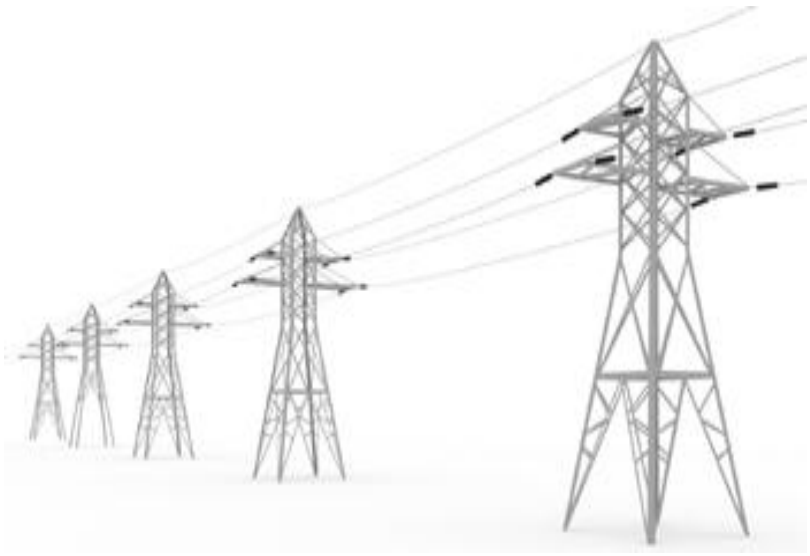
CUTS International

BCC&I THE BENGAL CHAMBER

EVENT REPORT



CONSUMER UNITY & TRUST SOCIETY
(CUTS INTERNATIONAL)
WITH
THE BENGAL CHAMBER OF COMMERCE AND INDUSTRY

BRIEF SNAPSHOT

- The target set by the Indian Government is to produce 2tn KWh electricity by the year 2019 and incorporate 100000 MW solar capacities as well as 60 GW hydro and wind energy in the energy mix by 2022.

- India needs to develop a sound roadmap complemented by a robust regulatory framework to resolve energy crisis. There must be a fair mix of conventional and renewable energy.

- The Government must also promote energy efficient practices among commercial and domestic consumers.

- Solutions should be able to address both global and local concerns (*Think Global, but, Act Local*).

- Invest in Research and Development to build a technology within the country to be able to suit the local conditions rather than importing it from another nation (aid towards the goal of 'Make in India'). Moreover, proper use of technology can revolutionise the entire sector; for example, monitoring through mobile network has been quite successful in recent times.

- Certain sources of renewable energy have already achieved grid parity in India. Tariff rates are expected to reduce further in the coming years.

- Mass Awareness Generation on the technical know-how, the benefits assured by renewable energy technology and the initiatives taken by the Government with the support of non-state actors is crucial to ensure proper execution of the Government's plans.

- India being the fourth-largest consumer of energy in the world cannot depend solely on the state-run utilities to meet its demand and thus, should explore the possibility of energy trade among the regional countries in South Asia.

- Smart Grid Technology ensures the maximum efficiency in power generation and utilisation. It is also capable of bringing in reduction in power theft and load shedding.

- Old inefficient plants that are polluting heavily must be either discharged or modernised at an accelerated pace incentivised by the Environmental Clearance Process. Locational advantages and disadvantages should be considered by the concerned authority before issuing a clearance certificate.

- Undoubtedly, coal will continue to contribute a major part of energy mix of India. However, promoting sustainable means of mining and making thermal power plants cleaner, using clean coal would definitely aid in a sustainable growth trajectory envisaged by the country.

Introduction

In the era of growing energy crisis, it is crucial for any country that its people ensure an access to clean and smart energy in order to accelerate the economic growth. India needs to develop a steady roadmap complemented by a robust regulatory framework to fulfil its commitments towards meeting international obligations and optimising its resource base to resolve energy crisis. To this end, the present Government has emphasised on two important factors – time bound execution of the proposed energy plan and imposition of strict punitive actions in case of failure to comply with the Government guidelines. India must also utilise the huge assistance offered by the international community including major funding agencies in the form of climate finance and technical know-how and should mobilise this fund to fast tract the process of achieving energy security for its citizens.

