

**PROJECT INFORMATION DOCUMENT (PID)
APPRAISAL STAGE**

Report No.: PIDA87443

Project Name	24x7 - Power for all in Andhra Pradesh (P155038)
Region	SOUTH ASIA
Country	India
Lending Instrument	Investment Project Financing
Project ID	P155038
Borrower(s)	Department of Economic Affairs
Implementing Agency	Government of Andhra Pradesh
Environmental Category	B-Partial Assessment
Date PID Prepared/Updated	23-Sep-2016
Date PID Approved/Disclosed	28-Sep-2016
Estimated Date of Appraisal Completion	08-Sep-2016
Estimated Date of Board Approval	30-Nov-2016
Appraisal Review Decision (from Decision Note)	

I. Project Context

Country Context

1. India is the world's 3rd largest economy by purchasing power parity accounting for around 17% of the world's population. India is also currently the world's third largest consumer of electricity, although average per capita consumption of electricity is only one third of the global average. India has the largest energy access deficit of any single country.

2. Efficient, reliable and affordable electricity supply is critical to India's ongoing economic growth and demographic transformation. India's GDP growth accelerated to 7.6 % in FY 2016 from an average of 6.5 % during FY 2013-2015. This was accompanied by a reduction in the poverty ratio from 37.2 % in FY 2005 to 21.9 % in FY 2012. Today, two thirds of India's population is above the poverty line. India is also becoming increasingly urban with urbanization rate of 31.2%, compared to only 28.6% in 2001. The urbanization rate is expected to exceed 40% by 2030. Demand for power is expected to grow significantly, to meet current suppressed demand (evidenced by load shedding and unreliable supply), to support economic diversification, the growing manufacturing sector, and to meet the rising economic aspirations of India's people.

3. Andhra Pradesh with a population 49 million, is a middle income state (NSDP INR 107,532 per capita in FY 2016) and is growing at a growth rate of 10.5% which is higher than the country average. Services sector registered a growth rate of 11.39 % in FY 2016 and is the engine for

pushing the overall growth. It is situated on the southeastern coast of the country with the second longest coastline.

Sectoral and institutional Context

4. Rural consumers and the urban poor constitute the bulk of the almost 300 million people without electricity. Even those who do have a connection to the electricity grid face intermittent power supply, particularly in rural areas. Industry and commercial enterprises also suffer due to unreliable supply, and are forced to invest in expensive diesel-fuelled back-up generation. This lack of reliability is not an issue of availability of power generation. India currently has surplus generation capacity. Against an estimated peak demand of 165 GW in FY 2017, the total generation capacity in India has already reached 303 GW in June, 2016 and India is expected to be energy surplus by 1.1 % in FY 2017. The reason for this lack of reliability is the poor performance of India's heavily indebted Distribution Companies, which are for the most part publicly owned, and whose limited resources leave them incapable of providing reliable electricity supply. Total accrued losses by distribution companies currently stand at around US\$66 billion, as a result of weak governance, low regulatory support (often resulting in below-cost-recovery tariffs), high aggregate technical and commercial (AT&C) losses, and poor commercial performance.

5. Enacting improvements in the provision of electricity services is particularly challenging since electricity is a concurrent subject under the Indian Constitution. The central government establishes the national legal framework and sets policies that provide overall guidance to the sector, but may not necessarily be binding on states in areas within the latter's jurisdiction. Central government-owned corporations play an important role in power generation and transmission, for the purposes of inter-state supply. State governments are responsible for electricity transmission and distribution within their territories. They may also engage in power generation, primarily to meet the state's individual energy requirements, though many energy-rich states have their companies export surplus power.

