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M4

RENEWABLE
Energy Portfolio

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Knowledge Partner





INTRODUCTION

The impact of climate change is visible and one can recall what Mr. Al Gore alarmed at one point of time in his documentary - "An Inconvenient Truth". All over the world, the energy experts have understood the need of clean energy from Renewable Sources and it would be life line of the human living in coming days. Globally, sharing of RE in the energy basket is growing very fast. The average annual growth rate during the past ten years (2005 to 2014) was 23% and the world wind power could supply upto 2000 GW by 2030 and by 2050, it could provide 25 - 30% of global electricity supply. 2015 was an unprecedented year, as annual installations crossed the 60 GW mark for the first time in the history with a total investment of USD 329bn in the Clean Energy Sector. India stood at 4th position in Wind Energy capacity globally with 25088 MW (5.9%) in 2015 and 10th position in Solar Energy capacity with 5050 MW (2.6%). India has installed capacity of 26769 MW in Wind and 6763 MW in Solar as on 31.03.2016. We better catch up fast to fulfill our energy security mission through RE. The vision of our Hon'ble Prime Minister for 100 GW of Solar and 60 GW of Wind has set the ball rolling. We will have to adopt integrated approach to "maximize output from our investment in RE" and "use it effectively and efficiently everywhere in the system and products".

KEY AUCTIONABLE POINTS :

Mapping RE potential, which has maximum output

The estimated wind power capacity in India at 80 mtr. hub-height is 103 GW, but as per the finding of LBNL, USA, the estimated total Wind potential in India

ranges from 2006 GW (at 80 mtr. hub-height) to 2131 GW (at 120 mtr. hub-height). The 95% of the Wind potential in India is concentrated in Southern and Western States. We, therefore, have to prioritize locations for maximum return from our investment. In off-shore, India is yet to take a concrete decision. In Solar space, the maximum potential is available on Western part in the States of Gujarat and Rajasthan.

Selection of Right Technology

In India, we have an annual average wind speed of only 4 - 7 m/s whereas WTG are designed to deliver rated output at wind speed range of 12 - 14 m/s. The WTGs will, therefore, operate at 1/3 to 1/2 of their rated capacity. The design of wind turbine, therefore, should account for this factor as well as other factors like weather, air temperature, ground elevation etc. In Solar, selection of PV technology and tracking system can maximize the output in diverse weather conditions.

While the Solar output is fairly known according to movement of the Sun, the Wind Energy output is quite variable, uncertain and intermittent. It is not only varying according to the season, but also during the day. As the installed capacity is growing up, the grid operator has a challenge of load balancing for reliable grid operation. In Gujarat, maximum output is available, when demand is low during monsoon. Moreover, there is low demand locally, so robust transmission system is required. These challenges in power grid operation are managed through ramping up/ramping down of conventional generation plant. In long run, we have to plan for the forecast mechanism, pumped storage, spinning reserve and energy storage system.

RE Management Centre

It is absolutely essential to have full scale real time data capturing and communication system for forecasting, scheduling, spinning reserves, power quality and management of grid, exclusively for RE. RE Management Centre will have to be planned and stakeholders of RE to share the responsibility. We should not miss at this juncture that large scale power injection from Solar PV at distribution level is equally threatening and would require similar management centre.

Transmission Infrastructure and Support System

Having said that RE potentials of maximum output are available either in remote locations or close to coastal line, we have to necessarily focus on power evacuation system both at Inter-State and Intra-State level. Green Energy Corridor with the funding of NCEF is a major transmission system under construction.

Distributed Generation and Micro Grids

Distributed generation in remote locations exclusively for local community from Solar PV alongwith energy storage system and control system, is the most economical power supply system. It curtails uncertainty of power supply system through long distribution lines as well as losses. The hybrid solution of RE combining Wind, Solar and DG Set is also a good viable alternate.

Grid Code, Grid Connectivity Obligations and Regulatory Intervention

So far, it is not followed strictly, but now onwards, we will have to ensure that grid connectivity obligations are complied by Wind and Solar developers. Many obligations are to be taken care at manufacturing stage and validated at site during commissioning. Regulatory intervention will be catalyst to safeguard the interest of stakeholder and balance the eco-system of RE.

