

## R&D and innovation

In FY24, for India business we were granted 333 patents and 145 design applications. Jaguar Land Rover was granted 337 patents and 279 design applications. Our cutting-edge R&D facilities consistently pioneer innovative mobility solutions, developing a range of alternative fuel technologies, from battery-electric to CNG, LNG, Hydrogen Fuel Cell and hydrogen-based ICE technologies.



CV

### State-of-the-art H2 ICE engine facilities

Tata Motors unveiled two state-of-the-art R&D facilities to promote sustainable mobility solutions, including an engine test cell for developing Hydrogen Internal Combustion Engines and infrastructure for storing and dispensing hydrogen fuel for Fuel Cell and H2ICE vehicles. These advancements represent Tata Motors' ongoing efforts towards carbon neutrality while harnessing the potential of hydrogen as a clean energy source, thereby contributing towards Government's sustainability goals.

### Hydrogen Fuel Cell-powered buses

Demonstrating a commitment to eco-friendly solutions, Tata Motors introduced Hydrogen Fuel Cell-powered buses – the first of their kind – to Indian Oil Corporation Ltd. These buses, inaugurated in New Delhi on September 25, 2023, represent a significant step towards advancing India's transportation sector.



PV

### Twin-cylinder CNG range

Revolutionising the Indian CNG market, the twin-cylinder technology offers an innovative industry-first solution. The traditional single cylinder CNG is replaced with two smaller CNG cylinders placed below the luggage area, to ensure a larger usable boot. This innovation ensures a no-compromise solution for customers, and addresses the biggest customer concern in CNG vehicles.



**EV**

**V2L and V2V technology**

The new Nexon.ev offered an innovative bi-directional charging technology making the Nexon.ev capable for V2X. This technology allows the customer both vehicle-to-vehicle (V2V) charging and vehicle-to-load (V2L) charging, which offers more functionality to the Nexon.ev, and also provides an option for charging in emergency situations.



**JLR**

**Open Innovation programme**

Jaguar Land Rover devotes significant resources in its R&D activities.

JLR's Open Innovation programme was set up in 2022, to deliver global collaboration with start-ups, scale-ups, like-minded external organisations and the wider Tata Group, exploring opportunities in seven key areas: Electrification, Connectivity, Digital Services, Metaverse, Industry 4.0, Talent and Sustainability.

**Advanced Future Energy Lab**

JLR unveiled its new Future Energy Lab, a £250 million, state-of-the-art EV test facility at its engineering centre in Whitley, Coventry. The new 323,000 sq. ft. facility at JLR's Whitley Engineering Centre in Coventry will host more than £40 million of technological innovations to enable the rapid testing of EVs, including electric test rigs, Electric Drive Unit (EDU) manufacturing and electric vehicle systems test cells. This includes a series of extreme-weather climate chambers, capable of simulating the harshest of conditions – from -40°C up to 55°C.

