



**Detailed Project Report for
P2P energy trading platform
at Uttar Power Corporation
Limited (UPPCL)**

16th June 2020

Submitted to:

Uttar Pradesh Power Corporation Limited

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1 Background

1.1 Introduction

Uttar Pradesh being the one of the largest State in India is also one of the most populous state of the country with its administrative capital Lucknow. With the levels of literacy rate of around at 70 % the state has abundant availability of quality human resource. It has the abundance of potential as destination for investments in manufacturing, tourism and Infrastructure services.

Power sector is the critical infrastructure element required for the smooth functioning of the economy. Efficient, reliant and sustainable power is essential to stimulate growth and prosperity in the state. The availability of the reliable, quality and affordable power can ensure growth of all sectors of the economy being it agricultural, industrial and others. Towns of Kanpur, Varanasi, Allahabad, Gorakhpur, Meerut, Aligarh, Moradabad, Muzaffarnagar, Saharanpur and Jhansi are known for their industrial importance in the state as well as at the national level.

Uttar Pradesh was one of the first state to embark upon economic and structural reforms in power sector. GoUP had taken key structural reforms and created entities , Uttar Pradesh Power Corporation Limited (2000) , Kanpur Electricity supply Company , KESCO (2000) , Purvanchal Vidyut Vitran Nigam Limited , PuVVNL - Varanasi (2003) , Madhyanchal Vidyut Vitran Nigam Limited , MVVNL- Lucknow (2003) , Paschimanchal Vidyut Vitran Nigam Limited , PaVVNL - Meerut (2003) and Dakshinanchal Vidyut Vitran Nigam Limited , DVVNL- Agra (2003).

UPPCL has the following major online systems in place-

- **Urban Online Billing:** To bring efficiency and transparency in operations, an online system for billing and collection consisting 17 modules is deployed in 168 towns across UP for a consumer base of 7.5 Million. The web applications have been hosted at on-premise Data Centre (DC) with replicated data in the Disaster Recovery Centre (DRC), and are accessed by various divisions, circle, sub-division and other offices situated at different locations in 168 towns across the state over WAN environment.
- **Mobile Applications:** Various mobile applications (e-Nivaran, e-Sanyojan, FAME) for urban and rural consumers have been developed for improving efficiency, revenue and easy functioning. These apps are integrated with urban and rural online billing systems and various payment service providers.
- **Customer Care Centre for urban Consumers:** Customer Care Centres for consumers are established in 4 Discoms to take care of the grievances and faster redressal. Consumer complaints are registered/tracked/resolved through 1912 (Toll Free Number). This system is integrated with urban online system and rural online billing system.
- **Web Self Service:** To facilitate its consumers UPPCL provides online payment, trust billing and load enhancement features to its users.
- **Prepaid Meter Online Recharge-** Integration is in place to do online recharge prepaid meter installed.

- **GIS and Network Analysis Solution** - GIS system is in place which includes asset mapping and consumer indexing. UPPCL also keeps updating the GIS database through incremental surveys of consumers and assets to accurately carry out energy accounting. To complement the GIS, GIS based network analysis system is implemented to be able to accurately carry out network studies and optimise deployment of network elements.
- **Integrations with Other Government Portals/Apps** - Billing system has been integrated with Centre for E-Governance and (Customer service centers)CSCs for bill payment, Udyog Bandhu, CM Dashboard, Energy Audit Module etc
- **Other Integrations with UPPCL** - Official website of www.uppcl.org has various integrations such as Energy Accounting Directory, Commercial Statements, Personal Information System, Jansunwai, Disciplinary Proceedings, Feeder wise Supply Hours, Daily Supply Hours, Court Case Monitoring etc.

1.2 About UPPCL

Uttar Pradesh Power Corporation Limited (UPPCL), is a company registered under the provisions of Companies Act 1956 / 2013 and is a fully owned entity of Government of Uttar Pradesh.