Innovation and Technology

Effective and efficient utilization of RE in day to day human life in essential areas like lighting, cooking, heating, transport (Ev's), education, telecom tower etc. can save million tonnes of fossil fuel and environment. Research Institutes and Scholars are doing good job in product and system design powered by RE. IT and Communication technologies have revolutionized the functionality of product and system design and same can be leveraged in RE Innovations.



| Sequence | Topic | Speaker | Duration (Mins) | From | To |
|--------------|---|---|-----------------|-------|-------|
| Introduction | Welcome & Inaugural Address | Suzlon | 15 | 9:30 | 9:45 |
| Session 1 | RE Potential and selection of right technology | | 60 | 9:45 | 10:45 |
| | Sesssion Chair | Mr. V Subramanian, CEO & Chairman, InWEA | | | |
| | RE Resource in India | Mr. Ravi Vohra - NREL | | | |
| | Challenges in development of solar thermal technologies | Dr Satyendra Kumar | | | |
| | Assessment of Wind Energy Resources in India | Mr. T Harinarayana, Director, GERMI | | | |
| | Development of off-shore wind in India | Ms Shruti Shukla, Director, GWEC | | | |
| | Latest wind technologies | Mr. Gorge Winkelmann, Suzlon | | | |
| | Tea Break | | 15 | 10:45 | 11:00 |
| Session 2 | Planning for grid integration of Renewable Energy | | 60 | 11:00 | 12:00 |
| | Sesssion Chair | Mr. S K Soonee, CEO – POSOCO | | | |
| | Implications of large scale RE integration on grid | S K Soonee, CEO – POSOCO | | | |
| | SLDC Perspective | B. B. Mehta, CE (SLDC) - Gujarat | | | |
| | RE integration - Central Perspective | Dr. Subir Sen, ED, PGCIL | | | |
| | Renewable Energy integration studies and operational issues | Mr. Arun Unni, GE | | | |
| | State level preparedness for RE integration | Ajit Pandit, Director, Idam Infra | | | |
| | Service Provider perspective | Vishal Pandya, Co-founder & Director, ReConnect | | | |

| | | | | | |
|-----------|---|---|------------|-------|-------|
| Session 3 | Grid Code, connectivity, obligations and regulatory interventions | | 40 | 12:00 | 12:40 |
| | Sesssion Chair | Dr. Pramod Deo, Former Chairman - CERC | | | |
| | Implications of large scale RE for future grid | Balawant Joshi, MD - Idam Infra | | | |
| | Net metering regulations for rooftop solar | Ronnie Khanna, Dy. Chief, USAID PACE-D TA Program | | | |
| | Distributed Generation | Mr. Sandip Sinha, VP, ABB | | | |
| Session 4 | Innovations in RE technologies and energy efficiency | | 50 | 12:40 | 13:30 |
| | Sesssion Chair | Mr. Anand Kumar, Chairman, GERC | | | |
| | Waste to Energy in Industries | Mr. Ulhas Parlikar, Director, ACC - CII Godrej GBC | | | |
| | Hybrid RE model | Mr. Arvind Tiwari, Manager, GE | | | |
| | How to make Wind Power more competitive and Financing Issues | Mr. Arvind Bansal - CEO & Founder, Continuum Energy | | | |
| | Solar Tracking System | Mr. Navshil Sharma, Director, InSolar Energy Pvt. Ltd., | | | |
| | Wind - Solar Hybrid solutions | Mr. Antonio Segarra, Chief Technical Officer, Gamesa | | | |
| | Lunch Break | | 60 | 13:30 | 14:30 |
| Session 5 | Technical Paper review and Q & A Session | B. B. Mehta, CE (SLDC) - Gujarat | 90 (01:30) | 14:30 | 16:00 |
| Closing | Vote of thanks from knowledge partner | Suzlon | 10 | 16:00 | 16:10 |
| | Tea Break | | 20 | 16:10 | 16:30 |

