

**PROGRAM-FOR-RESULTS INFORMATION DOCUMENT (PID)  
APPRAISAL STAGE**

Report No.: 122860

<b>Program Name</b>	India Energy Efficiency Scale-Up Operation (P162849)
<b>Region</b>	South Asia
<b>Country</b>	India
<b>Sector/Global Practice</b>	Energy and Extractives Global Practice; PPP Financial Solutions
<b>Lending Instrument</b>	Program-for-Results and IPF Guarantee
<b>Program ID</b>	P162849 and P165488
<b>Borrower(s)</b>	Department of Economic Affairs (DEA), Ministry of Finance
<b>Implementing Agency</b>	Energy Efficiency Services Limited (EESL)
<b>Date PID Prepared</b>	January 9, 2018
<b>Estimated Date of Appraisal Completion</b>	January 15, 2018
<b>Estimated Date of Board Approval</b>	February 22, 2018
<b>ROC Decision</b>	December 14, 2017

**I. Country Context**

**1. India's power sector is undergoing sustained growth to continue to fuel economic growth and meet the needs of its population.** India's annual Gross Domestic Product (GDP) growth rates averaging above 7 percent led peak power and energy demand to grow at 4.9 percent and 5.3 percent annually respectively since 2008. Energy demand will continue to grow rapidly, contributing about a quarter of the increase in global energy demand by 2040. An ambitious power generation capacity expansion effort is under way, with installed capacity exceeding 300 gigawatts (GW) in 2016, and expected to rise to 1,076 GW by 2040. Significant gains have been made in expanding electricity access, from 56 percent of the population in 2001 to over 80 percent in 2016.<sup>1</sup>

**2. Despite these achievements, reliable grid electricity supply remains a challenge.** It is estimated that about 250 million people are without grid connections, and of these, around two thirds reportedly choose not to connect because electricity supply is unreliable. Heavily indebted Distribution Companies (Discoms)<sup>2</sup> are unable to afford network investments and adequate power purchases to allow them to provide reliable supply. Households and agricultural consumers face unreliable supply and load shedding. Industrial and commercial enterprises have invested in expensive, inefficient and polluting diesel back-up generation, and incur associated coping costs.

<sup>1</sup> IEA, World Energy Outlook, 2016

<sup>2</sup> Annual and cumulative financial losses by public Discoms are about \$15 billion and \$66 billion respectively.

**3. India's per capita electricity consumption is expected to grow in coming years.** India is currently the world's third largest consumer of electricity, however, per capita consumption, at 1,090 kilowatt-hours (kWh), it is only one the third the global average. Significant growth in electricity demand is expected due to rising incomes and rapidly urbanizing populations purchasing more electrical appliances. Combined with the expansion of access, poses challenges for the already vulnerable system, and the Government's goal of 24x7 Power for All.

**4. The power sector is heavily reliant on coal.** Around 60 percent of India's electricity generation is coal-fired (192 GW) and about 50 GW coal-fired capacity is expected to be installed by 2020. An ambitious program to increase renewable energy based generation capacity to 175 GW by 2022 is under way, and renewables (excluding large hydropower) currently account for around 15 percent of power generation capacity. However, even if India achieves its target of 40 percent non-fossil fuel based generation capacity by 2030, this will only contribute to 25 percent of energy generated.

**5. In this context, energy efficiency has a critical role to play.** India's Nationally Determined Contribution (NDC), as declared in Paris at Conference of Parties (COP 21), includes the goals of expanding its renewable energy, energy efficiency, forestry, urban, and pollution reduction programs. In its NDC, India has made several commitments, including to: (i) to adopt a climate friendly and cleaner path; (ii) reduce its carbon intensity by 33-35% by 2030 from the 2005 level; and (iii) achieve about 40% cumulative electric power installed from non-fossil-fuel based energy resources by 2030, among others.

## **II. Sectoral and Institutional Context of the Program**

**6. Energy efficiency is critical for India to address the multiple challenges facing the power sector, moderate demand growth, and meet its climate change goals.** Maintaining India's electricity supply-demand balance while curbing thermal generation, and therefore Greenhouse Gas (GHG) emission growth, will require a combination of investments in networks, additional clean energy generation capacity and energy efficiency (EE). India's NDC proposes to reduce the emission intensity of its GDP by 33-35 percent by 2030 from 2005 level. The NDC document emphasizes the role of renewable energy and energy efficiency to achieve this goal.

