

MINUTES OF THE 61st MEETING
OF THE
FORUM OF REGULATORS (FOR) HELD AT CHENNAI (TAMIL NADU).

VENUE : **“SAMAYA” HALL
HOTEL INTER CONTINENTAL
EAST COAST ROAD
CHENNAI (TAMIL NADU).**

DAY / DATE : **FRIDAY, THE 22ND SEPTEMBER, 2017**

LIST OF PARTICIPANTS : **AT ANNEXURE-I (ENCLOSED)**

Opening Session

The meeting was chaired by Shri Gireesh B. Pradhan, Chairperson, Central Electricity Regulatory Commission (CERC) and Forum of Regulators (FOR). The Chairperson, CERC / FOR welcomed the Members of the Forum to the 61st Meeting of Forum of Regulators. He also extended a warm welcome to Dr. Arabind Prasad, Chairperson, Jharkhand State Electricity Regulatory Commission and Ms. Kusumjit Sidhu, Chairperson, Punjab State Electricity Regulatory Commission, who were attending the meeting of the Forum for the first time after assuming charge. He thanked the Chairperson, Tamil Nadu Electricity Regulatory Commission for hosting the meeting and appreciated the efforts made by the Chairperson, Members, Officers and Staff of TNERC in organizing the meeting and making necessary arrangements to host the FOR.

In his opening remarks, the Chairperson expressed satisfaction over the number of issues brought by the SERCs / JERCs for discussion in the Forum. He stated that it reflected the way SERCs owned the Forum and complimented the Members for their active participation.

Chairperson informed the Forum that Hon'ble Justice Shri Madan B. Lokur was invited as Chief Guest on the occasion of CERC Annual Day on 24.7.2017 to deliver the CERC Annual Day Lecture. The print version of the lecture was also shared with the Members. Some FOR members expressed that they would also like to join such proceedings in future which was welcomed by Chairperson, CERC / FOR.

The Chairperson, while outlining the initiatives taken by the FoR Technical Committee to facilitate effective integration of RE, informed the Forum that an update on the progress would be discussed during the course of the meeting. In this regard, he stated that handholding / facilitating the States in adopting the framework / mechanism for Forecasting, Scheduling, DSM etc. is a longer and time consuming exercise. The Chairperson proposed that constitution of the FoR Technical Committee may be amended suitably by designating it as FoR Standing Technical Committee, so that the Committee could continue to remain in place on permanent basis and assist the FoR on technical matters. The Forum agreed to the proposal with the suggestion that Members of non-RE rich States should also be invited as special invitees in the Technical Committee meetings.

The Chairperson referred to one of the recommendations of the Pradhan Committee Report related to ring-fencing of Load Despatch Centers. He urged the SERCs / JERCs to advise the State Governments to take up the matter expeditiously. The Chairperson, while lauding the efforts of the Forum of Load Despatchers (FoLD), requested the FoLD to update the Forum on a regular basis, with their latest initiatives and developments.

The Chairperson informed the Forum that as a proactive measure towards strengthening the adjudication system with efficient, economical and effective mode for access of information, the Commission launched e-Court Project SAUDAMINI (System for Adjudication Using Digital Access & Management of Information through Network Integration) on 4th April, 2016. In one of the earlier meetings, the Members of the Forum had appreciated the initiatives of CERC and

had urged CERC to extend support to all SERCs for implementing e-Court system at their offices. In this direction, the NIC has been requested for development of a generic software facilitating implementation across the board.

Chairperson referred to the issue of delay in payments to the RE generators that was discussed during the recently held Regulators' Meet with the Hon'ble Minister of State (MOS). During the meeting Hon'ble MOS had urged the Regulators to intervene to ensure that payments to RE generators are made as per contract terms. In this regard, Chairperson urged the Members of the Forum to take up this matter with respective utilities for necessary action.

Chairperson reiterated that given the variable nature of RE resources and in due consideration of the fact that it is clean and environmental friendly, 'Must Run Status' needs to be accorded to such resources in all States. The Members appreciated the view point.

He informed the Forum that CERC has brought out a Staff Paper on "National Open Access Registry (Technology Solution to Short Term Open Access Process)" to facilitate strengthening implementation of Open Access. The Staff Paper seeks to automate the process for Open Access, which at present is manual and cumbersome. Some States, like AP, have already taken initiative in this direction. The Chairperson urged the Members to implement the same in their respective States.

He informed the Members that during the months of August-September, 2017, a sudden increase in the market clearing prices at the exchange (IEX) was observed. The primary reason for this was the inability of many thermal power plants to generate to full capacity because of coal shortages. Wind generation has declined and hydro generation remained low this season. He stated that the Central Commission has been constantly monitoring the market trends, and, now there are indications that the prices are expected to soften further.

While referring to issue of compliance of RPO by the obligated entities, the Chairperson observed that the level of compliance was not encouraging. He called upon the Regulators to ensure RPO compliance by the obligated entities. He stated that CERC as well as FoR are taking necessary steps for an IT-based web-tool for monitoring compliance of RPO by the obligated entities and the generic tool is ready. This is expected to aid the process of RPO compliance.

Thereafter, the Forum took up the agenda items for consideration.

BUSINESS SESSION

Agenda Item No. 1 Confirmation of Minutes of the 60th Meeting of FoR held on 23.6.2017.

The Forum considered the minutes of the 60th Meeting of Forum of Regulators held on 23.6.2017 at New Delhi and endorsed the minutes.

Agenda Item No. 2 (i) Update on FoR Technical Committee on RE Integration at State level.

Dr. Sushanta K. Chatterjee, Joint Chief (Regulatory Affairs), CERC, made a presentation appraising the Forum about the progress made by the FoR Technical Committee on RE Integration at State Level.

- a. The Technical Committee of Forum of Regulators (FOR) was formed under the Chairmanship of Member CERC, Shri A.S. Bakshi, comprising Technical Members of State Commissions of renewable rich States to facilitate roll-out of Framework on Forecasting, Scheduling and Deviation Settlement of wind & solar generators in RE rich States.
- b. The Committee identified the need for implementation of Scheduling, Accounting, Metering and Settlement of Transactions in Electricity (SAMAST) framework across all States. This is the basic building block for power system operation and must be implemented in all States.

- c. To facilitate the States, a model DPR for implementation of SAMAST was also prepared to seek funds from PSDF. Some States have prepared DPRs and a few more are in progress. The Committee has reiterated the urgency of implementation of SAMAST recommendations in all States.
- d. Model Regulations were brought out for facilitating implementation of State Level Forecasting & Scheduling Framework. Some SERCs have notified Regulations. The Committee has reiterated the urgency of notifying Regulations on Forecasting & Scheduling in the States.
- e. Model Regulations were brought out for facilitating implementation of State-level Deviation Settlement Mechanism (DSM). Some SERCs have notified Regulations and others are yet to take action. Robust system of energy accounting and deviation settlement brings in the desired discipline in market participants in terms of interacting with the grid.
- f. The Committee is working on generic RPO web-tool to facilitate reporting and compliance monitoring of State obligated entities.
- g. The Technical Committee discussed the matter related to Co-operation among States for Optimum Utilization of their Generation Resources, amongst other issues. It has emerged that some of the Regions are predominantly “Surplus” in power, leaving little scope for co-operation within the region. This necessitates a national level framework / product for optimum resource utilization. Various other options for handling load / generation variation were discussed, including (i) Banking; (ii) DAM price on PX as reference; (iii) Pool based on VC as approved by the Regulator and on payment of cost; (iv) Pool based on VC as approved by the Regulator and on payment of MC; (v) Pool based on auction for intra-day for the rest of the day; (vi) Pool based on auction for intra-day on hourly basis; (vii) Pool based on auction for intra-day on intra-hour basis, i.e., for 15 min. block-wise etc. The Committee is still deliberating upon the matter.
- h. The Forum desired the NERPC may also be invited to participate in the deliberations. It was also decided to convene a separate meeting with all NE-States to appraise them of the deliberations of the Committee.

- i. As the latest initiative the Committee is currently discussing the issue related to introduction of 5 Minute Time Block in place of current 15 Minute Time Block operation for scheduling and settlement. The Committee observed that for effective integration of RE, a closer scheduling and settlement period is desirable.
- j. The Committee has recommended inclusion of inter-face meters as part of DPR of SAMAST for financial support FROM PSDF. The Forum observed that presently, hardware and software parts are covered under DPR for funding through PSDF. The inter-face meter is an important component and integral to the whole project facilitating RE integration effectively. The Forum endorsed the proposal of inclusion of inter-face meters as part of DPR of SAMAST for funding through PSDF.
- k. The Technical Committee also recommended constitution of State Power Committees (SPCs), on the lines of Regional Power Committees. The Committee observed that SPCs would act a suitable platform for State level utilities to bring State specific issues for discussion and resolution.

Agenda Item No. 2 (ii)

References from Maharashtra State Electricity Distribution Co. Ltd.(MSEDCL)

- (a) Uniform RE banking policy / provisions for Open Access Consumers**
- (b) Implementation of gross-metering or feed-in tariff over net-metering for roof-top solar RE**
- (c) Merging of solar and non-solar RPO targets**

(a) Uniform RE banking policy / provisions for Open Access Consumers:

MSEDCL, while referring to the discussion held during the Regulators' Meet with the Hon'ble Minister for Power on 22.7.2017 submitted that lack of uniform banking policy for RE generation is causing financial stress to the distribution utilities. It was placed that the demand for power and market price of power are lower during injection of surplus power into the grid by the consumers and the

demand for power and market price of power are higher at the time drawl of banked power from the utility. This results in substantial financial impact on the discoms.

The Forum noted that Periodicity of settlement, credit period and Rate of Purchase of surplus power differ from State to State. It was decided that the concept of banking need be reviewed in the wake of the emerging market realities and roll out of the framework of Forecasting, Scheduling and Deviation Settlement of variable RE, and creation of market products closer to real time. The FoR Working Group on Renewable should deliberate on this and suggest way forward for consideration of FOR.

(b)Implementation of gross-metering or feed-in tariff over net-metering for roof-top solar RE:

MSEDCL submitted that net-metering mechanism leads to shifting of consumers from higher tariff category to a lower tariff category due to installation of solar roof-top and consumption of power so generated. In this context, it was submitted that the Forum may consider evolving model regulations on gross-metering and feed-in-tariff for benefit of utility as well as consumers.

The Forum noted the submission and observed that State Regulators are fully empowered to take decision with regard to adoption of net-metering / gross-metering, while taking the State-specific conditions into consideration. FOR Secretariat should work on the next step to net-metering Report and present suggestions to FOR.

(c) Merging of solar and non-solar RPO targets:

The Forum considered submission for merging of solar and non-solar RPOs into one single RPO target for compliance by the obligated entities. It was observed that there is a significant change in the conditions which necessitated segmentation of RPO targets into solar and non-solar RPOs. The country has witnessed steep

decline in prices of solar power, almost reaching grid parity. Firmness is also likely to increase going forward with better forecasting and development of energy storage etc. The Forum felt that instead of two separate solar RPO and non-solar RPO, a single RPO encompassing all RE sources may be advisable in the light of the emerging market realities.

Agenda Item No. 2 (iii) Model Regulations for Roof-top Solar Photo-Voltaic Systems based on net-metering – Issue of maximum capacity of SPV plants under net-metering – Reference from Punjab State Electricity Regulatory Commission

The Forum noted the issue regarding the limitation of maximum capacity of SPV plants under net-metering and recommended that this aspect should also be considered as part of the study advised on item 2 (ii)(b) above.

Agenda Item No. 2 (iv) Scheduling and dispatch of RE based generation – Practices and dispensation in States.

The Forum noted that the Indian Electricity Grid Code notified by the Central Electricity Regulatory Commission recognized must run status for the RE plants. Several States have also accorded the similar status to RE plants in their regulations. The Forum resolved that this principle should be adopted universally across States.

Agenda Item No. 3 (i) Mechanism for incentivizing hydro for meeting peak load.

The Forum was appraised that the FoR Technical Committee has finalized Model Regulations on “Tariff Determination and Other Related Matters for Intra-State Hydro Generating Stations”. The Technical Committee observed that the hydro generators need to be given a commercial signal which drives them to give peak support.

Shri S.K. Soonee, Adviser, POSOCO made a detailed presentation (copy enclosed as **Annexure-II**) on the Model Regulations.

