

South Asian Regional Power Exchange (SARPEX)

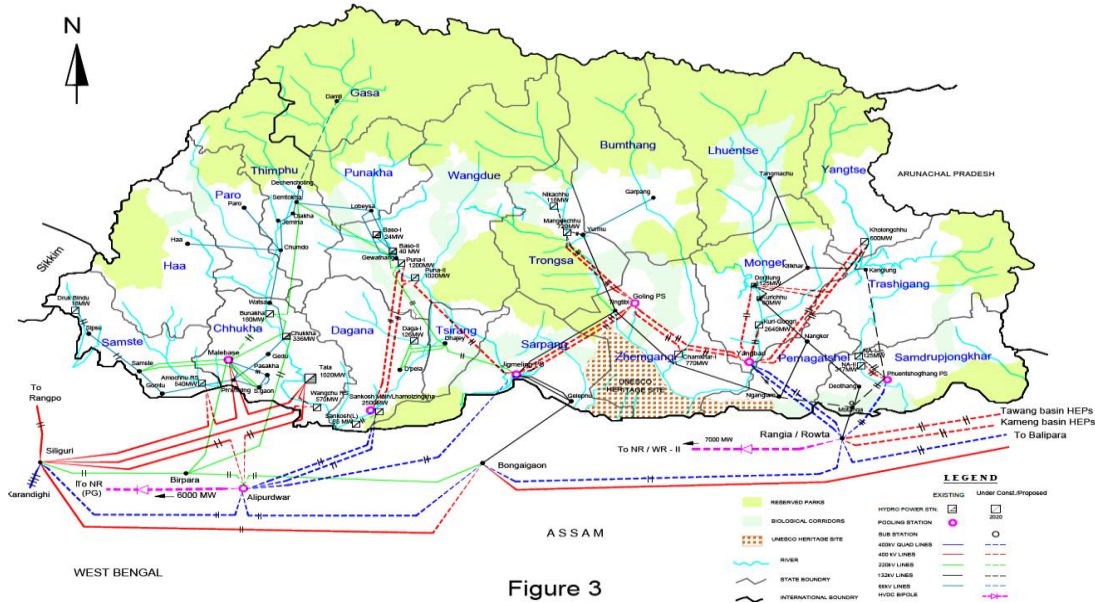


Figure 3

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Outline of Presentation

- ❖ Background of SARPEX
- ❖ Roles and Responsibilities of Core Team
- ❖ Learning from the Capacity Building Program
- ❖ Activities undertaken by the Core Team

Background of SARPEX

- ❖ South Asia regional power market, there is long and medium term power trading through bilateral agreements.
- ❖ Various bilateral and multilateral funding organizations (USAID-SARI/EI program, ADB-SASEC Program, SAARC, etc. are supporting the CBET which is necessary for economic growth of SA region
- ❖ No short term trading, especially of Day Ahead Market (DAM) due to the absence of a Regional Power Exchange.
- ❖ Key drivers for the trade are the **huge opportunities** for import and export of power due to prevailing demand supply balance in addition to **resource and demand complementarities** within the region
- ❖ Regional power exchange would provide the SACs with an opportunity for better price signals and would support a competitive power market.
- ❖ The mock exercise would also lead to the framing of the market design and rules for running the mock exercise and it would be a useful input for setting up a Regional Power Exchange.



Role and Responsibilities

- ✧ Team consists of one nodal officer and three team members.
- ✧ Data collection & Analysis (Daily Demand for the period **April 2015 to March 2016**) and subsequently decide the bids.
- ✧ Preparing and uploading the bids (71 selected days) for mock exercise

Learning from Capacity Building Program - DAM

- ❖ The core team attended the three days training in Feb. 2017 held in New Delhi, India
- ❖ Bid preparation for SARPEX
- ❖ **DAM:** Bidding in the market is done on day n, for trades which are effective on day n+1.
- ❖ **Price discovery:** closed, double sided auction for each 15 min time block for the following day, intersection of aggregated sale and purchase curves defines Market Clearing Price (MCP)
- ❖ SARPEX could provide an opportunity for sale of surplus energy that is available during wet season and during off peak hours. The pilot market is being run on both the modes of operation, unified as well as residual or sequential mode.
- ❖ **Analysis of the result** - The pilot market data will be analyzed to ascertain the desirability and the feasibility of a SARPEX. This will not only be based on the traded volume and price but also on economic analysis of the results bringing out the financial impact on the trades on the participating nations.