**7. India's EE potential remains largely untapped, in part due to limited availability and high cost of financing** for EE investments. India's energy savings potential is estimated to be 15-30 percent across all demand segments, representing about INR 740 billion,<sup>3</sup> with industry and residential sectors offering the highest saving potential.<sup>4</sup> However, energy efficiency in India faces financing, awareness, technical and capacity barriers. Financial barriers include high upfront investment costs; limited availability of commercial financing; weak balance sheets of EE service providers; dispersed nature, small size and high transaction costs for some individual projects; high risk perceptions by banks and financial institutions with limited familiarity and capacity to evaluate EE projects, services, business models or contracts offered by EE service providers.

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<sup>3</sup> National Action Plan for Climate Change, 2008.

<sup>4</sup> World Bank – ESMAP, “*Utility Scale DSM Opportunities and Business Models in India*,” 2016

**8. Residential and public sector EE faces specific barriers, that are similar in principle, but slightly different than those faced by industrial and commercial sectors.** Barriers include non-cost-reflective or highly subsidized residential and public sector tariffs (versus for industrial and commercial tariffs closer to costs), lack of awareness and limited technical know-how; perceived risks of EE by households; and low availability and high cost of financing for residential or public sector EE interventions. In the residential sector, another barrier is limited competition among a small number of manufacturers that offered few and expensive energy efficient products, hence unaffordable for a significant group of households. As use of lighting, ceiling fans, air conditioners, refrigerators, agricultural pumps, and industrial motors is projected to grow significantly<sup>5</sup> increasing electricity consumption, the Government shifted its focus to support addressing the barriers for the scale-up of EE appliances and equipment particularly in the residential sector.

**9. India has a nascent and growing Energy Service Company (ESCO) industry, facing market development challenges.** In the recent years, several ESCOs entered the market in India, but were unable to scale their business significantly, facing relatively typical early market development challenges, such as targeted companies' lack of knowledge of potential savings from EE or benefits of ESCO services. In addition, availability and cost of finance was a major challenge, due to hesitance by financiers and sponsors to invest in energy savings; lack of familiarity with the shared savings model, where the ESCOs would need to raise debt based on savings that would be accrued in the future; and weak balance sheets of some ESCOs. For institutions that were not experienced with this model, the perceived risk, and hence the cost of financing offered, was high.

**10. Energy Efficiency Services Limited (EESL) has emerged as a vital entity for EE in India by financing and delivering EE solutions, especially in the residential and public sectors.** EESL was established in 2009 as a state-owned ESCO under the Ministry of Power (MoP), a joint venture between four Public Sector Utilities – National Thermal Power Corporation Limited (NTPC), Rural Electrification Corporation Limited (REC), Power Finance Corporation Limited (PFC), and Power Grid Corporation of India Limited (PGCIL).

**11. EESL has been a key implementing agency of the Government's EE vision.** EESL's central role started with its implementation of the "Unnat Jyoti by Affordable LEDs for All" (UJALA) program, which involves Light Emitting Diode (LED) lightbulbs to replace conventional lightbulbs. Currently, the Government envisages 770 million lightbulbs in the residential sector will be replaced by LED lightbulbs by March 2019, corresponding to estimated load reduction of 20,000 MW and an annual energy savings of over 100 million kWh.<sup>6</sup> Similarly, EESL is implementing the Street Lighting National Program (SLNP), with the Government's goal to replace 13.4 million conventional street lights with LEDs.<sup>7</sup> EESL's newer initiatives target previously underserved market segments, such as municipal services and public buildings,

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<sup>5</sup> From an estimated 235,757 GWh/year in 2016 to 508,485 GWh/year by 2031. Source: World Bank, *Residential consumption of electricity in India: Strategies for low carbon growth* (2008).

<sup>6</sup> PIB (2016, March). "EESL reaches milestone of distribution of 7 crore LED bulbs on Budget Day". <http://pib.nic.in/newsite/PrintRelease.aspx?relid=137039>

<sup>7</sup> The Economic Times (2017, April). "2.1 million street lights replaced with LEDs, savings 295 million units per year". <http://energy.economictimes.indiatimes.com/news/power/2-1-million-street-lights-replaced-with-leds-savings-295-million-units-per-year/58427249>

contributing to the Government's Atal Mission for Rejuvenation and Urban Transformation (AMRUT) and the Smart City Mission. EESL is also contemplating other new ventures such as an electric vehicles program aligned with the MoP's vision to India move entirely to electric cars by 2030,<sup>8</sup> and its smart meter program that would contribute to the National Smart Grid Mission.

