



सत्यमेव जयते



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ENVIRONMENT AND ENERGY



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Improving Energy Efficiency in the Indian Railways System

PROJECT INFORMATION

Area: Environment and Energy

Budget: US\$ 26.2 million

- GEF: US\$ 5.2 million
- Government and others: US\$ 20 million
- In-kind: US\$ 1.0 million

Duration: 2011–2017

Government counterpart: Ministry of Railways, Government of India

Implementing partner(s): Ministry of Railways, Government of India

Other partner(s): Bureau of Energy Efficiency, Ministry of Power, Government of India

Location(s): National-level

Background

The Indian Railways network is one of world's largest, spread over 115,000 track kilometers (66,030 route km) connected with 8,500 stations, serving people since 1853. In 2014–15, the Indian Railways transported 8.39 billion passengers, that is, more than 23 million passengers a day. In addition, it transported 1050.18 million tonnes of freight across the country. Indian Railways consumed about 18.25 billion kWh electricity in 2014–15 which is 1.8 percent of the country's total electricity consumption.

Keeping in view the projected electricity demand from the railways in the next decade, to grow at about 9 percent per annum, Indian Railways has developed a long-term Energy Efficiency and Conservation Program (EECP) (2010–2032) to reduce energy consumption by 10 percent by 2032. Towards this, the Ministry of Railways in partnership with United Nations Development Programme (UNDP) is supporting the Indian Railways in rolling out and implementing the EECP and improving its energy efficiency in the long run.

About the project

The project aims to:

- develop a long-term energy efficiency and conservation programme to reduce energy consumption and emission of greenhouse gases in the Indian Railways;
- implement proven energy-efficient technologies and measures;
- develop institutional capacities and support technical training to enable the adoption of energy-efficient technologies;
- demonstrate through pilot projects energy-efficient technologies and measures to build staff capacity; and
- promote greater knowledge sharing and learning on cost-effective technologies that can reduce Green House Gas (GHG) emissions.

Developments thus far

Since 2011, the project has crossed several milestones:

- The institutional capacity of Indian Railways has been strengthened by the establishment of a Centre of Excellence on energy efficiency technologies and solutions at Indian Railway Institute of Electrical Engineering (IRIEEN), Nasik, Maharashtra and at South Central Railways, Secunderabad. Under this project, IRIEEN has set up training and testing facilities for pumps, motors, and the solar cum wind hybrid system; performance of heating, ventilation, and air conditioning, compressor systems and an energy auditing instruments laboratory. IRIEEN has also developed computer based training (CBT) module on improving the energy efficiency of electrical appliances and equipment. The testing facilities at IRIEEN will be used for energy efficiency courses, for practical energy performance training and the CBT module will be used for providing training on improving the energy efficiency of appliances.
- Technical training was provided to more than 10001 railway officers and supervisors at IRIEEN and the National Academy of Indian Railways, Vadodara, Gujarat on improving energy efficiency of electrical appliances and equipment.
- Energy audit guidelines, manuals, and procedures were developed for energy intensive railways operations, including production units, traction substations, workshops, production units, maintenance depots and buildings. Energy audit was undertaken for 15 facilities including railway stations, workshops, hospitals and buildings across the Indian Railways system.
- Gap analysis was carried out to identify opportunities for improving energy efficiency and to define areas for implementation of energy efficient technologies and measures.
- A Technology Information Resource and Facilitation Desk was set up at the Research Design & Standards Organization (RDSO) Lucknow, Uttar Pradesh.
- Electrical lights in 150 compartments of passenger trains were replaced with energy efficient LED lights resulting in a decline in maintenance costs and better quality of light saving over 4 million kiloWatt hours (kWh).
- The Dadar station, Mumbai has been selected for the implementation of a new energy efficient, building management system, which is a real-time, online monitoring tool that monitors consumption patterns, promptly diagnoses problems in electrical power usage, and takes immediate action.
- An online system, railsaver.gov.in, was developed by the Centre for Railway Information Systems (CRIS), it provides updated energy data across 16 zones of the Indian Railways. The analysis of data collected will facilitate in shaping the future strategies of the Indian Railways.
- CRIS has also designed and developed the IRGREENERI website which was launched by the Minister of Railways. It will act as a knowledge sharing platform on railways' green initiatives and best practices.
- To assess the replicability of the latest energy efficiency technologies in Indian Railways, 47 railway officials visited United Kingdom, Australia, Germany and Spain. Also, several national and international seminars and workshops were organized which provided a platform to share and learn from the experiences of international and national experts and industry leaders on energy efficient technologies, solutions and best practices in railways.
- Developed mobile based application of the rail saver web-portal for providing energy data across 16 zones and 6-production units of the Indian Railways by CRIS and utilizing the information generated for monitoring the energy consumption of respective divisions or zones;
- Implemented building management intelligent system (BMIS) in Rail Bhawan, New Delhi, for integration, online monitoring, control and automation of electrical power systems and appliances and improving energy management and responsiveness to snags
- Key pilot projects adopted in the Indian Railways are:
 - i. At Delhi Division - Optimal light control system, provision of 200 super energy efficient fans and solar pumps; demonstration of energy efficient technology on IT platform through 500 AMR meters including supply, fixing, testing and commissioning of LED lights in 150 non-AC second class three tier sleeper coaches of the Train Lighting depot.
 - ii. At Baroda House, New Delhi - Smart sensors and smart grid system set-up at the office of Indian Railways.
 - iii. At Dadar Station, Central Railways - Building management systems installed at stations and railway offices for implementing energy efficiency measures.
 - iv. Northern Railways - Bay lighting in workshops and loco sheds; automation of pumping arrangement at Ghaziabad and variable voltage variable frequency drives in lifts, installed;
 - v. North Western Railways- pumping arrangement automated at Jaipur Division.

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