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Indonesia-JICA Cooperation in The MRT Jakarta Phase II Project As an Implementation of SDG 11: Sustainable Cities and Communities

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Abstract: DKI Jakarta faces challenges in urban mobility and air quality, with the share of public transportation modes still far below the city's official target of 30 percent for 2030, while the transportation sector continues to dominate carbon monoxide emissions. This study analyzes the Indonesia-JICA bilateral cooperation on the Jakarta MRT Phase II and its contribution to SDG 11, specifically Targets 11.2 and 11.6, at the city level. Using a qualitative descriptive approach based on semi-structured interviews with a senior official from the Directorate General of Railways, Ministry of Transportation, triangulated with official JICA documentation and academic literature, the study finds that Phase II contributes to Target 11.2 through expanding rail access to currently underserved corridors and integrating transit-oriented development, and to Target 11.6 through STEP-mandated zero-emission electric propulsion technology and a modal shift away from private vehicles. Importantly, these contributions were embedded in the project design from the outset, rather than being applied retrospectively. The study concludes that a key advantage of bilateral Official Development Assistance (ODA) lies in its ability to embed SDG implementation within an incentive architecture that simultaneously aligns the interests of national governments, provincial governments, and private operators, offering a replicable model for local SDG implementation in rapidly urbanizing cities.

Keyword: Bilateral Cooperation, Official Development Assistance (ODA), MRT Jakarta Phase II, SDG 11

INTRODUCTION

DKI Jakarta's transportation sector remains the dominant source of the city's carbon monoxide emissions. At the same time, public transport modal share remained far below the city government's own 30 percent target for 2030 (Shiddiqi et al., 2024). These twin deficits in urban mobility access and air quality define Jakarta as a city where SDG 11's Targets 11.2 and 11.6 are not aspirational benchmarks but urgent structural obligations with a fixed 2030

deadline. This paper begins from that city-level failure, not from the bilateral relationship that seeks to address it and examines bilateral ODA as one specific implementation modality for closing the gap.

Sustainable Development Goal 11 (SDG 11) on *Sustainable Cities and Communities* is one of the 17 goals adopted by all United Nations member states in the 2030 Agenda for Sustainable Development, with the overarching ambition of making cities inclusive, safe, resilient, and sustainable by 2030 (United Nations, 2015). Two targets are particularly critical for rapidly urbanizing cities in the Global South. Target 11.2 calls for universal access to safe, affordable, and sustainable transport systems, with indicator 11.2.1 measuring the proportion of the population with convenient access to public transit. Target 11.6 mandates reduction of cities per capita environmental impact, measured by indicator 11.6.2 (PM2.5 and PM10 concentrations). Both targets directly address the accelerating urban mobility and air quality crises driven by unplanned motorization in cities lacking mass transit alternatives. SDG 11is inherently a sub-national challenge; it is cities, not nations, that plan transport networks and bear the costs of mobility failure. In Indonesia, Bappenas designates provincial governments as the primary SDG implementation frontlines, making DKI Jakarta's provincial government, not the central government that signs international commitments, the accountable unit for SDG 11 delivery.

Jakarta presents an acute case study of this challenge. With over ten million residents in the city proper and 30 million in the greater metropolitan area, the transportation sector contributes 96.36 percent of carbon monoxide emissions (28,317 tons per year) and accounts for 44 percent of total fuel consumption in Jakarta, according to data from the Ministry of Environment and Forestry (KLHK) reported by CNBC Indonesia (2023). Air pollution also imposes substantial economic costs, with annual health-related losses estimated at USD 2.94 billion, equivalent to 2.2 percent of Jakarta's Gross Regional Domestic Product (Syuhada et al., 2023). Furthermore, total GHG emissions reached 57.6 million tons CO2 in 2018, a 51.3 percent increase from 2010, while public transport modal share remains well below the 30 percent target set in the Rencana Induk Transportasi Jakarta (Shiddiqi et al., 2024). These deficits map directly onto Indicators 11.2.1 and 11.6.2, and it is against these benchmarks that this study evaluates the project's contribution.

Closing these gaps demands capital investment that exceeds Jakarta's fiscal capacity. At approximately USD 100 million per kilometer of underground rail, full-scale network expansion cannot be absorbed by domestic budgetary cycles without crowding out other priorities. Japan's ODA through JICA addresses this precisely, offering concessional financing at 0.1 percent per annum with 40 year repayment and 12-year grace periods (Ali, 2018), conditions that no commercial lender can replicate alongside mandatory technology transfer obligations under the Special Terms for Economic Partnership (STEP) mechanisms. For DKI Jakarta, this bilateral architecture simultaneously resolves both fiscal and technological constraints, allowing Jakarta to pursue its 2030 transport expansion goals more realistically.

