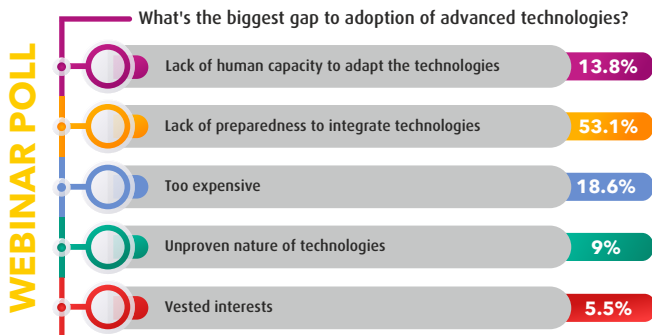
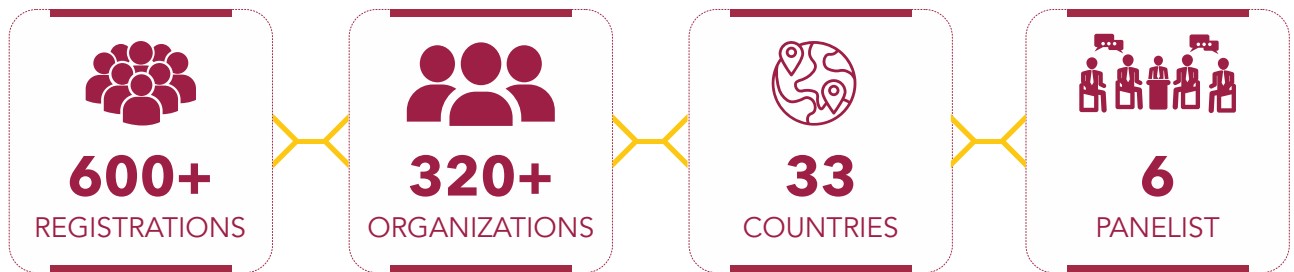


## POST WEBINAR Q&A:

### Grid Modernization - Technology and Innovation

1530Hrs -1700Hrs | 29<sup>th</sup> May 2020

**WEBINAR RECORDING: ACCESS HERE**



#### Mr. Ashok Pal, Chief General Manager(CTU-Planning), POWERGRID

1. My question to ASHOK PAL JI. You said with the RES , grid is being modernized on day to day basis. Please share your views about technology that currently being used by system operators including CTU /STU?

Answer:

Being a transmission planner, I am replying from transmission system planning aspect. Along with the integration of RE generation, we are building REMC (Renewable Energy Management Centres) for forecasting and managing the schedules of the renewables. Further, the STATCOMS are planned at suitable locations for management of reactive power flow. We are also contemplating synchronous condensers for managing the short circuit level at certain locations.

2. Hi I'm Chetan, Principal Consultant-Business Development at ZenMeter Solutions Pvt. Limited Bangalore. I've a question for Mr. Ashok Pal, In India can we see in future DISCOM availing "Flexibility As A Service" to manage the manage demand and supply at Division Level in their area (with the help of Grid Edge Devices)?

Answer:

The question is not very clear to me. The discoms can avail power supply from anywhere in India through open access and can manage their area accordingly. Probably, Mr. Sheshadri may supplement.

**Mr. Arun Kumar Mishra, Director, NPMU, National Smart Grid Mission**

1. Hi I am Shailendra Natraj, CTO Vidrona UK Ltd. My question: The utility companies often speak about the innovation but we do not see preparedness for adapting new technology like Predictive analytics using Machine learning + AI. to identify fault type not visible by naked eyes such as a. Rusting, b. Dust deposition +moisture. Foreign body identification on the assets. Why do we not think about increasing the life of ageing assets using cutting technology are they thinking to include the new technology in their technology roadmap?

Answer:

Dear Shailendra,

Deployment of predictive analysis for maintenance and asset life improvement is established practice and is being followed by say POWERGRID in it's equipment O&M. The particular example of rusting and related failure re very specific to structures. In that case the risk of not doing maintenance (Painting/member replacement) based on judgement on depth of rust is too much and may not value for money. As far as data and analytics is concerned there is always a lag in cycle i.e. data--> analysis--> what can be done--> value proposition v/s a vis existing solutions. AI need to be tuned in that needs lot of enthusiasm in the or actioner. I am sure some are already doing it. Drone Survey proactively is also deployed for hot spot in varying periodicity by transmission utilities, please refer to GRIDTECH papers in this regard.

