as parts of sectorial planning and achievement.</p> <p>&lt;Technical Aspect&gt;</p> <p>At the time of ex-post evaluation FMP and TCN answered that they sustain their capacities gained from the project through various training and capacity building including JICA's Knowledge Co-Creation Program (KCCP). FMP has delivered manpower trainings across various fields to their staff on a periodic basis. Also, TCN has conducted trainings and capacity building activities for their staff, including project management, risk analysis, energy economics, procurement process, Environmental Impact Assessment and feasibility Management, Security and cyber threat in project management, health and safety, electricity marketing and energy mix and application of alternative energy and renewable energy sources. These trainings have been conducted annually and the number of participants is at least 50 officials per year. In addition, some of the trained staff of TCN under this project get to be able to independently carry out the load forecasting study and analyze the load demand.</p> <p>&lt;Financial Aspect&gt;</p> <p>Although the details of financial information about the projects listed in the M/P were not obtained from implementing agencies, TCN answered that they have secured financing especially from donors such as AFD, AfDB &amp; World Bank for network expansion and improvement project identified in the M/P. Although there has been no sufficient allocation by the government of Nigeria to fully meet the necessary budget, there has always been some funding through the electricity tariff revenues and appropriation to implement some projects.</p> <p>&lt;Environmental and Social Aspect&gt;</p> <p>At the time of ex-post evaluation, no issues on environmental and social aspect through the utilization of the M/P was observed and it has not been necessary to take any countermeasures. FMP has periodically held regular stakeholders' meetings and conduct sensitization of the people in the project impacted areas. There is also a well-established Health, Safety and Environment (HSE) policy in place for every project.</p> <p>&lt;Evaluation Result&gt;</p> <p>In light of the above, slight problems have been observed in terms of the policy and financial aspects. Therefore, the sustainability of the project effects is ③.</p> |
| 5 Summary of the Evaluation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <p>The project prepared the M/P which has been a basis for Transmission Network Development Plan. The M/P has been utilized for the expansion and improvement of the power system. As for efficiency, the project cost slightly exceeded the plan and the project period considerably exceeded the plan. Considering all of the above points, this project is evaluated to be partially satisfactory.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

### III. Recommendations & Lessons Learned

#### Recommendations for Implementing Agency:

- It is recommended for FMP and TCN to continue high-level dialogue that will lead to the adoption of the M/P prepared by the project at the highest level of government and also secure a means of acquiring funds necessary for projects by exploring Public – Private Partnerships and private initiatives.
- It is recommended for FMP and TCN to identify priority projects and accordingly develop an action plan for implementation; in addition, FMP and TCN need to establish a mechanism to track the financial status of projects which makes it possible to see funding needs of each project.
- It is recommended for FMP and TCN to continuously conduct capacity building to keep accumulated knowledge in both organization because some of the staff members trained under the project have left the organization, retired, or transferred to other departments.

#### Lessons Learned for JICA:

- Even though it was confirmed that the implementing agencies partially utilized the proposed plan at the time of the ex-post evaluation, it could be difficult to properly evaluate the degree of the utilization status of the proposed plan in the case that the approval or revision of the M/P is set only as an evaluation indicator. Therefore, when JICA sets an indicator for the utilization status of the proposed plan at the time of ex-ante evaluation in technical cooperation for development planning project, it is necessary to set the indicator which can properly and directly evaluate the actual status of utilization of the proposed plan. For example, it could be possible to conduct more specific and verifiable evaluations by setting indicators based on multifaceted perspectives, such as the status of the proposed

plan being incorporated into the government's policies and plans, the status of stakeholder perceptions about the proposed plan, or the satisfaction of the stakeholders with the proposed plan.

- Sustainability of the M/P prepared by JICA's Technical Cooperation for Development Planning Project mainly achieved through capacity building and allocation of necessary budget for the implementation of the plan.
- Although the project aimed at formulation of a M/P on national power system development for 25 years, covering power demand forecast, power generation development, power system development and investment plan, the final report of the project does not clearly mention the priority projects in the M/P, but the lists of the proposed projects attached in the Annex. In order to facilitate use of the M/P developed by the project, it is essential to identify feasible priority projects with concrete financial resources, priorities them and describe the rational and characteristics of them through discussions among the stakeholders including the implementing agencies, the responsible ministries and the development partners during the project implementation.