

IR makes green progress

Despite its critical role in supporting the coal market (p38), Indian Railways remains committed to an ambitious set of sustainability goals. At the forefront of these is its national rolling programme of electrification, which is now nearing completion under the 'Mission 100%' approach (RG 7.23 p20).

Yet, as we reported in RG 12.22 p26, IR is not relying on wiring alone to reach its commitment of achieving net zero carbon emissions by 2030. For the relatively few routes where catenary is unlikely to be installed in the foreseeable future, IR has sought to develop alternative traction options, in line with trends seen widely around the world. In February 2022, the national government issued a Green Hydrogen Policy under the National Hydrogen Mission, and the following August an indigenously developed hydrogen fuel cell bus was unveiled. This had been developed by the Council of Scientific & Industrial Research and KPIT Private Ltd.

That prompted IR to follow up with its own hydrogen traction commitment, focused on deploying fuel cell-powered trains on the country's various narrow gauge mountain and heritage railways. As part of efforts to make these railways 'completely green', IR expects to roll out 35 hydrogen-powered trains on routes including the Darjeeling Himalayan Railway, Nilgiri Mountain Railway, Kalka Shimla Railway, Matheran Hill Railway, Kangra Valley, Bilmora Waghai, and Marwar – Devgarh Madriya lines.

However, IR's first deployment of hydrogen fuel cell traction is expected to be a retrofitted DEMU, which is being converted under a partnership between IR and Medha Servo Drives. The train is planned to re-enter traffic next year on the Sonpat – Jind route in Haryana. The project involves retrofitting the trainset with 100 kW FCmove™-HD+ fuel cells supplied by Ballard.

Solar progress

Over a decade ago, IR decided to develop solar power plants on railway land, setting a target of installing 1 000 MW. Half would come from roof-mounted panels on its buildings, and the rest from ground-based solar farms. In the national budget of 2017-18, it was announced that solar power would be used to power approximately 7 000 railway stations across the country and solar power plants would be installed

While its 'Mission 100' electrification programme is doing much to reduce Indian Railways' use of diesel, it has a range of other initiatives intended to help it achieve net zero by 2030.

Bharti Jain rounds up the latest developments.



Photo: Snehal Jeevan Paikar / Shutterstock

on the rooftops of railway buildings, warehouses and stations.

In March this year, IR reported that it had installed solar panels at around 1 500 stations, and commissioned 211 MW of solar plants and 103 MW of wind power. Meanwhile, no fewer than 2 500 hauled coaches have had solar cells fitted on their roofs; IR hopes this rolling power generation fleet could provide up to 3.84 MW of power.

Energy conservation

Elsewhere, IR is turning its attention to saving energy as well as generating it. A web-based Building Management System has been developed to monitor parameters such as heating, ventilation, air conditioning and lighting use at IR facilities across the country. Data transfer by GPRS is used to enable smart metering whereby staff can understand the energy consumption of a given building, while also receiving real-time alerts about the condition of utilities there. One such system has been commissioned at Dadar station in Mumbai, combining smart metering with replacement of lighting with energy-efficient LEDs.

LEDs are also being used to reduce the energy use of the illuminated facade of

The famous frontage of Mumbai's CST is now being illuminated with LEDs as part of an energy saving drive.

Mumbai's historic Chhatrapati Shivaji Maharaj Terminus. More than 1 200 diode bulbs have been installed on the famous exterior, reducing the overall power consumption from 70 kW to 17 kW.


A similar power control and management tool has been fitted at Wakav station in Maharashtra. This is used to alternate power take from solar or conventional grid supply depending on local conditions, feeding the resulting electricity into the supply to the station area's signalling.

IR has also been developing a National Energy Management Centre, which saw first use in May 2023. The centre is intended to give a 'big picture' view of how IR is using power by gathering data from 17 State Energy Management Centres. NEMC then provides IR with an immediate overview of energy consumption across a huge geographical area.

Biodiesel gains ground

While hydrogen traction is being assessed for narrow gauge railways, IR and its research arm RDSO see potential in using biodiesel to curb carbon emissions on line haul services which today rely on a diesel prime mover.

Grade B5 biodiesel has been tested by RDSO so far, where a 5% biofuel mix is added to the fuel blend. IR hopes that biomass grown alongside railway lines could be used to increase the amount of biofuel blend that could be used for non-electric traction; it hopes this could cut its overall diesel consumption by 5% to 10% in the medium term.

IR is also seeking to make greater use of bi-mode traction options. A demonstration battery-electric loco named 'Navdoot' has been launched by West Central Railway, which is able to haul 18 passenger coaches at up to 30 km/h. It has been fitted with no fewer than 84 battery cells, giving it off-wire haulage capability of up to 400 tonnes. The 84 tonne loco is being tested at stations and yards across the Madhya Pradesh region with a view to replacing diesel shunting locos with more sustainable alternatives. 

35

hydrogen-powered trains are to be rolled out on routes across India