1. Most of the CERC regulated hydro generators and some State owned and other hydro units where the hydro tariff is two part with capacity charge linked to plant availability factor and peaking support are providing better peaking (100 - 110%).
2. It was further observed that in most of the cases, the hydro stations with single part tariff and where the peaking capability is not factored in their tariff, are providing lower peaking support.
3. In this context, the draft Model Regulations on “Tariff Determination and Other Related Matters for Intra-State Hydro Generating Stations” were evolved and approved by the FoR Technical Committee.
4. The Draft Model Regulations prescribed for recovery of tariff in two parts, i.e., 50% through capacity charge linked to 85-90% of annual availability and the remaining 50% through energy charge linked to design energy.
5. In order to promote flexibility, RoE is prescribed to be linked with peaking / FGMO / black-start / synchronous condenser facility etc., besides providing higher RoE for storage / pondage type hydro generation.

Discussion & Consensus:

The Forum deliberated upon the draft Model Regulations and felt that the hydro generation needs to be promoted for bringing in flexibility to facilitate effective RE integration. The Forum endorsed in principle the draft Model Regulations on “Tariff Determination and Other Related Matters for Intra-State Hydro Generating Stations”, with the suggestion that comments on the drafting of the Regulations, if any be provided by SERCs to FOR Secretariat within a month following which it will be placed on the website of FOR.

Agenda Item No. 3 (ii)**Status of implementation of technical minimum schedule for operation of generating stations in States – Reference form Gujarat Electricity Regulatory Commission.**

Chairperson, GERC, detailed the challenges owing to RE integration being faced by RE rich States, observed that in order to accommodate variable RE generation, certain coal based generating plants could back-down upto 65% without oil support. Going further below, oil support is necessitated to run the generating units leading to an additional cost of Rs. 0.30 – Rs. 0.35 per unit. He requested the Members to share the practices being followed by them in this regard and the quantified norms, if any.

In this context, the Forum observed that RE generation by nature is intermittent, uncertain and variable. While considering these aspects and in order to facilitate integration of RE generation in the grid, the thermal generation need be kept flexible enough to respond to the needs of variation in RE generation and demand. The Central Electricity Regulatory Commission, taking the above into consideration, has amended the Indian Electricity Grid Code (IEGC) through the fourth amendment, providing for technical minimum of 55% in case of thermal generating units with corresponding compensation mechanism for deterioration of heat rate, aux energy consumption and oil support in excess of normative parameters.

The Forum was informed that if the plant operates at 55% PLF, an additional increase in cost to the tune of 6% on account of SHR and 1% on account of auxiliary consumption, i.e., a total of 7% increase in energy charge at the most. The Forum noted the projections, and agreed that the SERCs should frame suitable regulations to induce flexibility in thermal plants with appropriate incentive and disincentive.

Agenda Item No. 4 (i)**Jurisdiction of Commission on the Orders of GRFs and Ombudsman – Reference from Odisha Electricity Regulatory Commission.**

The Forum considered the reference brought by Odisha Electricity Regulatory Commission (OERC) regarding lack of provisions for consumers to appeal before the SERC against the Order of the Ombudsman. It was also brought before the Forum that in some cases, even though it appears to the Commission that the decisions of the GRF/Ombudsman are erroneous, the SERCs unable to take up the matters in view of the judgements of APTEL and Apex Court. In this regard, the Forum observed that the provisions currently available under the Electricity Act, 2003 facilitates constitution of consumer grievance redressal forum and the institution of Ombudsman to act as platforms for easy and quick disposal of consumer grievances. The SERCs / JERCs have the mandate to specify the complete framework as well as methodology for redressal of grievance and several SERCs have notified Regulations facilitating with detailed framework.

Agenda Item No. 4 (ii)**Tariff & related issues – Reference from Uttar Pradesh Electricity Regulatory Commission.**

Uttar Pradesh Electricity Regulatory Commission forwarded the status and the set of measures taken by them in tariff and other related areas. Status was with respect to UDAY targets, ACS-ARR gap, Power Purchase Cost, RPO targets, AT&C Loss levels, Regulatory Assets, Implementation of IT, ERP systems etc. The Forum noted the status.

Agenda Item No. 5 (i)**Action to be taken by States to define a framework (including setting a threshold limit) for developing intra-State transmission projects on competitive basis.**

The FoR Secretariat updated the Forum that as per provisions of the revised Tariff Policy notified by the Central Government, development of intra-State transmission projects is to be carried out by the State Government through competitive bidding process for projects costing above a threshold limit decided by

the SERCs. In this regard, it was placed before the Forum that in some States, development of State-level transmission projects was carried out through tariff based competitive bidding (TBCB) route and in some States, the conventional route of EPC based contracting is reportedly followed. Further, SERCs have not determined the threshold limit of the projects to be considered under TBCB route.

The Forum observed that in order to encourage transparency and efficiency in project costs, threshold limit for intra-State transmission projects is required to be determined by the SERCs as provided for in the Tariff Policy. Therefore, the Forum urged the Members to determine the threshold limit for their respective State-level transmission projects, while taking all relevant parameters of their State into consideration.

Agenda Item No. 5 (ii)	Evolve rates of depreciation for distribution assets by suitably modifying the depreciation rates for generation and transmission assets evolved by CERC.
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The FoR Secretariat placed before the Forum that the Revised Tariff Policy, 2016, provides for notification of rates of depreciation in respect of generation and transmission assets by the Central Electricity Regulatory Commission. Vide the same clause, it was also provided for the Forum of Regulators to evolve rates of depreciation for distribution assets with appropriate modification to the rates notified by the CERC. It was brought out that several State Electricity Regulatory Commissions have already specified the principles / rates of depreciation for distribution assets and different principles for determination of depreciation of distribution assets have been adopted by different SERCs.

The Forum, while observing that different principles were adopted by different SERCs lacking uniformity and also underscored the need to adhere to the provisions of the Revised Tariff Policy. The Forum authorized Chairperson, CERC / FoR to constitute a Working Group, which may examine the issue and evolve appropriate draft guidelines on determination of principles / rates for distribution

assets for consideration of the Forum.

Agenda Item No. 5 (iii) Evolve model guidelines for operating norms for distribution networks for notification by SERCs.

The FoR Secretariat placed before the Forum that the Revised Tariff Policy, 2016 provides for notification of operating norms for distribution networks by the State Electricity Regulatory Commissions. Vide the same clause, it was also provided for the Forum of Regulators to evolve model guidelines taking the State specific distinctive features into consideration. In this context, it was informed that the Central Electricity Regulatory Commission notified norms of operation for transmission system as part of the Tariff Regulations for FY 2014-19, which provides for 'Normative Annual Transmission System Availability Factor (NATAF)' and 'Auxiliary Energy Consumption in the Sub-Station (AC System & HVDC Sub-Station)'. Further, recovery of fixed cost of the transmission system is linked to the availability of transmission system, which also includes an incentive / disincentive mechanism.

It was also brought before the Forum that the Forum of Regulators has also examined the issues of network availability and supply availability as part of its study on 'Evolving an Appropriate Model for Distribution Margin' published in March, 2009. The report recommended for measuring 'Network Availability' in percentage terms over the course of a month / year 'Supply Availability' under two components, i.e., Base Load Supply Availability and Peak Load Supply Availability.

The Forum noted that while determination of distribution norms is an important aspect, power quality also assumes greater importance and forms integral to the distribution norms. Power quality is chiefly critical owing to sudden surge of pollution and noise in the system in the form of harmonics and spikes in voltage arising out of increasing use of LEDs and other electronic equipment. Therefore, the Forum decided that the issues related to guidelines for determination of

distribution norms may be dovetailed with the recommendations of the Working Group on Power Quality.

Agenda Item No. 6

Review of maximum ceiling of 1MW under roof-top solar grid interactive system based on net-metering – Reference from Bihar Electricity Regulatory Commission

This issue is similar to item no.2 (iii) and the decision therein will apply to this as well.

Agenda Item No. 7

Status of Indian Railways as ‘Deemed Licensee’ under the Electricity Act, 2003 and compliance of licensee obligations – Reference from Maharashtra Electricity Regulatory Commission.

The Maharashtra Electricity Regulatory Commission brought the issue of non-compliance of licensee obligations by the Indian Railways (a deemed licensee), before the Forum for discussion.

Several other Members also observed that Indian Railways is not adhering to the responsibilities as mandated under the Electricity Act, 2003. In this context, the Forum felt that Indian Railways has the obligation to comply with all necessary obligations of a licensee under the Electricity Act. The Forum authorised Chairperson, CERC / FoR to take up the matter with Ministry of Power / Ministry of Railways.

Agenda Item No. 8

Any other item with the permission of the Chair

Approach to be adopted by the Task Force on NE States.

The Chairperson, CERC / FoR has constituted a Task Force on North Eastern States, under the Chairmanship of Shri Anand Kumar, Chairperson, GERC and

Chairpersons of all SERCs / JERCs of north eastern region, MERC, TNERC and HPERC as its Members. The Chairperson, CERC / FoR observed that the mandate given to the Task Force assumes importance as recommendations would facilitate the Forum to suggest the necessary policy and regulatory initiatives for sectoral development in north eastern region.

The Chairman, Task Force on NE States, informed the Forum that the kick-off meeting will be held shortly at CERC, New Delhi, where a detailed action plan will be drawn. Based on the action plan, the Task Force will complete its task and bring its recommendations to the Forum for further discussion.

On conclusion of the meeting, Chairperson, CERC / FOR thanked the Chairperson, Members and staff of the Tamil Nadu Electricity Regulatory Commission (TNERC) for their painstaking efforts to host the 61st Meeting of "FOR" at Chennai. He conveyed to the Members of Forum that the next "FOR" Meeting will be held in New Delhi.

Secretary, CERC thanked the staff of “FOR” Secretariat for their arduous efforts in organizing the meeting.

The meeting ended with a vote of thanks to the Chair.

**LIST OF PARTICIPANTS ATTENDED THE 61ST MEETING
OF**

FORUM OF REGULATORS (FOR)

HELD ON 22ND SEPTEMBER, 2017 AT CHENNAI (TAMIL NADU).

S. No.	NAME	ERC
1.	Shri Gireesh B. Pradhan Chairperson	CERC – in Chair.
2.	Shri R.P. Singh Chairperson	APSERC
3.	Shri Naba Kumar Das Chairperson	AERC
4.	Shri Narayan Singh Chairperson	CSERC
5.	Shri Anand Kumar Chairperson	GERC
6.	Shri S.K.B.S. Negi Chairperson	HPERC
7.	Dr. Arbind Prasad Chairperson	JSERC
8.	Shri M.K. Goel Chairperson	JERC for State of Goa & UTs
9.	Shri M.K. Shankaralinge Gowda Chairperson	KERC
10.	Dr. Dev Raj Birdi Chairperson	MPERC
11.	Shri U.N. Behera Chairperson	OERC
12.	Ms. Kusumjit Sidhu Chairperson	PSERC
13.	Shri Vishwanath Hiremath Chairperson	RERC
14.	Shri Nanda Ram Bhattarai Chairperson	SSERC
15.	Shri S. Akshayakumar Chairperson	TNERC

16.	Mr. Ismail Ali Khan Chairperson	TSERC
17.	Shri Subhash Kumar Chairperson	UERC
18.	Shri R.N. Sen Chairperson	WBERC
19.	Shri B.P. Singh Member	DERC
20.	Shri K. Vikraman Nair Member	KSERC
21.	Shri Deepak Lad Member	MERC
22.	Shri Sanoj Kumar Jha Secretary	CERC/FOR
23.	Dr. Sushanta K. Chatterjee Joint Chief (RA)	CERC
SPECIAL INVITEES		
24.	Shri A.K. Singhal Member	CERC
25.	Shri A.S. Bakshi Member	CERC
26.	Dr. M.K. Iyer Member	CERC

Update on Technical Committee of FOR for Implementation of Framework on Renewables at the State Level



SEPTEMBER 22ND, 2017

61ST FOR MEETING

CHENNAI

FOR Technical Committee on Implementation of Framework on Renewables at State level