**12. EESL has mobilized significant financing for EE, but needs to improve the efficiency with which it accesses commercial capital.** Using a combination of financing sources, including equity capital from its promoters<sup>9</sup>, along with loans from development partners and commercial lenders, EESL provides upfront financing for investment, delivers solutions, and is repaid based on energy saved by the consumers. EESL has been able to mitigate upfront financing risk for its customers by making the entire upfront capital investment using its own capital. EESL has already raised commercial financing from a diverse set of sources, including commercial banks, domestic capital markets, and private investors. However, adequate access to commercial financing now risks presenting a bottleneck in the achievement of the goal of market transformation. Going forward, EESL will explore new and innovative models of raising commercial debt, which will enable reduced dependence on public finance, mobilize private resources more efficiently, and unlock commercial financing for the broader ESCO market.

### III. Program Scope

**13. IBRD financing would support priority initiatives under the EESL investment program.** EESL investment program for FY2017 to FY2022 projects INR 511 billion (USD 7.2 billion). IBRD financing, including the Program for Results (PforR) loan and the IPF guarantee, would contribute to a narrower Program boundary of INR 104 billion (USD 1.5 billion) covering for the period from FY2018 to FY2022 EESL's planned investments in UJALA and SLNP; and upstream technical work for the development of business models for new market segments and institutional strengthening.

**14. By combining the PforR instrument with an IPF Guarantee,<sup>10</sup> the operation will maximize finance for development.** The proposed operation would support (i) ongoing Government programs implemented by EESL based on national systems, practices (technical, fiduciary, and safeguards) and robust implementation approaches, with co-financing from various sources; (ii) achievement of measurable outputs and results aligned with the country's EE and GHG targets anchored in the National Mission on Enhanced Energy Efficiency (NMEEE) and the National Action Plan for Climate Change (NAPCC); and (iii) incremental improvements in the design of ongoing and new EE activities to ensure viability and sustainability, support development of private ESCOs and other EE market participants, and leverage public funds with other resources, especially commercial funds and climate financing. Furthermore, given that the ambitious program targets require increasing amounts of investment and financing each year, EESL needs to access to a wider set of commercial financiers to meet its investment needs and programs. The Guarantee will support to EESL in accessing new

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<sup>8</sup> The Economic Times (2017, August). "Government invites global bids for 10,000 electric cars". <http://economictimes.indiatimes.com/industry/auto/news/industry/eesl-to-procure-10k-electric-cars-for-various-ministries/articleshow/60072781.cms>

<sup>9</sup> EESL is a joint venture by the National Thermal Power Corporation Ltd. (NTPC), PowerGrid, Power Finance Corporation (PFC) and Rural Electrification Corporation (REC)

<sup>10</sup> The proposed guarantee has been processed under Investment Project Finance (IPF) guidelines.

commercial financing sources, diversifying its investor base and establishing a track record for regular future access to such commercial markets.

#### **IV. Program Development Objective(s)**

**15. The PDO is to scale up energy savings in residential and public sectors, strengthen EESL’s institutional capacity, and enhance its access to commercial financing.** The PDO level outcome indicators would focus on market transformation of select energy efficient appliances and equipment, development of sustainable business models in new EE market segments, enhanced access to commercial financing and institutional strengthening. For the IPF component, the key results on the amount of commercial financing leveraged by the IBRD guarantee will be quantified, measured and reported as a PDO outcome indicator.

**16. Key Program Results.** There will be four Results Areas under the PforR, whose achievement will be measured through six Disbursement Linked Indicators (DLIs). The Results Areas are:

- (i) Results Area 1: Energy savings and EE market transformation in the residential sector
- (ii) Results Area 2: Energy savings and EE market transformation in public street lighting
- (iii) Results Area 3: Development of sustainable business models in new EE market segments
- (iv) Results Area 4: Institutional strengthening for sustainable EE scale-up.

