



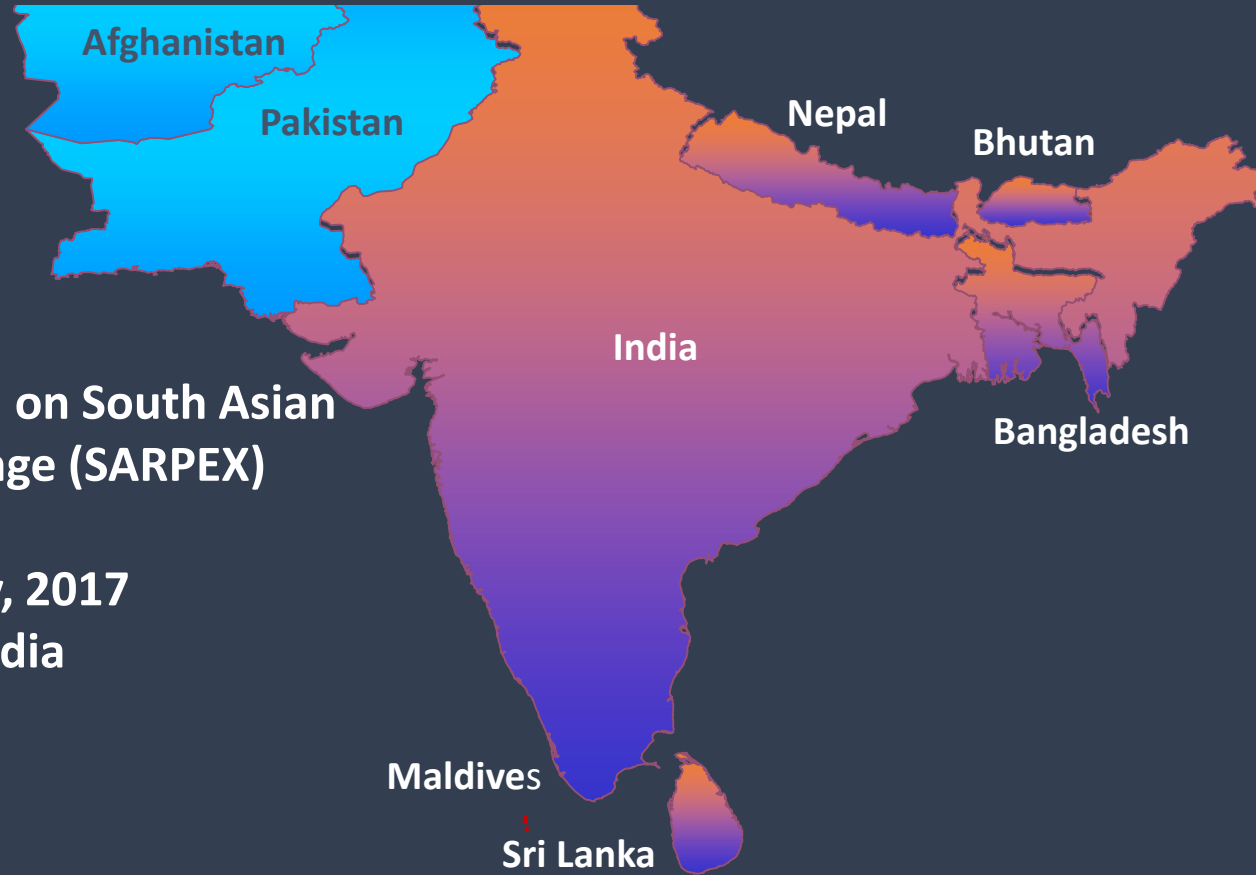
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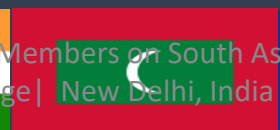
Guidelines for Bid Preparation for SARPEX



First meeting of core team on South Asian
Regional Power Exchange (SARPEX)

7th -9th February, 2017
New Delhi, India

Presented by:
Mr. S.K. Ray
Suruchi Sawhney

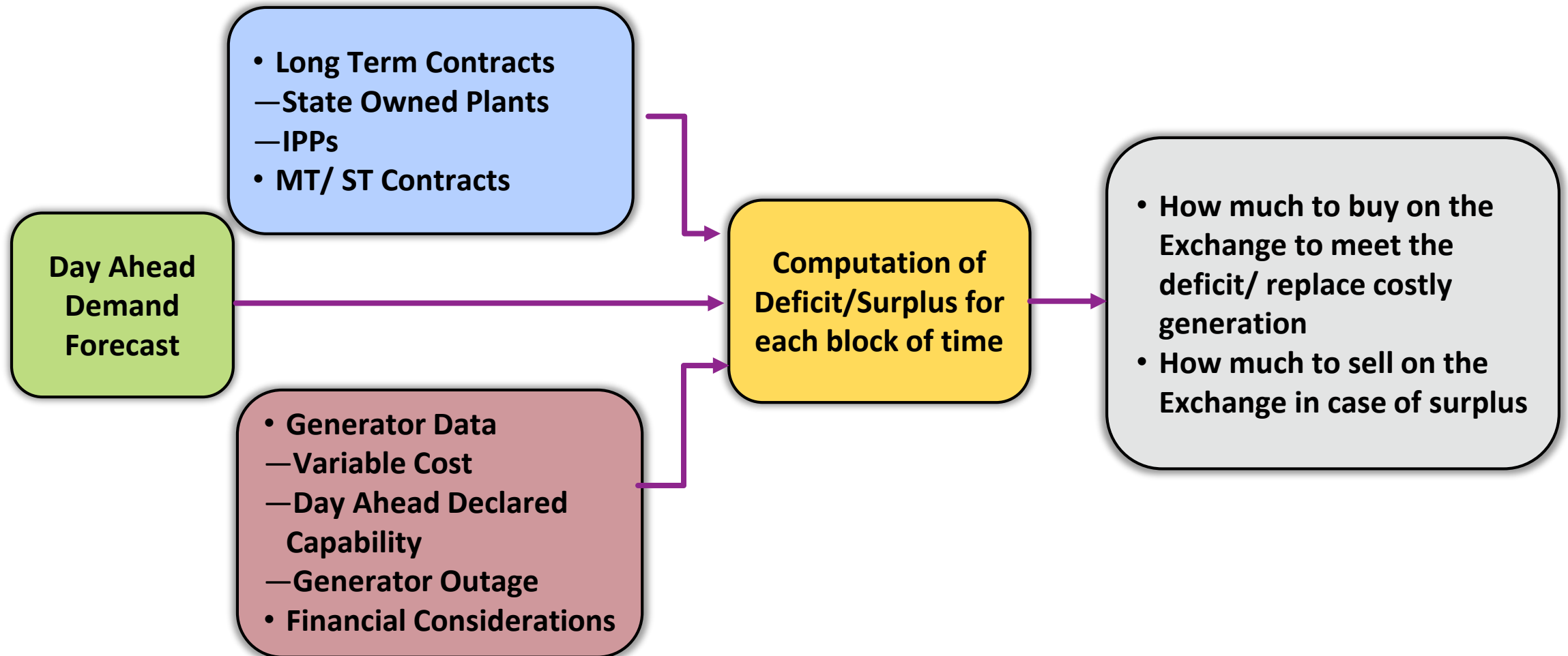


1st Meeting of Core Team Members on South Asian Regional
Power Exchange | New Delhi, India

