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Report No: ICR00005305

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

IMPLEMENTATION COMPLETION AND RESULTS REPORT

IBRD-8610

ON A

LOAN

IN THE AMOUNT OF US$500 MILLION

TO THE

PT. PERUSAHAAN LISTRIK NEGARA (PLN)

FOR THE

POWER DISTRIBUTION DEVELOPMENT PROGRAM-FOR-RESULTS

PROGRAM-FOR-RESULTS

December 10, 2020

Energy and Extractives Global Practice
East Asia and Pacific Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective December 31, 2019)

Currency Unit	=	Indonesian Rupiah (IDR)
IDR 1,000	=	US$0.072
US$1	=	IDR 13,901

FISCAL YEAR
January 1 – December 31

ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
ASA	Advisory Services and Analytics
Bappenas	*Badan Perencanaan Pembangunan Nasional* (National Development Planning Agency)
CPF	Country Partnership Framework
DCC	Distribution Command Control
DLI	Disbursement-Linked Indicator
DPL	Development Policy Loan
ERP	Enterprise Resource Planning
FM	Financial Management
GDP	Gross Domestic Product
GIS	Geographic Information System
GOI	Government of Indonesia
GW	Gigawatts
GWh	Gigawatt-hour
IBRD	International Bank for Reconstruction & Development
IDR	Indonesian Rupiah
ICR	Implementation Completion and Results Report
IFI	International Financial Institution
IPF	Investment Project Financing
IPP	Independent Power Producer
ISR	Implementation Status and Results Report
IVA	Independent Verification Agent
KPI	Key Performance Indicator
LV	Low Voltage
M&E	Monitoring and Evaluation
MDU	Main Distribution Unit
MEMR	Ministry of Energy and Mineral Resources
MoEF	Ministry of Environment and Forestry
MoF	Ministry of Finance

MTR	Midterm Review
MV	Medium Voltage
MVA	Megavolt Ampere
MW	Megawatt
PAD	Program Appraisal Document
PAP	Program Action Plan
PCB	Polychlorinated Biphenyl
PDO	Program Development Objective
PforR	Program-for-Results
PLN	PT. Perusahaan Listrik Negara (PERSERO), (State-owned Power Utility)
PMU	Project Management Unit
PSS SINCAL	Name of Distribution Planning Software Package
RBL	Results-based Loan
RUKN	*Rencana Umum Ketenagalistrikan Nasional* (National Energy Policy)
RUPTL	*Rencana Usaha Penyediaan Tenaga Listrik* (Power Expansion Plan)
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index
SCADA	Supervisory Control and Data Acquisition
SCD	Systematic Country Diagnostic
SILM	*Sistem Informasi Laporan Manajemen* (or Management Service Information System)
SLA	Subsidiary Loan Agreement
SOE	State-owned Enterprise
SPKK	*Satuan Pemantau Kinerja Korporat* (PLN's Internal Performance Monitoring Unit)
TWh	Terawatt-hour
UNIDO	United Nations Industrial Development Organization

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DATA SHEET

BASIC INFORMATION

Product Information

Program ID	Program Name	Financing Instrument
P154805	Power Distribution Development Program-for-Results	Program-for-Results Financing

Country	IPF Component
Indonesia	No

Organizations

Borrower	Implementing Agency
PT. Perusahaan Listrik Negara (PLN)	PT Perusahaan Listrik Negara (PLN)

Program Development Objective (PDO)

Original PDO

The Project's development objective is to increase access to electricity services and to improve the efficiency and reliability oftheir delivery in selected areas of Indonesia.

FINANCING

	Original Amount (US$)	Revised Amount (US$)	Actual Disbursed (US$)
World Bank Administered Financing			
IBRD-86100	500,000,000	500,000,000	499,979,828
Total	**500,000,000**	**500,000,000**	**499,979,828**
Non-World Bank Administered Financing			
Borrower/Recipient	530,000,000	530,000,000	650,000,000
Asian Development Bank	420,000,000	420,000,000	400,000,000
Total	**950,000,000**	**950,000,000**	**1,050,000,000**
Total Program Cost	**1,450,000,000**	**1,450,000,000**	**1,549,979,828**

KEY DATES

Program	Approval	Effectiveness	MTR Review	Original Closing	Actual Closing
P154805	22-Apr-2016	18-Nov-2016	23-Apr-2018	30-Apr-2020	30-Apr-2020

RESTRUCTURING AND/OR ADDITIONAL FINANCING

Date(s)	Amount Disbursed (US$M)	Key Revisions
05-Apr-2019	337.57	Change in Results Framework Reallocation between and/or Change in DLI Change in Program Action Plan

KEY RATINGS

Outcome	Bank Performance	M&E Quality
Highly Satisfactory	Highly Satisfactory	Substantial

RATINGS OF PROGRAM PERFORMANCE IN ISRs

No.	Date ISR Archived	DO Rating	IP Rating	Actual Disbursements (US$M)
01	29-Sep-2016	Satisfactory	Moderately Satisfactory	0
02	13-Jun-2017	Moderately Satisfactory	Satisfactory	107.65
03	09-Feb-2018	Moderately Satisfactory	Satisfactory	107.65
04	20-Jul-2018	Satisfactory	Satisfactory	337.57
05	17-Jan-2019	Satisfactory	Satisfactory	337.57
06	17-May-2019	Satisfactory	Satisfactory	337.57
07	25-Nov-2019	Satisfactory	Satisfactory	462.37
08	26-May-2020	Satisfactory	Satisfactory	462.37

SECTORS AND THEMES

Sectors

Major Sector/Sector	(%)
Energy and Extractives	**100**
Energy Transmission and Distribution	100

Themes

Major Theme/ Theme (Level 2)/ Theme (Level 3)	(%)
Private Sector Development	**17**
Jobs	17
Job Creation	17
Urban and Rural Development	**84**
Urban Development	42
Urban Infrastructure and Service Delivery	42
Rural Development	42
Rural Infrastructure and service delivery	42

ADM STAFF		
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I. PROGRAM CONTEXT AND DEVELOPMENT OBJECTIVES

A. CONTEXT AT APPRAISAL AND THEORY OF CHANGE

Country Context

1. **Indonesia is the world's largest archipelagic state, the fourth most populous nation, and the 9th largest economy in terms of purchasing power parity in 2015.**[1] It is a member of the Association of Southeast Asian Nations (ASEAN) group of countries that have a combined population of 608.4 million and is also a member of the Group of Twenty (G20). With more than 17,500 islands, of which 6,000 are inhabited, Indonesia has a population of over 250 million, with 300 distinct ethnic groups and over 700 languages and dialects. The gross national income per capita has increased 269 percent from US$1,280 in 2005 to US$3,440 in 2015. However, more than 28 million Indonesians still lived below the poverty line set at US$24.4 per month and approximately half of all households remained clustered around this poverty line.

2. **The Government has instituted various programs over the years to facilitate development in the Sumatra region. Sumatra Island is the second biggest island in Indonesia representing 25 percent of the country's total area.** Sumatra has the largest population center outside Java-Bali with about 54 million people or around 21 percent of the country's population[2] of which 9 million have no access to electricity. It also has 10 of Indonesia's 34 provinces and is one of the fastest developing areas, second only to Java-Bali in terms of economic significance. In 2015, Sumatra contributed 22.2 percent of national gross domestic product (GDP) after Java-Bali[3] and accounted for 14.5 percent of national electricity consumption with more than 10,000 household customers.[4] Due to the highly saturated conditions prevailing in the Java-Bali Island there is a growing demand for better conditions in adjacent areas and Sumatra is the logical extension of the development of the Java region. Expansion of electricity infrastructure in Sumatra is required to support the economic growth of this island.

Sectoral and Institutional Context

3. **The power sector is dominated by the state-owned power utility, PT. Perusahaan Listrik Negara (PERSERO) or PLN.** In 2015, PLN owned and operated 36.9 GW of the 55.5 GW of installed generating capacity in the country; independent power producers (IPPs) and rent generation represented 12.3 GW of installed capacity and the balance was from captive generation.[5] PLN's electricity sales in 2015 was 200.6 TWh (Terawatt hour) which was sold during the year to industries (31.7 percent), households (43.9 percent), businesses (18.0 percent), and others (6.5 percent). PLN's annual peak load in 2015 was 32.9 GW. PLN is the single operator of the power transmission and distribution (42,091 km of transmission lines, 345,406 km of medium voltage [MV] distribution lines, and 583,546 km of low voltage [LV] distribution lines).

[1] World Bank. 2017. *World Development Indicators 2017.*
[2] Profil Penduduk Indonesia Hasil Supas 2015, Indonesia Central Bureau of Statistics.
[3] Laporan Perekonomian Indonesia 2016, Indonesia Central Bureau of Statistics.
[4] PLN's Power Expansion Plan (*Rencana Usaha Penyediaan Tenaga Listrik,* RUPTL) 2016 and RUPTL 2017.
[5] PLN's RUPTL 2016 and Electricity Statistics 2015 of the Ministry of Energy and Mineral Resources (MEMR).

4. **The sector is regulated by the MEMR,** while decisions relating to the sector's financial footing including proposed tariff levels are taken at the parliamentary level (Commission VII of the House of Representatives) in discussion with the Ministry of Finance (MoF), the National Development Planning Agency (*Badan Perencanaan Pembangunan Nasional*, Bappenas), the Ministry of State-owned Enterprises, and PLN. Investment loans from multilateral/bilateral development banks would be approved and channeled by the MoF to PLN through a Subsidiary Loan Agreement (SLA). Bappenas was in charge of the planning and monitoring of investment loans, including all PLN projects financed by multilateral/bilateral development banks.

5. **To keep pace with economic growth, increase access to electricity, and meet the electricity demand, PLN developed a power system expansion plan called the RUPTL (*Rencana Usaha Penyediaan Tenaga Listrik*) for 2015–24.** The RUPTL outlined the expansion plan which included generation capacity, transmission lines, substation capacity, and distribution lines. A total of additional 55.5 GW generation capacity was expected during 2015–24 with an estimated total cost of US$70.6 billion, nationally. Table 1 provides information on the electricity infrastructure expansion plan for Sumatra.

Table 1. Summary of RUPTL 2015–24 for Sumatra

	Unit	Baseline	Forecast									
		2014[a]	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Economic growth	%	4.6[b]	5.9	6.2	6.6	6.8	6.9	6.8	6.8	6.8	6.8	6.8
Electricity sales	TWh	27.6	31.2	34.7	38.6	42.7	47.5	52.8	58.9	65.9	73.8	82.8
Electricity sales growth	%	7.2	11.7	11.1	11.1	11.1	11.2	11.2	11.6	11.8	11.9	12.2
Electrification ratio	%	80.0	87.2	89.8	—	95.0	—	99.2	—	99.9	—	99.9
Additional customers	million	11.18		0.6	0.6	0.6	0.6	0.6	0.4	0.3	0.3	0.3
Additional generation capacity	MW	5,148	1,310	924	1,398	2,066	4,429	1,341	1,036	1,234	1,245	2,742
Additional transmission line (70/150/275 kV)	km	10,852	5,718	3,947	2,912	3,180	3,548	1,812	242	384	636	1,234
Additional substation capacity	MVA	7,981	8,680	6,216	8,010	5,000	4,500	8,960	950	1,650	2,670	2,380
Additional distribution line (LV/MV)	km	92,706	7,300	7,100	7,600	7,600	7,900	8,100	8,300	8,400	8,800	9,100

Note: a. PLN's Statistic 2015.
b. Indonesia Statistic 2016.

6. **Focusing distribution investments in Sumatra would offer the best prospect for fast progress toward achieving the RUPTL's national electrification ratio target of 99.4 percent by 2024.** At appraisal, the total residential customers were 10.97 million customers, more than 92 percent of total electricity customers in Sumatra.[6] There were more than 200,000 customers in the waiting list for an electricity connection in 2015.[7] Up to about 3.2 million customers could be added to the grid during the Program

[6] RUPTL PLN 2015.
[7] PLN's Statistic 2015.

period resulting in an increase in the regional electrification ratio from 80 percent to about 97 percent.[8] As there are substantial existing and planned generation and transmission investments in Sumatra, investment in distribution would enable the commissioned power production to be delivered to the regional economy.

7. **The Power Distribution Development Program-for-Results (PforR) was designed to support PLN in the development of Sumatra's power infrastructure,** particularly to increase access to electricity for household consumers while improving efficiency and reliability of supply. The Program was the first PforR in Indonesia, and in particular with PLN, and also the first PforR lending instrument in the Energy and Extractives Global Practice within the World Bank. The Program was also a loan provision of the first international financial institution (IFI) through a direct lending mechanism to PLN with the MoF's sovereign guarantee. It was aligned with and incorporated lessons learned from the World Bank Group's engagement in the energy sector of Indonesia.

8. **The PforR was closely aligned with the World Bank's support to the power infrastructure sector in Indonesia over the past two decades.** The World Bank's efforts has been focusing on providing sufficient supply of electricity on a reliable and affordable basis, providing access to the remaining unelectrified households, and increasing the share of clean energy to diversify the use of domestic energy resources and address negative environmental impacts from coal power generation. The Program, built on PLN's program, was also expected to contribute to higher-level objectives and supported the achievement of the Country Partnership Framework (CPF)[9] for Indonesia 2016–20 within the energy engagement area to increase sustainable energy and connect millions of families to reliable electricity.

9. **To support the Government's vision, the World Bank has been actively engaged in the energy sector development through a combination of investment lending, policy dialogue, and technical support.** At appraisal, four ongoing Investment Project Financing (IPF) operations for a total of about US$1.49 billion in IBRD loans were supporting the sector's ability to meet demand by financing expansion of renewable energy generation capacity (Upper Cisokan Hydropower Project and Geothermal Clean Energy Investment Project) and expansions of substations (Indonesia Power Transmission Development Project and Indonesia Second Power Transmission Development Project). The Sustainable and Inclusive Energy Development Policy Loan (DPL), approved by the Board in early December 2015, was leveraging policy reforms to improve the regulatory framework for private sector participation in both power and gas, to reduce energy subsidies, and to improve the framework for increased electrification nationwide. In addition, the World Bank has been engaging with the Government through Advisory Services and Analytics (ASA) on its core engagement areas of strengthening sector governance and sustainability, supporting renewable energy and low carbon development, expanding access to modern energy services, and enabling gas sector policy formulation and investment planning. These ASAs included PLN's Corporate Financial Strategy, Cost of Service and Tariff Review, Performance-based Regulation for Setting Regulated Charges in the Power Sector, and related areas.

10. **The PforR was also in line with efforts by the Asian Development Bank (ADB), which has been an active partner in supporting the Government in the energy sector. ADB has implemented results-**

[8] 'Electrification ratio' is the number of households that have access to electricity and have been provided with some form of electricity supply from the grid divided by the total number of households.
[9] http://documents1.worldbank.org/curated/en/195141467986374707/pdf/99172-REVISED-World-Bank-Indonesia-Country-Partnership-Framework-2016-2020.pdf.

based and implemented in parallel in Sumatra for the same five-year period. ADB has prepared and negotiated a Results-based Loan (RBL) of US$600 million to PLN. The RBL would support PLN's transmission and distribution expenditure program over the 2015–19 period in the Sumatra region. Thus, both ADB and the World Bank provided parallel financing for the same distribution program in Sumatra over the same period. The only difference in program coverage was that of the US$600 million ADB loan, about US$180 million would be used to support prior results of the transmission component of the RUPTL. ADB, in parallel with the World Bank's energy DPL, also provided policy-based financing to support the Government's reforms to shift the energy sector to a more sustainable path. Many activities on the energy policy dialog with the Government through technical assistance were also in good collaboration with ADB.

Theory of Change (Results Chain)

11. A program results chain summarizing the expected outcomes, the intermediate indicators, and the relevant activities that will be undertaken by the Program to achieve the Program Development Objective (PDO) is summarized in figure 1. In general, it shows clear links between activities, outputs, intermediate outcomes (the PDO), and longer-term outcomes, as explained further in this section. Overall, the PDOs are addressed by a clear results chain through interventions (particularly Disbursement-Linked Indicators, DLIs) grouped into five intermediate results areas.