2. Hi I'm Chetan, Principal Consultant-Business Development at ZenMeter Solutions Pvt. Limited Bangalore. I've a question for Mr. Ashok Pal, In India can we see in future DISCOM availing "Flexibility As A Service" to manage the manage demand and supply at Division Level in their area (with the help of Grid Edge Devices)

Answer:

The Qs, though directed to Mr Pal, I would like to say: The demand and consumption of Flexibility as service at DISCOM level is only experimented a couple of time and there is a report on DR. It can be accessed at: [https://www.nsgm.gov.in/sites/default/files/India\\_Country\\_Report\\_MissionInnovation\\_Challenge\\_1\\_Smart\\_Grids.pdf](https://www.nsgm.gov.in/sites/default/files/India_Country_Report_MissionInnovation_Challenge_1_Smart_Grids.pdf)

The flexibility markets in real time are being experimented at TRANSCO level. The report can be accessed here: <https://posoco.in/report-on-flexibility-analysis-of-thermal-generation-for-renewable-integration-in-india/Flexibility-Analysis-of-Thermal-Generation-for-RE-Integration-in-India-1.pdf>

3. Grid modernization can effects on man power?

Answer:

Grid Modernisations effect on Manpower will be in terms of type of skill set required. The future Utility employees will have to possess more than one skill and ability to debug work with ICT tools will be must.

4. I want to know status of oil leak from transformer in sub stations. We provide repair services. Please suggest o&m for such services.

Answer:

These are regular O&M activities mostly done through OEMs. You can contact SE O&M div of any utility/ GMO&M of POWERGRID for these clarifications. The technology part id deliberated in GRIDTECH. The last one's link is here: <https://www.powergridindia.com/6th-international-exhibition-and-conference-gridtech-2019>

5. This question is related to reliability accountability. For example blackout in 2008 was reported after about 4-5 years. And finally none was accountable. Infact who was responsible for the issue were appreciated in the report instead of stringent measures to avoid such challenges. Who takes lead on ensuring accountability on reliability issues? What kind of transparent and time sensitive mechanisms are thought of to manage it? How do we weigh smartness in terms of measuring metrics per stakeholders?

**Answer:**

India has a blackout in 2012. AS a technology and modernisation initiative, there was implementation of Unified Real Time Dynamic State Measurement System, where in the issues gets crystallise sequentially in milliseconds. The report can be accessed here: [https://cigreconference.ca/papers/2019\\_/CIGRE-168.pdf](https://cigreconference.ca/papers/2019_/CIGRE-168.pdf)

6. DLMS and IEC61850 are existing for interoperability?

**Answer:**

The majority of DER is consumer driven and unminitored at DISCOM/TRANSCO level leading to blind spot in power procurement plan and execution phase in real time. The voltage management is also a challenge including Voltage Ride through for older plants. The DLMS and other standard do not establish interoperability at communication Network Layers.

7. "The Indian Transmission System is quite robust and technology-driven. However, Power Distribution still remains the weakest link. This is compounded by injection of increasingly volatile and dispersed renewable energy into the grid. What is your advice to the Indian DISCOMs who are traditionally orthodox in adopting new technology and innovation, to meet the challenges of keeping the Distribution grid stable and reliable, amidst growing RE integration?"

**Answer:**

The only advise is learn from failures and experiment of others before you have an unmanageable problem. Measure more, review operations at least in area of significant RE and revisit assumptions in which operations are planned without monitoring. Build Flexibility and controllability in Network and demand same form any sizeable DER connected to your network, directly or behind the meter.

8. If Few Utilities can drive use of technology to make themselves viable & all utilities are bring trained on new skills, why all utilities are not adopting same...?

**Answer:**

Utilities are at different learning cycle and some are struggling to solve old challenges. NSGM is hand-holding and prodding all the utilities experiment in a small footprint to learn and fast track adoption.

9. What are the steps that have been taken or are being taken wrt flexibility in the Indian grid? Is there a roadmap and a timeline? What is the status of the secondary frequency control (AGC) in India?

**Answer:**

AGC and Flexibility are as reported above. The bidirectional flow will challenge in terms of Voltage profile maintenance and protection coordination in some part of Network especially Sub Transmission and Distribution.

10. Are we bench marking our power quality issues and solutions with some of the best global utilities?

**Answer:**

Not yet in larger scale, some private DISCOMs are piloting the idea.

11. Can we consider current grid communication protocol as a challenge to integration of RE more efficiently and how can this be dealt to make grid more flexible and clean?

**Answer:**

Communication protocol isn't a direct impediment.