Assessing Phase II's prospective SDG contributions requires an empirical baseline; MRT Jakarta Phase I, which has been operational since March 2019 on the 15.7 km Lebak Bulus–Bundaran HI corridor, provides empirical proof of concept. BPS Statistics DKI Jakarta Province (2025) reported in 2024, it recorded 40.82 million passengers per year with a daily average of 111,534 and an on-time performance of 99.44 percent, exceeding the target of 33.67 million by 21 percent (ANTARA News, 2024). The CDM methodology ACM0016 confirmed that 53.75 percent of users switched from private vehicles, resulting in CO2 reductions growing from 2,732.7 tons in 2019 to 6,043.9 tons in 2023 (Nurdjanah et al., 2024). The success of Phase I also revealed the limitations of the network that terminates at Bundaran HI, leaving the dense corridors in Central and North Jakarta-Thamrin, Monas, Glodok, Kota without rail access. Jakarta MRT Phase II (Phase 2A), which has now reached 59.7 percent completion

(ANTARA News, 2026), extends the North-South Line by 5.8 km through seven new underground stations to Kota, with a target of being fully operational by 2030 in line with the SDG deadline.

Although previous studies have examined Indonesia-JICA cooperation in MRT Jakarta, none has systematically integrated the bilateral cooperation mechanism, the ODA-STEP institutional architecture, and quantifiable SDG 11 contributions at the sub-national level within a unified framework. This study addressed that the gap by examining: *How does Indonesia-JICA bilateral cooperation in MRT Jakarta Phase II contribute to the achievement of SDG 11, particularly Targets 11.2 and 11.6, at the city level?* The analysis draws on Complex Interdependence (Keohane and Nye, 1977), treating bilateral ODA as a structural SDG implementation vehicle in line with the OECD definition of development assistance. This perspective is supported by Kuik and Rosli (2023), who argue that bilateral mechanisms generate more tailored capital, technology, and capacity transfer multilateral alternatives.

METHOD

To examine the institutional dynamics and governance architecture underlying Indonesia-JICA bilateral cooperation, this study adopts a qualitative descriptive approach, a method well-suited to unpacking process-level phenomena that resist quantification. Primary data were generated through a semi-structure in-depth interview with Agustinus Danaukajar Suryanto, Head of the Planning Team (Ketua Tim Rencana), Directorate General of Railways, Ministry of Transportation of the Republic Indonesia. Suryanto was selected for his direct, sustained involvement across MRT Jakarta Phase I and II, spanning foreign financing arrangements with JICA, FIDIC contract negotiations, and inter-agency monitoring mechanisms. These were complemented by secondary sources including official JICA and government documentation, BPS statistics, DJKA project monitoring reports, peer-reviewed environmental impact studies, and academic literature on bilateral cooperation, ODA, and SDG 11.

Data analysis followed the Miles and Huberman (1994) interactive model, comprising three sequential stages: (1) data reduction through thematic coding of the interview transcript, identifying recurring themes around institutional architecture, financing mechanisms, SDG alignment, monitoring challenges, and technology transfer; (2) data display in the form of narrative analysis and structured tables; and (3) conclusion drawing through source triangulation across primary interview data, official JICA and government documents, and academic sources. This triangulation is particularly important given the methodological limitation of having a single primary informant from the Indonesian government side without direct data from JICA's institutional perspective, a constraint acknowledged here and addressed through extensive secondary source verification.

The research scope is delimited to the MRT Jakarta Phase II, from the signing of the first JICA ODA loan agreement in October 2018 which marks the formal commencement of bilateral financing commitments for Phase II, through mid-2025. As Phase II remains under construction at 59.19 percent completion (ANTARA News, 2026), empirical outcome data are not yet available; accordingly, this study evaluates Phase II's SDG contributions at the design and institutional level, using Phase I operational outcomes as proof-of-concept baseline.

