# Report and Recommendation of the President to the Board of Directors

Project Number: 50193-003
April 2020

# Proposed Results-Based Loan and Technical Assistance Grant
# India: Maharashtra Rural High Voltage Distribution System Expansion Program



Asian Development Bank

## CURRENCY EQUIVALENTS

(as of 20 February 2020)

| | | |
|---|---|---|
| Currency unit | – | Indian rupee/s (₹) |
| ₹1.00 | = | $0. 01396 |
| $1.00 | = | ₹71.634 |

## ABBREVIATIONS

| | | |
|---|---|---|
| ADB | – | Asian Development Bank |
| DLI | – | disbursement-linked indicator |
| EESL | – | Energy Efficiency Services Limited |
| ERP | – | enterprise resource planning |
| ESMS | – | environmental and social management system |
| HVDS | – | high voltage distribution system |
| IVA | – | independent verification agent |
| kV | – | kilovolt |
| kWh | – | kilowatt-hour |
| MED | – | Maharashtra Energy Department |
| MERC | – | Maharashtra Electricity Regulatory Commission |
| MSEDCL | – | Maharashtra State Electricity Distribution Company Limited |
| PAP | – | program action plan |
| PMU | – | project management unit |
| RBL | – | results-based lending |
| TA | – | technical assistance |

## NOTES

(i) The fiscal year (FY) of the Government of India and its agencies ends on 31 March. "FY" before a calendar year denotes the year in which the fiscal year ends, e.g., FY2019 ends on 31 March 2019.

(ii) In this report, "$" refers to United States dollars.

| | |
|---|---|
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**CONTENTS**

# RESULTS BASED PROGRAM AT A GLANCE

**1. Basic Data** — **Project Number:** 50193-003

| | | | |
|---|---|---|---|
| **Project Name** | Maharashtra Rural High Voltage Distribution System Expansion Program | **Department/Division** | SARD/SAEN |
| **Country** | India | **Executing Agency** | Energy Department, Government of Maharashtra, Maharashtra State Electricity Distribution Company Limited |
| **Borrower** | India | | |
| **Country Economic Indicators** | https://www.adb.org/Documents/LinkedDocs/?id=50193-003-CEI | | |
| **Portfolio at a Glance** | https://www.adb.org/Documents/LinkedDocs/?id=50193-003-PortAtaGlance | | |

**2. Sector**

| | Subsector(s) | ADB Financing ($ million) |
|---|---|---|
| ✓ **Energy** | Electricity transmission and distribution | 346.00 |
| | **Total** | **346.00** |

**3. Operational Priorities**

- ✓ Addressing remaining poverty and reducing inequalities
- ✓ Accelerating progress in gender equality
- ✓ Tackling climate change, building climate and disaster resilience, and enhancing environmental sustainability
- ✓ Promoting rural development and food security
- ✓ Strengthening governance and institutional capacity

**Climate Change Information**

| | |
|---|---|
| $CO_2$ reduction (tons per annum) | 130,000 |
| Climate Change impact on the Project | Medium |

**ADB Financing**

| | |
|---|---|
| Adaptation ($ million) | 2.40 |
| Mitigation ($ million) | 87.00 |

**Sustainable Development Goals**

SDG 7.1, 7.3
SDG 13.a

**Gender Equity and Mainstreaming**

Some gender elements (SGE) ✓

**Poverty Targeting**

General Intervention on Poverty ✓

**4. Risk Categorization:** Complex

**5. Safeguard Categorization** **Environment:** B **Involuntary Resettlement:** B **Indigenous Peoples:** C

**6. Financing**

| Modality and Sources | Amount ($ million) |
|---|---|
| **ADB** | **346.00** |
| Sovereign Results Based Lending (Regular Loan): Ordinary capital resources | 346.00 |
| **Cofinancing** | **0.00** |
| None | 0.00 |
| **Counterpart** | **357.10** |
| Others | 357.10 |
| **Total** | **703.10** |

Note: An attached technical assistance will be financed on a grant basis by the Technical Assistance Special Fund (TASF-OTHERS) in the amount of $1,000,000.

**Currency of ADB Financing:** US Dollar

Source: Asian Development Bank

# I. THE PROPOSAL

1. I submit for your approval the following report and recommendation on a proposed results-based loan (RBL) to India for the Maharashtra Rural High Voltage Distribution System Expansion Program. The report also describes the proposed transaction technical assistance (TA) for Implementation Support for the Maharashtra Rural High Voltage Distribution System Expansion Program, and if the Board approves the proposed loan, I, acting under the authority delegated to me by the Board, will approve the transaction TA.

2. The RBL will support a component of the state of Maharashtra's program to provide access to efficient, reliable, and good quality power supply to new agriculture customers through a metered high voltage distribution system (HVDS), related institutional strengthening, and enhanced awareness on HVDS and the efficient use of electricity and water for agriculture.

# II. THE PROGRAM

## A. Strategic Context

3. **The state economy.** Maharashtra, the second most populous state in India, has a high annual per capita income compared with the national average.[1] However, there is significant inequality within Maharashtra; the rural eastern parts of the state in particular have a high proportion of the population living below the poverty line.[2] About half of the state's labor force remains engaged in agriculture and related activities, but agriculture's share of the state's gross domestic product declined from 15.3% in FY2002 to 12.2% in FY2017 as a result of small farm sizes, lack of irrigation and dependence on rainfall, low agriculture productivity and less-than-efficient use of electricity and water, poor storage facilities and connectivity to markets. Maharashtra's Vision 2030 focuses on the agriculture sector with the goals of increasing growth to 5% per year, and increasing agricultural productivity and farmers' incomes.[3] These would be achieved by reducing the cost of cultivation; increasing the area under irrigation; providing access to a reliable power supply; promoting distributed solar power, electricity, water conservation and agriculture value chains; and improving access to markets.

4. **Power sector.** The Maharashtra Energy Department (MED)[4] is responsible for the state's power sector. The Maharashtra State Electricity Board was unbundled into generation, transmission, and distribution utilities in 2005; at that time aggregate technical and commercial losses averaged about 35%, the power sector had a demand–supply gap of over 20%, and customers, particularly in rural areas, faced unreliable and poor-quality supply. Steady progress has been made to improve electricity access and electricity distribution efficiencies along with generation and transmission capacity. The Maharashtra State Electricity Distribution Company Limited (MSEDCL), a state-owned enterprise with a distribution license formed after the unbundling, is currently India's largest electricity distribution company, supplying over 25.4 million customers in 457 towns and nearly 42,000 villages across Maharashtra, except in the city of Mumbai. MSEDCL supplies electricity to over 4.2 million agricultural customers in rural Maharashtra, who account for an estimated 30% of its electricity sales volume. However, despite overall efficiency improvements, a healthy sales mix (industrial and commercial sales account for

[1] The per capita income of Maharashtra was ₹165,491 compared with ₹103,870 nationally in FY2017. State Government of Maharashtra. 2018. *Economic Survey of Maharashtra*. Mumbai.

[2] World Bank. 2017. *Maharashtra – Poverty, Growth and Inequality*. New Delhi. Poverty maps indicate 24%–51% of the population in several districts in rural Maharashtra is living below the poverty line, while urban poverty is 9%.

[3] Government of Maharashtra, Planning Department. 2017. *Vision 2030.* Mumbai.

[4] The Energy Department is under the Industries, Energy and Labor Department, Government of Maharashtra.

about 44% of total sales), and high tariffs,[5] MSEDCL's financial status is impacted by its performance in rural Maharashtra, and a large base of rural customers that are not efficiently or reliably supplied with electricity.

5. **Rural power sector constraints.** Deficiencies in the traditional electricity distribution network design and historically inadequate capital expenditures have resulted in long, inefficient low-voltage distribution lines, with nearly 15–20 customers sharing a single large distribution transformer. Most rural feeders were mixed, with rural domestic and agriculture customers on the same feeder. MSEDCL's Gaothan and Infrastructure Plan program (implemented over 2006–2015) strengthened the rural distribution network and physically segregated 5,000 rural feeders. This allowed agriculture customers to receive 8–10 hours supply per day (though efficiency, quality and reliability are still concerns), while other customers receive a continuous supply. This has contributed to reducing average utility wide aggregate technical and commercial losses to about 17% in 2015. Per capita usage of electricity in Maharashtra reached about 1,300 kilowatt-hours (kWh)/year in 2014, but was under 800 kWh/year in rural areas, low compared to the world average of 3,000 kWh/year.

6. Power supply to agriculture customers remains affected by low metering levels, while inadequate payment enforcement results in estimated losses exceeding 20% for rural feeders with predominantly agricultural customers. Most agricultural customers are charged a fixed tariff based on the declared capacity of the agriculture pump rather than on actual electricity usage, resulting in inefficient electricity and water consumption. Retail agricultural tariffs are linked to prior assessments of customer payment capacity and require government subsidies and cross-subsidies from other customer categories to cover the cost of supply. The recurring electricity subsidy in Maharashtra for agriculture customers was $0.8 billion in FY2018.[6] This impacts the state's ability to fund social programs while cross-subsidies reduce the competitiveness of industries. Power is also often supplied to agricultural customers at night impacting pump usage and the quality of rural life.

## B. Program Rationale

7. **Government strategy and program for the sector.** The electricity sector in India is focused on accelerated electrification, adoption of clean energy source and increased energy efficiency, improvement in the quality of power supply to customers, and improved performance of utilities, which have traditionally been loss making. In 2016, the state government of Maharashtra formulated its program of Power for All with the objective to provide continuous (24-hour) reliable power to all non-agriculture customers and an assured 8–10 hours daily supply for agricultural customers across the state. The program has components covering renewable energy generation predominantly through the private sector, transmission and distribution system strengthening, 100% household electrification, adoption of efficient street lighting and agriculture pumps, metering and information and communication technology. While progress has been significant on renewable energy capacity addition, transmission and distribution investments and rural electrification for households, the agriculture pump related component has not materially progressed. In 2018, the state government of Maharashtra reviewed the requirements for reliable rural power supply for the agriculture sector and decided to provide applicants for agriculture electricity connections either a connection through HVDS or off-grid solar water pumps to ensure

[5] Tariffs are set by the Maharashtra Electricity Regulatory Commission (MERC). Industrial tariffs in Maharashtra are among the highest in India (about ₹8/kWh in FY2018).