Outline

- Power Procurement Process
- Present Criteria for participating on Indian Exchange(s)
- Regulatory Requirements for Cross-Border Participants for participating on Indian Exchange(s) – Recent MoP, Government of India, Guidelines
- SARPEX: Possible Design and Structure
- Prerequisites for Participating in Day-Ahead Market on SARPEX
- Basic Infrastructure required for Participating in Day-Ahead Market on SARPEX
- Pre-requisites for participating in the Mock Exercise for SARPEX

Power Procurement Process





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- Plant Availability/outages
- Transmission Availability
- Demand Data of other States
- Exchange Prices and Volumes



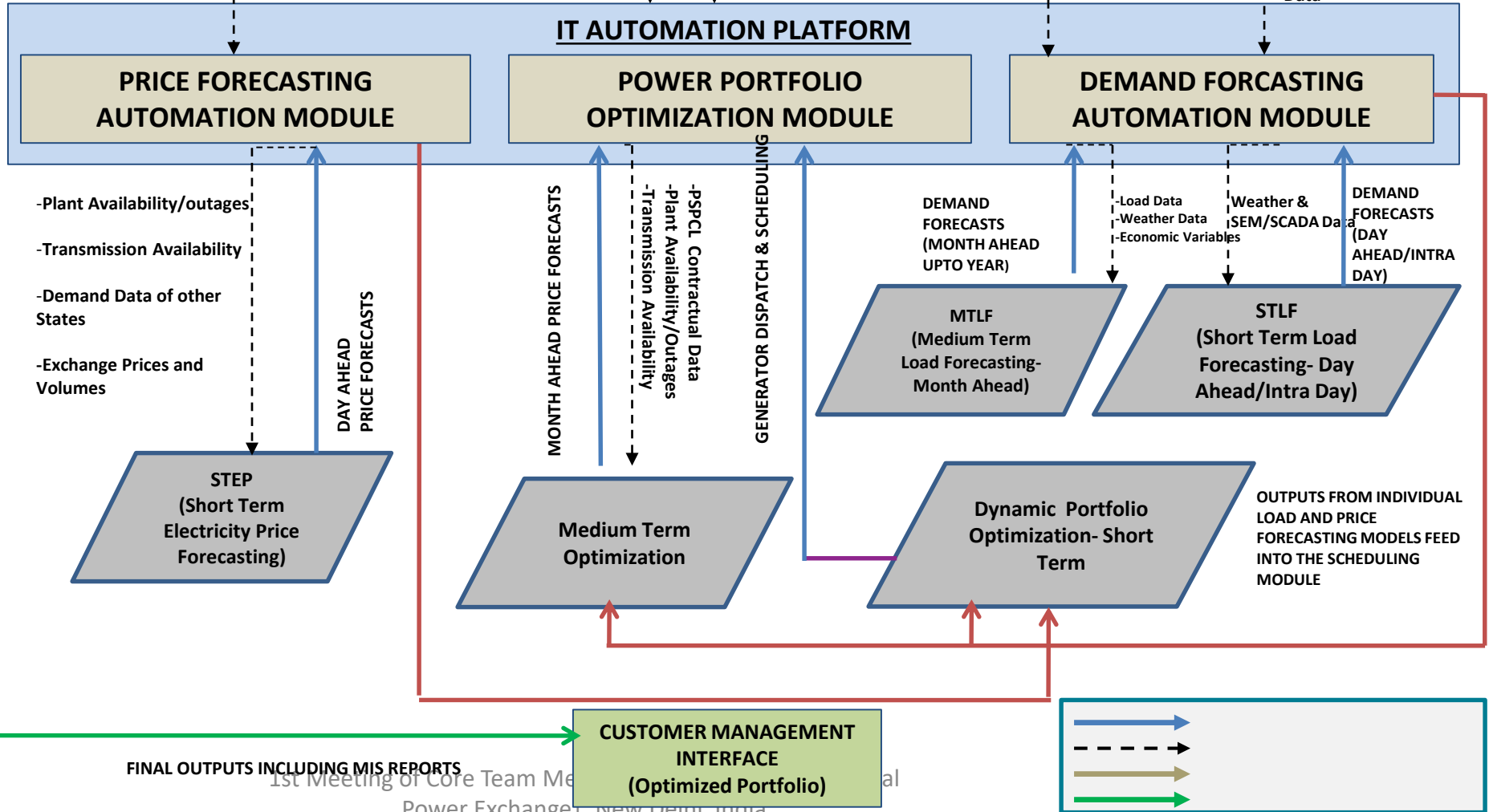
- PSPCL CONTRACTS
- VARIABLE COST DETAILS



- WEATHER DATA
- Data on Economic Variables



- 132 KV Substation Meters / SCADA/SEM Data



Unit Commitment Model

Source:

1st Meeting of Core Team Meeting
Power Exchange, New Delhi, India

Illustration -1

Sample Bids from Bhutan, Bangladesh, Nepal and India

5th April 2015, 06:00 to 06:15 AM

Illustration 1: Bid Formation for Nepal for 5th April 2015 for 06:00 to 06:15 ...(1/2)

Observations

- a. Load Shedding from 06:00-06:15 ~ 250 MW
- b. Total Demand Met ~ 549 MW and Total Domestic Supply ~ 344 MW

Assumptions regarding the data

- a. The difference between total Demand Met and Domestic Supply is being imported under CBET
- b. The load shedding in the given block was done on the account of Supply Shortfall
- c. Power Purchase is needed only to meet the un-served Load of 250 MW

Illustration 1: Bid Formation for Nepal for 5th April 2015 for 06:00 to 06:15 ...(2/2)

1

Suppose 100 MW out of a total deficit of 250 MW is needed at any cost

The Price observed on IEX for 4th April for the same block was observed to be Rs 2300/MWh

Therefore, the Utility can bid 100 MW at a price slightly above last day's price, say at Rs 2500/MWh

