

Country Name	<b>The Project for Power Development Master Plan</b>
Republic of Angola	

**I. Project Outline**

Background	<p>The economy of Angola had grown steadily since the end of the civil war in 2002, and the power sector infrastructures destroyed by the civil war had been recovered. However, the progress of recovering was slow due to low electric utility rate, large transmission and distribution loss, low fee collection rate, and others. The Ministry of Energy and Water Affairs (MINEA), the policymaking agency of the power sector, was responsible for preparing the national power development plan in line with the government's long-term development policy of "Vision 2025." However, MINEA had no experience of formulating a comprehensive power development master plan, which took account of long-term marginal cost for long-lasting power facility formulation based on highly accurate demand forecast. For stable power supply in Angola, it was needed to develop power supply and grid systems in line with a power development master plan based on statistical data and scientific analysis. Formulation of such a master plan was an urgent issue.</p>										
Objectives of the Project	<p>The project aimed to formulate a power development master plan for generation and transmission networks in the country, thereby contributing to the smooth implementation of power system development to enable a stable power supply in Angola.</p> <p>1. Expected Goals through the proposed plan<sup>1</sup>: Power generation and system development will be implemented according to the master plan, and power supply in Angola will be improved.</p>										
Activities of the Project	<p>1. Project Site: Luanda</p> <p>2. Main Activities: 1) power sector review on current situation, 2) power demand forecast, 3) primary energy source analysis, 4) power generation development planning, 5) power transmission development planning, 6) review on the private investment environment, 7) long-term investment planning, 8) economic and financial analysis, 9) environmental and social considerations, 10) drafting the power development master plan, 11) capacity development of stakeholders.</p> <p>3. Inputs (to carry out above activities)</p> <table border="0"> <tr> <td>Japanese Side</td> <td>Angolan Side</td> </tr> <tr> <td>1) Mission members: 7 persons</td> <td>1) Staff allocated: 10 persons</td> </tr> <tr> <td>2) Trainees received: 18 persons</td> <td>2) Land and Facilities: project office</td> </tr> <tr> <td></td> <td>3) Local cost: cost for utility of offices (electricity, water and telephone)</td> </tr> </table>			Japanese Side	Angolan Side	1) Mission members: 7 persons	1) Staff allocated: 10 persons	2) Trainees received: 18 persons	2) Land and Facilities: project office		3) Local cost: cost for utility of offices (electricity, water and telephone)
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Project Period	(ex-ante) April 2017 - July 2018 (actual) June 2017 - January 2019	Project Cost	(ex-ante) 270 million yen (actual) 250 million yen								
Implementing Agency	Ministry of Energy and Water Affairs (MINEA)										
Cooperation Agency in Japan	Tokyo Electric Power Services Co., Ltd. (TEPSCO), International Institute of Electric Power, Ltd. (IIEP)										

**II. Result of the Evaluation**

<b>1 Relevance/Coherence</b>
<p>[Relevance]</p> <p>&lt;Consistency with the Development Policy of Angola at the Time of Ex-Ante Evaluation&gt;</p> <p>The project was consistent with the development policy of Angola at the time of ex-ante evaluation. Formulating long-term development policies of "Vision 2025" and the "National Development Plan 2013-2017" (NDP 2013-2017), the government of Angola aimed to achieve sustainable economic growth through industrial diversification and departure from excessive dependence on oil. Under NDP 2013-2017, which placed the power sector as one of the seven important sectors, the government of Angola strived for the restructuring of power infrastructures destroyed by the civil war.</p> <p>&lt;Consistency with the Development Needs of Angola at the Time of Ex-Ante Evaluation&gt;</p> <p>The project was consistent with the development needs of Angola at the time of ex-ante evaluation. As stated above in "Background," MINEA was responsible for preparing the national power development plan for 2025 to accelerate the recovery of power sector infrastructures. MINEA had no experience of formulating a comprehensive power development master plan, which took account of long-term marginal cost for long-lasting power facility formulation based on highly accurate demand forecast. For stable power supply, it was needed to develop power supply and grid systems according to an updated power development master plan based on the statistical data and scientific analysis.</p> <p>&lt;Appropriateness of Project Design/Approach&gt;</p> <p>The project design/approach was appropriate. No problem attributed to the project design/approach was confirmed.</p> <p>&lt;Evaluation Result&gt;</p> <p>In light of the above, the relevance of the project is ③<sup>2</sup>.</p>
[Coherence]

<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 \* To be the same afterwards.).