The objective of the Annual Environment and Energy Conclave, 2015 organised by The Bengal Chamber of Commerce and Industry (BCC&I) was to spell out the latest developments in the country, both in policy realm as well as in the investment and operational areas to realise clean and smart power for India. The chief guest of the event was honourable Power Minister of India, Piyush Goyal and the key note address was delivered by Honourable Power Minister of West Bengal, Manish Gupta. The conclave witnessed huge participation from different stakeholders' categories – representatives from Government departments and institutions like Bureau of Energy Efficiency (BEE), Government controlled coal company Coal India Limited (CIL), distribution companies (DISCOMS) including Calcutta Electric Supply Corporation (CESC) and India Power Corporation, Civil Society Organisations (CSOs), private players, scholars and students from educational and research institutes like Indian Institute of Social Welfare and Business Management (IISWBM), end users and the media.

Consumer Unity and Trust Society (CUTS) International was the Consumer Connect Partner of BCC&I in this Conclave. The event was graced by the presence of many eminent Ministers and experts from Energy and Environment sector.

In the inaugural session, **Dr. Alok Roy, President of the Bengal Chamber of Commerce and Industry (BCC&I),** delivered a brief introductory speech by outlining the primary objectives of the Environment and Energy Conclave, 2015. He stated that the event aimed to bring together different like-minded people having diverse experience and expertise to deliberate on the theme 'Power for India – *Swachh and Smart'*. He emphasised upon the need for better and scientific resource management and invention as well as implementation of climate resilient technology to ensure India has a clean energy mix. He mentioned that BCC&I has successfully contributed in the arena of energy and environment in the past and will keep making relevant interventions in this sector in the coming days. He concluded by acknowledging the contribution of CUTS International, as the Consumer Connect Partner of the event and laid emphasis on the involvement of consumers in the entire energy reform process.

Dr. Ajay Mathur, **Director General, Bureau of Energy Efficiency**, said that the average energy consumption per person is one-sixth of the global average. Therefore, to ensure sustainable livelihood and better quality of life, the energy consumption should be eased. India should make use of the available technology and invent new technology that suits its own conditions in order to raise energy efficiency. Global climate change is another major concern of the recent times. To address all these issues, there should be an adequate blend of regulation and

management. He mentioned about the ongoing light emitting diode (LED) bulb programme in India, which promises to replace all the streetlights by LED bulbs and provide every household LED lighting systems. Dr. Mathur appreciated the role played by the Honourable Power Minister of India, Shri Piyush Goyal by calling him the *prime mover* to bring in desired changes in power sector.

Shri Surtitha Bhattacharya, Chairman and Managing Director of Coal India emphasised upon bringing all relevant stakeholders together to get their diverse interests reflected in the planning process and policy directives. Pointing out that India's reliance on coal could not be forgone in the distant future; he mentioned that we therefore need to have a fair fusion of conventional and renewable energy. He also pointed out that energy efficiency must be enhanced and losses should come down. According to him, creating market mechanism rather than subsidy based programme should be the objective of the Government. Also, the element of sustainability must be incorporated in all the designed and implemented programmes by the Government.

Hon'ble Minister-in-Charge, Power & Non-Conventional Energy Sources, Government of West Bengal, Shri Manish Gupta delivered a very informative speech highlighting a number of relevant key issues. He pointed out that the nuclear energy cannot supplement the power demand in the near future. According to him, it will take about 25 to 30 years for nuclear plants to be able to generate 500 thousand megawatts. Also, security and safety are the major concerns associated with nuclear power. This is the reason why Germany is willing to do away with nuclear power by 2030. Shri Gupta also indicated that biomass has huge potential but offers only localised solutions making it commercially unviable. Bio-diesel seems to be competing with food crops therefore not being able to exploit its full capacity. India needs to make a quantum jump in generation of energy through renewable energy resources. Solar power can be balanced with hydro power, making it a sustainable mix. The Minister also mentioned that pump storage[1] projects are a welcome step to address the storage issues. The first such project has already come up in Purulia district of the State, there are two more to come up in the span of a year. Solar rooftop is also coming in a big way in cities like Kolkata.