2

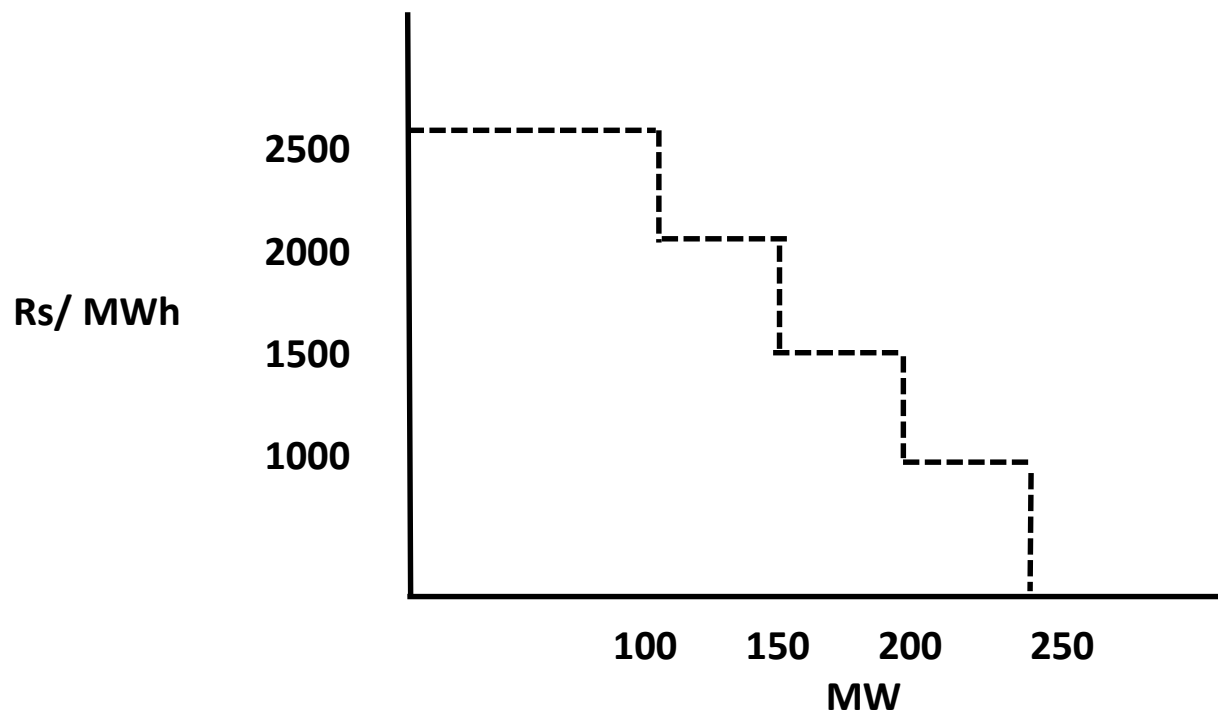
Suppose 50 MW of power is affordable at Rs 2000/MWh, another 50 MW is affordable at Rs 1500/MWh and remaining 50 MW at Rs 1000/MWh

The Utility can place bids of 50 MW each at Rs 2000/MWh, Rs 1500/MWh and Rs 1000/MWh

Thus, the total aggregate bid at Rs 1000 comes out to be 250 MW

Illustration 1: Aggregate Bid for Nepal for 5th April from 06:00 to 06:15

Buy-Bid from Nepal



Price (Rs/MWh)	Aggregate Purchase Volume (MW)
2500	100
2000	150
1500	200
1000	250

* Transmission Charges and Losses have not been included in the above analysis

Illustration 1: Bid Formation for Bangladesh for 5th April 2015 for 06:00 to 06:15 ...(1/2)

Observations

- a. Under CBET, 250 MW is contracted with PTC at a Total Cost Rs 5433/MWh (Break-up of Fixed and Variable Cost is not available)
- b. Total Demand- Supply balance is Met ~ 2835 MW

Assumptions regarding the data

- a. The difference between the sum of all hourly figure(s) and overall daily figure accounts for Auxillary Power Consumption
- b. The Fuel Consumption Rate (FCR) is given in Bangladeshi Taka/ KWh
- c. 1 Indian Rupee is equivalent to 1.20 Bangladeshi Taka

Illustration 1: Bid Formation for Bangladesh for 5th April 2015 for 06:00 to 06:15 ...(2/2)

The following Plants were identified to be significantly costlier than the Exchange Prices

Plant	Quantum Supplied	FCR (Rs/KWh)
Sikalbaha (Energis)	8 MW	10.45
Siddhirganj(Dutch Bangla)	8 MW	10.93
Juldah(Acom)	15 MW	10.91
Chittagong Eergypac	13MW	11.26
Khulna(KPCL -1)	6 MW	11.5
Khulna 150 MWGT	70 MW	15.65

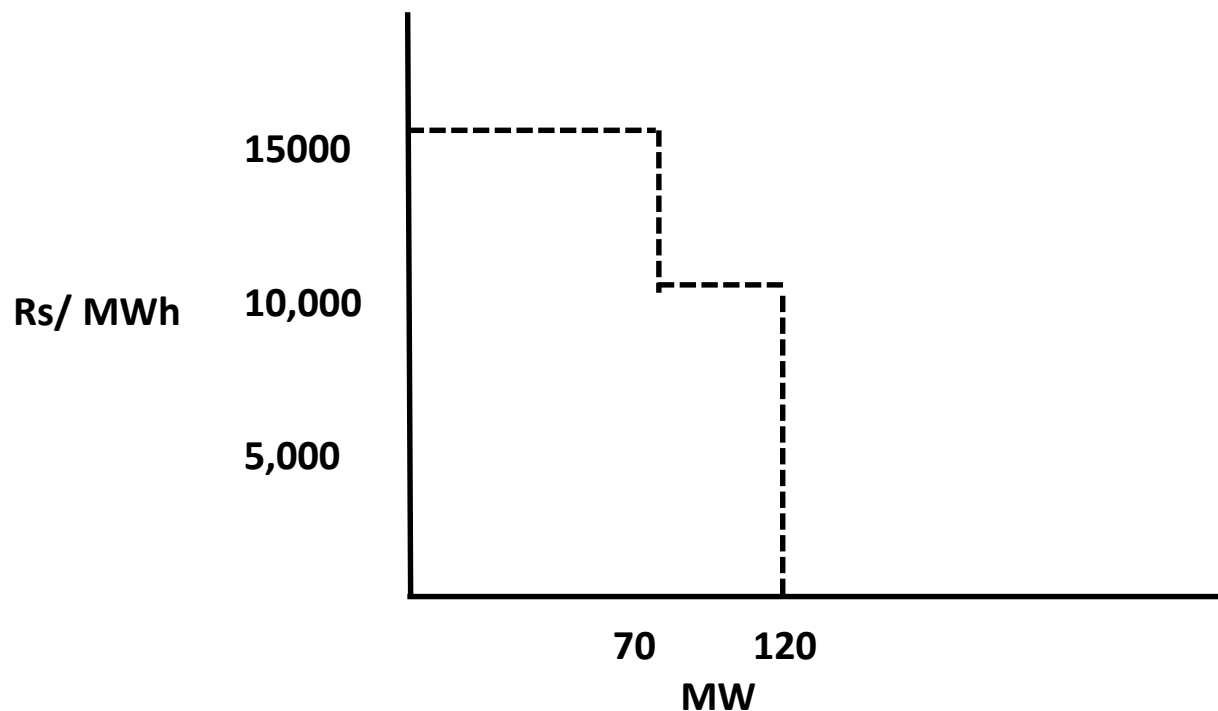
The Price observed on IEX for 4th April for the same block was in the range of Rs 2300/MWh

Thus, a total of 120 MW of costly generation can be replaced through the Exchange

Therefore, the Utility can bid 70 MW at a Rs 15,000/MWh and remaining 50 Mw at Rs 10,000/MWh

Illustration 1: Aggregate Bid for Bangladesh for 5th April from 06:00 to 06:15

Buy-Bid from Bangladesh



Price (Rs/MWh)	Aggregate Purchase Volume (MW)
15,000	70
10,000	120

* Transmission Charges and Losses have not been included in the above analysis

Illustration 1: Bid Formation for Bhutan for 5th April 2015 for 06:00 to 06:15 ...(1/2)

Observations

a.

Total Load ~ 169 MW

b.

Total Supply ~ 665 MW (from all plants except Dagachchu)

Assumptions regarding the data

a.