12. The overall objective of the Program is 'to increase access to electricity services and to improve the efficiency and reliability of their delivery in selected areas of Indonesia'. The project objectives and outcomes were achieved through the measures detailed in the following paragraphs.

13. The expansion of the distribution network under Results Area 1 (Improved access to electricity) was to enable connection to additional customers and then lead to increasing access to electricity services. The achievement of this development objective was possible through expansion of distribution networks and installation of new distribution transformers.

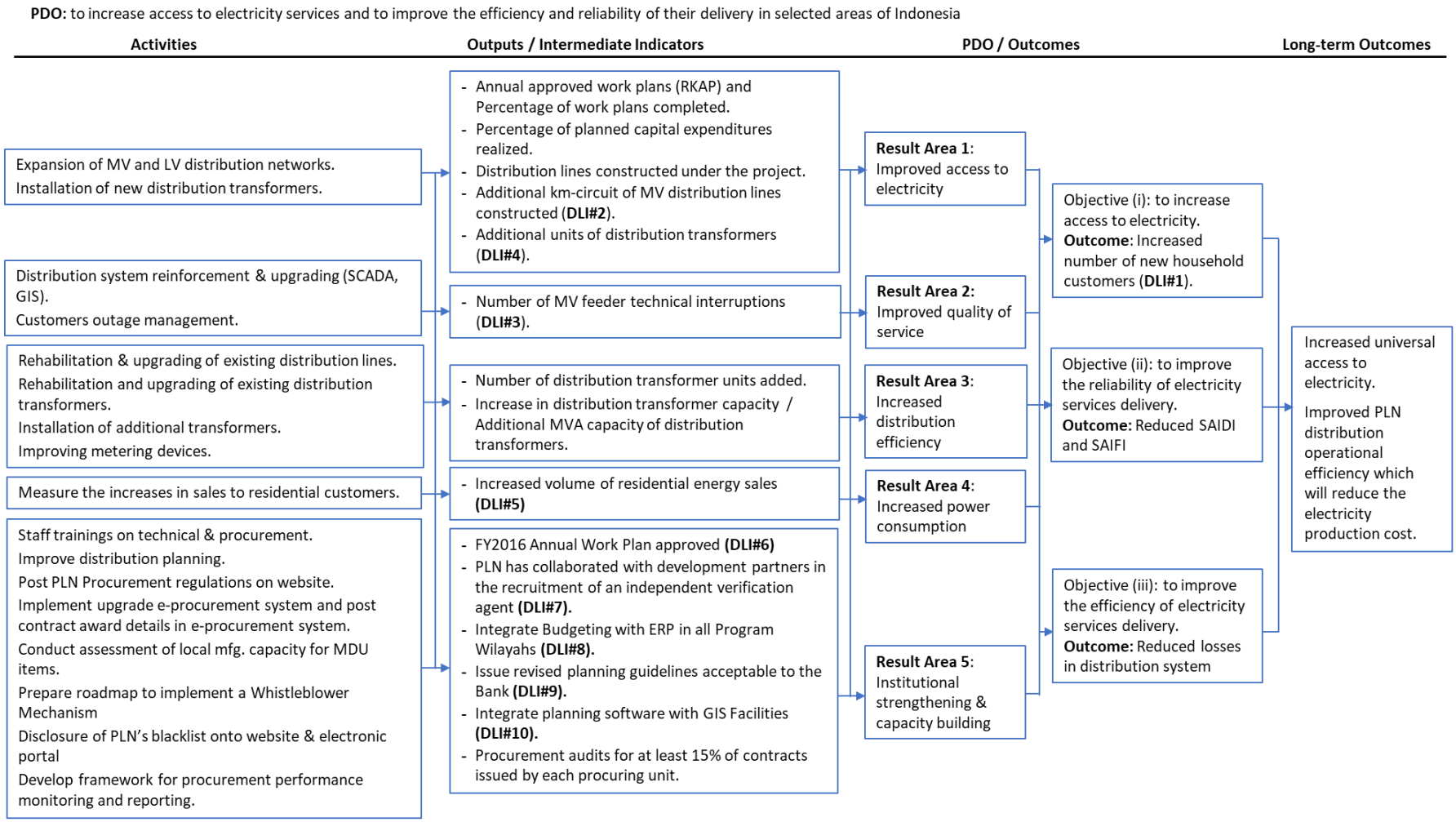
14. The activities on electricity system reinforcement/upgrading and customer outage management under Results Area 2 (Improved quality of service) were to reduce frequency and duration of outages which indicate an improvement in the reliability of electricity service delivery. Activities on reinforcement/upgrading of the distribution system (supervisory control and data acquisition [SCADA] and geographic information system [GIS]) and improvement for customers outage management were required to monitor and reduce system average interruption duration index (SAIDI) and system average interruption frequency index (SAIFI). Reduced SAIFI and SAIFI are indicators for an improved reliability of electricity service delivery.

15. The activities under Results Area 3 (Improved distribution efficiency) to reduce the distribution network losses and improve the efficiency of electricity delivery service consisted of expanding/rehabilitating/upgrading the distribution lines and substations, increasing the number of distribution transformers, and supporting improved network planning. Rehabilitation/upgrading distribution substations and transformers increased the distribution network efficiency and led to lower distribution losses. Expansion of the distribution line and substations will reduce the load in the distribution network which will also be able to increase the efficiency.

16. The capacity-building activities under Results Area 5 (Improved institutional capacity) aimed to improve distribution system planning and budgeting and operational management, and the activities under it contributed to all other results areas. The two prior results and three DLIs for this results area were based on the prioritized recommendations of the draft technical and fiduciary assessments. For prior results, the approval of 2016 work plans provided PLN with an incentive to expedite the approvals before the start of the fiscal year so that its Wilayahs had enough time to fully implement the plans within the year; while the selection of the independent verification agent (IVA) provided independent verification of Program results. The three DLIs for the implementation phase strengthened distribution system planning and improved program budgeting.

17. All those activities under different results areas would then eventually increase the power consumption and electricity sales for household customers which will be measured by the activity under Results Area 4 (Increased power consumption). Increased access to electricity by additional residential customers and improved efficiency of electricity service will enable increased power consumption. The use of this measure as a DLI gave PLN incentive to not only to increase customer connections but also actual power flow.

Figure 1. Program Results Chain



Critical Assumptions

- It was expected that the average annual national economic growth would be 6.6 percent and the increase in electricity supply would be on average 8.8 percent annually during 2015–19. Specifically, for Sumatra, the expected average annual electricity supply growth was expected to be 11.2 percent.

- The distribution expansion alone would not be able to increase the electricity access and sales; therefore, it was assumed that PLN needed to complement the Program by adding the required generation capacity and transmission lines in Sumatra.

Rationale for PforR Support, and Program Scope and Boundaries

Rationale for PforR Support

18. The power sector infrastructure development in Sumatra, particularly for the distribution sector, requires significant support to allow the achievement of its economic development target. According to the RUPTL for 2015–24, Sumatra's distribution system needed additional network facilities of around 20,000 circuit km of MV lines; 23,000 circuit km of LV lines; and 2,895 MVA or 28, 000 units of distribution transformers.

19. At appraisal, a PforR with direct lending mechanism was considered the most appropriate instrument to support the development of the Sumatra distribution network and the development challenges faced at the time of the Program preparation, given the existence of a well-defined PLN program on Sumatra distribution network.

20. It was considered as the most appropriate instrument based on the following considerations:

(a) The PforR would be based on results instead of expenditures as is the case with IPF. PLN would be able to focus on achieving expected results.

(b) It could support and simultaneously improve PLN's program. Past experience of implementing generation and transmission projects showed that PLN has generally achieved higher rates of budget execution when using its existing institutions and processes including procurement systems rather than those of the Government and/or external development partners.

(c) The PforR would provide PLN a chance to apply and benefit from direct lending arrangements from the direct lending mechanism that exclude the Program's budget from the annual state budget and disbursement process which are time consuming as referred to the experiences from the previous projects under the SLA mechanism.

21. PLN was keen to launch results-based approaches to improve project implementation outcomes. Comparing with past and ongoing generation and transmission projects, the implementation of distribution projects is decentralized, and the contracts' value is relatively small. These results-based loans (that is, ADB and the World Bank) offered PLN an opportunity to pilot a new approach to providing incentives for improving implementation performance, developing institutional capacity, and lending to

state-owned enterprises (SOEs) through the direct lending mechanism. As the first PforR in Indonesia, its successful implementation would facilitate the adoption of similar innovative mechanisms in other parts of the country and in other sectors.

Program Scope and Boundaries

22. The PforR supported a geographic slice of the distribution component of the RUPTL in that it would only cover Indonesia's Sumatra region out of the national distribution plan for 2015–19.

23. PLN's power expansion plan comprising generation, transmission, and distribution investment requirements (RUPTL) at appraisal covered 2015–24. The broader context for the RUPTL is the *Rencana Umum Ketenagalistrikan Nasional* (RUKN) which is a 20-year national energy policy document approved by the parliament. The RUKN provides the policy guidance of the Government of Indonesia (GOI) for preparation of the RUPTL. This guidance is related primarily to the projected energy demand and desired targets for electrification and the energy mix of production. At appraisal, the latest RUKN was approved by the parliament in 2008 and covers the period up to 2027.

24. To close the power infrastructure gap, which was constraining economic growth, PLN was focusing on implementation of the five-year time slice of the RUPTL covering 2015–19, the first five years of the sector expansion plan. Consistent with both the RUKN and the RUPTL, the key objectives of the five-year time slice were to increase access to electricity for household consumers and to meet the economy's power needs while improving efficiency and reliability of supply. Its specific key targets were to increase generation capacity by 35 GW and increase electrification ratio from 80 percent in 2014 to 97 percent by 2019. Further, PLN's detailed implementation plan envisages improvements in efficiency (loss reduction) and reliability indicators (SAIDI and SAIFI). The estimated total costs of the RUPTL for 2015–19 were US$83.4 billion, as indicated in Table 2. PLN's strategy was to mobilize substantial private sector resources for generation and to focus its own resources and those from multilateral funding agencies to finance transmission and distribution activities.

Table 2. Power Sector Expansion Expenditure Plan (RUPTL) for 2015–19

Expenditure Type	Total PLN (US$, billion)	Sumatra Only (US$, billion)
Generation		
by PLN	18.80	4.40
by IPPs	40.10	8.64
Total	58.90	13.04
Transmission		
by PLN	17.10	5.90
Distribution		
by PLN	7.40	1.45
Total Sector Expenditure Plan	83.40	20.39
Total PLN Expenditure Plan	43.40	11.75

25. PLN's program on which the proposed PforR was based is the national distribution component which was estimated to cost US$7.4 billion. The Program comprised activities aimed at improving

distribution system planning capabilities, increasing access to electricity by connecting new customers and improving existing distribution networks, and increasing the efficiency and quality of services to existing consumers. Various assessments were conducted at appraisal which were used to define the Program's operation scope. The assessments were carried out on technical (strategic relevance and program structure, technical soundness, results monitoring, PLN's evaluation capacity, economic evaluation, and PLN's financial condition and projections), fiduciary (financial management [FM] system, procurement system, and fraud and corruption), and environmental and social risks.

26. In addition to the reasons for which PLN selected the Sumatra region for the Program's coverage as explained in paragraph 6, the region also offers the best opportunity for 'piloting' the use of the IFI performance-based lending instruments, learning lessons, and improving the effectiveness of its program expenditure management before attempting to use them in the more difficult terrain of Eastern Indonesia.

27. The estimated cost of the Sumatra distribution program was US$1.45 billion or about 20 percent of the total national distribution for five years. Financing of the Program was expected to be provided by IBRD and ADB loans of US$500 million and US$420 million respectively and PLN's internal financing (including the Government's equity) of US$530 million.

Program Development Objectives (PDOs)

28. The PDO was 'to increase access to electricity services and to improve the efficiency and reliability of their delivery in selected areas of Indonesia', as referred to the Program's Loan Agreement and the Program Appraisal Document (PAD).

Key Expected Outcomes and Outcome Indicators

29. The Program financed the development of Sumatra distribution networks with the following key expected outcomes:

(a) **Increased access to electricity services** was measured through the additional total number of customers connected to PLN's grid. This indicator measured the degree of access to electricity achieved by the Program.

(b) **Improved efficiency of electricity services delivery** was captured by the percentage reduction in distribution system losses. This is a key parameter for assessing system efficiency improvements.

(c) **Improved reliability of electricity services delivery** was measured by the reduction in SAIDI and SAIFI. These are internationally accepted measures of power supply reliability.

30. The baselines and end targets of the PDO indicators were summarized in annex 1.

Program Results Areas and Disbursement Linked Indicators

31. The Program supported implementation of activities designed to achieve PLN's program goals in five results areas as follows:

- **Results Area 1: Improved access to electricity.** To achieve this objective, the Program supported the expansion of the distribution network with approximately (a) 19,487 circuit-km of MV and 23,594 circuit-km of LV distribution lines and (b) 28,327 transformer units with a total capacity of 2,895 MVA. These network improvements would enable PLN to connect about 3.2 million additional customers over the 2015–19 period.

- **Results Area 2: Improved quality of service.** Activities to improve the quality of service would involve system reinforcement and upgrading and customer outage management. In addition, the Program activities included upgrading of distribution control centers to SCADA functionality and completion of a GIS database in each *Wilayah*. These activities would improve the accuracy of measuring system reliability using SAIDI and SAIFI. Reduced MV feeder technical interruptions and decreases in the frequency and duration of outages and in voltage fluctuations will indicate an improvement in the quality of services.

- **Results Area 3: Improved distribution efficiency.** To achieve this objective, the Program supported rehabilitation and upgrading of existing distribution lines and substations and installation of additional substations and of improved metering devices. Distribution losses, a key barometer of utility performance, deteriorated significantly in 2013 (ranging from 7.4–14.7 percent among the Wilayahs) and again in 2015 after showing a modest recovery in 2014. The expected additions to the system of 80 grid substations (under PLN's transmission program and not part of the PforR) by 2017 would help to reduce system losses. The Program complemented loss reduction efforts by (a) expanding, rehabilitating, and upgrading the distribution lines and substations; (b) increasing the number of distribution transformers and thereby improving the LV/MV ratio in the network; and (c) supporting improved network planning.

- **Results Area 4: Increased power consumption.** Increased household connections would translate into higher levels of electricity consumption which would contribute to improved productivity and income growth among the population although per capita consumption might initially decline as poorer consumers are connected. The Program, therefore, also measured the increases in sales to residential customers that resulted from implementation of the Program activities. All the activities that were implemented under the Program to increase access, improve quality of services, and to improve efficiency and institutional capacity would also contribute to increased power consumption by relieving constraints that kept average annual growth rates at about 8 percent and below. However, achievement of this goal would also be influenced by activities outside the Program related to generation and transmission components of the RUPTL and the risks related thereto were moderate.

- **Results Area 5: Improved institutional capacity.** The Program's institutional capacity-building objectives were to improve distribution system planning and budgeting and to improve operational management. To strengthen distribution planning, the Program also included the following activities: (a) review, update, and issuance of revised distribution planning guidelines; (b) integration of planning software with GIS databases; and (c) enabling of the use of planning software by multiple users at each location through procurement of a corporate license. Activities to integrate budgeting with the enterprise resource planning (ERP) system were extended to cover all Wilayahs in Sumatra. Under the Program, PLN

reviewed the potential to optimize the use of GIS databases, not only for distribution planning but also for customer outage management, transformer load management, and asset management functions.

32. The PforR comprised 10 DLIs that contributed to the abovementioned five results areas. The DLIs comprise a mix of one outcome indicator and nine intermediate indicators. **Error! Reference source not found.** shows the allocation of the IBRD Loan to the DLIs at appraisal, including the allocation to prior results, as agreed with PLN during preparation of the Program.