The Hon'ble Minister underlined the need to engage with the neighbouring countries for power trade possibilities. Bhutan and Nepal have huge reserves for hydro power. India must explore the scope for hydro power trade with these countries. However, Shri Gupta rightly pointed out that whatever the State plans at present, it should have reasonable chance of success and must be able to attract investment to ensure economic growth of the State.

Shri Gupta proudly announced that the present Government in Bengal has been able to achieve 92 percent rural electrification as juxtaposed with 30 percent of rural electrification that was inherited from the previous Government. The present policies are designed to supply 10 percent power to those who lead a western lifestyle, 40 percent to those who aspire to lead a western lifestyle and 50 percent for those who require power essentially for better quality of life and productivity. He is hopeful to accomplish 100 percent rural electrification in West Bengal by June, 2016.

Hon'ble Minister of State with Independent Charge for Power, Coal and New & Renewable Energy, Government of India, Shri Piyush Goyal covered the entire canvas of the growing energy debate. He said that one should look more closely at the strategic plan for systematic improvement for the power sector. It is essential for the stakeholders to hear all sides

[1] Pumped Storage: Water is pumped up in the storage system using electricity available during lean period. Once the system is full, water is discharged and electricity is produced just like a regular storage-based hydropower plant.

of the story and remain open to criticism. Shri Goyal, as also pointed out by Shri Gupta in his speech, has been instrumental in executing energy conference in the North East Indian State of Guwahati for the first time where a large group of delegates participated coming from Delhi.

According to Shri Goyal, it should be a shared commitment of States and the Centre to provide 24*7 smart but clean electricity to the entire population by 2019. For this, India must have the right objective and right path to do right things in an efficient manner that will sustain over time. He explained how a number of other schemes launched by the Government of India like Make in India; Digital India; Skill India and *Swachh Bharat* are all interrelated. Shri Goyal laid emphasis on need for innovation of new and sustainable technology that will enable us to adopt energy efficient practices. The Minister also spoke about how *Swachh Bharat* campaign will ensure treating the city-waste properly and using the same in thermal plants, so that clean water is available for the households. The primary objective of the present Government is to ensure *minimum government and maximum governance*, as also emphasised by the Prime Minister. This is required to enable even the last man located in the remotest village in India to reap the benefits of development. To ensure proper execution of Government's initiatives, a strong management principle and a participatory approach should be in place. Every action should first analyse the root cause of a problem in a holistic way.

Also, creating 'framework solution' to every problem, taking actions that are result-oriented and ensuring that transparent and time-bound execution are the crucial factors being promoted by the present Government. It has also achieved desired result in many sectors. For example, the Western Coalfields has already operationalised eight mines in the last eight months. Shri Goyal emphasised the need for having a mobile-based monitoring system like the one which is already in place for the LED bulb project. The need for having innovative ways to finance different projects to keep the cost as low as possible was also stressed by the Minister. He assured that with private parties starting to extract coal from all the mines on a commercial basis, India will stop importing coal in near future. He pointed out that presently the Government is looking at a five-fold growth in renewable sector from 34000 MW to 174000 MW in following seven years making it the largest programme in the world to promote clean energy. India has already been successful to secure adequate fuel supply from Australia and Canada and technology support from France in order to explore nuclear energy options to make power-to-all a reality.