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

The project was consistent with the Japan’s ODA policy to Angola at the time of ex-ante evaluation. High priority of the cooperation for Angola was placed on the well-balanced sustainable economic growth through development of basic infrastructures including energy sector infrastructures<sup>3</sup>.

<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. Aiming at the development of policies and systems to improve investment environment for power sector, JICA started the Power Sector Reform Support Program through co-financing with the African Development Bank (AfDB) (L/A signed in August 2015). The program was complementary with the project which aimed at formulating the medium- to long-term power sector development plan. However, any specific actions of collaboration/coordination with the program were not planned and no specific action was taken by the project.

<Cooperation with other institutions/ Coordination with international framework>

Any cooperation/coordination with other institutions or international frameworks was not clearly planned at the time of ex-ante evaluation. Although the project referred to some documents of the aforementioned program in its completion report, no tangible or explicit result of information sharing with the program could be observed in the Master Plan and the project completion report.

<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 time of project completion. The “Power Development Master Plan” (Master Plan) was formulated by the time of project completion, which consisted of 1) power sector review, 2) primary energy source analysis, 3) power demand forecast, 4) generation development plan, 5) transmission system development plan, 6) private investment environment review, 7) long-term investment plan, 8) economic and financial analysis, 9) environmental and social considerations, and 10) technology transfer and capacity development.

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

The proposed plan has been partially utilized by the time of ex-post evaluation. While the Master Plan was approved by MINEA in December 2018 (Indicator 1), the number of feasibility studies conducted is limited to 6 out of 49 studies planned (12%) (Indicator 2). The main reasons of the delay are economic recession caused by the decline of oil prices and pandemic of COVID 19.

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

The expected goals through the proposed plan have been partially achieved at the time of ex-post evaluation. The number of power generation and system development projects implemented was 27 out of 49 projects planned (55%). The reasons of the delay are the same as the causes of the delay of feasibility studies stated above. The number of projects commenced was more than the number of feasibility studies. That was because MINEA, with due consideration of various circumstances, allowed a number of projects to be implemented without conducting feasibility studies. Power supply situation (power facility capacity, electricity access rate, off-grid rate) in the country have steadily improved as shown in the Table 1 below.

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

The project was classified as Category B according to JICA’s “Guidelines for Environmental and Social Considerations” (April 2010). No involuntary resettlement and other negative impact were caused by the project. In the implementation stage of the Master Plan, there were inevitable negative natural and social impacts such as soil erosion, tree cuts, dust, noise caused by the construction works and land acquisition and resettlements. MINEA applied appropriate measures, such as tree planting, dust control, noise insulation, etc., to mitigate the magnitude of impacts complying with the related laws and regulations such as the Environmental Framework Law, the Land Law (Law No. 9/04, 09/11/2004), and others. Environmental impact assessment (EIA) was conducted according to the Environmental Impact Assessment (Decree 51/04, July 2004), Environmental Licensing (Decree 59/07, 13 July 2007), and others. For the projects resulting in involuntary resettlement, Resettlement Action Plans (RAPs) have been prepared and disclosed, and compensations have been made according to RAPs and the JICA’s “Guidelines for Environmental and Social Considerations.” According to MINEA, no particular environmental and social issues have been reported. As for positive impacts, construction works of the Master Plan projects have created job opportunities to the local population.

