

## Concept Paper

### **On-line Training of Stakeholders on "Digitizing Industrial Motor Systems for Energy Efficiency"**

#### **Background:**

According to International Energy Agency, around half of the electricity used globally is consumed in electric motor systems. Industrial motor systems account for around 70% of manufacturing sector electricity consumption in different countries. The three most important motor systems in industry are pumps, fan and air compressor systems, or the general fluid systems in other words. Electric motors are, primarily, responsible for driving the industrial processing lines. United Nations Environmental Program (UNEP) has suggested that in the context of energy conservation, the motor systems have a potential of about 20% - 30% energy reduction.

One way to improve the system's efficiency is to replace low-efficiency components by high-efficiency components. This incurs significant costs. Another comparatively economical option is to introduce optimization and operational measures through digitization. The second option is ideal for the countries in South Asia, which are struggling with the issues of energy shortage. However, awareness, familiarity and higher skill levels should be ensured before proceeding to digitization process. In order to raise awareness and develop skills, there has been a need to introduce online training programs aimed at producing a pool of technical experts well-versed with applying the optimization and operational measures for various energy efficiency and energy conservation initiatives in industrial motor systems.

#### **Introduction:**

A motor system itself is a comprehensive system as it comprises of a series of components including inverter, motor, transmission accessories such as belt, gear box, driven equipment such as pump, fan, air compressor, pipe network and other control equipment. The system's overall efficiency is reflected by the efficiency of each of the involved components. In order to study the motor system in an online training, participants can use modern IoT technologies and operate the industrial motor load in real-time by simulating the various components and the application cases in factories and buildings. Such a training can aid in promoting awareness about the cost-effective solution to the issue of energy efficiency. Moreover, the knowledge and the exposure obtained can help the industries<sup>1</sup> to opt for economical and eco-friendly solutions.

SEC proposes an online training on “Digitizing Industrial Motor Systems for Energy Efficiency”. The online training will be a three days' activity. This training will include specially designed simulation software, and will have participants from the industrial sector of SAARC region. Trainers/Experts will share their experience on theoretical aspect of digitization followed by demonstration using simulation tool. In this training, experts will present the overall process, coordination among various

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<sup>1</sup>H. Ali, "Infographic: The Profile of Energy Use in Industrial Motor Systems," Global Efficiency Intelligence, LLC, San Francisco, 2017.

components of motor and energy flow sequence between these components. The experts will also demonstrate the case studies of motor digitization and accompanying energy savings. The aim is to familiarise the participants on energy savings in industrial motor system through digitization.

### **Objectives:**

The main objective of the training is to share the information on energy efficiency improvement in electric motor systems and sensitize the manufacturers, users and energy professionals in South Asian industries on the importance and benefits of such devices. Online training will have the following outcomes:

1. To spread awareness on the importance of energy efficiency for the industrial sector in SAARC region.
2. To demonstrate the potential energy savings, cost effectiveness, GHG reductions and other relevant benefits of the energy efficiency initiatives.
3. To equip the industrial professionals of SAARC region with essential skill set to implement energy efficiency and promote the smart utilization of resources.
4. To enhance capacity of participants by incorporating the latest IoT (Internet of Things) tools in industrial process system.

### **Major Aspects /Topics to be covered during the Training:**

The training will cover, but is not limited to the following aspects:

1. Construction and working principle of electric motor and various components of industrial motor system viz. VFD, starter, inverter, belt, gear.
2. Selection criteria of most efficient electric motor system for various applications.
3. Basis of energy savings in digitized motor systems
4. Industrial flow process and control strategy and communication architecture.
5. Application of latest IoT tools in energy efficiency and motor digitization.
6. Discussion on case studies of VFD applications and accompanying energy savings in overall system.
7. Areas of energy savings potential in existing industrial process driven by electric motor systems.
8. Installation requirement and safety assurance to the consumer concerned with digitized motor system.

### **Venue:**

The on-line training shall be broadcasted from the office of SEC.