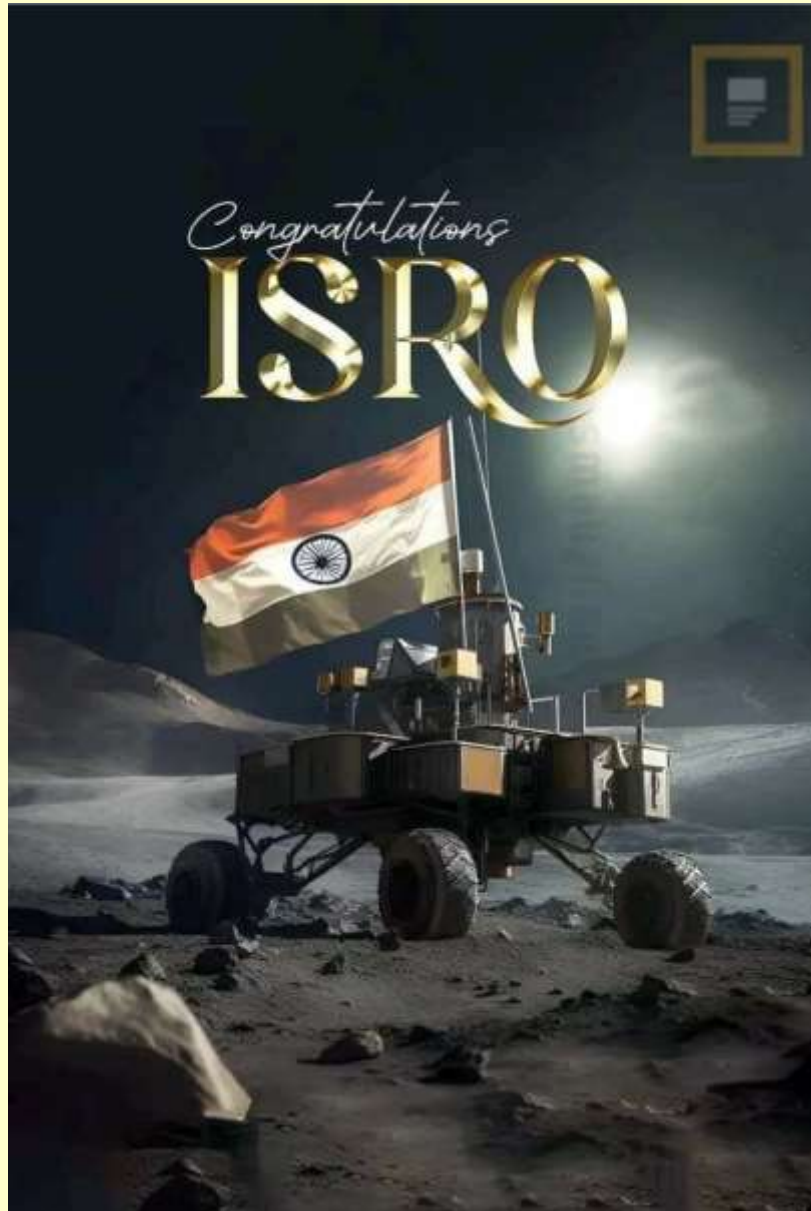




SPE News Letter

SPE(I), Vadodara Chapter

Oct, 2023 Issue: 4/2023



**Society of Power Engineers (India)
Vadodara Chapter (Estd. 1996)**

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OFFICE BEARERS & EXECUTIVE COMMITTEE MEMBERS FOR 2023-24



Er. MR Tilwalli
Chairman



Er. RS Shah
Vice-Chairman



Er. YV Joshi
Secretary



Er. NG Yadav
Treasurer



Er. VB Harani
Jt. Secretary



Er. SP Trivedi
Jt. Secretary



Er. MN Pandya
Member



Er. YD Mehta
Member



Er. Parag Parmar
Member



Er. Umesh Parikh
Member



Er. Bharat Dalwadi
Member



Er. SMS Baxi
Member

ADVISORY COMMITTEE MEMBERS FOR 2023-24



Er. PA Shah



Er. BN Raval



Er. SM Godkhindi



Er. JK Surti



Er. NV Lathia



Er. NC Solanki



Er. HD Joshi



Er. PP Shah



Er. Gitesh Chitaliya



Dr. AJ Chavda



Ms. Sangeeta S Godkhindi



Ms. Sheetal Shinkhede



Ms. Hetal Prajapati



Er. Hemant Nashikkar



Dr. SK Sharma

PATRONS



Er. PH Rana



Er. SM Takalkar



Dr. Satish Chetwani



Er. N Dinker



Er. GV Akre

SPECIAL INVITEE TO THE COMMITTEE

EDITORIAL BOARD

Er. . Umesh Parikh
Er. SM Takalkar Er. PH Rana
Er PA Shah Er. SM Godkhindi

OFFICE ADMINISTRATION COMMITTEE

Er. SMS Baxi Er. SM Godkhindi Er. NC Solanki
Er. HD Joshi



Dear Readers,

It gives me a great pleasure to interact with you for the first time, after I took over as a Chairman of SPE (I) Vadodara Chapter in July 2023.

I am, indeed, grateful for the confidence placed in me by all the members of SPE(I) and electing me and the other three members unopposed to the EC. I am also thankful to the EC members for selecting me to such a coveted post of Chairman.

I have taken over from **Er. GV Akre** who was the Chairman of SPE(I), Vadodara, for a very long time. During his tenure the SPE, Vadodara, has made rapid progress in the last 10 – 12 years. Our team has to continue from where he has left and take it further to new heights.

It is a herculean task but under the guidance of our senior colleagues like **Er. SM Takalkar**, **Er. GV Akre**, **Er. PH Rana** and many others, I want to assure the members that we will try our level best to scale new heights. We request the support of all members of SPE in achieving our goals and objectives.

We welcome any suggestions, by any member, to improve the working of SPE (I).

I came to know about SPE (I) almost 15 years ago, when I met Er. SM Takalkar and his team at a seminar conducted by SPE (I) in an Engineering College.

Our interaction increased gradually over a period of time and I started taking active interest in the activities of SPE (I).

I travelled with SPE (I) team to Bharuch, Surat and some other places and delivered lectures on the topic of Industrial Automation, which happens to be my forte. This brought me closer to the rank and file of SPE (I) Vadodara.

I was a member of the committee of SPE (I) Vadodara which arranged a 2-Day seminar on Induction Motors, 5–6 years ago.

I have realized that SPE(I) is a great platform for all engineers, from all branches, to contribute, participate, exchange ideas, deliver lectures, and learn about the latest state of the art technologies.

Vadodara city, as you all know, is the electrical hub of India with about 25% electrical goods manufactured here. More than 80-90% of the power transformers manufactured in India are manufactured in and around Vadodara.

Many multinational companies manufacturing electrical items, equipment, metro coaches, transformers for metros etc. are based in Vadodara.