Table 3. DLIs at Appraisal

Results Area	Indicative Loan Allocation (US$, millions)	DLI
Results Area 1: Improved access to electricity.	145.56	DLI#1. Number of new Residential (Household) customers connected (outcome)
	55.00	DLI#2. Additional Length of MV distribution lines (km) (intermediate)
Results Area 2: Improved quality of service.	60.00	DLI#3. Number of MV feeder technical interruptions per 100 km (intermediate)
Results Area 3: Improved distribution efficiency	65.56	DLI#4. Additional distribution transformer units (intermediate)
Results Area 4: Increased power consumption	105.55	DLI#5. Growth in residential energy sales (GWh) (intermediate)
Results Area 5: Improved institutional capacity	(16.00)	**Prior results**
	15.00	DLI#6. FY 2016 Annual Work Plan approved (intermediate)
	1.00	DLI#7. PLN has collaborated with development partners in the recruitment of an independent verification agent (intermediate)
	(52.33)	**DLIs during implementation**
	19.00	DLI#8. Integrate budgeting with ERP in all Program Wilayahs (intermediate)
	25.00	DLI#9. Issue revised planning guidelines acceptable to the Bank (intermediate)
	8.33	DLI#10. Integrate planning software with GIS facilities (intermediate)
Total	500.00	

B. SIGNIFICANT CHANGES DURING IMPLEMENTATION

Revised PDOs Outcome Targets, Results Areas, and DLIs

33. The Program was approved by the World Bank's Board of Executive Directors on April 22, 2016 and became effective on November 18, 2016. The only restructuring of the Program took place on April 5, 2019, responding to PLN's request (Ref. No. 4664/KEU.00.01 /DIVPRSUM/2018, received on November 22, 2018) to reallocate US$50 million from DLI#5 to DLI#1 (US$10 million), DLI#2 (US$20 million), and DLI#4 (US$20 million), after discussion during the midterm review (MTR) (in April 2018), given the much

faster implementation pace than what was originally expected. The PDO remained unchanged during the Program implementation. The Results Framework, allocation of proceeds, DLIs, and disbursement estimates were revised to align them better with the Program's outcomes, given that the achievement for some DLIs well exceeded the original planned annual targets. Detailed rationale of the restructuring is explained in the section on 'Rationale for Changes and their Implication for the Original Theory of Change'.

Change in the PDO Outcome Targets

34. The Program's indicators and targets were also revised to better reflect (a) the new and more comprehensive way of capturing SAIDI and SAIFI (PDO indicators); (b) to consider better-than-expected results during the first half of Program implementation and the reallocation of proceeds which allowed PLN to go beyond the original end-of-program targets; and (c) lower than originally anticipated growth in electricity sales.[10] The PDO outcome targets that were revised during the restructuring are noted in the following paragraphs along with a brief explanation.

35. **SAIDI and SAIFI.** The measurement of these indicators was comprehensively improved from the time the Program was prepared. In 2014–15, PLN was manually recording interruptions only on 20 kV feeders. In 2016, PLN started to computerize the recording of interruptions and calculation of SAIDI/SAIFI and extended the recording of interruption to the entire value chain (generation/transmission/ distribution for both MV and LV) therefore capturing the real quality of service perceived by customers. The restructuring revised the baselines to use 2017 SAIDI and SAIFI, as 2017 was the first year with comprehensive information. Targets were also discussed and agreed with PLN and reflected in the revised Results Framework.

36. **People provided with access to electricity by household connections.** At appraisal, the target for this indicator was set lower than the number of new customers to be connected by PLN over the Program period as mentioned in the PAD (Footnote 10, page 39) to factor implementation risks. The target for this indicator was revised for the same reasons explained in paragraph 34.

37. The end targets of the PDO indicators were revised, as provided in **Error! Reference source not found.**.

[10] During 2016 to 2018, there was a sharp decline in year-on-year growth in residential energy sales from 2016 to 2017—both in Sumatra (the project area) and Indonesia as a whole.

Table 4. Changes to PDO Indicators and the End Targets During Implementation

Indicator	Unit of Measure	Baseline	Original End Target (at Appraisal)	Revised End Target (at Restructuring)
People provided with access to electricity by household connections	Number	11,180,000	13,177,000	14,410,000
System average interruption duration index (SAIDI)	Minutes per customer per year	1,989 Revised from 493 at appraisal	463	1,650
System average interruptions frequency index (SAIFI)	Number of interruptions per customer per year	17.81 Revised from 8.63 at appraisal	8.11	15.50
Electricity losses per year in the project area	Percentage, subtype supplemental	11.92	10.00	Unchanged

Change in Allocation of Proceeds to Maintain the Pace of investments

38. At restructuring, the pace of investment was much faster than the original expectation (as demonstrated under DLI#1, DLI#2, and DLI#4, while the increase in energy sales (DLI#5) had been lagging. As discussed in paragraph 33, PLN requested the World Bank to reallocate the funds from DLI#5 to DLI#1, DLI#2, and DLI#4, as shown in the revised withdrawal of proceeds in table 5.

Table 5. Revised Withdrawal of Proceeds

	Original	Revised
Category (including DLI as applicable)	**Amount of the Loan Allocated (US$)**	**Amount of the Loan Allocated (US$)**
DLI#1. Number of new Residential (Household) customers connected	145,556,000	155,556,000
DLI#2. Additional Length of MV distribution lines (km)	55,000,000	75,000,000
DLI#3. Number of MV feeder technical interruptions per 100 km	60,000,000	Unchanged
DLI#4. Additional distribution transformer units	65,556,000	85,556,000
DLI#5. Growth in residential energy sales (%)	105,556,000	55,556,000
DLI#6. FY 2016 Annual Work Plan approved	15,000,000	Unchanged
DLI#7. PLN has collaborated with development partners in the recruitment of an independent verification agent	1,000,000	Unchanged
DLI#8. Integrate budgeting with ERP in all Program Wilayahs	19,000,000	Unchanged
DLI#9. Issue revised planning guidelines acceptable to the Bank	25,000,000	Unchanged
DLI#10. Integrate planning software with GIS facilities	8,332,000	Unchanged

Total Amount	**500,000,000**	**500,000,000**

Change in DLIs to Reflect the Reallocation of Proceeds and the Results at Midterm

39. As mentioned above, the increase in energy sales (DLI#5) had been lagging. DLI#5, with an allocation of US$105.55 million is related to residential energy sales. However, the year 2017 had seen a low level of increase in residential sales, despite increase in connections. During the Program's appraisal, PLN made projections of electricity sales growth based on the average national economic growth of 6.6 percent and estimated 11.2 percent of annual electricity sales increase in Sumatra. The actual national economic growth was 4.79–5.06 percent during 2015–18 which contributed to the lower electricity demand from industrial and business customers. During the same period, the actual electricity sales growth in Sumatra area was 5.8 percent compared to 11.2 percent as expected. Therefore, DLI#5 was unlikely to be achieved and was partly out of the control of the Program, as this phenomenon has been noted in all regions (the Sumatra region still having a sales growth higher than the other regions).

40. Following the reallocation of funds, the targets for the DLI#1, DLI#2, DLI#3, DLI#4, and DLI#5 were revised. Targets for DLIs#1, DLI#2, and DLI#4 were revised to accommodate higher achievement from the targets and to reflect the reallocation of proceeds. The values for DLI#1, DLI#2, and DLI#4 were also revised because there were inconsistencies in the PAD (Results Framework) with the DLIs of the PAD and Schedule 4 - Disbursement-linked Results of the Legal Agreement. Targets for DLI#3 were also revised as results were already better than the end target and to show continued progress in network reliability. Targets for DLI# 5, Growth in residential energy sales, were revised downwards under the Program restructuring to reflect the trend of lower electricity sales growth. Finally, targets for DLI#9 were clarified by introducing an intermediary target to ensure a clear common understanding of the objectives of the new distribution planning guidelines. Schedule 4 of the Loan Agreement - Disbursement-linked Results was revised accordingly for achievements needed annually to get full disbursement.

Table 6. DLIs at Appraisal and Restructuring

DLI	Unit of Measure	Baseline	Original End Target - at Appraisal	Revised End Target - at Restructuring
DLI#1. Number of New Residential (Household) customers connected*	Number (Thousand)	11,180.00	12,749.00	14,410.00
DLI#2. Additional Length of MV distribution lines (km)**	Kilometers	92,716.00	102,625.00	106,228.00
DLI#3. Number of MV feeder technical interruptions per 100 km	Number	21.22	21.02	16.00
DLI#4. Additional distribution transformer units	Number	80,130.00	94,082.00	98,338.00
DLI#5. Growth in residential energy sales	Gigawatt-hour (GWh)	15,850.00	20,767.00	18,438.00
DLI#6. FY 2016 Annual Work Plan approved	Yes/No	No	Yes	Unchanged

DLI	Unit of Measure	Baseline	Original End Target - at Appraisal	Revised End Target - at Restructuring
DLI#7. PLN has collaborated with development partners in the recruitment of an independent verification agent	Yes/No	No	Yes	Unchanged
DLI#8. Integrate budgeting with ERP in all Program Wilayahs	Yes/No	No	Yes	Unchanged
DLI#9. Issue revised planning guidelines acceptable to the Bank	Yes/No	No	Yes	Unchanged
DLI#10. Integrate planning software with GIS facilities	Yes/No	No	Yes	Unchanged

Note: * The original end target for DLI#1 was 12,749.00 in the Legal Agreement. The end target value in the system, 13,177 at restructuring had to be revised (a) to match the value in the Legal Agreement (Schedule 4 - Disbursement-linked Results) and (b) to reflect the addition of US$10 million for this DLI following the reallocation. Correct calculation was explained in the Restructuring Paper.
** The end target value for DLI#2 was incorrectly entered in portal but it had been fixed during the project restructuring.

Other Changes

41. During implementation, the abovementioned changes did not have a significant impact on the Program design or implementation.

Rationale for Changes and their Implication for the Original Theory of Change

42. In summary, four changes were made: (a) change in allocation of proceeds to maintain the pace of investments; (b) change in disbursement estimates, to better reflect the pace of disbursement; (c) change in DLIs to reflect the reallocation of proceeds and the results at midterm; and (d) changes to the Results Framework.

43. There was no impact on the original Theory of Change. The PDO remained unchanged. The restructurings changed the budgetary allocation to the project components but did not have an impact on the results chain although the PDO indicators and DLI targets were slightly revised. Their revisions adjusted the indicator targets due to more reliable data which became available during implementation but were not material in the measurement of PDO outcomes. The revision was also made to acknowledge the higher achievement compared to the original targets.

II. OUTCOME

A. RELEVANCE

Relevance of PDO

44. The Program at closing remains aligned with the World Bank's current CPF FY2016–20. The CPF FY2016–20 assigned a priority role to infrastructure, including energy, for furthering the Government's development goals of building a more prosperous, equal, and economically independent Indonesia,

eliminating extreme poverty and boosting shared prosperity. Specifically, the PDO contributed directly to CPF Engagement Area 2: Sustainable Energy and Universal Access. The CPF identifies the following four main areas for the World Bank to focus on in the energy sector: (a) energy infrastructure: improving operational efficiencies, reliability of services through, among others, transmission and distribution and pumped storage; (b) renewable energy and low carbon development: accelerating geothermal and other renewables complemented with sustainable development of hydropower and the gas sector; (c) access to modern energy services: potentially through grid extensions, possible off grid solutions, and modern cooking solutions; and (d) sector governance, competitiveness, and efficiency, particularly through the DPL series, and project delivery technical assistance. The Program has contributed to the achievement of the CPF's objective to increase supply and access to energy under Engagement Area 2.

45. The PDO also remains relevant with the 2020 Indonesia Systematic Country Diagnostic (SCD)[11] which is the basis for the next CPF under preparation. The SCD highlights Indonesia's electricity access, which is widespread but unevenly distributed and often unreliable and has a low quality of service, which are the challenges to be addressed by the Program. In addition, the Program supported the reform priority to increase the quantity and quality of infrastructure spending by the Government as referred to by SCD 2020 and the Program remains important to achieving the development objectives of the new CPF under preparation. Lastly, the Program helped the Government and PLN to implement its national strategies and energy planning, and the Program is still relevant with the current RUPTL 2019–28 and RUKN 2019–38.

46. Given that the Program was strongly relevant with the World Bank's CPF and Indonesia's electricity program (RUPTL and RUKN) at appraisal and is still relevant with the current SCD and national electricity program, the relevance of the PDO is rated High.

Relevance of DLIs

47. The DLIs were clearly defined and measurable and the baselines and feasible targets for the indicators were revised to maintain the pace of investments until the end of the Program. The DLIs were important and common program implementation milestones for PLN and similar distribution companies around the world to measure progress toward achievement of each segment of the PDO. For example, reduced technical interruptions per 100 km of MV distribution lines were used to measure improvements in the quality of power services whereas increases in kilometers of MV distribution lines measured the increased potential for additional customer connections. The target values were consistent with both the RUKN and the RUPTL key objectives. At the time of restructuring, the targets of DLIs were revised, new targets were agreed for the DLI#1, DLI#2, DLI#4, and DLI#5, to be in line with the reallocation of US$50 million.

48. The indicators were integrated with the Results Framework, while providing a timely and adequate flow of funds throughout the Program life to move implementation forward. The DLIs were relevant and adequate as incentives to achieve the objectives. The 10 DLIs comprise a mix of one outcome indicator and nine intermediate indicators. Five of the intermediate/output DLIs fall under the institutional strengthening and capacity-building results area, which were critical bottlenecks to the development objectives that might have hampered the Program's results without incentives. These

[11] http://documents1.worldbank.org/curated/en/717421594076964759/pdf/Indonesia-Systematic-Country-Diagnostic-Update.pdf.

indicators are intended to facilitate process/behavioral changes that would speed up preparation of annual plans, facilitate program budgeting, and improve distribution planning. This set of DLIs aimed to help PLN achieve potential program system improvements that were identified during the technical and fiduciary assessments. For example, distribution planning of the Program was strengthened through (a) the review, update, and issuance of revised distribution planning guidelines; (b) integration of planning software with GIS databases; and (c) enabling of the use of planning software by multiple users at each location through procurement of a corporate license. The implementation of the ERP system provided a non-utility specific information tool that supports efficient and transparent execution of processes of accounting, asset management, FM, human resources, procurement and logistics, project management, business planning and intelligence, and information management. The implementation of GIS databases not only strengthened distribution planning but also had the potential for improving customer outage management, transformer load management, and asset management functions.

49. As part of the PforR operation, the DLIs were annually verified by an IVA with a clear protocol and methodology for monitoring and verification. According to reported results, they all achieved—or exceeded—Program performance targets.

50. Given the clear alignment between DLIs and the PDO and the careful selection of DLIs to provide strong incentives to gradually progress toward the achievement of development outcomes, the relevance of DLIs is rated High.

Rating of Overall Relevance

51. As per the Implementation Completion and Results Report (ICR) Guidelines, overall relevance is rated High. The Program is clearly aligned to the World Bank's priority to develop the energy sector in Indonesia, and it was conceived as part of a wider government program of PLN. The overall relevance of the PDO and associated DLIs were reflected by their permanence throughout Program implementation. Strong commitment and leadership of the Government and implementing agencies contributed to the smooth achievement of PDOs and their associated DLIs. Thus, overall relevance of the Program is rated High.

B. ACHIEVEMENT OF PDOs (EFFICACY)

Assessment of Achievement of Each Objective or Outcome

52. The assessment of achievement of PDOs is organized around the three key development outcomes of the PforR outlined in the PAD and the Loan Agreement. While the PDO statement included three explicit objectives, 'to increase access to electricity supply', 'to improve the efficiency of their delivery', and 'to improve the reliability of their delivery' in Sumatra Island, the PAD also defined three related key outcomes: (a) increased access to electricity services, (b) improved efficiency of electricity services delivery, and (c) improved reliability of electricity services delivery, as well as five results areas: (a) improved access to electricity, (b) improved quality of service, (c) increased distribution efficiency, (d) increased power consumption, and (e) institutional strengthening and capacity building. The Program achieved all relevant and attributable indicators for the outcomes associated with the PDO despite energy sales being significantly lower than expected across Indonesia.

