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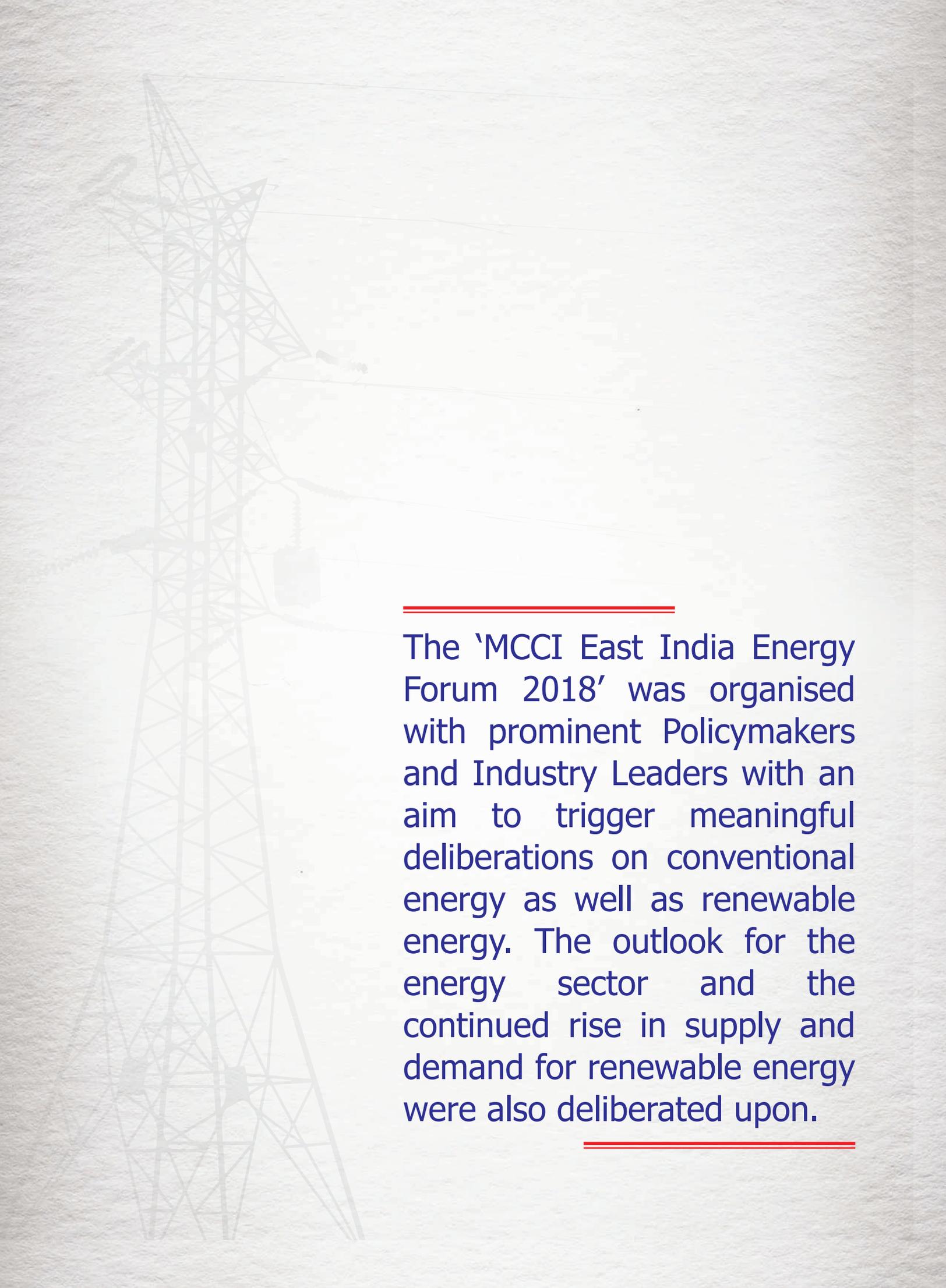


# MCCI EAST INDIA ENERGY FORUM

2018

Eastern India Power Sector:  
Creating a Vision for the Future

Friday, 08 June 2018 • Kolkata



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The 'MCCI East India Energy Forum 2018' was organised with prominent Policymakers and Industry Leaders with an aim to trigger meaningful deliberations on conventional energy as well as renewable energy. The outlook for the energy sector and the continued rise in supply and demand for renewable energy were also deliberated upon.

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# MCCI East India Energy Forum 2018

'Eastern India Power Sector: Creating a Vision for the Future'

on Friday, 8 June 2018 at The Lalit Great Eastern

'Eastern India Power Sector:  
Creating a Vision for the Future'

Inaugural Session



(L to R) Shri Souvik Banerjee, DG, MCCI, Shri Rohit Dhar, Director Sales, Vikram Solar Limited, Shri Vishal Jhajharia, Senior Vice President, MCCI, Shri Sobhandeb Chattopadhyay, Hon'ble Minister for Power & Non Conventional Energy Sources, Government of West Bengal, Shri Vivek Gupta, Vice President, MCCI, Shri R. N. Sen, Chairperson, West Bengal Electricity Regulatory Commission, Shri Devendra Goel, Managing Director, Lumino Industries Ltd, Shri Arun Palit, President, Adhunik Power & Natural Resources Ltd and Shri Kapil Thapar, Co-Chairman, Standing Committee on Power & Renewable Energy, MCCI

## Session Focus:

- What are the macro trends in the energy sector?
- How is West Bengal positioned with respect to the power scenario?
- What is the outlook for thermal power versus renewable energy?