<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 The Master Plan will be approved by MINEA, and feasibility studies for power source development and power system development will be started by the National	Indicator 1: The Master Plan will be approved by MINEA.	Status of Utilization: Mostly utilized. (Ex-post Evaluation) The Master Plan was approved by MINEA in December 2018.	MINEA
	Indicator 2: Feasibility studies for power source development and power system	Status of Utilization: Not utilized. (Ex-post Evaluation) Out of 49 feasibility studies planned by the Master Plan, 6 studies have been conducted. The main reasons of the delay are economic recession caused by the decline of oil prices and COVID 19 pandemic.	MINEA

<sup>3</sup> Ministry of Foreign Affairs, Japan, “ODA Databook” (2016)

Electricity Transportation Company (RNT) and other organizations based on the Master Plan.	development will be started by RNT and other organizations based on the Master Plan.																														
Expected Goals through the Proposed Plan: Power generation and system development will be implemented according to the Master Plan, and stable power supply in Angola will be improved.	Indicator: Power generation and system development will be implemented according to the Master Plan, and stable power supply in Angola will be improved.	<p>Status of Achievement: Partially achieved. (Ex-post Evaluation) Out of 49 power generation and system development projects planned by the Master Plan, 27 projects have been implemented. Out of 27 projects, 14 projects were completed, and 13 projects are ongoing at the time of ex-post evaluation. The main reasons of the delay are economic recession caused by the decline of oil prices and the pandemic of COVID 19.</p> <p>Table 1: Power supply situation in the country</p> <table border="1"> <thead> <tr> <th>Year</th> <th>2016</th> <th>2017</th> <th>2018</th> <th>2019</th> <th>2020</th> <th>2021</th> </tr> </thead> <tbody> <tr> <td>Power facility capacity (MW)</td> <td>2,356</td> <td>4,068</td> <td>4,898</td> <td>5,648</td> <td>5,878</td> <td>5,880</td> </tr> <tr> <td>Electricity access rate (%)</td> <td>29.4</td> <td>30.1</td> <td>30.4</td> <td>36.8</td> <td>41.3</td> <td>41.8</td> </tr> <tr> <td>Off grid rate (%)</td> <td></td> <td>6.0</td> <td>6.4</td> <td>5.0</td> <td>1.4</td> <td>1.0</td> </tr> </tbody> </table>	Year	2016	2017	2018	2019	2020	2021	Power facility capacity (MW)	2,356	4,068	4,898	5,648	5,878	5,880	Electricity access rate (%)	29.4	30.1	30.4	36.8	41.3	41.8	Off grid rate (%)		6.0	6.4	5.0	1.4	1.0	MINEA
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### 3 Efficiency

The project cost was within the plan (the ratio against the plan: 93%). Because of combined factors, the project period exceeded the plan (the ratio against the plan: 119%). Outputs were produced as planned. In the light above, the efficiency of the project is ③.

### 4 Sustainability

#### <Policy Aspect>

The revised national development plan “NDP 2018-2022” prioritizes action programs, public investment projects, and development support activities that planned to be carried out by the year 2022. “NDP 2018-2022” consists of six axes and Axis 3 comprises the policies for transportation, logistics and distribution, electric power, water and sanitation, and communication. The policy for electric power emphasizes the increase of the electrification rate at national level, the reduction of access asymmetries throughout the country, and others.

#### <Institutional/Organizational Aspect>

An implementation unit was created to promote and facilitate implementation of the projects planned in the Master Plan. The unit was composed by MINEA, RNT, the National Electricity Distribution Company (ENDE), and the Public Electricity Production Company (PRODEL). However, the unit has not been functioning because it is not officially recognized and authorized. The Minister of MINEA acknowledges the existence of the unit and recognizes the need to authorize it by increasing the members. According to MINEA, the institutional and organizational conditions of MINEA, RNT, ENDE, and PRODEL are stable, and their turnover rates have not been too high.

#### <Technical Aspect>

After the completion of the project, MINEA has provided training for the personnel involved in the project and other related agencies on various topics including planning, engineering, operations for power development. Training has been provided with the assistance of the development partners including JICA, the United States Agency for International Development (USAID), the Southern Africa Power Pool (SAPP), and the Central Africa Power Pool (PEAC). To maintain the technical level of agencies concerned, MINEA places the top priority on the training conducted with the assistance of development partners. However, prospects of the continuity of those assistances remain uncertain.

