

Energy Transition: The Countdown Clock

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National Smart Grid Mission
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THE THEME

The theme of the World Utility Summit, WUS 2020 is "Utility Next". The electricity eco system is undergoing an unprecedented transformation with the proliferation of renewables, distributed generation resources and electric vehicles on one side and consumer activism and regulatory pressures on the other. Developing countries are also facing these challenges in addition to their ongoing activities to provide universal 24x7 power supply. Moreover, as many of the consumers of electricity become prosumers, the electricity eco system would change radically and new market entrants would emerge. There is an immediate need for utilities to evaluate how the provision and consumption of energy services would happen in the future.

This summit would bring in thought leaders across the globe to deliberate the preparedness of utilities to deal with the transformational changes. Regulators, technology providers, consultants, government bodies and utility leaders are expected to share their views on the various challenging and exciting scenarios and help shape the roadmap of the future utilities.

SUMMIT TRACKS



MARKET ENABLERS

Knowledge Partner - USAID in association with KPMG

With the emergence of distributed generation resources and availability of multiple electricity providers in today's era, consumers have a variety of options to meet their changing energy demands. At the same time, future of the electricity ecosystem will include higher penetration of next generation technologies like renewables, energy storage, electric vehicles and digitization.

The role of utilities would need to be repurposed to prepare for the future. What will the customer portfolio of utilities look like? What will be future expectations of the consumers from the utility and how will the utilities need to transform themselves to meet them? How will the utility markets evolve? These are some intriguing questions that will be addressed in this track.



REVENUE SECURITY

Knowledge Partner - CRISIL

Utilities get their revenues primarily via billing the customers for their demand and energy usage. New eco systems, with multiple options for consumers to meet their electricity demand, will pose stiff competition to the utilities. How can the investments made by the utilities be safeguarded? How can utilities ensure they are resilient to the transformational changes in the electricity eco system? What are the key learnings from similar experiences? This track will cover the latest developments on the upkeep of the financial health of the utilities, learning across the globe and develop a strategy for a resilient utility.



GRID TRANSFORMATION

Renewable Energy and Electric Vehicles

Knowledge Partner - GIZ

Renewables and electric vehicles are being promoted across the globe for a variety of reasons. These technologies will transform the power grids in an unprecedented way. Renewables introduce high intermittency in generation capacity. High intermittency leads to underutilized transmission infrastructure, increased impact on grid operations and increased need for flexible generation sources. Increasing penetration of electric vehicles will require major upgradation of infrastructure and new business models. New approaches need to be explored to ensure smooth and effective integration of these technologies with the power grids. This track will cover the case studies globally and deliberate the technology considerations and best practices to manage the network.



ENABLING TECHNOLOGIES

Digitalization and Cyber security
Knowledge Partner - Accenture

With the abundance of critical data in power systems coupled with remote access, operating the system securely without compromising system availability and data privacy is a major concern. Cyber security threats are increasing day-by-day and there is a continued need to develop mitigation technologies and solutions to make the power equipment/devices, control systems, communication and operations more secure. Today, many concepts like user and device authentication, data encryption, communication robustness, defense-in-depth, malware protection, whitelisting, system hardening, monitoring and analytics are used by the stakeholders to address cyber security issues effectively. All the stakeholders including equipment/device vendors, system integrators, owners/operators of system, government agencies and technology experts have a role to play in making the power operation and delivery secure. This track will cover the latest development and share best practices in this space.



POLICY & STANDARDS

Knowledge Partner - National Smart Grid Mission

With the changing dynamics of the electricity ecosystem, policies & standards become extremely critical to ensure the technical, financial and business viability for all the stakeholders. There is a need to have a robust policy, especially in the areas of distributed generation, renewables, electric vehicles and energy storage. Consumers should be made aware of the changing scenarios and engage them in the decision process. It is imperative that all the stakeholders in the future utility eco system should support the evolving regulatory standards and ensure seamless transition. Environmental aspects also have to be considered. This track will share the views of various leaders driving policy and standards to ensure that the key interests of all the stakeholders are safeguarded.



ENERGY STORAGE

Knowledge Partner - India Energy Storage Alliance (IESA)

Energy storage has a versatile role to play in operating grids and providing value to all the stakeholders. This includes balancing demand and supply, regulating frequency, managing renewables and providing autonomy for consumers. Energy storage will also play a very important role in achieving full potential of new and upcoming technologies. This track will cover the latest developments in technologies, new business models, grid dynamics, learnings from pilot demonstrations and operational considerations associated with these technologies.

MESSAGE FROM KNOWLEDGE PARTNER



Shri Arun Kumar Mishra
Director, NPMU
National Smart Grid Mission
Ministry of Power, Government of India
EY

The energy world is transforming rapidly. The government and societal initiatives driven by the desire to undo harm done by Industrial Economy i.e. Global Warming, have unleashed technological innovation in Renewable energy. Gone are the days of supporting Solar and Wind through fancy tariff of five-six times of average energy cost, DISCOMs are struggling to contain threat from Solar and Wind, recent manifestation being move from Net Metering to Net Billing. The technology company's dream of making Utilities history through futuristic solution, may be farfetched, this paper is an attempt by NSGM through partners to sensitise DISCOM leaders towards what to watch out for, also for R&D and manufacturing of advanced energy storage technologies in the coming decade.

MESSAGE FROM KNOWLEDGE PARTNER



Somesh Kumar

Partner and Leader - Power & Utilities (India, Bangladesh and Nepal region)
EY

World Utility Summit 2020 is expected to be a platform wherein Electricity Regulators, Policy-makers, Utilities, Industry and Academia representatives will share a common platform and deliberate on policies, regulations and standards in the power sector. The “Policy and Standards” theme has progressive agenda aiming to facilitate development of policies, regulations and standards in new domains. The summit will hold a session on these lines that aims to transform the way electricity is generated, transmitted and consumed with special focus on decarbonization, digitization and decentralization.

In the current scenario, utilities are on the threshold of a paradigm shift and conventional methods and technologies of operating the electricity grid are beginning to change. These disruptions are leading to creation of innovative business models that are ever-evolving. While renewables continue to grow at exponential levels, time of day tariffs enabled by smart meters are expected to be powerful incentives to establish commercial frameworks and capture value in emerging markets.

In this knowledge paper, we have defined the energy transition pathways that are rapidly evolving, driven by technological innovation and falling costs. The tipping points for decarbonization & decentralization of power generation system have also been defined, that are relevant to utilities, along with the pivotal role of digital grids in this journey of transformation. Furthermore, various opportunities that would emerge out of these disruptions have also been captured in the paper. also for R&D and manufacturing of advanced energy storage technologies in the coming decade.