[6] Organisation for Economic Co-operation and Development. 2018. *Agriculture Policies in India.* Paris. Nationally, electricity subsidy for farmers was nearly $9 billion in 2016, second to fertilizer subsidies. Electricity subsidies grew nearly fourfold over 2000–2016.

the agriculture sector can access modern, reliable energy. The program components are periodically reviewed by the utilities, government and the regulator, and updated to 2021 to meet increasing demand. It is expected that the electrification program for farmers (including HVDS) would continue beyond 2021 after government and regulatory approvals.

8. **Proposed results-based lending program.** The Asian Development Bank (ADB) RBL will support Maharashtra's HVDS program for new grid-connected rural agricultural customers across the state. The HVDS program is demand-driven and based on applications received for new agricultural connections. The RBL program is expected to be implemented from April 2020 to December 2021, by which time about 156,000 metered HVDS connections are expected to be in place with distribution transformers, 11 kilovolt (kV) grid extensions, and upstream strengthening for adequate network capacity.

9. The RBL modality is suitable for the following reasons: (i) it uses MSEDCL's strong implementation capacity and functional enterprise resource planning (ERP) systems to undertake the HVDS program;[7] (ii) government ownership of the program is strong, as demonstrated by implementation of past rural electrification initiatives, and the initial implementation of the HVDS program in 2019; (iii) it will lower the transaction costs of implementing activities over the state of Maharashtra by using existing fiduciary and safeguard systems, which will be further enhanced under the program action plan (PAP); and (iv) the state government of Maharashtra and MSEDCL are committed to strengthening sector governance including metering of agricultural customers, improving operational performance, and facilitating information disclosure.[8]

10. **High voltage distribution system as an enabler**. Increasing the efficiency and reliability of electricity supply to agricultural customers poses significant challenges (para. 6). Maharashtra has undertaken pilots to increase the energy efficiency of pumps using the existing grid,[9] and promoted the adoption of drip irrigation. The pace of adoption is slow because of limited awareness on energy efficiency, high upfront costs, frequent pump burnout due to low voltage supply, and unmetered electricity supply. There is a need to review business models and technology, and to undertake work across the electricity, water, and agriculture sectors. The adoption of HVDS for rural feeders can support models for private sector development including franchisees and energy service companies for inefficient pump replacements. Given the national importance of rural development and the need to address distress on the part of farmers, the government of India is working to increase electricity and water use efficiency, improve subsidy targeting and farmers' incomes by 2022.[10] HVDS and customer metering support improved sector governance and would be a platform to meet these goals.

11. **ADB's value addition**. The proposed intervention is aligned with ADB's Strategy 2030 operational priorities to promote rural development and food security; tackle climate change, build climate and disaster resilience, enhance environmental sustainability; accelerate progress in

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[7] MSEDCL is one of the few public sector electricity utilities in India with functional ERP and advanced information technology capabilities and customer geo-referencing to support implementation monitoring.

[8] Program Action Plan (accessible from the list of linked documents in Appendix 2). Useful inputs to define RBL boundaries, the choice of disbursement-linked indicators (DLIs), and monitoring mechanisms were drawn from ADB. 2017. *Report and Recommendation of the President to the Board of Directors: Proposed Results-Based Loan Perusaahan Listrik Negara Sustainable Energy Access in Eastern Indonesia – Electricity Grid Development Program*. Manila.

[9] ADB. 2016. *Report and Recommendation of the President to the Board of Directors: Proposed Loan, Administration of Loan, and Administration of Technical Assistance Grant to India for the Demand Side Energy Efficiency Sector Project*. Manila. ADB is supporting a national program with EESL on replacement of pumps. The adoption of energy-efficient pumps can reduce the electricity requirements by about 25%, based on studies by Maharashtra Energy Development Agency in 2009 and 2016.

[10] Government of India, NITI Aayog. 2017. *India - Three Year Action Agenda 2017–2019 to 2019–2020*. New Delhi.

gender equality; and strengthen governance and institutional capacity.[11] It aligns with India's Nationally Determined Contribution to reduce emission intensity by up to 35% by 2030 from 2005 levels, and ADB's India country partnership strategy, 2018–2022 for inclusive infrastructure and addressing climate change.[12] It supports Sustainable Development Goal (SDG) 7 on access to affordable, reliable, sustainable, and modern electricity to all; and SDG 13 on action to combat climate change. ADB has supported HVDS projects in India for reliable and efficient supply to rural customers through project and program loans.[13] ADB's support for this first phase of HVDS for new agricultural customers in Maharashtra will strengthen the achievement of outcomes, improve awareness of the benefits of HVDS, and strengthen the development of the subsequent phases for HVDS expansion to cover agricultural customers beyond 2021 and mobilize commercial financing. The RBL will complement an ongoing ADB project aimed at improving connectivity and a planned project for value chains in agriculture[14] to support the state government's objective to promote economic growth and private sector development in rural areas. The RBL will strengthen linkages between electricity and water use under the state's Water 2030 program,[15] disseminate knowledge, and enhance institutional development.

## C. Program Scope

12. The RBL supports the rural HVDS component of Maharashtra's Power for All program. Table 1 summarizes the scope of the government program and RBL program.

**Table 1: Program Scope**

| Item | Broader Government Program | Results-Based Lending Program |
|---|---|---|
| **Outcome** | Adequate generation, transmission and distribution network capacity to meet increasing demand and provide 8–10 hours a day of power supply to agriculture customers and continuous power supply (24-hours a day) to other customer categories. | Efficient, reliable, and good quality power for agriculture customers in rural Maharashtra for 8-10 hours a day. |
| **Key outputs** | Addition of 5,300 MW of generation capacity (4,000 MW of renewables including distributed generation); increased transmission and distribution capacity; electrification of 1.8 million households; connections for 0.23 million farmers to HVDS or off-grid solar pumps; installation of 35.6 million efficient bulbs, 0.9 million efficient streetlights and 0.5 million pumps. | 0.156 million agriculture customers connected to HVDS, MSEDCL institutional capacity improved, and efficient use of electricity and water demonstrated. |
| **Activity types** | Construction and installation of generation, transmission, distribution and energy efficiency improvements along with associated institutional strengthening of utilities and customer awareness. | Construction and installation of metered HVDS connections, high- tension lines, and substations; institutional strengthening, customer awareness. |

[11] ADB. 2018. *Strategy 2030:Achieving a Prosperous, Inclusive, Resilient, and Sustainable Asia and the Pacific*. Manila.
[12] ADB. 2019. *Country Partnerships Strategy:India,2018–2022—Accelerating Inclusive Economic Transformation*. Manila.
[13] ADB. 2011. *Report and Recommendation of the President to the Board of Directors: Proposed Multitranche Financing Facility and Technical Assistance Grant to India for the Madhya Pradesh Energy Efficiency Improvement Investment Program*. Manila; and ADB. 2014. *Report and Recommendation of the President to the Board of Directors: Proposed Policy-Based Loan and Technical Assistance Grant to India for the Punjab Development Finance Program*. Manila. In Madhya Pradesh, conversion to HVDS in rural areas reduced distribution losses and improved revenue recovery. While capital intensive compared to conventional distribution, HVDS restricts the number of customers on a single transformer, enabling better metering, monitoring, enforcement, and quality of power supply with fewer outages.
[14] ADB. 2019. *Report and Recommendation of the President to the Board of Directors: Proposed Loan and Technical Assistance Grant to India for the Maharashtra Rural Connectivity Improvement Project*. Manila; and ADB. 2019. *India: Maharashtra Agribusiness Network Project*. Manila.
[15] The state of Maharashtra has a functioning multi-stakeholder platform for coordination in the water sector.

| Item | Broader Government Program | Results-Based Lending Program |
|---|---|---|
| **Expenditure** | About $10.4 billon (government program), of which about $703.1 million is for rural HVDS component | $703.1 million |
| **Main financiers** | Utility financing, state government, debt from various sources including ADB, private sector (renewable generation, distribution in Mumbai) | Counterpart funding including debt, ADB |
| **Geographic coverage** | Maharashtra (entire state) | Rural Maharashtra |
| **Implementation period** | 2016–2021 | 2020–2021 [a] |

ADB = Asian Development Bank, HVDS = High Voltage Distribution System, MSEDCL = Maharashtra State Electricity Distribution Company Limited, MW = megawatt.
[a] The program covers eligible prior results in 2019 and activities associated to the RBL under the attached TA to be completed by 31 March 2022.
Source: Maharashtra Energy Department and Maharashtra State Electricity Distribution Company Limited.

## D. Program Results

13. The RBL program's impacts will be emission intensity of the economy reduced, agricultural productivity in rural Maharashtra improved, and efficiency in the electricity value chain achieved.[16] The outcome will be access to efficient, reliable, and good quality power supply for new agricultural customers in rural Maharashtra improved.[17]

14. **Output 1: High voltage electricity distribution network in rural Maharashtra for new agricultural customers installed.** The RBL program focuses on enabling farmers in rural Maharashtra to use electricity to irrigate land and earn their livelihoods. An estimated 156,000 farmers will be connected to the high voltage distribution network and metered by December 2021. This involves (i) installation of 132,600 customized distribution transformers; (ii) installation of 46,800 kilometers of 11 kV high voltage line extensions to connect new customers to the existing distribution grid; and (iii) construction or upgrading of 121 33/11 kV distribution substations to improve the upstream distribution network capacity for HVDS to supply new customers.