#### <Financial Aspect>

Financial situation of power development in Angola after the completion of the project has been challenging due to economic recession caused by the decline of oil prices and the pandemic of COVID 19. To cope with the situation, MINEA and power development agencies of RNT, PRODEL, and ENDE have made every effort of them to find financiers and financial supporters interested in power development in Angola. To date, though the number of projects is limited, power development projects planned in the Master Plan have been implemented with funding from the Deutsche Bank, the Banco Santander, the Commerzbank AG, and the government of the United Kingdom. Besides, positive signals are observed that crude oil prices are rising, and social and economic turmoil caused by COVID 19 seems to be calming.

#### <Environmental and Social Aspect>

Due regard has been given to environmental and social considerations for implementing the projects planned in the Master Plan as stated above in <Other Impacts at the Time of Ex-post Evaluation>. No particular environmental and social issues have been reported by the time of ex-post evaluation.

#### <Evaluation Result>

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

### 5 Summary of the Evaluation

The project prepared the Mater Plan for comprehensive power development in Angola. After the project completion, while the Master Plan was approved by MINEA, the rate of feasibility study implementation was as low as 12% mainly due to financial constraints. As for sustainability, some problems have been observed in terms of the financial aspect. As for efficiency, the project period exceeded the plan. Considering all of the above points, this project is evaluated to be partially satisfactory.

### III. Recommendations & Lessons Learned

#### Recommendations for Implementing Agency:

- It is recommended that MINEA in collaboration with RNT, ENDE, and PRODEL activates the implementation unit to promote implementation of the projects planned in the Master Plan. It is recommended to construct a database, formulate an projects

implementation strategy and mechanism, and establish a monitoring and information sharing system for the unit. If any technical and managerial support is needed, it might be necessary to seek for an assistance of development partners.

- It is recommended that MINEA takes an initiative and make specific actions to revise the Master Plan to suit the situation after the decline of oil prices and the pandemic of COVID 19. Four years passed after the approval of the Master Plan and the unprecedented incident of pandemic of COVID 19 took place in those years and has changed the global social and economic situations. Those situations have made the Master Plan out-of-date, and the implementation of the projects planned in the Master Plan has been significantly delayed. Therefore, it is necessary to update the Master Plan to restart the systematic power development under the today's situation.

Lessons Learned for JICA:

- The project prepared the Master Plan, and it was authorized by the government. However, the implementation of the Master Plan has stagnated due to the plunge of oil prices, on which economy of Angola heavily depends, and pandemic of COVID 19 the incidence never expected by the Master Plan. A master plan is ordinarily formulated taking no account of unknown risks or risks of low probability. However, there is always a possibility of occurrence of such risks as they happened in the case of the project. Once those risks take place and social and economic situation drastically change, the master plan would be out-of-date and needed to be updated. Therefore, it is recommended to include a contingency plan in a master plan to give a signal for an urgent revision of itself. If it defines the timing of revision (e.g., the master plan should be revised when the oil prices decline over 30% for more than 6 months<sup>4</sup>) or prepares some scenarios for the revision, it would be more valid contingency plan. From a viewpoint of project evaluation, it would also be desirable because a project and its master plan would be evaluated by the out-of-date irrelevant indicators if it is not revised. In addition, it is not realistic for the implementing agency to try to get development partners' support every time when the revision is needed. And the timing of revision could be missed due to negotiations and procedures for getting the support. Therefore, assuming the contingencies at the time of project formulation, it is desirable to make institutional preparation and capacity development of the implementing agency during the project implementation period so that the implementing agency would be able to implement the contingency plan by themselves in a flexible and speedy manner.



Belem substation (440 kV) in Huambo Province started its operation in 2019



Belem substation (440 kV) in Huambo Province started its operation in 2019

<sup>4</sup> Figures of 30% and 6 months are only examples with no substantial significance.