# PEER-TO-PEER TRADING

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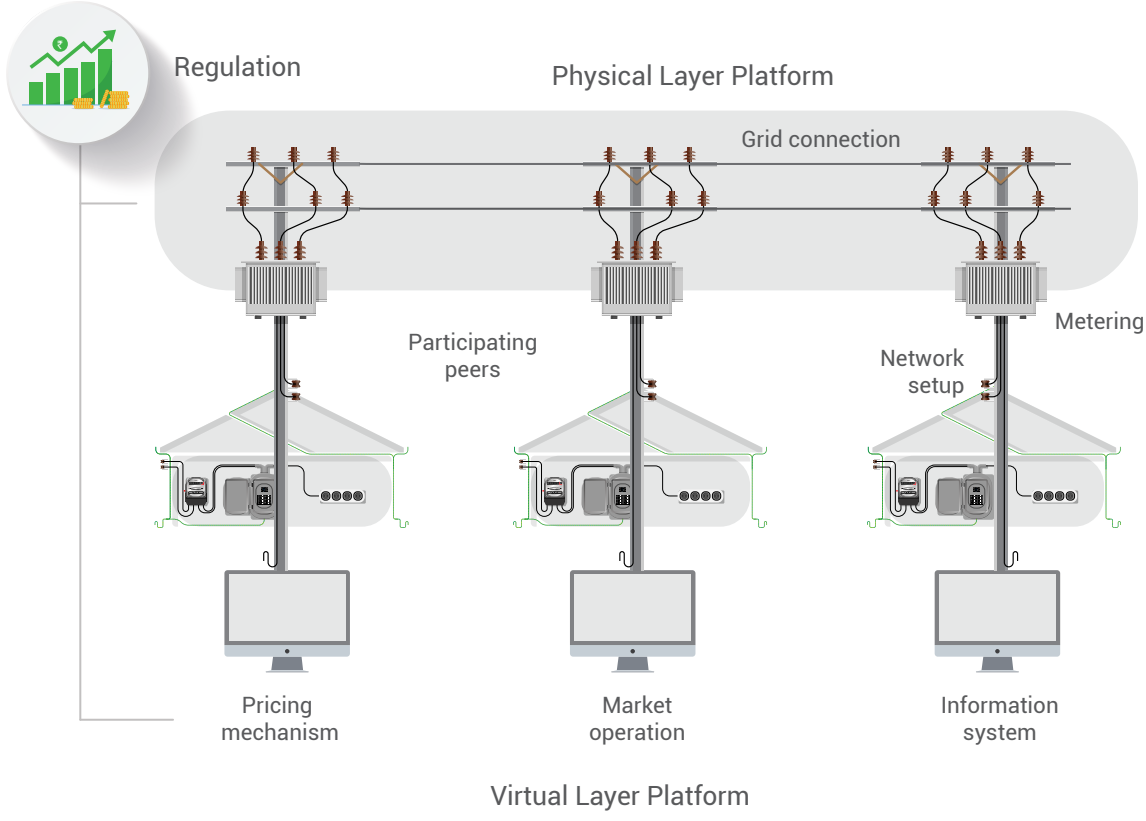
## Introduction

**Peer-to-Peer Trading:** P2P trading is a localised tech-based market trading, wherein the prosumer intelligently manages their load to optimise consumption cost and to maximise revenue from rooftop solar & battery storage system




As shown in Fig., elements of P2P network can be divided into two layers:

- ### Virtual layer

  The virtual layer, essentially, provides a secured connection for participants to decide on their energy trading parameters. It ensures that all participants have equal access to a virtual platform, in which transfer of all kinds of information takes place, buy and sell orders are created, an appropriate market mechanism is used to match the buy and sell orders, and finally, financial transactions are carried out upon successful matching of the orders.