15. **Output 2: Institutional capacity of Maharashtra State Electricity Distribution Company Limited improved.** The RBL program will support improvement in the institutional capacity of MSEDCL, as follows: (i) at least 1,000 MSEDCL staff (including all eligible and interested women) demonstrate knowledge and skills on capital investments, operation, maintenance, monitoring, and safeguards for HVDS; (ii) systems for metering for agricultural customers on HVDS are functional, enabling improved planning, metering, billing, collection and enforcement; and (iii) systems for physical verification of HVDS assets would be functional, with information recorded in the ERP.

16. **Output 3: Awareness of high voltage distribution systems and the efficient use of electricity and water in rural Maharashtra enhanced.** The program will collect data, and demonstrate and promote awareness of HVDS and efficient use of electricity and water in rural Maharashtra by (i) establishing and operating an HVDS monitoring dashboard that will aid MSEDCL and government agencies in decision-making, and promote inter-agency coordination by providing timely information such as status of agricultural connections, sales, meter data, voltage variations, and transformer failure rates; and (ii) providing periodic updates on processing of HVDS connections to 156,000 customers (including women). In addition, the government and

[16] Government of India. 2015. *India's Intended Nationally Determined Contribution*. New Delhi; and footnote 3.
[17] The design and monitoring framework is in Appendix 1.

MSEDCL have agreed on a pilot in rural Maharashtra for one 100% HVDS agriculture feeder with energy-efficient pumps and associated efficient irrigation equipment, and a program to improve the awareness of at least 500 users (including all eligible women) on HVDS and efficient use of electricity and water. Recommendations from the pilot to enable the adoption of energy and water conservation through tariffs and improved subsidy administration will also be identified for MED.

17. The disbursement-linked indicators (DLIs) and other performance indicators provide ambitious yet achievable measures of progress towards program outputs and outcome. The DLI targets have been chosen in consultation with MED and MSEDCL's plans for HVDS rollout, and with careful consideration of 2019 performance and feedback on earlier projects. All indicators are provided in the design and monitoring framework (Appendix 1) and the program results framework. ADB financing will be disbursed in accordance with the allocation table (summarized in Table 2).

**Table 2: Disbursement-Linked Indicators**

| Indicator | Disbursement Allocated ($ million) | Share of Total ADB Financing (%) |
|---|---|---|
| **Outcomes** | | |
| DLI 1 Effective metering and billing of HVDS agricultural customers | 69.2 | 20.0 |
| DLI 2 Improved power reliability for HVDS agricultural customers. | 51.9 | 15.0 |
| DLI 3 Improved power quality for HVDS agricultural customers | 51.9 | 15.0 |
| **Output 1: High voltage electricity distribution network in rural Maharashtra for new agriculture customers installed** | | |
| DLI 4 156,000 new metered HVDS agricultural electricity connections in rural Maharashtra | 69.2 | 20.0 |
| DLI 5 46,800 km. of 11 kV distribution lines for HVDS agricultural electricity connections | 34.6 | 10.0 |
| DLI 6 Upstream capacity for 121 33/11 kV substations for agricultural HVDS | 17.3 | 5.0 |
| **Output 2: Institutional capacity of MSEDCL improved** | | |
| DLI 7 Institutional capacity of 1,000 MSEDCL staff on HVDS increased | 17.3 | 5.0 |
| **Output 3: Awareness on HVDS, and the efficient use of electricity and water in rural Maharashtra enhanced** | | |
| DLI 8 HVDS monitoring dashboard operational | 34.6 | 10.0 |
| **Total** | **346.0** | **100.0** |

ADB = Asian Development Bank, DLI = disbursement-linked indicator, HVDS = high voltage distribution system, kV = kilovolt, MSEDCL = Maharashtra State Electricity Distribution Company Limited.
Source: Asian Development Bank estimates.

18. A rigorous verification protocol, including independent third-party validation, has been agreed to. Verification of the outcome and output DLIs will be based on MSEDCL's ERP and validated by an independent verification agent (IVA), who will undertake sample visits to confirm data collected and seek feedback from the RBL program beneficiaries. The verification process is designed to strengthen the capacity of MSEDCL and the state government to oversee the program's statewide implementation.

## E. Expenditure Framework and Financing Plan

19. **Program expenditures.** The RBL program expenditures are estimated to be a total of $703.1 million including eligible prior results from 2019 (Table 3 & para 21). This includes capital expenditure on upstream network including construction and augmentation of 33/11 kV substations and downstream network strengthening including 11 kV distribution lines, poles, distribution transformers, and metered connections. It includes costs related to institutional capacity development, monitoring and improving customer awareness.

**Table 3: Summary of Program Expenditure Framework, 2020–2021**

(in 2019 prices)

| Item[a] | Amount ($ million) | Share of Total (%) |
|---|---|---|
| HVDS electricity distribution network in rural Maharashtra for new agriculture customers installed | 548.1 | 77.9 |
| Institutional capacity of MSEDCL improved | 2.0 | 0.3 |
| Awareness on HVDS and the efficient use of electricity and water in rural Maharashtra enhanced | 0.5 | 0.1 |
| Taxes | 88.0 | 12.5 |
| Administration cost | 23.1 | 3.3 |
| Financing costs | 20.9 | 3.0 |
| Contingencies | 20.4 | 2.9 |
| **Total** | **703.1** | **100.0** |

HVDS = high voltage distribution system, MSEDCL = Maharashtra State Electricity Distribution Company Limited.
[a] This includes financing of eligible prior results in 2019.
Sources: Maharashtra State Electricity Distribution Company Limited and Government of Maharashtra estimates.

20. **Program financing.** The total financing needed is estimated at $703.1 million, of which the government has requested a regular loan of $346.0 million from ADB's ordinary capital resources to help finance the program. The loan will have a 20-year term, including a grace period of 5 years; an annual interest rate determined in accordance with ADB's London interbank offered rate (LIBOR)-based lending facility; a commitment charge of 0.15% per year; and such other terms and conditions set forth in the draft loan and program agreements. Based on the straight-line method, the average maturity is 12.75 years, and there is no maturity premium payable to ADB. The financing plan is summarized in Table 4.

**Table 4: Program Financing Plan**

| Source | Amount ($ million) | Share of Total (%) |
|---|---|---|
| Counterpart funding[a] | 357.1 | 50.8 |
| Asian Development Bank[b] | | |
| Ordinary capital resources (loan) | 346.0 | 49.2 |
| **Total** | **703.1** | **100.0** |

[a] Includes loans mobilized by Maharashtra State Electricity Distribution Company Limited (MSEDCL) and guaranteed by the state Government of Maharashtra.
[b] Asian Development Bank loan to be passed to MSEDCL as a grant by the state Government of Maharashtra.
Sources: Maharashtra State Electricity Distribution Company Limited and Government of Maharashtra estimates.

21. **Disbursement arrangements.** Disbursements will be made in accordance with ADB's *Loan Disbursement Handbook* (2017, as amended from time to time) and detailed arrangements agreed between the government and ADB. The loan proceeds will be disbursed to the national government's Controller of Aid, Accounts and Audit Account. The loan will be disbursed subject to the achievement and verification of the DLIs. Financing of prior results not more than 12 months before loan signing is requested to support achieving the results as scheduled, given that such activities comply with the PAP and the results verified in accordance with verification protocols. Based on assessments, prior results for achievement of DLIs 4, 5, and 6 are not expected to exceed 13% of ADB financing. An advance disbursement may be requested after loan approval to finance advance payments to contractors and would not exceed 20% of ADB financing. The combined total of advance financing and financing for prior results would not exceed 30% of ADB financing. Subsequent disbursements will be made based on quarterly achievement of DLIs. Partial disbursements for DLIs 4, 5, 6, and 7 are allowed in proportion to the DLI target achievement provided these are verified and accepted by ADB. The verification mechanism and protocols have been established depending on the nature of the DLIs (Appendix 3).

## F. Capacity Development and Program Action Plan

22. Various assessments were undertaken to assess capacity gaps for the program. An initial PAP was prepared and has been agreed with MSEDCL and MED to define specific activities to improve program implementation. The PAP includes actions to strengthen technical capacity; monitoring; fiduciary responsibilities, gender, and safeguards to ensure that the achievement of key RBL program results strengthens MSEDCL and government systems. The PAP will be refined, improved, and updated during implementation, as needed.

## G. Technical Assistance

23. The attached TA will help strengthen the RBL program implementation through a pilot for energy and water conservation that would support demonstration and awareness raising on the benefit of the HVDS platform, the potential for associated services including irrigation advisory, pump replacement and wider adoption of drip irrigation. It would also support advocacy for design inputs for effective policy making including on tariff-setting, payment, and subsidy administration for efficient electricity and water use, and to scale up the post-2021 HVDS program. The TA would also provide support to improve monitoring and coordination with stakeholders and strengthen capacity for safeguards. The TA is estimated to cost $1.1 million, of which $1.0 million will be financed on a grant basis by ADB's Technical Assistance Special Fund (TASF-other sources). The government will support the TA in the form of counterpart staff and other in-kind contributions.[18] MED will be responsible for the TA and will coordinate through MSEDCL and relevant agencies including Maharashtra Energy Development Agency, Groundwater Surveys and Development Agency, and the Water Resources Department.

## H. Implementation Arrangements

24. Maharashtra Energy Department and MSEDCL are the executing agencies for the program. MSEDCL will be responsible for physical investments in the network under the program. A steering group headed by the Energy Secretary and Chairman and Managing Director of MSEDCL will periodically review program implementation and provide overall direction. The HVDS unit in MSEDCL headed by a Chief Engineer will review implementation being undertaken through MSEDCL field offices, aggregate information at a circle level, and submit periodic progress reports on achievements including on DLIs, the PAP as well as other key indicators.