- Committee formed under chairmanship of Member CERC, Shri A.S. Bakshi
- Comprises Technical Members of State Commissions of RE rich states, viz.
 - Andhra Pradesh, Gujarat, Karnataka, Maharashtra, Rajasthan, Tamil Nadu, Telangana
- Committee's mandate is to ensure timely action by States on:
 - Deployment of Framework on Forecasting, Scheduling and Deviation Settlement of wind & solar generators;
 - Implementation of Availability Based Tariff (ABT) framework;
 - Introduction of Ancillary Services and Reserves;
 - Implementation of Automatic Generation Control (AGC) and primary control
- Mandate further expanded by FoR

Key Initiatives and Progress achieved by the Technical Committee

3

1. Implementation of Scheduling, Accounting, Metering and Settlement of Transactions in Electricity (SAMAST)
2. Implementation of State Level Forecasting and Scheduling Framework
3. Model Deviation Settlement Mechanism (DSM) Regulations
4. Development of RPO Web-tool
5. Regional Co-operation for Optimum Utilization of Generation Resources
6. Introduction of 5 Minute Time Block

(1) SAMAST: Scheduling, Accounting, Metering and Settlement of Transactions in Electricity (SAMAST) Report

4

- Sub-Committee constituted at 2nd meeting of Technical Committee
 - Survey of prevailing infrastructure and procedures in 28 States, one-on-one interaction with SLDCs of 13 States
- SAMAST is the building block for advancing States towards intra-state grid discipline, smooth inter-State transactions, integration of renewables, etc.
- SAMAST report encompasses following requirements for implementation:
 - Hardware, including metering
 - IT infrastructure
 - Communication systems
 - Energy Accounting system and Settlement procedures
 - State Regulatory Pool Account
 - Human resources
 - Governance structures

Update on implementation of SAMAST

5

- Model DPR and Model Implementation Roadmap shared
- FOR endorsed the 'Report on SAMAST' at its 55th meeting on 22nd July, 2016
- So far **only 4 States**, Andhra Pradesh, Madhya Pradesh, Tamil Nadu and Telangana have prepared DPR as outlined in the SAMAST Report
- Haryana, Karnataka, Odisha, Punjab and West Bengal are in the process of preparing DPR
- Part funding shall be sought from Power System Development Fund (PSDF)
- Technical Committee urges ALL states to create:
 - A State Power Committee, on the lines of National Power Committee, for driving implementation of SAMAST
 - A small group to oversee/guide the implementation, comprising representatives from SLDC, concerned RLDC and RPC

(2) Implementation of State level Forecasting & Scheduling Framework

6

- FOR endorsed Model Regulations for State Level Forecasting & Scheduling Framework, as prepared by FOR Secretariat, at the 50th FOR Meeting (30.9.15)
- Eight SERCs notified final Regulations (Andhra Pradesh, Chhattisgarh, Jharkhand, Karnataka, Rajasthan, Tripura, Uttarakhand and JERC (M&M))
- Four SERCs notified draft Regulations (Gujarat, Madhya Pradesh, Odisha, Rajasthan and Tamil Nadu)
- Key aspects:
 - Qualified Coordinating Agency (QCA)
 - Operationalization of Virtual Pool and de-pooling mechanism
 - Funding the deficit in State Imbalance Pool
 - Mechanism for DSM for inter-state transactions of embedded entities
 - Metering arrangement

(3) Model Deviation Settlement Mechanism (DSM) Regulations

7

- To facilitate scheduling, energy accounting and deviation settlement of **all grid-connected entities** (buyers & sellers), while ensuring **intra-state grid discipline**
- Model Regulations agreed in principle at the 8th meeting of the Committee held on 2nd Dec 2016
- Thereafter, FOR endorsed the Regulations at its 57th Meeting held in Raipur on 16th Dec 2016. Regulations now available on the FoR website:
http://www.forumofregulators.gov.in/Data/Working_Groups/DSMR.pdf
- Status update:
 - Final DSM Regulations notified by Andhra Pradesh, Chhatisgarh, Rajasthan and Uttarakhand
 - Draft DSM Regulations brought out by Madhya Pradesh, Karnataka, Gujarat, Tamil Nadu and Odisha

(4) Development of RPO Web-tool

8

- RPO compliance monitoring Web tool developed for Rajasthan, under USAID/PACE-D programme- presented to FOR in Nov 2016
- FOR referred to Technical Committee for scaling up and generalisation of the Web tool for other States
- **Generic Web Tool for RPO reporting and compliance now ready; in process of implementing in Gujarat**
- M/s TERI developed an IT portal (based on directions of MNRE) to facilitate as a centralized platform
- Representatives of MNRE, FOR Consultant (Idam) & TERI met
- **Both tools complement each other and modalities of integration of data from Generic RPO web-tool to TERI portal finalized**
- All SERCs are requested to mandatorily implement RPO web-tool while making amendments, if any, to relevant Regulations

(5) Regional Cooperation for Optimum Utilization of Generation Resources

9

- Increasing penetration of VRE needs sharing of generation resources across States for balancing purposes
- Sub-group constituted comprising of stakeholders from Northern, Western and Southern Region, headed by Member Secretaries of respective RPCs
- Meetings of sub-groups in NRPC, WRPC, SRPC held. Meeting of Representatives of Sub-Groups was held under Chairmanship of Shri A.S.Bakshi, Member, CERC and during the meeting it emerged that
 - **Recognized the 'value of electricity resource' vis-a-vis 'cost of generation'**
 - **Some States not willing to cooperate on 'cost' basis**
 - **As some Regions are 'surplus' - little scope for cooperation within the State**
 - **This necessitates national level framework / product for optimum resource utilization**
- Various other options for handling load / generation variation also discussed
 - **Banking**
 - **DAM price on PX as reference**
 - **Pool based on VC as approved by the Regulator and on payment of cost**
 - **Pool based on VC as approved by the Regulator and on payment of MC**
 - **Pool based on auction for intra-day for the rest of the day**
 - **Pool based on auction for intra-day on hourly basis**
 - **Pool based on auction for intra-day on intra-hour basis i.e for 15 min. block-wise etc.**

(6) Introduction of 5-minute Time Block

10

- Tertiary reserves ancillary services implemented at ISTS level - actions at power plant happen 16-30 mins after instruction by NLDC
- Secondary regulation services through Automatic Generation Control (AGC) soon expected- necessitates moving to 5-minute settlement (atleast for plants under AGC)
- 5-minute scheduling and settlement offers many advantages- reduction of requirement of reserves, more accurate ramping estimates, creating value for flexibility, lowering of overall system costs, etc.
- Sub-group constituted comprising CEA, CTU, RPCs, POSOCO and CERC- to prepare a roadmap for implementation (including requirements for infrastructure, standards and regulations)
- Sub-Group held its meetings. It was decided that
 - **RPCs may discuss 5-minute scheduling and settlement**
 - **Meter manufacturers to demonstrate implementation using the existing models / versions of meters**

THANK YOU

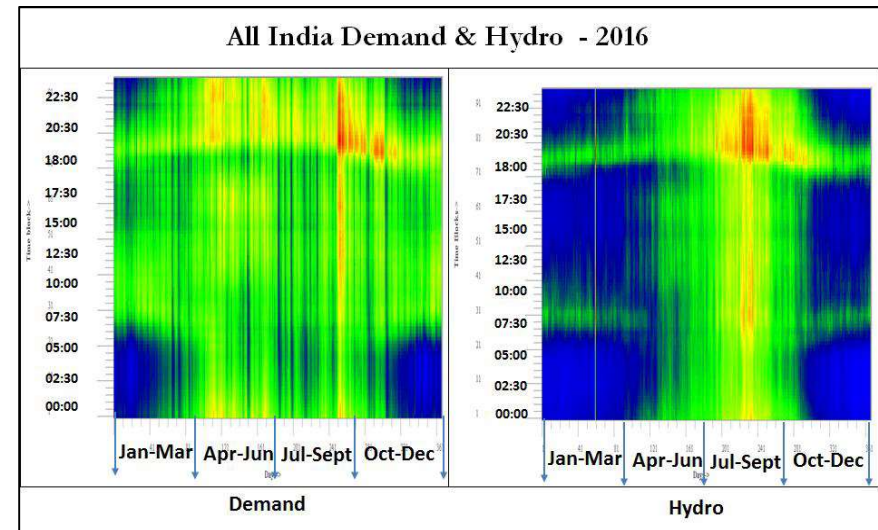


Agenda Item No: 3(i) Incentivizing Hydro For Meeting Peak Load

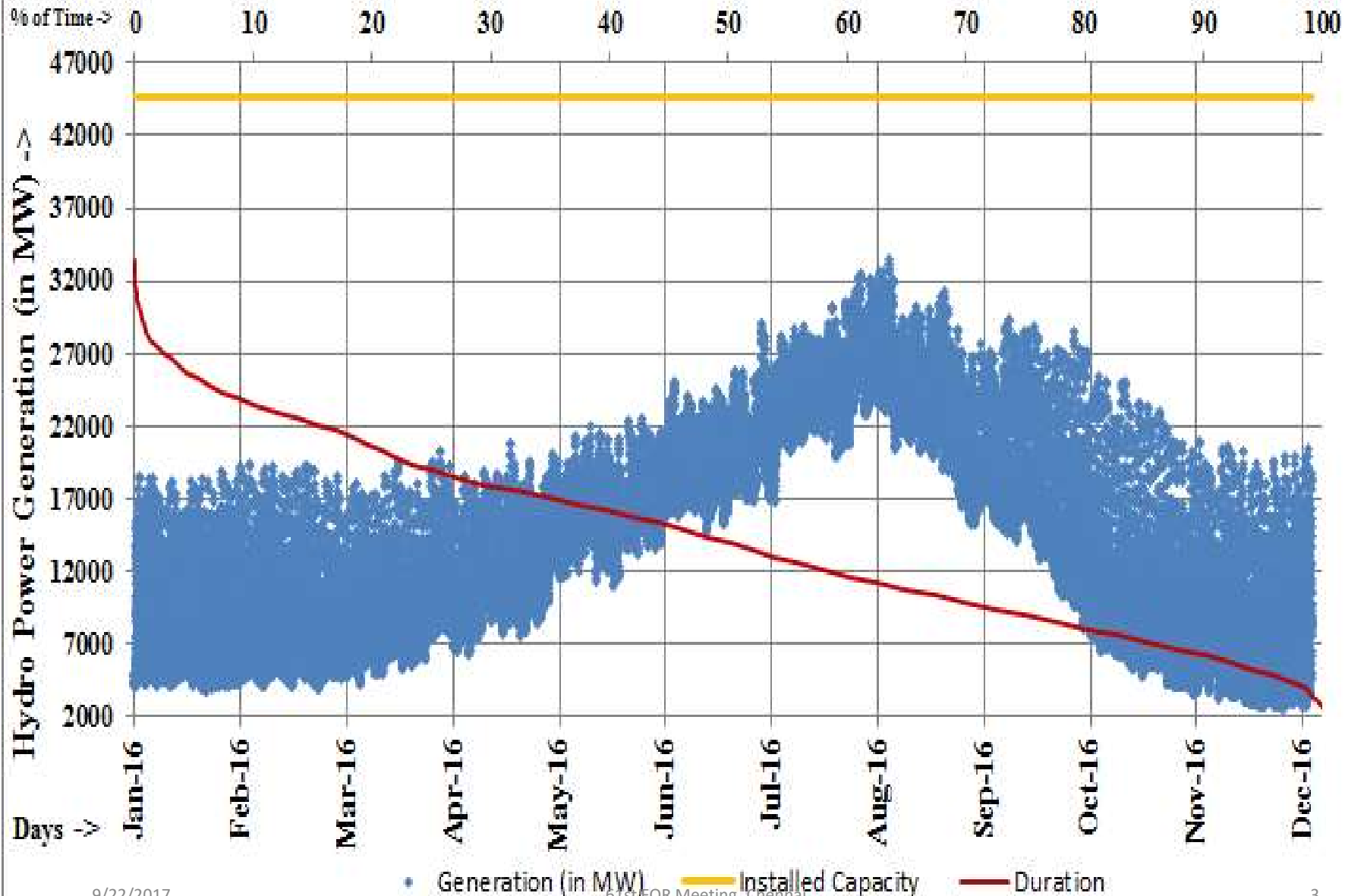
61st Forum of Regulators Meet, Chennai
22-Sep-2017