RESULTS AND DISCUSSION

DKI Jakarta's Transportation Deficit and SDG 11

Jakarta's transportation deficit is not merely a governance challenge; it is a compound structural failure with documented environmental and public health consequences that directly map onto SDG 11's target framework. Between 2020 and 2023, the number of registered motor vehicles in Jakarta grew from 20.2 million to 22.9 million units, an average annual increase of

4-5 percent (BPS DKI Jakarta, 2024). The transportation sector accounts for 96.36 percent of Jakarta's carbon monoxide emissions (28,317 tons/year) and 44 percent of total fuel consumption. Total GHG emissions reached 57.6 million tons CO2 in 2018, a 51.3 percent increase from 38.03 million tons in 2010 (Shiddiqi et al., 2024), while the economic burden of vehicle-generated PM2.5 and PM10, the official Indicator 11.6.2 pollutants, is estimated at approximately USD 2.9 billion annually (Syuhada et al., 2023).

Against SDG Target 11.2, Jakarta's official modal share target of 30 percent across all public transport by 2030, as confirmed by Suryanto and codified in the Rencana Induk Transportasi Jakarta, remains far from reached, with private vehicle dependency entrenched as the dominant mobility pattern. Suryanto further confirmed that MRT planning is designed not merely to produce output in the form of physical infrastructure or outcome in the form of improved mobility, but to achieve measurable impact: quantified reductions in congestion and GHG emissions, alongside public health improvements, given that rail transit users are inherently required to walk to and from stations. This confirms that SDG 11's logic is embedded in the project's upstream planning framework, not applied retroactively as a label.

The Logic of Indonesia-JICA Bilateral Cooperation

Indonesia-JICA cooperation for MRT Phase II operates within a formalized regulatory architecture governed by Government Regulation No. 10 of 2011, which defines the Blue Book-Green Book pipeline through which all foreign-financed projects are identified, prioritized, and advanced to loan agreement. The first ODA-STEP loan agreement for Phase II was signed in October 2018 for ¥70 billion yen at 0.1 percent annum, with a 40 year repayment period and 12 year grace period (Ali, 2018). A second tranche of ¥87.9 billion yen followed in April 2023, with JICA explicitly stating that the project contributes to SDGs Goals 9,11, and 13 (JICA, 2023).

The STEP conditionality carries direct SDG implications: it requires advanced Japanese technology, specifically Sumitomo Corporation and Nippon Sharyo for rolling stock and Japanese firms for signaling and tunneling systems, while mandating technology transfer to Indonesia (JICA, 2023). Suryanto noted that the operational MRT system is technologically more advanced than contemporary Japanese subway systems, a direct product of STEP's requirement to deploy the latest available technology. This positions ODA-STEP not merely as a financing instrument but as a structured vehicle for closing Jakarta's technological gap in urban rail.

The cooperation's three-tier institutional structure distributes both responsibility and ownership across government levels (Table II). DKI Jakarta bears 51 percent of the loan burden not by obligation but by deliberate choice: 100 percent of MRT infrastructure becomes provincial property upon completion, creating self-reinforcing ownership logic where the financing burden is accepted precisely because the long-term asset and operational benefit occurs entirely to the province. This arrangement is unprecedented among Indonesia transport projects, contrasting it with the Surabaya commuter rail upgrade with German financing where the Ministry of Transportation remained the sole executing entity with no sub-national involvement.

Table 1. Institutional Structure Of Indonesia Cooperation In Mrt Jakarta Phase II

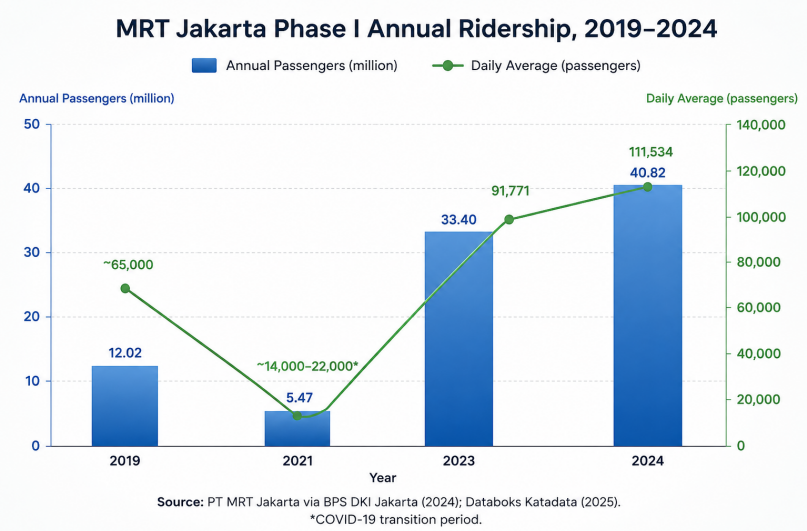
Entity	Institution	Role
Executive Agency	Ministry of Transportation (DJKPRT)	National technical authority; JICA coordination; multi-layer invoice verification
Implementing Agency	DKI Jakarta Provincial Government	100% asset owner upon completion; land acquisition responsibility
Sub-Implementing Agency	PT MRT Jakarta (Perseroda)	Field technical executor; operational management; feeder coordination
Donor/Lender	JICA (Japan)	ODA-STEP loan; technology transfer (rolling stock, signaling, tunneling); technical oversight