53. Outcomes were assessed for the entirety of the implementation period, rather than with split ratings for restructuring. A split rating before and after restructuring was not adopted for the following reasons: (a) there were no changes to the PDO outcomes; (b) the restructurings did not introduce substantial and/or material change to key outcome indicators, Program scope, and the associated level of ambition; and (c) the revised indicators reflected a better measure for achievement of the PDO and the end targets were revised as reliable data became available. The results of the Program were measured on the basis of the overall financing, provided by the World Bank, ADB, and PLN.[12]

Development outcome (i): Increased access to electricity services

54. The PDO indicator for this development outcome 'Improved access to electricity to result in the addition of new consumers' is 'People provided with access to electricity by household connections'. To achieve this objective, the Program supported the expansion of the distribution network. The number of residential customer connections was a key indicator used by both PLN and the GOI to assess progress of the country's electrification goals. Data for the number of PLN customers in Sumatra were extracted from the Management Service Information System called SILM (*Sistem Informasi Laporan Manajemen*), which had facilities to report the total number of customers broken down by (a) category/type of customer and (b) by PLN operating region. The primary source of data was the Centralized Customer Service Application (AP2T), which was linked to another application, Centralized Management and Monitoring of Sales (P2APST), that served as an interface to a number of banks that facilitates online payment from customers. Both applications were linked to SAP for data recording and reporting purposes. **Error! Reference source not found.** shows that the Program exceeded the revised target at closing. A total of 3.8 million new household customers were added during the Program compared to the expected 3.2 million during appraisal. These additional customers have contributed to the increased electrification ratio in Sumatra from 80.0 percent in 2014 to 96.2 percent in 2019[13], which was higher than the 2019 target in RUPTL 2015. The additional connection for new household customers could happen because of the expansion of distribution networks and increased capacity of distribution transformers under the Program which can be fully attributed to the Program.

55. All targets of intermediate indicators were also met or exceeded, which contributed to improved access to electricity to result in the addition of new consumers. The annual plan was approved in November 2019. About 22,213 km distribution lines were constructed or rehabilitated under the Program, with cumulative distribution lines of 114,929 km exceeding the target of 106,228 km. The percentage of planned capital expenditures realized reached 88 percent, exceeding the target of 85 percent. PLN exceeded the end target of residential energy sales of 19,201 GWh from the revised target of 18,438 GWh in 2019.

[12] ADB's DLIs, the implementation and monitoring and evaluation (M&E) arrangements were successfully harmonized through consultations and information sharing during the preparation and implementation stage. ADB also used the same IVA that PLN retained for the PforR.
[13] PLN's Statistic 2019.

Table 7. Achievement of Objective (i): to Increase Access to Electricity Services

PDO Indicator	Baseline	Actual	End Target	End Target Achieved as a Percentage
People provided with access to electricity by household connection (Number, Corporate)	11,180,000	14,980,000	14,410,000	103.9
Intermediate Indicator	**Baseline**	**Actual**	**End Target**	**End Target Achieved as a Percentage**
Annual work plans approved (*Rencana Kerja Anggaran Perusahaan*)	No	Yes	Yes	100
Percentage of planned capital expenditures completed (Percentage)	82	88	85	103.5
Distribution lines constructed under the project (Kilometers)	92,716	114,929	106,228	108.1
Increased volume in power sales to residential customers (GWh)	15,850	19,201	18,438	104.1

56. All related programmed actions in the Program Action Plan (PAP) were satisfactorily achieved. As mentioned earlier, 'DLI#1: Number of new Residential (Household) customers connected' and 'DLI#2: Additional length of MV distribution lines' have increased electricity access of customers, as they are an important signal of progress toward increasing customer connections, which resulted in DLI#5, which is the intermediate indicator 'Improved power consumption by residential customers'. Objective (i) was successfully achieved, thus efficacy is rated High.

Development outcome (ii): Improved efficiency of electricity services delivery

57. The PDO indicator for this development outcome 'Improved distribution efficiency results in reduced losses' is 'electricity losses per year in the project area (Percentage, Custom)'.[14] Distribution system losses are a key measure of a utility's operational efficiency. The Program contributed to electricity loss reduction efforts by improving network planning, namely (a) expanding, rehabilitating, and upgrading the distribution lines and substations; (b) increasing the number of distribution transformers and thereby improving the LV/MV ratio in the network; and (c) supporting improved network planning. Since the beginning of the Program, this PDO indicator was showing deterioration from baseline targets. However, before program closing in 2020, PLN notified the World Bank, during the mission, that since 2017, the result target for this indicator was mistakenly recorded, since PLN was actually recording the cumulative losses from distribution and transmission, whereas the indicator was meant to measure improvement in distribution. The correct achievement for the distribution losses was recorded in the Program's last Implementation Status and Results Report (ISR). The level of distribution losses has in fact constantly improved as shown in figure 2, and the indicator was well below the end-target value. The end target for

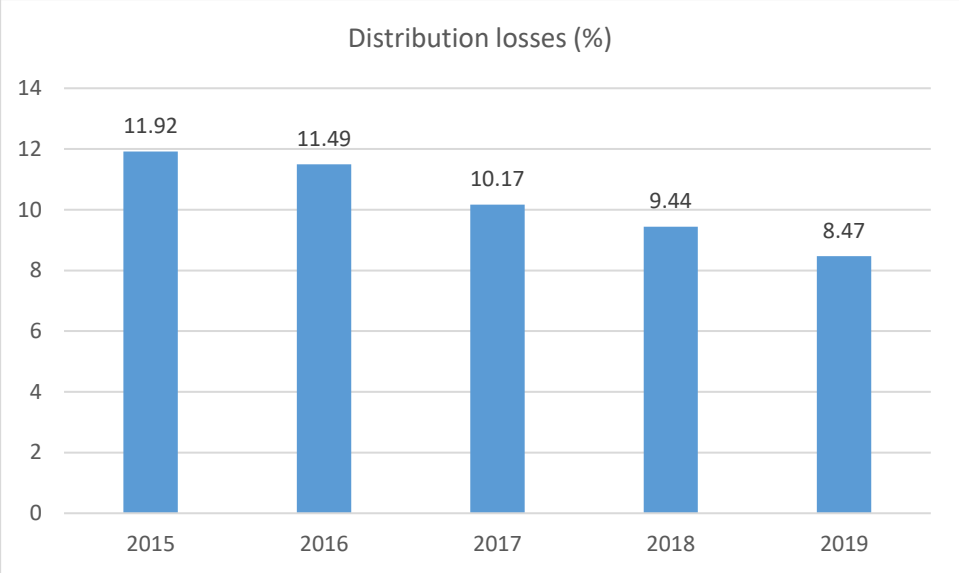
[14] Distribution losses include technical and non-technical losses, but it was not segregated at appraisal because it is quite complex to measure; while the total losses calculation is straightforward, efficiency should capture both.

'Electricity losses per year in the project area (Percentage, Custom)' was achieved. The activities under the Program were fully attributable to the achievement of this outcome.

Table 8. Achievement of Objective (ii): to Improve Efficiency of Electricity Services Delivery

PDO Indicator	Baseline	Actual	End Target	End Target Achieved as a Percentage
Electricity losses per year in the project area (Percentage, Custom)	11.92	8.47	10.00	179.7
Intermediate Indicator	**Baseline**	**Actual**	**End Target**	**End Target Achieved as a Percentage**
Number of distribution transformer units added (Number)	80,130	111,036	98,338	112.9
Increase in distribution transformer capacity (MVA) (Kilovolt-Ampere)	7,981,000	11,060,000	9,880,000	119.4

Figure 2. Distribution Losses in Sumatra since the Beginning of the Program



58. All related program actions in the PAP and intermediate indicators were also satisfactorily achieved. A total of 30,906 additional transformer units were installed during the Program with cumulative total transformers of 111,036 units exceeding the target of 98,330 units, and distribution transformer capacity increased from baseline value of 7,981,000 KVA to 11,060,000 KVA, exceeding the end target value of 9,880,000 KVA. The additional number of transformer units installed was also DLI#4 for this results area, which would help PLN focus on reducing LV feeder lengths and increasing MV coverage which would in turn reduce the technical losses in the LV system. Efficacy for objective (ii) is rated High.

Development outcome (iii): Improved reliability of electricity services delivery

59. The PDO indicator for this development outcome 'Improved quality of service to result in reduced interruptions' are reduction in 'System Average Interruption Duration Index (SAIDI) in minutes per customer year' and 'System Average Interruption Frequency Index (SAIFI)'.[15] These are internationally accepted measures of power supply reliability. At appraisal, the measurement for SAIDI and SAIFI were still under development. A huge deterioration of SAIDI/SAIFI was noticed starting in 2017 compared to historical data. However, while the team was further investigating the cause of this deterioration with PLN, it was found that this was a result of the comprehensive improvement of the measurement of these indicators from the time the Program was prepared. In 2014–15, PLN was manually recording interruptions only on 20 kV feeders. In 2016, PLN started computerizing the recording of interruptions and calculation of SAIDI/SAIFI and extended the recording of interruptions to the entire value chain (generation/transmission/distribution for both MV and LV) therefore capturing the real quality of service perceived by customers. Since the first year with comprehensive information was 2017, the baselines were revised to 2017 SAIDI and SAIFI data. With the restructuring, the target for this PDO indicator was well achieved for both SAIDI and SAIFI. It should be noted that SAIDI and SAIFI could be strengthened now with the conversion of distribution control centers into full SCADA functionality and with the completion of installation of GIS facilities in all Wilayahs during the Program period. The Program has significantly contributed to the achievement of target on reduced interruptions.

Table 9. Achievement of Objective (iii): to Improve Reliability of Electricity Services Delivery

PDO Indicator	Baseline	Actual	End Target	End Target Achieved as a Percentage
System average interruption duration index SAIDI (minutes per customer per year) (Minutes, Custom)	1,989	1,164	1,650	243.4
SAIFI (number of interruptions per customer per year) (Number, Custom)	17.81	11.28	15.5	282.7

60. All related program actions in the PAP were satisfactorily achieved. The intermediate indicator, 'Number of MV feeder technical interruptions per 100 km (Number, Custom)' which was also selected as DLI#3, exceeded its target by reducing from 21.22 MV feeder technical interruptions per 100 km to 16.02, despite the end target post restructuring being much more ambitious. Improved reduced MV feeder technical interruptions and decreases in the frequency and duration of outages and in voltage fluctuations indicated an improvement in the quality of services. Efficacy for objective (iii) is rated High.

[15] SAIDI/SAIFI here only considered distribution. During project implementation, PLN provided SAIDI/SAIFI that also included transmission. This has been corrected in January 2020.

Improved Institutional Capacity and the Program System

61. One of the objectives of PforR operation is to strengthen the Government's capacity, in this case PLN. The path to achieving institutional development was defined by five intermediate indicators which were also selected as DLI#6, DLI#7, DLI#8, DLI#9, and DLI#10, including two prior results.

62. The two prior results, 'FY 2016 Annual Work Plan approved', and 'PLN collaborated with development partners in the recruitment of an independent verification agent (IVA)' were already achieved before loan signing to incentivize implementation. The approval of 2016 work plans was intended to provide PLN with an incentive to expedite the approvals before the start of its fiscal year so that its Wilayahs would have enough time to fully implement the plans within the year; while the selection of the IVA was meant to provide independent verification of Program results.

63. The other three intermediate indicators used to measure the achievement of this results area included 'Integrate budgeting with ERP in all Program Wilayahs' (DLI#8), 'Issue revised planning guidelines acceptable to the Bank' (DLI#9), and 'Integrate planning software with GIS facilities' (DLI#10). The DLIs for the implementation phase were intended to strengthen distribution system planning and improve program budgeting. Disbursements for the two prior results were against the verification of the results following the effectiveness of the loan.

64. **Integrate budgeting with ERP in all Program Wilayahs.** The ERP system provided a non-utility specific information tool that supports efficient and transparent execution of processes of accounting, asset management, FM, human resources, procurement and logistics, project management, business planning and intelligence, and information management. Linking budgeting and ERP aimed to improve PLN's procurement and contract management practices by strengthening transparency and ensuring competitive procurement process which could lead to better bid prices and more efficient Program costs. Under the Program, PLN has developed a new user-friendly application called 'E-Budget' to integrate the budget planning and expenditures (work execution). 'E-Budget' has been rolling out in all Wilayahs since May/June 2018. At closing, the E-budget and ERP systems were linked and integrated for all PLN Wilayahs. Linking the budget to the ERP application helped strengthen the capacity and accountability of PLN's Internal Performance Monitoring Unit (*Satuan Pemantau Kinerja Korporat*, SPKK), facilitate budget preparation and monitoring, and facilitate financial reporting. For FM-related PAP actions, PLN improved the verification process and coordination among Wilayahs offices, Regional Directorate, SPKK, and the Corporate Secretary to ensure the accuracy of the key performance indicator (KPI) achieved through SILM. PLN demonstrated adequate internal control, and internal audit was conducted regularly covering the Program as sample in its Annual Internal Audit Plan (PKPT or *Program Kerja Pengawasan Tahunan*). In addition, PLN also submitted all quarterly reports to the World Bank, including the last report covering Q4 of 2019 although slight delays occurred.

65. **Issue revised planning guidelines acceptable to the Bank.** PLN has approved the Regulation of Distribution Planning Guidelines No. 000019.P/DIR/2020 dated April 30, 2020 and sent it to the World Bank on May 6, 2020. The planning guidelines identified the most economically appropriate development and expansion plans for the distribution system and developed the required procedures and methodologies to implement these guidelines. A complete set of self-standing documentation is now available to effectively carry out PLN's distribution network planning activities and to meet the corporate objectives in terms of reliability and quality of service, as well as to justify and optimize the investment

program across areas/Wilayahs. In addition, changes to the planning process, properly structured in the guidelines, were made to introduce use of GIS-based information in the planning process.

66. **Integrate of planning software with GIS facilities.** The GIS helps create and maintain a reliable database of customers and network assets. The pilot application of GIS integration with the distribution planning software package, namely PSS SINCAL, has started since October 2018 and was completed in one pilot Wilayah in each of the six main PLN operating regions across Indonesia during 2019. PLN completed the training of all distribution system planners in 2018. In July 2019, User Acceptance Test was performed for GIS integration with PSS SINCAL (a power system planning software) and was finished by the third party. PLN has provided evidence on usage of PSS SINCAL with GIS in Banda Aceh, for more than five feeders. After the pilot Wilayahs across Indonesia had fully been digitized, the PSS SINCAL software was used to plan multiple feeders in each of the pilot Wilayahs. Subsequently, PLN's plan was to extend the use of PSS SINCAL across all the Wilayahs in Indonesia—that was beyond the pilot Wilayah in Sumatra (that is Aceh) and the other pilot Wilayahs in other regions of Indonesia. The introduction of PSS SINCAL—together with GIS-based network digitization and enhanced Distribution Command Control (DCC) SCADA systems—would enable much more accurate calculation of electrical losses.

67. Overall, Program activities contributed to institutional strengthening and capacity building to result in the improved use of modern technology and trained and competent personnel. The measures supported by the institutional strengthening and capacity-building results areas would bring positive impact to the implementation of the entire PLN distribution program beyond Sumatra and beyond the RUPTL in the long term.