Motivation

- **Sub optimal operation of some hydro generators**
 - Scope for optimization & flexible operation along with economic gains
 - Requirement of flexibility in view of large scale Renewable Integration
 - SAMAST - Need for multi-part hydro tariff, incentive for flexible Gen.
- **Hydro Power - a source of flexibility & reliability**
 - Overload capability
 - Peaking support
 - Fast ramping
 - Primary Response
 - Voltage Regulation
 - Black Start Capability
- **Constitution of FOLD Working Group**



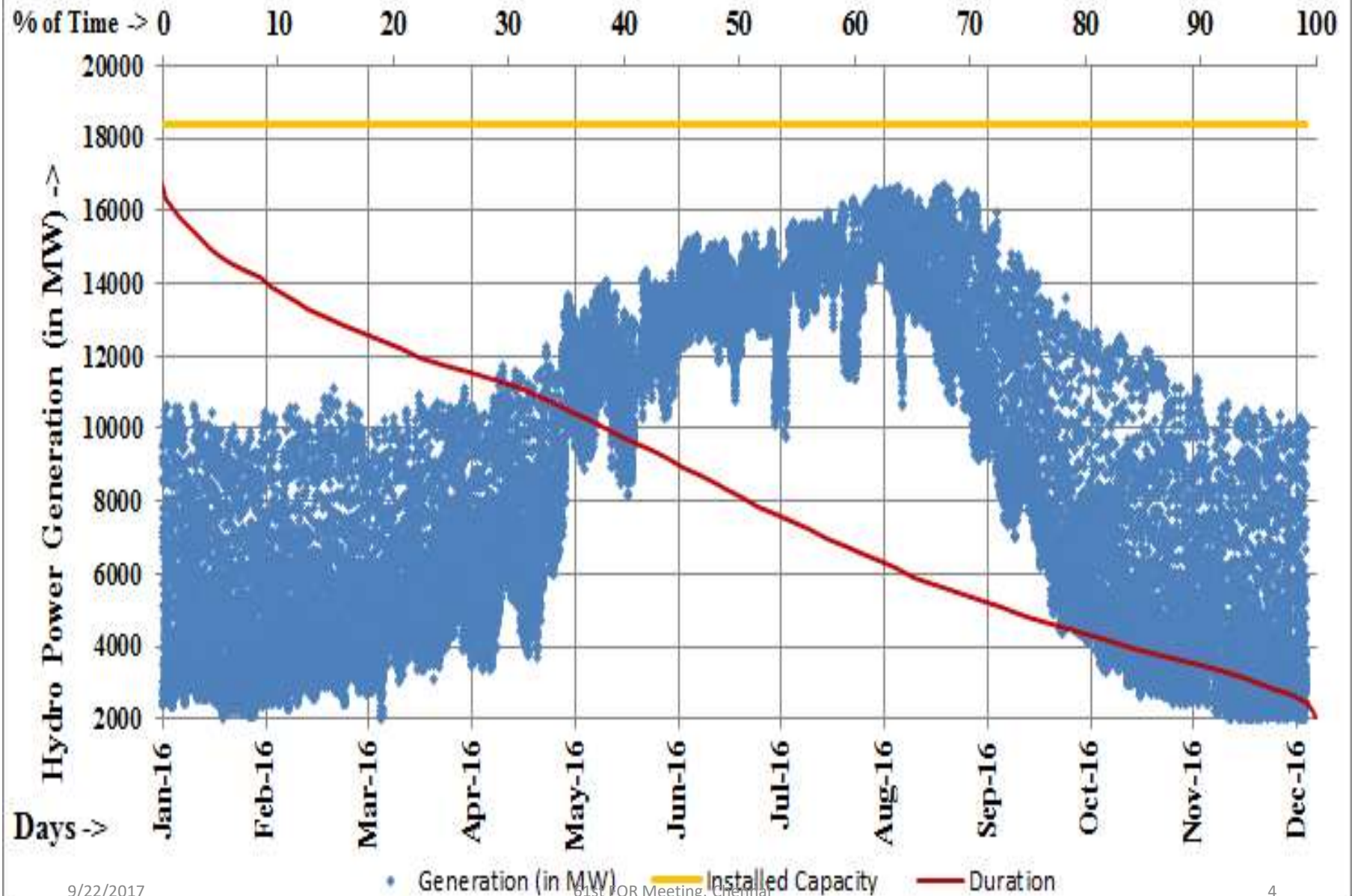
All India Hydro -44627 MW