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Introduction: Setting the context for energy transition

1.1 The energy transition pathways are rapidly evolving driven by technological innovation and falling costs

The energy industry globally (including India) is in various stages of transformation driven by 3Ds – decarbonization, decentralization and digitalization. Power sector is leading the ongoing energy transition driven by rapid decline in renewable electricity costs, particularly wind and solar power generation. The infusion of renewables, complemented with storage is already nearing grid parity. In addition, rising electricity consumption in new areas such as mobility, cooking, industrial process heat, etc. is creating opportunities for more dynamism in the electricity markets.

In India as well, the power sector stakeholders, particularly the electric utilities across GT&D segments will be on the front line bracing the impact of clean energy disruption and innovation. While clean energy investment has witnessed fast growth, it is also limited by inertia of incumbent players, processes and business models.

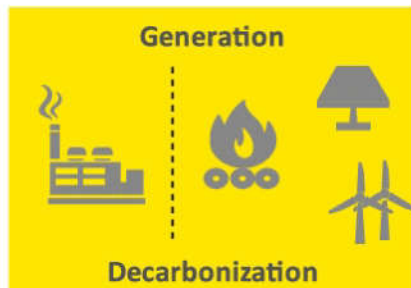
Turning disruptive threats into growth opportunities, testing new and innovative business models, initiating reforms and restructuring are the key imperatives. The Power & Utilities sector is approaching an important cross-road and therefore needs to consider many different futures to inform its purpose and strategic priorities.

Moreover, the clean energy transitional challenges are diverse and cannot be addressed by discreet efforts at individual stakeholder level. The lack of integrated planning approach is resulting in the lost opportunity of driving coordinated efforts, developing integrated solutions and achieving synergistic outcomes that have the potential to deliver cross cutting impact and benefits.

Planning for sustainable future pays off. Long term integrated planning is more cost effective than reacting to the challenges that can arise from clean energy transition – IRENA

We should leave fossil fuels before it leaves us – IEA

While energy transition is a shared concern among countries, progress will be a function of decisions taken within national settings reflecting specific social, economic and political priorities – World Economic Forum



- ▶ Bioenergy – biomass to power
 - Bagasse cogeneration
 - Other Biomass
 - Waste to energy
- ▶ Hydropower
- ▶ Solar PV
- ▶ Concentrated Solar Power
- ▶ Wind Power
 - Onshore
 - Offshore
- ▶ Solar Wind Hybrid
- ▶ Ocean Wave/Tidal Energy



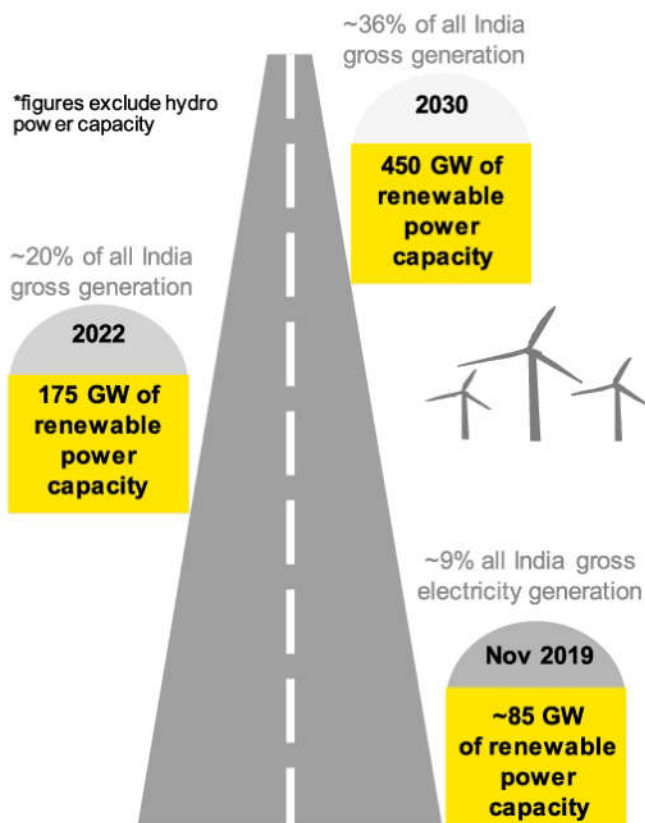
- ▶ Rooftop Solar PV, Building Integrated PV, battery storage (behind the meter and grid scale)
- ▶ Solar agriculture pumps
- ▶ Renewable based min and micro grids
- ▶ Combined Heat & Power
- ▶ Energy Efficiency – buildings, industry, infrastructure and appliances
- ▶ Electrification of mobility and industrial heat (fossil to electricity; fossil to hydrogen)



- ▶ Smart meters & AMI
- ▶ Demand response & Internet of Things
- ▶ Home and Building Energy Management Systems
- ▶ Smart EV charging systems

1.2 Renewables will continue to be the fastest growing sources of power generation through 2030

India aims for 175 GW of cumulative power generation capacity from renewables by 2022. This is nearly 2 times the current installed capacity of ~ 85 GW (as of Nov'19). Further, the CEA estimates that by 2030, the cumulative installed capacity from renewables could reach ~450 GW (excluding hydro), accounting for 54% of the all India power generation capacity.



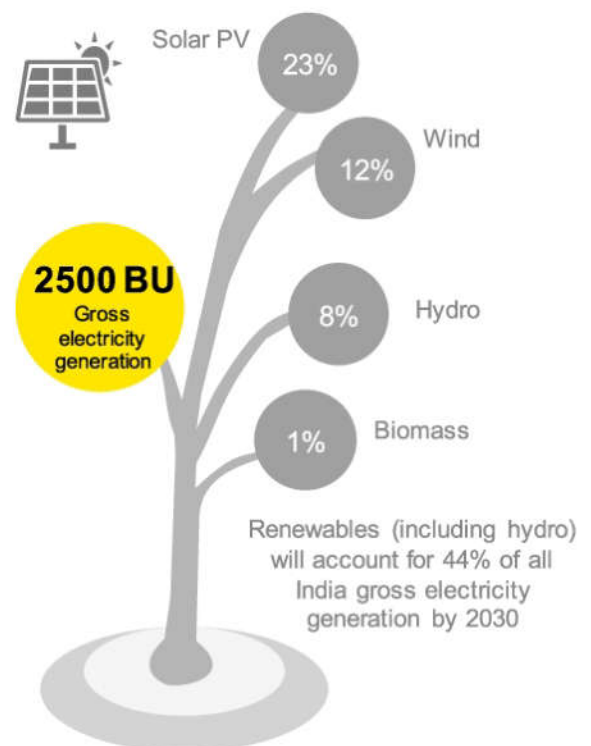
Source: CEA & MNRE 2019

Establishment of gigawatt and megawatt scale solar parks may continue to be the dominant mode of deployment for solar power in the next decade. Solar parks are integrated facilities built by pooling land and evacuation infrastructure together and enable solar power deployment to become a plug and play affair. Currently about 42 solar parks with a cumulative capacity of 23 GW have been either operational or in the process of getting established across 17 states. Solar power park developers along with land are identified and capacity allotted.