# III. SUMMARY OF ASSESSMENTS

## A. Program Technical Assessments

25. **Relevance, justification, and adequacy.** The RBL program is relevant and is part of Maharashtra's broader government program to improve access, efficiency, and reliability for new agriculture customers. While HVDS is a proven solution for the distribution sector, it has not been widely adopted for agricultural customers because of the high upfront capital expenditure. The technical modeling of representative agriculture feeders in rural Maharashtra confirmed the reduction in losses by adopting HVDS for new connections compared to the business as usual. The benefits significantly increase if HVDS is extended to both new and existing connections. The HVDS program for new connections is expected to continue after 2021 . There is also a plan for progressive conversion of existing customers for high loss feeders, and this will be reviewed under the PAP. The RBL program includes capacity enhancement of 33/11 kV upstream substations

[18] Attached Technical Assistance Report (accessible from the list of linked documents in Appendix 2).

based on the expected increase in energy demand for HVDS, which will be undertaken in coordination with the transmission utility. MSEDCL has entered into power purchase arrangements under the state's solar program implemented through Energy Efficiency Services Limited (EESL) and the private sector including distributed grid connected rural solar projects, to provide daytime power for the agricultural sector. [19] The plans to develop the HVDS network are based on standard designs, are operationally viable, and would increase supply reliability and power quality. Climate financing is estimated to cost $89.4 million. ADB will finance $87.0 million for mitigation and $2.4 million for adaptation. These costs were estimated using ADB's guidance note on counting climate finance.

26. **Economic returns.** Economic analysis, carried out in accordance with ADB guidelines,[20] reviewed alternatives to the RBL program and estimated an economic internal rate of return of 10.6% in constant 2019 prices compared with business-as-usual connections using low voltage distribution systems. The adoption of HVDS would reduce distribution losses, improve reliability of supply, and reduce burnout rates for agriculture pumps and distribution transformers. It reduces the use of diesel in case of outages. The estimated economic returns increase further if coupled with the adoption of efficient pumps and drip irrigation and increased farmer productivity.

27. **Poverty reduction and gender.** The RBL program aims to supply reliable power to agricultural customers (including women) for irrigation, thereby helping increase agricultural productivity and incomes. Most farmers in Maharashtra are considered small and marginal.[21] The program is classified as having some gender elements. MSEDCL has progressive policies on women's recruitment and their awareness on and participation in HVDS training would be strengthened under the RBL program. Participation of women in HVDS customer awareness raising will also be supported. The potential for farmers and their families, including women, to benefit from reduced electricity and water usage, and improvements in government policy including linkages to other programs to be associated with HVDS would be studied under the proposed pilot supported by the TA, and the knowledge shared with MED and other stakeholders.

28. **Sustainability and governance.** In June 2019, MSEDCL was ranked third among distribution utilities nationally for performance under the government's *Ujwal Discom Assurance Yojana* (a program for operational improvement and financial turnaround) and one of the few public sector electricity distribution companies with an after-tax profit. However, MSEDCL had a debt-service coverage ratio of less than 1 in FY2018. To reduce the impact on MSEDCL for the capital-intensive HVDS program, the state government proposes to provide long tenor ADB funds as a grant to MSEDCL. Tariffs for MSEDCL are independently set by the Maharashtra Electricity Regulatory Commission (MERC) based on a published methodology and a public hearing process. MSEDCL has been unable to effectively meter the agricultural customers on the conventional distribution network (para. 6). The introduction of HVDS supports 100% metering, monitoring of energy consumption, and billing based on a usage-based tariff, and improves the utility's capacity to track and take action on non-paying customers. The attached TA would support a pilot for MSEDCL and MED to identify avenues for adoption of energy and water conservation through tariffs and improved subsidy administration to increase the sustainability of the HVDS program. The HVDS dashboard would allow MSEDCL management and stakeholders, including other government departments, to track the relevant information on HVDS customers.

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[19] ADB. 2019. *Report and Recommendation of the President to the Board of Directors: Proposed Loan, Administration of Loan, and Administration of Technical Assistance Grant to Energy Efficiency Services Limited for the Scaling up Demand-Side Energy Efficiency Sector Project.* Manila.

[20] ADB. 2017. *Guidelines for the Economic Analysis of Projects*. Manila.

[21] Out of 13.7 million farmers in the state,78.6% are small and marginal farmers, each with less than 2 hectares of land.

## B. Program Systems Assessments

29. **Monitoring and evaluation system.** MSEDCL's existing monitoring system is ERP-based. MSEDCL has invested in software to track new applications for connections, network operation and maintenance, meter reading and billing, capital projects, and financial transactions. MSEDCL is using a geographic information system to tag and determine the requirements for connecting each new customer to the network, which supports easier verification of quantities. MSEDCL staff use smart phones and employee applications to ensure that field data is directly uploaded, up-to-date, and traceable. Prominent performance indicators tracked include electricity sales, distribution loss, network reliability, tariffs, cost of supply, load-shedding, project implementation and financial indicators. The system can monitor DLI performance; a customized HVDS reporting dashboard is being implemented (DLI 8) to provide monthly monitoring and quarterly progress reports and information flows to the MED. During due diligence, MSEDCL agreed to implement a sampling and data collection system to report on quality of power supply for agricultural customers (DLI 3). To complement monitoring and evaluation, the IVA will verify information related to the DLIs and monitor PAP implementation for compliance. The state government's Directorate of Economics and Statistics will evaluate program performance and impact through external parties.

30. **Fiduciary systems.** MSEDCL follows the rules and regulations set under the Companies Act, 2013 for corporate governance and financial reporting and its operations are governed by the regulatory framework provided under the Electricity Act, 2003, and rules and regulations enacted by MERC.[22] The RBL program will use MSEDCL's fiduciary systems for financial management, procurement, audits and anticorruption. These systems were assessed to determine their ability to manage fiduciary risks and provide assurances that the RBL program funds will be used as intended, with due consideration for economy and efficiency.[23]

31. The overall fiduciary risk is rated as *moderate*. MSEDCL has substantial capacity to undertake the RBL program, with a well-structured finance and accounts function headed by qualified professionals. It has a transparent and efficient management system with ERP systems, centralized billing and management dashboards. MSEDCL has an effective budgetary planning and control system with an internal audit function that performs well and has maintained a fixed asset and inventory register through the ERP. However, improvements are needed for timely completion of physical verification of assets, internal controls for financial reporting and to address the qualified audit opinion. These are being implemented and addressed in the PAP.

32. The procurement assessment covered the procurement profile of the RBL program, and country- and agency-level procurement assessments. The RBL program will rely on MSEDCL's systems and will exclude high-value contracts in accordance with ADB's RBL policy.[24] MSEDCL has a well-defined, transparent, and accountable procurement process and uses electronic procurement. The procurement process covers the preparation of cost estimates, evaluation procedures, confidentiality, staff performance review, and the appeals mechanism defined in MSEDCL and state procurement guidelines. The scope for procurement includes turnkey contracts and goods. The goods packages that are about 11% of the total RBL program in value

[22] Electricity is a concurrent subject in India, which is governed by both central and state governments. The overarching framework is provided by the national Electricity Act, 2003 and the specific and operational rules and regulations are provided by the individual state electricity regulatory commissions.

[23] Program Fiduciary Risk Assessment (accessible from the list of linked documents in Appendix 2).

[24] ADB. 2013. *Piloting Results-Based Lending for Programs.* Manila. High-value contacts are those with estimated value over $50 million for works, turnkey and supply, and installation contracts; $30 million for goods; $20 million for information technology systems and non-consulting services; and $15 million for consulting services.

and consisting of relatively low-value transactions at an average cost of $1 million, include a provision to split a contract if qualified bidders from the state of Maharashtra volunteer to reduce prices to match the lowest competitive bid received. This is specified in the bidding document and is followed in several Indian states. The overall procurement risk is assessed as *moderate*.

33. The anticorruption framework of the RBL program is effective. The state government of Maharashtra has established an Anti-Corruption Bureau to investigate complaints against public servants involving abuse of position and corruption. MSEDCL has a well-structured anticorruption function with five vigilance cells dealing with complaints including corruption, embezzlement, and fraud charges against its officers. MSEDCL has developed an online grievance redress system for customers to log complaints and provide feedback on services. The Guidelines to Prevent or Mitigate Fraud, Corruption, and Other Prohibited Activities in Results-Based Lending for Programs were explained to the government and MSEDCL (footnote 25) and are part of the PAP.

34. **Safeguard systems.** A program systems safeguard assessment (PSSA) was prepared. The RBL program is classified as category B for environment and involuntary resettlement, and category C for indigenous peoples, in accordance with ADB's Safeguard Policy Statement (2009). Due diligence was conducted on the activities including construction and augmentation of 33/11 kV substations, 11 kV lines, distribution transformers, and connections. MSEDCL confirmed that land acquisition is not proposed for connections and the program is demand-driven. The 33/11 kV distribution substation would typically be on barren government land. If private land acquisition is required, it would be through voluntary donation or direct purchase with no involuntary land acquisition. The distribution lines will originate from the nearest existing 11 kV line and the alignment will follow rights-of-way of existing roads or unused land between agricultural plots without intruding on private property. Activities located in or directly adjacent to key biodiversity areas or national protected areas—including wildlife sanctuaries or reserves, forests, and cultural heritage sites—will be excluded from the RBL program through the application of the safeguard screening guidance. The RBL program activities will not cause significant, irreversible, diverse, or unprecedented adverse environmental and social impacts. Potential construction-related impacts from pole and line installation and operation include air and liquid emissions, waste etc. with occupational and community health and safety impacts. The impacts associated with construction and operation will be managed by MSEDCL by implementing relevant national regulations and company practices. Indigenous peoples are not targeted beneficiaries, although the RBL program will not exclude them. The RBL program will not adversely impact indigenous peoples, their cultural identity, survival, cultural resources, or livelihood systems.

35. In addition, policy equivalent assessment was undertaken to compare national, state, and agency-level policies with ADB's Safeguard Policy Statement (2009). There are well-defined legislative frameworks for environment and social safeguards in India and Maharashtra. MSEDCL rules and practices on safeguard matters are institutionalized and there is a specific grievance redress mechanism. However, gaps in procedural matters (site screening, record keeping, and monitoring) have been identified and environmental and social management system (ESMS)[25] guidelines, tools and formats have been developed for the RBL program. Meaningful consultations were undertaken, and the results incorporated. MSEDCL has identified staff from head office and in each division to undertake the safeguard activities. The PMU will implement the safeguard PAP and ESMS for the RBL program and report to ADB through semiannual monitoring reports. Consultants under the TA will guide the PMU and monitor implementation.