SPEAKERS



Mr. V Subramanian
CEO & Chairman,
InWEA

V. Subramanian, an IAS of 1971 Batch (West Bengal cadre), has served 37 years in several prominent capacities with the Government of India and the Government of West Bengal. As the secretary with the Ministry of New and Renewable Energy (MNRE), Government of India, he pioneered important initiatives for the development of the renewable energy sector, including the introduction of the Feed-in Tariff concept. As additional secretary and, later, financial adviser, Ministry of Rural Development, he implemented the national rural development plans including the National Rural Employment Guarantee Scheme. Presently, he is a freelance consultant. He is also the business development adviser to the Council for Industrial and Scientific Research in New Delhi, secretary general of the Indian Wind Energy Association and chairman of the Research Council of Indian Institute of Petroleum (in an honorary capacity).



Mr. Ravindra Vora
Advisor, International Programs -
Renewable Energy &
Grid Integration, NREL

Mr. Ravindra Vora is the Advisor of International Programs on Renewable Energy & Grid Integration in National Renewable Energy Laboratory (NREL) since 2014. He advises the US Department of Energy's 21st Century Power Partnership Program and international initiatives in Switzerland, India, South Africa, Mexico, and Pakistan with activities including utility scale renewable energy deployment strategies in emerging countries, development of smart hybrid-clean energy microgrid system for rural and urban slums, and energy storage application for renewable energy grid integration and distributed generation in microgrid systems. He is also associated with Transventure Energy LLC and TransWind Energy LLC for promoting sustainable clean energy solutions and reforms in power sectors worldwide. Prior to joining NREL, Mr. Vora served as the Renewable Energy Advisor to South

Africa's national utility company, Eskom, and launched Suzlon's successful entry into the USA. He holds a Bachelor's and a Master's degree in Chemical Engineering from Iowa State University and a Master's degree in International Management from Thunderbird Graduate School of International Management.



Dr. Satyendra Kumar
Chairman & CTO Saurya
EnerTech

Dr Satyendra Kumar, a highly respected technologist with broad management and leadership bandwidth, has over twenty five years of experience in research, development and deployment of solar PV technologies. He has more than 200 publications in International Journals and Conferences.

Dr Kumar joins Saurya EnerTech from Lanco Solar where he was founding member and Chief Technology Officer. He was responsible for organization building and the technology strategy of the group's vision of sand to power business model. As a CTO and member of the top management council, he held cross functional responsibilities in organization building, business development, international purchasing, EPC and O&M. He directed technology acquisition, adaptation and implementation of manufacturing facility – polysilicon,

ingots, wafers, cells and modules (investment US\$ 300 million). He commissioning of over 200MW of PV power plants. Led award

winning design and development of plug and play roof-top PV systems. He led the team for monitoring, O&M and root cause analysis of more than 200MW of solar PV power plants employing different technologies spread across India. Africa's national utility company, Eskom, and launched Suzlon's successful entry into the USA. He holds a Bachelor's and a Master's degree in Chemical Engineering from Iowa State University and a Master's degree in International Management from Thunderbird Graduate School of International Management. As a Professor at IIT Kanpur (1990-2008) and subsequently as CTO at Lanco Solar (2008-2013), Dr Kumar has mentored a large number of young professionals for solar technology and business.

Dr Kumar is also founder and director of Swajal Water Pvt Ltd, a social enterprise providing solar powered safe drinking water solutions.

Dr Kumar got his education at IIT Roorkee, IIT Delhi, Ecole Polytechnique France and Penn State University USA.

Saurya EnerTech Pvt Ltd, an ISO 9000-2008 company promoted and managed by prominent technologists from IITs and industry in India. It has been engaged in consulting, training and installation of solar technologies since 2009.