6. In 2014, Government of India (GoI) announced an ambitious 24 x 7 Power for All (PFA) program involving a partnership approach with States to ensure reliable electricity supply within the next five years. This initiative aims at ensuring uninterrupted supply of quality power to existing consumers by the end of 12th Five Year Plan (2017), and providing access to electricity to all unconnected consumers by 2019. Each state has prepared a detailed roadmap of the steps to be taken to address the issues of the power sector. The PFA plan is a common integrated planning framework across the power sector value chain to augment the power capacity of the state commensurate with the increase in demand. The PFA plan is signed jointly by the GoI and State government to indicate that GoI will complement the efforts of the state government in bringing uninterrupted quality power to all households, industries, commercial businesses, public needs and any other electricity consuming entities as per the state policy. To support the financial sustainability of the electricity sector, and provide distribution companies with the financial capacity to meet the Government's 24 x7 Power For All plans, the GoI also announced a parallel program - the Ujjwal DISCOM Assurance Yojna (UDAY) in 2015. The UDAY program seeks to restructure distribution company's debt, requiring State governments to take responsibility for part of this debt, in return for improvements in service delivery and commercial performance by the distribution companies.

7. Andhra Pradesh was among the first Indian states to initiate legal, structural, regulatory and

institutional reforms in the power sector in the late 1990s. Vertically integrated Andhra Pradesh State Electricity Board (APSEB) was unbundled into six independent companies, namely, Andhra Pradesh Power Generation Company (APGENCO), to undertake generation of electricity, Andhra Pradesh Power Transmission Company (APTRANSCO) to undertake transmission, and four Andhra Pradesh Power Distribution companies (APDISCOMS). The Andhra Pradesh Electricity Regulatory Commission (APEREC) was set up in 1999. In 2014, The Andhra Pradesh Reorganization Act bifurcated the state of Andhra Pradesh into Telangana and the residuary Andhra Pradesh state. Following the state bifurcation, the Andhra Power sector operations now comprises four entities: (i) Andhra Pradesh Power Generation Corporation Ltd (APGENCO) and (ii) Transmission Company of Andhra Pradesh (APTRANSCO); (iii) Southern Power Distribution Company of Andhra Pradesh Ltd. (APSPDCL), covering eight districts; and (iii) Eastern Power Distribution Company of Andhra Pradesh Ltd. (APEPDCL) for five districts in the remaining part of the state.

8. The power sector reforms undertaken by Government of Andhra Pradesh from 1997-2004 had some gains but these were not sustained. The reforms resulted in the state's energy deficit being reduced to 1.5 % during FY 2004, while the country-wide average was 7.1 %. However, after 2004 the sector began facing considerable challenges:

i. High energy and peak deficits led to significant costs being incurred on power purchase: Inadequate capacity addition, idle capacity due to unavailability of gas, and low utilization of existing thermal power generation stations due to inadequate supply of coal, prevented in-state generation from servicing the growing demand for power in the state. The energy and peak deficit in the state increased to 17.6 % and 20.2 % respectively during FY 2013 as against the all India average of 8.7 % and 4.5 % respectively. Further, delay in connectivity of Southern grid to the national grid, restricted the state's option of buying cheaper power from power surplus states in other parts of India. Despite the integration of the southern grid with the rest of India in 2014, the state has not benefited significantly, as it has been allocated limited inter-regional Medium Term Open Access (MTOA) for power, owing to constraints in the transmission corridor. The state, being unable to secure dependable power imports at reasonable prices, has resorted to procuring power at higher cost from short term sources (short term PPAs or purchases from the exchange). The share of short term power purchases in total power procurement reached 23% in FY 2015 against only 4% in FY 2010. The average cost of short term power in FY 2015 was INR5.7/kWh (~62% higher than average per unit costs of long term PPAs).

ii. The challenge of managing scarce power supply between agriculture, small domestic and industrial consumers: To reduce the financial burden on small and marginal farmers, the state of Andhra Pradesh has a stated policy of supplying free or significantly subsidized power to agriculture consumers. Thus it needs to balance the large agriculture-based demand (~25% of total consumption in FY 2015), with meeting the growing needs of cross-subsidizing consumer categories like industry. In FY 2013, due to an electricity shortfall, industrial consumers were forced to cut their consumption by 40%, and distribution companies were not allowed to release new or additional industrial load. This adversely impacted the financial position of the distribution companies as well as the industrial sector, and reduced economic growth of the state. Further tariffs for small domestic consumers (with up to 200 kWh of monthly consumption according to FY 2016 tariff structure) are much lower than the average cost of supply. Given the need to maintain subsidized supply to these categories -- small domestic and agriculture consumers which together

constitute more than 40% of the sales by volume ➤(the state will need to make efficiency gains in other areas.

