

CIGRE-336

Challenges of Payment Security Mechanism in Power Sector and it's solution through Smart Contracts

Presented by : Santosh Kumar Jain

Authors: Santosh Kumar Jain

Paresh Khandelwal

P K Agarwal

POSOCO, INDIA



Overview

- Introduction
- Payment Security Mechanism & it's Challenges
- Concept of Smart Contracts, DL & Blockchain technology
- Proposed Smart Contract Model for resolving PSM Challenges
- Conclusion and Way Forward

Introduction

- Sustainability of business, economy, and infrastructure solely depends on the returns generated by its use. Robust PSM is a must for sustainability of the power sector.
- **This paper proposes**
- Model of auto executable Smart Contract in place of legacy PPAs.
- Enabling of Real time settlements through Smart Contracts.
- Enabling Buyers to sell the committed share of defaulting parties in open electricity market.
- Strengthening the entire supply chain of Power sector.

Payment Security Mechanism & it's Challenges

PSM:

This mechanism ensures sellers of assured payment from buyers by way of Letter of Credit (LC), Bank guarantee (BG), etc. as per Power Purchase Agreements (PPAs).

Challenges

- Physical PPAs,
- PPA non-compliances,
- Inadequate penalty & Dues recovery mechanism
- Absence of real time settlement practices.
- Socio-Political & Legal reasons

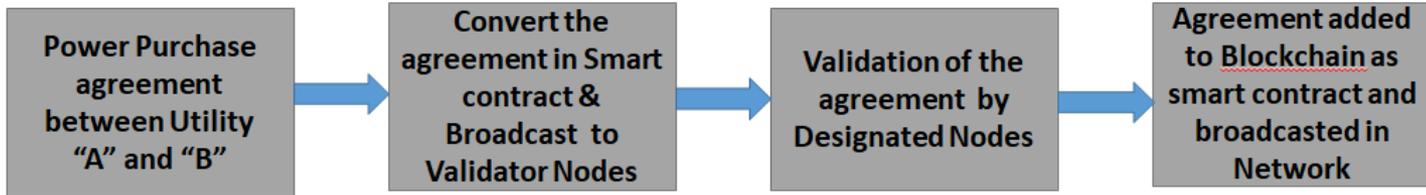
Concept of block chain technology, distributed ledger and smart contracts

Blockchain Technology : is a special form of a distributed database. All participants in the network share a consistent copy of the database in a decentralised mode.

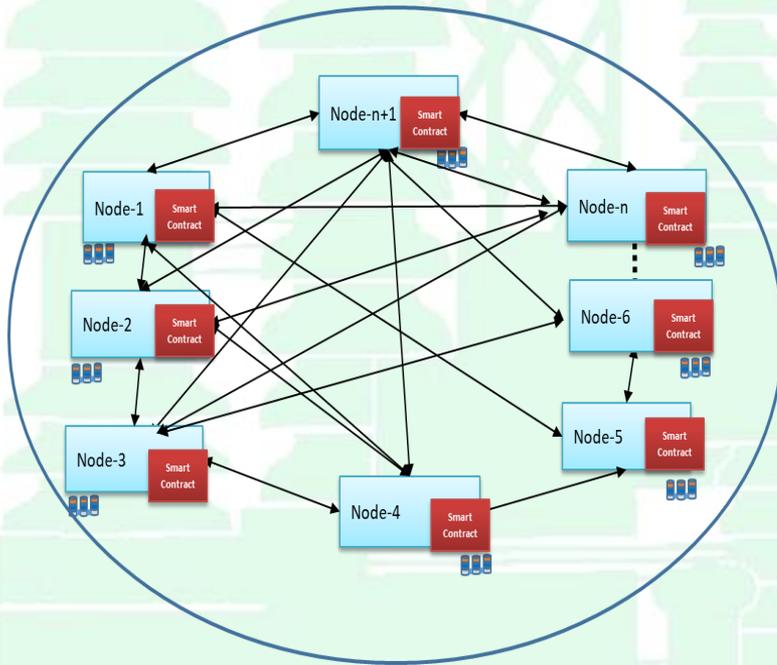
Distributed Ledger (DL): Each node of Blockchain network is having similar copy of ledger known as distributed ledger. Any transaction could be permanently stored in ledger only if consensus is received from participating nodes.

Smart Contracts: are pre-defined and formalised agreements executed and enforced by code across all network nodes in an autonomous and decentralised manner

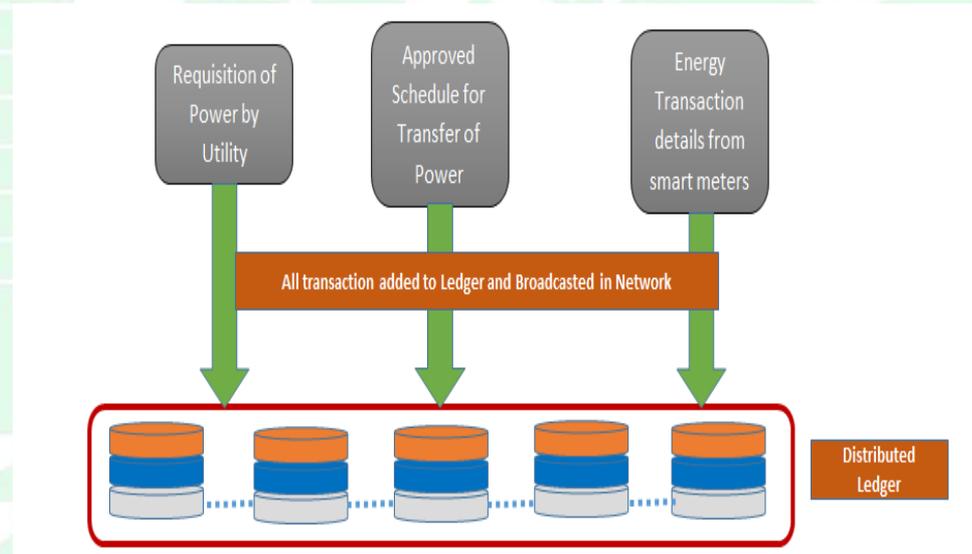
Proposed Smart Contract Model for resolving PSM Challenges



Block diagram for conversion of PPA into Smart Contracts



Distributed network of stakeholders (Nodes)



Process of adding transactions in blockchain network

Conclusion & Way forward

- Smart contracts (PPAs) will enable scheduled transaction, real time portfolio balancing, Billing & settlement in real times or near to real times with minimal human intervention & decentralized manner.
- Grid can be balanced more smoothly, safely & economically with optimum resources.
- Latest technologies namely Blockchain, Artificial Intelligence, Machine Learning & Internet of Things (IOT) can help the electrical grid to transform from Dumb (non-communicative) to Communicative Grid.
- Regulators and policy makers are also in process to introduce adequate PSM in a quest to minimize the outstanding dues thus ensuring sustainability of grid infrastructure.



Queries welcome at : Email id: skjain@posoco.in/skjainpgcil74@gmail.com Mobile No. 9599441397