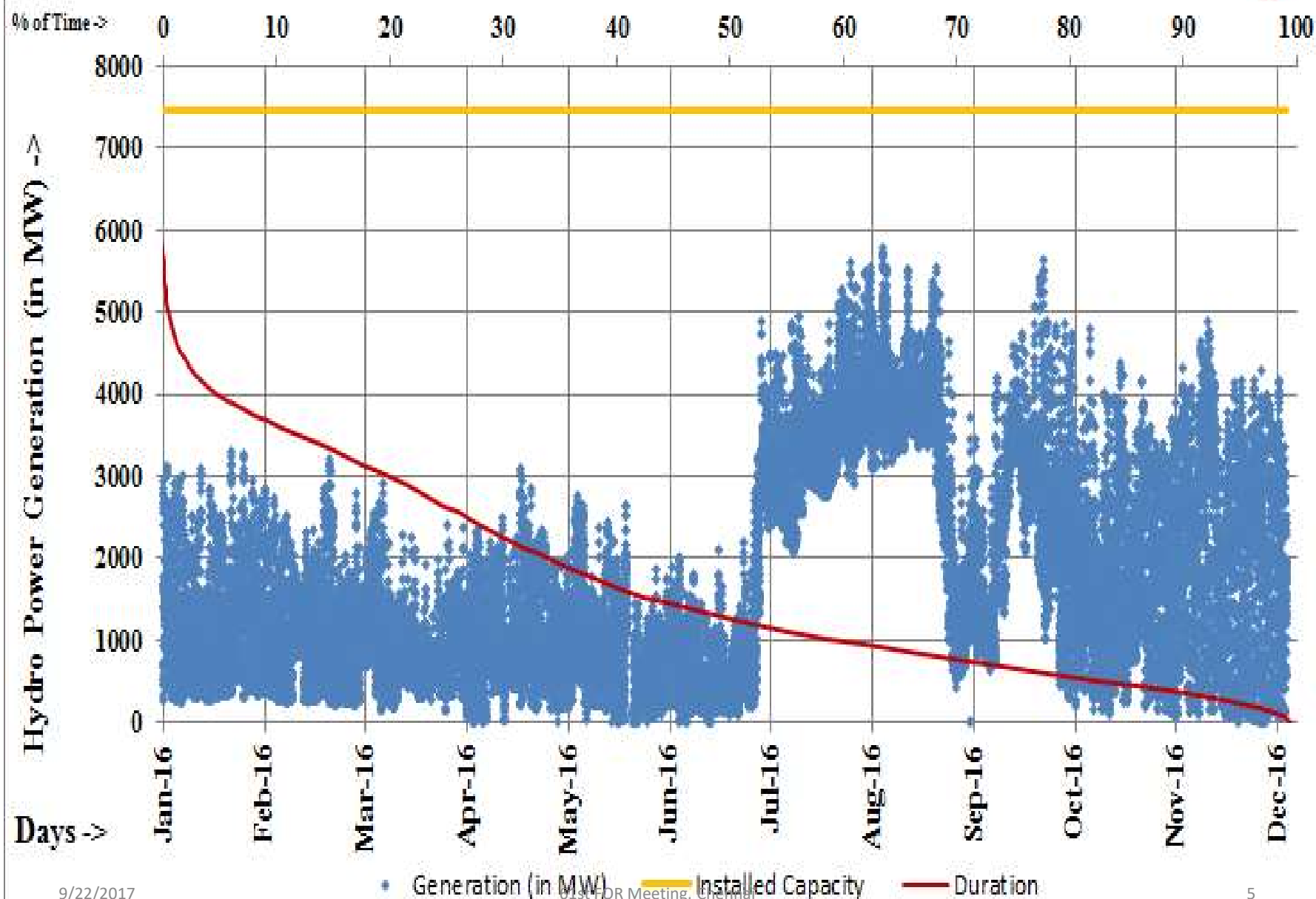
9/22/2017

61st FOR Meeting, Chennai

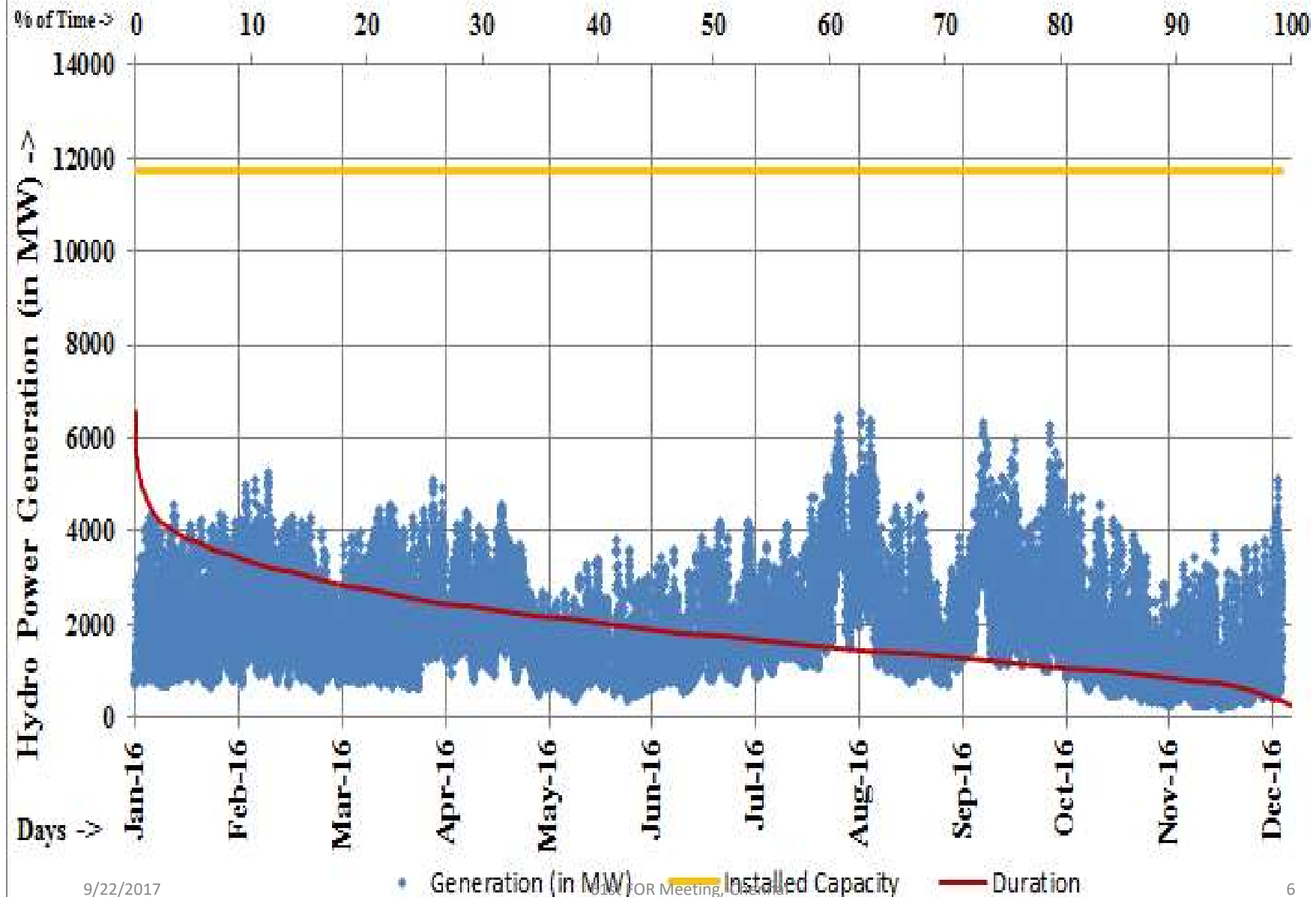
Northern Region Hydro -18383 MW



Western Region Hydro -7448 MW



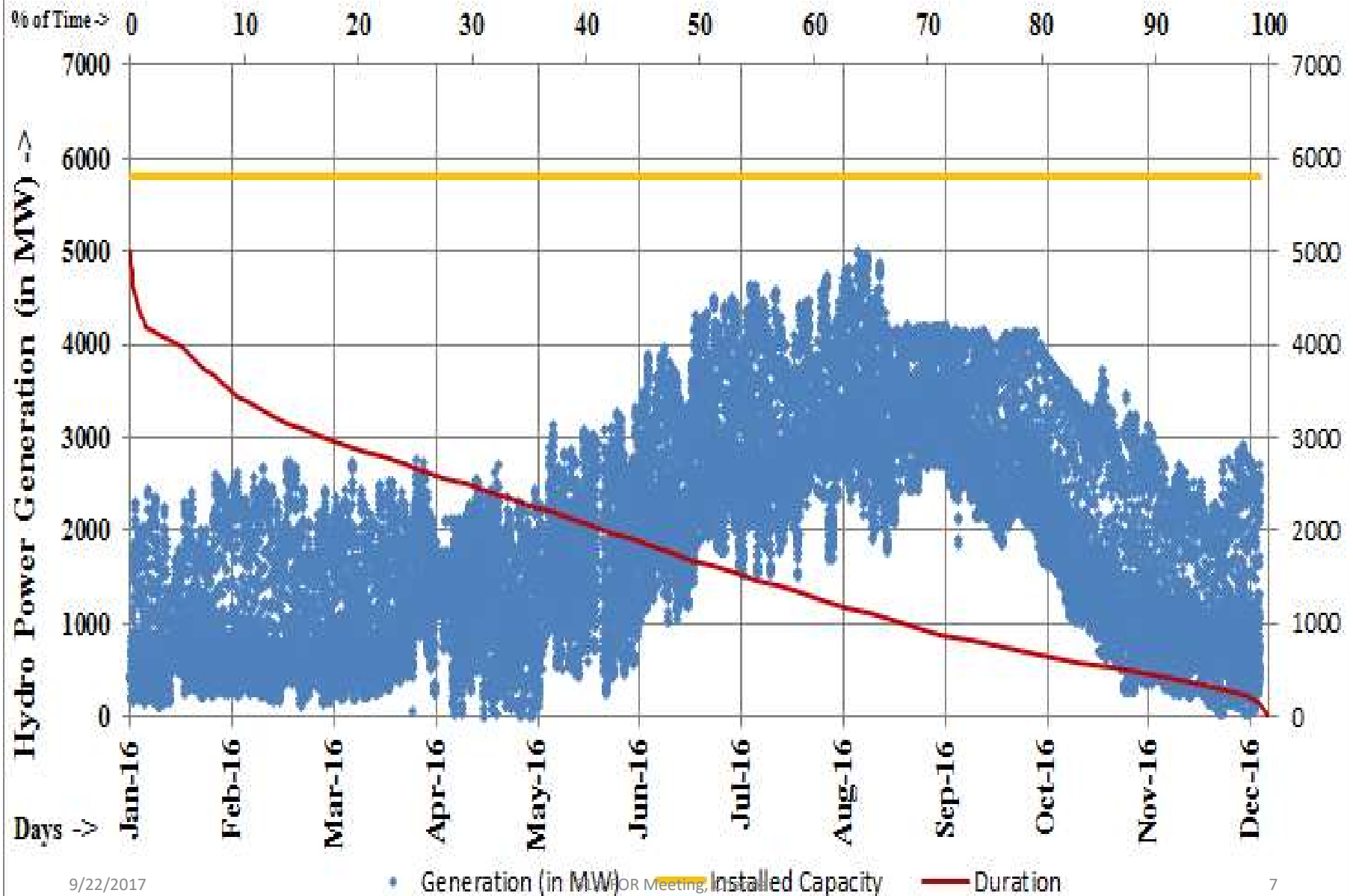
Southern Region Hydro -11740 MW



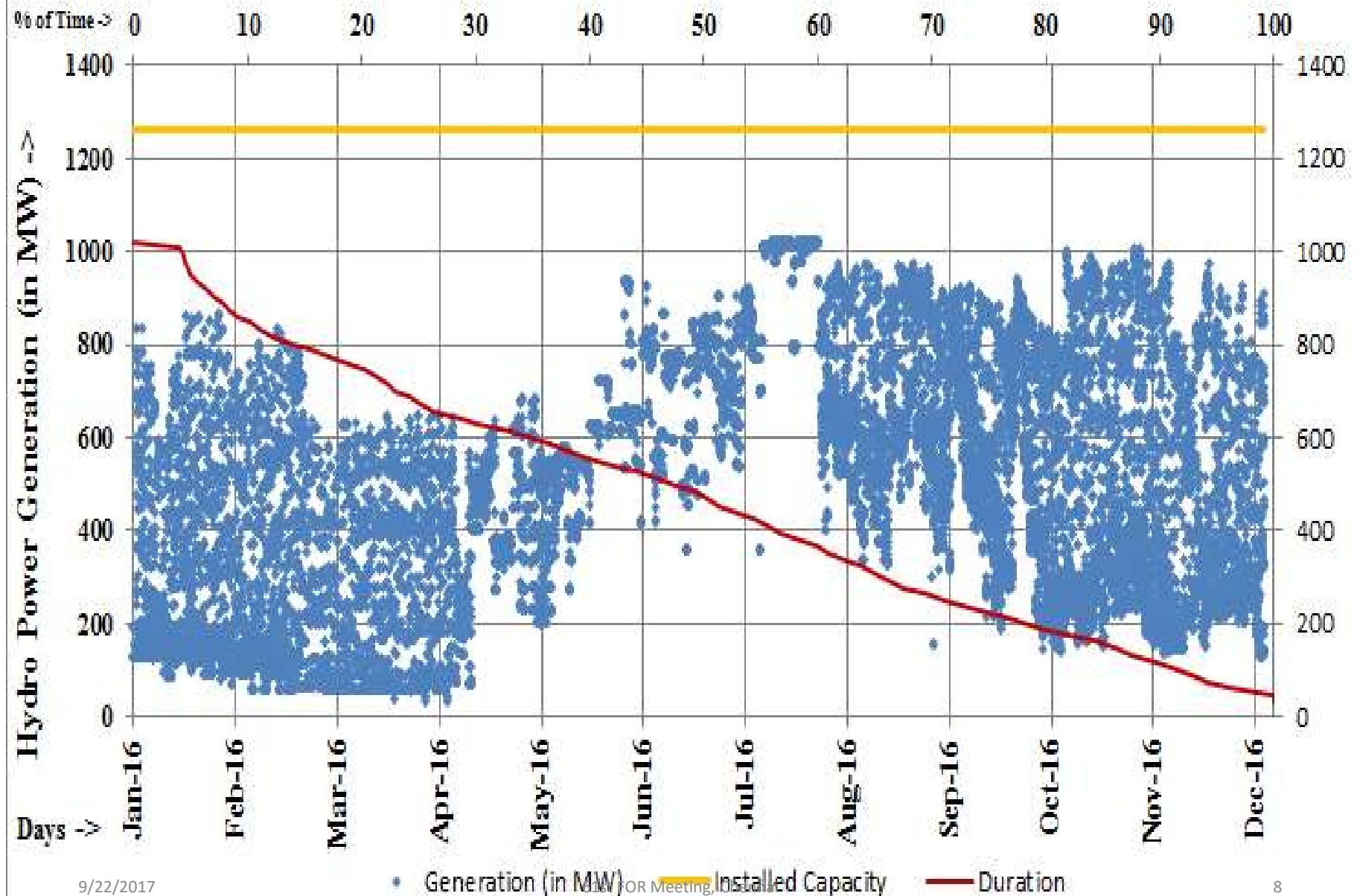
9/22/2017

FOR Meeting, Dec-16

Eastern Region Hydro -5794 MW



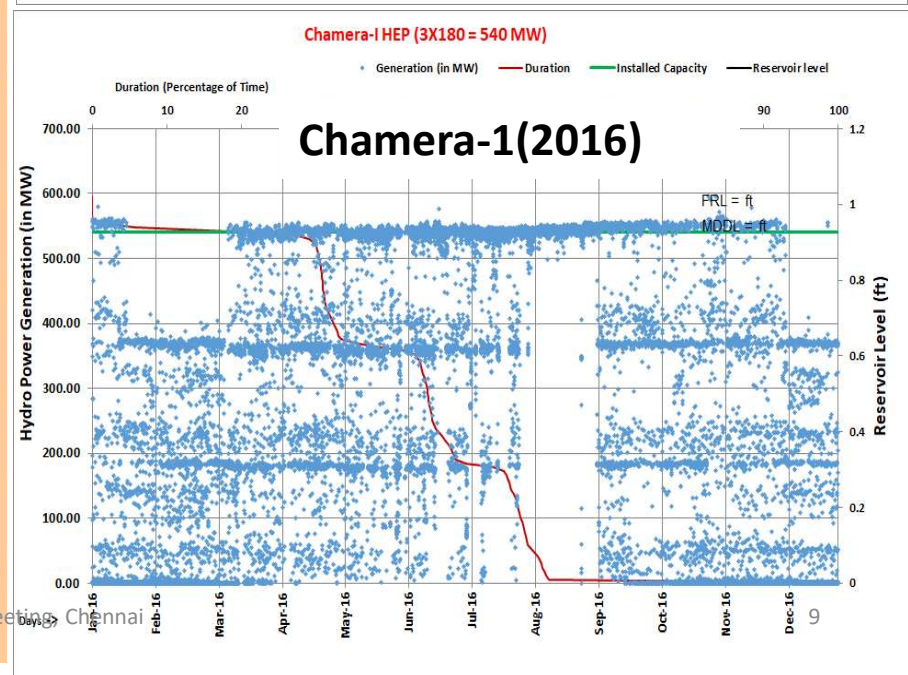
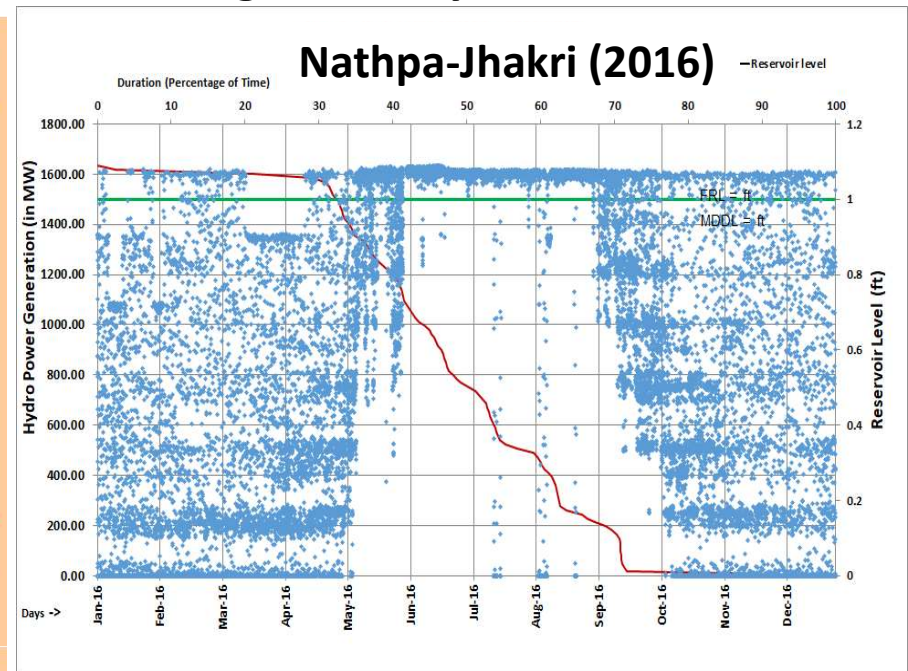
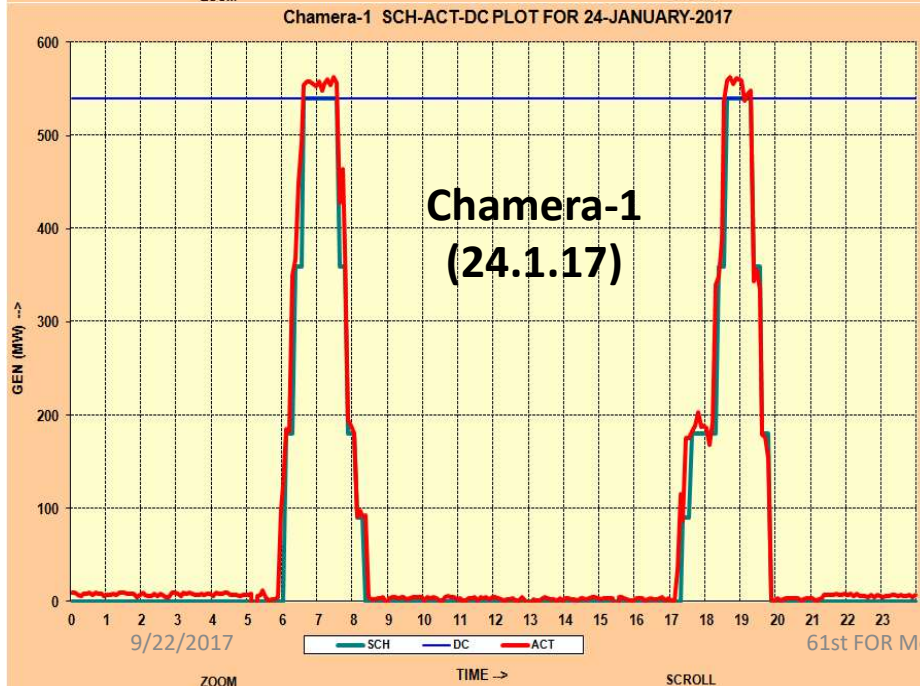
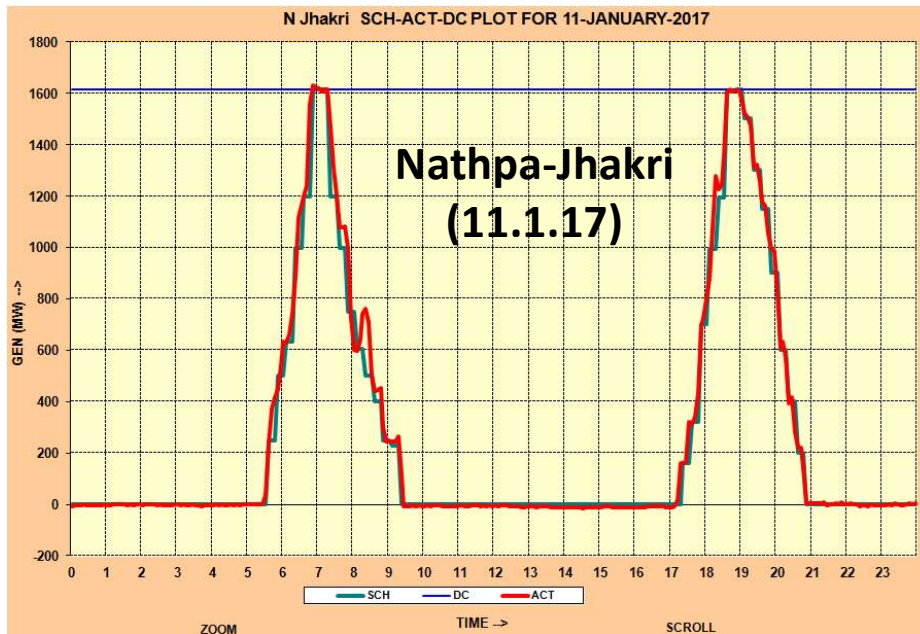
North-eastern Region Hydro -1262 MW