There are many MSMEs manufacturing sophisticated electrical and electronic equipment in Vadodara.

These facts give us an edge over other chapters of SPE. We should utilize the full potential of these facilities and infrastructure to develop our chapter of SPE. We can arrange lectures by experts from these multinational companies, arrange seminars on different topics, visits to the factories etc.

We need to start a fundraising program for the SPE, by arranging seminars with sponsors, so that SPE can plan for a bigger office space for meetings and library.

The first lecture programme of the New Year started with a bang, if I may call it so. We had arranged an expert lecture by Er. (Dr.) AJ Chavda on Digital Asset Management and Condition Monitoring of Equipment, on 18 Aug 2023, at Vasvik Hall. It was a very well attended programme and the quality of the lecture was excellent. All members present really enjoyed the lecture and I personally gained a lot by listening to the lecture. I congratulate Er. (Dr.) AJ Chavda for an excellent presentation. We need many programmes like this.

We have planned an interesting Seminar, on Dec. 7 & 8 on Civil and Structural Engineering aspects in Power Sector and Industries, details of which are being shared to all the stake holders. I request the members to render wholehearted support to the event.

The chapter is also committed to serve as a bridge between Academy and Industry. This aspect will receive my priority as it is a service to Academy & Industry both.

All those who are interested in contributing to the progress of SPE, in any form, are welcome. He or she can contact me or any other EC member and discuss ideas.

(contd. on page-3)



Dear Readers,

In a recent development from this issue of SPE News Letter, you will see a seamless transition in the name of editor of this newsletter. I am delighted

to accept the responsibility as Editor of widely circulated and accepted house journal of SPE Vadodara, from Er. SM Takalkar, Patron of our Society. Yes, I am indeed thankful to Er. PH Rana, Er. SM Takalkar, Er. PA Shah, Er. NV Rede and Er. SM Godkhindi for concurring to be a part of Editorial Board.

Society gets stronger when the people come together and the collective efforts which are built propel in creating powerful societal changes. When 'direction' is blended with 'dynamism' it will certainly result in harmonious progress. Change is essential for society to adopt technological advancement or shift in strategies. 'Change' also aims to minimise resistance, maximise benefits that ensure society remaining agile in a constraining business environment.

The month of September, 2023 has set various 'high' in power sector. Nation has touched the record high peak power demand of 240GW on September 1st, 2023. Peak demand shortage was 10GW on the same day. In the month of August, 2023 power demand has grown to 23% - one of the highest in the world. Kudos to the grid operators for maintaining grid security, grid discipline and reliability of power supply.

At the same time, CEA projected peak demand to cross 256GW and 1736BU energy requirement in FY 2023-24. The growth in peak demand and energy requirement emphasizes the need to engage in strategic planning and adequate investment in the sector. In meeting this demand, reliable and sustainable power

supply across the country will play a pivotal role.

Talking about the present power system, it can be seen that the EA, 2003 has revolutionized the power sector by taking measures conducive to development of electricity industry, promoting competition, protecting interest of consumers, supply of electricity to all areas, electricity tariff rationalization, ensuring transparent policies for subsidies and promoting environmentally benign policies.

In the present-day scenario, electricity is considered as fourth element for our survival after air, water and food. Depriving of electricity, denies people equal opportunities in the matter of education and consequently suitable employment, health, sanitation and other socioeconomic rights. Right to electricity of a person is integral to the achievement of socio-economic rights. In view of the above, every citizen has a right to get electricity and therefore the practice of providing the supply of electricity to the lower income group of consumers at affordable rates, cross subsidy among the different consumer category etc. can't be eliminated. This would, however, require identifying a retail supply licensee which may be among the existing distribution licensee, for the purpose of Universal Service Obligation (USO) and ensure electricity at regulated rate to every consumer as mandated under the EA, 2003. To attain the objective of USO, some portion of cheaper source of power (plants) are allocated to the USO supplier.

I hope with the support of learned members of Team – SPE (I), I will be able to deliver appropriate justice to the responsibility which I am entrusted with.

Wishing all members, a Happy & Joyful festive season ahead, including Navratri and Diwali

Er. Umesh Parikh

Cover Story:

The most significant achievement of Bharat:

August 23, 2023 is Golden day in the history of Indian Space Science. Chandrayan-3 successfully landed on the south pole of the moon where no other country has landed, making India the first country to get this notable achievement. This success of ISRO has taken our nation as fourth member of the elite lunar club. The lander "Vikram" and Rover 'Pragyan' configuration of Chandrayan-3 carries sophisticated scientific pay load for exploration. The achievement is mainly attributed to the meticulous planning, perseverance and dedication of team. **Dr. Vikram Sarabhai** had once said "*The question is not whether a developing country should adopt space technology-rather the question is whether it can afford to ignore it*". Thus started the journey from the Indian National Committee for Space research (INCOSPAR) in 1962 to the formation of ISRO on Aug 15, 1969. Let us congratulate team-ISRO comprising engineers & scientists and other industries associated with success of Chandrayan-3.

OUR NEW CHAIRMAN



Er. Mohan R Tilwalli has taken over as a **Chairman** of **SPE(I) Vadodara Chapter** from July-2023. He graduated in Electrical Engineering from Walchand College of Engineering, Sangli, Maharashtra in 1971.

He did his M. Tech. (Energetics) from IIT-Mumbai in 1973

Initially he served in Tata Engineering & Locomotive Company (TELCO) in R&D Department for four years. Thereafter he migrated to Vadodara in 1977 & joined a small scale company named Servo Drives Pvt. Ltd. in GIDC, Makarpura, Vadodara. In 1981 he started his own proprietary firm named Gururaj Engineers. The company was converted into Private Ltd. recently.

Gururaj Engineers Pvt. Ltd. is in the business of manufacturing Dc Drives, Heater Controllers, Battery Chargers, Vibrator Feeder Controls, Induction Heating Units, Plating Rectifiers, Load Banks, And Custom Built Electronic Equipment and Control Panels Involving Automation

The company represents GE (now Emerson), Omron, Delta, Crouzet for their Automation products like PLC, Servo, SCADA, AC VFDs, etc. His company is responsible for execution of many projects which include Water Automation in Kampala-Uganda, Dam Automation for rivers in Bihar & Karnataka, 100V, 5000 Ampere DC Source for a Govt. of India Project, Biscuit Wrapping Machine Automation, Cut to Length Machines used in many industries, Transformer Winding Machine for Transformers used in Metro Locals, a Multi Axis Servo based System etc.

Er. Mohan Tilwalli is very soft spoken and amicable by nature. In spite of being a Kannadiga (hailing from Karnataka), he has made Vadodara & Gujarat as his permanent abode. He has been a member of SPE(I) for many years now.

The Editorial Board extends a warm welcome to **Er. Mohan R Tilwalli**. The Editorial Board is confident about the growth of the Vadodara Chapter under his able leadership.

Er. Umesh Parikh
Editor

From the Chairman's Desk

(contd. from page-1)

Hoping to meet you more often and also hope to see members in large numbers soon at the next programme.