The demand of Bhutan is entirely met by generation from Chukha, Basochu and Kurichu

b.

Currently, the power from these plants is being sold to India at roughly Rs 2.1- 2.2/ KWh under Bilateral Contract

Illustration 1: Bid Formation for Bhutan for 5th April 2015 for 06:00 to 06:15 ...(2/2)

1

Suppose out of a total surplus generation of 500 MW available with Bhutan, 200 MW is still contracted under Cross Border Bilateral Contract

The Tariff from the sale of power to India under Bilateral Trade is roughly Rs 2200/MWh

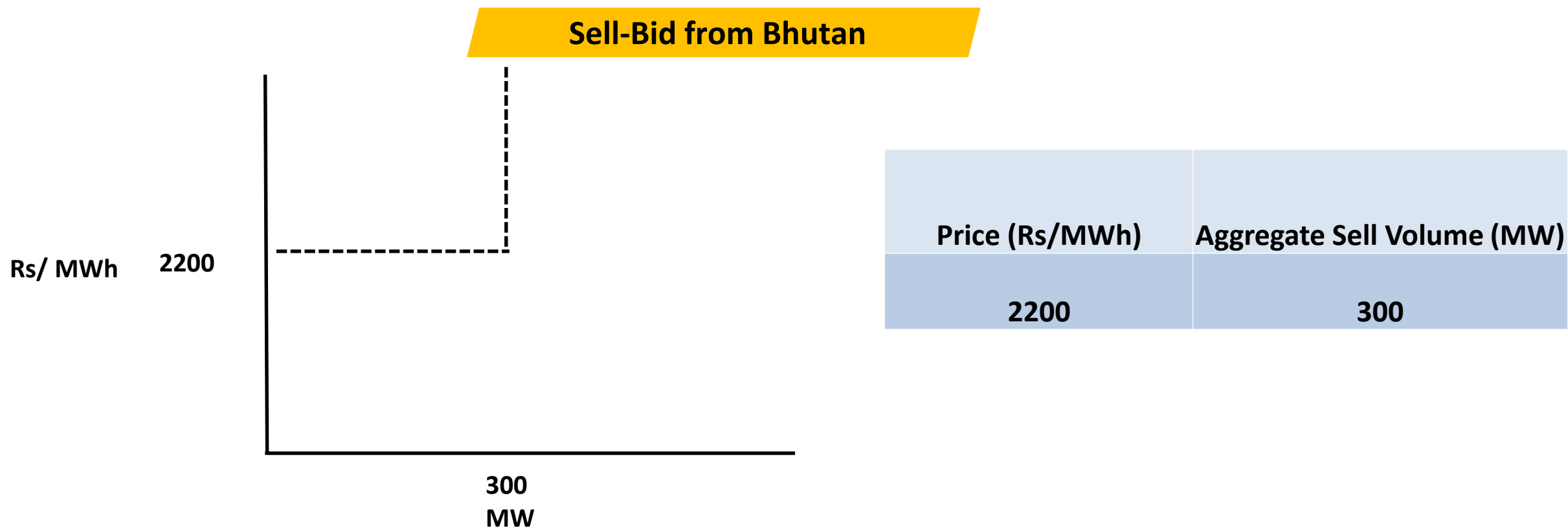
2

The Remaining Power Surplus of 300 MW is available to be sold on the Exchange

The Price observed on IEX for 4th April for the same block was in the range of Rs 2300/MWh

Therefore, the Utility can place a sale bid of 300 MW at a price Rs 2200/MWh, which is equivalent to its opportunity cost

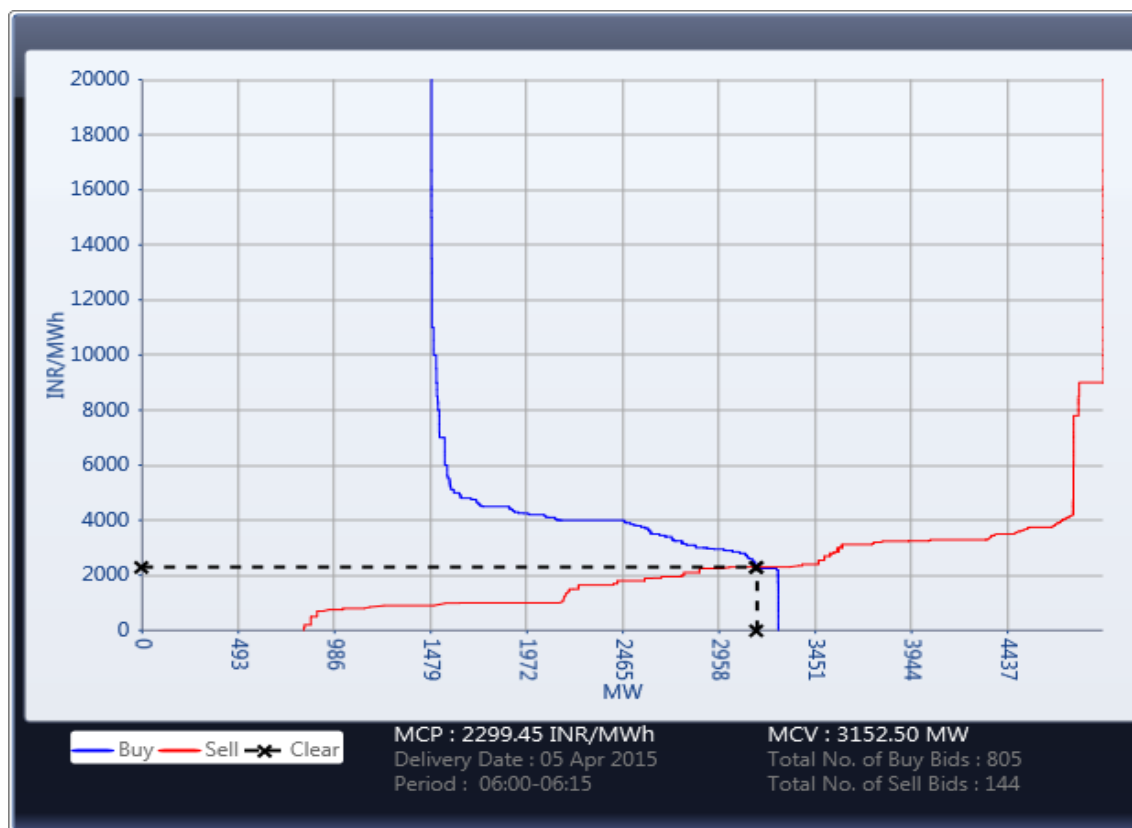
Illustration 1: Aggregate Bid for Bhutan for 5th April from 06:00 to 06:15