Rating of Overall Efficacy

68. Overall efficacy is rated High.

69. Despite the PforR being the first lending instrument of its kind to support PLN, the first in the World Bank's Energy and Extractive Global Practice, and also the first in any sector of the World Bank's engagement in Indonesia, the results have exceeded expectations at approval and the revised targets as part of the restructuring. The latter set higher expectations, based on the strong implementation capacity and results achieved at midterm. The expected investments were implemented within the original time frame and using the full IBRD loan, and the pace of implementation of investments with some DLIs had actually been faster than the original expectation, thereby warranting the revision of target values to be more ambitious. As described earlier, the Program achieved its development objectives in substance in terms of all of its outcomes and met or exceeded the targets of all of its results indicators. The DLIs proved to be suitable and acted as a good incentive for implementation. All results areas were achieved, and all actions in the PAP were successfully carried out. Additional indicator-by-indicator information is provided in annex 1.

C. JUSTIFICATION OF OVERALL OUTCOME RATING

Overall Outcome Rating: Highly Satisfactory

70. Based on the High rating for relevance of objectives and High rating for efficacy, the overall outcome rating of the Program is assessed as Highly Satisfactory. All of the Program objectives were met and exceeded their targets.

D. OTHER OUTCOMES AND IMPACTS (IF ANY)

Gender

71. The Program did not include gender-specific activities and was not gender tagged but was considered gender-informed as it contributed to the gender inclusion aspects of development. Increased access to electricity generally benefits both men and women. The principal Program beneficiaries included an additional 3.8 million new household customers which statistically amounts to about 49.4[16] percent of beneficiaries being women. PLN has not developed its customer database with disaggregated gender data, but the statistics data show that between 11.36 and 19.84 percent of households in provinces of Sumatra are led by women.[17]

Mobilizing Private Sector Financing

72. The project has not attracted reasonable private financing because the beneficiary is an SOE, PLN. The power sector has sizable investment needs (rehabilitation needs alone estimated to be in excess of US$43.34 million) and private sector participation is not only important to satisfy investment needs, but also to improve operational performance. The Program contributes to increase the customer connections, capacity, efficiency, and reliability of the Sumatra distribution system which will enable additional generation projects, including renewable energy projects which are mainly financed and developed by the private sectors. However, private sector participation would only be possible when the overall regulatory and institutional environment is adequate, and when there are right incentives, which takes years and broader reforms. The World Bank is closely supporting the Government on the sector reform initiatives, including on creation of an enabling environment for leveraging private sector and commercial financing through ongoing and planned technical assistance activities and projects.

Poverty Reduction and Shared Prosperity

73. The Program did not explicitly measure its direct impact on low-income rural and urban populations and other vulnerable groups or the impacts on poverty reduction. The Program was beneficial for customers of all income levels. By increasing access to electricity and improving the reliability and efficiency of power supply, the Program contributed to the increased business and industrial customers in Sumatra area. At Program closing, the number of business and industrial customers were increased by 38 percent and 44 percent, respectively, compared to the data in 2015. Additional business and industrial customers will enable job creation which is important in the effort on poverty reduction and shared prosperity. There was an increase in GDP per capita in Sumatra from IDR 37.09 million in 2014 to IDR 40.38 million in 2018, which could be indirectly contributed by the Program through business and industrial customers.

[16] Data as of 2019 from Indonesia Statistic 2020.
[17] National Economic Census 2009–2019, Central Bureau of Statistic.

III. KEY FACTORS THAT AFFECTED IMPLEMENTATION AND OUTCOME

A. KEY FACTORS DURING PREPARATION

74. **Lessons learned from past and ongoing operations.** Lessons learned from past and ongoing generation and transmission projects were incorporated in choosing the financing/lending instrument for this Program and mitigating the implementation constraints encountered: (a) decentralized implementation of distribution investments, including planning, design, procurement, contract management, payment, and commissioning processes, at PLN's branch offices (Wilayahs) resulted in faster implementation; (b) the main distribution unit (MDU) items, which comprised the bulk of expenditures under the Program, were fairly standardized and procurement of these items could be streamlined through framework contracts with registered (prequalified) manufacturers; and (c) unlike generation and transmission projects, the distribution segment demands less land and follows existing road corridors to reach customers.

75. **Relationship dynamic between PLN and the World Bank.** At the time of the preparation of the Program, there were three projects financed by the World Bank and implemented by PLN: Indonesia Power Transmission Development Project, Indonesia Second Power Transmission Development Project, and Upper Cisokan Pumped Storage Project. All three projects were experiencing slow progress and low disbursement rate. The World Bank team was in close coordination with PLN to solve the implementation issues, but it did not result in significant progress and caused the World Bank to issue a threat to partial cancellation (which happened in 2017 and 2018). Under this tremendous pressure, the World Bank was able to keep the engagement with PLN by providing this PforR as an alternative lending instrument, and this allowed maintaining the relationship jeopardized by the possible partial cancellations.

76. **Program's design.** As the first lending instrument to support PLN, the first in the World Bank's Energy and Extractive Global Practice, and also the first in any sector of the World Bank's engagement in Indonesia, the clearly defined Program boundaries, results areas, and key activities identified to be linked with disbursement incentives during preparation were deliberately and realistically conceived to establish a clear operational logic. The design of program scope and boundary which was well aligned with PLN's organizational structure has been an important factor to a successful Program implementation. The Program supported the implementation of several investment and reform measures outlined in the RUPTL and RUKN, by focusing on the electricity distribution sub-sector, as substantial generation and transmission investments were already in place. As such, the PDO focused on three areas of distribution service—access, efficiency, and reliability, which were linked to the achievement of five well-defined key development outcomes. By focusing on the service area of Sumatra, the Program ensures that benefits accrue to the largest share of customers, given that the area is the largest population center outside Java-Bali and an important economic growth center for Indonesia.

77. **Donor coordination.** ADB and the World Bank agreed to provide parallel financing for the same distribution program in Sumatra over the same period. The World Bank and ADB were in close coordination since the development of respective investments to ensure complementarity and avoid overlapping. ADB and the World Bank also agreed to use a streamlined approach and the performance would be measured for the whole Program. ADB's DLIs and the implementation and M&E arrangements were successfully harmonized through consultations and information sharing during the preparation and

implementation stage. ADB also used the same IVA that PLN retained for the PforR. The close collaboration between the World Bank and ADB avoided duplication of effort and promoted efficient utilization of Program resources.

78. **Risks and mitigation measures.** The overall risk was adequately assessed as Substantial during preparation, with a special concern on fiduciary risk, given that key stakeholders were not entirely familiar with the PforR instrument. Despite the Wilayahs, who carried out the physical implementation activities, carrying out similar programs over the years and being experienced and capable of managing the distribution construction work envisaged under the Program, issues could arise from the capacity of the local manufacturers and heavy internal procedures. To mitigate these risks, a dedicated PAP was designed and included as part of the PforR, which primarily related to identified improvement measures to be supported under the Program's four areas: (a) technical, (b) environmental and social, (c) procurement, and (d) FM. For instance, PLN rollout of new financial systems and processes, completed procurement process for MDUs, and improved verification processes. The PAP was successfully implemented through the Program and all risks were reduced to Low at Program closing.

B. KEY FACTORS DURING IMPLEMENTATION

Factors Subject to the Control of PLN

79. **Commitment and leadership.** Clear targets set in the Program and the continuous commitment and leadership at the top level enabled the smooth implementation of PLN's own program, and at the same time, maintained the high level of relevance of the Program throughout the implementation period. It was further supported through national-level implementation supervision and results reporting requirements. PLN as the implementing agency was highly committed to the Program's success. It established a project structure to ensure enhanced project management and coordination, as well as further timely and proper monitoring and reporting. It had an effective implementation structure and staff capacity and followed the nationally guided RUPTL and RUKN to increase access to electricity for household consumers and to meet the economy's power needs while improving efficiency and reliability of supply. It should be highlighted that the Program is under one directorate (Sumatra) in PLN's organizational structure. One line of bureaucracy is an important aspect to streamline the decision-making process, project implementation, and supervision.

80. **Program ownership and boundary.** PLN has designed the activities and the objectives based on the time slice of its own program under the RUPTL. Before the Program, the PLN team had been familiar with the preparation and implementation of similar activities. These factors were significant in developing the ownership of the Program by the PLN team and PLN management. PLN was also disciplined in maintaining the Program boundary within the scope of the distribution network in a clear geographic area of Sumatra, supported by ambitious but realistically achievable targets.

81. **Coordination and engagement.** PLN and the World Bank team worked seamlessly together, contributing to the ultimate PDO. At the early stage of implementation, PLN has made significant progress with the physical installation of new distribution lines, transformers, and household connections. However, the implementation of the PAP remains uneven, with some PAP items being well advanced (such as the rollout of new financial systems and processes) but with several PAP items relating to improved planning and technical operations being implemented slower. For example, there was a delay

in the approval of the distribution planning guidelines. Close collaboration between the World Bank team and PLN identified and addressed these issues during restructuring, and the implementation for these activities substantially accelerated. All the PAP actions were considered fully and satisfactorily completed at the Program closing date, and all the DLIs were completed on time.

82. **Program funds.** Final ex post contributions by financing source were broadly in line with the shares agreed to ex ante. Based on the cumulative Sumatra distribution network capital expenditures as of December 31, 2019, PLN contributed US$650 million, which was even above the ex ante agreed contributions (US$530 million). The share of IBRD financing of the Program at closing was 32 percent (slightly lower than the ex ante agreed contribution). ADB contributed US$400 million to the Program, comparing with ex ante agreed contributions of US$420 million. There was underachievement of residential energy sales in 2019 below ADB's DLI target. Beyond the program boundary, PLN was able to bring adequate investment funds to increase the generation capacity and the transmission line in Sumatra. There was an additional 6,757 MW generation capacity and 8,074 km transmission line during the Program period.

Factors Subject to the Control of the World Bank

83. **World Bank support.** There was continued, tailored support from the World Bank's team to guide implementation. The MTR was used to assess progress and prioritize critical next steps. During the MTR in 2018, a review on progress of all Program indicators, DLI progress, and disbursement projections and a review of the implementation of the PAP were carried out and duly documented. The MTR also confirmed the need to adjust the targets for DLI#1, DLI#2, DLI#4, DLI#5, and DLI#9 as explained in paragraph 28. The issue was thoroughly discussed and addressed after the MTR, so that when a formal Program extension request was received from PLN, it was quickly processed. The PAP contributed to enhancing the capacity of the executing agencies and reducing the main risks identified at preparation. The high quality of the World Bank supervision and the World Bank team's proactivity also contributed to the success of the Program.

IV. BANK PERFORMANCE, COMPLIANCE ISSUES, AND RISK TO DEVELOPMENT OUTCOME

A. QUALITY OF MONITORING AND EVALUATION

M&E Design

84. As mentioned in the Theory of Change and in Factors During Preparation and Implementation sections, the logic behind the Program was clear and straightforward, and substantive achievements were made in all three elements of the PDO and evidenced by PDO indicators.

85. **Results Framework and DLIs were well defined and coherent with the outcome indicators.** The design of DLIs involved both specific measures leading to concrete results as well as policy reforms with long-term institutional impacts. The choice of specific indicators was guided by their significance in signaling progress toward achieving the planned outcomes. There were three types of DLIs: one was PDO indicators, five of the intermediate/output DLIs fell under the institutional strengthening and capacity-building results areas, and the other four intermediate/output DLIs related to important program

implementation milestones. The DLIs were selected and agreed upon with PLN, guided by three key considerations: (a) for each results area, the use of the identified outcome indicators as DLIs was considered first as this would directly provide the incentives for meeting program goals; (b) the feasibility of measuring, monitoring, and verifying the indicators was considered and the indicators were revisited at restructuring to better reflect the faster pace of disbursement and data; and (c) the selection of DLIs was informed and coordinated with the ADB which is financing the same program in Sumatra. All of the targets have been met or exceeded, on time.

86. DLI verification protocols were clearly defined during appraisal to ensure a smooth and robust verification process, capturing both the quantitative and qualitative aspects of the DLI achievements under both, the ADB and IBRD, loans. An IVA was hired by PLN to help strengthen the M&E methodologies and capacity of the Program when the evaluation capacity and established procedures prepared by PLN were reasonable. The IVA verified results through financial audit, procedural verification, and physical inspection that had tested the accuracy and quality of results claimed by PLN. The IVA used the verification protocol as the basis for preparation of a Program Results Verification Report that was submitted to the World Bank by PLN. This helped PLN further strengthen its M&E methodologies and capacity.

87. **Adequate institutional arrangements were contemplated.** PLN, as the implementing agency, had the responsibility for overall Program results M&E. Within PLN, the SPKK collected and consolidated data from the Wilayahs and assisted the Project Management Unit (PMU) to prepare a quarterly performance monitoring report. The SPKK's role under the Program was in line with its existing mandate to report to PLN's President Director on corporate performance against the agreed KPIs. PLN already had an established procedure for performance bonuses and penalties for a selected number of KPIs. The Wilayahs also maintained statistics on all the indicators and were required to provide data under the Program.

M&E Implementation

88. M&E of the Program involved (a) the Results Framework; (b) quarterly implementation progress reports on inputs, outputs, and results; (c) an MTR of implementation and outcome progress; and (d) the ICR. The PMU was responsible for day-to-day M&E activities, including collecting data and monitoring and reporting progress against the agreed performance indicators to the World Bank.

89. M&E was implemented thoroughly and as planned and was reported regularly as part of the client-prepared Program progress reports. PDO-related targets were duly and timely reported on the basis of information provided by the implementing agencies. IVA annual reports were timely available and consistently used as the main basis for authorizing the World Bank's disbursements upon the successful achievement of DLI-associated targets.

90. Primary attention was given to DLI implementation and verification. Verification reports were found to be consistent with implementation agencies' information and the World Bank internal reporting system. According to IVA reports and information provided, all end-of-Program targets had been achieved (or exceeded) by the Program closing, which led to timely and full disbursement of World Bank proceeds according to DLI results.

91. The indicators and DLIs were updated at restructuring to reflect the Program outcomes more accurately by (a) incorporating a new and more comprehensive way of rebasing SAIDI and SAIFI; (b) considering better-than-expected results during the first half of the Program implementation and the reallocation of proceeds which will allow PLN to go beyond the original end-of-program targets; and (c) considering lower than originally anticipated growth in electricity. In addition, the inconsistency in target figures in the PAD and the Legal Agreement were also fixed during the restructuring. Before program closing in 2020, the measurement calculation for the PDO indicator, 'electricity losses per year in the project area' was also revised, because PLN was actually recording the cumulative losses from distribution and transmission since 2017.

M&E Utilization

92. M&E was utilized to (a) monitor and manage the Program progress particularly through the intermediate results indicators and achievements toward the PDO, (b) identify areas where emerging issues might require attention and adjust their respective implementation plans to achieve the Program's objectives, and (c) provide a basis for important decision-making, such as the restructuring.

93. The indicators were closely aligned with PLN Sumatra's corporate KPIs, resulting in the M&E results and reporting being used more strategically. Implementing and achieving the targets of the DLIs translated into progression of the indicators as well. PLN headquarters used these indicators, such as DLI#1 (new customers connected) and DLI#5 (energy sales to monitor Wilayah performance), through review and oversight by its internal audit (*Satuan Pengawas Internal*, or SPI), and SPKK divisions. At the same time, IVA provide crucial support to the SPKK for further enhancement of its approaches and methodologies for M&E and reporting on results.

Justification of Overall Rating of M&E Quality

94. **The overall quality of M&E is rated Substantial.** The Program was successful in being able to monitor progress and providing evidence that most of the development objectives as planned for at the Program start had been met. The Program implemented a framework for data collection and systematic analysis that greatly improved resource allocation and facilitated the achievement of results. However, considering slight hitches in calculating the target value for an indicator, which was corrected before Program closing, the overall quality of M&E is rated Substantial.

B. ENVIRONMENTAL, SOCIAL, AND FIDUCIARY COMPLIANCE

Environmental and Social

95. **E&S compliance and rating is Satisfactory.**

96. Capacity building that has been carried out by the Program to strengthen PLN's capacity has been successfully applied by PLN, starting with environmental and social screening, documenting the results of consultations, documenting complaints from the community, and regular monitoring and good engagement between stakeholders. The safeguard capacity building was prepared on a basis of environmental and social system assessment carried out at appraisal. To sustain these good practices, PLN should include environmental and social risk management standards in the operational system of the

distribution activities by improving the operational system (Standard Operating Procedure) in Book 4/Buku 4 (*Standar Konstruksi Gardu Distribusi dan Gardu Hubung Tenaga Listrik*, *Des 2010*).