With best wishes to all the readers for the ensuing Dussehra & Diwali festivals.

Mohan Tilwalli
99095 65620

NEW LIFE / YEARLY MEMBERS ENROLLED

GR No.	Grade	Name
2415	M (23-24)	Ravi K Palwal
2416	LM	Rajul P Shah
2417	LM	Dr. Ruchi P Shrivatava

ACNOWLEDGEMENT

Society of Power Engineers (I) Vadodara Chapter received donations as under:

1. Er. SM Takalkar	LM	Rs. 20,000
2. Er. MR Tilwalli	LM	Rs. 10,000
3. Er. (Ms). Sangeeta S Godkhindi	LM	Rs. 1,000
4. Er. Manish N Pandya	LM	Rs. 1,000
5. Er. KJ Prabhu	LM	Rs. 1,000
6. Er. KC Yadav	LM	Rs. 1,000
7. Er. YD Mehta	LM	Rs. 1,111
8. Er. RM Panchal	LM	Rs. 500

SPE(I) Vadodara Chapter thanks to above donors. SPE(I) further expects similar gesture from other members as well as from well-wishers



CHAPTER'S ACTIVITIES

➤ On **08 Jul 2023**, Chapter jointly with **IE (I), Vadodara**, organized evening lecture on **“Situational Awareness of Grid using WAMS and WAMS based Analytics and Cyber Security in Power System”** at Vasvik Auditorium. The speaker was **Er. MG Gadhavi**, Addl. Chief Engineer, GETCO, Bharuch.

In his presentation he covered the following:

- WAMS in Gujarat Grid after Phase-II project.
- Case studies of tripping of major transmission lines and its effect on the Grid.
- Synchrophasor Real-time monitoring visualization tools at SLDC, GETCO.
- Development of Synchrophasor Analytics.
- Architecture of WAMS.
- Various components of WAMS.
- Comparison between phasor technology and traditional SCADA technology.

The presentation generated lot of enthusiasm which was evident from the Q/A at the end.

Er. Ambikesh Padhya, Chairman, IE(I) Vadodara, **Er. YV Joshi**, Secretary SPE(I) and **Er. RS Shah**, Vice-Chairman, SPE(I) were on the dais. The event was anchored by **Er. PA Shah**, Advisory Committee member, SPE(I).



Er. Padhya, Chairman, IE (I) presenting Certificate to **Er. Gadhavi**
L to R Er. Joshi, Er. Padhya, Er. Gadhavi, Er. Shah

➤ On **16 Jul 2022**, **27th AGM** of the **Chapter** was held at Baroda High School, Alkapuri. The report of the same is brought out in this issue.

➤ On **18 Aug 2023**, Chapter jointly with **IE (I), Vadodara**, organized evening lecture on **“Digital Asset Management & Condition Monitoring of Equipment”** at Vasvik Auditorium. The speaker was **Er. (Dr.) AJ Chavda**, Chief Engineer (Engg.), GETCO, Vadodara.

His presentation revolved around effective condition monitoring of power transformer and extending the life of it. He mainly covered the following:



Er. Tilwalli, Chairman, SPE(I) greeting **Er. (Dr.) Chavda** with memento



Er. Tilwalli, Chairman, SPE(I), presenting Welcome address



Er. Padhya, Chairman, IE(I), Vadodara presenting Welcome address

- Detailed explanation of Capacitance and Tan Delta and Power Factor and its relevance to power transformer.

- Condition monitoring and maintenance philosophy for service life extension.
- Importance of RI and PI tests.
- Asset management with condition monitoring.

He presented lot many case studies in which the most critically failed transformers were taken in to service with minor repairs which was the result of critical condition monitoring.

His efforts to salvage large number of power transformers from declared scrap condition and thus save lot of money for GETCO was cheered by the members attending the lecture.

Er. MR Tilwalli, Chairman, SPE(I), **Er. YV Joshi**, I/c Vice-Chairman, SPE(I), **Er. VB Harani**, I/c Secretary, SPE(I) and **Er. Ambikesh Padhya**, Chairman, IE(I) Vadodara were on dais. **Er. Tilwalli** and **Er. Padhya** presented welcome address. **Er. Harani** presented vote of thanks. **Er. PA Shah**, Advisory Committee member anchored the event.

Er. VB Harani
I/c Secretary

PROCEEDINGS OF 27TH ANNUAL GENERAL MEETING HELD ON 16 JUL 2023

As decided the **27th AGM** of the SPE(I) Vadodara Chapter was organised on **16 Jul 2023** at 10.00 hrs. at Baroda High School, Opp: Express Hotel Petrol Pump Lane, RC Dutt Road, Alkapuri, Vadodara-390 007.

The following business was transacted.

Due to the lack of quorum at the scheduled time, the members present left the venue and reassembled at the same place after half an hour and carried on the AGM business.

The members present in the house observed 1-minute silence to pay respect to the members who left for their heavenly abode during the year. They are late **Er. BN Solanki**, **Er. PM Shah**, **Er. UB Marathe**, **Er. AP Parmar**, **Er. RH Vasavada** and **Er. PM Pancholi**.

Welcome address by the Vice-Chairman

The Vice-Chairman of the Vadodara Chapter, **Er. RS Shah** gave a welcome address. He highlighted the progress of the Chapter during the year. He stressed the need for further

efforts to make Vadodara Chapter a Brand in the Power Sector. He thanked all the members of the Executive Committee and Advisory Committee for their valuable support. He also expressed satisfaction the successful celebration of silver Jubilee year. He appealed to the members for raising fund for the new office of SPE. He further expressed gratitude for the efforts and support by **Er. GV Akre** during his Chairmanship tenure.

Address by Chairman:

The Chairman of the Vadodara Chapter, **Er. GV Akre** welcomed all the members and went on to give brief history of SPE Vadodara in general and that of his tenure in particular. He stated that during his long tenure of 13 years, he has received good support and affection from all the members. He stated that the members would continue to support new EC members. He also emphasized increasing new members to expand the horizons of SPE Vadodara. He lauded the efforts made by the founding members for shaping the SPE(I)

Vadodara and make it known in the power engineering fraternity. He named **Er. SM Takalkar, Er. N Dinker, late Er. SM Joshi** and many others for the same.

The house gave a standing ovation to Er. GV Akre for his selfless services to the chapter.

The agenda of AGM was pursued as follows.

1. Confirmation of Minutes of last AGM held on 28.8.22.

Minutes of last AGM was already circulated through SPE NEWS Letter July-2023 issue. However, Secretary of the Chapter, **Er. YV Joshi** read out the minutes of last AGM held on 28 Aug 2022. The minutes were approved by the house as presented.

2. Presentation of Secretary's report

Along with 27th AGM Notice, Secretary's Report for 2022-23 was already circulated. However, I/c Secretary of the Chapter, **Er. YV Joshi** presented Secretary's Report for the year 2022-23.

Some of the main points of the report are as under.