* Transmission Charges and Losses have not been included in the above analysis

Illustration 1: Aggregate Bids from India for 5th April from 06:00 to 06:15

Actual data on IEX Website



Extracted

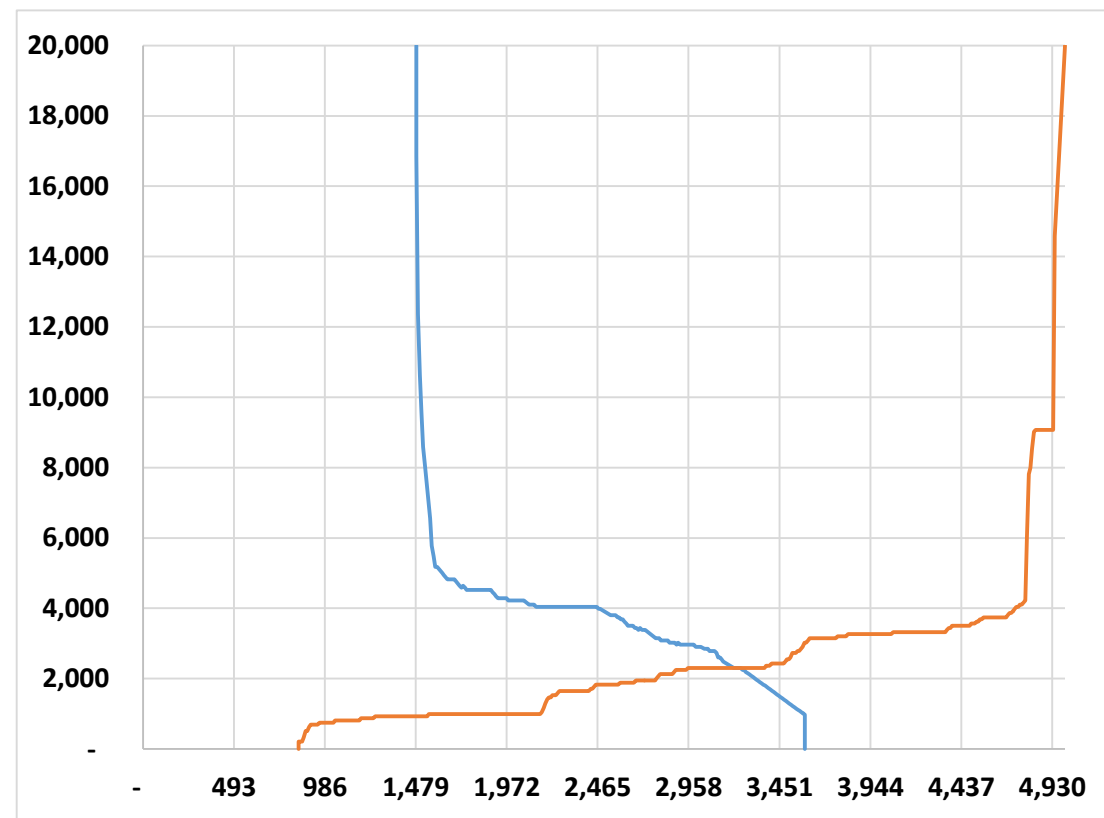


Illustration -2

Sample Bids from Bhutan, Bangladesh, Nepal and India

5th April 2015, 12:00 to 12:15 Noon

Illustration 2: Bid Formation for Nepal for 5th April 2015 for 12:00 to 12:15 ...(1/2)

Observations

- a. Load Shedding from 12:00-12:15 ~ 200 MW
- b. Total Demand Met ~ 516 MW and Total Domestic Supply ~ 286 MW

Assumptions regarding the data

- a. Currently, the power from these plants is being sold to India at roughly Rs 5.4/ KWh under Bilateral Arrangement
- b. The load shedding in the given block was done on the account of Supply Shortfall
- c. Power Purchase is needed to meet the un-served Load of 200 MW and replace the costly import of power through Bilateral Contracts

Illustration 2: Bid Formation for Nepal for 5th April 2015 for 12:00 to 12:15 ...(2/2)

1

Suppose Currently 200 MW is being imported from India under Bilateral Contracts at Rs 5.40/KWh

The Price observed on IEX for 4th April for the same block was observed to be Rs 2900/MWh

Therefore, the Utility can bid 200 MW at Rs 5000/MWh to replace the costly import under Bilateral Contract

2

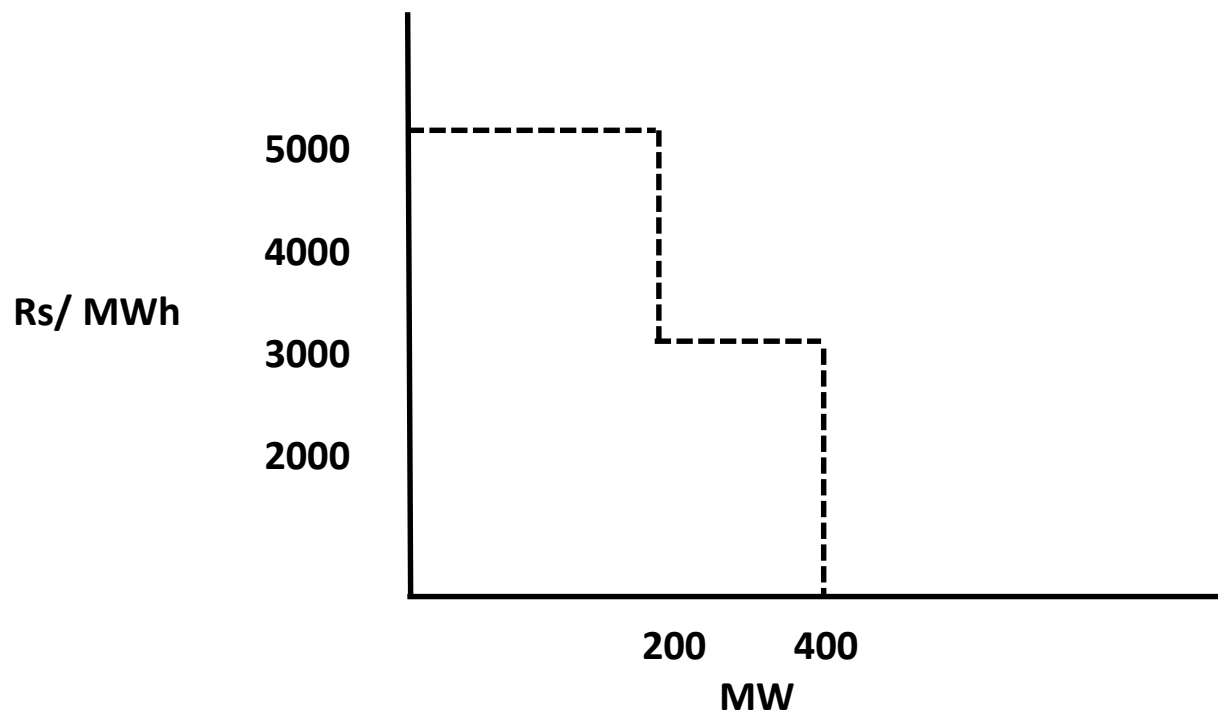
Suppose 200 MW of power deficit can be affordable met at Rs 3000/MWh

The Utility can place buy bid of 200 MW each at Rs 3000/MWh

Thus, the total aggregate bid at Rs 3000 comes out to be 400 MW

Illustration 2: Aggregate Bid for Nepal for 5th April from 12:00 to 12:15

Buy-Bid from Nepal



Price (Rs/MWh)	Aggregate Purchase Volume (MW)
5000	200
3000	400

* Transmission Charges and Losses have not been included in the above analysis

Illustration 2: Bid Formation for Bangladesh for 5th April 2015 for 12:00 to 12:15 ...(1/2)