9/22/2017

FOR Meeting, Delhi

Illustration - Peaking Support from CERC Regulated Hydro Stations



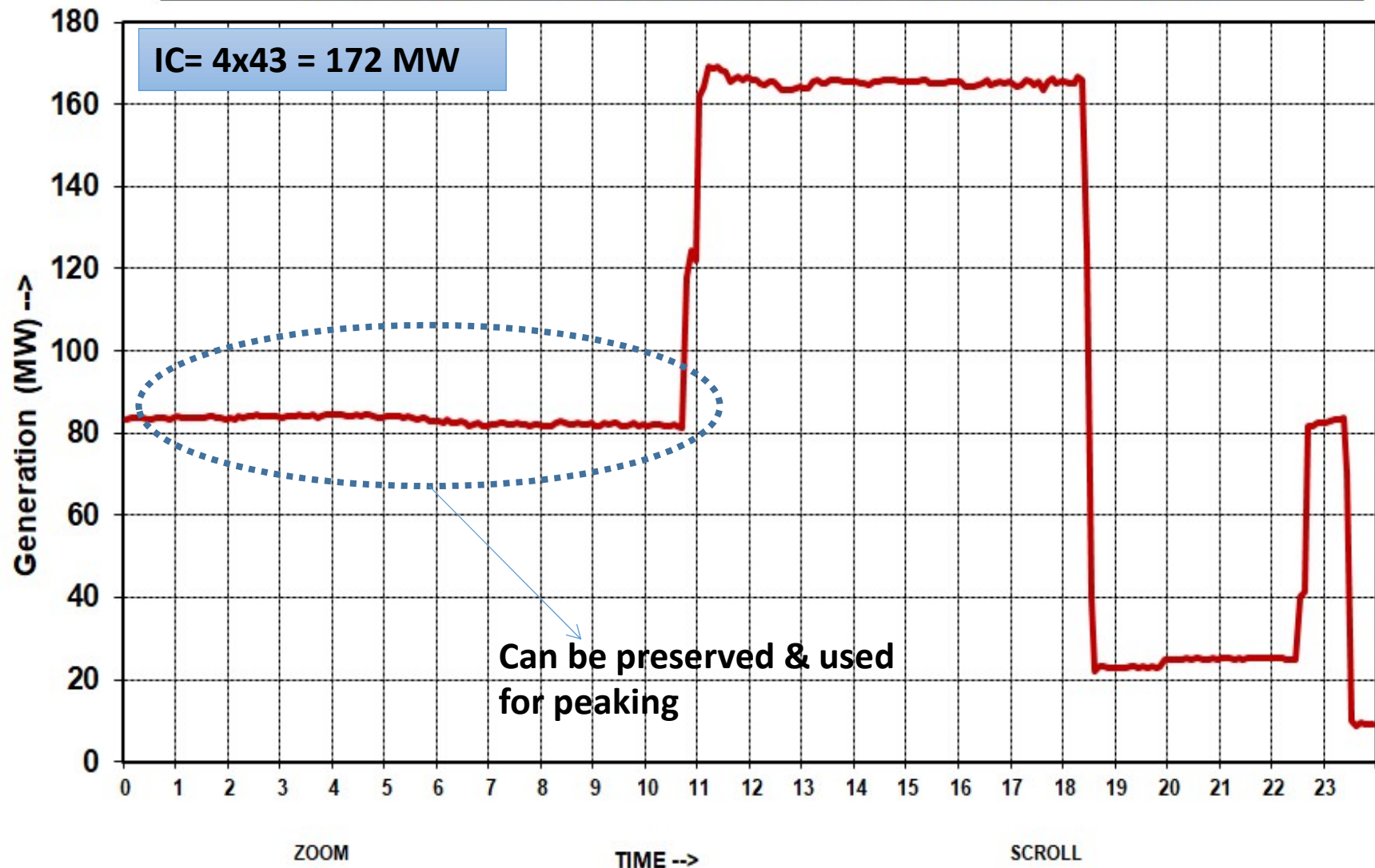
9/22/2017

61st FOR Meeting Chennai

Illustration: Performance of State-Hydro Stations

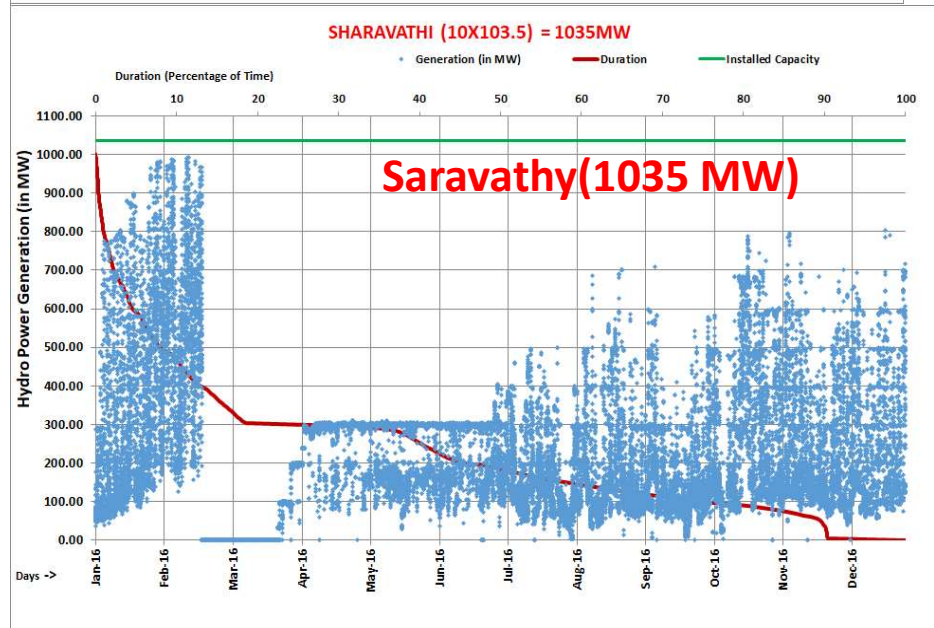
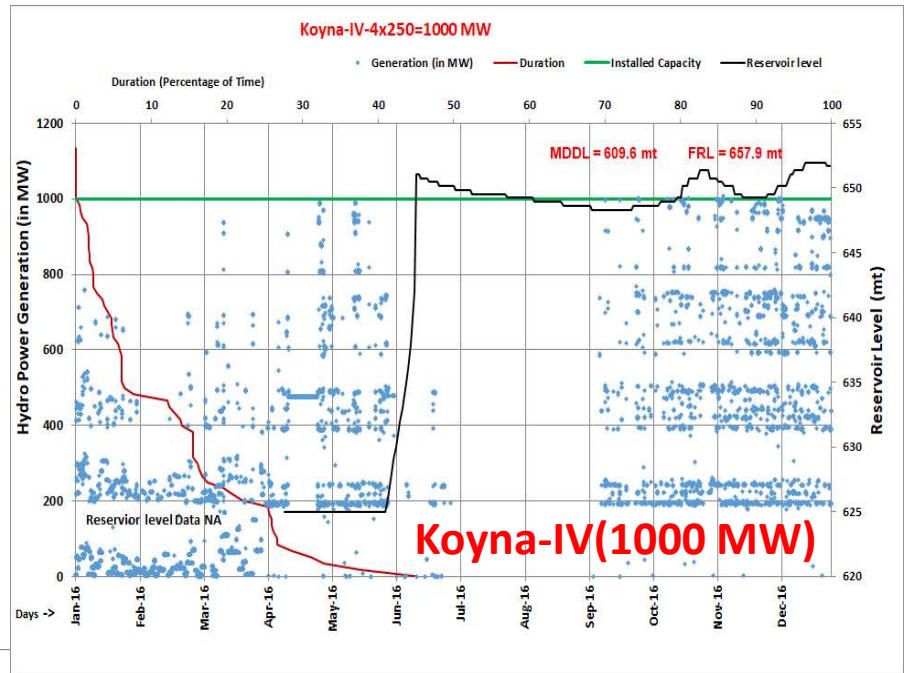
Generation Pattern of Ranapratapsagar(H) for 29-January-2017