Prof. T. Harinarayana
Director GERMI-RIIC,
Gandhinagar, Gujarat,
India

Dr. T. Harinarayana is the Director of the Gujarat Energy Research and Management Institute, Research Innovation and Incubation Centre, Gandhinagar, Gujarat. He holds two doctoral degrees in the field of Electromagnetics-one from Edinburgh University, UK & the other from Indian School of Mines, Dhanbad. He served earlier as Dy. Director at the National Geophysical Research Institute, Hyderabad for more than three decades. He is a leading Scientist, well recognized for his excellence in deep EM Technique-Magnetotellurics. He also holds the position of an Independent Director, Gujarat State Petroleum Corporation Limited, Gandhinagar, Gujarat. Dr. T. Harinarayana is a member of the Russian Academy of Natural Sciences, Moscow. He has received the National Mineral Award-1991, the Andhra Pradesh Scientist Award-2008. While serving as Scientist-'G' and Head Magnetotelluric Division, NGRI, Hyderabad he became a fellow and a member of

numerous national (IGU, AEG, APAS etc.) and international (IAGA, EMSEV etc.) scientific societies, academic forums and editorial boards of various techno-scientific journals of global importance. His academic and research excellence created opportunities for him to serve as a visiting professor and scientist at the University of Tokyo, Japan and the University of Texas, USA respectively. He has also organized and chaired a large number of conference / seminars and technical sessions.

Dr. Harinarayana has successfully completed several scientific research projects related to oil exploration – eg. marine magnetotellurics in gulf of kutchch - and led techno-scientific projects in India. He has guided a large number of master and doctoral theses and authored high quality publications in international and national journals, especially in the areas of hydrocarbons, geothermal, seismo-tectonics, earthquakes, tsunamis and deep crustal studies.



Ms. Shruti Shukla
Director - Policy and
Global Projects
Global Wind Energy Council

Shruti holds over 12 years of international experience working in the fields of energy policy and climate change. She joined the Global Wind Energy Council in 2010 as a Sr. Policy Advisor. At GWEC she is responsible for global wind markets analysis, policy and regulatory affairs and external projects. She is based out of Washington D.C. She is the lead for the GWEC led the Facilitating Offshore Wind in India (FOWIND) project. She is a co-author of both the Pre-Feasibility Reports for Gujarat and Tamil Nadu and the Global Offshore Wind Policy and Market Assessment Reports. She has contributed to and edited the Supply Chain, Port Infrastructure and Logistics Study under the project. She is also the co-author for IRENA's report on 30 Years' of Policy for Wind Energy.

Shruti holds an MS in Environmental Policy and Regulation from the London School of Economics and Political Science and an MBA in Business Economics from the University of Delhi.



Dr. Joerg Winkelmann
HO- Innovation and Strategic
Research, Suzlon Energy GmbH

Dr. Joerg Winkelmann is head of product innovation and product strategy processes at Suzlon Energy GmbH. Dr. Joerg joined Suzlon in 2003 and initially involved in WTG load calculation, validation measurement as well as certification. In 2009, he was appointed as Project Manager Innovative Products at Suzlon, where his main focus involves product innovation and product strategy processes. He has also worked at Motoren- und Energietechnik GmbH, where initiated the steps towards the wind industry on projects dealing with WTG dynamics. Dr. Joerg has done Mechanical Engineering and dynamics and gained his doctorate on the Optimization of a complex mechanical / dynamical device by Genetic Algorithm from University of Rostock, Moscow in 1999.



Mr. S. K. Soonee
Chief Executive Officer,
POSOCO

Mr. Sushil Kumar Soonee is the Chief Executive Officer of Power System Operation Corporation Limited since May 2010. Mr Soonee has three decades experience of Power System Operation of Eastern, Southern and Northern Grids of India. He has worked extensively in Integration of State Grids to form a Regional Grid and subsequent integration of Regional Grids leading to the formation of the National Grid. He has specialization in Power System Operation, Planning, Commercial, Settlement, Restoration and entire gamut of Power Pooling and Governance. Mr Soonee also has keen interest and expertise in electricity Markets including Power Exchanges, Open Access in Inter-State Transmission System, and Regulatory affairs besides expertise in Load Despatch Technology, integration of Renewable Energy Sources including REC Mechanism, Transmission Pricing and

development of Ancillary Services. He is a Fellow of Institution of Engineers (India), Senior Member of IEEE and represents India on the CIGRE Study Committee C2 on Power System Operation and Control