Solar and wind hybrid projects will gain momentum for efficient utilization of transmission infrastructure and land, reduce the variability in renewable power generation and achieve better grid stability. The existing policy seeks to promote new hybrid projects as well as hybridisation of existing wind/solar projects integrated with energy storage solutions.

The private sector investment will be central in building the new capacity. The sector has developed aggressive financing mechanisms and is mobilizing massive amounts of capital despite recent investment saturation. Auctions will be the preferred mode of capacity addition in future. As the share of solar and wind power generation rises, flexibility to cope with the variability and uncertainty will determine the pace of their addition.

Renewables generation mix by 2030



Source: Optimal Generation Mix for 2030, CEA 2019

Reasonably priced grid scale energy storage solutions will determine the pace of solar and wind power capacity addition beyond 2022. The CEA's optimal generation mix assessment estimates 136 GWh of energy storage capacity by 2030 to help integrate the increased share of renewables. Pumped hydropower is a proven cost effective energy storage solution globally, but its deployment could be limited because of competing uses, such as irrigation. A national policy mission is underway for promoting manufacturing, deployment, innovation and cost reduction of energy storage solutions. Additionally, a transition to some form of time-of-day pricing at the wholesale or retail level is recommended in National Electricity Plan (by CEA) to create self-sustaining markets for energy storage solutions.

Key policy instruments driving the energy transition in Power & Utilities sector

NDCs under Paris Climate Agreement	<ul style="list-style-type: none"> • Lower emissions intensity of its GDP by 33-35% compared to 2005 levels by 2030 - 21% reduction already achieved from 2005-14. • Increase total cumulative electricity generation from fossil free energy sources to 40% by 2030 - ~20% is the current share of energy mix from fossil free sources
RE capacity addition targets under National Solar Mission	<ul style="list-style-type: none"> • 175 GW renewable energy capacity by 2022 (100 GW Solar, 60 GW Wind) • 450 GW RE by 2030 • ~84 GW is the current installed capacity of renewable energy
Renewable purchase obligations	<ul style="list-style-type: none"> • 21% of procurement to be from renewable energy sources by 2022 by all state electric utilities and captive consumers • Solar (10.5%) and Non-solar (10.5%) targets notified for compliance
Reverse auctions	<ul style="list-style-type: none"> • Transition from feed-in-tariff based procurement to auctions with reverse bidding helped achieve lowest tariffs and competitive procurement
Solar park infrastructure support	<ul style="list-style-type: none"> • A plug and play concept for developers to de-risk land acquisition and evaluation infrastructure • 42 solar parks approved with a capacity of ~23 GW
Must run status for Solar and Wind	<ul style="list-style-type: none"> • To minimize curtailment, Solar and wind power installations enjoy must run status for power scheduling and dispatch as per the Indian Electricity Grid Code
Open access waivers for corporate procurement	<ul style="list-style-type: none"> • Open access waivers for corporate procurement of renewable energy has encouraged many leading companies transition to clean energy mix and save on energy costs
De-risking payment security	<ul style="list-style-type: none"> • The emergence of SECI, NTPC, EESL and other national players as demand aggregators and traders has helped de-risk the payment security for investors and project developers
Green energy corridors	<ul style="list-style-type: none"> • Interstate and intrastate transmission infrastructure capacity addition to integrate new renewable energy capacity addition in resource rich states – AP, Gujarat, Rajasthan, Maharashtra, HP, Karnataka, and TN
Net metering regulations for rooftop solar	<ul style="list-style-type: none"> • Nearly 29 states adopted the Model Net Metering Regulation 2013 keeping in mind the changing landscape for rooftop solar energy. CAPEX and RESCO models are largely the dominant business models so far but new utility centric business models will drive the future capacity addition.
Unnat Jyoti by Affordable LEDs for All (UJALA)	<ul style="list-style-type: none"> • World's largest LED lighting program with over 36 crore LED lamps, 71 lakh tubular lamps and 23 lakh BEE 5 star ceiling fans distributed across the country
Kisan Urja Suraksha evam Utthaan Mahabhiyan (KUSUM)	<ul style="list-style-type: none"> • Component-A: 10 GW of decentralized ground mounted grid connected renewable energy power plants for land owning farmers. • Component-B: expand energy access for 1.75 million marginal farmers by replacing existing diesel pump sets with standalone solar powered agriculture pump sets. • Component-C: energy independence of 1 million grid connected agriculture consumers by promoting adoption of solar powered irrigation pump sets.

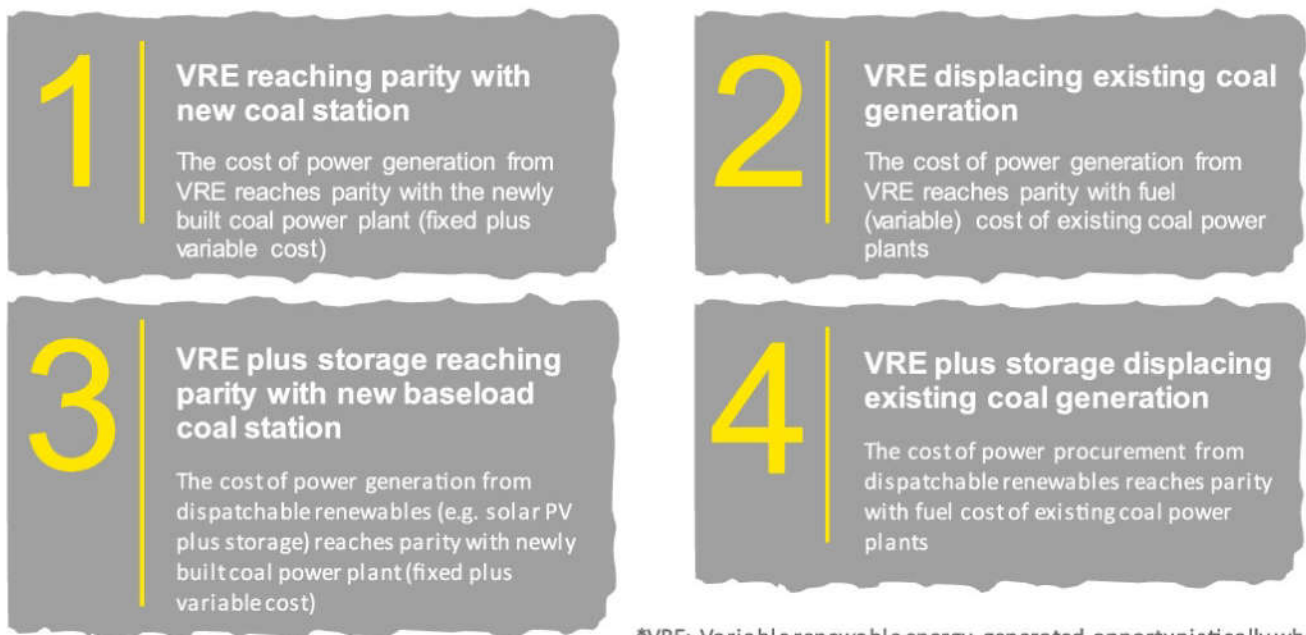
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The Countdown Clock for Energy Transition