#### **V. Environmental and Social Effects**

**17. The Program Environmental and Social Systems Assessment (ESSA) concludes that the proposed Program is expected to result in substantial environmental and social benefits.** The ESSA assessed the adequacy of the Program’s environmental and social systems and identified specific measures required for managing environmental and social impact. The ESSA finds that the benefits from the Program can be sustainable beyond the project period, if it is planned properly, and if the negative impacts or adverse environmental issues are managed effectively involving various stakeholders.

**18. Adverse effects that are sensitive, diverse and unprecedented on the environment and people are not foreseen, and the Program is deemed to have “moderate” social risk.** Planned efforts and focus on institutional capacity development is essential to ensure that the Program interventions will result in sustainable social and environmental benefits.

**19. Institutional capacity for environment and social risk management.** Key provisions of EESL’s environmental systems are aligned with environmental legislations at the national and state levels, which could address most of the impacts arising out of EESLs programs. There are opportunities for improving and strengthening the way in which EESL handles environmental and social impacts and risks associated with its activities, particularly in relation to waste management, hazards and issues during installation and maintenance, product quality related

issues and placement decisions. EESL has broad experience and capability of managing most of the activities envisaged under the program. EESL has prepared an Environment, Occupational Health & Safety and Social Manual (EHSS) to institutionalize its environmental health and safety, and social management systems. Currently, the manual covers UJALA and SLNP, and ongoing activities under these programs are yet to be fully aligned as per the manual. Provided EESL staff capacity is strengthened to properly guide, prepare, plan, implement and run its various programs, and ensure compliance with EHSS Manual, the proposed activities are unlikely to have any significant adverse impacts on the environment

**20. The ESSA concluded that institutional mechanisms to focus on environmental and social considerations in program design and implementation are inadequate.** Therefore, actions were included in the results framework focusing on institutional strengthening, program planning, capacity building and monitoring. Furthermore, the establishment of an adequately staffed sustainable development unit would focus on and oversee incorporation of environmental and social considerations in program planning, implementation and operations, capacity building and monitoring. The ESSA also recommends updating and strengthening the EHSS Manual to cover all operations of EESL, training to staff on its updated Standard Operating Procedures (SOPs), Documentation Formats (DFs) and monitoring formats and incorporating mechanisms to address issues emerging from climate vulnerability and disasters. *These are captured in DLI6 under RA4 and Program Action Plan item 10.*

**21. The appraisal stage Integrated Data Safeguards Sheet (ISDS) indicates that the environmental safeguards category is “B”.** Since the exact location of all program activities are not yet known and some activities under EESL’s Program may have short and long-term implications, the environmental safeguards category at this stage has been determined as “B”. The environmental safeguard policy that it triggers is Environmental Assessment (OP/BP/GP 4.01). The Project will have minor and/or temporary adverse environmental impacts. Main project benefits are associated with significant energy and cost savings due to the use of energy efficient LED bulbs and avoided environmental stress due to it replacing the Compact Fluorescent Lamps (CFLs) which are widely in use today.

**22. Environmental impacts under the IPF guarantee will be managed through the Environmental Management Framework (EMF).** EESL has prepared and disclosed an EMP to facilitate the screening and categorization of projects. The report presents the implementation plan for required mitigation measures for activities classified as Ec, and requires that projects categorized as Eb undergo an Environmental Assessment as part of Detailed Project Report (DPR) preparation. Activities categorized as Ea are recommended to be avoided.

**23. Social impacts resulting from the activities envisaged under the IPF guarantee are positive.** Social risks from this project are determined as low. OP 4.12 (Involuntary Resettlement) is not triggered while OP 4.10 (Indigenous Peoples) the policy is triggered as a precaution, since location of all program activities is not known. EESL has prepared and disclosed an Indigenous Peoples Policy Framework (IPPF), which includes activities such as public consultations, information dissemination regarding the program and active participation of communities in the program as well as benefit sharing, where possible.

## VI. Financing

Source	US\$ Million
Borrower/ Recipient	320
IBRD	220
Commercial Financing	200
- Commercial Financing Guaranteed	200
- Guarantee (IBRD)	80
Co-financing (AIIB, other IFIs)	756
Total	1496

## VII. Program Institutional and Implementation Arrangements

**23. The Program will be implemented by EESL.** As a corporate entity governed under the 2013 Companies Act, EESL is a joint venture of four state public sector enterprises, to facilitate the implementation of EE projects in partnership with private ESCOs, state level institutions and other companies to achieve EE goals. EESL is one of the key agencies tasked with the implementation of NMEEE.

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