Source: Compiled from Suryanto interview (2025), JICA (2023, 2024), and Government Regulation No. 10/2011.

Contributions to SDG Target 11.2: Accessibility and Modal Shift

SDG Indicator 11.2.1 measures the proportion of the population with convenient access to public transport. MRT Phase I provides the critical empirical baseline. By 2024, Phase I recorded 40.82 million annual passengers averaging 111,534 daily, a 21.87 percent year-on-year increase that surpassed PT MRT Jakarta's own target of 33.67 million passengers (Table III). Research applying CDM ACM0016 methodology found that 53.75 percent of phase I users shifted from private vehicles, generating annual CO2 reductions that grew from 2,732.7 tons in 2019 to 6,043.9 tons in 2023 (Nurdjanah et al., 2024). These figures constitute proof of concept that Jakarta's population will use quality rail transit when it is genuinely available.

Table 2. MRT Jakarta Phase I Annual Ridership, 2019-2024



Source: PT MRT Jakarta via BPS DKI Jakarta (2024); BPS-Statistics DKI Jakarta Province, Growth of Transport Report (2024); Databoks Katadata (2025)

MRT Jakarta Phase II extends the North-South Line 5.8 km from Bundaran HI to Kota Station through seven new underground stations, Thamrin, Monas, Harmoni, Sawah Besar, Mangga Besar, Glodok, and Kota, bringing the total line to 21.5km and connecting Central and North Jakarta's dense commercial and heritage corridors currently unreachable by MRT (PT MRT Jakarta, n.d.) . Every station is designed under TOD principles, creating multimodal hubs that addressed what Suryanto identifies as rail's fundamental structural constraint: its non-door-to-door character.

Importantly, Suryanto documented a confirmed intermodal multiplier effect: when the Greater Jakarta LRT began operations in August 2023, commuter rail ridership increased measurably as users gained new feeder connections they previously lacked. The Phase II extension to Kota is designed to precisely replicate this dynamic. As dense economic and

tourism hubs, Glodok and Kota are expected to generate exponential ridership increases once connected to the MRT backbone. The Bundaran HI-Harmoni segment is targeting operation by the end of 2027, with full Harmoni-Kota service by 2029, keeping Phase II's contribution in line with the 2030 SDG deadline.

Contributions to SDG 11 Target 11.6 Emissions Reduction and Environmental Co-Benefits

SDG Target 11.6.2 measures urban PM2.5 and PM10 concentrations. Phase II contributes through three compounding mechanisms. First, vehicle substitution at scale: seven new stations in currently car-dependent corridors will draw commuters away from private vehicles in areas where no rail alternative presently exists. JICA official loan documentation explicitly identifies reducing environmental impact and supporting climate change initiatives as core project objectives (JICA, 2023), positioning SDG 11.6 as a design criterion of the ODA financing itself rather than an ancillary benefit.

Second, *zero-emission propulsion technology mandated by STEP:* electric traction produces zero direct emissions at the point of operation, and STEP's requirement for state-of-the-art Japanese technology ensures the system's operational carbon footprint is minimized by design. In this framework, technology quality is a financing condition, not a procurement choice.

Third, and frequently overlooked in transport-environment analyses, is the health co-benefit of modal shift. Suryanto explicitly noted that rail transit users walk to and from stations as an inherent feature of the mode, generating physical activity that produces measurable health improvements. This co-benefit connects SDG 11.6's environmental mandate with SDG 3 on Good Health and Well-Being in ways that standard transport analyses seldom capture. Its recognition within the planning framework itself signals a level of integrated policy thinking that strengthens the project's claim as a genuine SDG implementation instrument.

