Ex-Ante Evaluation (for Japanese ODA Loan)

Africa Division 4, Africa Department, JICA

1. Basic Information

Country: Republic of Côte d'Ivoire
Project Name: Taabo-Kossou-Bouake Power Network Reinforcement Project
Loan Agreement: May 25, 2022

2. Background and Necessity of the Project

(1) Current State and Issues of the Electric Power Sector in Côte d'Ivoire

The Republic of Côte d'Ivoire (hereinafter referred to as "the country") has presented its policy on proactively implementing high-priority projects that directly contribute to improving the lives of the people, including better access to high-quality energy, in the National Development Plan (PND 2021 to 2025 under development).

Aiming to boost rural development to reduce the country's north-south disparity that has existed since the late 1990s due to in particular the political crisis, the government has developed the Government Plan for Social Development (2019 to 2020), and focused on the electric power sector in rural areas that have poor power-generation facilities. In the Master Plan for Power Generation and Transmission in Côte d'Ivoire (MP) developed in June 2015, the country has set the goals of: (1) Increasing the capacity of power-generation facilities from 1,409 MW in 2011 to 5,691 MW by 2030; and (2) Extending the total length of the transmission lines across the country from 4,384 km in 2014 to approx. 10,160 km, and building 46 new substations by 2030 in addition to the 46 already existing ones (as of 2014). Improvements have occurred in the electric power sector based on this plan, such as steady rises in the capacity of power-generation facilities owing to private investment and other factors (2,199 MW in 2017) and the increase in the electrification (electrified area) rate to 79.6% in 2020 from 42% in 2014. However, remaining problems to solve are power loss during transmission and distribution due to insufficient transmission, transformation, and distribution facilities and the aging of the existing facilities. Loss rates between 2011 and 2014 ranged between 14.3% and 22.3%, much higher than the averages of 11.2% to 11.7% in the sub-Saharan area in the same period (World Bank, 2022). Frequent power outages (average number of power outages per house per year: 18, average power outage duration: 14.4 minutes (World Bank, 2020)) are another problem to solve, so developing transmission, transformation,

and distribution facilities is an urgent matter. Under these circumstances, the country supplies 21% of the amount of power pooled in the West African Power Pool, which is a framework where 14 member West African countries pool power. Thus, the country plays an important role as a power supplier (West African Power Pool, 2020).

A core transmission line (225 kV) has been laid through the country's central regions of Taabo, Kossou, and Bouake, the area the Project covers. This line transmits power from the southern part, where power generation facilities are concentrated, not only to the capital Yamoussoukro, and Bouake, the city with the second largest economy after Abidjan, but also to the nortern part which has no power supply and to the neighboring the Republic of Mali and Burkina Faso under the framework of the West African Power Pool. As such, it is positioned as an international interconnection line. Therefore, this area plays an important role not only in earning revenue from selling electric power, improving the lives of local people, and revitalizing local industries but also in reducing the country's north-south disparity and in promoting stable development of the entire region including the neighboring countries.

On the other hand, in the cities of Yamoussoukro and Bouake, which this core transmission line supplies with power, the peak power demand is expected to increase at an annual rate of as high as 7% every year as both the population and economy grow (2018 to 2033) (MP, 2015). With the current transmission, transformation, and distribution facilities, more frequent power outages and other problems would disrupt the lives of residents and industrial activities, which presents a challenge to tackle. In addition, it is estimated that the Republic of Mali and Burkina Faso currently depend on power supplied by the country for 15 to 25% of their demand, and these numbers are expected to rise further in the future. It has been pointed out that the dependence rate will exceed 30% in 2030 (estimate based on the Economic Community of West African States (ECOWAS) revised master plan for the development of power generation and transmission of electrical energy (December 2018), and the electric power export plan of Côte d'Ivoire Energies). Under these circumstances, this area currently supplies power to the northern region through only a single transmission line, and if an accident occurs in the transmission line, a bypass route must be used. This raises fears that the longer transmission distance may cause a significant voltage drop and a capacity shortage in the bypass route, which may limit the amount of power that can be transmitted and destabilize the entire system. Such a situation has a high

chance of triggering a major power outage, so the need to increase this transmission line's capacity and reliability is urgent.

The objective of the Taabo-Kossou-Bouake Power Network Reinforcement Project (hereinafter referred to as "the Project") is to increase the power supply to the country's central and northern regions as well as neighboring countries, by installing two additional transmission lines, extending the existing substations in Taabo, Kossou, and Bouake, and constructing new substations and distribution networks in the capital Yamoussoukro and Bouake. Thereby contributing to the stability of the power supply, improving the living environment of local residents and revitalizing industrial activity. This is positioned as a high-priority project in the country's MP.

(2) Japan's and JICA's Cooperation Policy and Operations in the Electric Power Sector

The JICA Country Analysis Paper for the Republic of Côte d'Ivoire (March 2016) analyzes the problems the country faces in improving the electrification rate in rural areas and meeting the escalating demand for power. The Japan's Country Assistance Policy for the Republic of Côte d'Ivoire (March 2018) also states that energy and other infrastructure that underlie economic activity should be developed to promote sustainable economic growth. Thus, the Project is consistent with the analysis and policies.