[25] It consists of a set of guiding documents including safeguards screening, due diligence template, generic environment management plan, safeguards monitoring template, consultation template, and guidelines for voluntary donation and direct purchase. These are developed as an ESMS for this program.

The PSSA was disclosed on ADB's website in September 2019. A climate risk assessment was conducted, and the potential risks are assessed as *medium,* including increase in rainfall and temperatures. These potential risks will be addressed in the technical design.

### C. Integrated Risk Assessment and Mitigating Measures

36. Major risks and mitigating measures are summarized in Table 5. The overall benefits and impact are expected to outweigh the risks and costs.

**Table 5: Summary of Integrated Risk Assessment and Mitigating Measures**

| Risks | Rating Without the Mitigating Measures | Key Mitigating Measures |
|---|---|---|
| **Results.** Limited demand for HVDS for new agriculture connections. | Substantial | Government policy for all new grid connections for agriculture on HVDS. Awareness of efficient use of electricity, water will be enhanced through a pilot for HVDS, efficient pumps and drip irrigation. |
| Slowdown in generation and transmission investments may reduce intended benefits. | Moderate | Ongoing coordination between MSEDCL and other utilities. Distributed grid-connected solar projects under implementation under other programs. |
| **Fiduciary**. Qualified opinion in audited statements, asset verification and internal controls on financial reporting. | Moderate | HVDS assets recorded through ERP. Physical asset verification and implementation of internal controls included in the PAP. |
| **Expenditures and financing**. Cost and time overruns. | Moderate | Benchmarked against similar programs. |
| **Safeguards.** Screening, planning, monitoring inadequate to comply with ADB's safeguard policies. | Moderate | Demand driven program with established grievance redress mechanisms. Training of MSEDCL staff across all circles. Capacity building under TA. |
| **Overall RBL program risk** | **Moderate** | |

ERP = enterprise resource planning, HVDS = High Voltage Distribution System, MSEDCL = Maharashtra State Electricity Distribution Company Limited, PAP = program action pan, TA = technical assistance.
Note: Risk factors are assessed against two dimensions: (i) the likelihood that the risk will occur, and (ii) the impact of the risk on the outcome. Rating scale: low = low likelihood and low impact; moderate = substantial to high likelihood but low to moderate impact; substantial = low to moderate likelihood but substantial to high impact; high = high likelihood and high impact.
Source: Asian Development Bank.

## IV. ASSURANCES

37. The government and the MSEDCL have agreed with ADB on certain covenants for the RBL program, which are set forth in the loan agreement and program agreement.

## V. RECOMMENDATION

38. I am satisfied that the proposed results-based loan would comply with the Articles of Agreement of the Asian Development Bank (ADB) and recommend that the Board approve the loan of $346,000,000 to India for the Maharashtra Rural High Voltage Distribution System Expansion Program, from ADB's ordinary capital resources, in regular terms, with interest to be determined in accordance with ADB's London interbank offered rate (LIBOR)-based lending facility; for a term of 20 years, including a grace period of 5 years; and such other terms and conditions as are substantially in accordance with those set forth in the draft loan and program agreements presented to the Board.

Masatsugu Asakawa
President

2 April 2020

## DESIGN AND MONITORING FRAMEWORK

**Impacts the Results-Based Lending Program is Aligned with**

(i) Emission intensity of economy reduced by 33-35% by 2030 from 2005 levels (Government of India's Intended Nationally Determined Contributions) [a]

(ii) Agricultural productivity in rural Maharashtra improved and efficiency in the electricity value chain achieved (Government of Maharashtra's Vision 2030) [b]

| Results Chain | Performance Indicators with Targets and Baselines | Data Sources and Reporting Mechanisms | Risks |
|---|---|---|---|
| **Outcome**<br><br>Access to efficient, reliable, and good quality power supply for new agricultural customers in rural Maharashtra improved | **By June 2022:**<br><br>**Access**<br>a. At least 700 million kWh of electricity sales to 156,000 HVDS-connected agricultural customers reported. (2018 baseline: 0) (RFI 5.1)<br><br>**Efficiency**<br>b. At least 90% of agricultural customers served by HVDS billed a metered, usage-based energy charge. (2018 baseline: 0) (DLI 1) (RFI 5.1)<br><br>c. Greenhouse gas emissions reduced by 130,000 $tCO_2e$/year [c] (2018 baseline: 0) (RFI 3.1)<br><br>d. Policies promoting efficient use of electricity and water by agricultural customers adopted (2018 baseline: none) [d] (TI 6.2.1)<br><br>**Reliability**<br>e. Distribution transformer failure rate for HVDS of less than 8% achieved (2018 baseline: Over 12% for agricultural LVDS connections) (DLI 2)<br><br>**Quality**<br>f. Voltage drop for 156,000 HVDS-connected agricultural customers reduced to not more than 6% (2018 baseline: Over 15% observed for existing connections) (DLI 3) (RFI 5.1) | a–f. MSEDCL reports, statistics, and independent monitoring reports | Slowdown in generation and transmission investments may reduce intended benefits. |

| Results Chain | Performance Indicators with Targets and Baselines | Data Sources and Reporting Mechanisms | Risks |
|---|---|---|---|
| **Outputs**<br>1. High voltage electricity distribution network in rural Maharashtra for new agricultural customers installed | **By March 2022:**<br>1a. 156,000 agricultural customers (including women applicants) in rural Maharashtra connected and 100% metered through HVDS (2018 baseline: 0) (DLI 4) (RFI 5.1)<br><br>1b. 132,600 new HVDS distribution transformers configured for farmers' expected consumption commissioned in rural Maharashtra (2018 baseline: 0) (RFI 5.1.1)<br><br>1c. 46,800 circuit km of new high tension (HT) 11 kV lines constructed in rural Maharashtra (2018 baseline: 0) (DLI 5) (TI 5.1.1) [e]<br><br>1d. Upstream network capacity for agricultural HVDS improved through 121 new or upgraded 33/11 kV distribution substations in rural Maharashtra (2018 baseline:0) (DLI 6) (TI 5.1.1) | 1a.–d. MSEDCL statistics and independent monitoring reports | Supply delays and price increases beyond projections can impact timely delivery and completion of outputs. |
| 2. Institutional capacity of MSEDCL improved | 2a. At least 1,000 MSEDCL rural staff (including all eligible and interested women) demonstrated knowledge and skills on HVDS capital investments, operation and maintenance, monitoring, and safeguards (2018 baseline: 0) (DLI 7) (TI 6.1.1)<br><br>2b. Systems for 100% metering and billing of agricultural customers on HVDS established and functional (2018 baseline: No) (TI 6.2.3)<br><br>2c. Systems for 100% physical verification of HVDS assets established and functional (2018 baseline: No) (TI 6.2.3) | 2a Pre- and post-training assessment<br>2b.–c. MSEDCL statistics and independent monitoring reports | |
| 3. Awareness regarding HVDS and the efficient use of electricity and water in rural Maharashtra enhanced | 3a. HVDS monitoring dashboard for agricultural customer supply installed and operational to provide information to MSEDCL and the government of Maharashtra and improve inter-agency coordination (2018 baseline: Not applicable) (DLI 8) (TI 6.2.3)<br><br>3b. Awareness of 156,000 HVDS customers (including 100% of eligible women customers) on HVDS increased (2018 baseline: Not applicable)<br><br>3c. At least one agriculture feeder with 100% HVDS, energy-efficient pumps, and associated efficient irrigation equipment pilot-tested in rural Maharashtra, with findings and recommendations submitted to the Maharashtra Energy Department [f] (2018 baseline: 0) (TI 5.1.1) | 3a, 3c. Independent monitoring reports and rapid surveys<br><br>3b, 3d Pre- and post-assessment | |

| | | | |
|---|---|---|---|
| | 3d. At least 500 users (including eligible women) in the vicinity of an agriculture feeder reported increased awareness on HVDS and its link to efficient use of electricity and water in rural Maharashtra [f] (2018 baseline: 0) | | |

**Key Program Actions**

**1. High voltage electricity distribution network in rural Maharashtra for new agricultural customers installed**

1.1 Receive applications for new HVDS connections.
1.2 Expand 11 kV lines; install distribution transformers, meters, and service lines for new HVDS connections.
1.3 Confirm installation of connections and generate monthly bills for new connections.
1.4 Enhance upstream capacity at 33/11 kV substations to meet demand.

**2. Institutional capacity of MSEDCL improved**

2.1 Establish HVDS training program for MSEDCL staff, including on HVDS investments, operation, maintenance, metering, billing, asset verification, and safeguards.
2.2 Identify and enroll MSEDCL rural division staff for HVDS training.
2.3 Ensure systems for collection and collation of field information are in place for preparing periodic reports.
2.4 Improvements for asset verification and internal controls for financial reporting.
2.5 Review progress on program including action plan and resolve bottlenecks in implementation.

**3. Awareness on HVDS, and the efficient use of electricity and water in rural Maharashtra enhanced**

3.1 Confirm and implement reporting requirements for HVDS monitoring dashboard.
3.2 Select pilot project location and configuration to support efficient electricity and water usage.
3.3 Implement the pilot and disseminate lessons to stakeholders, including by providing inputs for decision making at the state level for future HVDS investments.

**Financing Plan**

Total program financing from 2020 to 2021 [f] : $703.1 million
ADB: $346.0 million (ordinary capital resources loan) [g]
Counterpart funding: $357.1 million

**Assumptions for Partner Financing** Not applicable

ADB = Asian Development Bank, DLI = disbursement-linked indicator, HVDS = high voltage distribution system, km = kilometer, kV = kilovolt, kWh = kilowatt-hour, LVDS = low voltage distribution system, MSEDCL = Maharashtra State Electricity Distribution Company Limited, RFI = results framework indicator, TA = technical assistance, $tCO_2e$ = tons of carbon dioxide equivalent, TI = tracking indicator.