12. How does transmission planning is different for smart cities compared to urban cities of now where high reliability of power is required for energy consumptions all time?

Answer:

Transmission planning is done at National level mostly where State is Unit and City level planning is being done by State Utilities except Delhi where the Transmission planning is actually for the city state of Delhi.

13. How Dynamic Line Rating (DLR) can be beneficial for utilities and transmission companies to increase the dynamic rating of the transmission line with respect to actual environmental of the transmission line which are 80% loaded? Can you please put some light on this? Is Govt. of India is planning to deploy such technology or policy with respect to this?

Answer:

The DLR as concept has been debated /appreciated and there isn't any large move to rerate lines. Individual instances may be evaluated by CEA if merit is established.

14. How should the flexibility services be monetised?

Answer:

The classical way is by establishing pilots and designing market mechanism as monetisation of any service is closely related to regulations under which market performs.

15. How the planning of location and sizing of battery energy storage is done?

Answer:

BES is mostly behind the meter. At network planning is dependent on intended use. In case it's for infrastructure investment postponement, it's tied to infra element. For Energy reliability an analysis on lead profile and voltage profile is best way forward.

16. May I know what would be the key aspect to be considered for integration of EV charging infrastructure with distribution grid?

Answer:

From Grid perspective it will be Grid capacity and need for infrastructure upgrade.

17. Not much has happened in Smart Grid domain in Distribution segment beyond Pilot Project. What is the future roadmap?

Answer:

Govt has advised all DISCOMs to set up AMI infrastructure win prepaid Smart Meter asap. There is likelihood of Smart Metering being mostly undertaken as part of Smart Grid. There could be localised SG at city level in Smart cities as well as in Solar city concept being discussed.

18. Sir, the flexibility of Grid for large scale RE integration is essentially required. But when it comes to quantification of flexibility, can POSOCO declare its flexibility on handling the RE Shocks. Further, what are the flexibility improvement measures in terms of implementation time: short term, medium term and long term.

Answer:

Dear Maruthi, Flexibility has multiple meaning and it's a subject in itself. Yes Flexibility is required and unless measurement as well as regulatory aspects are settled, declaring a number in itself is source of confusion. I would like you to recall the discussions and challenges around Inter-Regional transfer capacity for a perspective. POSOCO has done study for RE integration and it's study can be accessed here: <https://posoco.in/wp-content/uploads/2017/06/National-Study-Executive-Summary.pdf> For a sharper perspective on Flexibility itself ISGAN has developed a report and paper which can be accessed here: [http://www.iea-isgan.org/wp-content/uploads/2019/03/ISGAN\\_DiscussionPaper\\_Flexibility\\_Needs\\_In\\_Future\\_Power\\_Systems\\_2019.pdf](http://www.iea-isgan.org/wp-content/uploads/2019/03/ISGAN_DiscussionPaper_Flexibility_Needs_In_Future_Power_Systems_2019.pdf). The IEA figure on Flexibility requirement in India is enclosed herewith.

19. We are discussing technology to help us resolve OT challenges but technology comes with IT & eventually IT challenges/threats i.e. Cyber Security which ultimately putting us in a vicious cycle of increased cost & efforts to secure us...what is the opinion of our experts on this how to make a balance ?

**Answer:**

Types, the OT, an off shoot/Niche area of IT does raises threat of Cyber Security. However not deploying OT isn't choice. The demand for consumer, the ever unpredictable network and RE generation, increasing cost of deploying teams for every work as specialists are needed as well as reliability and prompt service expectation of customer means OT is here to stay. A right balance with modern and discipline work force as well as healthy mix on remote/cyber with local/physical system and process mitigates the threats cost economically.

20. Why can't we in INDIA have any mandatory distribution line at least of 11KV OR 22KV. Many nearer cities within the state/ district having both of voltage levels?

**Answer:**

These are historical development and nowadays it's 11 KV. However there may not be jurisprudence in replacing all 22KV with 11KV given transformer costs and only marginal saving on spare. The maintenance cost remains same.

21. Why, in India we are not using FACTS devices to increase the power handling capability and stability of grid instead of going for new power lines?

**Answer:**

FACT are deployed on need basis, in India currently ISTS network has more than 50 devices.

### **Mr. Amitabh Singhal, CTO, Sterlite Power Ltd.**

1. Often the new technology is not taken forward on the name of a. budget b. Regulatory bodies?

**Answer:**

I agree that introduction of new technology in the Grid requires lot of efforts and justifications and commercial scrutiny (due to L1 requirements). Technology tried & tested by one utility (in India or abroad) is also not immediately accepted by others. So definitely there is a need to have a body which promotes and helps quick adoption of new technologies across utilities.