- ▶ During this year, the Chapter has made reasonable progress. Between two AGMs total 12 new members are registered which includes 12 Life Members.
- ▶ Thus, total registered members of SPE (I) Vadodara Chapter as on 30 Jun 2023 are 2410 - out of which there are 605 Life Members.
- ▶ It is my privilege to present before you that our Chapter has organized 7 monthly lectures and 2-Day Conference on "Metallurgy in Power Sector & Industries" during the year.
- ▶ **On 19 Apr 2023**, the **Chapter** convened an **Extra Ordinary General Meeting** at the Auditorium of the IE(I), Vadodara to transact following business:
 - (i) To discuss and decide/resolve the issue of disposing off the present office premises situated at 48-FF, Avishkar Complex, Old Padra Road, Vadodara.
 - (ii) To discuss and decide / resolve the matter of relocating the office premises.The report was accepted by the house without any change or observations.

3. Presentation of Accounts of the Chapter for the year 2022-23

Along with 27th AGM Notice, Accounts of the Chapter for the FY 2022-23 was already circulated. However, the Treasurer of the Chapter, **Er. NG Yadav** presented the same in brief. The accounts were approved by the AGM unanimously.

4. Presentation of Budget of the Chapter for the year 2023-24.

The annual Budget for 2023-24 was circulated along with AGM notice. The Treasurer of the Chapter. However, **Er. NG Yadav** presented the same. The budget was approved unanimously.

5. Proposal for the approval of the name of Auditor for the year 2023-24.

The Treasurer **Er. NG Yadav** proposed the name of Shri Niraj Mujmundar & Associates Chartered Accountants as an Auditor for the financial year 2023-24. The house approved the proposal unanimously.

6. Open house Session

- a. **Er. NG Yadav**, treasurer emphasized the need for ramping up the corpus of the chapter. He suggested certain way and means to achieve this. One of his suggestions was a generous donation from the members.
- b. **Er. JC Marathe**, suggested that those who want to contest for the post of Executive Committee member should mandatorily enroll 5 new members.
- c. **Er. Manish N Pandya** suggested that the EC members should strive hard for the donations. He announced a donation of Rs. 1,000/-.
- d. **Dr. Namra R Joshi** who is a professor in Dhule Engg. college and normally remains present during each AGM could not join AGM this time. However, he sent a message of good wishes to all the members. His message was read out by **Er. PA Shah**.
- e. **Er. Keval Velani** stated that the office bearers of the chapter should provide equal opportunity to all the members in the activities of the chapter.
- f. **Er. NG Yadav** read out the names of the major donors for the Silver Jubilee celebration. The work done by **Er. PH Rana** and **Er. SM Takalkar** was lauded by **Er. NG Yadav**. Both of them were felicitated by Chairman **Er. GV Akre**. **Er. PH Rana** and **Er. SM Takalkar**

responded to the felicitation.

7. **Programme of Felicitation** of Life Members of SPE (I) Vadodara who completed 65 years of age on 30 Jun 2023, The following Engineers were felicitated.

1	Er. Hamukhrai A Hadwani
2	Er. Dinesh M Patel
3	Er. Yogendra Kumar M Sharma
4	Er. Manoj J Desai
5	Er. Ashokkumar K Mistry
6	Er. Jatinkumar B Parekh
7	Er. Rajubhai K Patel
8	Er. Kailash C Yadav
9	Er. Devesh S Sheth
10	Er. Pravesh K Agarwal
11	Er. Sangeeta S Godkhindi

8. **Election of Executive Committee Members:**

Er. PN Shah, DE, MGVCCL, who was Polling & Returning Officer made all arrangements to conduct the Election for four posts of Executive Member for the years 2023-2026 with the assistance of **Er. PA Shah**. However in his absence **Er. PA Shah** read out the proceedings of the election as under.

- Against four posts, following five nomination forms were received as candidate for EC Member:

1. **Er. VB Harani**
2. **Er. RS Shah**
3. **Er. YV Joshi**
4. **Er. MR Tilwalli**
5. **Er. NC Solanki**

- **Er. PA Shah** then informed house that **Er. NC Solanki** has willingly withdrawn his nomination and hence there was no need to conduct the election process.
- On this basis following four members are declared Elected uncontested by election officer.

- (1) **Er. RS Shah**
- (2) **Er. MR Tilwalli**
- (3) **Er. VB Harani**
- (4) **Er. YV Joshi**

Newly elected four EC Members as above, were felicitated by the outgoing Chairman ER. GV Akre. He also expressed his gratitude towards efforts by **Er. PN Shah, Er. PA Shah & Er. JD Tamhane** for their services in conducting election for many years.

9. **Vote of Thanks:**

On behalf of SPE (I), **Er. SP Trivedi**, Jt. Secretary offered **Vote of Thanks** to all members, sponsors, supporters, volunteers, and persons who have worked / assisted directly and indirectly for great success of the AGM. He thanked the donors, speakers, all EC and AC and patron members for their valuable support in the activities of SPE (I) Vadodara

The AGM ended after recitation of the National Anthem.

Anchoring:

The entire event was anchored by **Er. PA Shah**, LM & Advisory Committee Member, **Er. Parag Parmar**, LM & Executive Committee. **Er. Gargey Bhatt**, LM helped **Er. PA Shah** in audio visuals.

The AGM ended with a delicious lunch.



RANDOM THOUGHTS



Last couple of years have been full of calamities. The worst has been havoc due to floods. Even the places known for scanty rain (deserts) have experienced flooding. USA, China, Bharat (Uttarakhand, Himachal Pradesh, UP, MP, Gujarat, Maharashtra etc.) and many parts of the world have been affected by the worst ever flooding causing severe damage to property and loss of life. This has perhaps come as an aftermath of Covid-19. There are experts and exponents who take position in media and start dropping their views and judgments on such calamities. The most common among them is “climate change”. It is a common belief that the pollution all over the world is responsible for whatever is happening in the world. Other observations of experts include exploitation of forest, mines and minerals from the crust of the earth. The melting of glaciers in Himalaya and in Polar Regions is also attributed to global warming. The haphazard development in Himalayan region is pinpointed by every one for recent floods and consequent damages.

However, no one is able to quantify and allocate the cause (in %age) for each of the calamities. It is also reported that the earth is tilting day by day beyond what has been labelled as the known degree of inclination. As per astronomy the tilt is between 22.1° to 24.5° in 40,000 years. The human is racing in the Universe to find answers to millions of questions related to status of the earth and the solar system and galaxies. The recent landing of Vikram on Lunar surface added one more dimension to the race.

If the nature of earth is studied minutely, it can be generalized that the sum of the resources always remain same. This is for the reason that whatever we exploit still remains as a part of the earth. The exploration of mines, minerals, oil, water etc. remains on the earth even after the consumption. The obvious reason is, the total mass and energy which cannot be created or be destroyed.