Observations

- a. Under CBET, 250 MW is contracted with PTC at a Total Cost Rs 5433/MWh (Break-up of Fixed and Variable Cost is not available)
- b. Total Demand- Supply balance is Met ~ 3812 MW

Assumptions regarding the data

- a. The difference between the sum of all hourly figure(s) and overall daily figure accounts for Auxillary Power Consumption
- b. The Fuel Consumption Rate (FCR) is given in Bangladeshi Taka/ KWh
- c. 1 Indian Rupee is equivalent to 1.20 Bangladeshi Taka

Illustration 2: Bid Formation for Bangladesh for 5th April 2015 for 12:00 to 12:15 ...(2/2)

The following Plants were identified to be significantly costlier than the Exchange Prices

Plant	Quantum Supplied	FCR (Rs/KWh)
Haripur NEPC(HFO)	13 MW	10.96
Sikalbaha (Energis)	8 MW	10.46
Siddhirganj(Dutch Bangla)	93 MW	10.94
Karaniganj(powerpac)	20 MW	11.02
Meghnaghat (IEL)	40 MW	10.94
Gagnagar(Orion)	70 MW	11.61
Patenga	13 MW	11.27
Khulna 150 MWGT	40 MW	15.65

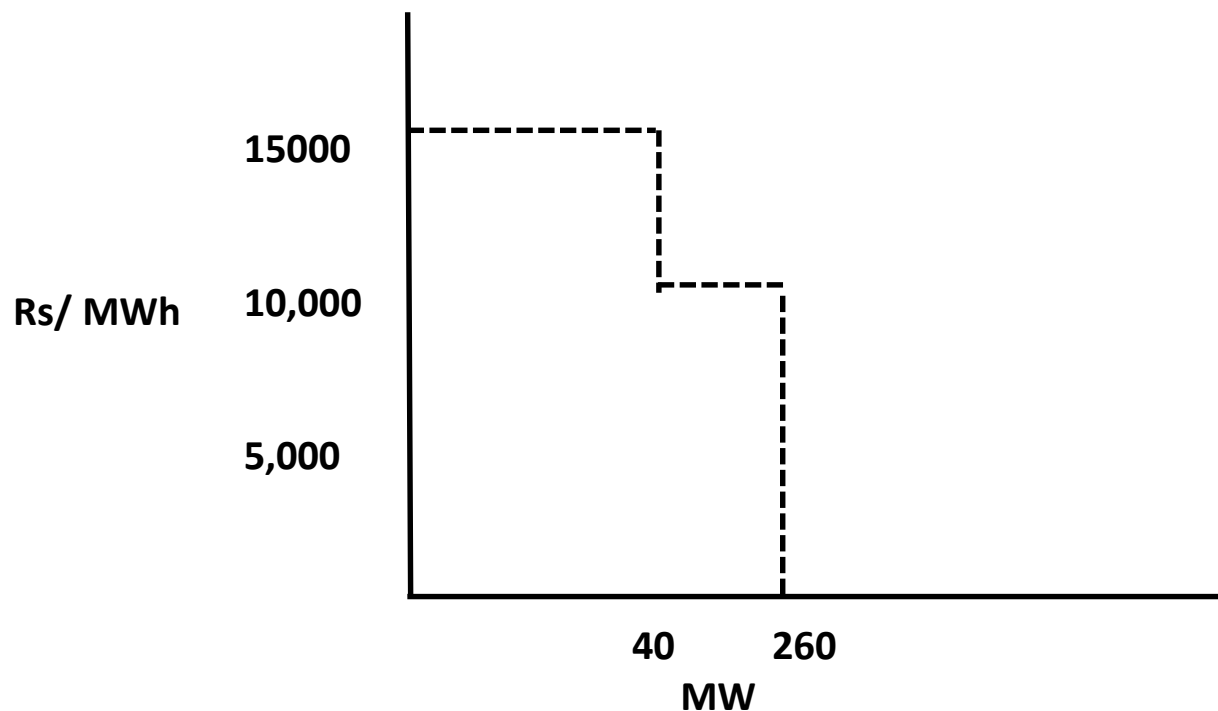
The Price observed on IEX for 4th April for the same block was in the range of Rs 2900/MWh

Thus, roughly 300 MW of costly generation can be replaced through the Exchange

Therefore, the Utility can bid 40 MW at a Rs 15,000/MWh and remaining 260 MW at Rs 10,000/MWh

Illustration 2: Aggregate Bid for Bangladesh for 5th April from 12:00 to 12:15

Buy-Bid from Bangladesh



Price (Rs/MWh)	Aggregate Purchase Volume (MW)
15,000	40
10,000	260

* Transmission Charges and Losses have not been included in the above analysis

Illustration 2: Bid Formation for Bhutan for 5th April 2015 for 12:00 to 12:15 ...(1/2)

Observations

a.

Total Load ~ 213 MW

b.

Total Supply ~ 723 MW (from all plants except Dagachchu)

Assumptions regarding the data

a.

The demand of Bhutan is entirely met by generation from Chukha, Basochu and Kurichu

b.

Currently, the power from these plants is being sold to India at roughly Rs 2.1- 2.2/ KWh under Bilateral Contract

Illustration 2: Bid Formation for Bhutan for 5th April 2015 for 12:00 to 12:15 ...(2/2)

1

Suppose out of a total surplus generation of 500 MW available with Bhutan, 100 MW is still contracted under Cross Border Bilateral Contract

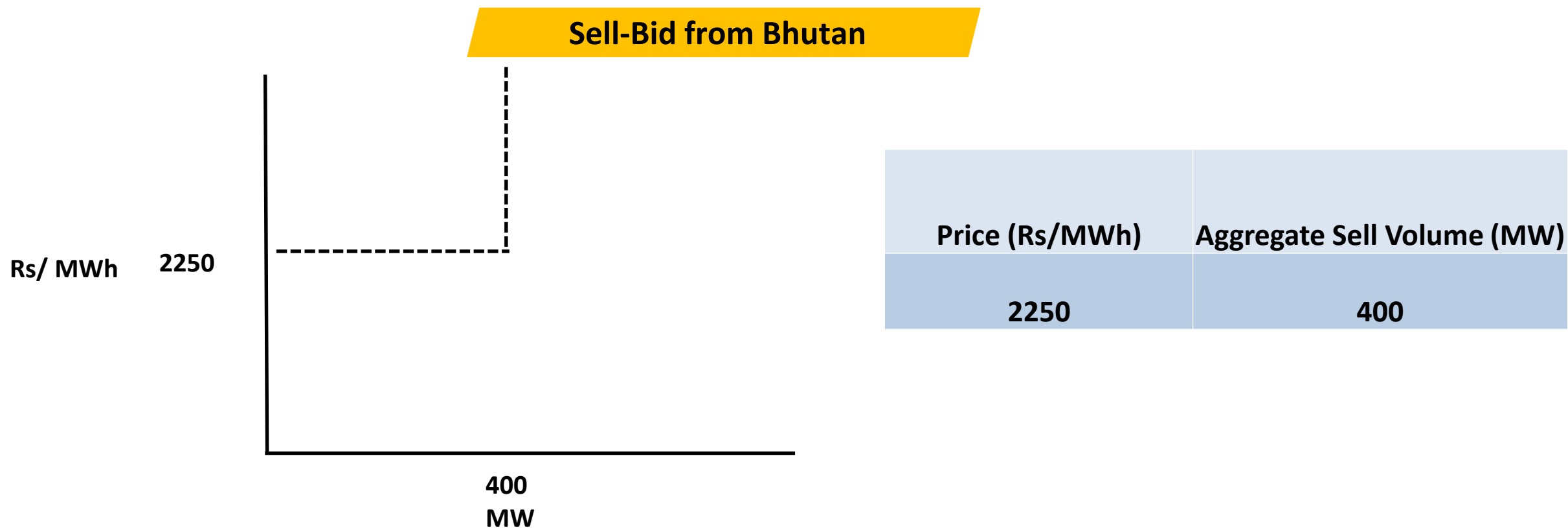
The Tariff from the sale of power to India under Bilateral Trade is roughly Rs 2200/MWh