Table 3. Mapping of Indonesia-JICA Cooperation Contributions To SDG 11

MRT Jakarta Contribution to SDG 11 Targets

SDG 11 TARGET	OFFICIAL INDICATOR	MRT JAKARTA CONTRIBUTION
Target 11.2 (Sustainable Public Transport)	**11.2.1:** Population share with convenient public transport access	• 5.8 km extension to 7 underground stations • Transit-Oriented Development (TOD) integration • Supports Jakarta's 30% public transport modal share target by 2030 • Phase 1 ridership reached **40.82 million** passengers/year (2024), **111,534** daily average passengers • Intermodal integration with LRT and KRL strengthens urban mobility connectivity
Target 11.6 (Reduced Urban Environmental Impact)	**11.6.2:** Urban PM2.5/PM10 annual concentration	• Phase 1 precedent: **53.75%** modal shift rate • CO_2 reduction **2,732.7 tons** (2019) → **6,043.9 tons** (2023) • Zero-emission electric propulsion (STEP-mandated) • Impact-based planning (GHG + health co-benefit)

Note: *Data refers to MRT Jakarta Phase 1 performance (as of 2024) and related environmental impact outcomes.*

Source: *BPS Provinsi DKI Jakarta, Berita Resmi Statistik – Perkembangan Transportasi Desember 2024 (3 Februari 2025); PT MRT Jakarta; Dinas Perhubungan Provinsi DKI Jakarta.*

Source: Compiled from United Nations (2015), Suryanto (2025), JICA (2023, 2024), Nurdjanah et al. (2024), BPS DKI Jakarta (2024).

ODA-STEP as a Bilateral SDG Implementation Modality: Theoretical Synthesis

When viewed within the Complex Interdependence framework, the above findings converge into a single analytical argument. The Indonesia-JICA relationship operates through multiple simultaneous channels: formal government-to-government ODA loans, JICA's technical coordination with the Ministry of Transportation's planning team, procurement relationships with Japanese industrial companies including Sumitomo Corporation and Nippon

Sharyo, and the STEP mandatory technology transfer obligations. These channels reinforce each other and form a network of cooperation rather than a simple bilateral transaction (Keohane and Nye, 1977).

The structure of mutual benefits explains the choices of both parties. Indonesia obtained concessional financing at 0.1 percent per annum with a 40-year repayment term and a 12-year grace period, terms that no commercial lender could replicate; technology that, according to Suryanto's assessment, outperformed Japan's own contemporary subway system; and measured progress on SDG 11, evidenced by a modal shift rate of 53.75 percent in Phase I and CO2 reductions increasing from 2,732.7 tons in 2019 to 6,043.9 tons in 2023 (Nurdjanah et al., 2024), which cannot be achieved with domestic resources alone. Japan gains a strategic position in Southeast Asia's largest economy, market access for Japanese industrial companies, and a leading demonstration of its quality infrastructure investment doctrine under the G20 Principles (JICA, 2024). Cooperation is sustained not by altruism but by the structural complementarity of each party's interests.

These findings reinforce and extend the argument of Kuik and Rosli (2023): bilateral infrastructure cooperation not only results in tailored capital and technology transfers, but when the institutional architecture includes subnational government ownership, as demonstrated by the three-tier MRT structure, it creates enduring local commitments that sustain SDG contributions well beyond the project implementation period. For DKI Jakarta, JICA ODA-STEP is not a complement to the implementation of SDG 11. It is a structural condition that allows the implementation to be realized within the 2030 deadline.

CONCLUSION

This study demonstrates that the Indonesia-JICA bilateral cooperation on the Jakarta MRT Phase II contributes to Targets 11.2 and 11.6 of SDG 11 at the DKI Jakarta sub-national level through three structural mechanisms: rail access to currently underserved corridors to improve public transport accessibility, the implementation of STEP-mandated zero-emission propulsion technology to reduce the city's environmental burden, and the replication of the intermodal multiplier effect documented in Phase I to generate modal shifts across the network. These contributions were embedded in the project design from the outset, rather than applied retrospectively, as evidenced by JICA's explicit SDG framework in its loan documentation and the planning team's integration of impact metrics including modal shifts, greenhouse gas emission reductions, and improved public health.

Theoretically, this arrangement demonstrates that a key advantage of bilateral ODA lies in its ability to embed SDG achievements within an incentive architecture that simultaneously aligns the interests of the central government, provincial governments, and private operators. This finding extends the thesis of Kuik and Rosli (2023) and strengthens Complex Interdependence as an analytical lens for infrastructure-based development partnerships. As Phase II targets full operation by 2030, further research should assess the measurable SDG contributions to the Phase I baseline and examine whether this three-tier bilateral model can be replicated in other Indonesian metropolitan contexts.

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