## The speakers at the Inaugural Session were

**Shri Rohit Dhar**, Director Sales, Vikram Solar Limited

**Shri Arun Palit**, President, Adhunik Power & Natural Resources Ltd

**Shri Devendra Goel**, Managing Director, Lumino Industries Ltd

**Shri R. N. Sen**, Chairperson, West Bengal Electricity Regulatory Commission

**Shri Sobhandeb Chattopadhyay**, Hon'ble Minister for Power & Non Conventional Energy

Sources, Government of West Bengal

**Shri Vishal Jhajharia, Senior Vice President, MCCI** in his welcome address said India ranks 3rd among 40 countries in Ernst & Young's Renewable

## Shri Vishal Jhajharia

Energy Country Attractiveness Index, on the back of strong focus by the Government on promoting renewable energy and implementation of projects in a time bound manner. India has moved up 73 spots to rank 26th in the World Bank's list of electricity accessibility in 2017, which is a significant improvement. In September 2017, the Government of India launched the 'Saubhagya' scheme to provide electricity connections to over 40 million families in rural and urban areas by December 2018 at a cost of USD 2.5 billion.

Sustained economic growth continues to drive electricity demand in India. The Government



of India's focus on attaining 'Power for all' has accelerated capacity addition in the country. Total installed capacity of power stations in India stood at 334,146.91 Megawatt (MW) as on February, 2018. Between April 2000 and September 2017, the power industry attracted USD 12.3 billion in Foreign Direct Investment (FDI), accounting for 3.44 p.c. of total FDI inflows in India.

Some recent developments in the power sector include

- Energy Efficiency Services Ltd (EESL) has raised USD 454 million from Global Environment Facility (GEF) for its energy-efficiency projects in an attempt to boost India's move towards becoming a low carbon economy
- A total of 26.3 million households which are below poverty line (BPL) have been electrified under the Rural Electrification component of Deen Dayal Upadhyay Gram Jyoti Yojana (DDUGJY), according to the Ministry of Power, Government of India.
- In order to lower India's crude oil imports, the Government of India is going to promote coal gasification to convert high ash coal into methanol that can be used as cooking gas and transportation fuels, according to the NITI Aayog
- The Union and state governments have agreed to implement the Direct Benefit Transfer (DBT) scheme in the electricity sector for better targeting of subsidies, according to the Power Ministry
- All the states and union territories of India are on board to fulfil the Government of India's vision of ensuring 24x7 affordable and quality power for all by March 2019, according to the Power Ministry

The Government of India has released its roadmap to achieve 175 GW capacity in renewable

energy by 2022, which includes 100 GW of solar power and 60 GW of wind power. The Union Government of India is preparing a 'rent a roof' policy for supporting its target of generating 40 gigawatts (GW) of power through solar rooftop projects by 2022.

West Bengal demonstrates a flawless public governing system in all three aspects, viz generation, transmission and distribution, and is regarded as a power-surplus and investment-ready state which has outpaced many other Indian states as far as progress in power sector is concerned. Odisha is the first state in India which introduced and implemented power sector reforms. Bihar has taken key initiatives to operate the public private partnership model in power distribution.

## Shri Rohit Dhar



**Shri Rohit Dhar, Director Sales, Vikram Solar Ltd.** said that his company is a world class Tier 1 solar module manufacturer and comprehensive Engineering, Procurement and Construction (EPC) solutions provider. It has its manufacturing unit at Falta in West Bengal. The company produces lowest cost energy.

Vikram Solar's sales grew at a CAGR of 54 p.c. in the last 5 years. It has invested USD 1.5 million in R&D and product certifications in FY 2016-17. Vikram Solar has world class manufacturing plant with equipment from Germany, Switzerland and Japan. It has ISO 9,001, ISO 14,001 and ISO 18,001 certifications. The Company follows a fully integrated approach encompassing engineering, procurement, Finance, Project Management and O&M. With an aim to making solar energy more accessible, viable and efficient, Vikram Solar

deploys world class technology to design, install and commission benchmark solar projects globally.

The current annual rated production capacity of Vikram Solar in **module manufacturing** is 1 GW. Its PV modules shipped globally is 825 MW.

Also, the Company is an end to end solution provider for utility scale, roof-top and off-grid projects. It has a track record of more than 750 MW of solar EPC projects in India.

Vikram Solar's O&M projects exceed 350 MW. It has special equipment and processes adapted for harsh environment.

The 12 year history of Vikram Solar is as follows:

- 2006: The Company is established
- 2009: First international utility scale EPC project in Germany
- 2010: The company doubles its production capacity
- 2011: 3 MW installed under National Solar Mission of India
- 2013: First 40 MW plant commissioned in Rajasthan
- 2014: Ranked India's sole Tier 1 module manufacturer (Bloomberg). Installed India's first floating solar power plant
- 2014: Completion of India's largest roof-top installation of 2 MW
- 2016: Company forays in Sub Saharan region
- 2017: Company achieves 1 GW of production capacity
- 2018: Executes 280 MW EPC project in India

## Shri Arun Palit

**Shri Arun Palit, President, Adhunik Power & Natural Resources Ltd.** mentioned the Saubhagya Scheme launched by the Government of India and other consumer friendly initiatives. He said that there is a possibility of load growth and therefore the base load needs to be raised.

Adhunik is a Rs 5,000 crore conglomerate with interests in steel, mining and coal. One of its activities is coal based thermal power. While we may say that reliance on coal for thermal power needs to be reduced, the fact is that we will continue to depend on fossil fuels. The single largest expense head for thermal power plants is fuel cost.



For sustainable growth in the power industry, all players must be economically viable. It is a **sympiotic relationship** between users, Discom and generating companies. A sick Discom cannot exist with a strong generating company. In our own interest, we have to ensure that Discoms are restored to the pink of health. At the same time, Discoms should keep in mind the interests of the end user.

With regard to the steel industry, Shri Palit said that the industry faced a bad patch and it is doing better now. Cheap power is needed to economise the cost of the product. At times, the industry feels that power costs are too high.