Hon'ble Minister of State with Independent Charge for Power, Coal and New & Renewable Energy, Government of India, Shri Piyush Goyal released a special publication **'Mainstreaming Sustainable Development: A Quick Diagnostic of Key**

Challenges and Opportunities for Water, Energy and Food Security in South Asia' ***prepared by CUTS International.***[2]

Owing to the rapid changes in global demographic factors, the pool of basic resources is shrinking at a fast pace. Millions of poor houses in this sub-continent lack secure access to water, food and energy. In this backdrop, CUTS International has been engaged in a regional programme called Sustainable Development Investment Portfolio (SDIP) developed by the Department of Foreign Affairs and Trade (DFAT), Government of Australia. This report tries to capture valuable insights on the challenges in water, energy and agriculture sectors in three major river basins (viz. Indus, Brahmaputra and Ganges) spread across five countries (viz. Pakistan, Indian, Nepal, Bhutan and Bangladesh). CUTS had taken in to consideration the contribution of both the state and non-state actors towards faster achievement of sustainable access to food, water and energy.

A presentation was given by **Shri Niranjan Das, Chief General Manager (Environment), Coal India Limited** covering all dimensions of Coal India mines followed by a lecture of **Shri Partha Sarathy Bhattacharya, Former Chairman, Coal India Limited & Currently Executive Director, Deepak Fertilisers and Petrochemicals Corporation Limited (DFPCL)** and a member of the advisory group working on different issues in the power sector. Shri Bhattacharya said that it is important to have a high degree of coordination among the State and Central government as well as among the various departments. He mentioned that every institution should understand the perspective of other institutions to bring in the desired change. Presently, India produces 550mn tonne of coal on its own and imports another 200mn tonnes. If 24*7 power has to become a reality, then reliance on coal-based thermal power will only grow in the coming days. The only solution to this is opening up the coal sector for commercial mining (introducing competition) and diversifying the energy portfolio of the country by involving the renewable energy sources in the picture. He recommended following Query Centric Cyber Physical Systems (QCPS) model, a model largely followed by the World Bank, which has two components – quality and cost. He further pointed out the coal pillars found in Ranigung and Jharia have high quality of coal stuck inside. Thus, replacing these pillars with artificial structures invented by a good research work will make the coal available to use.

Mr. Sanjay Seth, Secretary, Bureau of Energy Efficiency (BEE), re-spelt the roadmap for a clean and smart energy future of India. He emphasised on the fact that being a policy-making agency established by the Government of India, Bureau of Energy Efficiency has been working on different aspects of energy efficiency since 2002. It has promoted the creation of market mechanisms instead of subsidy-based programmes to enhance energy efficiency of the nation. In his short speech, he mentioned how effectively the Energy Efficient Services Limited (EESL) is implementing the LED bulb programme in various states of India including West Bengal. He assured the audience that huge reduction in the price of LED bulbs is a result of bulk procurement of the same by the Energy Efficiency Services Limited (EESL) rather than compromising on the quality. He also mentioned that the company offers free replacement of the defective bulbs and the warranty period extends up to seven years.

Mr. Sanjoy Chakraborti, Executive Director, CESC Limited, highlighted that supplying cost- effective power in an environmental-friendly way has been the objective of this utility. He

[2]http://www.cuts-citee.org/SDIP/pdf/Mainstreaming_Sustainable_Development-A_Quick_Diagnostic_of_Key_Challenges_and_Opportunities_for_Water_Energy_Food_Security_in_South_Asia.pdf

also stated that different technology available in the market to monitor any changes in the efficiency level should be used by different utilities and thermal power plants to keep a check on their production process.

Mr. Shrirang Karandikar, Chief Executive Officer, India Power Corporation Limited, deliberated on two integral aspects of clean energy supply namely harmonics and Power Factor. He spoke about the technical aspects of energy supply and mentioned that in order to achieve energy security with quality power at a reasonable cost in an environment-friendly system, one must ensure that energy efficient practices are encouraged. Also, by improving the power factor and maintaining a harmonics free environment, uninterrupted supply of clean power could become a reality.