97. PLN used the environmental and social screening guidance it prepared to screen its proposed activities. The guidance forms were disseminated it to all Wilayahs, PLN units (*Unit Induk Distribusi*/Distribution Area Unit and *Unit Induk Pusat Penyaluran* and *Pusat Pengatur Beban Sumatra*/Center for Load Distribution and Dispatch) in Sumatra annually and implemented properly. Of all the Program activities that have been reported and reviewed by the World Bank, there were no impacts on physical or economic displacement nor impacts on indigenous peoples. PLN provided minutes of meetings based on the results of consultations before construction begins. The public consultations were carried out prior to civil works to reach an agreement with the community.

98. **Environmental.** PLN's commitment and efforts in addressing the environmental issues should be much appreciated. Regardless, there were challenges in implementation of the PAP on better management of the warehouse, especially regarding used transformers oil that may contain polychlorinated biphenyl (PCB). PLN has brought all key stakeholders to a forum in an attempt to find the best available technology for PCB management, in particular, the Ministry of Environment and Forestry (MoEF), which is the leading ministry in implementation of Law No. 19/2009 on Ratification of Stockholm Convention on Persistent Organic Pollutants, and the United Nations Industrial Development Organization (UNIDO) Indonesia Office, which has received a specific Global Environment Facility (GEF) funding for a program of 'Introduction of an Environmentally Sound Management and Disposal System for PCB Wastes and PCB-contaminated Equipment'. To this end, the task team is confident in concluding that the potential negative environmental impact due to improper management of the used transformers oil has been well managed. PLN should continue (a) to improve management of warehouses, not only the distribution warehouse in Sumatra region but also other warehouses in the country where used transformers are stored and (b) to collaborate with the MoEF and UNIDO in supporting the country commitment for the elimination of the use of PCB in equipment (for example, transformers and capacitors) by 2025.

99. **Social.** Throughout Program implementation, the social risk compliance rating was satisfactory. PLN has carried out all environmental and social screening processes according to the agreed screening format. PLN headquarters and all regional units in Sumatra region coordinate regularly, both in the screening process and in monitoring of its implementation. On a quarterly basis, PLN presents a quarterly report on the Program progress which includes environmental and social aspects. The Program implementation did not find significant social impacts, but the team recorded operational weakness of the Program in documenting the results of consultations and complaints received from the community both by contractors and PLN Regional Units.

100. PLN has a well-established management system for handling any grievance/complaint from the public throughout the country, namely Call Center 123 and front-line customer services representatives, and has monitored the complaints handling during construction. Complaints received included those related to construction impacts, environment, community health and safety, and social issues. Call Center 123 can be accessed by anyone, anywhere in Indonesia through PLN's website, email, telephone, and social media (for example, Facebook and Twitter); through which the Wilayahs were able to take immediate actions. The Wilayahs verify the issues and resolve the grievances/complaints within 24 hours by referring to standard operating procedures. Monitoring and recording of complaints handling and completeness of monitoring were well documented for activities related to the Program, including public

consultations, minutes of pre-development meetings with communities, land-use agreements, and tree cutting/pruning (per individual/owner).

Fiduciary

101. **The procurement performance has been assessed as Satisfactory.** The procurement aspects under the Program are planning, bidding, evaluation, contract award, and contract administration. During Program implementation, improvements were made by PLN, in terms of (a) complying with the World Bank's Anti-Corruption Guidelines by ensuring that PLN does not award contracts to firms/individuals who are in the World Bank's debarred/temporary suspended list; (b) upgrading the e-procurement system so that PLN is able to published detailed notification of awards through the system; (c) publishing PLN's blacklisted firms on its website as required by PLN's procurement regulation; (d) conducting local suppliers capacity assessment for MDU items; and (e) ensuring that corrective actions from the last procurement audit conducted by PLN's internal auditor have been taken care of. Despite the quality issues of the quarterly procurement performance report during the early stage of Program implementation, there were some improvements made until the end of the Program implementation period.

102. **The FM performance was Satisfactory**. The Program's FM system, including accounting, budgeting, internal control, funds flow, financial reporting and auditing, was acceptable to the World Bank. During the early stages of implementation, supervision missions identified issues related to delays and inaccuracies in the procurement performance monitoring reports submitted by PLN. PLN was also struggling with the verification process internally. With support from the World Bank's team, PLN enhanced collaboration (including its project unit and treasury unit), and effectively resolved these issues. PLN regularly submitted the interim financial reports that were acceptable by the World Bank. PLN also submitted the entity's audit reports on time with clean (unqualified) opinion. The audit reports were published on the PLN website. One DLI, 'Integrate budgeting with ERP in all program Wilayahs', was aimed to improve the budgeting system in PLN. There was a delay in achieving the target at the early stage of implementation, as PLN had a companywide target to run the system in all offices in Indonesia, rather than in the Sumatra region only. The target was achieved in 2018 and the amount disbursed in 2019.

C. BANK PERFORMANCE

Quality at Entry

103. Based on its analysis of previous experience of PLN's distribution project in Indonesia and also in other countries in the region, the World Bank/borrower preparation team decided on a set of development objectives that were highly relevant for Indonesia and came up with a design that was appropriate given the local institutional context. The Program was deliberately and realistically conceived as a way to support PLN on specific areas of its broader energy sector strategy and objectives. The Program contributed to the implementation of PLN's existing RUPTL. Supporting the existing program has ensured the readiness of the operation during appraisal. The team closely engaged with PLN during preparation and the design of DLIs was in coordination with the client.

104. The project management arrangements, fiduciary procedures, M&E systems, and safeguards enforcement measures were based on standard practices that had proven effective in numerous World

Bank-funded projects worldwide, and the policies and procedures described in the Operational Manual prepared as a condition of effectiveness specified the implementation procedures in considerable detail.

Quality of Supervision

105. The World Bank worked closely with PLN to ensure successful implementation of the Program. During the implementation of the Program, the World Bank conducted regular supervision missions (about four a year), participated in bi-yearly review missions by the IVA, and conducted two regular missions. The Aide Memoires and ISRs were prepared in a candid manner and on time. During the implementation, the team was able to identify more reliable data in the early stages of implementation. The Results Framework was an effective tool for proactive management of issues encountered during project execution, such as the discrepancies between the Results Framework included in the PAD and the DLIs included in the Financing Agreement. When issues materialized, for instance, during the MTR, the World Bank appropriately advised the client, and restructuring was done to improve identified shortcomings. The Program was in compliance with fiduciary and safeguard policies. The World Bank's task team played a crucial coordinating and proactive role in suggesting and promoting solutions to implementation challenges, in partnership with ADB.

Justification of Overall Rating of Bank Performance

106. The overall rating of the World Bank's performance is Highly Satisfactory. The World Bank task team was diligent in preparation of the Program, ensuring that the Program's outcomes were relevant to Indonesia's energy sector needs and strategies at the time of Program preparation and incorporated lessons from previous projects to ensure smooth implementation. The task team covered all the required Program aspects during preparation, including fiduciary, risk assessment, M&E, and social and environmental safeguards. During Program implementation, the task team took proactive actions during the Implementation Support Missions and the MTR to maintain the good pace of Project implementation and adjust or clarify a few DLIs. The World Bank team also actively supported PLN, providing them guidance and advice, resulting in successful Program completion.

D. RISK TO DEVELOPMENT OUTCOME

107. **There is a low risk to the achievement of the development outcomes.** The Program has demonstrated and yielded good benefits for PLN, the broader energy sector, and the Government. The Program results are expected to sustain even beyond the Program life.

108. The risk to achieve the objective, 'increase access to electricity services and to improve the efficiency and reliability of their delivery in selected areas of Indonesia' is Low because PLN is able to maintain an operation and maintenance program adequately. The infrastructure investments are likely to last through the lifetime of the technology. In addition, extensive training has been provided to ensure that PLN's staff are able to properly operate and use the systems. In addition, a review of the historical allocations for operation and maintenance showed that PLN expenditures were in line with best industry practices at 3–5 percent of capital expenditures.

109. In the short term, the COVID-19 pandemic may further slow down the economic growth which will affect the sales of electricity to business and industrial customers. In the long term, there is a risk that

the development outcomes achieved by the project may not be sustained. Cost recovery tariffs are very important for the financial and operational sustainability of PLN, and despite few tariff adjustments being made during implementation, the customer tariffs and the electricity production and distribution cost are still not close to its recovery level. PLN relies on annual subsidy provided by the MoF to close the financing gap to allow PLN to have adequate funds for the operation, maintenance, and financing of its investment program. The World Bank team has been continuously providing supports to the GOI and PLN to reduce and mitigate this risk through an extensive ASA program. Several analytical works have been and will continue to be provided under the Indonesia Energy Transition and Sustainable Access to Modern Energy for All Programmatic Advisory Services and Analytics such as (a) the reform of the public service obligation from electricity subsidy to social protection, (b) advisory support for an improved electricity sector governance, (c) PLN's financial early warning system, (d) options for PLN's new forward-looking revenue model, and (e) preparation of a white/vision paper on PLN's financial stabilization.

V. LESSONS AND RECOMMENDATIONS

110. **By supporting the existing government programs, this PforR helps leverage the World Bank's development assistance that can lead to greater development effectiveness**. The client ownership and commitment of the operation will be high when it supports the existing program and if the program is also the client's high priority. The client should have been familiar and had adequate experiences and capacity in implementing such existing activities which will allow the client to manage the program well and effectively. Future operations should be designed based on the medium and long-term priorities ensuring both the Government's and sector stakeholders' ownership and commitment. Previous experience in implementing the World Bank-financed projects is also a key factor to manage fiduciary, environmental/social risks, and technical aspects of the program well.

111. **A clearly defined scope and program boundary are important to ensure the achievement of the Program's outcomes**. When the Program supports a part of a bigger program, selecting the subprogram, defining the period of support, and outlining the boundary and geographic focus are important aspects of the Program design. The need to focus areas of intervention and to define activities that can be realistically achieved given implementation capacity was key for the success of the Program. The clearly defined and well-maintained Program boundaries, results areas, and key activities identified to be linked with disbursement incentives during preparation, managed to establish a clear operational logic, and this has been an important factor to guide the Program implementation.

112. **The prerequisite for the success of a PforR operation is strong leadership and alignment of the Program design with the client's internal organization structure**. Leadership from the top management will ensure a streamlined decision-making process on strategic aspects during the design stage and any major issues during the implementation stage. The Program may also benefit from the client's decentralized organization allowing regional offices to have sufficient authority to conduct the planning, design, procurement, contract management, payment, and commissioning to implement the program in their respective areas. The decentralized arrangement supported with adequate capacity at the regional level will result in faster implementation. For future operations, it will be important to design the Program's components or activities aligned with the client's organizational structure which could benefit from the faster decision-making process throughout the project design and implementation stages.

113. **An important feature for the PforR instrument is that it incentivizes removal of critical roadblocks to improving the Program's effectiveness, efficiency, and sustainability.** The DLIs were carefully selected to address implementation challenges and institutional capacity constraints, with required improvement measures included in the PAP. The Program was a successful demonstration of linking public investment with outcomes and results targeting institutional reforms, including sensitive or politicized areas such as budget planning and personnel management, which were difficult for the World Bank to get involved in under traditional IPF projects. When preparing similar operations in the future, World Bank teams should consider whether alternative financing instruments that focus less on process and more on results might be more appropriate—such as a PforR or DPL.

114. **For the success of the Program, the World Bank's task team's close engagement and frequent monitoring were required, which necessitated greater supervision.** The depth of technical expertise and close monitoring for the achievement of DLIs and PAPs—and for proper verification protocols require rigorous supervision. During the implementation, most members of the task team, including several task team leads, were based in Indonesia, which significantly facilitated coordination with the client, other relevant donors, and the IVA. The team was able to provide timely feedback to PLN throughout the Program. Fiduciary aspects were closely monitored, the identified issues addressed, and training provided to strengthen the capacity of the PLN staff, and safeguards supervision was eventually ramped up when needed. The dedication of the team and the demonstrated value of well-prepared consultations were highly appreciated by the counterparts. Proactivity during the implementation stage by the team through the Program's restructuring ensured the achievement of the outcomes and maximized the disbursement from each DLI. The restructuring not only captured the faster-than-expected progress and its implication to the disbursement allocation, but also identified the trend of low electricity sales and proposed the revision of related target indicators to ensure the achievement of the Program outcomes.

115. A **PforR can strengthen coordination between the client, World Bank, and other development partners, toward full alignment with government programs.** As demonstrated by this operation, the PforR instrument provides an opportunity to coordinate development partners, harmonize the dialogue with the Government, and facilitate full donor support toward a government program. Over the implementation of the Program, the World Bank team joined two IVA missions and conducted two joint missions with ADB every year from the start of implementation. Strong coordination can bring more informed and more balanced decision-making on critical issues and lead to more informed and more balanced decision-making.

116. **Long-term vision and continued client commitment are needed to maintain and scale up the good practices, that will lead to the sustainability of the Program.** The Program has demonstrated the benefits and outcomes of continued commitment, and paved the road both for PLN and the World Bank to further improve the sector through replicating the project design and results in future distribution projects. However, the results of some interventions, especially those that are designed to promote institutional change take time to materialize. As the counterpart's institutional arrangements and personnel composition might change, sectoral priorities might also change, maintaining commitment thus becoming more important. For instance, it is necessary to follow the distribution planning guidelines developed. Another example is the importance of extending the use of ERP across all the Wilayahs in Indonesia as they are becoming very useful tools in ensuring efficient and transparent execution of processes, as demonstrated by the pilot.

117. **The task team's proactivity during the project design is also an important factor for Program success**. This Program was the first operation in Indonesia using a direct lending mechanism to PLN instead of an SLA through the MoF. During the Program preparation, the Government issued a regulation to allow SOEs, such as PLN, to get a direct loan backed by a sovereign guarantee to be issued by the MoF. Understanding that the direct lending would provide an added value to the Program in simplifying the lending process, the team took a good proactive approach to the MoF and Bappenas to propose the Program as the first operation for the direct lending. The SLA mechanism is included in the annual state budget which requires the parliament's approval and has a time consuming disbursement process.

118. **The decisions of using a direct lending mechanism and a PforR as the lending instrument have contributed to the improvement of project implementation compared to other previous projects with PLN**. The direct lending mechanism provided flexibility to PLN for budget approval and the disbursement process and excluded it from the time-consuming state budget process. For the implementation of the PforR, PLN Wilayahs were allowed to use PLN's own procurement system which they have been familiar with. The activities under the Program were judged not to be likely having significant adverse impacts that are sensitive, diverse, or unprecedented on the environment and/or having low environmental and social risks for affected people. PLN already has a set of procedures on environmental and social safeguards systems that are aligned with the Indonesian legal framework and with World Bank policies. The Wilayahs have been carrying out similar distribution programs over the years and are experienced in and capable of managing distribution construction envisaged under the Program.

119. **Despite being the first PforR instrument in the World Bank energy sector and the World Bank operation in Indonesia, this Program is considered a best example**. The lessons learned and best practices gained from the implementation of this Program should be communicated and disseminated within the World Bank energy or infrastructure group and the World Bank's other sectors in Indonesia. The PforR is an alternative lending instrument to be considered in the dialog with the World Bank's clients. Both lessons learned and best practices could be modified and applied in a different local context to create a better design and ensure better implementation of a similar program elsewhere in the future.