There should be a balance in the power industry which is currently lacking. We need a holistic approach keeping in mind the sympiotic relationship between the parties. While determining tariff for power, the cost of power should be kept in mind, together with concern about what the market can bear. The two sources of power include power from Discom and cheaper power from open access.

The two basic tenets are level playing field and survival of the fittest. The power industry needs a level playing field and the Government is trying to promote competition by creating a level playing field. We do not have a level playing field at present. Shri Palit asked why do we have differential treatment?

The two routes for setting power tariff are the competitive bidding route and the cost plus route. Fuel cost and fuel security are the most important factors for thermal power plants. Many Independent Power Producers (IPP) have installed large power stations. The IPPs are buying fuel at huge cost and since they may not have a Purchasing Power Agreement (PPA), they have idle capacity.

In other words, IPPs lack fuel security. Currently, there is inadequate regulation for fuel. Fuel must be regulated and fuel cost must be justified.

## Shri Devendra Goel



**Shri Devendra Goel, Managing Director, Lumino Industries Ltd.** said that Lumino is engaged in the manufacture of cables / conductors as well as Engineering, Procurement and Construction (EPC) projects.

Lumino has ventured into EPC projects in the supply and erection of 11/33 KV distribution line of rural electrification infrastructure and household electrification under various GoI programmes. Besides, Lumino is engaged as a **solar EPC contractor**.

Lumino has been working for national electrification. It has electrified 7,000 villages and it is laying stress on strengthening transmission and distribution.

## Shri R. N. Sen

**Shri R. N. Sen, Chairperson, West Bengal Electricity Regulatory Commission** said that the consumption pattern of electricity is changing as people are no longer contented with a fan and light only but they are now using air-conditioners and fridges. There has been a focus on energy efficient lighting in the last 1.5 years. Demand from the commercial segment, which cross-subsidises the domestic and agriculture sector grew 3.53 p.c. CAGR in the last 5 years. Electric vehicles will be available shortly and they will reduce demand for fossil fuels.

Today, 75 p.c. to 77 p.c. of power comes from thermal power plants. One hopes that this reliance will



come down. In the end, India will continue to rely on fossil fuel for power. However, if India is able to meet a part of its demand from renewable energy sources, then the rise in demand for fossil fuels may not be sharp. If we really migrate to renewable energy, we must know how to manage it. For example, solar power is not available at all times and hydel power can be used to meet peak demand in the evening.

Across India, **all costs for thermal power plants have increased** except for Fixed Costs recovery which has fallen from Rs 2.01 per unit to Rs 1.66 per unit. There has been a huge increase in coal cost and railway freight rates. Shri Sen said that fuel cost has increased about 50 p.c. in the last few years or 5 p.c. to 6 p.c. per annum. In other words, input costs of thermal power plants are abnormally high and so the price of power is high. IPPs do not have linkages for coal. T&D losses have moved higher.

With regard to open access, Shri Sen said that industry always likes open access due to lower rates. Distribution licensees have universal service obligation and they have to link up with power producers for which they incur huge sunk costs. Distribution licensees also have to build large infrastructure and they have to ensure that the consumer always gets power by even buying power at high rates. In other words, it is important for the licensee to make sure that power is available at any price.

Shri Sen summarised by saying that WBERC is a neutral body, which will do whatever is best for all parties.

## Shri Sobhandeb Chattopadhyay

**Shri Sobhandeb Chattopadhyay, Hon'ble Minister for Power & Non Conventional Energy Sources, Government of West Bengal**



said that the State is rapidly growing under Smt. Mamata Banerjee, Hon'ble Chief Minister. The State Government is ready to supply quality uninterrupted power to industry. The Budget allocation for Power which was about Rs. 495 crores in 2011 has increased to over Rs. 2,818 crores.

Shri Chattopadhyay said that if the State Government cannot give power to everyone, then it cannot expect progress in the State and growth of industry depends on availability of power. He added that whatever preparation was needed for growth in West Bengal has been done and the state has developed in every aspect in order to attract industry to the State.

Shri Chattopadhyay said that growth of GVA which was about 5.42 p.c. in 2012-13 has increased to about 9 p.c. in 2016-17 while growth of GSDP has moved up from about 5.6 p.c. to about 9.2 p.c. during the same period. The State experiences no loss of mandays at present.

The peak demand in the State is projected at over 8,000 MW whereas the State Government is capable of providing more power than that. West Bengal is currently selling surplus power to Bangladesh. By 2019, West Bengal will generate over 200 MW of solar power. The consumer base in the State has grown from 85 lacs in 2011 to 1.81 crores after 7 years. The State Government has completed 99.98 p.c. of household connections in this time. The power mix in the State will include solar and hydel.

Shri Chattopadhyay said that his Ministry does not set rates for tariffs which is under the jurisdiction of West Bengal Electricity Regulatory Commission. Cost of coal has increased by about 60 p.c. between 2011 and 2017 and railway freight has gone up by 80 p.c. The price of power depends on input costs. Shri Chattopadhyay added that if the cost of coal could be reduced, then it will be reflected in a reduced power tariff.

The State Government is giving a subsidy of Rs 886 crores for poor households who are consuming electricity upto 300 units. It is also giving power connection at a low cost of Rs. 279. The Government of West Bengal is developing underground power system in 75 towns, which should curb theft of power.

Looking ahead, Shri Chattopadhyay said that the State Government will invest an additional Rs. 15,000 crores in the power sector. Shri Chattopadhyay concluded by saying that if any industry has problems with power in the state, then they may directly contact him.

The session ended with a hearty vote of thanks offered by Shri Kapil Thapar, Co-Chairman, Standing Committee on Power & Renewable Energy, MCCI.