The only effect on the planet is disturbance to the routine life of human and animals residing on the Globe. If you take a case of Himalaya

was not felt as movement of human being was restricted due to lack of means of conveyance.

Those who are born after independence (like myself) will be well aware that there were no roads to go to Badrinath, Kedarnath, Gangotri & Yamnotri (so called Chardham) in Uttarakhand (earlier Uttarpradesh). People used to cover the pilgrimage on foot or on pony. The land slide was happening even at that time. The pucca roads came in to existence in seventies (1970 onwards)

The experts attribute the recent calamities in Himalayan region to various developmental works and projects like Hydro power plants, Dams, Roads etc. The other reason given for the episodes is expansion of cities and town on the hill slope and poor drainage.

It is not an intention to undermine the findings of experts but a logical look at the total mass of Himalayan mountain and mass which is disturbed by the development and population, should at least set a wave of thinking as to what else can be responsible for trouble in Himalayan region.

Forgetting Himalayan region, the flooding all over the world, devastating cyclones, eruption of volcanos, earth quake etc. should also be attributed to climate change and human interference?

Malthusian theory of population hints at control on population through natural causes and manmade causes. However, he coreleted the control to the availability of food which is being contested. Otherwise we see it coming true in a way or the other. Other aspect of his theory is that it was based on the Global situation in last quarter of 18th Century. The green revolution, industrial revolution and medical development were not predicted by then.

The important point to be taken in to account is the increasing needs of the human being on the earth and reliance on each other. Earth is a Global village now and there is a race for survival. In such circumstances technological development cannot be put on hold. Increase in population is due to sufficient availability of food (save some very much underdeveloped countries) and medical assistance all over the world.

World's population has increased from 2.5 Billion in 1950 to 7.9 Billion by now. For sustenance of this increasing population we need to have enough infrastructure. This is bound to impact the environment. The natural calamities are part of the earth's own activities and those influenced by seismic activities.

Therefore, we have to take such mishaps in our side and go on living. However, we should see that we do not make our present life miserable by adding pollution and unlawful use of natural resources and forest cover.

Best wishes to the readers for upcoming festivals, the last being Diwali.

Er. SM Takalkar
Patron

SWEET MEMORIES OF 27TH AGM



Event beginning with Ganesh Stuti
L to R Er. Trivedi, Er. Harani, Er. Joshi,
Er. Akre, Er. Shah, Er. Yadav



**Welcome address by
Vice-Chairman**



August gathering



Brief History of SPE (I) Vadodara by Chairman



Presentation of Yearly Report & minutes of EOGM by Secretary



**Event Anchoring
Er. PA Shah**



**Presentation of Accounts by Treasurer
On the dais L to R Er. SP Trivedi, Er. VB Harani,
Er. YV Joshi, Er. GV Akre, Er. RS Shah**

OPEN HOUSE SESSION



Vice-Chairman conducting Open House Session

SUGGESTIONS BY MEMBERS



Er. JC Marathe



Er. Manish N Pandya



Er. KN Velani

HONOURING/FELICITATION & RESPONDING



Er. Takalkar felicitated by Chairman



Er. Takalkar responding his felicitation



Er. PH Rana felicitated by Chairman



Er. Sangeeta Godkhindi honoured by Chairman



Er. Neeraj Panchal honoured by Chairman



Er. HA Hadwani honoured with shawl by Secretary



Er. YK Sharma honoured with shawl by Treasurer



Er. YK Sharma responding his honoring



Standing ovation to the Chairman for his selfless service to the Chapter



Er. Sangeeta Godkhindi responding to honouring



Vote of thanks by Er. SP Trivedi

NEWLY ELECTED EC MEMBERS



**Newly elected EC Member
Er. Tilwalli thanks members**



**Er. RS
Shah**



**Er. YV
Joshi**



**Er. VB
Harani**



**Event Anchoring
Er. Prarag Parmar**

Integration of Renewable Energy – Challenges for Grid Stability and Way Forward

Ravish Chandra Jha, AGM and Suneet Mehta, Sr. Manager – NTPC Ltd.

Abstract: Fossil fuels have been providing most of energy requirements of all the sectors till now. However, the serious environmental concerns have resulted in countries agreeing for phase down of coal power and looking at alternative sources of energy. Renewable energy technologies are the key to reducing GHG emissions from the power sector. The paper discusses the challenges of renewable integration with a focus on grid stability issues with such large integration.

In order to achieve Green House Emission targets (COP26 targets) and to reduce dependency on fossil fuel-based generation, most of the countries around the world are planning to increase the generation from renewable sources. Government of India (GoI) has set a target of achieving 175 GW of renewable generation by 2022 and 500 GW by 2030. The increasing penetration of renewable energy poses many challenges to the stability and reliability of the power system. The paper brings out the challenging aspects of requirement of short circuit power, inertia and dynamic reactive power in the changing grid scenario and available technologies to deal with these challenges. There is an urgent requirement of regulatory policies and cost recovery mechanisms for the required ancillary services (inertia, short circuit power, dynamic reactive power etc.) to promote investment in the area so as to ensure grid stability and reliability in the renewable era.

1. Introduction

Fossil fuels have been providing most of the energy needs of the world for past many years. These include the energy required for the transport, industry and power sector. The use of fossil fuels produces large amounts of CO₂ which contributes to the greenhouse effect and in turn causes global warming. The SO_x, NO_x, CO emissions and particulate matter released from burning of fossil fuels are the major contributors to air pollution. India contributes around 7% of the total global CO₂ emissions and is the third largest emitter of CO₂ in the world. Figure-1 & 2 illustrate the Global and Indian scenarios for CO₂ emissions from

various sectors. It can be seen from the figures that the major contributors towards CO₂ emissions are electricity and heat, industry and transport sector. The global commitments and actions for reducing the GHG emissions are growing but they still fall short of what is needed to limit the global temperatures and reverse the effects of climate change.

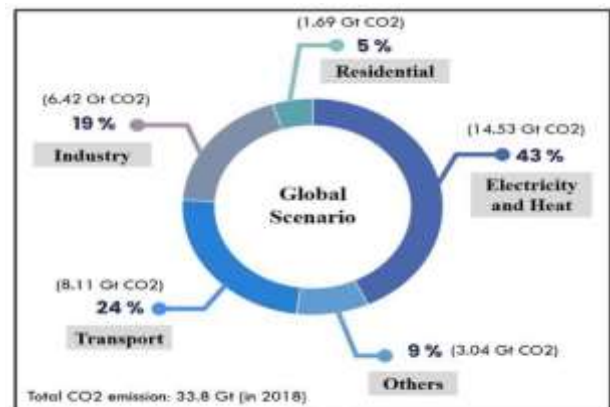


Figure 1: Sector wise CO₂ emissions (Global Scenario)

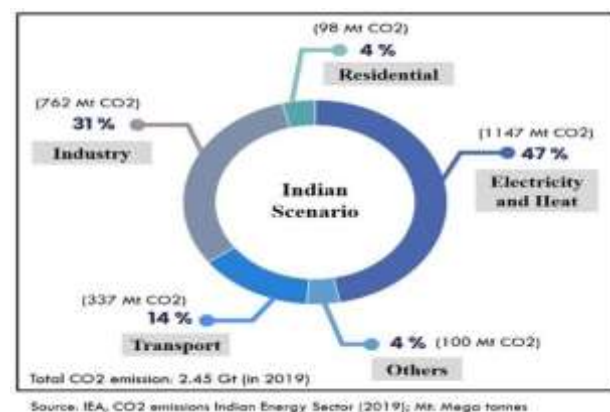


Figure 2: Sector wise CO₂ emission (Indian Scenario)

The UN climate change conference in Glasgow (COP26) has provided new building blocks that can get the world on a more sustainable low carbon pathway in future. The major contribution of GHG from electricity sector resulted in countries ultimately agreeing for a phase down of coal power and phase-out of inefficient sources.