iii. Distribution utilities faced financial stress due to recent non-recovery of cost of supply: The distribution companies were not compensated for the high power purchase cost. In FY 2013, distribution companies indicated Govt. receivables towards additional power subsidy amounting to US\$ 1274.6 million as doubtful and also wrote off unapproved or pending in court Fuel Surcharge Adjustment (FSA) to the tune of US\$ 553 million . The gap between the revenue generated from supply of power and the utility ➤(s cost of supply has been rising. The distribution sector reported a cumulative loss of around US\$ 1,500 million (INR 9,930 crores) across the three years, FY 2013-2015. Further, the state has had to resort to short term loans to pay for power purchases, leading to short term borrowings of ~US\$ 1,060 million (~INR 6,900 crores) in FY 2013, before the kick-in of the GoI ➤(s financial restructuring plan (FRP), details of which are discussed in the subsequent section.

iv. The financial stress led to inadequate investment in transmission and distribution infrastructure: Due to the poor financial performance of the utilities, there has been an under investment in the transmission and distribution infrastructure of the state. While the state has entered into significant long term PPAs in power generation, the growing power demand has already exposed bottlenecks in the transmission and distribution network in the state, which are only going to increase as more power flows through the network. Based on data shared by the distribution utilities, in some districts with high industrial loads, the distribution network has already reached its peak capacity (high transformer loading at 33kV sub-stations), high distribution transformer failure rate (~5% annually), and many network components have already reached their rated economic life (thus further increasing the chance of failures).

Since 2014, the Government of Andhra Pradesh has taken significant steps to improve the power sector in the state. The political leadership has accorded a high priority to improving the availability and quality of power supply for the state ➤(s economic development. Andhra Pradesh was one of the first states to sign the 24x7 Power for All plan and the specific indicators of state commitment include:

i. Implementation of a generation expansion strategy and simultaneously improving the generation mix through renewable energy: The state plans to more than double the installed capacity of the state from 8,300 MW in FY 2015 to ~16,000 MW (from non-renewable sources) by 2019, through a mix of private sector and public sector investments. By March 2016, around 4000 MW capacity addition had been achieved. Further, a five year renewable energy plan has been prepared to ensure that renewable energy installed capacity is also increased significantly (~7000MW from grid connected solar and wind combined). The implementation of the generation plan outlined above, the state distribution companies have been able to reach a NIL energy and peak deficit and thus lower their dependence on short term purchases and hence, reduce the growth in average power purchase costs.

ii. Virtual feeder segregation to regulate agriculture supply and dedicated feeders for rural industries and commercial establishments: Andhra Pradesh has completed the virtual segregation (single phase supply for rural households and three phase supply for agricultural loads) of all its rural feeders, which has enabled the distribution companies to provide 24 hour supply to all rural

domestic consumers and 7 hours supply for agriculture consumers. Further, to ensure reliable and continuous supply to the industries and commercial establishments in rural areas, the distribution companies are supplying power to these establishments through dedicated feeders in the majority of their supply area, and plan to construct new dedicated feeders in the remaining areas.

iii. Reduction in aggregate technical and commercial (AT&C) losses: The AT&C losses in the state decreased from 23% in FY 2004 to around 11% in FY 2015, through better metering, regular energy audits, and successful promotion of demand-side measures. However, there is still room for improvement to further reduce these losses.