[a] Government of India. 2015. *India's Intended Nationally Determined Contribution*. New Delhi.
[b] Government of Maharashtra, Planning Department, 2017. *Vision 2030.* Mumbai.
[c] Based on reduction of technical losses through metered HVDS of at least 0.5% compared with LVDS under a business-as-usual scenario; this applies to the HVDS program only.
[d] Supported under TA.
[e] High tension (HT) and high voltage (HV) are used interchangeably.
[f] Associated with $1 million in TA funding from ADB's Technical Assistance Special Fund (TASF-other sources). Pilot to be designed and implementation to be supported using the TA. The findings from the pilot would support the government program after 2021 for adoption of HVDS, efficient pumps, and drip irrigation practices.
[g] This includes financing of eligible prior results in 2019.

**Contribution to the ADB Results Framework**

RFI 3.1 Total annual greenhouse gas emissions reduction ($tCO_2e$/year). Target: 130,000.
RFI 5.1 People benefiting from increased rural investment (number). Target: 156,000 HVDS-connected customers.
TI 5.1.1 Rural infrastructure assets established or improved (number). Target: 46,800 km. of high voltage distribution lines, 132,600 distribution transformers, 121 33/11 substations and 1 pilot agriculture feeder with 100% HVDS.
TI 6.1.1 Government officials with increased capacity to design, implement, monitor, and evaluate relevant measures (number). Target: 1,000 MSEDCL rural staff.
TI 6.2.1 Service delivery standards adopted and/or supported in implementation by government and/or private entities (number). Target: 1 (Policies promoting efficient use of electricity and water by agricultural customers adopted)
TI 6.2.3 Measures to strengthen state-owned enterprise governance supported in implementation (number). Target: 3 (1 system for metering and billing, 1 system for physical verification of HVDS, 1 HVDS dashboard for information sharing and inter-agency coordination).

Source: Asian Development Bank.

**LIST OF LINKED DOCUMENTS**
http://www.adb.org/Documents/RRPs/?id=50193-003-3

1. Loan Agreement
2. Program Agreement
3. Country Economic Indicators
4. Sector Assessment (Summary): Energy
5. Program Soundness Assessment
6. Program Results Assessment
7. Program Results Framework
8. Program Expenditure and Financing Assessment
9. Program Monitoring and Evaluation System Assessment
10. Program Fiduciary Systems Assessment
11. Integrated Risk Assessment and Mitigating Measures
12. Contribution to the ADB Results Framework
13. Development Coordination
14. Summary Poverty Reduction and Social Strategy
15. Program Implementation Document
16. Program Safeguard Systems Assessment
17. Program Action Plan
18. Attached Technical Assistance Report

**Supplementary Documents**

19. High Voltage Distribution System Experience and Technical Study
20. Financial Management Assessment Report
21. Maharashtra Rural High Voltage Distribution System – Leveraging Energy Water Linkages
22. Climate Change Assessment
23. Program Safeguard Systems Assessment with Appendixes

## DISBURSEMENT-LINKED INDICATORS, VERIFICATION PROTOCOLS, AND DISBURSEMENT SCHEDULE
## Table A3.1: Disbursement-Linked Indicators

| Results Indicators | DLI (yes /no) | Baseline Value & Unit | Baseline Year | Target Values of Results Indicators | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Prior Results | Apr 20 -Jun 20 | Jul 20 -Sep 20 | Oct 20 -Dec 20 | Jan 21 -Mar 21 | Apr 21 -Jun 21 | Jul 21 -Sep 21 | Oct 21 -Dec 21 | Jan 22 -Mar 22 |
| ***Outcome*** | | | | | | | | | | | | |
| 1. Agricultural customers are effectively metered and billed a usage-based energy charge for utilization of the HVDS network[1] **(%)** | DLI1 | NA% | 2018 | | >60% | >60% | >70% | >70% | | | | |
| 2. Improved power reliability for agricultural customers with less interruptions. Distribution failure rate for HVDS lower than 8% | DLI2 | 12% | 2018 | | <8% | <8% | <8% | <8% | | | | |
| 3. Improved power quality for agricultural customers. Voltage drop for HVDS-connected agricultural customers not more than 6% (MERC voltage regulation)[2] | DLI3 | 15% | 2018 | | <+/-6% | <+/-6% | <+/-6% | <+/-6% | | | | |
| 4. Reduction in greenhouse gas emissions by 130,000 tCO2 equiv./year compared to conventional low voltage distribution grid. | No | 0 tCO2 equ/year. | 2018 | | | | | | | | | 130,000 (FY 21-22) |
| ***Output*** | | | | | | | | | | | | |
| 5. Increase in number of new agricultural electricity connections in rural Maharashtra through metered HVDS by 156,000 by 2021 | DLI4 | 0 / nos. | 2018 | 65,000 | 30,000 | 10,000 | 20,000 | 20,000 | 11,000 | | | |
| 6. Increase in number of commissioned HVDS distribution transformers by 132,600 for new agricultural electricity connections in rural Maharashtra by 2021. | no | 0 / nos. | 2018 | 54,600 | 25,000 | 9,000 | 16,500 | 16,500 | 11,000 | | | |
| 7. Increase in length of 11kV distribution lines for new agriculture electricity connections in | DLI5 | 0 / km. | 2018 | 19,000 | 9,000 | 3,000 | 6,000 | 4,000 | 5,800 | | | |

[1] No. of connections metered and billed a usage-based energy charge at least once during the 3-month period out of the total no. of pump set connections issued under the HVDS program.

[2] Maharashtra Electricity Regulatory Commission (Standards of performance of distribution licensee, period for giving supply and determination of compensation), Regulation 2014. Measured at customer end at the day after commissioning of distribution transformer (DTR). The measured voltage would be then compared against system voltage of 440 voltage as stipulated in the Regulation. It would be done on a sample no. of HVDS customers in each circle. (10 customers/circle every quarter)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| rural Maharashtra through metered HVDS by 46,800 km. by 2021 | | | | | | | | | | | | |
| 8. Addition of new 33/11kV substations, augmentation/upgradation of existing 33/11 kV substations by 121 in rural Maharashtra to improve upstream network capacity for agriculture HVDS by 2021 | DLI6 | 0 / nos. | 2018 | | 10 | 10 | 20 | 20 | 20 | 15 | 26 | |
| 9. Increase in institutional capacity with number of MSEDCL staff (including all interested and eligible women) that demonstrate knowledge and skills on operations, maintenance and monitoring of HVDS for agriculture customers by 1,000 by 2021 | DLI7 | 0 / nos. | 2018 | | 250 | 250 | 250 | 250 | | | | |
| 10. E-procurement audits conducted annually | no | no | 2018 | yes | | | yes | | | yes | | |
| 11. 100% physical fixed asset verification for HVDS program | no | no | 2018 | yes | yes | yes | yes | yes | yes | yes | yes | |
| 12. 100% metering of agricultural customers on HVDS | no | 0 | 2018 | yes | yes | yes | yes | yes | yes | yes | yes | yes |
| 13. HVDS monitoring dashboard to monitor agricultural customer supply parameters created and operational<br>*Monitoring of performance indications (No. of connections, Sales in MU, voltage variations, transformer failure, staff trained, safeguard reports prepared etc.)* | DLI8 | No | 2018 | | yes | | | | | | | |
| 14. At least 1 agricultural feeder with 100% HVDS and energy efficient irrigation equipment pilot tested in rural Maharashtra. | no | 0 | 2018 | | | | | yes | | | | |
| 15. At least 500 agriculture customers (including all interested and eligible women) on the feeder reported increased awareness on HVDS with efficient use of electricity and water in rural Maharashtra. | no | 0 | 2018 | | 125 | 125 | 125 | 125 | | | | |
| 16. Customers who have applied for HVDS receive periodic updates on their connection status, billing. | no | | | yes | yes | yes | yes | yes | yes | yes | yes | yes |

Sources: Asian Development Bank.