- ### Physical layer

  The physical layer, is essentially a physical network that facilitates the transfer of electricity from sellers to buyers once the financial settlements between both parties are completed over the virtual layer platform. This physical network could be the traditional distributed-grid network provided and maintained by the independent system operator or Discoms. It can also be a separate physical microgrid, distribution grid, which can work both in off-grid & grid-connected mode with the traditional grid. Further, all necessary communication & power management system is enabled between different prosumers and the grid.

## How P2P Works

The seller i.e. Roof Top Solar (RTS), places sell bids on P2P platform and buyers place buy bids for matching & price determination. The clearing & settlement is also done by P2P platform, with energy data being fed to it through Smart Meters (SM).

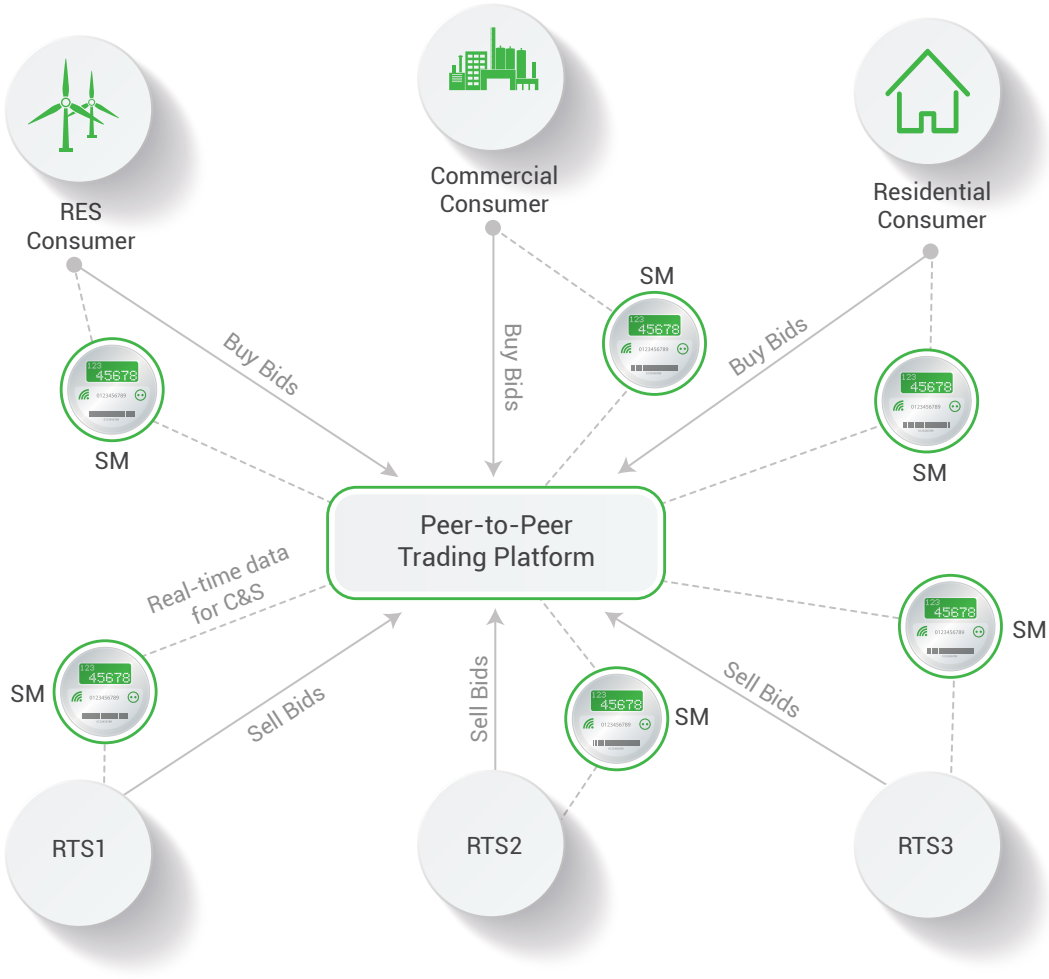



Fig: P2P Trading in Grid Integrated Smart Micro-grids

## Peer-to-Peer Markets

Market development to facilitate P2P trading is crucial in the localised market, both in grid-connected and isolated localised markets.