Mr. S Datta, Principal Consultant - Lighting, Energy Efficiency Services Limited, pointed out that his organisation has been engaged in a number of power sector projects like converting municipality street lights and household lighting systems to more efficient LED bulbs. They have signed MoUs with many state governments in this regard. He shared with the audience that during a span of past seven months, the price of LED bulb has reduced from Rs 340 to Rs 69 rupees indicating further reduction, over following few months. In West Bengal, two pilot projects of installing LED lighting systems in public buildings/parks have been implemented so far– one in *Rasbihari* connector and the other in *Naba Diganta*. Maintenance service is provided by EESL for seven years from the time of installation, which invariably will cut down the cost. In the following two years, EESL plans to change all street lights to LED lighting systems in India.

Mr. Pradeep S Mehta, Secretary General, Consumer Unity and Trust Society (CUTS International), the Consumer Connect Partner of this event, provided a new dimension to the whole debate. He spoke from the consumer's point of view and said that as consumers we all need to be environmentally and socially conscious. But unfortunately, due to lack of political will, there has been very little or no consumer awareness about green growth. For example, the concept of 'Eco Mark' launched in 1993, is not known by many of us. It is quite saddening to see the main concern of Bureau of Indian Standards has been the ISI marking and not the Eco Mark. Mehta pointed out that all the member states of UN are committed to promote green consumption upon accepting the UN Guidelines for Consumers. In the environment performance index, India ranks 155 among 178 countries on environmental quality. Environmental degradation has cost India 80bn dollars a year in 2009. He raised a valid question i.e. does prosperity in India have to come at the cost of environmental degradation? On the other hand, he urged upon looking at both the aspects i. e. availability of power and accessibility factor together while engaging in the energy debate. He also mentioned that the electricity Act of 2003 placed consumer interest at the core of its objectives. More regulations should have such inclinations towards consumer interest. Concluding his brief intervention, Mr. Mehta thanked Hon'ble Minister, Shri Piyush Goyal for recognising the efforts put forth by CUTS International on different consumer related issues.

In the post lunch session, '*Swach and Smart Power – From Trading to Markets*', **Mr. Deepak Amitabh, Chairman and Managing Director, PTC India Limited,** elucidated the role of traders in the energy market. He said that the Electricity Act, 2003 first coined the concept of 'open access' and made power a commodity. India, being the fourth-largest consumer of electricity in the world, cannot solely depend on the state utilities for uninterrupted power supply. Therefore, Power Trading Corporation was established by the Government of India to promote trade of power in the entire region through a multi-buyer and multi-seller model. He

put emphasis on having hybrid RE technology like the solar pumped storage to solve energy crisis in India.

Prof. Rahul Tongia, Ph.D., Fellow, Brookings India / Brookings Institution; Adj. Professor, Carnegie Mellon University; Tech. Advisor, Smart Grid Task Force, Govt. of India; Advisor, India Smart Grid, mentioned that one need to interpret Smart Grid as an enabling environment. The formal definition by the US State Department of Power focuses on the four aspects while defining smart grid – more choices including cleaner power, better quality of service, greater resiliency and increased efficiency in asset utilisation. Smart grid spans over the entire space of generation, transmission and distribution making sense to all the stakeholders. It is capable to make Indian energy space more secured and sustainable to supply reliable and quality power to all with active participation from all the stakeholders. The Government has designed a smart grid mission recently.

As indicated by Prof. Tongia, India does not always have a surplus power across its wide geographical regions. Therefore, a smart grid is required to ensure the maximum efficiency in power generation and utilisation. It will also bring in mass reduction in power theft and the practice of load shedding. The magic of smart grid is that it focuses on functionalities rather than technologies. However, the rate of success depends much upon the designing part. We must also remember that smart grids could be anchors for smart cities that India plans to build in near future.

The Government while designing relevant policies on smart grid should keep in mind that the primary objective of common people is to acquire quality electricity at a reasonable price. The big challenge for smart grid as pointed out by Prof. Tongia is to reach the last mile of the remotest village in the country and to ensure that there is continuous power supply meaning zero load shedding. As a part of the growing trend, a number of energy companies comprising aggregators, energy efficiency providers, quality providers have been developing and supplying innovative models to a number of hotels and shopping malls in India in order to enable them to control the load. They might consider extending their services to the household sector. During an interaction session with the audience it was pointed out by Prof. Tongia that the network effect of electricity needs to be understood to answer that why it is not always possible for any entrepreneur to sell the power generated by his unit to a third party. Interconnection, legal and technical issues are other interrelated aspects of power supply that lay down conditions for power sharing between two regions.