## 'Coal - The Mainstay of India's Energy & Energy Security Mix'

### Session Focus:

- Increase in coal production – Challenges & Way ahead
- Coal Connectivity: Perspective & Issues
- Rationalizing allocation of coal linkages
- To facilitate PPA and proper payment security mechanism with State Govt/State Utilities.
- Economics of Transportation of Coal
- Increase in competition with privatization of Coal
- Scaling up of Mining & Exploration of Coal in India

## Plenary Session I:

- Implementation of Price Pooling Mechanism
- Encourage need based import

### The speakers at the Session were

**Session Chairman: Shri V. K. Arora**, Chief Mentor, KCT Coal Sales Ltd

**Shri Tarun Mukherjee**, GM – Environment, Coal India Limited

**Shri Debashis Basu**, GM – HRD, Central Mine Planning & Design Institute

**Shri R. P. Ritolia**, Advisor, India Power Corporation Limited



L to R) Debashis Basu, GM – HRD, Central Mine Planning & Design Institute, Shri Tarun Mukherjee, GM - Environment, Coal India Limited, Shri V. K. Arora, Chief Mentor, KCT Coal Sales Ltd and Shri R. P. Ritolia, Advisor, India Power Corporation Limited

## Shri V K Arora



**Shri V K Arora, Chief Mentor, KCT Coal Sales Ltd** stated that the present energy demand of the country is met by the following sources: Coal: 54 p.c., Oil: 32 p.c., Natural Gas: 8 p.c., Hydro: 5 p.c and Nuclear: 1 p.c..

Coal shall continue to be a major source of primary energy in times to come. Its share is likely to remain at around 52 p.c. by 2047.

As on 2016-17, the demand for coal was about

838 MMT against which the domestic supply was 647 MMT which necessitated imports of 190 MMT that cost the country about Rs. 10,000 crores.

Coal India Ltd., which is the major producer of coal producing 84 p.c. of India's coal and feeding 98 out of 101 coal based thermal power plants in India is projected to increase its production to about 1,000 MMT by 2022. Additionally, the government has also projected that there would be availability of another 500 MMT from captive blocks. After the initial mad rush, subsequent auctions of coal blocks have not attracted good interest. Hence, the figure of 500 MMT from captive mines is considered doubtful.

With a view to comply with its commitments and India's voluntary efforts to reduce pollution, the country is committed to transition towards greater use of cleaner sources of energy. The Government is proposing to add 175 GW of renewables (100 GW by way of solar, 60 GW by way of wind and 15 GW of biomass) by 2022. This is an ambitious target but given the Government's commitment, it can certainly be achieved.

The Government was clear that huge investment in renewables shall be made through a transparent system of reverse e-auction. This led to a pleasant discovery of **substantial drop in the**

**prices of renewables.** Prices of solar and wind power have come down. These prices compare well with thermal.

Since renewables are seasonal or available during certain part of the day only, this comes along with huge investments in the transmission system so that renewable power is absorbed into the system as and when it is produced. Simultaneously, a trend of falling prices in the storage system for electricity would also ensure adequate developments in storage of electricity through new generation batteries.

In the transport sector, there shall be a shift towards rail-based mass transport systems and electric vehicles. Most of India's vehicles shall be powered by electricity by 2030. This would not only reduce energy demand, but also save the exchequer USD 100 billion (about Rs 6.5 lac crore) every year. While reducing pollution levels in cities by 80 p.c. – 90 p.c., this USD 100 billion saving is over twice India's defence budget for 2017-18, or over 10 times the amount invested in renewables in 2016.

While Coal India Ltd. and Singareni Collieries Co. Ltd. (SCCL) will jointly achieve a production of 1 billion tonnes, companies like NTPC are going to increase their investments in coal mining. NTPC has plans to produce 3 MMT by this year and then gradually scale upto 60 MMT.

**Coal India and SCCL shall no longer be traditional mining companies and will gradually transform themselves as power companies** as Neyveli Lignite Corporation Ltd. has done. MCL is proposing to set up a 1,000 MW power plant. WCL would be setting up a 1,200 MW power plant.

If the mining companies transform themselves into power companies, coal could be used for power generation at the cost price thereby reducing the cost of power. Investment in power generation for the next few years shall only be by mega coal companies, as no private sector company would like to invest further in a coal based power plant.

Coal shall continue to be a dominant fuel for generating power for years to come. Washing of low grade coal has to be made mandatory to reduce pollution load. Efficient combustion of coal through technologies (HELE) has to be used extensively for limiting the discharge of polluting gases. Inefficient and old plants have to be gradually replaced.

## Shri R. P. Ritolia



**Shri R. P. Ritolia, Advisor, India Power Corporation Limited** said that coal plays a dominant role in India's energy sector. It is one of the cheapest sources of energy. Coal accounts for 58 p.c. of India's energy mix. Coal mining and coal fired thermal power generation are two of the core industries which together contribute about 10 p.c. of India's Index of Industrial Production.

More than 90 p.c. of coal is produced / supplied by Coal India and SCCL creating a monopolistic scenario. **Inefficient coal linkage in terms of location of sourcing mines and end use plants adversely impacts cost of power generation.** In fact, poorly planned logistics of coal supply is the single biggest reason of unprofitably high landed cost of coal. The heavy reliance on imported coal continues unabated. There is a negligible role of private sector in coal mining. The target of 500 million tonnes from captive mines by 2020 does not seem feasible by any means.

Invigorated thrust by Government of India has provided an impetus to renewable power generation (especially Solar) which may play a disruptive role to thermal power projects. Thermal power plants are facing a threat of becoming uncompetitive when compared with solar power. The Government of India is aiming to achieve 175 GW renewable energy capacity by 2022. The renewable power is not a base load, it is time of day sensitive and it cannot be stored, at this moment. Hence, renewable power is more ephemeral than thermal electricity. Also, grid integration and management issues remain to be addressed that would require time and money.