Mr. Ajit Pandit
Director, Idam Infrastructure
Advisory Private Limited

Mr. Ajit Pandit is the director of Idam Infra. Mr. Pandit has more than 17 years of experience in the development and implementation of various renewable energy generation schemes, transmission, evacuation, grid connectivity, and distribution schemes. He is recognized by the industry as an expert in policy and regulatory matters concerning electricity industry, and in renewable energy sector in particular. He has assisted several utilities, renewable energy developers, and state electricity regulatory commissions in addressing regulatory issues influencing the growth of renewable energy in India. He has also assisted FOR in developing uniform Renewable Energy Policy framework across States. Mr. Pandit was invited as member of a task force established by MNRE and CERC for grid integration of renewable energy projects and on resolving issues related to implementation of the Renewable

Regulatory Fund (RRF). He was also member of the standing committee on transmission formed by the Maharashtra Electricity Regulatory Commission (MERC) to review and formulate a long-term perspective plan for transmission system plans in Maharashtra.



Mr. Arun Kumar Unni
Principal Engineer
Energy Consulting, India
GE Energy Management

EDUCATION

Bachelor of Engineering, Delhi Institute of Technology
Advanced Management Programme – IIM Bangalore

EXPERIENCE

In 2008 Arun Kumar Unni joined the Power Economics team of GE Energy Consulting.

Mr. Unni is an expert in techno-economic evaluation studies involving power plant economic evaluation, tariff modeling. He has performed economic analysis of energy technologies encompassing the GE thermal & renewable product portfolios (including gas/steam turbines, gas engines & wind/roof-top PV applications), and assessed their competitiveness. Mr. Unni has also led consultancy studies covering power demand projection, generation & transmission planning and production

simulation for the ASEAN countries namely S. Korea, Philippines and Myanmar.

Before joining GE, Mr. Unni was employed for 12 years by the Reliance group of companies in the field of power project development. He was also part of the core team for standardization of costing of steam and power in cogeneration applications.

Topic: Renewable Integration in India

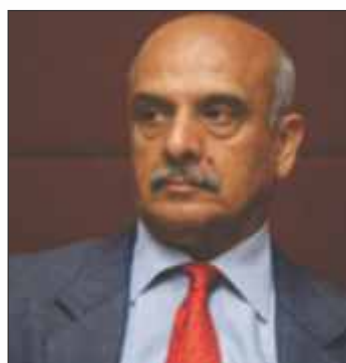
- a) Approach for renewable integration studies
- b) Operational issues with higher renewable penetration - Impediments and enablers
- c) Production simulation – India case



Mr. Vishal Pandya
REConnect Energy Solutions
Private Limited

An engineer by heart and has passion for power markets. He brings good understanding on regulations, power system studies, market models, programming, algorithms and renewable energy. That makes him the holy grail of energy market. He loves innovation through technology and believes in delivering things with a difference. He is an alumnus of IIT Bombay with specialization in power systems & power electronics. Before REConnect, he worked with IEX (business development) and L&T (power transmission and distribution).

A rare gujju soul who doesn't think much about money except for his strict veg. diet and love for dandia dance.



Dr Pramod Deo
Former Chairman - CERC

Dr. Pramod Deo is the former Chairperson, Central Electricity Regulatory Commission and is the longest serving electricity regulator in India. Dr. Deo has 30 years of experience in the Indian Administrative Service (IAS) of which more than 20 years of experience has been at both policy and project management levels in the energy sector. He has worked in the power sector in the Ministry of Power, Government of India, Department of Energy, Government of Maharashtra and international institutions like UNEP and AIT.

In the Department of Energy, Government of Maharashtra his major contribution was drafting the State Electricity Reform Bill 2000.

During this period he also held the concurrent charge of Environment Department. He has worked with the UNEP Risoe Centre on Energy, Climate and Sustainable Development (URC), located in Denmark as Senior Energy Economist for five years (1993 - 1998). On behalf of the Centre he also worked for UNDP on the development of Global Environment Facility (GEF) capacity building proposals to equip Egypt, Jordan and Malaysia to respond effectively to the Framework Convention on Climate Change (FCCC). All the energy-environment projects and climate change mitigation studies extensively covered power sector reforms, energy efficiency and conservation options.

He was the founding Director of state and national level energy institutions, namely the Maharashtra Energy Development Agency (1986-88) and the Energy Management Centre (1989 - 1993), set up to promote renewable energy and energy efficiency respectively. The latter has been upgraded under Energy Conservation Act 2001 to the Bureau of Energy Efficiency (BEE), a statutory body to implement the new law.