2. India COP26 Targets

The target for decarbonization of Indian economy has been well and truly set by our Hon'ble PM in COP26. The commitments from India at COP26 towards climate action has broadly set two target dates:

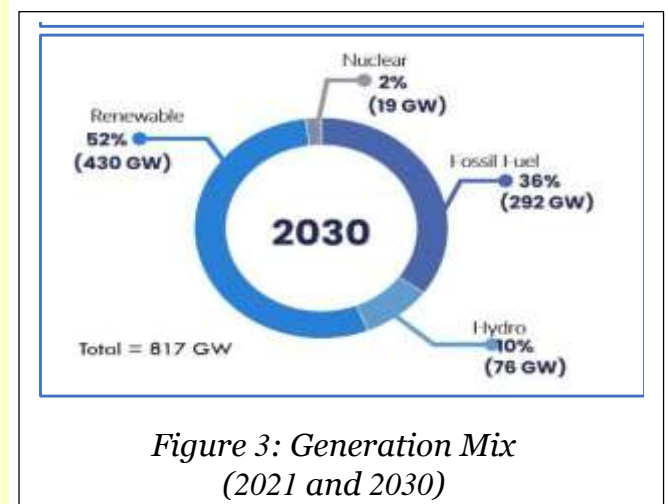
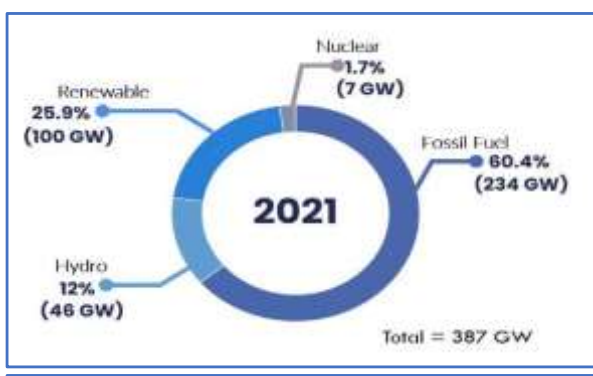
- 50% of India's energy to be met by using Renewable energy sources, 45% carbon intensity reduction and non-fossil fuel-based capacity of 500 GW by 2030
- Carbon neutral zero emission economy by 2070

A focused roadmap along with sound policy/regulatory framework is required for achieving the above targets. The ambitious targets provide opportunities for installation of renewable generation sources, higher EV/FCEV penetration, carbon capture and utilization (CCUS) which can further be used for ethanol/methanol production for use in existing vehicles and development of non-polluting alternate fuels which can replace fossil fuels.

3. Alternatives to Fossil Fuels

The power sector plays a key role across all sectors—from transport and building to industry and for production of low emission fuels such as hydrogen. Therefore, transformation of electricity sector is central to achieving carbon neutral zero emission economy by 2070.

As per CEA report on 'Optimal Generation Capacity Mix for 2029-30', the generation mix in 2030 is going to change with fossil fuels contributing approximately 36% (compared to 60.4% in 2021) and renewables contributing 52% (compared to 25.9% in 2021). A comparison of generation mix is 2021 and likely generation mix in 2030 in given in Fig.-3



Renewables can contribute most to decarbonizing electricity sector. As per IEA report (Net Zero 2050), 90% global electricity generation shall come from renewable energy sources with solar and wind accounting for nearly 70% of the generation. However, there are many challenges with such large renewable integration in to the system. The major ones being the intermittency of these sources, energy storage and grid stability issues.

Initiatives, policy / regulations are already in place for development of RE sector. Further, solutions need to be worked out for development of new technologies and promotion of existing technologies to address these challenges. Some possible solutions for addressing these challenges of energy storage and intermittency are as follows:

- Pairing battery storage system with solar PV, wind generators to improve power system flexibility.
- Promotion of Hydro, Pumped Storage Plants
- Development of Hydrogen infrastructure and use of green hydrogen for energy storage and power system flexibility.
- Retrofitting of coal and gas fired plants with CCUS during the transition phase. Carbon capture can be used to produce ethanol / methanol direct use as fuel in existing vehicles / aircrafts.
- Co-firing ammonia in coal fired boilers
- Co-firing biomass in coal fired boilers
- H₂ blending/firing in gas turbines

Grid stability issue which is a major challenge with RE integration is described in detail in the paper. Grid stability issues arise due to the flexibility required in the system to accommodate the supply side variability (due to large RE

generators in system), decrement of inertia, short circuit power and reactive power reserves in the system due to combined effect of addition of renewables energy sources and withdrawal of conventional energy sources from the grid.

4. Grid Stability Issues: Simulation Studies

A simulation has been carried out on a sample network to understand the effect of renewable integration on SCR. Sample network configuration is shown in Figure-4. Sample network was modelled in PSSE where system bus is connected to 1800MW of conventional generation and 800MW of renewable generation (in form of wind generation).

Short Circuit Power: It is the power required to maintain the voltage level in case of a fault. Short circuit power reflects the system strength. SCR of a bus is defined as the ratio of SC MVA to the MW rating connected at that bus.

Simulations of the following cases have been carried out on sample network described above:

- Case-I: All conventional generation connected in the bus (1800 MW) and no renewable generators connected (Figure-4). SCR calculated in this case is 5.09.
- Case-II: Addition of 2 nos. wind generators (400 MW each) in Case-I (Figure-5). SCR calculated in this case is 3.63.
- Case-III: Conventional generation of 800 MW is removed from case-II (Figure-6).
- SCR calculated in this case is 2.445.
- Case-IV: All renewable generators and one synchronous condenser (400/-320 MVAR) (Figure-7). SCR calculated in this case is 5.24.