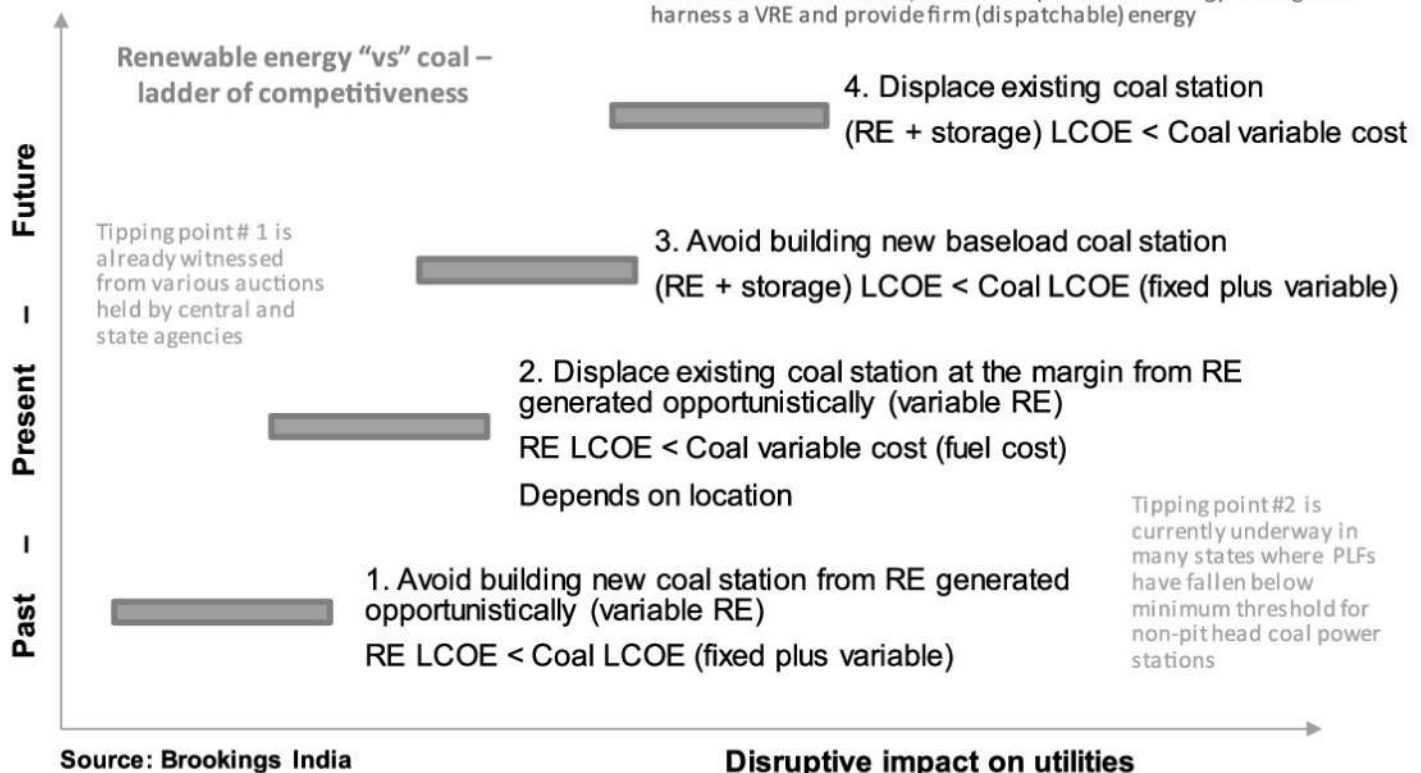
2.1 Understanding the tipping points for decarbonisation of power generation system

We are moving toward a new energy system, augmented and interconnected by digital technologies, where power and information flow in both directions. Generation is becoming more decarbonised, distributed and closer to the end consumer. Decarbonisation of power generation system from renewable energy sources will unfold/materialise through four disruptive “tipping points”, a term coined to characterize the transition through discrete events. Understanding the when, what, and how of the tipping points creates opportunities for electric utilities and other stakeholders.