**Pit head power plants may improve**

**business profitability.** The business model has to be changed in order to maintain competitive cost of coal based thermal power plants. Pit head beneficiation and power plants may help in reducing the cost of coal, as it removes expensive logistics cost. Adopting supercritical technology based power plant may further improve efficiency and reduce cost. Adoption of digitisation and IoT like smart metering may add value. **Sasan Ultra Mega Power Project** which has its own captive coal mines and owned by a subsidiary of Reliance Power is a good example of an efficient operation where power is generated at only Rs. 1.70 per unit. Pit head plants may also address some of the pollution issues related to transportation and handling of coal. Commercial mining may create a competitive mining scenario forcing miners to adopt modern practices leading to reduced cost of mining.

With regard to the future of the coal industry, one can foresee logistical rationalisation whereby coal will be sourced from the nearest possible coal mine. It is suggested that Coal India, SCCL and captive miners build pit head plants which will reduce cost of generating power. Also, commercial mining is expected to bring process optimisation and inculcation of modern practices which will lead to reduced cost of mining. In addition, adoption of state of the art beneficiation technologies will help. Finally, the Government of India is suggested to come up with a coal sector development policy aiming at growth of the sector.

### Shri Debashis Basu



**Shri Debashis Basu, GM – HRD, Central Mine Planning & Design Institute (CMPDI)** said that global energy markets are facing disruption which will change the energy mix. However, the complete

removal of old energy sources such as coal is not foreseen. India has the world's fifth largest coal reserves with 8 p.c. share or 95 billion MT. It can produce coal for the next 100 years. The importance of coal cannot be denied.

CMPDI has acquired state of the art equipment. The Government is making efforts to create an infrastructure and adopt best practices in coal mining. There is a thrust on safety and protecting the environment. Coal India is installing washeries to reduce pollution. It is using new coal beneficiation technologies to give clean coal to industry.

The job of increasing coal production in a short time is a challenge. India is adopting modern techniques in drilling and it is going for high depth open cast mines about 400 metres to 450 metres deep. The task of increasing coal production will be done keeping in mind environmental concerns. In addition, there is stress on improving quality of coal.

There is a requirement for enhanced drilling of exploratory bore holes. CMPDI is drilling at the rate of 1.5 million metres per year compared to 0.2 million to 0.3 million metres per year a few years ago.

Finally, there is an urgent need to develop coal bed methane (CBM). The Government has allowed Coal India to develop CBM at its mining leasehold areas at Raniganj Coal Field and Jharia Coal Field.

### Shri Tarun Mukherjee



**Shri Tarun Mukherjee, GM - Environment, Coal India Limited** spoke about challenges faced by coal sector in India. Coal is of strategic importance in the economy as India is the third largest coal producer and it is the fourth largest importer of coal.

Around 77 p.c. of the coal consumed in India is met through indigenous sources. Coal India produces 82 p.c. of India's current coal production. Coal is India's primary source of energy and it currently meets 58 p.c. of India's energy requirement.

The market for domestic coal is expected to double in size by 2030. Captive and commercial mining are expected to change the market structure to a limited extent.

The key challenges faced by the sector include **Development risks** such as

- Inadequate logistics infrastructure
- Decreasing cost competitiveness
- Limited technology adoption and upgradation, and
- Safety and sustainability performance below global peers

Development risks could cause coal production to be significantly lower than the potential. Against a normative time limit of 36/42 months from allocation, actual commencement has been significantly delayed. There is a multitude of agencies at Central, State and Local Government levels involved in supervising the industry. Forest clearance followed by land issues are major reasons for delays in case of Coal India.

**Inadequate logistics infrastructure** is an area of concern. The addition in evacuation capacities has typically lagged the production capacity enhancement. As per existing expansion plans, the supply is estimated to get further concentrated in Jharkhand, Odisha and Chhattisgarh - where the logistics infrastructure is already operating at maximum capacity. Distant coal demand centres are expected to further aggravate the logistics problem. In the end, an inadequate logistics infrastructure

may play spoilsport.

Indian coal faces **decreasing cost competitiveness**. Cost of coal mining is expected to increase in future because of

- Worsening geology resulting in increase in stripping ratios in NCL, MCL and SECL (which would contribute 65% of Coal India's production in future)
- Increasing proportion of lower grade coal in production mix
- Increasing land acquisition costs
- Inflation and manpower costs
- Taxes on mining and cost of logistics, and
- Other levies and freight cost adversely impacting the competitiveness of coal

Domestic coal is increasingly losing its competitiveness in power generation against renewable energy sources. Even, the difference in landed cost between domestic and imported coal is declining sharply

**Limited technology adoption** is an area of concern. Indian companies have remained behind their global counterparts in adoption of modern mining methods. Though several technologies have been tried, large scale implementation is still lacking.

The **safety and sustainability performance** of Indian coal industry is below global peers. While safety standards have improved, there is significant ground still to cover for Indian companies. Ambient air quality in the mining regions has also lagged other global mining geographies. Clean coal technologies have not received enough thrust in the country. Ash disposal has emerged as a key challenge. India is expected to generate ~500 MTPA of ash by 2030. It is not just an environmental concern but also a land availability issue.

## 'A leap towards sustainable power in Eastern India'

### Session Focus:

- Opportunities and Challenges in Power Distribution
- Energy Efficiency Improvement
- Technology enablement for sustainability
- Emphasis on DSM of system load through time-of-day metering HV consumer, LT industrial and irrigation consumers

### Plenary Session II:

- Steps towards energy efficiency and increasing the renewable energy mix
- Market Transformation for Energy Efficiency (MTEE): Accelerating energy-efficient appliances in designated sectors
- Tariff rationalization Open Access issues & challenges in T&D: Dynamics of Short Term Open Access
- Innovative Technology for Efficient

Transmission

- Grid Integration challenges at Distribution level

### The speakers at the Session were

**Session Moderator: Prof. Subhasis Neogi**,  
School of Energy Studies, Jadavpur University

**Shri Debasish Das**, Vice President – Regulatory,  
India Power Corporation Limited

**Shri Amitava Biswas**, Member Secretary, West  
Bengal Electricity Regulatory Commission

**Shri Shyama Prosad Moitra**, Chief Engineer –  
Planning & Engineering, Distribution, West Bengal  
State Electricity Distribution Company Limited