Besides being the holding company for Power Generation and Transmission entities, UPPCL is also the holding company for five DISCOMS namely Paschimanchal Vidyut Vitaran Nigam Limited (PVVNL), Purvanchal Vidyut Vitaran Nigam Limited (PuVVNL), Madhyanchal Vidyut Vitaran Nigam Limited (MVVNL), Dakshinanchal Vidyut Vitaran Limited (DVVNL) and Kanpur Electricity Supply Company (KESCO). These DISCOMS are responsible for supplying of electricity to the consumers and to maintain the 33/11, 11/0.433 KV, substations, 33/11 kV/LT network of the area, receiving electricity supply from higher voltage system, distribute it to its consumers, record their consumption, issue electricity bills according to applicable tariff and realize the revenue. Various divisions of the DISCOMS are also responsible to release new connections and from time to time extend and improve its distribution network and control the line losses of electricity, technical as well as commercial and various other related activities.

The Company is engaged primarily in the business of distribution of Electricity. It has been vested with the distribution assets, interest in property, rights and liabilities of the erstwhile UPSEB necessary for the business of distribution in its area of distribution comprising of all districts of Uttar Pradesh.

The above 5 Companies have been given the status of a Distribution licensee as per Section 14 of the Electricity Act 2003. In order to fulfil the obligations of the Distribution licensee as mandated under the provision of Uttar Pradesh State Electricity Reforms Transfer Scheme 2012 and Electricity Act 2003, the main objects to be pursued by the company are:

- To undertake the activities of distribution to all consumers irrespective of the voltage, provision, supply, wheeling, purchase, sale, import, export and trading of electricity,

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introduce open access in distribution as per the Electricity Act 2003 and/or the directions of the regulator.

- To plan, develop, acquire, establish, construct, erect, lay, hire, lease, buy, sell, operate, run, manage, maintain, enlarge, alter, renovate, modernize, work and use a power distribution system network in all its aspects including amongst others various voltage lines and associated sub -stations, including distribution centers, cables, wires, accumulators, plants, motors, meters, apparatus, computers and materials connected with sub-transmission, distribution, supply of electrical energy, ancillary services, telecommunication and telemetering equipment.
- To tender, finalize and execute Power Purchase Agreements and other agreements for sale or purchase of electricity with generating companies, trading companies, other distribution companies, Central and State generating authorities, departments or companies, societies, other States, utilities, Independent Power Producers and other Persons.
- To undertake Rural Electrification schemes in the licensed area.
- Any other work incidental to the objectives & functions of the company.

The details of 5 DISCOMS are as follows;

DISCOMS	RAPDRP PART A		Non-RAPDRP	
	No. of Consumer Served *	District Served	No. of Consumer Served*	District Served
Dakshinanchal Vidyut Vitran Nigam Ltd (DVVNL)	1093589	19	3286962	21
Madhyanchal Vidyut Vitran Nigam Ltd (MVVNL)	1815243	17	4126303	19
Purvanchal Vidyut Vitran Nigam Ltd (PuVVNL)	1229043	19	5573860	20
Paschimanchal Vidyut Vitran Nigam Ltd (PVVNL)	2421582	13	3321032	12
Kanpur Electric Supply Company (KESCO)	601819	1	Not in scope	
Total	7161276	69	16308157	72

Table 1 : Details of Consumers and Districts

*As per 2018 data

Discoms	Zone	Circle	Distribution Division	SDO	Test Division
Dakshinanchal Vidyut Vitran Nigam Ltd (DVVNL)	6	28	77	190	23
Madhyanchal Vidyut Vitran Nigam Ltd (MVVNL)	6	29	105	205	27
Purvanchal Vidyut Vitran Nigam Ltd (PuVVNL)	6	30	96	194	22
Paschimanchal Vidyut Vitran Nigam Ltd (PVVNL)	6	29	96	195	28
Total	24	116	374	784	100

Table 2 - Details of RAPDRP PART-A and Non-RAPDRP Offices

1.3 Mission of UPPCL

Uttar Pradesh Power Corporation Ltd. (UPPCL), with a vision to provide, uninterrupted power supply to every consumer of the state is now looking forward to increasing the consumer base as well as increasing the revenue by incorporating new technology, process and procedure. The mission of Uttar Pradesh Power Corporation Limited (UPPCL) is to ensure reliable quality of power to its customers at competitive prices. The UPPCL is committed to achieving this mission through:

- Provide cost efficient good quality electricity to all categories of consumers for economic development/social uplift of the State.
- Make the energy sector commercially viable so that it ceases to be burden on the state budget; and
- Protect the investment of the consumers.