Tipping points for decarbonisation of power generation system in India

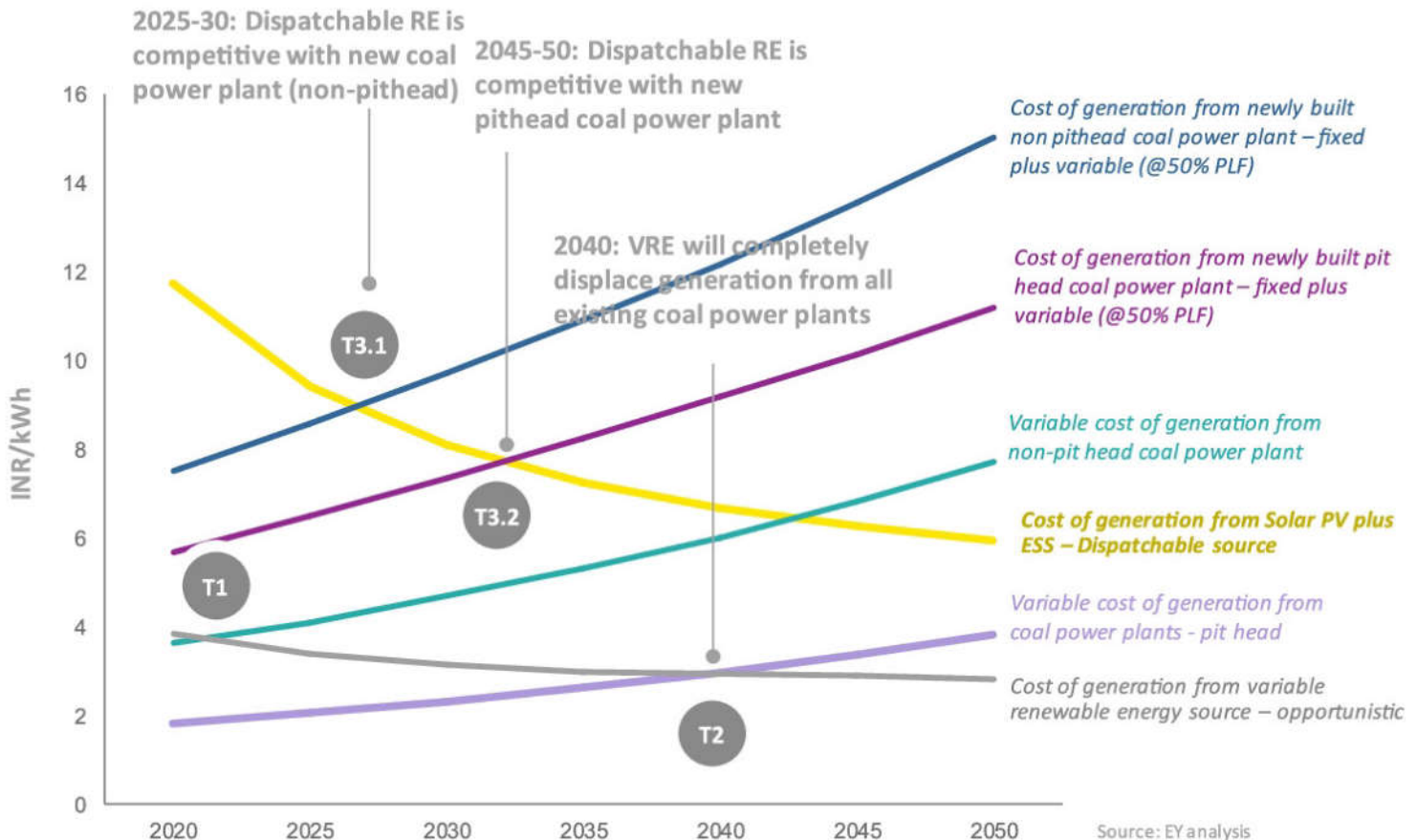


*VRE: Variable renewable energy generated opportunistically when the wind blows or sun shines; Renewable power with energy storage can harness a VRE and provide firm (dispatchable) energy



2.2 The Countdown Clock for Decarbonisation

Competitive advantage coupled with innovation will drive solar and wind power installations beyond their potential. Together with cost effective energy storage solutions (ESS), they will displace coal based generation and dominate the power supply mix through 2050. Dispatchable renewables, especially Solar PV integrated with energy storage solutions (ESS) at the generation site is forecasted to become competitive with new coal power stations (non-pithead) before 2030 and pithead stations before 2035. Variable renewable energy sources with opportunistic generation is already displacing the existing coal power plants (non-pithead) at the margin and by 2040, it is likely to displace generation from all operating coal plants including pithead stations.



The energy transition characterised by above tipping points will pose some obvious challenges that electric utilities must address to remain relevant in the rapidly evolving environment. For example, the PLFs of coal power stations may further drop below minimum threshold as they will become less competitive w.r.t to increasing share of VRE. The business case for new coal power stations to provide baseload will be increasingly challenged in the coming decade. Asset quality deterioration and heightened risk of NPAs / stranded assets in the thermal power generation sector is likely to be intensified, especially in the renewable resource rich states.

Insights from EY's future energy scenario modelling in the renewable resource rich states taking into account the above countdown clock for decarbonisation:

Deep decarbonisation of power generation system will help electric utilities flatten the cost of power procurement with only a marginal increase through 2050. This can also turn around the financial health of electricity distribution companies by bridging the gap between ACS and ARR. The benefits of affordable electricity for the consumers will outweigh the costs of clean energy transition. ESS capacity addition will be determined by the quantum of daily shortfall after exhausting all available sources of energy and inter day / seasonal load variability. Coal's share in the overall power generation mix will peak in 2025 and gradually diminish through 2050. Post 2035, both coal and gas based thermal power generation will compete to become the bridge source serving the evening shortfall that will likely persist even after the time shift of excess renewable energy by ESS and load shift of flexible load. The quantum of capacity addition required from these sources will be largely determined by ramping requirements.

2.3 The Countdown Clock for Decentralisation

Decentralisation of power generation system will unfold/materialise through three disruptive “tipping points”, with renewable energy sources at the centre of this transition. These three tipping points will be felt across all functions and by all stakeholders. Understanding the when, what, and how of the tipping points creates opportunities for electric utilities and other stakeholders.

The cost of round the clock decentralised solar power generation (solar PV integrated with ESS) for self-consumption will reach parity with grid cost of supply before 2030. Commercial & Industrial consumers, especially with predominantly day operations, will find DRE solutions more competitive than grid supplied electricity in the next 2-3 years.

Consumers with appetite for self production of clean renewable electricity will migrate from centralised power supply/grid supply. The power generation ecosystem will be increasingly distributed and closer to the end consumer. This is a tremendous opportunity for electricity distribution companies for turning disruptive threats into opportunities through new service-oriented, value-driven business models. Time of day retail tariffs enabled by smart meters can be a powerful incentive to establish commercial frameworks and capture value in these emerging markets.