2

The Remaining Power Surplus of 400 MW is available to be sold on the Exchange

The Price observed on IEX for 4th April for the same block was roughly Rs 2900/MWh
Therefore, the Utility can place a sale bid of 300 MW at a price Rs 2250/MWh, which is slightly above its opportunity cost

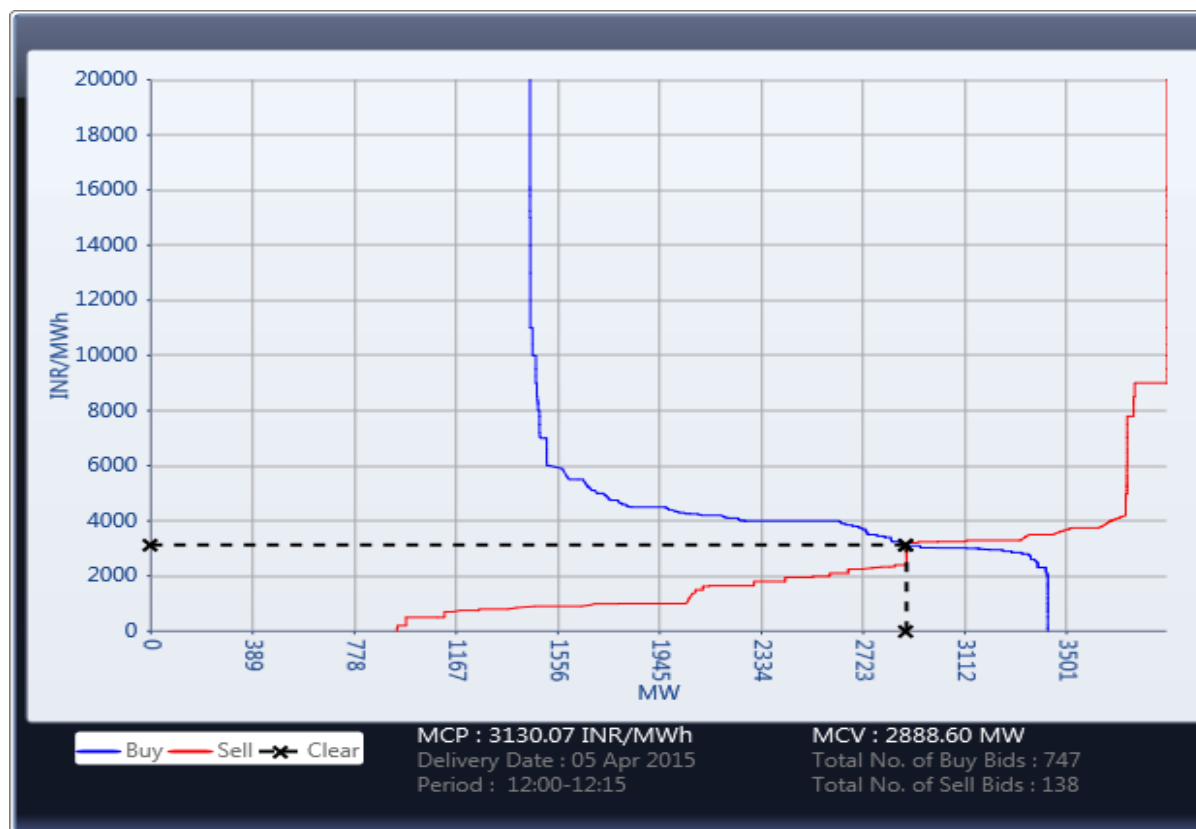
Illustration 2: Aggregate Bid for Bhutan for 5th April from 12:00 to 12:15



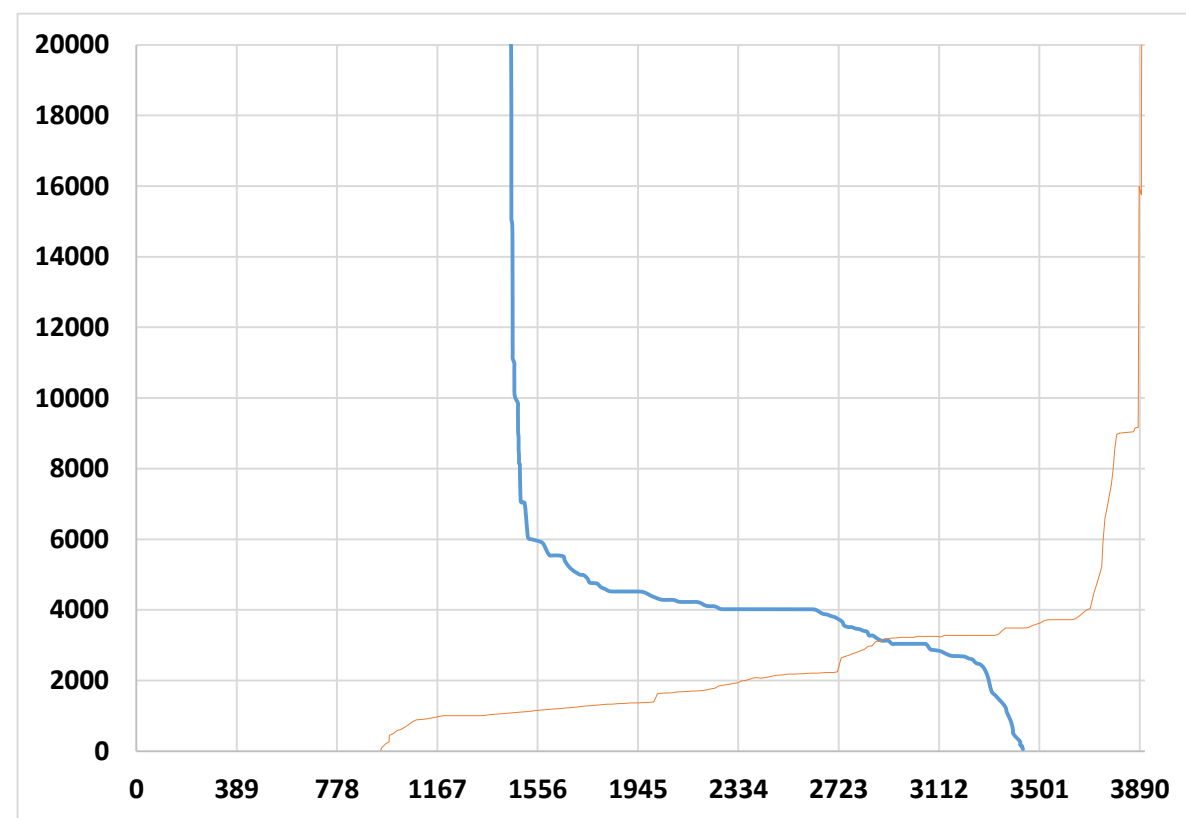
* Transmission Charges and Losses have not been included in the above analysis

Illustration 1: Aggregate Bids from India for 5th April from 12:00 to 12:15

Actual data on IEX Website



Extracted



Portal Screenshots - Homepage

SARPEX : MOCK EXERCISE HOME RESULTS CONTACT

WELCOME BHUTAN -



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SOUTH ASIAN REGIONAL POWER EXCHANGE - MOCK EXERCISE

Hello, representatives of **BHUTAN** , Welcome to **SARPEX** - South Asian Regional Power Exchange Mock Exercise Portal!