iv. Signing up for the UDAY Scheme and Financial Restructuring Plan, 2012: GOAP signed an MOU with Ministry of Power in June 2016 under the UDAY scheme in order to ensure the turnaround and long term financial viability of the state distribution companies. Under this scheme GOAP will take over 75 % of the working capital term loans (WCTL) outstanding as on 30th September 2015. In addition, the state government had earlier had also taken over certain portions of the debt of the distribution companies under the Government of India's Financial Restructuring Package of 2012. Thus, under the two schemes together, the state government is expected to take on over US \$1.3 billion (INR 88.9 billion) of the debt of the distribution companies by the end of FY 2017. In addition, under UDAY, the state government has also agreed to finance the future losses of the distribution companies in a graded manner over the next five years. It shall also provide operational funding requirements (OFR) support to the distribution companies, until they achieve turnaround. On their part, the distribution companies are expected to undertake specified measures for loss reduction, demand side management, quarterly tariff revisions to offset fuel price increase, increase employee engagement, develop a customer service strategy, and procure power through a transparent process of competitive bidding. The outcome of operational improvements will be measured through indicators such as reduction in AT&C losses and reduction in gap between average cost of supply and average revenue realization.

The financial health of the distribution companies is thus projected to improve in the future. A detailed financial analysis has been undertaken to understand the business environment that is expected to exist in the future. Based on the pipeline of generation projects already implemented and planned in the future the average costs of power purchase are expected to plateau. Further because of improvement in operational efficiency and support from GoAP through UDAY the distribution companies are expected to achieve a financial turnaround for the distribution companies by FY 2020.

C. Higher Level Objectives to which the Project Contributes

The overarching objective of the World Bank Group's Country Partnership Strategy (FY 2013-2017) is to support poverty reduction and shared prosperity in India. Continued rapid economic growth is a precondition for poverty reduction and shared prosperity, and to achieve economic growth it is imperative that India is able to provide all of its citizens with affordable, reliable electricity supply, in line with growing demand. The proposed project supports the first pillar of the ongoing India Country Assistance Strategy (2013-2017) integration. This project, through its focus on improving operational efficiency in transmission and distribution sector will provide increased supply of affordable, reliable electricity to the citizens in the state of Andhra Pradesh.

II. Proposed Development Objectives

The development objective of the project is to increase the delivery of electricity to customers and to improve the operational efficiency and system reliability in distribution of electricity in selected areas in Andhra Pradesh.

III. Project Description

Component Name

Component 1: Power Transmission System Strengthening

Comments (optional)

This component will make priority investments in 220 kV, 132 kV, 66 kV, and 33 kV transmission and sub-transmission lines and associated substations, to strengthen and augment the power system. The specific investments proposed by the state have been verified based on a load flow study. These investments will reduce overall transmission system losses and increase the capacity of the state transmission network to enable it to meet demand growth.

A few substations and the associated lines will be funded under this project. These packages will be implemented through integrated turnkey supply and installation (S&I) contracts.

Component Name

Component 2: Smart Grid Development in Urban Areas

Comments (optional)

The Government of India has launched a Smart Cities Mission, which aims to identify and develop a number of selected cities across India as smart cities. It is expected that the development of these cities will develop a smart city model which can then be replicated throughout the country. In Andhra Pradesh, Kakinada, Vishakapatnam and Tirupati have been selected for development as smart cities in the Smart Cities Challenge conducted by GoI.

This component will support investments in smart grids and underground cables in the above mentioned three cities. These investments would include smart meters for selected consumers, distribution Supervisory Control and Data Acquisition (SCADA) /, automated sub-stations, and ring main units.

Component Name

Component 3: Distribution System Strengthening--Rural

Comments (optional)

This component will support the augmentation of the distribution network (33kV and below) and the construction of the High Voltage Distribution System (HVDS) in rural areas. The majority of the investments under this component are located in Anantapur and Kurnool-- the two new districts that have been transferred to APSPDCL post the restructuring of the State.

The objective of this component is to reduce distribution system losses, increase the capacity of the distribution network to meet growing load demand, improve system reliability, and improve the quality of supply to end consumers. The specific investment components would include a) Rural HVDS & b) Distribution Network Strengthening & Augmentation.