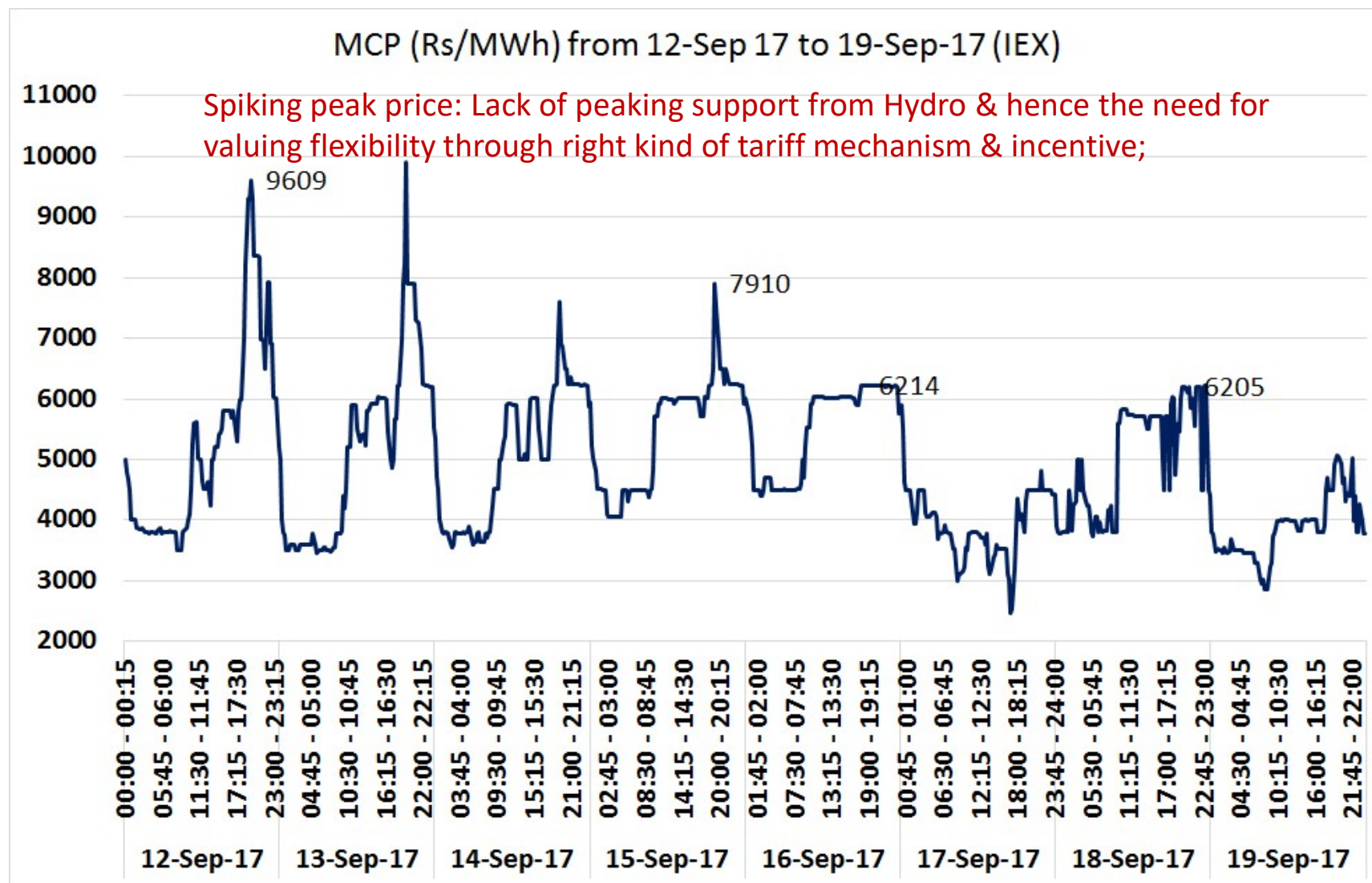
Generation --> Max: 169 MW Min: 9 MW Avg : 97 MW



With a given MWh & water release, 2-part Tariff encourages better scheduling for meeting peak-load, instead of utilizing the energy for base-load.

Peaking from State Hydro Units : Scope for additional peaking – through tariff design & incentive schemes





Terms of Reference(ToR) of FOLD Working Group on Hydro:

1. To study,
 - existing capability of hydro stations in states and Inter-state level
 - tariff and operating norms for hydro stations
 - Prevailing practices for scheduling and utilization of available capabilities
 - Constraints w.r.t. Inflows, hydrology, water release, reservoir depletion, machine capability etc.
2. To explore scope for utilizing available hydro stations as a **flexible resource**:
 - for Peaking, Ramping, Load following
 - Primary response,
 - secondary control (AGC),
 - Pumped storage,
 - reactive energy support,
 - Black-start etc.
3. To explore scope for **integrated operation** of intra-basin hydro stations
4. To study the existing **communication facility** of HPS with control centers.
5. To suggest possible **mechanisms and regulatory interventions** for optimizing utilization of existing hydro capabilities without violating the identified constraints.
6. Any other related matter.

The Process

Survey of hydro power stations

- 35 GW (79%) out of 44.5 GW
- 149 hydro stations
- 486 generating units

Consultation with hydro generators / State Load Despatch Centres

- Appreciation of constraints
- Philosophy of dispatch

Big Data Analysis

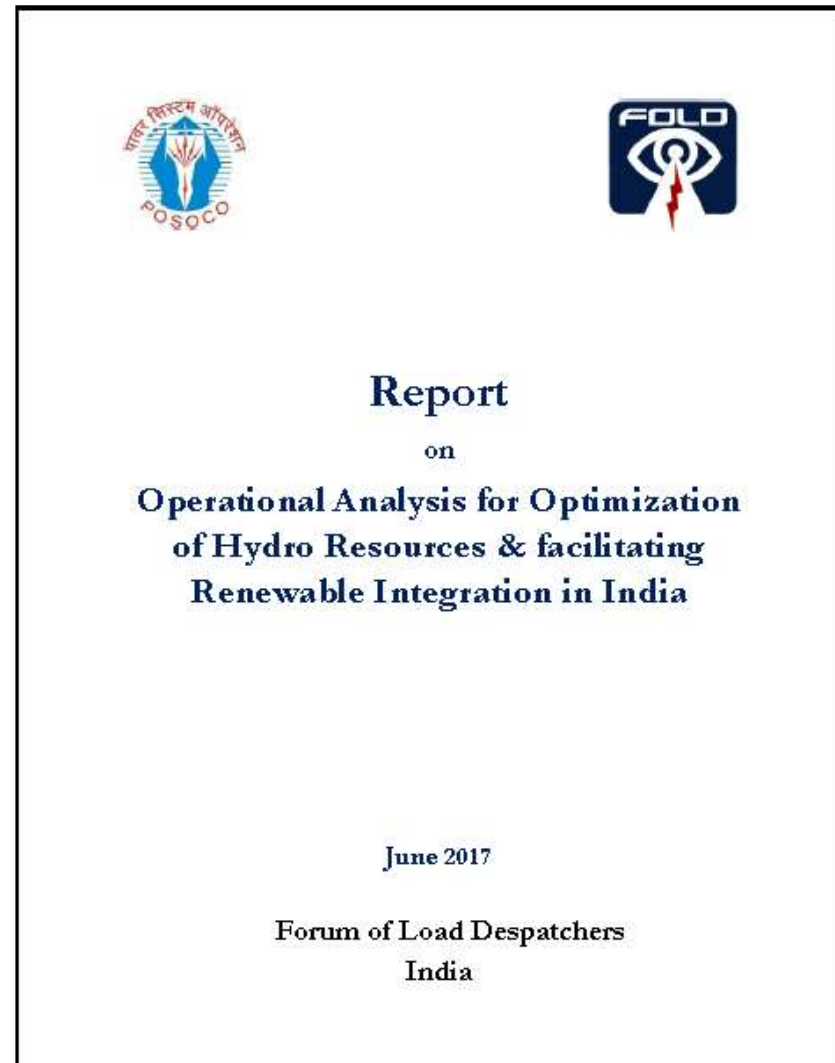
- 9 Years Data Analysis
- 38 Million Data Points
- Data Visualization

Brain Storming in FOLD Meetings

- 6 months work
- Around 70 Contributors
- More than 1000 man hours

Summary of Contents

1. Introduction
2. Existing Hydro & Pattern Analysis & Survey
3. Flexibility Metrics
4. Valuing Hydro: Flexibility Assessment, Ranking & Optimization
5. Pump Storage Facilities
6. Constraints in Hydro Generation Despatch
7. Tariff Structure for Hydro Power
8. Scheduling & Dispatch at Regional level
9. International Experience on Hydro Despatch
10. Recommendations
11. Bibliography



<https://posoco.in/download/fold-posoco-report-on-operational-analysis-for-optimization-of-hydro-resources/?wpdmdl=14168>

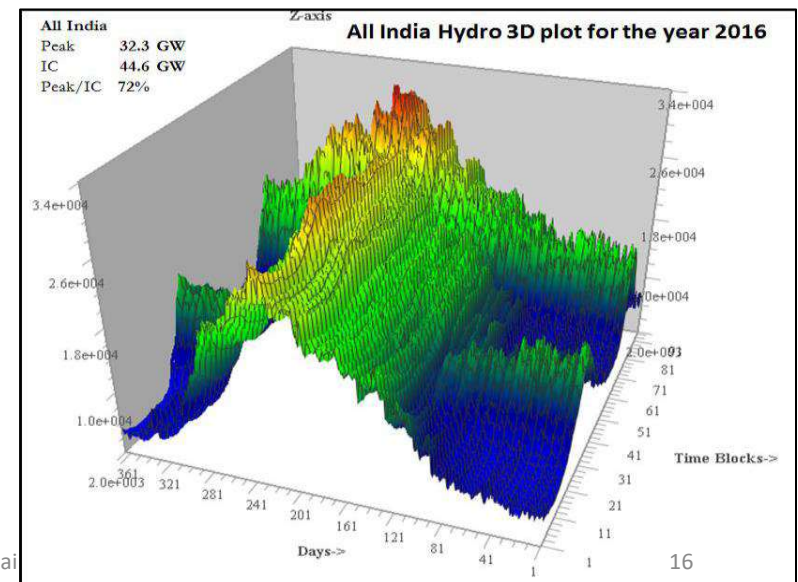
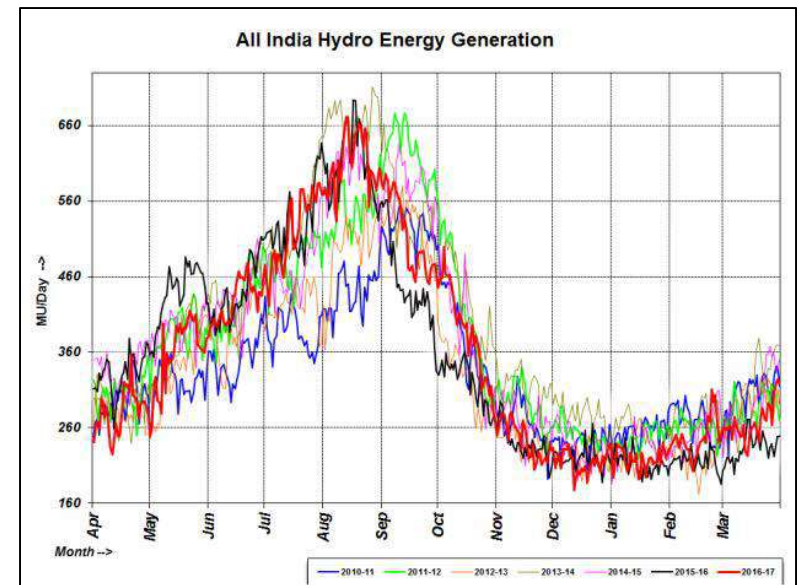
Summary of Findings

• Defining Flexibility Indices

- Peaking, Ramping, Capacity Utilization
- Flexibility Indices as a metric for improvement
- Plants with multi part tariff performing better

• Operational Performance

- Peak Hydro Support 30 GW in high hydro season & 18-20 GW in lean hydro season against IC of 45 GW
- Seasonal Hydro Flexibility
- 87 tested for black start
- 25 Stations out of 150 have synchronous condenser facility - to be harnessed