## Table A3.2: Verification Protocols

| Disbursement-Linked indicator (DLI) | Definition and description of achievement and verification | Information source and frequency | Verification Agency and procedure |
|---|---|---|---|
| **Outcome** | | | |
| **DLI 1 – Agricultural customers are effectively metered and billed a usage-based energy charge for utilization of the HVDS network** | | | |
| **Apr 20 – Jun 20:** At least 60% of total new HVDS connections are being used.<br><br>**Jul 20 – Sep 20:** At least 60% of total new HVDS connections are being used.<br><br>**Oct 20 – Dec 20:** At least 70% of total new HVDS connections are being used.<br><br>**Jan 21 – Mar 21:** At least 70% of total new HVDS connections are being used. | DLI 1 measures the ratio of HVDS connections that are billed a metered, usage-based energy charge at least once during the verification period. It reflects the extent to which the HVDS infrastructure constructed under the program is effectively put to use and if farmers are metered and billed a usage-based tariff that supports efficient consumption of power.<br><br>Conditions for disbursement are met if the number of connections billed during the verification period out of the total number of HVDS connections issued under the scheme met the specified targets.<br><br>If the target is not met for a certain verification period, no disbursement will be made. Should the target for the following verification period be met, the amount for the previous undisbursed amount will be disbursed together with the amount for the current period.<br><br>Disbursements can be deferred until the target ratio has been achieved. | MSEDCL New connections system (NCS) and Billing Database<br><br>Required frequency for reporting will be quarterly, and MSEDCL and ADB may agree each year on interim reporting arrangements as appropriate.<br><br>Monitoring may be as frequent as MSEDCL wishes. | Every quarter, the M&E team in MSEDCL prepares an attestation that the DLI is met and attaches the relevant reports.<br><br>The IVA will verify the results every quarter from MSEDCL's Billing Database and NCS. The IVA will also verify the results by spot checks of the HVDS system at circle/ division level.<br><br>The IVA will refer to the verification protocols and other relevant guidelines prepared for the program.<br><br>The IVA report is to be attached to the MSEDCL's report. Within one month of receiving the validated report, ADB will confirm that the target has been met. |
| **DLI 2 – Improved power reliability for agricultural customers with less interruptions** | | | |
| **Apr 20 – Jun 20:** Distribution transformer failure rate to be less than 8%<br><br>**Jul 20 – Sep 20:** Distribution transformer failure rate to be less than 8%<br>**Oct 20 – Dec 20:** Distribution transformer failure rate to be less than 8%<br><br>**Jan 21 – Mar 21:** Distribution transformer failure rate to be less than 8% | DLI 2 is the rate of failure of distribution transformer failures for HVDS related agricultural customers. It is computed as a ratio of "number of transformers failure during a period" to "average number of transformers present during the verification period"<br>Conditions for disbursement are met if the rate of failure of distribution transformer is less than the target for a given quarter.<br><br>If the target is not met for a certain verification period, no disbursement will be made.<br><br>Should the target be met combined for the following and previous verification periods, the amount for the previous undisbursed amount will be disbursed together with the amount for the current period.<br>Disbursements can be deferred until the target ratio has been achieved for combined, consecutive verification periods. | Manual or automated reporting (in MS Excel format) of Distribution Transformer failure rate by MSEDCL.<br>Required frequency for reporting will be quarterly. MSEDCL and ADB may agree each year on interim reporting arrangements as appropriate.<br><br>Monitoring may be as frequent as MSEDCL wishes. | Every quarter, the M&E in MSEDCL prepares an attestation that the DLI is met and attaches the relevant reports.<br>The IVA will verify the results every quarter from MSEDCL's manual reporting in MS Excel format. The IVA will also verify the results by spot checks of the HVDS system at circle/ division level.<br><br>The IVA will refer to the verification protocols and other relevant guidelines prepared for the program.<br><br>The IVA report to be attached to the MSEDCL's report. Within one month of receiving the validated report, ADB will confirm that the target has been met. |

| Disbursement-Linked indicator (DLI) | Definition and description of achievement and verification | Information source and frequency | Verification Agency and procedure |
|---|---|---|---|
| **DLI 3 – Improved power quality for agricultural customers** | | | |
| **Apr 20 – Jun 20:** Voltage variation should be within the limit of +/- 6%<br><br>**Jul 20 – Sep 20:** Voltage variation should be within the limit of +/- 6%<br><br>**Oct 20 – Dec 20:** Voltage variation should be within the limit of +/- 6%<br><br>**Jan 21 – Mar 21:** Voltage variation should be within the limit of +/- 6% | Definition of DLI 3 is the maintenance of voltage profile within the voltage deviation band specified by MERC. [3] The permissible deviation band specified by MERC in 6% (+/-)<br><br>Conditions for disbursement are met if the deviation of voltage is maintained within +/- 6% of system voltage of 440V for 90% of the time within a given quarter.<br><br>If the target is not met for a certain verification period, no disbursement will be made.<br><br>Should the target be met combined for the following and previous verification periods, the amount for the previous undisbursed amount will be disbursed together with the amount for the current period.<br><br>Disbursements can be deferred until the target ratio has been achieved for combined, consecutive verification periods. | From the customer database, 10 new customer distribution transformers (with 10 unique codes) shall be chosen for each circle. Considering 35 circles, total 350 transformer codes will be used for verification. Each distribution transformer connects up to 2 metered customer connections. Only one connection per transformer shall serve for voltage verification.<br><br>Voltage is measured and stored on each meter for HVDS connected customers for a time period of 45 days. This data must be manually extracted from the meter. Any meter recording shall show maintenance of a voltage fluctuation within +/- 6% of the system voltage of 440V during 90% of the time recorded (outages are excluded).<br>Required frequency for reporting will be quarterly and MSEDCL and ADB may agree each year on interim reporting arrangements as appropriate.<br>Monitoring may be as frequent as MSEDCL wishes. | Every quarter, the M&E team in MSEDCL prepares an attestation that the DLI is met and attaches the relevant reports.<br><br>The IVA will verify the results every quarter from MSEDCL's Billing Database and NCS. The IVA will also verify the results by spot checks of the HVDS system at circle level.<br><br>The IVA will refer to the verification protocols and other relevant guidelines prepared for the program.<br><br>The IVA report is then attached to the MSEDCL's report. Within one month of receiving the validated report, ADB will confirm that the target has been met. |

[3] MERC (Standards of performance of distribution licensee, period for giving supply and determination of compensation), Regulation 2014.

| Disbursement-Linked indicator (DLI) | Definition and description of achievement and verification | Information source and frequency | Verification Agency and procedure |
|---|---|---|---|
| **Output** | | | |
| **DLI 4 – Increase in number of new agricultural electricity connections in rural Maharashtra through metered HVDS** | | | |
| **Prior Results:** Release of 65,000 metered agriculture connections through HVDS program<br><br>**Apr 20 – Jun 20:** Release of 30,000 metered agriculture connections through HVDS program<br><br>**Jul 20 – Sep 20:** Release of 10,000 metered agriculture connections through HVDS program<br><br>**Oct 20 – Dec 20:** Release of 20,000 metered agriculture connections through HVDS program<br>**Jan 21 – Mar 21:** Release of 20,000 metered agriculture connections through HVDS program<br><br>**Apr 21– Jun 21:** Release of 11,000 metered agriculture connections through HVDS program | Conditions for full disbursement are met if the number of new agriculture connections released by MSEDCL through HVDS for a quarter reaches the target number specified for that quarter (first column).<br><br>Partial disbursement. The DLI is scalable and partial disbursement is allowed for over and under achievement. If the target is not fully achieved, then disbursement can be proportional to the increase made from the previous period's achievement. The following formula will be applied:<br><br>Partial DLI disbursement = planned DLI disbursement per metered agriculture connection* actual number of metered agriculture connections achieved for the quarter.<br><br>Disbursements are allowed for early or late achievement of the DLI and capped at the total ADB financing allocation. This means that the planned disbursement amount can be released when the set target is fully achieved even if the achievement is late, as long as the achievement is during the program's duration. | MSEDCL New Connection System<br><br>Required frequency quarterly and MSEDCL and ADB may agree each year on interim reporting arrangements as appropriate.<br><br>Monitoring may be as frequent as MSEDCL wishes. | Every quarter, the M&E in MSEDCL prepares an attestation that the DLI is met and attaches the relevant reports.<br><br>The IVA will verify the results every quarter from the MSEDCL New Connection System. The IVA will also verify the results by spot checks of the HVDS system at circle/ division level.<br><br>The IVA will refer to the verification protocols and other relevant guidelines prepared for the program.<br><br>The IVA report is to be attached to the MSEDCL's report. Within one month of receiving the validated report, ADB will confirm that the target has been met. |
| **DLI 5 – Increase in length of 11 kV distribution lines for new agricultural electricity connections in rural Maharashtra through metered HVDS** | | | |
| **Prior Results:** Commissioning of 19,000 circuit-km of HT Lines through HVDS program<br><br>**Apr 20 – Jun 20:** Commissioning of 9,000 circuit-km of HT Lines through HVDS program<br><br>**Jul 20 – Sep 20:** Commissioning of 3,000 circuit-km of HT Lines through HVDS program<br><br>**Oct 20 – Dec 20:** Commissioning of 6,000 circuit-km of HT Lines through HVDS program | Conditions for full disbursement are met if the length of HT Lines (circuit-km) commissioned under HVDS Scheme for a quarter reaches the target number specified for that quarter (first column).<br><br>Partial disbursement. The DLI is scalable and partial disbursement is allowed for over and under achievement. If the target is not fully achieved, then disbursement can be proportional to the increase made from the previous period's achievement. The following formula will be applied:<br><br>Partial DLI disbursement = planned DLI disbursement per circuit-km of HT lines through the HVDS program * actual achievement of circuit-km of HT lines through the HVDS program achieved for the quarter.<br><br>Disbursements are allowed for early or late achievement of the DLI and capped at the total ADB financing allocation. This means that the planned disbursement amount can be released when the set | Project Module of MSEDCL ERP System<br><br>Required frequency for reporting will be quarterly and MSEDCL and ADB may agree each year on interim reporting arrangements as appropriate.<br><br>Monitoring may be as frequent as MSEDCL wishes. | Every quarter, the M&E in MSEDCL prepares an attestation that the DLI is met and attaches the relevant reports.<br><br>The IVA will verify the results every quarter from the project module of MSEDCL ERP system. The IVA will also verify the results by spot checks of the HVDS system at circle/ division level.<br><br>The IVA will refer to the verification protocols and other relevant guidelines prepared for the program.<br><br>The IVA report to be attached to the MSEDCL's report. Within one month of receiving the validated report, ADB will confirm that the target has been met. |