**Shri Rajib Kumar Das**, Deputy General Manager  
(Planning), CESC Limited

### Prof. Subhasis Neogi



**Prof. Subhasis Neogi, School of Energy Studies, Jadavpur University gave a technical presentation on 'Energy Efficiency - an Approach Towards Energy Conservation'. He showed slides displaying 'Thermal Imaging of Building Exterior', both for insulated building and uninsulated building. He displayed a slide showing 'Thermal Imaging of Building Interior' for 'Sources of Heat Generation' and 'Sources of Heat Transfer Through Building Structures'. Prof. Neogi also showed a slide on 'Thermal Image of Window System Exposed to Solar Radiation'.**

Shri Neogi said that energy conservation is directed towards achieving optimised system energy efficiently. When we talk about energy application and savings of energy we need to improve system efficiency at design stage so that demand for energy is reduced. Currently, we are

allowing heat generation to take place in buildings and then we cool the building. When we talk about energy efficiency, we should talk about system efficiency.

### Shri Amitava Biswas



**Shri Amitava Biswas, Member Secretary, West Bengal Electricity Regulatory Commission** said that regulators want their activities to be cost effective. Energy must be transported smoothly from generator to end user. The three stages are generation, transmission and distribution. The consumer is the last mile that consumes the energy. The problem lies with the last mile as it gets disturbed for many reasons. It suffers from high density of population and it is vulnerable to fault and weather conditions.

Peak demand in India was 1,61,826 MW in April 2018 while peak demand in West Bengal was about 8,000 MW. The South, North and Western parts of India are running with small shortage of power. There is zero shortfall in the Eastern part of the country.

If consumers can build rooftop solar panels, then energy will be at the doorstep of consumer and many distribution problems will be overcome. But solar power has problems as it is not available 24 x 7. As of now, we do not have storing capacity for solar energy. Therefore, we have to build storage capacity in the form of battery, which may be expensive. In the end, we will have to depend on fossil fuel for at least another 15 to 20 years. We can minimise use of fossil fuel, by increasing use of solar power or use hydel power when solar energy is not available.

Government of India has taken the initiative

to use LED bulbs extensively. Already, one program has been introduced by EESL to use LED bulbs. Under this programme, EESL will distribute 77 crore LED bulbs by March 2019 which will save 7,000 MW of power or Rs 14,000 crores per year. Energy efficient pumps may be used in agriculture which will save 35 p.c. of energy that will amount to savings of Rs. 4,500 crores per year. The tenet is that the loss component should be reduced.

## Shri Debasish Das



**Shri Debasish Das, Vice President – Regulatory, India Power Corporation Limited** said that his company is a distribution licensee since 1990. It operates in a competitive electricity environment with DVC and WBSEDCL. India Power operates in a volatile, uncertain, complex and ambiguous environment.

The biggest opportunity in the power sector comes from the fact that India has a per capita power usage of 1,122 units which is 4x less than power consumption in China and 7x less than consumption in Singapore.

The challenge for India Power is how to reduce distribution loss through community participation and blend strategy with technology. One issue is how to reduce cost by using technology. A second challenge is to provide quality power at an affordable cost. Another challenge is the emergence of other options, such as solar power, for the consumer. The industry structure needs to be deepened and participation has to be increased by making the industry more attractive. Once sharing of network takes place, the landed cost of power will come down for the consumer as capital expenditure will fall for the producers.

West Bengal has a progressive pricing policy and it has different prices for seasonal power such as peak pricing, non-peak pricing and normal pricing. The challenge lies in reducing peak demand and policies are in place to increase demand responsiveness.

With regard to integrating renewable energy in the grid, we need to see its impact on distributed generation from different sources, impact on steady state operation and contingency analysis. In other words, it is not as simple as plug and play.

With regard to energy efficiency improvements, Government of India has launched schemes with LED bulbs and other programmes. All these efforts are still at an experimental stage. We do not have a critical mass as yet for impact analysis.

## Shri Shyama Prosad Moitra



**Shri Shyama Prosad Moitra, Chief Engineer – Planning & Engineering, Distribution, West Bengal State Electricity Distribution Company Limited** said that sustainable power means delivering power to each and every consumer base with less interruption, quality voltage profile and that too at an affordable tariff. **Contingency handling** is the main factor to maintain sustainability.

Each of the grids in India have their own peculiarities. The grid for the Eastern Region has low load, high coal reserves and pit head base load plants. In October 1991, East and Northeast grids were synchronized. In March 2003, West was synchronized with East & Northeast grids. In August 2006, North was synchronized with Central Grid. The Eastern region is linked with all regions.

## Shri Rajib Kumar Das



**Shri Rajib Kumar Das, Deputy General Manager (Planning), CESC Limited** spoke on 'Rooftop Solar – Grid Integration' issues. Levelised tariff for solar power in Rs./kWh has fallen sharply. Now, PV market appears to be moving towards self-consumption and Net Metering.