ANNEX 1. RESULTS FRAMEWORK, DISBURSEMENT LINKED INDICATORS, AND PROGRAM ACTION PLAN

Annex 1A. RESULTS FRAMEWORK

(i) PDO Indicators

Objective/Outcome: Increase access to Electricity Services

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
People provided with access to electricity by household connections	Number	11180000.00 01-Jan-2015	12749000.00 31-Dec-2019	14410000.00 05-Apr-2019	14980000.00 31-Dec-2019

Comments (achievements against targets):
The number of people provided with access to electricity, which is measured by household connections, increased to 14,980,000 against the formally revised target, 14,410,000. This is around 3.9% better than expected. This PDO indicator measures the increased access to electricity services. The number of residential customer connections was a key indicator used by both PLN and the GOI to assess progress of the country's electrification goals. Data for the number of PLN customers in Sumatra was extracted from the Management Service Information System called SILM, which had facilities to report the total number of customers broken down by a) category/type of customer; and b) by PLN operating region.

Objective/Outcome: Electricity losses per year in the project area

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion

Electricity losses per year in the project area	Percentage	11.92 01-Jan-2015	10.00 31-Dec-2019		8.47 31-Dec-2019

Comments (achievements against targets):
Electricity losses during implementation reduced from 11.92% at appraisal to 8.47% in the end of 2019, against 10% targeted. This is around 79.7% better than expected. This is a key measure of a utility's operational efficiency. Since the beginning of the project, this PDO indicator was showing deterioration from baseline targets. However, PLN notified the Bank in 2020 during the mission that since 2017, the reported cumulative losses had taken into account both distribution and transmission, whereas the indicator was meant to measure improvement in distribution. The level of distribution losses has in fact constantly improved, and exceeded the end target value.

Objective/Outcome: Improve reliability in the Project area

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
System average interruption duration index (SAIDI) in minutes per customer year	Minutes	1989.00 01-Jan-2018	463.00 31-Dec-2019	1650.00 05-Apr-2019	1164.00 31-Dec-2019

Comments (achievements against targets):
At closing, SAIDI was reduced to 1,164 Minutes per customer per year, from 1,989 Minutes per customer per year at appraisal, exceeded the revised target of 1,650 Minutes per customer per year. Since 2016, PLN started to computerize the recording of interruptions and calculation of SAIDI/SAIFI and extended the recording of interruption to the entire value chain (generation/transmission/distribution for both medium and low voltage) therefore capturing the real quality of service perceived by customers. Therefore, the baselines were revised to 2017 SAIDI and SAIFI data. With the restructuring, the target for this PDO indicator is well achieved for both SAIDI and SAIFI.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
System average interruptions frequency index (interruptions per customer per year)	Number	17.81 01-Jan-2018	8.11 31-Dec-2020	15.50 05-Apr-2019	11.28 31-Dec-2019

Comments (achievements against targets):
At closing, SAIFI was reduced to 11.28 interruptions per customer per year, from 17.81 interruptions per customer per year at appraisal, exceeded the revised target of 15.50 interruptions per customer per year. Since 2016, PLN started to computerize the recording of interruptions and calculation of SAIDI/SAIFI and extended the recording of interruption to the entire value chain (generation/transmission/distribution for both medium and low voltage) therefore capturing the real quality of service perceived by customers. Therefore, the baselines were revised to 2017 SAIDI and SAIFI data. With the restructuring, the target for this PDO indicator is well achieved for both SAIDI and SAIFI.

(ii) Intermediate Results Indicators

Results Area: Improved Access to electricity

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Annual work plans approved (on time)	Yes/No	N 01-Jan-2015	Y 31-Dec-2019		Y 15-Nov-2019

Comments (achievements against targets):

The annual work plans approved in in November 2019. This intermediate indicator is achieved.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Percentage of planned capital expenditures realized	Percentage	82.00 31-Dec-2014	85.00 31-Dec-2020		88.00 31-Dec-2019

Comments (achievements against targets):
Percentage of planned capital expenditures reached 88 percent, which exceeded the End target of this intermediate indicator, which is 85%.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Distribution lines constructed or rehabilitated under the project	Kilometers	92716.00 01-Jan-2015	104510.00 31-Dec-2020	106228.00 05-Apr-2019	114929.00 31-Dec-2019
Distribution lines constructed under the project	Kilometers	92716.00 01-Jan-2015	104510.00 31-Dec-2019	106228.00 05-Apr-2019	114929.00 31-Dec-2019

Comments (achievements against targets):
At the end of 2019, 114,929 Kilometers distribution lines were constructed or rehabilitated under the Program, exceeding the revised target of 106,228 km.

Results Area: Improved quality of service

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Number of MV feeder technical interruptions per 100 km	Number	21.22 01-Jan-2015	21.02 31-Dec-2019	16.00 05-Apr-2019	16.02 31-Dec-2019

Comments (achievements against targets):
The intermediate indicator, “Number of MV feeder technical interruptions per 100 km (Number, Custom)” was exceeded its target by reducing from 21.22 MV feeder technical interruptions per 100 km to 16.02.

Results Area: Increased efficiency

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Number of distribution transformer units added	Number	80130.00 01-Jan-2015	97904.00 31-Dec-2020	98338.00 05-Apr-2019	111036.00 31-Dec-2019

Comments (achievements against targets):

Number of transformers added is the difference between the actual number of transformers in the grid to date minus the baseline number of transformers. 111,036 additional number of transformer units were installed, which would help PLN to focus on reducing LV feeder lengths and increasing MV coverage which would in turn reduce the technical losses in the LV system.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Increase in distribution transformer capacity (MVA)	Kilovolt-Amphere(KVA)	7981000.00 01-Jan-2015	9717000.00 31-Dec-2019	9880000.00 05-Apr-2019	11060000.00 31-Dec-2019

Comments (achievements against targets):
Distribution transformer capacity increased from (MVA) baseline value, 7,981,000.00 Kilovolt-Ampere (KVA) to 11,060,000 KVA, exceeding the end target value of 9,880,000 KVA.

Results Area: Improved power consumption by residential customers

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Increased volume in power sales to residential customers (GWh)	Gigawatt-hour (GWh)	15850.00 31-Dec-2014	21471.00 31-Dec-2019	18438.00 05-Apr-2019	19201.00 31-Dec-2019

Comments (achievements against targets):
Increased volume in power sales to residential customers (GWh) is the difference between the actual value and the baseline value. The target was revised at restructuring to reflect the slower than expected trend of electricity demand growth across Indonesia. PLN has exceeded the revised end target of residential energy sales of 18,438 GWh from 15,850 GWh in 2015— it was able to achieve residential energy sales to 19,201 GWh in 2019.

Results Area: Institutional strengthening and capacity building

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
PLN collaborated with development partners in the hiring of an independent verification agent	Yes/No	N 01-Jan-2015	Y 31-Dec-2019		Y 24-Apr-2020

Comments (achievements against targets):
PLN collaborated with development partners in the hiring of an independent verification agent.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Integrate budgeting with ERP in participating Wilayahs	Yes/No	N 01-Jan-2015	Y 31-Dec-2019		Y 24-Apr-2020

Comments (achievements against targets):
PLN has developed a new user friendly application called “E-Budget” to integrate between budget planning and expenditures (work execution). “E-Budge” has been rolling out in all Wilayahs since May/June 2018. At closing, the E-budget and ERP systems was linked and integrated for all PLN Wilayahs. Linking the budget to ERP application helped strengthen the capacity and accountability of SPKK, facilitate budget preparation and monitoring; and facilitate financial reporting.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Issue revised distribution planning guidelines acceptable to the Bank	Yes/No	N 01-Jan-2015	Y 31-Dec-2019		Y 30-Apr-2020

Comments (achievements against targets):
PLN's Board of Director has approved the new Distribution Planning Guidelines on April 30, 2020 to effectively carryout PLN’s distribution network planning activities and to meet the corporate objectives in terms of reliability and quality of service, as well as to justify and optimize the investment program across areas/Wilayahs.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Integrate distribution planning software with GIS facilities	Yes/No	N 01-Jan-2015	Y 31-Dec-2019		Y 24-Apr-2020

Comments (achievements against targets):

The pilot application of GIS integration with PSS SINCAL software has started since October 2018 and was completed in one pilot Wilayah in each of the six main PLN operating regions across Indonesia during 2019.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Conduct procurement audits for at least 15% of contracts issued by each procuring unit and share results with the Bank	Yes/No	N 01-Jan-2015	Y 31-Dec-2020		Y 24-Apr-2020

Comments (achievements against targets):
PLN conduct procurement audits and shared the results with the Bank on time.

ANNEX 1B. DISBURSEMENT LINKED INDICATORS

DLI 1: Number of new Residential (Household) customers connected (Number (Thousand))

	Baseline	Project closing	Total
Original values	11,180.00	12,857.00	
Actual values		14,980.00	

Allocated amount ($)		155,556,000.00	155,556,000.00
Disbursed amount ($)		155,556,000.00	155,556,000.00

Comments (achievements against targets):

By the end of 2018 PLN had already exceeded the minimum amount of new residential customers connected to receive the full amount disbursable. Since the beginning of the project, PLN has connected 3.8 million of new residential customers, exceeding the initial objective of 3.23 million.

DLI 2: Additional Length of MV distribution lines (Kilometers)

	Baseline	Project closing	Total
Original values	92,716.00	106,228.00	
Actual values		114,929.00	
Allocated amount ($)		75,000,000.00	75,000,000.00
Disbursed amount ($)		75,000,000.00	75,000,000.00

Comments (achievements against targets):

PLN has already achieved the minimum cumulative length of Medium Voltage Distribution Lines to receive the full amount disbursable (after reallocation of proceeds under project restructure).

DLI 3: Number of MV feeder technical interruptions per 100 kilometers (Number)

	Baseline	Project closing	Total
Original values	21.22	16.00	
Actual values		16.02	
Allocated amount ($)		60,000,000.00	60,000,000.00
Disbursed amount ($)		59,980,000.00	59,980,000.00

Comments (achievements against targets):

The Medium Voltage (MV) feeder interruptions per 100ckm at closing is 16.02, which is 0.1% higher than the target of 16.00 and considered that this DLI indicator has been achieved. This shows a continued improvement in Medium Voltage reliability and is significantly exceeding the original target. The DLI is met at 99.9%.

DLI 4: Additional distribution transformer units (Number)

	Baseline	Project closing	Total
Original values	80,130.00	98,338.00	
Actual values		111,036.00	
Allocated amount ($)		85,556,000.00	85,556,000.00
Disbursed amount ($)		85,556,000.00	85,556,000.00

Comments (achievements against targets):

By the end of 2018, PLN had achieved the minimum number of Distribution Transformers to receive the full amount disbursable (after reallocation of proceeds under project restructure). Nonetheless, during the year 2019, PLN installed a further 5,474 distribution transformers.

DLI 5: Growth in residential energy sales (Gigawatt-hour (GWh))

	Baseline	Project closing	Total
Original values	15,850.00	18,438.00	
Actual values		19,201.00	
Allocated amount ($)		55,556,000.00	55,556,000.00
Disbursed amount ($)		55,555,828.00	55,555,828.00

Comments (achievements against targets):

The target for Residential Energy Sales has been revised downwards under the project restructure to reflect the current trend of lower electricity sales growth. At the closing, PLN has exceeded the revised target of residential energy sales.

DLI 6: FY 2016 Annual Work Plan approved (Yes/No)

	Baseline	Project closing	Total
Original values	No	Yes	
Actual values		Yes	

Allocated amount ($)		15,000,000.00	15,000,000.00
Disbursed amount ($)		15,000,000.00	15,000,000.00

Comments (achievements against targets):

This DLI has already been achieved and disbursement fully made at effectiveness.

DLI 7: PLN has collaborated with development partners in the recruitment of an independent verification agent (Yes/No)

	Baseline	Project closing	Total
Original values	No	Yes	
Actual values		Yes	
Allocated amount ($)		1,000,000.00	1,000,000.00
Disbursed amount ($)		1,000,000.00	1,000,000.00

Comments (achievements against targets):

This DLI has already been achieved and disbursement fully made at effectiveness.

DLI 8: Integrate budgeting with ERP in all Program Wilayahs (Yes/No)

	Baseline	Project closing	Total
Original values	No	Yes	

Actual values		Yes	
Allocated amount ($)		19,000,000.00	19,000,000.00
Disbursed amount ($)		19,000,000.00	19,000,000.00

Comments (achievements against targets):

PLN has developed a new user friendly application called “E-Budget” to integrate between budget planning and expenditures (work execution). “E-Budge” has been rolling out in all Wilayahs since May/June 2018. At closing, the E-budget and ERP systems was linked and integrated for all PLN Wilayahs.

DLI 9: Issue revised planning guidelines acceptable to the Bank (Yes/No)

	Baseline	Project closing	Total
Original values	No	Yes	
Actual values		Yes	
Allocated amount ($)		25,000,000.00	25,000,000.00
Disbursed amount ($)		25,000,000.00	25,000,000.00

Comments (achievements against targets):

PLN has approved the Regulation of Distribution Planning Guidelines No. 000019.P/DIR/2020 dated April 30th 2020 and sent it to the World Bank on May 6, 2020.

DLI 10: Integrate of planning software with GIS facilities (Yes/No)

	Baseline	Project closing	Total
Original values	No	Yes	
Actual values		Yes	
Allocated amount ($)		8,332,000.00	8,332,000.00
Disbursed amount ($)		8,332,000.00	8,332,000.00

Comments (achievements against targets):

The pilot application of GIS integration with PSS SINCAL software has started since October 2018 and was completed in one pilot Wilayah in each of the six main PLN operating regions across Indonesia during 2019. PLN completed the training of all distribution system planners in 2018. On July 2019, User Acceptance Test (UAT) was performed for GIS integration with PSS SINCAL was finished by third party.

ANNEX 1C. PROGRAM ACTION PLAN

Action	Timing		Achieved (Yes/No)	Completion Measurement
Provision of planning software with GIS capability and corporate license	Due Date	31-Dec-2016	Yes	New planning software with GIS capability used in at least one Wilayah

Comments:

Following the acquisition of the corporate license for the distribution planning software package (PSS Sincal), PLN has already completed the training of about half of the planners and expect the other half to be trained by the end of December 2019.

Application of planning software for distribution investment	Due Date	31-Dec-2019	Yes	Application of planning software in at least one Wilayah.
Comments: First applications of planning software for distribution investment was completed in 2019 in several Wilayahs.				
Improving application of GIS data base in at least 5 feeders	Due Date	31-Dec-2018	Yes	Application of planning software in at least one Wilayah
Comments: Improving application of GIS data base in at least 5 feeders was completed in several Wilayahs.				
Increasing number of skilled and certified systems planners. This action has been in-progress during the all duration of the project.	Due Date	31-Dec-2019	Yes	PLN staffed certified increased at 95% at the end of 2019
Comments: 75.61% of staff certified as of December 2019. Note that with the turn-over of staff percentage of staff certification fluctuate from one year to another. In total, the number of staffs certified over the course of the program exceeds target.				
Review options for loss computations by using alternative methodologies e.g. load flow based calculations and simplified spreadsheet methods	Due Date	31-Dec-2019	Yes	New methodology applied for loss computations (using new planning software)
Comments: Improvements and correct loss computations will be made once the new planning software (PSS SINCAL) is installed and used by all Wilayahs.				

Review and updating power distribution planning criteria	Due Date	30-Apr-2020	Yes	New power distribution planning guidelines approved
Comments: New Planning Guidelines have been developed and reviewed (acceptable to the Bank) - it was approved by PLN BOD.				
Identification study of (distribution control upgrades) upgrades needed	Due Date	30-Dec-2016	Yes	Identification study completed
Comments: Identification study of (distribution control upgrades) upgrades was completed.				
Engineering design of distribution control centers upgrades	Due Date	29-Jun-2018	Yes	Engineering design of distribution control centers upgrades completed
Comments: Specification and bidding documents submitted to the Bank for review in June 2018.				
Implementation of distribution control centers upgrades	Due Date	31-Dec-2019	Yes	At least one DCC upgraded
Comments: One DCC have been fully upgraded (completed in 2019) - others are ongoing.				
Post procurement regulations on PLN's website	Due Date	30-Jun-2016	Yes	Post procurement regulations on PLN's website
Comments: Procurement regulations were posted on PLN's website.				