In the West Africa region, which includes Côte d'Ivoire, the Project on the Corridor Development for West Africa Growth Ring Master Plan (2015 to 2018, a technical cooperation for development planning), has been implemented. That project proposed enhancing the power networks in the region with the aim of improving connectivity between the southern coastal region, where industrial development is being vigorously promoted, and the northern inland region. The Project is consistent with the proposal in the MP developed for this technical cooperation project. In addition, the 7th Tokyo International Conference on African Development (TICAD7, 2019) cemented the policy of promoting investment in quality infrastructure, primarily in three important areas for which MPs, including the one mentioned above, have been completed. In the run-up to TICAD8 (August 2022), JICA has made it a pillar of its cooperation policies to promote infrastructure development for regional economic integration through promoting corridor development, enhancing connectivity, and developing resilient city environments and infrastructure. In addition, JICA has set up as one of the

purposes of its Business Strategy in the field of energy and mining, building societies where all people in developing countries have sustainable and affordable access to low-carbon, adequate and stable electricity, and has a policy of concentrating its efforts on boosting transmission and distribution networks. The Project helps to achieve this strategic goal. Japanese companies are also showing strong interest in developing electric power facilities in this region.

(3) Other Donors' Activities

The World Bank has been working to improve major transmission facilities in the country. It is now providing loans to support the renovation and development of distribution networks in Abidjan and other major cities, as well as electrification in rural areas (in the southwestern part). Similarly, the African Development Bank is supporting transmission-lines development between San Pedro and Soubre, and electrification in rural areas (in the western part) in the form of loans. The French Development Agency (Agence Francaise de Developpement) is supporting electrification in rural areas (in the southern and central parts) through a combination of grants and loans. China is also providing loans to build hydropower plant, and donating funds to construct and renovate power lines and transformer substations in the country's southwestern and northeastern regions. By upgrading the country's core transmission line, substations, and distribution networks in the capital Yamoussoukro and the economic city Bouake through the Project, all of these support projects can help improve access to power and a stable power supply throughout the entire country.

3. Project Description

(1) Project Objective

The objective of the Project is to increase power supply to the central and northern parts of the country as well as to neighboring Mali and Burkina Faso by installing and extending transmission lines, substations and distribution networks between Taabo, Kossou, Bouake, which are located in central Côte d'Ivoire. Thereby contributing to the stability of the power supply, improving the living environment of local residents and revitalizing industrial activity.

(2) Project Site/Target Area

Lacs District, Yamoussoukro Autonomous Region, and Bandama District (population: approx. 3.06 million)

(3) Project Components

1) Civil engineering works
2) Installation of new transmission lines that run through Taabo, Kossou, and Bouake (2 lines) (225-kV overhead transmission lines, approx. 270 km in total)
3) Extension/construction of substations: extension of three existing substations (Taabo, Kossou, and Bouake 2, 225 kV/90 kV), and construction of two new substations (Yamoussoukro 2 and Bouake 3, 225 kV/33 kV/15 kV)
4) Development of distribution networks (that come out of two new substations (Yamoussoukro 2 and Bouake 3) (30 kV and 15 kV))
5) Consulting services (general design, tender assistance, construction supervision, etc.)

(4) Estimated Project Cost (Loan Amount)

27.404 billion Yen (of which 22.028 billion yen is covered by the ODA loan)

(5) Schedule

May 2022 to March 2028 (total of 71 months). The project will be completed when the facilities enter service (February 2027).

(6) Project Implementation Structure

1) Borrower: The Government of the Republic of Côte d'Ivoire
2) Guarantor: N/A
3) Executing Agency: Côte d'Ivoire Energies (hereinafter referred to as "CI Energies")
4) Operation and Maintenance Agency: Compagnie Ivoirienne d'Electricité

(7) Cooperation and Sharing of Roles with Other Donors

1) Japan's Assistance Activities: N/A
2) Assistance Activities of Other Donors: In other parts of the country, projects for enhancing transmission, distribution, and transformation facilities, electrifying rural areas, and constructing power generation stations are underway with support from the World Bank, the African Development Bank, the French Development Agency (Agence Francaise de Developpement), and other donors. Those projects and the Project are expected to work

together to produce synergistic effects in electrifying the country.

(8) Environmental and Social Considerations/Cross-Cutting Issues/Category of Gender

1) Environment and Social Considerations

(i) Category: B

(ii) Reason for categorization:

The Project does not have a significant adverse impact on the environment because it is not a large-scale project in the transmission, transformation, and distribution sector, as described in the JICA Guidelines for Environmental and Social Considerations (effective as of April 2010). The Project is also not associated with any influential characteristics or sensitive areas as described in the JICA Guidelines.

(iii) Environmental permit:

An environmental and social impact assessment (ESIA) report for the Project was approved by the National Environmental Agency (ANDE) of Côte d'Ivoire in August 2020, and an environmental permit has been issued by the agency.