[Bids Submission - Click Here!](#)

Submit your Bids in Excel format following this link.

[View Reports - Click Here!](#)

See previous bid submission results and bids uploaded by you.

Users can click this link to navigate to bids submission page

Users can click this link to view archived reports

Portal Screenshots – Bids Submission Page

SARPEX : MOCK EXERCISE

HOME

REPORTS

CONTACT

WELCOME BHUTAN -

BIDS SUBMISSION - SARPEX

Submit your bids on this page in predefined excel formats provided by the administrator.

[View previously bid dates - Click here!](#)

Submit Bids Here!

Step1: Choose Date, Month and Year you want to submit the bid file for.

Step2: Upload the Bids file in xlsx format.

Step3: Confirm the bids submission and wait for success message.

Select day:

Select month:

Select year:

**** UPLOAD EXCEL FILE CONTAINING BIDS ****

Choose File No file chosen

* Please ensure that data is entered properly in the excel template before submission!

CONFIRM BIDS SUBMISSION

Users can choose a date for which they are uploading the bids

Users can upload their bids by clicking here and choosing the excel file containing bids

Portal Screenshots – Bids Submission Results Page

BIDS SUBMISSION RESULTS - SARPEX
The results of your bids submission are displayed on this webpage.
The default date is today. Please choose a different date for viewing corresponding results.

CHOOSE A DATE TO VIEW RESULTS

Select day: Select month: Select year:

Showing bids submission results for date: 15-04-2015

UNIFIED MODE RESULTS

Users can choose a date and see results for the corresponding date

Results are shown for unified and Residual Mode

Portal Screenshots – Archived Reports Page

SARPEX : MOCK EXERCISE HOME RESULTS CONTACT

WELCOME BHUTAN -

VIEW ARCHIVED REPORTS - SARPEX

You can view the previously uploaded bids by you and the reports associated with those bids on this page!
Please choose a date to see the reports.

CHOOSE A DATE TO VIEW REPORTS

Select day:

Select month:

Select year:

SHOW REPORTS

Users can choose a date and see reports for the corresponding date

VIEW/DOWNLOAD PREVIOUSLY ARCHIVED BIDS & RESULTS

Click on the following links to see the reports of the corresponding date on the link.

[30-01-2017/Results/Reports](#)

[27-01-2017/Results/Reports](#)

[29-01-2017/Results/Reports](#)

[26-01-2017/Results/Reports](#)

[28-01-2017/Results/Reports](#)

[25-01-2017/Results/Reports](#)

Portal Screenshots – Contact Admin Page

SARPEX : MOCK EXERCISE

HOME

WELCOME BHUTAN -

CONTACT APPLICATION ADMINISTRATOR

For queries regarding

1. Bids Submission Issues
2. Results Display Issues
3. Data Discrepancy

Please use the contact form below to send a message to the application administrator.

Your issues will be resolved at the earliest.

Write a message to administrator for issues!

Fill the fields below and click on 'SEND MESSAGE TO ADMIN' button to send the message to application administrator.

QUERY/MESSAGE SUBJECT

Please enter the subject of the query or message here...

QUERY/MESSAGE BODY

Message/Query:

SEND MESSAGE TO ADMIN

Users can contact app administrator for issues

Present Criteria for participating on Indian Exchange(s)

- Anyone, Individual or a Firm who is an electricity generator, trader or consumer can participate on the Exchange.
- The Member may be an individual, partnership firm or a company registered under Companies Act, 1956
- In view of pruning the risks associated with trading, some exchanges also have additional criteria of qualification. For example. IEX puts forth the criteria of minimum net worth of the firm becoming a Member.
- On the front of technical requirements of qualification, the Member must have
 - Standing clearance from SLDC
 - Possess Availability Based Tariff Meter

Regulatory Requirements for Cross-Border Participants for participating on Indian Exchange(s) – Recent MoP, Government of India, Guidelines

- Any Participating entity, with approval from the Designated Authority is eligible for cross border trade of electricity through Indian Power Exchanges under the categories of **Term Ahead Contracts, Intra Day Contracts/ Contingency Contracts** as defined in the Power Market Regulations of CERC
- The quantum of electricity that can be traded under cross border trade for electricity in Indian Power Exchanges shall be prescribed from time to time by the Designated Authority
- Cross border trade of electricity can be extended to other categories of contracts based on review by Ministry of Power in consultation with CERC

SARPEX: Possible Design and Structure

- SARPEX could be institutionalise as a part of present Indian Power Exchange(s) or a stand-alone Exchange for the purpose of Day-Ahead Power Trading and may operate in either of the above nodes
- Further, as discussed earlier, the day-ahead market on SARPEX could operate in two modes – Unified or Residual
- The criteria/pre-requisites for participation remains unchanged in both the modes

Prerequisites for Participating in Day-Ahead Market on SARPEX

- All parties interested in participating on SARPEX will have to become a Member on the Exchange through either of then-decided categories of Membership
- The Relevant/Designated Authority may be appointed to authorize an Eligible Entity or Obligated Entity or Voluntary Entity to become a Client of any other Member in accordance with requirements as may be Prescribed by the Exchange
- In SARPEX, all trades are proposed to be executed at the inter-regional periphery of the Indian grid while the operational control of the transmission system of Member Countries falls within the jurisdiction of the respective countries.
- A “No Objection Certification” (NOC) will be required from interested participants in each Member Country for allowing access up to the inter-regional periphery of the Indian Grid

Basic Infrastructure required for Participating in Day-Ahead Market on SARPEX

- Workstation(s), as approved by the Exchange, to access the Automated Trading Facility. The Member will pay to the Exchange, charges for installation and support as may be Prescribed by the Exchange
- Adequate Manpower to access the Workstation. The User may be any person chosen by the Member like his employee but has to be approved by the Exchange
- Telecom connectivity to connect the workstation through a Leased Line provided by a vendor approved by the Exchange
- Information Collection System to collect all the data required to ascertain the quantum and price bids for sale/purchase of power
- System and Procedures for implementing all trades generated through SARPEX

Pre-requisites for participating in the Mock Exercise for SARPEX

- Information Collection System and Personnel to collect all the data required to ascertain the quantum and price bids for sale/purchase of Power
- No NOC is required for participating in the Mock Exercise
- Price and Quantity bids need to be submitted for a total of 71 days, as shared earlier
- Details of the Trade Market Simulation will be covered in the next session