Component Name

Component 4: Energy Efficient Pump Sets

Comments (optional)

This component will support the replacement of around 30,000 existing agricultural pump sets with BEE rated five star energy efficient pump sets. For the remaining pump sets in the selected area/ district, the project will support the installation of smart control panels on existing pump sets to help farmers reduce electricity consumption.

Component Name

Component 5: Technical Assistance for Institutional Development and Capacity Building

Comments (optional)

This component will improve the project management capabilities and commercial performance of the AP utilities by (i) Improving ICT systems, (ii) improving the business processes, (iii) support supervision of contracts through Project Management Consultants, and (iv) building staff capacity through training, workshops, and study tours.

IV. Financing (in USD Million)

Total Project Cost:	570.00	Total Bank Financing:	240.00
Financing Gap:	0.00		
For Loans/Credits/Others			Amount
Borrower			170.00
International Bank for Reconstruction and Development			240.00
Asian Infrastructure Investment Bank			160.00
Total			570.00

V. Implementation

A. Institutional and Implementation Arrangements

The Project will be implemented in the state of Andhra Pradesh, by three state-owned but legally separate entities/companies APTRANSCO, APEPDCL and APSPDCL, referred to as the Project Implementation Entities (PIEs).

The three PIEs have set up dedicated Project Implementation Units (PIUs) to implement the project. This does not imply that the project would be ring-fenced from the PIEs broader organization. Within the existing departmental structure (procurement, finance, etc.), the PIEs will have designated individuals with clear responsibility for dealing with all issues related to the proposed World Bank loan.

B. Results Monitoring and Evaluation

Monitoring and evaluation (M&E) mechanisms have been established at the project, entity and sector levels. At the project level, the M&E framework includes the following:

- i. APTRANSCO Project Implementing Unit (PIU): This PIU is responsible for implementing the transmission system components funded under this project. The PIU is already functioning and is responsible for developing a detailed operational manual which will cover the implementation of all major transmission investments. The operations manual will include a clearly defined rationale for each investment, implementation milestones, and a description of how project monitoring tools will be used to monitor project implementation.

ii. APEPDCL & APSPDCL PIUs: The two distribution company PIUs are responsible for preparing detailed project reports (DPR), with baseline data, for distribution investments in each project area, detailing the technical and financial justification and the layout of existing and proposed distribution infrastructure, with clearly defined implementation milestones. The PIUs may implement the distribution components funded under the project. If required, the PIUs may be supported in contract management by project management consultants with a focus on delivery of quality assets, and adherence to the implementation schedule.

The PIUs will provide the Bank with quarterly physical progress reports, audited financial statements, and other such information as the Bank may reasonably require.

A robust group of monitoring indicators has been put in place to track the progress of the project (i) information on results indicators (ii) information on monitoring indicators - additional data on project progress across various functional areas such as environment, social, technical as well as financial indicators that will be collected and tracked on a periodic basis.

VI. Safeguard Policies (including public consultation)

Safeguard Policies Triggered by the Project	Yes	No
Environmental Assessment OP/BP 4.01	x	
Natural Habitats OP/BP 4.04	x	
Forests OP/BP 4.36	x	
Pest Management OP 4.09		x
Physical Cultural Resources OP/BP 4.11	x	
Indigenous Peoples OP/BP 4.10	x	
Involuntary Resettlement OP/BP 4.12	x	
Safety of Dams OP/BP 4.37		x
Projects on International Waterways OP/BP 7.50		x
Projects in Disputed Areas OP/BP 7.60		x

Comments (optional)

Environmental and Social Management (ESMF) has been prepared for project as all the locations for activities supported under the project are not yet finalized. The ESMF provides the utilities with guidance for determining the appropriate level of environmental and social assessment required for the sub-projects. Further, it guides the utilities in preparing the necessary environmental and social mitigation measures for the sub-projects during the pre-construction, construction, operations and maintenance phases. It describes methods for consultations to be undertaken in subsequent stages, grievance redressal mechanism including public complaints. The institutional arrangements commensurate with the nature and extent of impacts in power Transmission and Distribution sub-projects have also been provided in the ESMF.

VII. Contact point

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