2 Objective

Blockchain has been touted as the next big technological advancement- impacting everything from online transactions to e-governance. Blockchain is a distributed ledger platform that securely stores information and serves as a repertoire of transactions accessible to everyone. Rather than being controlled by one entity, blockchain is spread across multiple computers and uses a form of data logging to ensure that the information cannot be changed or corrupted by anyone. By decentralizing data and protecting the way it is transacted, blockchain promotes transparency and the sharing of information.

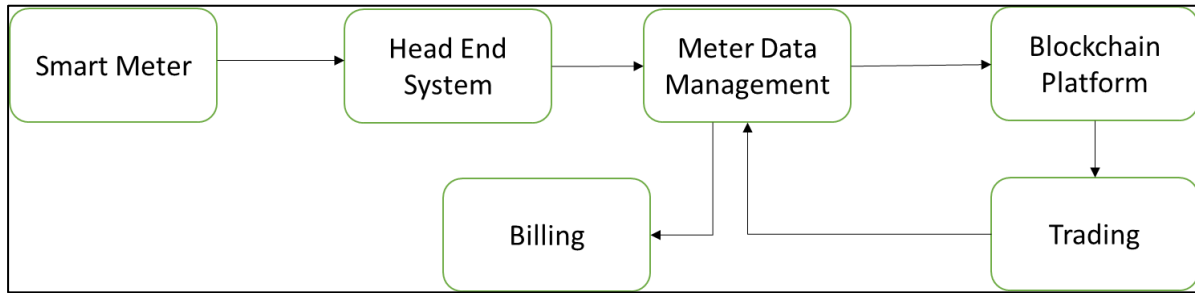
There are several matured use cases of blockchain technology in the power sector of which the most popular is Peer-to-Peer (P2P) energy trading platform which could offer following benefits to the stakeholders:

1. Establishment of P2P Trading Platform for trading of rooftop solar (RTPV) amongst the consumers: This platform could create a marketplace that will provide opportunities the customers to trade their RTPV power among the participants in the market place to maximize their benefits. Customers can track payments of their excess energy and can also sell it at a more competitive price than selling it back to the grid or an energy retailer. Blockchain will act as an operating system and innovative facilitator in the transformation of energy markets from centralized to hybrid, distributed energy markets underpinned by renewable energy and distributed energy resources.
2. Provide Rooftop Solar owners more flexibility, further incentivizing the uptake of DERs in the DISCOM/State
3. Provide valuable opportunities (first of its kind in India) to UP DISCOMs to:
 - a) Learn how best to implement a network tariff to support the wider rollout of P2P trading
 - b) Understand the impacts of P2P trading on the electricity distribution network

Technical justification

One of the major requirements for blockchain implementation is the availability of smart meter, communication infrastructure and its integration with blockchain platform and the DISCOM's billing system. As Uttar Pradesh Power Corporation Limited (UPPCL) in association with EESL has already replaced over 8,00,000 electricity meters with smart

meters in various cities like Lucknow, Kanpur, Varanasi, Allahabad, Gorakhpur, Meerut, Moradabad etc., it will be easier to deploy blockchain technology both from the operational and financial standpoint.



3 Benefits

1. By enabling excess solar to be traded directly between households/buildings, it will optimize the utilization of rooftop solar. This will have positive impact on the financial and operational positions of both customers and the utility
2. New revenue streams through the possible collection of transaction fees along with wheeling charges by DISCOMs
3. It could offer an opportunity to further understand customer behaviour, providing deep insights into electricity usage and generation
4. Balancing of local generation and demand with energy cost reflecting the true value of electricity usage
5. It will demonstrate the capability of the UPPCL to provide a measured and effective response to the regulatory agenda set by the UPERC

4 Costing

Total costing of the project with details	
Name of the Project & Project No.	P2P Trading Platform
Date of Start of Project	2020
Scheduled Date of Completion	2025
Estimated Cost (Rs. Crs) at start of project	10
Cost Escalation / variation with reasons, if any	NA
Proposed Funding (Equity, Loan, Grant details)	Equity
Scheduled Date of Completion	2025
Delay & reasons, if any	NA

5 Duration

The overall project duration is for **60 Months**.