MECON LIMITED ,RANCHI – 834 002

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Sub: Recommendation points of All India Seminar on "Power Sector: Recent advancement and challenges ahead. " – RAOCAPS-2017 organised by IEI, JSC in association with MECON.

Following topics were discussed in detail during the seminar 12th & 13th August'2017:

- Power generation technologies (Conventional and Renewable)
- Transmission & distribution
- Control & Automation
- Pollution control technologies including monitoring
- Futuristic technologies

All the above subjects were addressed by Guest Speakers, Eminent Speakers, Invited speakers and Manufacturers through display in their exhibition stall and presented during manufacturer presentation session.

Following recommendations are suggested by committee after due deliberations:

1. To improve plant load factor (PLF) and plant efficiency of all existing thermal/ hydro power plant must carry out RNM study after 15~20 years by expert agencies and based on this report revamping / phasing out plan shall be executed.
2. Condition based maintenance of plant & equipment to be introduced with advanced diagnostic measure by monitoring of lubrication oil, vibration monitoring & signature analysis, electrical parameters, infra-red image monitoring and surface quality check.
3. For renewable technology penetration, institutions shall be encouraged to participate in Micro-level off-grid installation for drinking water, mobile charging, and toilet cleaning applications at remote village.
4. Alternative resource of energy from bio-diesel, Waste to energy with sound technological development at commercial level to be encouraged.
5. Techno economics on implementation of modern SMART – Control System in existing power plant to be studied for improving reliability, prompt control.
6. For dynamic control of parameter at power plant , modern instrumentation with 3-D graphics visibility, image monitoring and remote control, decision making using

artificial intelligence in existing plant need to be to be checked for techno-economic feasibility.

7. For industrial power market, trading may be introduced at national level for market stability, distribution quality improvement and ultimate benefits to the customers.

8. For reforming distribution sector at national level scheme shall be developed. Strong communication channel among consumers, distributor, transmission sector, generator, fuel supplier shall be developed for delivery of quality resources/ services and ensure return of payment to all the links of channel as per agreement for business ease.

9. SMART GRID SOLUTION for demand side management at Load center and City Power distribution.

10. Micro- grid / Off-grid solution through Cooperative financing for rural power generation and application both for local supply and grid connectivity.

11. **On Futuristic Energy Generation Technology on E2E – Maximum time it was deliberated in the 1st day and 2nd day by Eminent Speaker Dr. Tahakur.**

    The lecture was very clear on the negative side of conventional energy sources thermal, hydro, nuclear including renewable solar, tidal and wind. Only ray of hope is E2E by converting water into energy in very low foot print with no waste, efficiency 90~95% great technology. I was sincerely trying to understand the technology but could not follow in the absence of adequate technical details. May I request our chairman of the technical committee, having relevant experience on the subject (i.e related to power plant) or other members of technical committee with power plant background to please write at least 5 to 10 lines on this noble technology in the recommendation so that IEI, JSC and MECON, Ranchi both will get enlightened on this historical development of Indian in Science and Technology, which can be viewed as future possibility of green power generation. Thank you for recognizing such a great innovative technology and focusing huge opportunities to delegate and

MECON fellow colleagues. Best wishes for success of Dr. Tahkur's upcoming E2E installation in Jharkhand State.

I urge in the recommendation following basic points please be highlighted on E2E and not on the negative side of conventional energy:

What is Input energy Elect / Potential / Nuclear or Mass defect/any new form?
Steam is generated by heat or some other means?
It was told only input 500 lit water, 450 lit return and 50 lit converted to energy. Is this 50 kg water mass converted to energy for generating 1MW power?
It will be great if we can write fundamental points of upcoming technology E2E.

11. Futuristic – Technology Adoption of Moving Coke Treatment process for Multi Pollutant (PM, SO_2, SO_3, NO_X, Hg) Control

The process has been installed on coal-fired units (up to 600 MW), mainly in Japan. System efficiency is 99% of SO2 and SO3, 20–80% NOx, over >90% of mercury (both elemental and oxidised) and ~50% of PM are removed in the process when burning low to medium sulphur coals. The moving coke bed system is installed after the particulate control device i.e. ESP.

The process consists of three stages, namely pollutant adsorption, regeneration of coke by heating and by-product H2SO4/ Gypsum and Hg recovery. The adsorber is a single- or two-stage tower, depending on the design. It consists of a number of moving beds from top to bottom that operate in parallel. SO2, SO3, NOx and mercury are removed by the sorbent through adsorption, chemisorption and catalytic reactions. Particulates are reduced by their impact on the coke pellets. The clean flue gas exits the adsorber and is released through the stack. The activated coke takes ~80–120 h to pass through the adsorber and the residence time for the flue gas is ~10 s.

This system produces 14 t of solid waste every two years as compared with 45–47,000 t/y for ESP or bag house based activated carbon systems for 250 MW power plant. The removed coke is then replaced. The mercury concentration of the

waste coke is around 5400 ppm, significantly higher than the 40–140 ppm on activated carbon waste materials. This process is running in Japan for over five years and the system has not become replete with mercury as yet, meaning that no mercury disposal has been required so far in the entire time that the system has been in operation. Activated coke is regenerated by heating up to 450°C. At this temperature the mercury with SO2 is desorbed but is held within the desorb zone. It then re-adsorbs at the top end of the regenerator and is therefore again confined within a defined zone of activated coke chamber. Once the mercury in this zone reaches saturation capacity (usually 2–3 years) the coke is disposed of. Desorbed SO2 is converted to SO3 in catalytic converter and subsequently H2SO4 or Gypsum is produced.

For the Indian Coal this system is very much effective as SO2 load is limited to 1500 ppm. Multi-pollutant processes that remove several regulated pollutants in one system may be more cost-effective than separate individual pollutant treatment.