The declining cost of rooftop solar and battery storage system drives market participants to intelligently manage their energy needs, and at the same time participate in arbitrage with the grid in various market models, such as a P2P trading, and demand response to the DSO or TSO.

The market, with distributed energy resources & storage, gives price signal to participants, which further leads to more investment in DER segment. Further, the localised P2P market may also facilitate the market participants to arbitrage with the wholesale market.

To further facilitate development of P2P market in the localised market in DISCOMs area, various regulatory enablers need to be put in place, such as scheduling procedures under P2P trading, final settlement & billing incorporating P2P trade and DSM related rules.

## Developing the P2P Trading Markets in Indian Context

- **Provide Alternative Business Models for DISCOMs**

  P2P provision will provide opportunities to proactively engage with customers through an alternative business model, where additional revenue streams for the DISCOMs will come by collecting wheeling charges (P2P network usage fee) and transaction fees per transaction.

- **Reduce Burden on DISCOMs for RPO Compliance**

  By enabling excess solar to be traded directly between households, it will reduce DISCOMs' requirement to purchase excess solar from residents and the increased penetration of rooftop Solar (RTS) shall reduce the burden of RPO compliance on DISCOMs.

- **Better Load Management by DISCOMs by Reducing Burden of Absorbing Variable RE from Central Grid**

  Increased penetration of RTS within the distribution system improves the predictability of RE generation pattern vis-à-vis RE fed through central pool. Therefore, supporting P2P will support RTS penetration in DISCOMs network and shall further help DISCOMs in balancing load and reducing exposure to DSM by absorbing a more predictable RE generation from its distribution network itself.

- **Reduction in AT&C Losses and Power Purchase Cost**

  Solar rooftop systems & P2P trading could help in the reduction of T&D loss, avoid over-loading of distribution transformers (DTs) & network congestion, and help in meeting demand with higher degree of reliability as generation is at the contract demand side. Promoting rooftop solar enables DISCOMs to shift the load during daytime to capitalise on cheaper power from RE and the DISCOMs would be saving on power purchase costs.

- **Virtual Power Plant Services**

  Eventual goal is to move to a VPP consisting of aggregation of distributed energy storage systems, creating a 'sink' for energy in the short term and providing other services, such as voltage, active - reactive power management, Frequency Control Ancillary Services in the long term.

  Within the distribution system, the DISCOMs could become aggregator of distributed RTS and the entire ecosystem of hybrid RE solutions, such as Vehicle to Grid, Grid to Vehicle, EV Charging, Optimisation of Battery Storage Services, could be integrated with the P2P trading. One such example is Distributed Energy Resources Management System (DERMS) developed by GE Grid Solutions for a US based utility — Pacific Gas & Electric. The DERMS also forecasts generation from PV units and facilitates RTS owners to trade as P2P and at Power Exchanges.

- **P2P Business Fits with the Centrally Sponsored Schemes like KUSUM**

  DISCOMs can further expand P2P business in various parts of India in line with the proposed scheme of KUSUM to solarize agriculture. Through KUSUM policy for farmers, Government aims to have an installed solar capacity of 25,750 MW by 2022, at existing 11kV/33kV substations of DISCOMs, through a capital subsidy outlay of Rs. 34,422 Crs. The KUSUM policy provides capital subsidy to farmers to set up solar generating stations of capacity 500 KW to 2 MW, and the excess solar generation can be sold to the DISCOMs to support farmers income. This excess generation can be routed to the Peer-to-Peer Trading platform to create values for DISCOMs and consumers.

**THERE'S A LOT HAPPENING IN ENERGY MARKETS.**
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