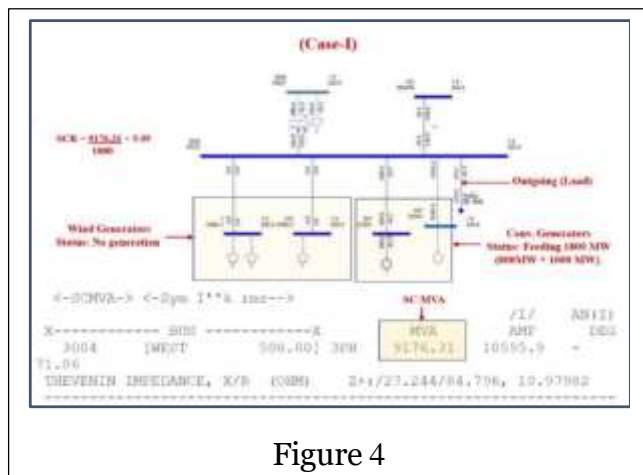


Figure 4

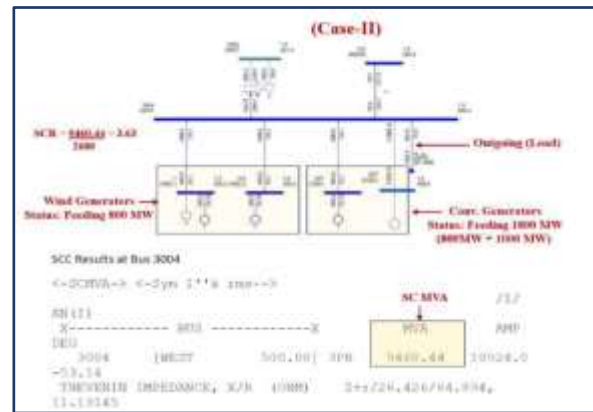


Figure 5

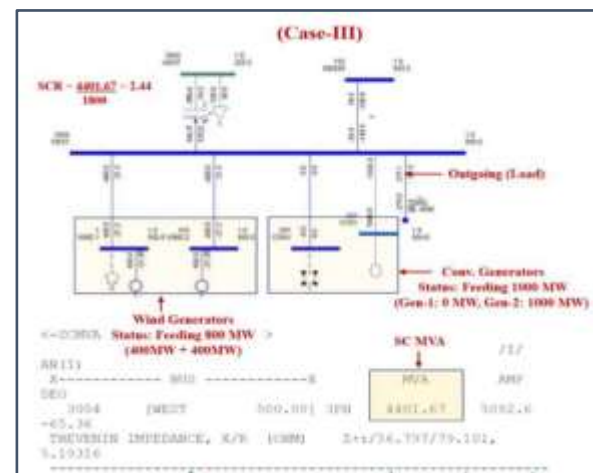


Figure 6

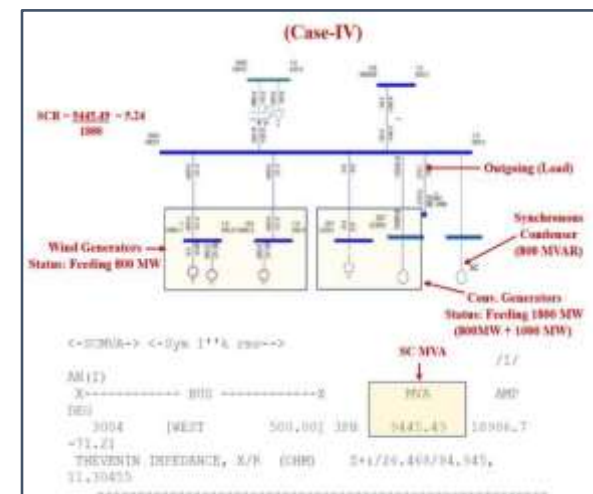


Figure 7

Inertia:

The renewable generators are connected to the grid using power electronic converters/devices and hence they cannot provide the inertia for grid stability in comparison to the conventional generators. As a result, the rate of change of frequency (RoCoF) becomes large with renewable integration. RoCoF indicates the

robustness of a power system to withstand sudden imbalances. A simulation carried out on a sample network by national grid (energy company operating in US) to understand the effect of Inertia constant (H) on RoCoF is given in Figure-8.

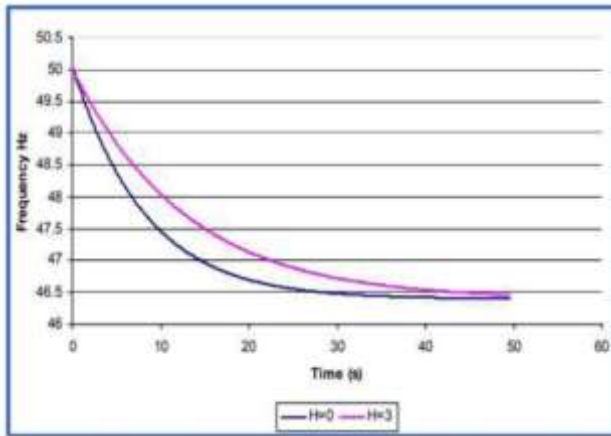


Figure 8

Dynamic Reactive Power:

Another issue which will crop up in the future grid generation mix shall be significant decrease in reactive power levels/reserves. During the transient fault conditions, low inertia wind turbines and inertia less solar generation may not be able to provide the required voltage support to the grid without proper reactive power support mechanisms.

For understanding the effect of the renewable sources on voltage stability (dynamic reactive power), a simulation for bus voltage restoration time in case of system faults has been carried out for the following cases on the sample network described earlier:

- Case I: Only conventional generation of 800 MW connected in the bus (Figure-9).
- Case II: Only wind generation of 800MW connected in the bus (Figure-9)

The difference in system response time (voltage response) during transient condition is indicated in Figure-9 for both the cases.

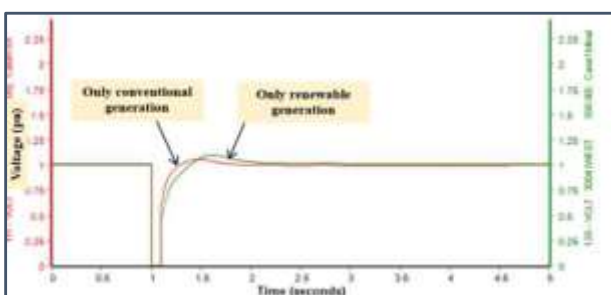


Figure 9

5. Challenges and Way Forward

Presently, for reactive power compensation, SVCs/STATCOMs are being installed in the Indian Power System by PGCIL as a "Grid Element". However, SVCs and STATCOMs cannot provide inertia and have a very limited capability to provide short circuit power which is essential for ensuring grid stability and reliability in renewable era.

Synchronous condensers can be a novel solution for provision of these ancillary services which is a need of the hour in renewable era.

Synchronous condenser is a conventional solution that has been used for many years for regulating reactive power before there were any power electronics compensation systems and can be tailored to meet the system requirements for these ancillary services.

