

Training of trainers' workshop: Japanese low carbon technologies and best practices

The Institute for Global Environmental Strategies (IGES), Japan, and The Energy and Resource Institute (TERI), India, organized a Training of Trainers (ToT) workshop on Japanese low carbon technologies (LCTs) and best practices related to compressed air system on October 15, 2018 at TERI Southern Regional Centre, Bangalore as a part of the activities under Japan-India Technology Matchmaking Platform (JITMAP). The key objective was to build the capacities of energy auditors/managers on efficient selection and operation of air compressors used in Indian industry. About 40 participants, consisting of energy auditors from consulting firms and energy managers from industries attended the workshop.



Mr Girish Sethi, Senior Director, Energy Program, TERI welcomed the participants and the IGES team and spoke about successful collaboration with IGES with Japanese private sector companies to bring Japanese LCTs in India. He emphasized on the need to build capacities of Indian industries on various energy efficiency improvement

measures. He thanked Mr Saito Tsukasa, the expert on compressed air system for sharing his knowledge with Indian stakeholders.

Mr Toshizo Maeda, Deputy Director, IGES Kansai Research Centre (IGES KRC), briefed about project objective and requested the participants to take the benefit of training program to share the technological need of Indian industries so that IGES could bring relevant technology providers to India in the future.





Mr Saito Tsukasa, Compressed Air System Expert formerly with Hitachi Industrial Equipment System Co. Ltd, Japan, made a detailed presentation made a detailed presentation on “Optimisation of compressed air systems – Japanese experience”. Some highlights from his presentation are summarised below:

- Air compressors energy consumption share is approximately 5% to 25% in almost every industry in India (20~25% in Japan) and the operating energy cost of the air compressor is about 7-8 times more than the initial capital cost. Air pressure demand and maintenance are the key factors constituting the energy consumption of an air compressor.
- Proper selection and optimization of compressed air system offers a good potential to save energy. Key points for energy saving in compressor equipment consist of reducing unnecessary air consumption of the equipment to lower the compressor's load factor, using inverter and reviewing and reducing the pressure required for the equipment.
- Key words for energy saving are:
 - Stop - Stop high pressure operating and stop the supply of air to non-usable area.
 - Reduce - Reduce compressed air pressure as you need.
 - Repair - Repair compressor system and air leakage points.
 - Change - Replace an old compressor by introducing with high-efficiency product.
 - Recover - Recover energy such as exhaust hot air.
 - Shut down - Shut down the supply of compressed air during night time, lunch time & break time.
- There is a significant scope to save energy by improving the operating practices such as leakages (saving – 10 to 40%), pipe sizing & design (savings 7



to 20 %), type and overall condition (savings 7 to 15 %) and pressure settings for reciprocating, screw type (savings 8 to 16 %).

- Pipe size – thinner size should be checked. For reduced pressure loss without large number of bends should be avoided. Air with 4- 5 m/s of velocity should be considered but if the piping cost is too high then 15- 20 m/s of velocity could be considered for calculation of pipe size. Types of valves ball valves and globe valves, in globe valves there are 60% more losses than gate valves.
- For effective utilization of compressed air at end use level, installation of air saving valve in the exhaust outlet of air cylinder and nozzle-type gun saves up to 30% volume.
- Daily inspection and periodic inspection are essential for energy saving therefore the following steps should be a part of energy operation of air compressors:
 - Carry out proper maintenance: Proper maintenance by referring to the maintenance schedule and the contents of maintenance recommended by the manufacturer.
 - Use genuine parts: Genuine parts are the most appropriate parts for good and stable operation.
 - Carry out periodical maintenance: Periodical maintenance enables to prevent large troubles occurring in the future by taking measures in advance after grasping the trends such as the conditions of wearing, corrosion, and deterioration of machines, etc.

His presentation was followed by an interactive question and answer session with the participants. The session was moderated by Dr G R Narasimha Rao, Director, Industrial Energy Efficiency, TERI. The participants raised queries about measurement procedures to be adopted and new instruments/tools being used in Japan. Also questions on best operating practices to be adopted to maintain lower specific power



consumption were raised. Pipeline designing and air saving equipment were also discussed during the session.

Key takeaways

- ToT are useful platforms to disseminate knowledge on low carbon technologies (LCTs) and best operating practices (BOP) among energy auditors and energy managers, who in turn disseminate the knowledge with a larger group of industrial units.
- The participants greatly appreciated the knowledge shared by the Japanese experts and reiterated that more such activities should be undertaken to build local capacities.

Way forward/follow-up

- There is a well felt need to have more of ToT workshops for building capacities of Indian energy auditors and managers in the future.
- One industry showed interest in Japanese compressor manufactures during the program. TERI will follow up that company for further matching opportunity.
- Based on the participants' feedback form, technologies related to chillers, steam boilers, hot water generators and so on were identified as possible areas for future ToT programs.

