

Japanese ODA Loan

Ex-Ante Evaluation(for Japanese ODA Loan) Middle East Division II, Middle East and Europe Department Japan International Cooperation Agency

1. Name of the Project

Country: The Republic of Iraq (hereinafter referred to as "Iraq")

Project: Basrah Refinery Upgrading Project (IV)

Loan Agreement: December 28, 2022

2. Background and Necessity of the Project

(1) Current State and Issues of the Oil Sector and the Priority of the Project in Iraq

The oil sector is the largest industry, accounting for 45.7% of the GDP and 87.3% of the government revenue, and the single most important source of foreign exchange earnings in Iraq (World Bank). The country has proven crude oil reserves of 145 billion barrels, making it fourth in the world. Its crude oil production reached 3.97 million barrels per day (BPD) (OPEC) in 2021 and is projected to further increase. Regarding Iraq's petroleum refining sector, the existing 14 refineries have suffered significantly falls in their capacity due to wartime damage and deterioration over years of service. In addition, the Baiji Refinery, a major refinery in northern Iraq, was suspended due to the activities by Islamic State in Iraq and the Levant (ISIL) since June 2014. Due to this situation, Iraq's refining capacity is limited at approximately 1,120,000 BPD (OPEC). These factors have led to huge supply-demand imbalances in the consumer petroleum product markets. For example, the domestic supply-demand gap reached 48,000 BPD in the gasoline market. In fact, despite being an oil producer, Iraq has been forced to import petroleum products, which costs the country 3.7 billion dollars per year. Given the massive reconstruction needs, it is essential to invest in the petroleum refining sector not only to reduce the import of petroleum products to stop foreign exchange outflow but also to increase the production and export of petroleum products to raise foreign exchange earnings in the future. Nevertheless, financial difficulties due to the recent drop in oil prices as well as political instability and security risks have made it difficult to secure sufficient funding, and many plans to construct new refineries or rehabilitate old ones have been suspended.

While the National Development Plan 2018-2022 published by the Iraqi government did mention diversification for an economy dependent on the oil sector, the oil sector is expected to continue to contribute to the GDP and the government revenue. Furthermore, the White Paper for Economic Reform published in October 2020 clearly indicated a focus on the oil sector for accelerating economic growth. The Basrah Refinery Upgrading Project (this Project) aims to construct a new fluid catalytic cracking¹ (FCC) complex, the first of its kind in Iraq, and other relevant units within the Basrah Refinery, an existing large refinery representative of Iraq. It will not only help improve the efficiency of the existing refinery, but will also contribute to reducing the domestic supply-demand gap and inhibit the foreign exchange outflow by increasing the production of gasoline and other petroleum products.

The Iraqi government is also strengthening its environmental regulations. The Light Gas Oil Hydrotreating Unit² (LGOHDT) installed in this Project can be used to produce high-quality petroleum products in line with international environmental regulations which have low sulfur content, a cause of air pollution. This will help reduce the environmental load as well as transfer related technology. The Iraqi government is implementing initiatives for climate change such as joining the Paris Agreement in November 2021, and creating nationally determined contributions (NDC) that include cutting greenhouse gas emissions by 1 to 2% from 2021 to 2030. The installation of the LGOHDT will promote improving the fuel efficiency of automobile fuel (gas oil) and is therefore in line with these policies.

(2) Japan's and JICA's Policy Cooperation Policy and Operations in the Oil Sector in Iraq

Japan's Country Development Cooperation Policy for the Republic of Iraq (July 2017) identifies the "development and diversification of industries for economic growth" as a priority area and cites the "crude oil, gas and petroleum products sector development" as a development challenge. This Project conforms with these policies. In addition, this Project is expected to contribute to the Sustainable Development Goals 7 (ensure access to affordable, reliable, sustainable and modern energy for all) and 9 (build resilient infrastructure,

¹ Used to produce high-octane gasoline through catalytic thermal cracking of the desulfurized gas oil

² Used to produce low-sulfur diesel fuel through catalytic reaction between gas oil and hydrogen

promote inclusive and sustainable industrialization and foster innovation). Therefore, this Project is consistent with the development issues and policies of Iraq as well as the cooperation policies of Japan and JICA.