Dr. Deo is a recipient of the World Wind Energy Award 2005 from World Wind Energy Association for his outstanding achievement in the dissemination of wind energy. Confederation of Indian Industry (CII) selected him for their national award "Distinguished Personality - Energy Management" for the year 2006.



Mr. Sandip Sinha
Vice President - Microgrid
Program, India

Sandip Sinha is Program Manager of Microgrid in India.

He is responsible for Development and implementations of group business strategy for Microgrid in India. It includes market development and penetration, identifying suitable technology and solutions and support business on development of product, service deliverables and lifecycle management for Microgrid in India. He was previously heading the sales of Grid Automation business of Power Grid Division at ABB in India.

Sandip is a bachelor of electrical engineering from Bangalore University and MBA from IIT Delhi. He has over 22 years of extensive industry experience, which includes 19 years in ABB where he has held various management positions in the field of, Manufacturing, Testing, sales and Marketing, project management and services primarily in Energy Automation and communication domain.

ABB Group profile

ABB (www.abb.com) is a leading global technology company in power and automation that enables utility, industry, and transport & infrastructure customers to improve their performance while lowering environmental impact. The ABB Group of companies operates in roughly 100 countries and employs about 135,000 people.



Mr. Anand Kumar
Chairman, GERC

Mr. Anand Kumar has taken over as Chairperson, Gujarat Electricity Regulatory Commission on 5th April, 2016. Before joining Gujarat State, he has served the State of Meghalaya as Chairperson-ERC and State of Uttarakhand as Electricity Regulator. He holds a post-graduate degree in Finance Management and Graduate degree in Electrical Engineering from IIT-Roorkee. He has also done Advanced Software Programming Course from Hitachi, Japan and training in Economics Regulation from National Regulatory Research Institute, at Ohio University USA. He has more than 36 years of experience in the Power Sector of which 18 years of experience has been at Regulations, Reforms and Restructuring in the Power sector. Out of some key assignments, was his association in Unbundling and Restructuring of the power sector in Uttar Pradesh and assignments at Regulatory Commissions of Uttar Pradesh, Uttarakhand and Meghalaya.



Mr. Arvind Bansal
CEO & Founder, Continuum
Wind Energy Ltd

Arvind is a Civil Engineering Graduate of Indian Institute of Technology, Delhi (1991) and an MBA from Indian Institute of Management, Ahmedabad (1993).

Arvind has an experience of over 23 years in operations and investment banking, wherein he closed many transactions in the power, media and technology sectors and gained long and rich experience in the energy and renewable sector while advising on some of the early independent power projects.

His entrepreneurship inklings led him to start Continuum Energy in 2009.

He is also a Non-Executive Director on the board of Daiwik Hotels, a company focusing on mid-range hotels at pilgrimage tourist locations in India.



Mr. Ronnie Khanna
Deputy Chief of Party
(Renewable Energy), USAID
PACE-D TA Program

Mr. Ronnie Khanna is the Deputy Chief of Party (Renewable Energy) for the USAID PACE-D TA Program. He has experience of 12 years in advisory services in the areas of Policy and Programme Design, Business Model Design and Deployment, Strategy and Market Assessment for various stakeholders operating in the Renewable Energy Sector in India. He has extensive experience of working in the area of solar energy deployment especially decentralized solar deployment through solar rooftop installations, small hydro, wind and biofuels.



Mr. Ulhas V. Parlikar
Dy. Head, Geocycle India, ACC
Limited,

Work History:

4.5 yrs with Hindustan Lever Limited,
8.5 yrs with National Peroxide Limited and Past 21 yrs with ACC Limited

Education:

B. Tech (Chem Engg.) - Osmania University and M. Tech (Chem. Engg) - IIT Chennai

Experience:

Policy Advocacy; Business Function management; Marketing; Project Management; Process Design & Engineering; Strategic Planning; Collaborations for Technology Transfer & Technology Assimilation; Technology Development and Scale up; R&D;

Affiliations:

