- Trading market type : DAM (Day ahead market)

- The day of delivery is divided into multiple blocks of equal duration (24 hours-24 Blocks) and for each of the blocks, bidding happens separately and market prices are determined independently.

- **For each block, the market price is same for all the members (non-discriminatory) who win the bid, in a given region. The bid winning consumers have to pay for complete bid quantity at the market price irrespective of consumption and this cost gets added to his bill. The losing consumers get no electricity from the market**(If price we pay is x and market clearing price is y; then if our bid x >=y we get our demanded i.e. bid quantity electricity at Market clearing price y; if our bid price x<y we do not get electricity).

- Determination of Market clearing price, as explained by Vinayak :

  Important points related to price discovery :

  - We are not market makers, we do not influence any price changes i.e. we cannot influence any change in market clearing price

  - X axis is cumulative quantities of all the orders placed with ours, supply is from the producers side

  - Basically, we have to bid above p2 for each block to get our deal cleared if the market clearing price for the block is p2.
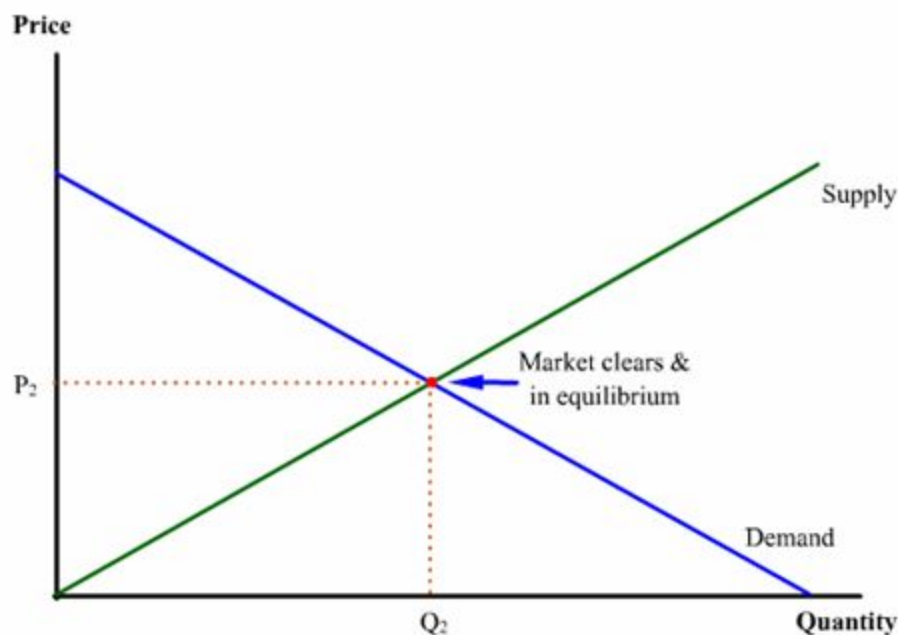
- we do not know the location, cannot use external data based on location

- **there are four sources from which the demand can be fulfilled viz. solar plant, battery, electricity market and DISCOM.**

- (We have to develop algorithm to minimize the difference in the actual train set and the predicted train set, both are forecasted datasets)

- The actual demand of all the consumers should be fulfilled at any cost from one of the four sourcesPrecedence of sources to fulfil demand: Solar plant > Electricity from market > Battery > DISCOM

- Battery:

  - has certain efficiency, a limited charging and discharging capacity (specified in the data sheet)

  - Battery can charge to its full capacity and discharge to zero state of charge

  - (Battery is charged from solar panel and every day's energy is stored and carried the next day which is stored in battery)

  - **Battery can either charge or discharge in a given block but cannot do both and everything is represented in terms of KWh for convenience**

  - **In a block, battery charges automatically when the supply from solar plant and electricity market combined exceeds the demand** (When the supply from solar and bid market is more, the remaining solar every will be stored in battery by inverter which has 100% efficiency)

  - **In a block, battery discharges automatically when the demand exceeds the supply from solar plant and electricity market combined** (the discharged battery energy here is assumed to being used as supply when solar and bid market fall short of demand)

  - Battery capacity – 25 KWh

  - Battery charging and discharging capacity – 5 KWh i,e,. battery can charge or discharge in energy upto 5 KWh in an hour

  - Battery efficiency – 80% i,e,. if 10 KWh is stored in the battery, it can supply only 8 KWh

  - The efficiency of the battery and inverter do not decrease with time

- Billing :

  - The daily bill is calculated only based on energy purchased in units and per unit cost. All other charges involved are ignored

- ○ Bid quantities should be only integers while bid price can take any value

- ○ The capital costs and maintenance costs associated with solar plant, battery and inverter are ignored. Hence the unit cost of electricity from solar plant is taken as zero

- ○ Price of electricity offered by DISCOM – Rs.7/KWh

- ○ Price of solar and battery : 0 rs

- Bidding :

   - ○ There are no upper and lower limits on the bid quantity

   - ○ The market is large enough such that the effect of the bid made by the community, on the market prices is negligible (we are not influencing market clearing price in any way)

   - ○ No of blocks in a day for bidding – 24 blocks each of duration one hour

- Inverter efficiency – 100%

Judging Criteria:

Test set includes data for 50 days. The teams have to submit two csv files: 1) bid quantities (in KWh) for each of the blocks in a day, for 50 days 2) bid prices (in Rs./KWh) for each of the blocks in a day, for 50 days. Based on the actual values of demand, solar output and market prices, the daily bill is calculated for each of the 50 days. One point is awarded to each of the top 5 teams with least bill on a given day. So a team can accumulate up to 50 points by being in the top 5 for 50 days. Fifty points are awarded to each of the top 5 teams with least cumulative bill for 50 days. So all teams are evaluated on a scale of 0-100 for every dataset.

Final Score = 10+0.9*(0.2*Public-LeaderBoard-Set-Score + 0.8*Private-Test-Set-Score).

The 10 marks is given for presentation quality during Inter-IIT Tech Meet.

Days refer to the days in the dataset and not days of submission.

Training Set: **Linked Here**

1. Oracle predictions of the community's hourly energy demand (in KWh) for 900 days are available at
2. Oracle predictions of the hourly solar plant output (in KWh) for 900 days are available at
3. Oracle predictions regional market prices (in Rs./KWh) for 900 days are available at
4. Actual values of the community's hourly energy demand (in KWh) for 900 days are available at

5. Actual values of the hourly solar plant output (in KWh) for 900 days are available at
6. Actual values regional market prices (in Rs./KWh) for 900 days are available at

Private Test Set:

1. Oracle predictions of the community's hourly energy demand (in KWh) for 100 days are available at
2. Oracle predictions of the hourly solar plant output (in KWh) for 100 days are available at
3. Oracle predictions regional market prices (in Rs./KWh) for 100 days are available at

Public Leaderboard Set:

1. Oracle predictions of the community's hourly energy demand (in KWh) for 50 days are available at .
2. Oracle predictions of the hourly solar plant output (in KWh) for 50 days are available at .
3. Oracle predictions regional market prices (in Rs./KWh) for 50 days are available at .