(3) Other Donors' Activities

This sector has received no assistance from other donors.

3. Project Description

(1) Project Objective

This Project aims to improve the quality and productivity of petroleum products, reduce the supply-demand gap, decrease the environmental load, and transfer related technologies, by installing a new fluid catalytic cracking (FCC) Complex with relevant units at Basrah Refinery in Basrah Governorate in the southern part of Iraq, thereby contributing to economic and social reconstruction in Iraq.

(2) Project Site / Target Area

Basrah City in the Governorate of Basrah

(3) Project Components

- 1) Construction of FCC Complex (detailed design, procurement of facilities and equipment (processing units, utility facilities, etc.), construction works, test running, transfer of technologies, etc.)
- 2) Consulting Services (reviewing the detailed design, bidding assistance, construction management support, etc.)

(4) Estimated Project Cost

524,796 million Yen (Japanese ODA loan: 120,000 million Yen)

(5) Schedule

October/2012-August/2026 (167 months)

Commencement of commercial operation is considered as the completion of the Project. (Planned in September 2025)

(6) Project Implementation Structure

- 1) Borrower: The Government of the Republic of Iraq
- 2) Guarantor: None

- 3) Executing Agency: The Ministry of Oil
- 4) Operation and Maintenance System: The Ministry of Oil and South Refineries Company (SRC)

(7) Collaboration and Sharing of Roles with Other Donors

1) Japan's Activity

In this sector, JICA has so far implemented the following five ODA Loan projects with a total approved loan amount of 207 billion yen: the Crude Oil Export Facility Reconstruction Project; the Basrah Refinery Upgrading Project (E/S); the Baiji Refinery Upgrading Project (E/S); and the Basrah Refinery Upgrading Project (I) (hereinafter referred to as the "Basrah (I)"); and the Basrah Refinery Upgrading Project (II) (hereinafter referred to as the "Basrah (II)"); and the Basrah Refinery Upgrading Project (III) (hereinafter referred to as the "Basrah (III)").

This Project is the fourth project of its kind, following Basrah (I) (Loan Agreement was signed in October 2012), Basrah (II) (Loan Agreement was signed in June 2019) and Basrah (III) (Loan Agreement was signed in October 2021).

2) Other Donors' Activity

None in particular.

(8) Environmental and Social Consideration/Cross-Sectoral Issues/Gender Category

1) Environmental and Social Consideration

① Category: A

② Reason for Categorization: This Project falls under the petroleum refining sector as defined in the JBIC Guidelines for Confirmation of Environmental and Social Considerations (published in April 2002; hereinafter referred to as the "Environmental Guidelines").

③ Environmental Permit: The Preliminary Environmental Impact Assessment (Preliminary EIA) report related to this Project was approved by the Ministry of the Environment of the Republic of Iraq. The EIA report related to this Project, including the additional component, was approved by the Ministry of the Environment of the Republic of Iraq in December 2017.

④ Anti-Pollution Measures: Air pollutants emitted during construction

and after operation commences will be kept below the national and international limits (e.g. the Environmental, Health and Safety (EHS) Guidelines of the International Finance Corporation (IFC)) by installing a tail gas treatment unit and a sulfur recovery unit. Water and soil pollution caused by wastewater from the FCC complex after it is put into operation will be reduced by using double pumps and reusing the wastewater after it is treated to meet the national and international standards. Hazardous waste generated during construction and after operation commences, such as chemicals and fluorescent lights, will be properly treated at dedicated facilities or hazardous waste treatment plants. The impact of noise pollution during construction is likely to be limited because it is curbed by using noise suppressors and low-noise equipment as well as because the refinery is approximately 2.8 km away from the nearest residential areas.