Expert member on several in-house and external committees; Authored chapter on AFR co-processing in “Low carbon technology road map for the Indian Cement Industry” published by IEA and WBCSD; Invited member of the committee formulated by CPCB / MoEFCC for preparing guidelines on SMC disposal; Invited member of the working group formulated by MoEFCC for drafting HWM Rules 2016; Chairman – CII project on increasing AFR utilization in Indian cement industry; Chairman – Advisory Committee of the SRI India Plastic Project by WRF;

Achievements:

Spearheaded the promotion of co-processing for waste management in India; Implemented >50 co-processing trials; Improved AFR utilization in ACC from Nil to half a million TPA; Implemented three pre-processing platforms for conversion of wastes to AFRs; Executed Design, Engineering & Commissioning of > 50 projects; Managed Consultancy services in 5 countries to set up of 24,000 TPA cement capacity; Developed & scaled up 20 Technologies; Negotiated and finalized collaborations for transfer of 10 technologies; Published >25 papers;



Mr. Arvind Tiwari
Manager, GE Global Research,
India

Arvind Tiwari is the Manager for the Renewable Electrical System at GE Global Research, Bangalore. The core research area of the group is focused on Power Conversion - Architecture & Control in Renewable domain.

The research group is actively involved in developing solutions involving electronic processing of renewable power, grid integration solution and farm controls enabling better productivity.

Prior to joining GE in November 2003, Arvind was faculty with Indian Institute of Technology, Banaras Hindu University, Varanasi, India (1998-2003) and with M/s Crompton Greaves Limited, India as Design Executive from 1997 to July 1998. Arvind is Senior Member IEEE, C. Engg and MIET (UK) and AMIE (India). Arvind has to his credit 20+ international &

national publications and 25+ patents in the area of electrical technology.

Arvind graduated from IET, Lucknow; M.Tech., IIT Delhi and PhD at IIT, BHU in electrical engineering.

Overview of the presentation:

Title: "Hybrid Renewable System - GE Experience"

At GE Global Research GE, we are keeping track of emerging trends and challenges in power sector both from local and global perspective. Locally, GE engineers have developed specific power generation solutions like the new 1.7MW – 103 M Brilliant Wind Turbine, which is built to handle the unique wind conditions such as low wind speeds experienced in India. With smart analytics and controls and energy storage/PV integrated with each, these turbines also can overcome challenges with power variability and efficient utilization of deployed infrastructure.

The keynote presentation proposes to introduce these new power architecture and controls enabling turbine integrated hybrid system. Presentation will cover innovative solutions and key projects deployment experience in the domain.



Mr. Antonio Segarra
Chief Technical Officer -
Solar Business Unit
Gamesa Renewable Private
Limited

Mr. Antonio Segarra, an Aeronautical Engineer, started his career in early 90's, has served across the areas of wind, Solar and Hydro project development. Today, he has an experience of over 20 years, spread across various Leading renewable energy companies in the world. In his previous positions, he has actively involved in the development of wind power project for Gamesa Eolic totaling to about 1500 MW. He was heading 9REN – a company specialized in Solar project development and EPC division of Sileken – a company specialized in PV module manufacturing. He also has his own investments in PV and Hydraulic plants. Owing to his hands-on experience in Wind and Solar, he now brings in a new energy in powering Gamesa's Solar Business & Solar Inverter Business through his treasured engineering capabilities.



Mr. B B. Mehta
Chief Engineer,
State Load dispatch Center,
Gujarat Energy
Transmission Co. Ltd.,
Vadodara

Mr B B. Mehta is Chief Engineer, SLDC at Gujarat Energy Transmission Corporation Limited (GETCO). He has been associated with GETCO for nearly three decades. He is overall in charge of efficient and secure Power System Operation and Control in the state of Gujarat as Chief Engineer (SLDC). He is actively involved in Renewable Energy integration, System stability, electricity market economics, energy efficiency & smart grid for power system operation and has also played key role in implementation of SCADA / PMU / WAMs / wind energy forecasting solutions. He has represented Gujarat at various forums and presented many papers at national level seminars. He is graduate engineer in electrical & electronics with Master degree in engineering with specialisation in computers with experience of about 32 year in the sector.



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