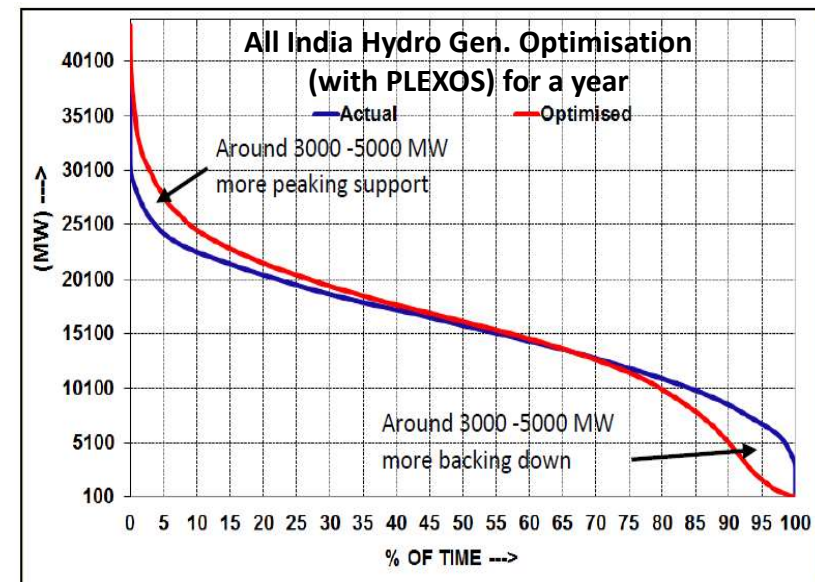
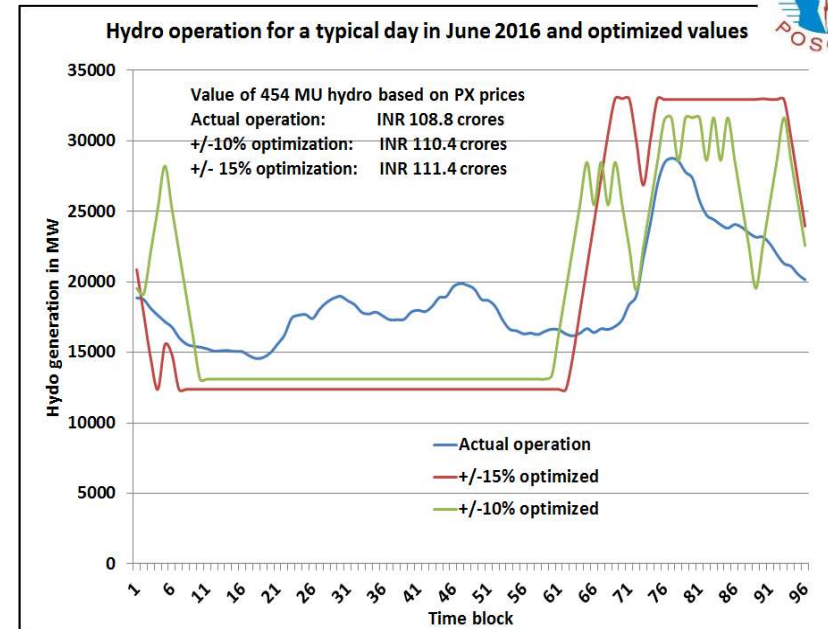
Summary of Findings

• Valuing Hydro

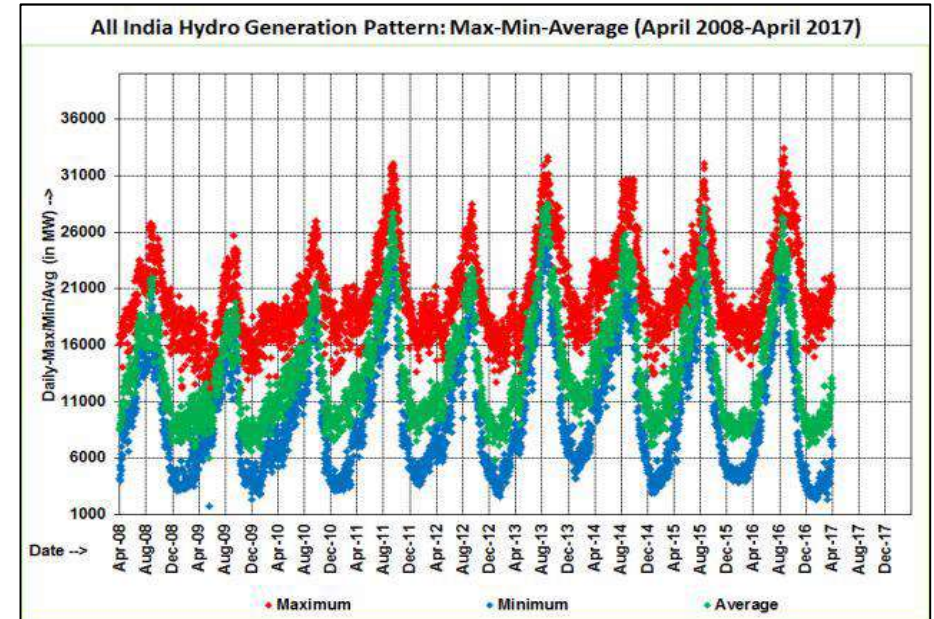
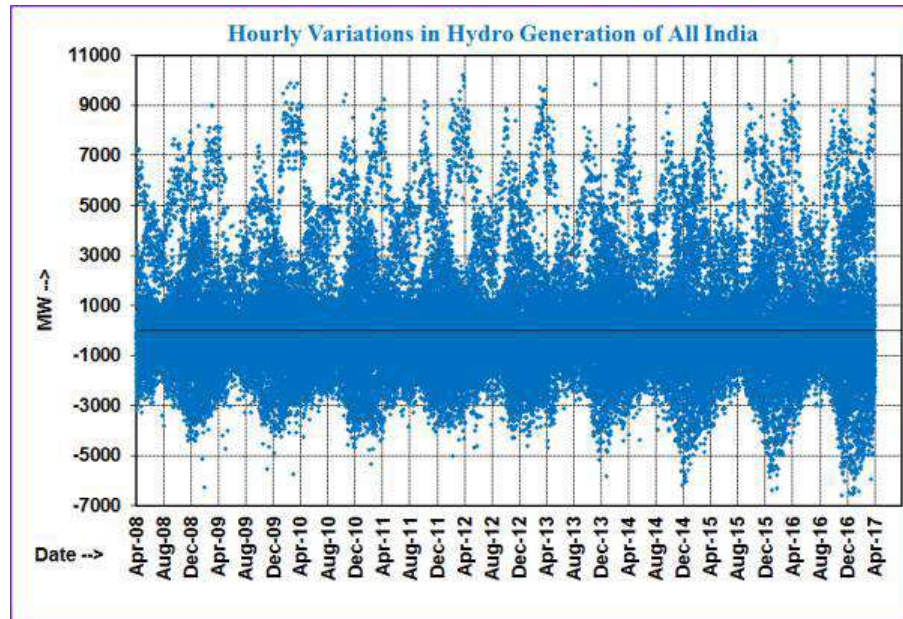
- 128 BU of annual hydro generation
- 32 BU Reservoir energy content
- Economic gains with further optimization

• Optimization based on Production Cost Modelling

- 4 GW Extra Peaking Support during peak
- 5 GW Extra Backing down during off peak
- Overall flexibility enhanced

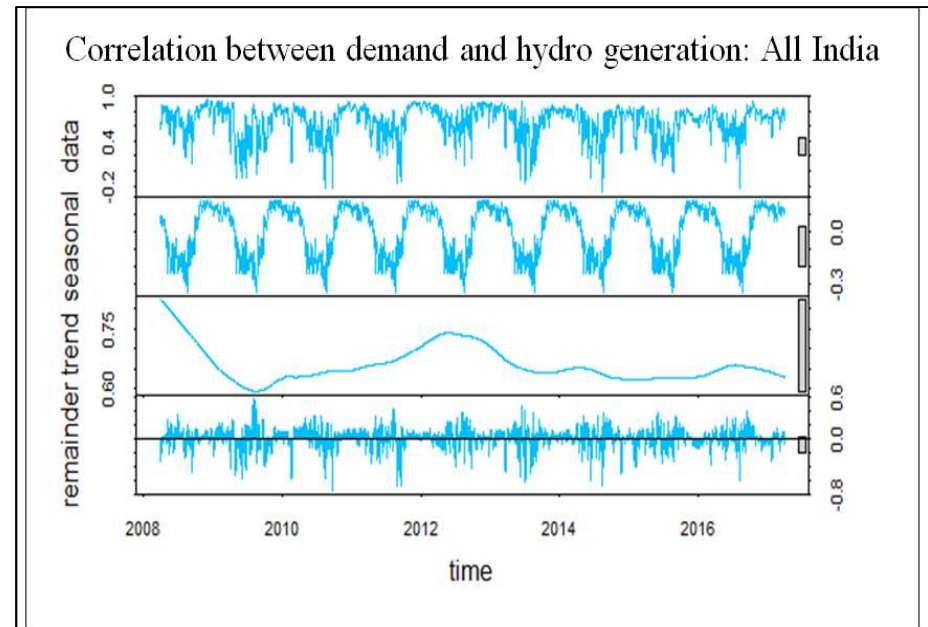
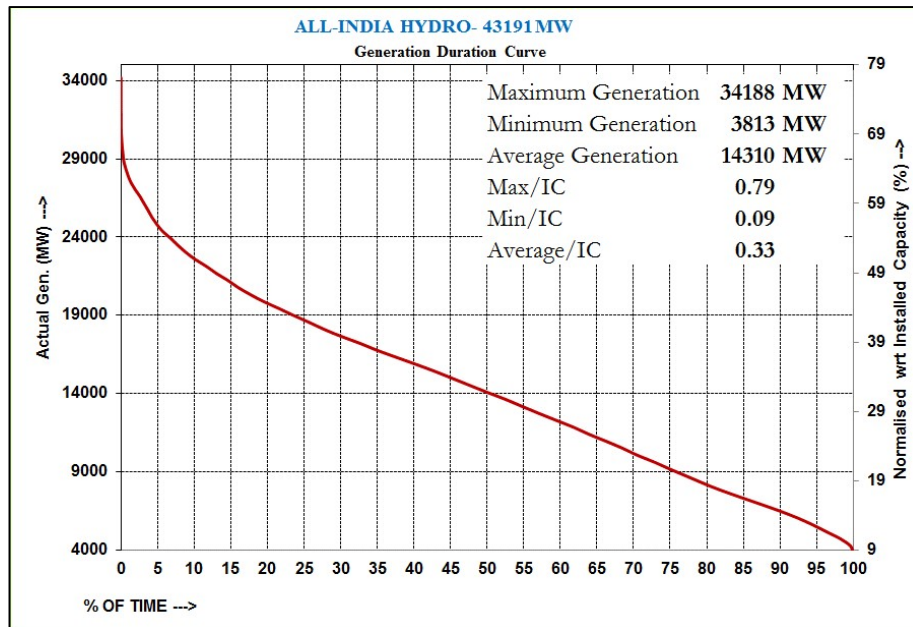


Flexibility Analysis of Hydro Generation



- Seasonality in Hydro Variation / Max / Min /Average Generation
- Less Variation in High Hydro Season
- More Variation in Low Hydro Season
- More scope for peaking support and off-peak backing down

Flexibility Analysis of Hydro Generation



- Max Gen : 34 GW
- Min Gen : 4 GW
- Average Gen : 14 GW
- Max/IC : 0.79
- Min/IC : 0.09
- Average/IC : 0.33

- Seasonal Decomposition to identify trend and seasonality
- Decreasing Correlation between Demand and Hydro Generation
- Higher Correlation during lean hydro season

Key Recommendations

Optimization & Incentives
for Flexibility

Coordinated Scheduling
& Despatch

Multi Part Tariff

Inflow Forecasting

Revisiting Hydrological
Constraints

Ancillary Services from
hydro power stations

Transmission planning
impacting hydro flexibility

Silt Forecasting &
Coordinated Flushing

Review of standards

Renovation &
Modernization



Model Regulation for Tariff Determination & other related matters for Intra-State Hydro Generating stations 2017 (Draft)

Deliberated in 14th FOR Technical Committee Meeting (New Delhi)

Key features of FOR Model Hydro Tariff Regulation (draft)

Tariff Recovery (AFC) – 2 Part

- (i) Capacity Charge (50%) – Linked to 85-90% annual availability(NAPAF) & 3 hrs Peaking in a day (PAFM)
- (ii) Energy charge (50%) – ECR linked to Design Energy(DE)
- (iii) ECR capping (beyond DE)

ABT & DSM for Hydro: Ex-ante schedule to be sacrosanct

PSP Hydro – Capacity charge & Energy charge; Prorated reduction in AFC for m/c outage by > 15%; Plant DC to include Gen/Pumping hours & MWh in each mode

RoE linked to Flexibility features:

- Peaking/FGMO/PSS/AVR/Communication/Black-start/Synchronous Condenser facility wherever applicable
- Higher RoE for Storage/Pondage type to promote flexibility
- Incentive for timely completion

Incentivising Black Start Service based on capability demonstration & certification

Incentivising Synchronous Condenser operation

Trial Operation Norms : Compliance to CEA Standards viz. peaking(110%) ,12 hrs at MCR, FGMO, PSS/AVR, Fast ramp, part load operation , islanded operation etc.



Thank You!