⑤ Natural Environment: This Project is likely to have a minimal adverse impact on the natural environment since the project site is not located in sensitive areas or their vicinity, such as national parks.

⑥ Social Environment: This Project will not involve land acquisition or involuntary resettlement because it is located within land owned by the executing agency.

⑦ Other/Monitoring: During construction, air and water quality, waste, noise, and other environmental factors will be monitored by the EPC contractors under the supervision of the executing agency. After operation commences, air and water quality, waste, and other environmental factors will be monitored by the executing agency.

2) Cross-Sectoral Issues: None in particular

3) Gender Category: Not subject

Reason for Categorization: As a result of consultation with the Office for Gender Equality and Poverty Reduction, it has been determined that this Project is not “gender informed.”

(9) Other Important Issues

Since this Project is eligible for Special Terms for Economic Partnership (STEP), it is expected that Japan’s advanced know-how will be used for the engineering service and construction of desulfurization and FCC facilities through this Project. In addition, it is also planned that Japanese instrumentation equipment will be installed.

4. Targeted Outcomes

(1) Quantitative Effects

Outcomes (Operation and Effect Indicators)

Indicator	Baseline	Target (2027) [Expected value 2 years after project completion]
Gasoline production (BPD)	0	18,767
Gas oil production (BPD)	0	35,919
Heavy oil production (BPD)	0	40,738
Wild naphtha ³ production (BPD)	0	2,117
LPG production (tons per day)	0	4,344
Rate of operation (percent)	0	95.9

(2) Qualitative Effects

Increased productivity for petroleum products, reduced demand-supply gap, reduced environmental burdens (reduction of air pollutant emission by installment of LGOHDT), and economic and social reconstruction in Iraq

(3) Internal Rate of Return

Based on the assumptions listed below, the economic internal rate of return (EIRR) for the Project is 15.8%, and the financial internal rate of return (FIRR) is 5.6%.

【EIRR】

Cost: Project costs and operation and maintenance expenses (excluding taxes)

Benefit: Exports of petroleum products increased as a result of this Project

Project life: 35 years

【FIRR】

Cost: Project costs and operation and maintenance expenses

Benefit: Sales of petroleum products

Project life: 35 years

³ Produced as an intermediate product.

5 . External Factors and Risk Control

- (1) Preconditions: None in particular
- (2) External Factors: The security situation will not be much worse than it is now.

6 . Lessons Learned from Past Projects

Lessons learned from the ex-post evaluation for the "Mombasa Diesel Generating Power Plant Project," an ODA loan project for Kenya, and similar projects indicate that if the project facility is mutually linked to and integrally related to other existing facilities in terms of function or operation, then simply completing the project facility may not be enough to fully achieve the project effect. In this Project, it is expected that after the FCC complex is installed in and connected to the existing refinery, they will both be mutually and jointly operated. As the connection between the FCC complex and the existing refinery is outside of the scope, the PMT (Project Management Team) established within the executing agency will lay piping for supplying stock oil from the existing refinery to the FCC complex. It has been confirmed that the Iraqi side will be responsible for this, and that close contact will be maintained.

7 . Evaluation Results

This Project is consistent with the development issues and policies of Iraq as well as the cooperation policies and analysis paper of Japan and JICA. While the oil sector is considered as the most important industry of the Iraqi economy, this Project aims to increase the production of consumer petroleum products to boost foreign exchange earnings and raise the supply of gasoline to promote economic recovery and contribute to resolving political and social concerns in Iraq. In addition, this Project is expected to contribute to the Sustainable Development Goals 7 (ensure access to affordable, reliable, sustainable and modern energy for all) and 9 (build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation). Therefore, it is highly necessary for JICA to support the implementation of this Project.

8 . Plan for Future Evaluation

- (1) Indicators to be Used
As indicated in Sections 4.
- (2) Future Evaluation Schedule

Ex-post evaluation: 2 years after the project completion

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