

Peer-to-Peer solar energy transaction through block-chain based platform in UP

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Stakeholder

- * Prosumers
- * Consumers
- * Technology Service Provider
- * Discom
- * Regulator
- * Consumer Forum

Regulatory Framework for P2P energy transactions

- * Guidelines & Regulations
- * Technological Aspects
- * Commercial Arrangements
- * Accounting, Billing and Settlement
- * Dispute resolution

Regulatory Framework for P2P energy transactions

- * Enabling provisions for different types of Rooftop Solar (RTS) connections for discom consumers with post paid smart meters
 - * Net Metering
 - * Gross Metering
 - * Net Billing
- * Unbundled Tariff Orders for discom with-
 - * Tariff for category wise consumers
 - * Feed in tariffs for different RTS connections
 - * Wheeling Charges (for use of discom's wires)
 - * Open Access Charges, Cross Subsidy Charges & Additional Charges

Regulatory Framework for P2P energy transactions

- * Engagement of Technical Service Provider for block-chain based P2P technology Platform with cyber security & Privacy
- * App/ Web platform for Time Slot wise Prosumer-Consumer injection-drawl and offer-bid
- * Deviation mechanism for penalty for deviation
- * P2P interface with MDM of discom for Unified Billing
- * Discom as counter-party for p2p transactions
- * Combined billing by discom to Prosumer & Consumer with credit (P2P) and debit (Grid import)

Types of Connections & Eligible Consumers

Type of Connection	Eligible Consumer	Feed-in-Tariff (Rs./Kwh)for surplus energy injected to the grid
Net Metering (bi-directional metering)	Domestic, Agriculture	Applicable Tariff
Gross Metering (uni-directional metering)	All Consumers	125% of previous years Solar bid price (Rs.3.75)
Net Billing (bi-directional metering)	All Consumers	125% of previous years Solar bid price (Rs.3.75)

Tariff Structure

Category	Tariff (Rs./Kwh)	Remarks
Domestic	5.50-6.50	Subsidized
Agricultural	2.00	Subsidized
C&I	7.30-9.00	Subsidizing

Consumer Category, Metering & Tariff- Uttar Pradesh

Category		Metering	Import Tariff (Rs./Kwh)	Export Tariff (Rs./Kwh)
Domestic- Lowest	D1	Net Metering	5.50	5.50
Domestic- Highest	D2	Net Metering	6.50	6.50
C&I- Lowest	C1	Gross Metering/ Net Billing	7.3	3.75
C&I –Highest	C2	Gross Metering / Net Billing	9.0	3.75

Trading Opportunity for Consumers (Import) & Prosumer (Export)

Prosumer Category and (Export tariff-Rs./Kwh)	Consumer Category and (Import tariff-Rs./Kwh)	Difference in Import tariff & export tariff (Rs./Kwh)	Discom & Platform Charges (Rs./Kwh)	Net Trading Opportunity (% of Consumer tariff)
D1 (5.5)	C1 (7.3)	1.8	1.34	0.46 (6.3%)
D1(5.5)	C2 (9.0)	3.5	1.34	2.16 (24%)
D1(5.5)	D2 (6.5)	1	1.34	Unviable
C1(3.75)	C1 (7.3)	3.55	1.34	2.21 (30.2%)
C1(3.75)	C2 (9)	5.25	1.34	3.91 (43.4%)

Advantages

- * Decentralization- removes the need for intermediaries like utility companies, allowing direct energy exchange between producers and consumers. This decentralized approach promotes energy independence.
- * Efficiency- Allows for secure, real-time, and transparent transactions. Smart contracts enable automatic execution of agreements when conditions are met, streamlining the energy trading process and reducing administrative overhead.
- * Transparency- All transactions recorded on a block-chain are transparent and immutable. This transparency ensures trust among participants, as everyone can verify the transactions, making the system more reliable and accountable.
- * Flexibility - enable consumers and producers to negotiate their own energy prices and terms directly. This flexibility fosters a competitive market, potentially leading to lower energy costs for consumers.
- * Optimized Energy Distribution- facilitates the efficient distribution of excess energy. Prosumers can sell surplus energy to nearby consumers directly, reducing transmission losses.

Advantages

- * Energy Sharing Communities- creates energy sharing communities where neighbors can share excess energy. This fosters a sense of community and encourages the use of renewable energy sources, reducing the overall carbon footprint.
- * Incentives for Producers- Producers of solar energy can receive fair compensation for the excess energy they generate. This financial incentive encourages more people to invest in solar energy systems, promoting the adoption of renewable energy technologies.
- * Grid Stability- contributes to grid stability. During peak demand periods, excess energy from local solar producers can be utilized locally, reducing strain on the centralized grid and preventing grid overloads.
- * Resilience- Block chain technology's distributed nature enhances the resilience of the energy system. In the event of a localized outage or natural disaster, P2P transactions can continue within the local network, ensuring a continuous energy supply.
- * Environmental Benefits- By encouraging the use of solar energy and reducing reliance on fossil fuels, P2P solar transactions contribute significantly to mitigating climate change and promoting a sustainable energy future.

Questions and Comments :

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