Further, synchronous condenser-based augmentation of power networks with installation at strategic locations shall have the following advantages over SVCs/STATCOMs

- Provision of inertia, short circuit power, overload capability and low voltage ride through (LVRT) in addition to dynamic reactive power
- Low Cost of Installation (Approx. 35Lakh /MVAR for new synchronous condenser and 20Lakh/MVAR for repurposing retiring assets in comparison to 57Lakh/ MVAR for STATCOM)
- Promoting Make in India (Most of the components of Synchronous Condenser can be indigenously manufactured)
- No harmonics in the Power System

Also, many of the thermal plants in India are going to retire by 2027. Instead of scrapping these units, the retiring units can be converted to synchronous condensers and can provide an economical solution for required ancillary services as the same infrastructure and equipment can be used with some modifications. The lower capex costs and benefits of repurposing retiring units as synchronous condensers have also been highlighted in "Report on Reactive Power Management and Voltage Control Ancillary Services in India" submitted by POSOCO to CEA on 22nd March 2021.

Therefore, synchronous condensers may be the

most optimized and strongest technical solution to deal with problems of low inertia, short circuit power and reactive power requirement due to changing grid scenario.

6. Regulatory Support Required

Presently, no concrete mechanism and regulations are available for compensating the ancillary services (inertia and short circuit power) which are a need of the hour in the renewable era. In order to ensure grid stability, reliability and to promote investment in the field of ancillary services, there is an urgent requirement to formulate cost recovery mechanism and regulations for these services. Sound regulatory policies are necessary to ensure adequate provision of these ancillary services at a reasonable cost. The ultimate aim should be to develop regulations that ensure reliable, suitable and adequate ancillary services at strategic locations for overall stability of the power system at a realistic cost. The basic considerations while framing the regulations for these ancillary services shall be as follows:

- Assessment/mapping of required ancillary services considering planned renewable integration
- Provision of incentive/ benefit/ payment to all service providers of such ancillary services on non- discriminatory basis (irrespective of the fact if service provider is transmission utility or generation utility or independent facility)
- Policy Initiatives and regulation for the above ancillary services
- Revenue model/compensating mechanism for all ancillary services

Further, system studies need to be carried out by the system operator to ascertain which ancillary service is required at a particular location (considering planned RE integration). These studies shall help in deciding the equipment (STATCOM or a synchronous condenser or a combination of both and their ratings) to be installed for the required ancillary service. Further, similar cost recovery mechanism needs to be adopted for a particular ancillary service irrespective of the equipment that is providing the said ancillary service. For instance, synchronous condensers installations need to be compensated in a similar way SVCs/STATCOMs are being compensated.

7. Conclusion

Renewable energy technologies are the key to reducing GHG emissions from the power sector. Renewables can also play an important role in reducing emissions from buildings, industry and transport sector. Different options such as pairing battery storage system with solar PV and wind generators, promotion of Hydro and Pumped Storage Plants, development of Hydrogen infrastructure & use of green hydrogen for storage/flexibility, retrofitting of coal and gas fired plants with CCUS for producing ethanol/methanol for direct use as fuel in existing vehicles/ aircrafts in transition period, Co-firing ammonia in coal fired boilers (transition phase) and H₂ blending/firing in gas turbines need to be explored for addressing the energy storage and intermittency issues.

Further, with the growth of renewable integration and retiring of existing thermal plants, there is a challenge for grid stability due to lack of inertia and short circuit power. Short circuit power, inertia and reactive power compensation have inherently been provided by the conventional generators and hence grid stability has never been an issue in the pre-renewable era. The renewable generators which mostly consist of solar and wind are integrated to the power system with the use of power electronic devices. The renewable generators connected through these power electronic devices pose challenges to the power system as they cannot provide inertia, have limitations of providing short circuit power, reactive power and introduce harmonics in the power system.

For grid stability issues, synchronous condenser-based augmentation of power networks with installation at strategic locations can make the system performance at par with conventional generation technologies, where active power is being generated from wind farms or solar parks and other requirements of critical ancillary services are met by the synchronous condenser. System studies, identification of type and location of ancillary service (at that particular location), well planned pricing mechanism and regulatory policies are necessary for promoting investment in ancillary services. These systems need to be in place as early as possible so that ancillary service providers are ready when there is a major shift from conventional to renewable generation.

MEMBERS IN NEWS

The Institution of Engineers (India), Vadodara Local Centre organized “**Engineers Got Talent**” programme on 09 Sep 2023 at Engineers Bhavan, Vasvik Hall, Race Course Vadodara as birthday of Royal Charter of IE (I). Our Life members have participated in the

Er. PH Rana – sang three songs.

Er. SM Takalkar – played flute.

Er. Bihag Majmudar–sang Gujarati Song

Er. Bipin Makwana – played Tabla



Er. PH Rana – singing a song, Er. Majmudar on Harmonium & Er. Makwana on Tabla



Er. Majmudar singing with Harmonium & Er. Makwana on Tabla



Er. SM Takalkar playing flute & Er. Makwana on Tabla



Audience enjoying the programme

A National Conference on **“Failure Analysis of Power Transformer / Reactor – Case Studies”** was organized by CBIP and CIGRE. The conference was conducted under the aegis of CIGRE NSC A2 on Power Transformers and Reactors. The conference was held on 9 & 10 Aug 2023 at Hotel Le- Meridien, New Delhi.

The following members of SPE (I), Vadodara Chapter has taken active participation in the conference:

- ✦ **Er. YV Joshi** – **Session Chairman** on 10 Aug 2023. Technical Session-4 Condition Monitoring Techniques – II.

- ✦ **Dr. (Er.) AJ Chavda** – Presented technical paper on **Fire Incidents of Power Transformers – Case Studies.**

- ✦ **Er. SM Takalkar & Er. PA Shah** – submitted technical paper on **Design and Essentiality of Transformer Fire Protection System** and presented by **Er. PA Shah**

- ✦ **Er. PB Mehta** – Presented technical paper on **Case Studies of Failure of Power Transformer and Analysis thereof.**



Er. PB Mehta



Er. (Dr.) AJ Chavda



Er. PA Shah



Er. YV Joshi, Session Chairman

OBITUARY



Er. Atulkumar P Parmar, Retd. DE, GETCO and Life Member of Society of Power Engineers (I) Vadodara Chapter passed away on **06 Jul 2023**

May God give peace to the departed soul and give strength to his family members to bear the impact.



Er. Rahulkumar H Vasavada, Retd. EE (Civil), DGVCL and **Life Member** of Society of Power Engineers (I) Vadodara Chapter passed away on **11 Jul 2023**.

He was having a sound cultural back ground.

He always greeted one with smiling face and was very popular in the power and civil engineering fraternity.

May God give peace to the departed soul and give strength to his family members to bear the impact.



Er. Padmakant M Pancholi, Retd. EE, GSECL and **Life Member** of Society of Power Engineers (I) Vadodara Chapter passed away on **15 Jul 2023**. He had worked in different capacities

before retiring as Executive Engineer. He was very amicable and friendly in relations with the members.

May God give peace to the departed soul and give strength to his family members to bear the impact.

Disclaimer

The views expressed in this newsletter are solely of the author and do not necessarily reflect the views of the editorial committee and Society of Power Engineers (I), Vadodara

The End