2. Please share your views from technological perspective?

**Answer:**

I did mention about use of technologies in project execution (e.g. live line reconductoring, use of drones in conductor stringing, use of heli-cranes in tower erection). Besides, use of dynamic line rating tools to unlock latent line ampacity, use of power flow controller to manage power flows in parallel circuits are some other examples which are available and deployable by Sterlite Power.

3. PST is it commercially viable?

**Answer:**

Application of PST or any other power flow control device has to be driven by technical need (through power system study) and by payback period (and not only upfront cost).

4. Currently the grid is designed for one way flow of power, what issues would be encountered with DER integration and initiation of bi-directional flow of power?

Answer:

In transmission network, power flows may happen both ways already (in many lines) and as such it should be less impacted. Ofcourse overall network planning through simulation of various scenarios should be conducted to access the impacts and define solutions, if necessary.

5. Any new innovative idea to free transmission line from ROW issues?

Answer:

ROW requirement remains, considering operational and public safety reasons. Cables would not have similar ROW concerns.

6. How Dynamic Line Rating (DLR) can be beneficial for utilities and transmission companies to increase the dynamic rating of the transmission line with respect to actual environmental of the transmission line which are 80% loaded? Can you please put some light on this? Question to Mr. Arun: Is Govt. of India is planning to deploy such technology or policy with respect to this?

Answer:

DLR technology is here and has been adopted globally in many places. It helps to unlock latent ampacity of existing transmission lines. If RE injection is happening in a line and the line gets overloaded (deemed based on static ampacity) during high RE generation, DLR can help to increase situational awareness and let higher power flow (without risk of actual overload). Both RE gnerator, utility and consumer at large can benefit with minimal investment on DLR.

7. In India, we have moved largely for gas insulated substation (GIS) considering its numerous advantages and is also considered as smart move in transmission sector. However, we are using SF6 gas for all the equipments installed which is a very severe GHG (Green house gas). It doesn't seems a smart move for the healthiness of the environment. Is there any alternative known for SF6 gas which could be used for even the HV 765KV equipments? Please explain India's stand in this aspect.

Answer:

Yes, green gas alternatives (in lieu of SF6) are under development, and to my knowledge, such solutions are now commercially available for upto 220 kV GIS (& for 400 kV GIS busducts). GIS OEMs are working in this direction. Globally, some countries have regulations to reduce SF6 usage (or emitions). I am not aware of any such move yet by authrities in India. Even for transformers, environmentally friendly oils are available (possibly upto 220 kV class ?)

8. In view of low system inertia due to increasing RE, is there any work going on in the field of dynamic correction to the generation & network side based on PMUs

Answer:

I do not have specific information about this. However Battery storage systems should help to ride through RE generation variations, as they get deployed widely in the Grid.

9. We are discussing technology to help us resolve OT challenges but technology comes with IT & eventually IT challenges/threats i.e. Cyber Security which ultimately putting us in a vicious cycle of increased cost & efforts to secure us...what is the opinion of our experts on this how to make a balance?

Answer:

This cycle will continue. In my view any technology will get widely adopted only when the pros outweigh the cons (if any). Risks have to be managed by knowing them and by having the strategy to deal with them.

10. We wanted to deploy Drone but there is no clear guidelines to use drone this implies that there is lack of preparedness in govt also.

Answer:

In Sterlite power, we have used drones for conductor stringing and heli-cranes for tower erection activities. There are guidelines around line of sight drone usage and with permission from local administration it can be used.

11. Why can't we in INDIA have any mandatory distribution line at least of 11KV OR 22KV. Many nearer cities withing the state/ district having both of voltage levels?

Answer:

The question is not very clear to me. To my knoweldge, majority of utility distribution networks in India are at 11 kV with only few areas having legacy 22 kV networks.

12. Why, in India we are not using FACTS devices to increase the power handling capability and stability of grid instead of going for new power lines?

Answer:

I believe that our planners are looking into this aspect and increasingly such FACTS elements are being used, specially by CTU. At state level more can be done for sure.

## LIVE WEBINAR:

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**Mr. Anil Rawal**  
CEO,  
Intellismart Infrastructure  
Pvt. Ltd

**Mr. Bryan C. Spear**  
Managing Director,  
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Trilliant Networks

**Mr. Francis D' Souza**  
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