Tipping points for decentralisation of power generation

Tipping point 1

“Grid cost parity” of non-utility solar plus storage systems

The birth of the new energy system

Tipping point 2

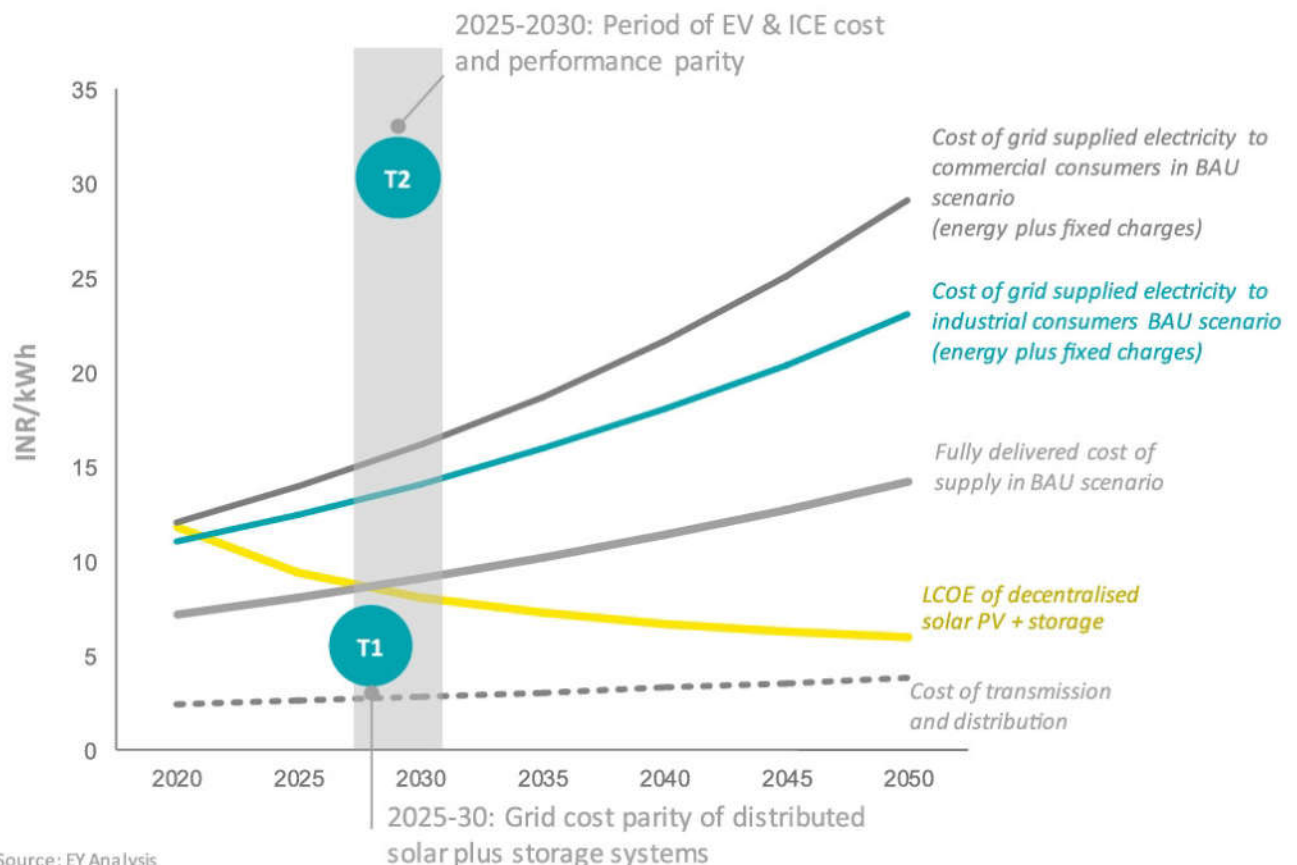
The price of battery electric vehicles reaches cost parity and performance parity with Internal Combustion Engine (ICE) vehicles

Electricity and mobility industry convergence

Tipping point 3

The cost of transporting electricity exceeds the cost of generating and storing it locally

The digital energy market place



3

**Energy transition led
opportunities in the
Power & Utilities
sector**

3.1 Turning disruption into opportunities

Clean energy transition in the utility scale power generation value chain would require lakhs of crores of capital investment towards adding giga/mega watt scale solar PV and wind power systems, cost effective energy storage solutions by electric utilities. This has immense potential to create direct jobs and local value creation in the sector. Accelerated transition would ensure a more secure, cost-effective, efficient and environmentally sustainable energy mix, while also combating climate change and air pollution threats.

However, distributed generation will take up increasing share of electricity demand in future. Specifically, distributed solar power generation will grow to contribute substantially more than utility scale systems. Solar powered irrigation will be one of the largest sources of distributed generation driven by increasing market share of solar powered irrigation systems and agriculture feeders. Rooftop solar capacity addition will be primarily driven by residential consumers, corporate procurement and favourable cost economics.

DISCOMs must evolve from electricity supply companies to becoming energy service companies with strong revenue streams in the distributed energy sources and associated ancillary services. They must continuously test and scale up innovative service oriented business models to compensate for revenue loss from defecting consumers and find value in the emerging distributed energy markets. Comprehensive reforms are required to restructure electric utilities and enhance their capabilities in this transition.

Solar powered off-grid solutions will rapidly emerge as viable alternatives for several livelihood applications promoting a sustainable rural economy. Two kinds of complementary solutions are emerging in this context:

- i. Product innovations for livelihood applications, which can use electricity efficiently and effectively
- ii. DRE-powered innovations that can bridge gaps in the centralised electricity supply system and power income-generating activities in rural areas

These innovations are already beginning to transform lives among rural population by increasing productivity and product value, reducing input costs and drudgery. A 2018 study by CEEW estimates about USD 13.2 billion market for 14 key DRE powered rural income-generating activities, which constitute about one-third of the 34 million micro-enterprises in rural India. These include custom tailoring, beedi manufacturing, restaurants, retail shops, hairdressing, flour milling, furniture manufacturing, jewellery making, poultry raising, sweetmeat making, and vehicle repair. The estimated market size pertains to the value of energy efficient appliances running with DRE (solar and battery) in these markets.

Apart from this, growing number of corporate customers are likely to enter into renewable PPAs to adopt high share of clean energy as their source of electricity. Corporate renewables deals is one of the important and principal driver for accelerating renewables share in the overall energy mix. Growing EVs will bring new load to the system which may not coincide with renewable energy generation without smart grid technologies.