Shri V Subramanian, IAS, Former Secretary to the Government of India, Ministry of New and Renewable Energy stated that power is a subject that appears on the concurrent list but mostly, the state governments play an active role in this regard. Therefore, it is important to secure active participation and involvement of state government officials and state-level regulatory commissions, so as to ensure effective implementation of policy-led initiatives in the power sector. Subramanian also agreed upon the fact that there must be flexibility in the regulatory framework to make inter-state power trade possible and mentioned that solar plants with better efficiency are required to make them commercially viable.

Shri Subramanian mentioned that multiple tenders floated by different agencies for single purpose often confuse the stakeholders. It was noted that there exists a general concern among the panellists and the audience regarding the way the solar market is evolving at present with so many undesirable players getting involved. Shri Subramanian feared that the unchecked participation and flow of capital in the solar market, if not immediately regulated by the Government, might lead to a solar scam. Furthermore, the regulatory measures should not disincentivise the entry of new and efficient players only on the basis of lack of experience. He urged the young entrepreneurs to explore the RE sector for more active participation to accelerate India's green growth.

Mr. Jayabrata Mukherjee, Managing Director, GP Green Energy Systems Pvt. Ltd, informed that his company has been engaged in gasification field, since 1997. He referred gasification plants as a source of continuous power supply unlike solar and thus being economically viable. This could be used as decentralised power on site. The GP Energy group has successfully experimented with a variety of feed stock like wood chips, animal residues, barley, sewage sludge, saw dust and brown coal. According to him, Waste-to-Energy maximises resource value while minimising environmental impact, so that both economy and environment can thrive. He also mentioned that GP Energy has successfully developed a unique gas cleaning system to remove tar and particulates from gas in stages to ensure impurities in gas do not exceed 10 mg/nm3, at the final stage. From dry high calorie valued combustible waste, the potential capacity for waste to energy plants is expected to grow to about 2200 MW by 2030. Therefore, India should focus on building up relevant capacity to exploit such rich renewable energy source.

Mr. Santosh Kamath, Partner- Infrastructure & Government Services, KPMG India Private Limited, re-established the fact that Renewable Energy has better prospects in Indian context. It has already achieved the grid parity recently. The Solar Rooftop Systems are coming in a big way and there will be an unprecedented solar penetration in Indian Energy Market by 2021. Mr. Kamath emphasised on utilising huge Gas capacity that the region has and careful utilisation of nuclear energy for the overall betterment of the energy scenario. He remarked that Solar Pumped Storage implemented in Purulia district of West Bengal has the potential to solve storage problems that are often associated with RE systems.

Mr. Jan Grimbrandt, Chairman and CEO, Boson Energy SA (Luxembourg) delivered a short presentation on his company's profile. The execution capacity of Boson Energy is limited to Germany and Poland. They have recently launched small-scale gasification systems along with the existing waste plants, which has been their forte since 2005.Grimbrandt also specified that Boson Energy works in applied research capacity. Boson Energy, being an impact technology company, looks at the energy system in a holistic manner by focussing on the local conditions and the total cost incurred by the society. It specialises on cost efficient and zero emission distributed power and thermal solutions to its clients. He concluded his brief presentation by indicating that Boson Energy looks forward to get involved in India's energy sector by

undertaking three major activities namely, technology transfer, capacity building and manufacturing. He was happy to announce that positive dialogues in this regard have already been initiated with different stakeholders in India.

The speaker for the valedictory session was **Dr. Sunita Narain, Director General, Centre for Science and Environment**. Dr. Narain presented the findings of a recently concluded study on rating the Thermal Power Plants in India. The thermal power sector uses 70 percent of the country's coal, huge areas of land and water. Coal-based power plants have a huge environmental footprint. 60 percent of the total carbon emission is from this sector; 45-50 percent of sulphur oxides or SOx, 30 percent of nitrogen oxides or NOx and more than 80 percent of mercury emissions are from thermal power plants of the country.