Implementation of upgraded e-procurement system and announcement of award details through e-procurement as per PLN regulations	Recurrent	Continuous	Yes	Continuous
Comments: Implementation of upgraded e-procurement system and announcement of award details through e-procurement as per PLN regulations was completed.				
Restrict open book method for less than 3 suppliers in DPT (qualified suppliers in DPT) for Main distribution items (MDUs). No additional items beyond the existing 16 MDU items to be procured using open book method under this Program	Recurrent	Continuous	Yes	Continuous
Comments: Action applied				
No direct procurement/direct appointment of SOEs and/or PLN's subsidiaries/joint ventures/affiliates under this Program	Recurrent	Continuous	Yes	Continuous
Comments: Action applied				
No direct procurement or direct	Recurrent	Continuous	Yes	Continuous

appointment of small or micro industries under this Program for contracts above IDR300 million				
Comments: Fulfilled				
Conduct assessment of local manufacturing capacity for MDU items	Due Date	30-Sep-2016	Yes	Assessment completed
Comments: Assessment of local manufacturing capacity for MDU items was conducted.				
Improve accountability/credibility of SPKK reporting by integrating Division Head Sumatra's validation of KPIs as reported by the Wilayahs (prior to SPKK reporting)	Recurrent	Continuous	Yes	Continuous
Comments: Fulfiled				
Procurement audits by SPI of 15 percent of contracts awarded by each procuring unit under the Program to be shared with the Bank	Recurrent	Continuous	Yes	Continuous
Comments: Fulfilled				
No contract awards to firms and individuals on PLN's sanctions list and/or	Recurrent	Continuous	Yes	Continuous

on the Bank's debarred/temporary suspension lists - upload PLN's black list onto website and electronic portal as per PLN regulation 166/2012				
Comments: Fulfilled				
Integrate budgeting with ERP for Wilayahs participating in the Program	Due Date	31-Dec-2018	Yes	Integration completed
Comments: ERP was linked with budgeting for Wilayahs participating in the Program.				
Roadmap to strengthen existing whistleblower regulations and system, including guarantees to protect whistle blowers	Due Date	30-Sep-2016	Yes	Roadmap completed
Comments: Integrate budgeting with ERP for Wilayahs participating in the Program was completed.				
Develop procurement performance monitoring framework and report performance as per the framework	Due Date	30-Jun-2016	Yes	Framework completed and reporting done according to framework
Comments: Procurement performance monitoring framework and report performance as per the framework was developed.				

Undertake environmental and social monitoring and training in environmental health and safety standards for PLN and its contractors	Recurrent	Continuous	Yes	Continuous
Comments: Fulfilled				

ANNEX 2. BANK LENDING AND IMPLEMENTATION SUPPORT/SUPERVISION

A. TASK TEAM MEMBERS

Name	Role
Preparation	
Stephan Claude Frederic Garnier, Aidan Tendai Padraic Gregan	Task Team Leader(s)
Yash Gupta, Angelia B. Nurwihapsari .S	Procurement Specialist(s)
Christina I. Donna	Financial Management Specialist
Nevi Aryani	Team Member
Alkadevi Morarji Patel	Social Specialist
Kian Siong	Environmental Specialist
Puguh Imanto	Team Member
Ria Nuri Dharmawan	Counsel
Peter Leonard	Safeguards Advisor/ESSA
Rumiah Aritonang	Team Member
Evarist F. Baimu	Counsel
Cristina Hernandez	Team Member
Sulistiowati Ms.	Social Specialist
Chrisantha Ratnayake	Team Member
Supervision/ICR	
Stephan Claude Frederic Garnier	Task Team Leader(s)
Angelia B. Nurwihapsari .S	Procurement Specialist(s)
Christina I. Donna	Financial Management Specialist
Theodore Manggala Amarendra	Counsel
Nevi Aryani	Team Member

Muchsin Chasani Abdul Qadir	Team Member
Kian Siong	Environmental Specialist
Aidan Tendai Padraic Gregan	Team Member
Puguh Imanto	Team Member
Peter Leonard	Safeguards Advisor/ESSA
Rumiah Aritonang	Team Member
Alejandro Alcala Gerez	Counsel
Shankar Narayanan	Social Specialist
Cristina Hernandez	Team Member
Sulistiowati Ms.	Social Specialist

B. STAFF TIME AND COST

Stage of Project Cycle	Staff Time and Cost	
	No. of staff weeks	US$ (including travel and consultant costs)
Preparation		
FY15	15.975	133,971.47
FY16	58.825	612,255.10
FY17	0	47,440.00
FY20	.080	191.14
Total	**74.88**	**793,857.71**
Supervision/ICR		
FY16	0	1,097.72
FY17	30.697	236,669.06
FY18	17.476	141,394.93
FY19	16.234	73,079.07
FY20	17.436	94,962.69
Total	**81.84**	**547,203.47**

ANNEX 3. PROGRAM EXPENDITURE SUMMARY

Source of Program Financing	Type of Co-financing	Estimates at Appraisal (US$)	Actual Expenditures (Disbursement)		
			Actual (US$)	Percentage of Appraisal	Percentage of Actual
World Bank		500.00	499.98	37.00	32.26
Borrower		530.00	650.00	34.00	41.93
Other partners					
ADB[a]	Joint	420.00	400.00	29.00	25.81
Total		1,450.00	1,549.98[b]	100.00	107.64

Note: a. ADB has provided an RBL of US$600 million to PLN, of which US$180 million was allocated for the transmission component of the RUPTL.
b. Actual total capital expenditure for Sumatra Distribution Network during September 2015–December 2019 was IDR 21,697,281,499,578 or equal to US$ 1,560,842,651 (middle exchange rate of Bank Indonesia, December 31, 2019, US$1 = IDR 13,901)

ANNEX 4. BORROWER'S COMMENTS

PT PLN (Persero)
PROJECT COMPLETION REPORT (PCR)

Power Distribution Development Program for Result (PforR) – World Bank
IBRD LOAN No. 8610-ID

EXECUTIVE SUMMARY

1. BACKGROUND

PLN's current power expansion plan comprising generation, transmission and distribution investment requirements (the "Rencana Usaha Penyediaan Tenaga Listrik" or RUPTL) covers the period 2015-2024. The broader context for the RUPTL is the Rencana Umum Ketenagalistrikan Nasional (RUKN) which is a 20-year national policy document approved by Parliament. The RUKN provides the GoI's policy guidance for preparation of the RUPTL. Consistent with both the RUKN and the RUPTL, the key objectives of the 5-year time slice are to increase access to electricity for household consumers and to meet the economy's power needs while improving efficiency and reliability of supply. Its specific key targets are to increase generation capacity by 35 MW and increase access to electricity from 85%, to 97% by 2019. The Government's program on which the proposed PforR is based is the distribution component of the 2015-2019 time slice of the RUPTL which entails activities to improve distribution system planning capabilities, connect new customers, improve existing distribution networks, and increase the quality of services.

According to the RUPTL (2015 – 2024), an estimated US$1.45 billion is needed to develop the distribution network in Sumatra to meet PLN's medium-term objectives of increasing access, efficiency and reliability. To accomplish the objectives of the program, targets for each DLI had been set prior to the program implementation. However, some DLIs targets have been revised through program restructuring approved by the World Bank in April 2019 to accommodate the improved target by the end of the program completion in 2019.

The program's development objective is to increase access to electricity services and to improve the efficiency and reliability of their delivery in selected areas of Indonesia.

2. ACHIEVEMENT

The overall PLN's performance for achievement of Program's Development Objectives and Implementation Progress has been satisfactory as evidenced by completion of the Disbursement Linked Indicators (DLIs) successfully as of 31 December 2019:

a) DLI#1: Number of New Residential Customers (Household) Connected.

A number of 14,980,000 people, more than revised end target of 12,749,000 in 2019, have been provided with access to electricity by household connection.

b) DLI#2: Cumulative Length of Medium Voltage Distribution Lines.
PLN has achieved the minimum cumulative length of Medium Voltage Distribution Lines (114,929 km) and received the full amount disbursable (after reallocation of proceeds under project restructure).

c) DLI#3: Permanent Medium Voltage Feeder Interruptions per 100ckm.
The Permanent Medium Voltage Feeder Interruptions per 100ckm for 2019 is 16.02, which is very closed to the revised full-year target of 16 interruptions per 100 ckm. This shows a continued improvement in Medium Voltage reliability and is significantly exceeding the original target. The DLI is met at 99.75% of the total target.

d) DLI#4: Number of Distribution Transformers.
By the end of 2018, PLN had achieved the minimum number of Distribution Transformers to receive the full amount disbursable (after reallocation of proceeds under project restructure).

e) DLI#5: Residential Energy Sales.
The target for Residential Energy Sales has been revised downwards under the project restructure to reflect the current trend of lower sales growth within PLN. PLN has exceeded the calendar 2019 revised target of residential energy sales of 19,201 GWh in Sumatra.

f) DLI#6: (prior result) FY 2016 Annual Work Plan approved.
This DLI have already been achieved and disbursement fully made.

g) DLI#7: PLN has collaborated with development partners in the recruitment of an independent verification agent. This DLI have already been achieved and disbursement fully made.

h) DLI#8: Integrate budgeting with ERP in all Program Wilayahs.
This DLI have been achieved and disbursement fully made.

i) DLI#9: Issue revised planning guidelines acceptable to the Bank.
Revised of distribution planning guidelines has been approved by BOD on 30th April 2020, and the submission to the World Bank has been made on 6th of May 2020.

j) DLI#10: Integrate planning software with GIS facilities.
Procurement planning software has been completed, and corporate GIS procurement is already in the kickoff meeting stage. GIS application has been integrated with PSS sincal application for system planning, and currently it has been implemented at UIW Aceh.

Meanwhile, the performance of achieving the results framework as a whole has also been satisfactory in implementing the program as follows: (i) Number of people provided with access to electricity by household connection in Sumatra of 14,980,000 customers has been achieved, higher than the revised end target of 14,410,000 customers; (ii) Current 8.47% of electricity losses per year in Sumatra has been achieved, less than the revised end target of 10,00% in 2019; (iii) SAIDI (minutes per customer per year) has reached 1,164 points, less than the revised end target of 1,650 in 2019, as well as for the SAIFI (number

of interruptions per customer per year) which has reached 11.28 points, less than the revised end target of 15.5 points by the end of 2019.

Those three PDO indicators have met and exceeded the targets. This confirms that the Program has met its development objectives, in addition, within the original timeframe and using the full IBRD loan.

In addition, by the implementation of Program Action Plan (PAP), a number of potential improvements have been identified to improve the development effectiveness of PLN's distribution expenditure program. These relate primarily to four areas:

a) Technical: which has completed the Distribution Command Control (DCC) Upgrade; Provision of planning software with GIS capability and corporate license; and Electrical losses. While Distribution planning guidelines is expected to be completed prior to closing date.

b) Environmental and social: in which PLN had conducted Bank social team field visit, screening procedures that shows no activities triggering cultural heritage property and economic displacement; monitor concerning the handling of complaints during construction; prior consultation and information; sustaining good practices; and Environmental Management prior and during the program implementation.

c) Procurement: where PLN has successfully conducted procurement performance due to most of corrective actions from the last procurement audit have been taken care of and the new contract for the Main Distribution Units (MDU) is now in place; a procurement audit has been conducted for the period of November 2018 to October 2019; and the procurement process for MDU has been completed and the new contract has been signed except for cubicles, distribution transformers, and kWh meters 3 phase; and

d) Financial management: where related to DLI, the DLI#8 (Integrate budgeting system with ERP in all Program Wilayahs/Unit) has been achieved and disbursed in FY2019. For FM related to Program Action Plan (PAP), PLN has improved the verification process and coordination among Wilayahs offices, Regional Directorate, SPKK and Corporate Secretary to ensure the accuracy of KPI achieved through SILM. PLN continues to demonstrate adequate internal control, and internal audit unit is conducted regularly covering the Program as sample in its Annual Internal Audit Plan (PKPT). In addition, PLN also continues submitting Quarterly reports to the Bank, lasted in 2019 for Q4 report.

3. PLN PERFORMANCE

PLN as the implementing agency were highly committed to project success. It established a project structure to ensure enhanced project management, coordination, as well as further timely and proper monitoring and reporting.

Since September 1, 2015, PLN has restructured its organization so that the Sumatra power system is overseen by the Directorate of Sumatra Region for all the six Wilayahs (Aceh, Sumut, Sumbar, RKR, S2JB, and Babel) and by the Directorate of Western Java Region for the Distribution Unit, Lampung. Within the Directorate of Sumatra Region there are three divisions for Development, Construction and Operation.

These divisions assist the Director to supervise the Wilayahs and the distribution unit with respect to operation & maintenance and construction activities as well as overseeing KPI targets, development planning and budgeting. For operation, each Wilayah was responsible for both power distribution network and generation plant feeding into the 20 kV distribution systems, while the distribution unit is responsible only for the distribution system.

However, there are still many advantages of PLN to assigned PLN's Wilayahs to implement the program, in term of alignment and comprehend technical knowledge of system existing, electricity demand, customers, peak demand or others social matters.

4. LESSON LEARNED AND RECOMMENDATIONS

As the program implemented by PLN's Wilayahs, collision between regular operational activity and the one managed by the program under the loan cannot be avoided. The large number of work implementation contracts under the PforR program, as well as the involvement of 7 Wilayah/distribution in Regional Sumatra, may be the main obstacle faced by PLN, especially EVP BANG REG SUM in monitoring and supervising the implementation of this program. There were many works to be handled; those are contractual process, technical construction matters, administration contract, disbursement, monitoring projects, amendments, permits, social problems, as well as payment to final report. Good commitment and coordination between PLN Regional Sumatra and PLN's Wilayahs were crucial to the smooth implementation of the overall program.

Regarding slightly underachievement of DLI#3 Permanent Medium Voltage Feeder Interruptions, PLN needs to improve the reliability of the electricity network system by conducting several activities that support the program optimally, such as: (i) cutting trees, which according to the data are the highest cause of this interruptions; (ii) monitor the assets management and replacement needed using application; (iii) implementing Care for Asset Initiative program to monitor and identify assets replacements that needed on time maintenance.

To ensure the increased access to electricity services and the enhancement of the efficiency and reliability of power supply in Sumatra achieved, all of the Program's key outcome indicators needs to be regularly monitored beyond project completion to maintain and optimize the performance. In its implementation, each Wilayah as the implementing unit in their respective regions must commit to reporting all related activities regularly and on time.

To ensure the program sustainability, PLN needs to maintain the good work and even improve performance in several sectors if deemed necessary. PLN also continues to be committed to fulfilling the environmental and social safeguards by following the procedures and regulations that apply to each distribution activity carried out by PLN's Wilayahs.

ANNEX 5. SUPPORTING DOCUMENTS (IF ANY)

1. Project Appraisal Document, Report No. PAD101551, dated March 24, 2016*
2. Restructuring Paper, Report No. RES35737*
3. Implementation Status and Results Reports: 1 through 8 (September 2016 through May 2020)*
4. Aide Memoires:
   (a) Implementation Support Mission dated March 9 – 13, 2020
   (b) Implementation Support Mission dated September 25 – 27, 2019
   (c) Implementation Support Mission dated April 8 – 12, 2019
   (d) Implementation Support Mission dated October 15 – 19, 2018
   (e) Implementation Support Mission dated April 23 - 27, 2018
   (f) Implementation Support Mission dated March 13 – 22, 2017
   (g) Implementation Support Mission dated September 19 – 23, 2016
   (h) Pre-appraisal Mission dated December 7 – 17, 2015
   (i) Identification Mission dated May 11 – 27, 2015
5. Loan Agreement No. 8610-ID, dated May 20, 2016*
6. Amendment No. 1 of the Loan Agreement, dated April 8, 2019*
7. Borrower's Project Completion Report, December 2020

* https://projects.worldbank.org/en/projects-operations/document-detail/P154805