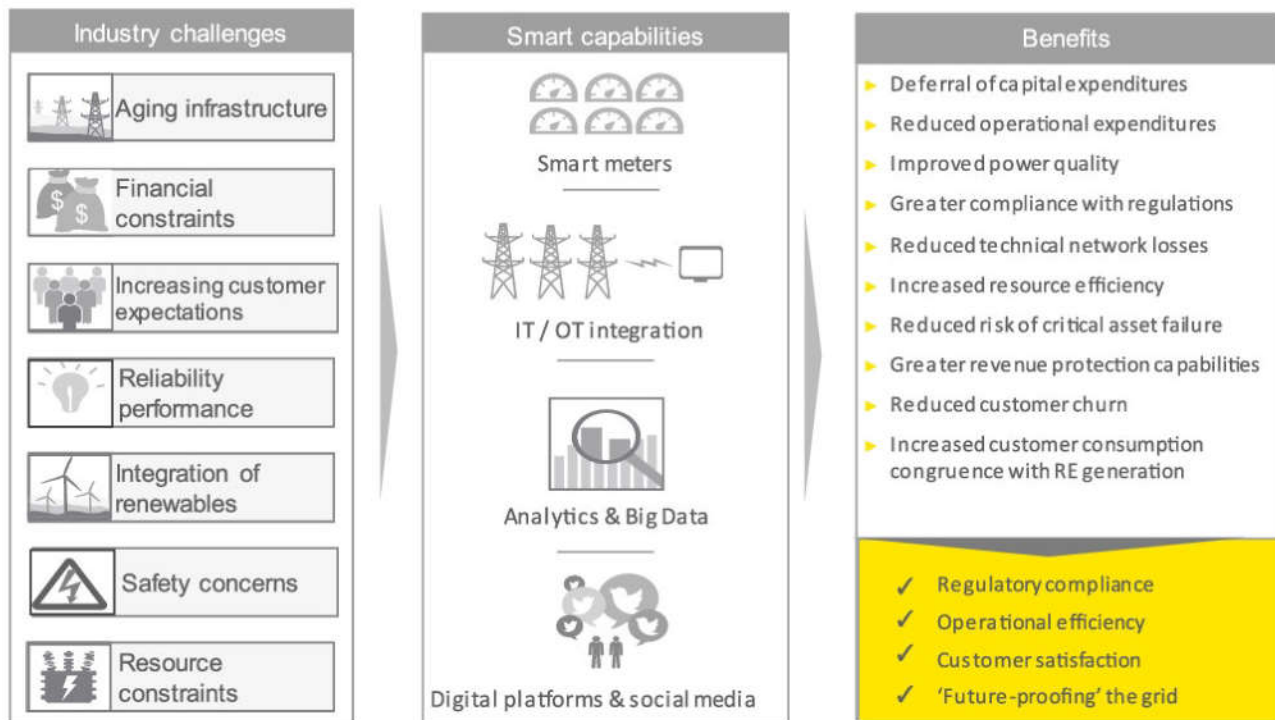
Renewable powered electrification of industrial heat is one of the key emerging transition pathways to decarbonise industry that is otherwise hard. However, total decarbonisation of this sector, particularly that requires high-grade heat may be difficult purely by means of electrification. Hydrogen produced from renewable electricity through an electrolyser could be cost effective & facilitate the integration of high levels of VRE into the energy system. Hydrogen could be the missing link in the decarbonisation of industrial heat. Key hydrogen technologies are maturing. Scale-up can yield the necessary technology cost reductions.

Solar PV and Wind Power	Battery storage	EV	Micro grids	HEM / BEM	P2P electricity trading – blockchain
Smart meters	Artificial intelligence	Grid edge technology	Cloud	Renewable powered electrolysis and hydrogen	Demand response & energy efficiency

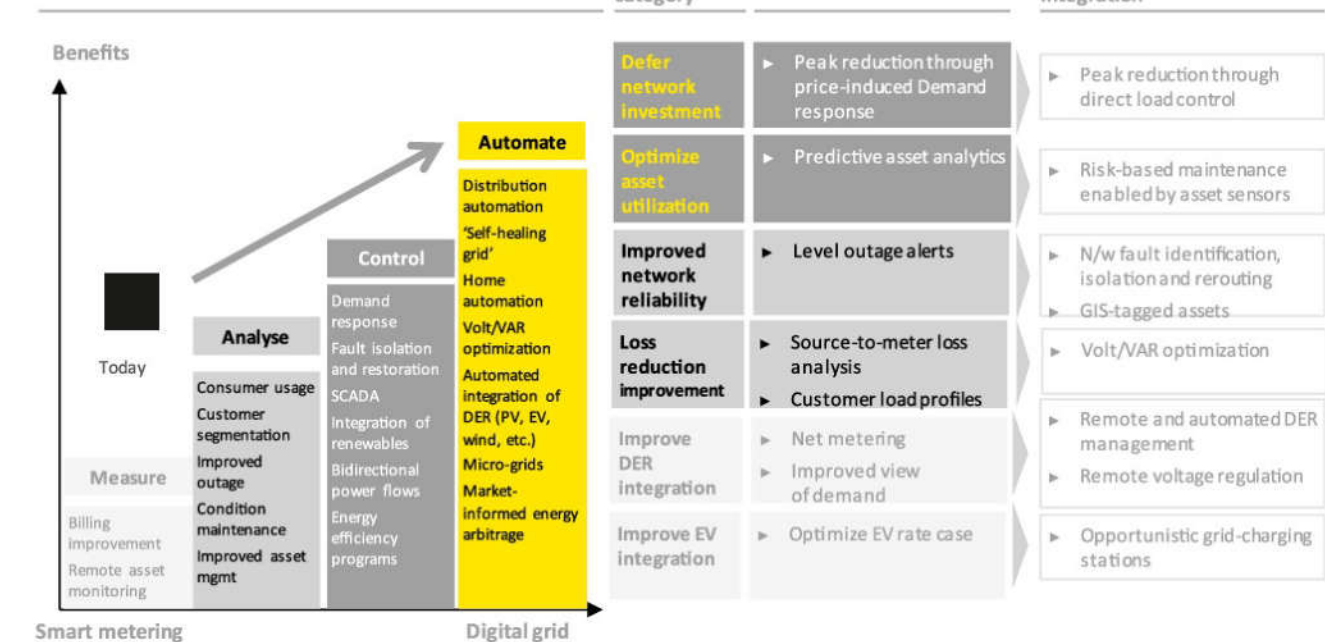
Industrial energy efficiency will take centre stage going forward driven by stringent regulations on energy consumption norms and competitiveness. Energy conservation building codes (ECBC) along with integrative design for radical efficiency of heating, cooling, lighting and appliances in commercial and residential buildings will be the single largest distributed energy resource through 2050.

3.2 Role of smart grids and digitization in accelerating the energy transition

Digital grid supported by a two-way communications can provide **insight and control** into the operations, empowering utilities to partner with end-consumer and better respond to disruptive challenges



Digital grid evolution anticipated for India



Source: EY Analysis

4

References

4 References

- ♦ A Second Wind for India's Wind Energy Sector Pathways to Achieve 60 GW, CEEW, 2019
- ♦ Repowering of old wind turbines in India, Indian Wind Energy Association and Indo-German Energy Forum, 2018
- ♦ Draft report on optimal generation capacity mix for 2029-30, CEA, February 2019
- ♦ Sanchit Waray, Sasmita Patnaik, and Abhishek Jain (2018) 'Clean Energy Innovations to Boost Rural Incomes', CEEW
- ♦ RE "versus" coal in India – A false framing as both have a role to play, Brookings India, 2018
- ♦ India Second Biennial Update Report to the United Nations Framework Convention on Climate Change, Ministry of Environment, Forest and Climate Change, Government of India, 2018 - <http://moef.gov.in/wp-content/uploads/2019/04/India-Second-Biennial-Update-Report-to-the-United-Nations-Framework-Convention-on-Climate-Change.pdf>
- ♦ RECAI (Renewable Energy Country Attractiveness Index) Issues 50-53, EY
- ♦ Renewable Energy Demand In India - Corporate Buyer's Perspective, WWF, 2019
- ♦ https://powermin.nic.in/sites/default/files/webform/notices/Clarification_on_Orders_related_to_Renewable_Purchase_Obligation_dated.pdf
- ♦ <https://powermin.nic.in/en/content/transmission-works-under-green-energy-corridor-%E2%80%93-ii>
- ♦ List of Solar Parks as on 31-05-2019, MNRE - <https://mnre.gov.in/sites/default/files/uploads/18.%20List%20of%20Solar%20Parks%20as%20on%2031-05-2019.docx>
- ♦ <http://www.ujala.gov.in/>
- ♦ <https://mnre.gov.in/sites/default/files/webform/notices/KUSUMguidelines.pdf>

The issues and points mentioned in this paper will be deliberated during the panel discussion and insights and concerns from utility practitioners, industry, regulators and policy makers will be shared post event.