West Bengal Electricity Regulatory Commission (Cogeneration and Generation of Electricity from Renewable Sources of Energy) Regulations, 2013 state that

- Installed Capacity shall not be less than 5 kW
- Injection of energy from roof-top PV Sources shall not be more than 90 p.c. of consumption from

## 'Renewables: Enabler for Sustainable Growth'

### Session Focus:

- Role of Renewables for a sustainable future
- Storage & Transmission of Renewables
- Domestic Consumer on Renewable System
- What can be done to accelerate Domestic Solar PV Mfg in India?
  - Steps towards energy efficiency and increasing the renewable energy mix
  - Policy and regulation framework for the commercial growth of solar Energy

### The speakers at the Session were

**Session Moderator: Dr. B. K. Choudhury**, Professor - Department of Energy Management, IISWBM

the licensee's supply

- Net energy injected by the consumer(s), in excess of 90 p.c. of consumption of that consumer(s) from the licensee's supply in a year shall be treated as unwanted / inadvertent injection

- Slab tariff, as approved, shall be applicable for billing

- In case, injected energy is more than drawal (after taking into carried forward energy from previous bill), entire energy charge is deducted

**Grid Integration** issues include the high variability of the solar energy and other issues, such as

- A cloud can potentially reduce sunlight by 80 p.c. within one second

- Question of frequency stabilisation and voltage stability arises

- The communications and control logic has to be extended to the low voltage grid to support these distributed generation

The duty of a distribution licensee is 'to develop and maintain an efficient, co-ordinated and economical distribution system in his area of supply'. The grid should be free of sags, spikes, disturbances and above all interruption. Growing customer expectation and use of sophisticated electrical equipment put an added responsibility upon utility to ensure that the delivered level and quality of supply is maintained.

## Plenary Session III:

**Shri K. K. Maskara**, Director & Head – Commercial & Bid Management EPC, Vikram Solar Limited

**Shri Piyush Jaju**, Co-Founder & CEO, Onergy Solar

**Shri D. Bandyopadhyay**, WBCS (Exe), CEO, WBREDA

**Shri Jaydeep Sarkar**, Deputy Manager (WB & NE), Energy Efficiency Services Limited

## Dr. B. K. Choudhury

**Dr. B. K. Choudhury, Professor - Department of Energy Management, IISWBM** spoke on 'Renewables: Enabler for Sustainable Growth'.

Albania, Iceland and Paraguay obtain essentially all of their electricity from renewable



sources (Albania and Paraguay 100 p.c. from hydroelectricity, Iceland 72 p.c. hydro and 28 p.c. geothermal). Norway obtains nearly all of its electricity from renewable sources (97 p.c. from hydropower). 100 p.c. Renewable Energy is a reality today: Communities, regions, islands and countries across the world are celebrating their recent transition to 100 p.c. renewable energy.

India reached 20 GW in installed solar capacity, four years ahead of target. The target has been scaled up five times to 100 GW from solar.

Dr. Choudhury explained 'Energy use per capita versus Human Development Index' in 20 countries with energy use per capita on the X axis and Human Development Index (HDI) on the Y axis. His observations are as follows

- Energy use per capita tends to increase in general with rise in HDI
- The slope (i.e. Rate of increase of HDI compared to Energy Use per Capita) slows down in general as HDI increases
- If highly populated countries like China and India follow the average slope, 0.9 HDI may be attained at more than 60 kWh/head/day which would require resources of another earth and therefore impossible to attain
- If we learn from the path of Germany, 0.9 HDI may be attained at less than 30 kWh/head/day, which is possible.

## Shri K. K. Maskara

**Shri K. K. Maskara, Director & Head – Commercial & Bid Management EPC, Vikram Solar Limited** said that solar was started commercially in India in 2009-10. At that time,

the efficiency of solar modules was 14 p.c. to 15 p.c. and the cost of setting up a solar plant was Rs. 12 crores to Rs. 15 crores per MW. Today, the efficiency of modules can be 17 p.c. to 19 p.c. and the cost has come down to Rs. 4 crores per MW.

The price of solar power has come down. Today, solar power is cheaper than thermal power. A solar panel can be setup anywhere and power can be produced for free during the day and part of it may be exported to the grid. At night, the consumer can import power from the grid. Under the net metering concept, the consumer only pays for the net usage.

Solar power has no cost attached to it other than Fixed Cost and the equipment is expected to last 25 years. Therefore, solar power has great potential.

## Shri Piyush Jaju

**Shri Piyush Jaju, Co-Founder & CEO, Onergy Solar** said that he works on rooftop solar systems and solar lighting. He described solar power as a 'decentralised distributed generation'. Poor people can benefit from small solar setups. However, in Eastern India where minerals are the mainstay of the economy, less attention is paid to renewable energy. Shri Jaju noted that it takes less time and effort to sell a solar system in Maharashtra or Gujarat than in West Bengal.

People in rural areas have adopted solar power since they frequently do not get power from the grid. Bihar and Jharkhand have a thriving solar market due to regular power cuts. On the other hand, industry has been slow to adopt solar rooftop



systems. Shri Jaju said that the time is right, for switching to solar power as solar rooftop systems have become economically viable. We should accept solar as the technology of the future, he said.

### Shri D. Bandyopadhyay



**Shri D. Bandyopadhyay, WBCS (Exe), CEO, WBREDA** said that energy plays a vital role in economic growth. Per capita energy consumption is a measure of living standard. For rapid and sustainable growth, energy must be benign on the environment. In this regard, he mentioned that thermal power plants have an inherently depleting feature (of fossil fuel) and so they cannot meet demand forever. Consequently, there is a focus on renewable energy.

Peak demand for power is expected to increase in West Bengal. So, already stressed power utilities will face further problems due to rising peak demand and variability in its pattern.

India's standing has risen to 6th in solar power and 5th in the renewable market. Statistics reveal a major advancement in the popularisation of solar power. The generation of solar power has doubled in the last four years. Consequently, the 175 GW target

by 2022 is not a distant dream.

Storage of solar power is important and energy storage capability is needed for integration of energy. Batteries are promising for storage. We also need to worry about grid stability and grid injection through solar power.

The Government of West Bengal has taken major initiatives on both policy and regulatory matters for renewable energy. There is policy intervention to popularise solar power in high rise buildings and rules for solar power have been mandated for buildings above a certain height.

**A new policy on renewable energy has been framed and it is waiting for approval from Government of West Bengal.** The Government of West Bengal is doing a pilot study on battery storage of power. Module manufacturing capability needs to be geared up in West Bengal.