Activities undertaken– Sample Bid preparation (13 April 2015)

- Total National load – 222MW
- Total generation excluded Dagachhu Generation- 360.06MW
- 90% under long term PPA & 10% in the open market (SARPEX) (Assumption)
- The bids are prepared for 96 time block (0:00 to 23:00 hours, each 15 minutes time block) till July 2015

Activities undertaken– Data Collected

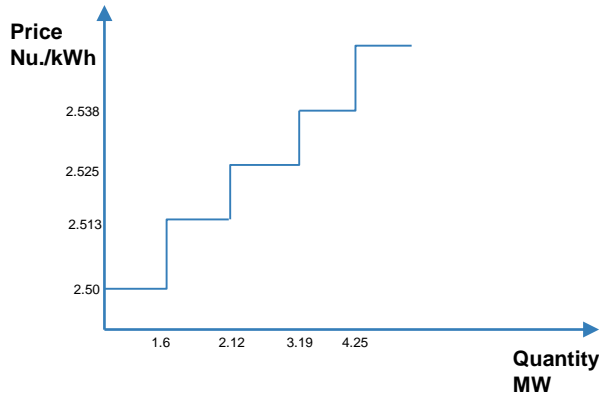
List of Days for which data were furnished

APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	JANUARY	FEBRUARY	MARCH
Sunday, April 5, 2015	Wednesday, May 13, 2015	Thursday, June 11, 2015	Thursday, July 2, 2015	Saturday, August 8, 2015	Sunday, September 13, 2015	Tuesday, October 13, 2015	Friday, November 27, 2015	Thursday, December 10, 2015	Wednesday, January 6, 2016	Sunday, February 7, 2016	Saturday, March 5, 2016
Saturday, April 11, 2015	Friday, May 15, 2015	Sunday, June 14, 2015	Saturday, July 11, 2015	Sunday, August 9, 2015	Sunday, September 20, 2015	Wednesday, October 14, 2015		Monday, December 14, 2015	Friday, January 8, 2016	Monday, February 8, 2016	Tuesday, March 8, 2016
Monday, April 13, 2015	Saturday, May 16, 2015	Monday, June 15, 2015	Monday, July 13, 2015	Tuesday, August 11, 2015	Tuesday, September 22, 2015	Saturday, October 17, 2015		Tuesday, December 15, 2015	Saturday, January 9, 2016	Thursday, February 11, 2016	Monday, March 14, 2016
Sunday, April 19, 2015	Tuesday, May 19, 2015	Sunday, June 21, 2015	Thursday, July 16, 2015	Wednesday, August 19, 2015	Wednesday, September 23, 2015	Thursday, October 22, 2015		Sunday, December 20, 2015	Monday, January 11, 2016	Sunday, February 14, 2016	Saturday, March 19, 2016
Wednesday, April 29, 2015		Friday, June 26, 2015	Sunday, July 26, 2015	Thursday, August 20, 2015	Monday, September 28, 2015			Wednesday, December 23, 2015	Thursday, January 14, 2016	Wednesday, February 24, 2016	Monday, March 21, 2016
		Saturday, June 27, 2015	Monday, July 27, 2015	Saturday, August 22, 2015				Thursday, December 24, 2015	Tuesday, January 19, 2016		Monday, March 28, 2016
		Tuesday, June 30, 2015		Sunday, August 23, 2015				Tuesday, December 29, 2015	Wednesday, January 20, 2016		Tuesday, March 29, 2016
				Wednesday, August 26, 2015				Wednesday, December 30, 2015	Thursday, January 21, 2016		Wednesday, September 9, 2015
				Sunday, August 30, 2015					Friday, January 29, 2016		

Bid preparation (Sample for One time block)

Bid Format

Illustration of bid for 13th April 2015 from 0:00 to 0:15 hours



Transmission charges and losses are not included in the bid

Time block	Price (Nu./kWh)	Aggregate sell volume (MW)
t1	2.50	1.06
t1	2.51	2.12
t1	2.53	3.19
t1	2.54	4.25
t1	2.55	5.31
t1	2.56	6.37
t1	2.58	7.44
t1	2.59	8.50
t1	2.60	9.56
t1	2.61	10.62
t1	2.63	11.69
t1	2.64	12.75
t1	2.65	13.81