1.About EY

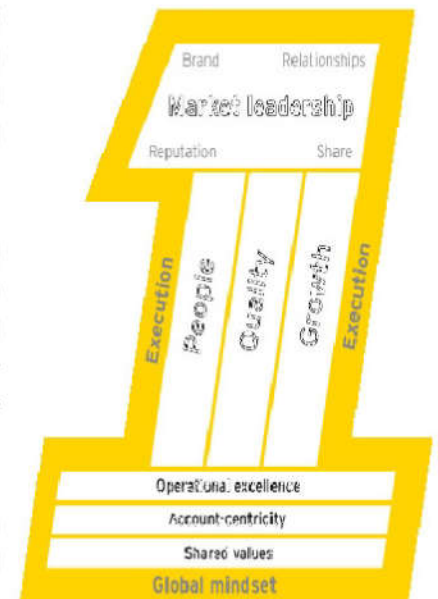
270,000 people | 700+ offices | 150+ countries

EY is one of the world's leading professional services firm with operations in over 150 countries. EY employs more than 270,000 personnel providing an unmatched depth and variety of specialized services. Our worldwide organization enables our clients to take full advantage of the resources that are available and helps us to serve our clients with a level of quality and consistency that is superior to that of our competitors.

EY is a global leader in assurance, tax, transaction and advisory services. EY is committed to doing its part in building a better working world. The insights and quality services we deliver help build trust and confidence in the capital markets and in economies the world over. We develop outstanding leaders who team to deliver on our promises to all of our stakeholders. In so doing, we play a critical role in building a better working world for our people, for our clients and for our communities.

Among international firms, EY has one of the largest public sector practices with nearly a century of service devoted to the public sector and an internal structure to support and enhance our services to Governments and international donor agencies. It is well known and respected by public sector community and professional peers. EY has significant experience in advising Governments across the world in areas ranging from technology to skill development and private sector development. EY has a significant Fortune 500 client base across the world.

EY's strong market share, both domestic and international means that we can provide you with the benefits of our vast and highly effective service and information infrastructure. We are a leading firm in the private sector business community and recognize that our success hinges on sustainable economic development. EY is committed to doing its part in building a better working world. Businesses today face faster change and more complexity than ever before. That's true whether they are global companies or local enterprises. Growing our own business depends on helping our clients navigate through that change and complexity, wherever they are in the world.



2.EY in India

In India, EY's advisory services has a strength of over 40,000 employees, spread over 11 cities including Ahmedabad, Bangalore, Chandigarh, Chennai, NCR (Delhi, Gurgaon and Noida), Hyderabad, Jamshedpur, Kochi, Kolkata, Mumbai and Pune. The firm has serviced a wide array of government and public sector clients across multiple areas. Today we are recognized as leaders in the professional services. The accolades we receive encourage us to continue striving for excellence.

☑ We have been ranked as the # 1 Brand among the Big Four in India for the fourth successive edition of the Global Brand Survey

☑ Ranked #1 for brand distinctiveness, favorability

☑ Strongest position in India on brand attributes.

Source: Global Brand Survey, conducted by Ipsos, an independent research agency, commissioned by EY.

☑ *Ranked as #1 brand in India for fourth successive editions of the biennial Global Brand Survey 2017 conducted by Ipsos (2017), Kantar (2015), TNS (2013), TNS (2011)



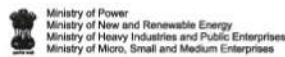


ABOUT WUS 2020

World Utility Summit is a pioneering thought leadership forum, attempts to set the agenda for the future, actively playing the role of a key enabler for the eco-system, to develop optimal solutions, technology & products. A platform exclusively for the Utilities, by the Utilities, of the Utilities; It aims to be a pioneering thought leadership forum for Utilities and will engage CXOs and senior management of Utilities, energy efficiency bodies, standards organizations, regulators, industry, finance professionals and policy makers from around the world. The Summit's objectives are to create integrated and sustainable future Utilities for the benefit of all people, by:

- **Bringing together world utility leaders** on one platform and vitalize the future leaders by many interactions generated during the summit on a global scale, face to face meetings, networking opportunities to collaborate and learn from each other and through the forum's committee members
- **Setting the agenda for the future** by sharing and debating innovative solutions and new ideas to the world's most pressing challenges faced by Utilities
- **Creating value** by providing the global leaders with the knowledge and insights that engender a better understanding of the global and regional challenges. The World Utility Summit is sponsored by ELECRAMA, the world's largest confluence of the everything electric and technically sponsored by IEEE, the World's largest technical professional organization for the advancement of technology. The second edition is co-located with ELECRAMA, 20-21 January 2020 in Delhi NCR, India.

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IEEMA is the first ISO certified industry association in India, with 800+ member organisations encompassing the complete value chain in power generation, transmission and distribution equipment. Its membership base ranges from public sector enterprises, multinational companies to small, medium and large companies. IEEMA members have contributed to more than 90% of the power equipment installed in India.

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The Power & Energy Society (PES) provides the world's largest forum for sharing the latest in technological developments in the electric power industry, for developing standards that guide the development and construction of equipment and systems, and for educating members of the industry and the general public. Members of the Power & Energy Society are leaders in this field, and they and their employers derive substantial benefits from involvement with this unique and outstanding association.

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ELECRAMA is the flagship showcase of the Indian Electrical Industry ecosystem and the largest congregation of power sector ecosystem in the geography. ELECRAMA brings together the complete spectrum of solutions that powers the planet from source to socket and everything in between. Featuring not just equipment & technology, but peerless thought leadership platforms for everything electric from technical conclaves to industry summits.

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IEEE, an association dedicated to advancing innovation and technological excellence for the benefit of humanity, is the world's largest technical professional society. It is designed to serve professionals involved in all aspects of the electrical, electronic, and computing fields and related areas of science and technology that underlie modern civilization.

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Knowledge Partner



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