She added that, furthermore, the extraction cost for coal is very high and it has high pollution impact on the local communities. An important observation by CSE in this regard has been the location of the most polluting thermal power plants, which are often in the poor tribal areas of Chhattisgarh. This indicates the Government's tendency to establish such plants in such localities where people having less or no voice in the development process. Also, as we engage ourselves in renewable energy resources, it is also important to see how to make thermal power cleaner. Earlier, similar ratings were done by CSE in other sectors, such as automobile (2001), cement (2005) and steel (2012). In this study, plants were assessed on the basis of the following factors:

- Water conservation practices adopted by the plant (aiming at *zero liquid discharge*)
- Efforts for ash handling and use
- Efficiency (below or above average)
- Effort to meet strict PM Norms
- Efforts for handling Sulphur Dioxide or SO2

The CESC power plant located at Budge Budge scored highest in this rating. However, the study reveals that this sector has a long way to go. It is very evident that the biggest agenda should be achieving highest efficiency possible. Land requirement for any Indian thermal plant is generally between 2-10 acres per megawatt whereas ideally it should be 1 acre per MW. It was also noted by the study team that in most of the cases, 50-60 percent of land is used just to dump ash. Two-third of the Indian thermal plants are located in the water stressed areas. Mismanagement of water, lack of initiatives to recycle the used water, dumping polluted water in rivers that are lifelines of India are few of the issues that the team came across during the survey. It should be realised by all that India is too poor a country to waste or misutilise resources like this. There is more than a billion tone of fly ash currently unused in the country. With ash generation getting doubled by 2022, we are uncertain up to what extent this figure would go. Therefore, ash management is crucial for efficient working of thermal power plants.

In April, 2015, the Ministry of Environment Forest and Climate Change issued a draft notification for thermal power plants giving direction towards water conservation and other issues related to better water management. It showed the willingness of the Government to solve such issues. Another major concern was that most of the plants have efficiency level of 10 percent below the benchmark figure. The average efficiency level as pointed out by this study is 32.8 percent whereas the same for US and China is 35.7 percent. The problem in India is that the

most efficient stock has been utilised in the least efficient manner. Therefore, the question arises is should the focus be on building more thermal power plants or on incentivising the existing ones to produce power more proficiently?

Way Forward

The target set by the Indian Government for its power sector is to produce 2tn kWh of electricity by the year 2019 and incorporate 100000 MW solar capacities as well as 60 GW hydro energy and wind energy in the energy mix by 2022. There must be concerted effort by different categories of stakeholders to materialise these targets. The BCC&I Environment and Energy Conclave, 2015 brought to the table a number of recommendations successfully for bringing in the desired changes:

- There are two components of energy security that the Government must focus on – raising energy efficiency level in the existing conventional power plants and generating clean energy in large-scale through installation of Renewable Energy technology.
- Technical innovations should be accompanied by mass awareness generation programmes to equip common people with RE technology and associated benefits and various initiatives taken by the state and central governments.
- Old inefficient plants that are heavily polluting must be retired or modernised at an accelerated pace incentivised by the environmental clearance process. Locational advantages and disadvantages should be considered by the concerned authority before issuing a clearance certificate.
- Inclusion of environmental cost/compliance in merit order dispatch.
- It should be ensured that there is maximum utilisation of the most efficient stock and polluting plants are not picked first just because they are cheaper.
- There is no doubt regarding the fact that coal will continue to contribute to a major part of energy mix of the nation. However, promoting sustainable means of mining and making thermal power plants cleaner would definitely aid in a sustainable growth trajectory envisaged by India.
- Optimum utilisation of India's renewable energy resource base and promoting smart-grid- based integrated systems.
- Promoting a robust regulatory framework that also encourages active participation of young and capable entrepreneurs in the renewable energy sector.

- End -