Executive Summary

India is expected to maintain a robust economic growth rate of over 8% in the coming decade. This implies substantial increase in economic activities and raises the challenge of adding the infrastructure necessary to enable this development. India has ambitious plans of adding over 180,000 MW of generation capacity as well as associated power systems by the end of Twelfth Five Year plan, more than the cumulative capacity addition achieved till date. With such an ambitious target, the power sector requires augmentation of capacity across the value chain including manufacturing, construction, fuel and material supplies, project planning and implementation, financial management and operations and maintenance management.

While large-scale investments have been planned and numerous projects are underway, the lack of competent manpower to execute these projects and subsequently operate and maintain them is already being felt. The scarcity is increasing by the day and unless the Government, industry and all other stakeholders invest in attracting and training the available talent on an urgent basis, it has the potential to become a major bottleneck and derail the rapid growth in the sector that has just begun. This report addresses some of the key human resource challenges in the power sector today and lays out strategies for attracting fresh talent, retaining existing manpower and creating the necessary infrastructure for sustained training and development.

The study attempts to estimate manpower requirements of the power sector in India through scenario building, taking into consideration several factors like- fuel mix, technological changes, environmental concerns & growth. This uniqueness of this study on Indian power sector lies in its focus on manpower requirement at different levels including manpower requirements for environmental protection that would be required for meeting power requirements through alternate sources. The estimated manpower requirement for operations and maintenance pertaining to generation of power was estimated to be between 3.30 lakh and 4.79 lakh by the end of 2017 and between 4.10 lakh and 6.02 lakh by the end of 2020, depending upon the fuel mix, technology and growth in the power sector. This manpower would be required at different

levels for achieving power generation installed capacity to the tune of 350 GW by 2017 and 440 GW by 2020 respectively. However, it may be noteworthy that the available manpower far exceeds than the required manpower for the future. This clearly shows that availability of manpower will not be an issue; however critical issue would be quality of human resources in terms of required skills at different levels in the power sector to effectively and efficiently use the available capacities in the power sector. The study therefore attempted to evaluate training facilities and infrastructure available and required through a questionnaire survey, involving various employee categories across all major power utilities. The results indicate that, not much emphasis goes in training for lower level management, as they are generally outsourced and are considered out of the mainstream employees. In addition it was observed that engineers, supervisors and workmen lack basically technical, human and knowledge skills respectively, and there is a significant difference between the perceptions of employees across different levels regarding the effectiveness of training and development programs, wherein employees at higher levels perceive the programs as effective and on the other hand employees at lower level perceive it as ineffective. Program **design and commitment** of the top management was identified as the two most important factors contributing towards the effectiveness of training & development programs.

The study highlights major problems faced by the power sector, through an expert opinion poll and proposes certain key strategies such as - **a**ttract talent by showcasing opportunities, improving brand image and changing the work environment, expand training to cover behavioral and attitudinal changes, strengthen ITIs and other vocational skill development centers, standardize curriculum and develop certification standards, expand existing training facilities and create new infrastructure, ensure proper utilization of funds through direct payments, introduce electives at graduate engineering programs and specialized programs at post-graduate level, create awareness on energy efficiency among all stakeholders and incorporate mandatory training for personnel involved in energy intensive processes, and increased investment for creation of modern training infrastructure. In addition, the study also highlights the need for developing a comprehensive training program, development of inter and intra departmental informal training networks, training emphasis on human resource management and finance, developing training programs for contractual labor, disaster

management courses, developing more simulator programs for imparting practical knowledge & developing collaborative programs with colleges and universities.