| Disbursement-Linked indicator (DLI) | Definition and description of achievement and verification | Information source and frequency | Verification Agency and procedure |
|---|---|---|---|
| **Jan 21 – Mar 21:** Commissioning of 4,000 circuit-km of HT Lines through HVDS program<br><br>**Apr 21 – Jun 21:** Commissioning of 5,800 circuit-km of HT Lines through HVDS program | target is fully achieved even if the achievement is late, as long as the achievement is during the program's duration. | | |
| **DLI 6 – Addition of new 33/11 kV substations, augmentation/upgradation of existing 33/11 kV substations in rural Maharashtra to improve upstream network capacity for agricultural HVDS** | | | |
| **Apr 20 – Jun 20:** Commissioning of 10 substations under HVDS program<br><br>**Jul 20 – Sep 20:** Commissioning of 10 substations under HVDS program<br><br>**Oct 20 – Dec 20:** Commissioning of 20 substations under HVDS program<br><br>**Jan 21 – Mar 21:** Commissioning of 20 substations under HVDS program<br><br>**Apr 21 – June 21:** Commissioning of 20 substations under HVDS program<br><br>**Jul 21 – Sep 21:** Commissioning of 15 substations under HVDS program<br><br>**Oct 21 – Dec 21:** Commissioning of 26 substations under HVDS program | Conditions for full disbursement are met if the number of substations commissioned under HVDS Program for a quarter reaches the target number specified for that quarter.<br><br>Partial disbursement. The DLI is scalable and partial disbursement is allowed for over and under achievement. If the target is not fully achieved, then disbursement can be proportional to the increase made from the previous year's achievement. The following formula will be applied:<br><br>Partial DLI disbursement = planned DLI disbursement per substation * actual achievement of commissioned substations achieved for the quarter.<br><br>Disbursements are allowed for early or late achievement of the DLI and capped at the total ADB financing allocation. This means that the planned disbursement amount can be released when the set target is fully achieved even if the achievement is late, as long as the achievement is during the program's duration. | Project Module of MSEDCL ERP System<br><br>Required frequency for reporting will be quarterly and MSEDCL and ADB may agree each year on interim reporting arrangements as appropriate.<br><br>Monitoring may be as frequent as MSEDCL wishes. | Every quarter, the M&E in MSEDCL prepares an attestation that the DLI is met and attaches the relevant reports.<br><br>The IVA will verify the results every quarter from the project module of MSEDCL ERP system. The IVA will also verify the results by spot checks of the HVDS system at circle/ division level.<br><br>The IVA will refer to the verification protocols and other relevant guidelines prepared for the program.<br><br>The IVA report to be attached to the MSEDCL's report. Within one month of receiving the validated report, ADB will confirm that the target has been met. |
| **DLI 7 –Increase in institutional capacity with number of MSEDCL staff (including all interested and eligible women) that demonstrate knowledge and skills on operations, maintenance and monitoring of HVDS for agricultural customers.** | | | |
| **Apr 20 – Jun 20:** HVDS related training completed for 250 MSEDCL staff working in rural Maharashtra<br><br>**Jul 20 – Sep 20:** HVDS related training completed for 250 MSEDCL staff working in rural Maharashtra | Conditions for full disbursement are met if the number of MSEDCL staff trained on HVDS for a quarter reaches the target number specified for that quarter (first column).<br><br>Partial disbursement. The DLI is scalable and partial disbursement is allowed for over and under achievement. If the target is not fully achieved, then disbursement can be proportional to the increase made from the previous period's achievement. The following formula will be applied: | Number of MSEDCL employees from Technical Department, Nashik attending 3-day training course on HVDS including on investment, billing & collection, transformer failure and maintenance. | Every quarter, the M&E in MSEDCL prepares an attestation that the DLI is met and attaches the relevant reports.<br><br>The IVA will verify the results every quarter from the project module of MSEDCL ERP system. The IVA will also verify the results by spot checks of the HVDS system at circle/ division level. |

| Disbursement-Linked indicator (DLI) | Definition and description of achievement and verification | Information source and frequency | Verification Agency and procedure |
|---|---|---|---|
| **Oct 20 – Dec 20:** HVDS related training completed for 250 MSEDCL staff working in rural Maharashtra<br><br>**Jan 21 – Mar 21:** HVDS related training completed for 250 MSEDCL staff working in rural Maharashtra | Partial DLI disbursement = planned DLI disbursement per trained MSEDCL staff * (actual achievement of trained MSEDCL staff achieved for the quarter<br><br>Disbursements are allowed for early or late achievement of the DLI and capped at the total ADB financing allocation. This means that the planned disbursement amount can be released when the set target is fully achieved even if the achievement is late, as long as the achievement is during the program's duration. | Required frequency for reporting will be quarterly and MSEDCL and ADB may agree each year on interim reporting arrangements as appropriate.<br><br>Monitoring may be as frequent as MSEDCL wishes. | The IVA will refer to the verification protocols and other relevant guidelines prepared for the program.<br><br>The IVA report to be attached to the MSEDCL's report. Within one month of receiving the validated report, ADB will confirm that the target has been met. |
| **DLI 8 –HVDS monitoring Dashboard to monitor agricultural customers created and operational** | | | |
| **Apr – Jun 20:** HVDS monitoring dashboard to monitor agricultural customers supply parameters created and operational | Definition of DLI 8 is the creation of online HVDS dashboard for monitoring of indicators for supply to farmers connected on HVDS network (No. of connections, Sales in MU, Voltage variations, transformer failure rates).<br><br>The dashboard would also support program monitoring (km. of lines, number of 33/11 kV sub-stations, number of MSEDCL staff trained, safeguard report status etc.)<br><br>Conditions for disbursement are met if complete online HVDS dashboard is created by MSEDCL<br><br>Disbursements are allowed for early or late achievement of the DLI. This means that the planned disbursement amount can be released when the set target is fully achieved even if the achievement is late, as long as the achievement is during the program's duration. | Project Module of MSEDCL ERP System | The M&E in MSEDCL prepares an attestation that the DLI is met and attaches the relevant reports.<br><br>The IVA will verify the results and confirm the HVDS dashboard is operational. The IVA will also verify the results by spot checks of the HVDS system at circle/ division level.<br><br>The IVA will refer to the verification protocols and other relevant guidelines prepared for the program.<br><br>The IVA report to be attached to the MSEDCL's report. Within one month of receiving the validated report, ADB will confirm that the target has been met. |

ADB = Asian Development Bank, DLI = disbursement-linked indicator, ERP = enterprise resource planning, HT = high tension, HVDS = high voltage distribution system, IVA = independent verification agent, M&E = monitoring and evaluation, MERC = Maharashtra Electricity Regulatory Commission, MS = Microsoft, MSEDCL = Maharashtra State Electricity Distribution Company Limited, MU = million units (kilowatthours), NCS = new connection system.
Sources: Asian Development Bank.

## Table A3.3: Disbursement Schedule ($ million)

| Disbursement Linked Indicators | DLI | Total ADB Financing Allocation ($ Million) | Share of ADB Financing (%) | Target Values of Results Indicators | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Prior Results | Apr 20 Jun 20 | Jul 20 Sep 20 | Oct 20 Dec 20 | Jan 21 Mar 21 | Apr 21 Jun 21 | Jul 21 Sep 21 | Oct 21 Dec 21 | Jan 22 Mar 22 |
| ***Outcome*** | | | | | | | | | | | | |
| 1. Agricultural customers are effectively metered and billed a usage-based energy charge for utilization of the HVDS network[4] (%) | DLI 1 | 69.2 | 20% | 0 | 17.300 | 17.300 | 17.300 | 17.300 | 0 | | | |
| 2. Improved power reliability for agricultural customers with less interruptions. Distribution failure rate for HVDS lower than 8% | DLI 2 | 51.9 | 15% | 0 | 12.975 | 12.975 | 12.975 | 12.975 | 0 | | | |
| 3. Improved power quality for agricultural customers. Voltage drop for HVDS-connected agricultural customers not more than 6 % (MERC voltage regulation)[5] | DLI 3 | 51.9 | 15% | 0 | 12.975 | 12.975 | 12.975 | 12.975 | 0 | | | |
| ***Output*** | | | | | | | | | | | | |
| **4. Increase in n**umber of new agriculture electricity connections in rural Maharashtra through metered HVDS by 156,000 by 2021 | DLI 4 | 69.2 | 20% | 28.833 | 13.308 | 4.436 | 8.872 | 8.872 | 4.879 | | | |
| 5. Increase in length of 11kV distribution lines for new agriculture electricity connections in rural Maharashtra through metered HVDS by 46,800 km. by 2021 | DLI 5 | 34.6 | 10% | 14.047 | 6.654 | 2.218 | 4.436 | 2.957 | 4.288 | | | |
| 6. Addition of new 33/11 kV substations, augmentation/upgradation of existing 33/11 kV substations by 121 in rural Maharashtra to improve upstream network capacity for agriculture HVDS by 2021 | DLI 6 | 17.3 | 5% | 0 | 1.430 | 1.430 | 2.860 | 2.860 | 2.860 | 2.145 | 3.717 | |
| 7. Increase in institutional capacity with number of MSEDCL staff (including all interested and eligible women) that demonstrate knowledge and skills on operations, maintenance and monitoring of HVDS for agriculture customers by 1,000 by 2021 | DLI 7 | 17.3 | 5% | 0 | 4.325 | 4.325 | 4.325 | 4.325 | | | | |

[4] No. of connections metered and billed a usage-based energy charge at least once during the 3-month period out of the total no. of pump set connections issued under the HVDS program.

[5] MERC (Standards of performance of distribution licensee, period for giving supply and determination of compensation), Regulation 2014. Measured at customer end at the day after commissioning of distribution transformer (DTR). The measured voltage would be then compared against system voltage of 440 voltage as stipulated in the Regulation. It would be done on a sample no. of HVDS customers in each circle. (10 customers/circle every quarter)

| Disbursement Linked Indicators | DLI | Total ADB Financing Allocation ($ Million) | Share of ADB Financing (%) | Target Values of Results Indicators | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Prior Results | Apr 20 Jun 20 | Jul 20 Sep 20 | Oct 20 Dec 20 | Jan 21 Mar 21 | Apr 21 Jun 21 | Jul 21 Sep 21 | Oct 21 Dec 21 | Jan 22 Mar 22 |
| 8. HVDS monitoring dashboard to monitor agricultural customers supply parameters created and operational<br>*Monitoring of performance indications (No. of connections, Sales in MU, voltage variations, transformer failure, staff trained, safeguard reports prepared etc.)* | DLI 8 | 34.6 | 10% | 0 | 34.6 | 0 | 0 | 0 | 0 | | | |
| **Total** | | **346** | **100%** | **42.880** | **103.566** | **55.659** | **63.742** | **62.264** | **12.027** | **2.145** | **3.717** | |

DLI = disbursement-linked indicator, HVDS = high voltage distribution system, MERC = Maharashtra Electricity Regulatory Commission, MSEDCL = Maharashtra State Electricity Distribution Company Limited, MU = million units (kilowatthours).
ADB can provide an advance at the request of the borrower to finance results.
Sources: Asian Development Bank.