	Client ID	Region	Time Block	Order Nation	Order Type	Price (Rs./kWh)	Quantity (MW)
1							
2	Bhutan1	Bhutan	t1	Normal	Sell	2.500	-1.06
3	Bhutan1	Bhutan	t1	Normal	Sell	2.513	-1.06
4	Bhutan1	Bhutan	t1	Normal	Sell	2.525	-1.06
5	Bhutan1	Bhutan	t1	Normal	Sell	2.538	-1.06
6	Bhutan1	Bhutan	t1	Normal	Sell	2.550	-1.06
7	Bhutan1	Bhutan	t1	Normal	Sell	2.563	-1.06
8	Bhutan1	Bhutan	t1	Normal	Sell	2.575	-1.06
9	Bhutan1	Bhutan	t1	Normal	Sell	2.588	-1.06
10	Bhutan1	Bhutan	t1	Normal	Sell	2.600	-1.06
11	Bhutan1	Bhutan	t1	Normal	Sell	2.613	-1.06
12	Bhutan1	Bhutan	t1	Normal	Sell	2.625	-1.06
13	Bhutan1	Bhutan	t1	Normal	Sell	2.638	-1.06
14	Bhutan1	Bhutan	t1	Normal	Sell	2.650	-1.06
15	Bhutan1	Bhutan	t2	Normal	Sell	2.500	-1.06
16	Bhutan1	Bhutan	t2	Normal	Sell	2.529	-1.06
17	Bhutan1	Bhutan	t2	Normal	Sell	2.558	-1.06
18	Bhutan1	Bhutan	t2	Normal	Sell	2.587	-1.06
19	Bhutan1	Bhutan	t2	Normal	Sell	2.616	-1.06
20	Bhutan1	Bhutan	t2	Normal	Sell	2.645	-1.06
21	Bhutan1	Bhutan	t2	Normal	Sell	2.674	-1.06
22	Bhutan1	Bhutan	t2	Normal	Sell	2.703	-1.06
23	Bhutan1	Bhutan	t2	Normal	Sell	2.732	-1.06
24	Bhutan1	Bhutan	t2	Normal	Sell	2.761	-1.06
25	Bhutan1	Bhutan	t2	Normal	Sell	2.790	-1.06
26	Bhutan1	Bhutan	t2	Normal	Sell	2.819	-1.06
27	Bhutan1	Bhutan	t2	Normal	Sell	2.848	-1.06
28	Bhutan1	Bhutan	t3	Normal	Sell	2.587	-1.06
29	Bhutan1	Bhutan	t3	Normal	Sell	2.616	-1.06
30	Bhutan1	Bhutan	t3	Normal	Sell	2.645	-1.06
31	Bhutan1	Bhutan	t3	Normal	Sell	2.674	-1.06
32	Bhutan1	Bhutan	t3	Normal	Sell	2.703	-1.06
33	Bhutan1	Bhutan	t3	Normal	Sell	2.732	-1.06
34	Bhutan1	Bhutan	t3	Normal	Sell	2.761	-1.06
35	Bhutan1	Bhutan	t3	Normal	Sell	2.790	-1.06
36	Bhutan1	Bhutan	t3	Normal	Sell	2.819	-1.06
37	Bhutan1	Bhutan	t3	Normal	Sell	2.848	-1.06
38	Bhutan1	Bhutan	t3	Normal	Sell	2.877	-1.06
39	Bhutan1	Bhutan	t3	Normal	Sell	2.906	-1.06

Source: DHPS, MOEA

Bid Submission (Portal screenshots – Homepage)

The screenshot shows a web browser window with the URL <https://e52e36b2.ngrok.io/sarpeX/default/main>. The page features the USAID logo, the SARI/EI logo, and the IRADe logo (Integrated Research and Action for Development). A navigation bar includes links for HOME, RESULTS, REPORTS, CONTACT, ABOUT SARPEX, and LOGOUT. The main heading is "SOUTH ASIAN REGIONAL POWER EXCHANGE - MOCK EXERCISE". A welcome message reads: "Hello, representatives of BHUTAN , Welcome to SARPEX - South Asian Regional Power Exchange Mock Exercise Portal!". Below this, there are two main sections: "Bids Submission - Click Here!" with a link to submit bids in Excel format, and "View Reports - Click Here!" with a link to view previous bid submission results. A small image of a dragon is visible on the left side of the bid submission section.

Bid Submission (Portal screenshots – Homepage)

The screenshot shows a web browser window with the URL <https://e52e36b2.ngrok.io/sarpeX/default/submitBids>. The page features a header with the USAID logo, the SARI/EI logo, and the IRADe logo (Integrated Research and Action for Development). A navigation bar contains the text "SARPEX : MOCK EXERCISE" and links for HOME, ABOUT, RESULTS, REPORTS, and CONTACT. The main content area is titled "BIDS SUBMISSION - SARPEX" and includes the instruction: "Submit your bids on this page in predefined excel formats provided by the administrator." Below this is a link: "View previously bidde dates - Click here!". The "Submit Bids Here!" section provides three steps: "Step1: Choose Date, Month and Year you want to submit the bid file for.", "Step2: Upload the Bids file in xlsx format.", and "Step3: Confirm the bids submission and wait for success message." There are three dropdown menus for "Select day:", "Select month:", and "Select year:". An orange button labeled "** UPLOAD EXCEL FILE CONTAINING BIDS **" is positioned above a file upload area that shows "Browse..." and "No file selected.". A note below the upload area states: "*Please ensure that data is entered properly in the excel template before submission". At the bottom of the form is a "CONFIRM BIDS SUBMISSION" button.

BIDS SUBMISSION - SARPEX

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

[View previously bidde 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 ****

Browse... No file selected.

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

CONFIRM BIDS SUBMISSION

Source: <https://e52e36b2.ngrok.io/sarpeX/default/results#>



TASHI DELEK