(iv) Anti-pollution measures:

To control air pollution during construction works, measures will include water sprinkling, setting speed limits for work vehicles, etc. To control water and soil pollution and waste during the construction works and after the facilities enter service, measures will be taken to prevent oil leaks from equipment and materials, backfilling with surplus soil, and others based on an environmental management plan. Consequently, the impacts of this Project will be minimal.

(v) Natural environment:

Since the project site is not a sensitive area such as a national park, nor near any, the Project is has minimal adverse impacts on the natural environment.

(vi) Social environment:

The upgrade of the existing substations, which will take place on the premises of the existing facilities, does not involve any land acquisition. Furthermore, the construction of new substations and other facilities will not involve any relocation of residents because land acquisition has already been completed by CI Energies. Installing additional transmission

lines will involve acquiring approx. 15 ha of land and compulsory relocation of six residents. This will take place according to the country's domestic procedures together with an Abbreviated Resettlement Action Plan developed based on the JICA Guidelines for Environmental and Social Considerations. As a result of consulting with residents, there were no dissenting opinions in particular from affected residents about this Project.

(vii) Other/monitoring:

During the construction works and after the facilities enter service, CI Energies and the construction companies will monitor air quality, water quality, waste, soil pollution, noise, vibrations, etc. based on an environmental management plan, and a steering committee organized by CI Energies will monitor land acquisition and resident relocation.

2) Cross-Cutting Issues:

This Project helps to reduce greenhouse gas (GHG) emissions by using low-loss electric wires. The mitigation effect of climate change through the Project (approximation of GHG emission reduction) is approx. 20,469 tons (of CO_2 equivalent) per year.

3) Category of Gender:

N/A ■ GI (gender mainstreaming needs assessment and analysis project)

Description of Activities and Reason for Categorization: In this Project, gender-mainstreaming needs were assessed and examined, but specific efforts that contribute to gender equality or empowerment of women were not included. On the other hand, an agreement has been reached with the executing agency about creating projects from the viewpoint of promoting equality between men and women (e.g.: ensuring equal pay for equal work for men and women) in the construction industry or from other perspectives related to gender.

(9) Other Important Issues

This Project will use low-loss electric wires, which have a track record of long-term, stable operation by Japanese companies.

4. Targeted Outcomes

(1) Quantitative Effects

Performance Indicators (Operation and Effect Indicators)

Indicator	Facility	Baseline (Actual value in 2020)	Target (2029) [Two years after project completion]
Electricity Supply (GWh)	Yamoussoukro 2 substation	-	113
	Bouake 3 substation	-	123
	Electricity Supply from from Bouake 3 substation to Ferkessedougou (225 kV)	-	1,976
Number of power outages at substations (Number per year) (*)	Yamoussoukro 2 substation	-	0
	Bouake 3 substation	-	0

* Number of power outages lasting 10 min. or longer due to a transmission line failure

(2) Qualitative Effects: Improved living environments of residents in the central and northern parts of the country, and revitalized industrial activity

(3) Internal Rate of Return

Based on the premises below, the economic internal rate of return (EIRR) of this Project is 36.5%. The financial internal rate of return (FIRR) has not been calculated because it is difficult to calculate financial revenue properly*.

* This is because it is difficult to accurately calculate the increase in revenue from selling electric power that is attributed solely to this Project.

[EIRR]

Costs: Project costs, costs for purchasing electric power from power-generation companies, and operation and maintenance costs (all exclusive of tax)

Benefits: Differences in costs between implementing and not implementing this Project

Project Life: 30 years

5. External Factors and Risk Control

(1) Preconditions: N/A

(2) External Factors: N/A

6. Lessons Learned from Past Projects

In the ex-post evaluation of the Cairo-Alexandria Transmission System Project (evaluated in FY2014), an ODA loan for the Arab Republic of Egypt, it has been reported that an increase in the number of people entitled to compensation for relocation during the project's implementation phase caused prolonged negotiations and it became necessary to reroute the transmission lines. This delayed the schedule. Since the Project will also involve relocating residents, the implementation schedule was developed assuming that negotiations on compensation will take some time. Once the Project begins, its progress will be monitored through interviews, receipt of reports, and other measures to ensure that the executing agency is running the Project smoothly.

7. Evaluation Results

The Project is consistent with the Côte d'Ivoire's development issues and policies as well as Japan's and JICA's cooperation policies and analyses. It will contribute to stabilizing the power supply to the country's central and northern regions and to neighboring countries through installing/building transmission lines, substations, and distribution networks, and will help to mitigate climate change (secondary objective). The Project contributes also to Goal 7 of the SDGs "Ensure access to affordable, reliable, sustainable and modern energy for all" and Goal 13 "Take urgent action to combat climate change and its impacts." Therefore, supporting the Project is crucial.

8. Plan for Future Evaluation

(1) Indicators to be used

As indicated in Section 4.

(2) Timing

An ex-post evaluation will be taken place two years after this Project is complete.

End