WBREDA is trying to popularise solar systems in the State. If a solar system could be setup on the rooftop of every school, then society would benefit as electricity bills are a major expense item for cash strapped schools. Solar water heating systems which are most useful in hostels need to be popularised. Solar panel is being synchronised with grid power in Sagar Island.

### Shri Jaydeep Sarkar



**Shri Jaydeep Sarkar, Deputy Manager (WB & NE), Energy Efficiency Services Limited (EESL)** spoke about how energy efficiency is being scaled up in India with the Innovative Business Models of EESL.

EESL is working with two models, namely

(1) **Bill Financing Model (OBF)** with interventions directly with consumers for LEDs,

Fans, ACs, etc. Consumers for LED bulbs and fans pay EMIs through their electricity bill for 1-2 years.

(2) **ESCO 'Service' Model** where EESL is dealing with institutions like buildings, agriculture, Discoms and municipalities. It involves implementation and investment by EESL in the whole facility and payments from savings in energy and maintenance cost.

Shri Sarkar mentioned the **UJALA** programme which is EESL's flagship programme involving conversion of conventional domestic lights with LED bulbs, tube lights and fans. This UJALA programme has become the largest lighting initiative in the world in the last 2 years. Under this programme, 9 W LED bulb replaces older bulbs, 20 W LED tube replaces 45 W conventional tubes and 50 W fans replace 75 W old fans. Such replacement reduces the power demand by 7,500 MW and generates an estimated savings by Rs 15,000 crores annually.

Shri Sarkar also spoke about the **Street Lighting National Programme (SLNP)** involving replacement of conventional street lights with LED street lights and an online portal created for Centralized Controlling and Monitoring. This programme has led to 45 p.c. to 55 p.c. energy savings. The entire investment is made by EESL and there is no capital cost for Urban Local Bodies (ULBs). The utility re-pays EESL from savings in energy and maintenance cost.

Shri Sarkar mentioned the following four lessons:

(1) Standardization of technology to match the necessary output. Also, the selection of equipment will lead to significant savings by scale up.

(2) Adopt demonstrated and deemed savings involving one time demonstration to validate outputs and energy savings, turnkey implementation, maintenance over the contract period and IT enabled real time monitoring of energy consumption.

(3) Aggregation of demand across states with pooling of prices to pass on benefits of reduced prices. Aggregation of supply with transparent procurement in bundles to ensure continuous price discovery and sustainability of demand.

(4) Online and real-time monitoring tools developed to monitor the performance.

## Key Take Aways :

- India has moved up 73 spots to rank 26th in the World Bank's list of electricity accessibility in 2017, which is a significant improvement. In September 2017, the Government of India launched the 'Saubhagya' scheme to provide electricity connections to over 40 million families in rural and urban areas by December 2018 at a cost of USD 2.5 billion.

- A total of 26.3 million households which are below poverty line (BPL) have been electrified under the Rural Electrification component of Deen Dayal Upadhyay Gram Jyoti Yojana (DDUGJY), according to the Ministry of Power, Government of India.

- The Government of India has released its roadmap to achieve 175 GW capacity in renewable energy by 2022, which includes 100 GW of solar power and 60 GW of wind power. The Union Government of India is preparing a 'rent a roof' policy for supporting its target of generating 40 gigawatts (GW) of power through solar rooftop projects by 2022.

- For sustainable growth in the power industry, all players must be economically viable. It is a symbiotic relationship between users, Discom and generating companies.

- We need a holistic approach keeping in mind the symbiotic relationship between the parties. While determining tariff for power, the cost of power should be kept in mind, together with concern about what the market can bear.

- Across India, all costs for thermal power plants have increased except for Fixed Costs which have fallen. There has been a huge increase in coal cost and Railway freight rates.

- The Budget allocation for Power has risen sharply since 2011 in West Bengal, which is a power surplus state.

- Coal India Ltd., which is the major producer of coal producing 84 p.c. of India's coal and feeding 98 out of 101 coal based thermal power plants in India is projected to increase its production to about 1,000 MMT by 2022. Additionally, the government has also projected that there would be availability of another 500 MMT from captive blocks. After the initial mad rush, subsequent auctions of coal blocks have not attracted good

interest. Hence, the figure of 500 MMT from captive mines is considered doubtful.

- The Government was clear that huge investment in renewables shall be made through a transparent system of reverse e-auction. This led to a pleasant discovery of substantial drop in the prices of renewables. Prices of solar and wind power have come down. These prices compare well with thermal.

- Coal India and SCCL shall no longer be traditional mining companies and will gradually transform themselves as power companies as Neyveli Lignite Corporation Ltd. has done. MCL is proposing to set up a 1,000 MW power plant. WCL would be setting up a 1,200 MW power plant.

- Inefficient coal linkage in terms of location of sourcing mines and end use plants adversely impacts cost of power generation. Pit head power plants may improve business profitability.

- The key challenges faced by the power sector include Development risks such as

Inadequate logistics infrastructure

Decreasing cost competitiveness

Limited technology adoption and upgradation, and

Safety and sustainability performance below global peers

- The biggest opportunity in the power sector comes from the fact India has a per capita power usage of 1,122 units which is 4x less than power consumption in China and 7x less than consumption in Singapore.

- Contingency handling is the main factor to maintain sustainability of power.

- Grid Integration issues include the high variability of the solar energy.

- 100 p.c. Renewable Energy is a reality today: Communities, regions, islands and countries across the world are celebrating their recent transition to 100 p.c. renewable energy.

- Energy use per capita tends to increase in general with rise in Human Development Index (HDI).

- Today, solar is cheaper than power from coal based plants. Poor people can benefit from small solar setups.

- A new policy on renewable energy has been framed and it is waiting for approval from Government of West Bengal.



Report written & compiled by Shri Rajiv Mukerji, Deputy Secretary, MCCI





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