

# **ELECTRIC VEHICLES**

**Electric vehicles are the key technology to decarbonise road transport, a sector that accounts for 16% of global emissions. Recent years have seen exponential growth in the sale of electric vehicles together with improved range, wider model availability and increased performance. Passenger electric cars are surging in popularity - we estimate that 13% of new car sold in 2022 will be electric; if the growth experienced in the past two years is sustained, CO<sub>2</sub> emissions from cars can be put on a path in line with the Net Zero Emissions by 2050 Scenario.**

# **Types of Electric Vehicles**

**There are four types of electric vehicles available:**

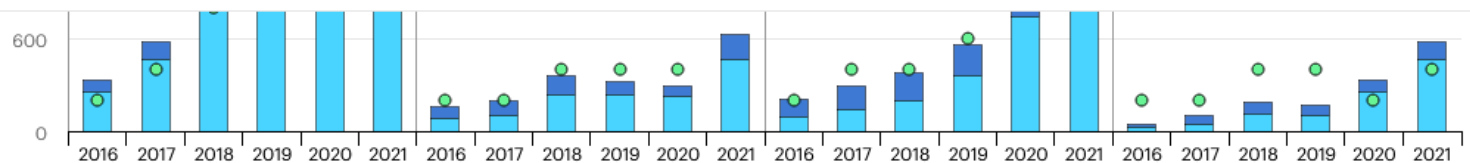
- **Battery Electric Vehicle (BEV):** Fully powered by electricity. These are more efficient compared to hybrid and plug-in hybrids.
- **Hybrid Electric Vehicle:**
  - **Hybrid Electric Vehicle (HEV):** The vehicle uses both the internal combustion (usually petrol) engine and the battery-powered motor powertrain. The petrol engine is used both to drive and charge when the battery is empty. These vehicles are not as efficient as fully electric or plug-in hybrid vehicles.
  - **Plug-in Hybrid Electric Vehicle (PHEV):** Uses both an internal combustion engine and a battery charged from an external socket (they have a plug). This means the vehicle's battery can be charged with electricity rather than the engine. PHEVs are more efficient than HEVs but less efficient than BEVs
  - **Fuel Cell Electric Vehicle (FCEV):** Electric energy is produced from chemical energy. For example, a hydrogen FCEV.

# **Electric car sales took off across major car markets in 2021**

**Electric car sales reached a record high in 2021, despite supply chain bottlenecks and the ongoing Covid-19 pandemic. Compared with 2020, sales nearly doubled to 6.6 million (a sales share of nearly 9%), bringing the total number of electric cars on the road to 16.5 million. The sales share of electric cars increased by 4 percentage points in 2021. The Net Zero Emissions by 2050 Scenario sees an electric car fleet of over 300 million in 2030 and electric cars accounting for 60% of new car sales. Getting on track with the Net Zero Scenario requires their sales share to increase by less than 6% percentage points per year.**

# Electric car registrations and sales in many countries

Electric car registrations and sales share in China, United States, Europe and other regions, 2016-2021

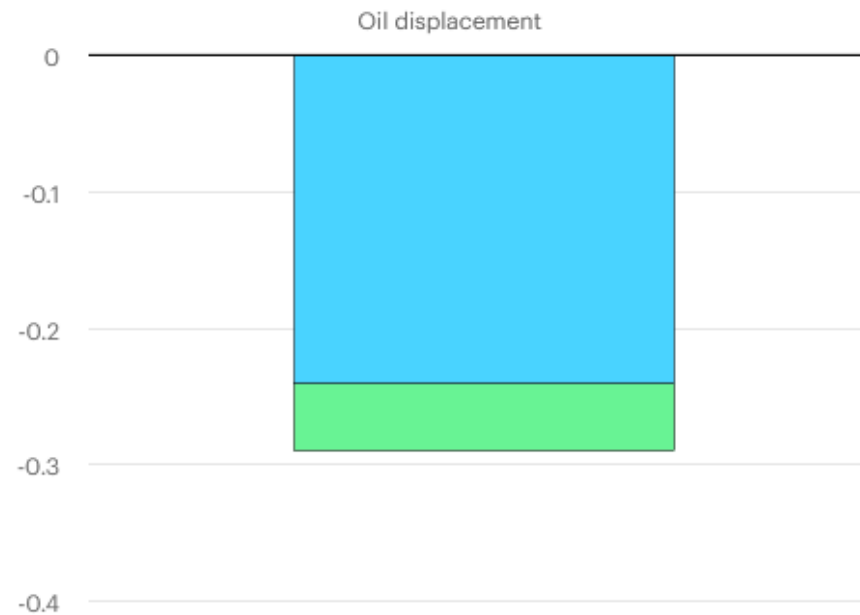


# EVs avoid oil consumption

Oil displacement resulting from use of EVs, 2021

Open 

Mbbl/d



# **Battery energy density is increasing and alternative chemistries are being developed**

**Energy density is key to ensuring that BEVs have sufficient range. The energy density of batteries for EVs has been rising over the past year, and now some of the highest performing battery cells can reach energy densities of over 300 Wh/kg, up from around 100-150 Wh/kg a decade ago – meaning that with the same mass, electric cars can now travel twice as far. This progress has been made thanks to continuous improvement in battery chemistry and cell design. Key examples of this include Tesla's upcoming 4680 cells and LG Energy Solution's Ultium cells.**

# **Expenditure on EVs and investment in the supply chain are increasing**

**In 2021 consumers across the world spent an estimated USD 250 billion on EV purchases. The growth in EV sales is driving investment in electrification, which represented more than 65% of overall end-use investment in the transport sector in 2021. Recent analysis by the IEA estimates that this share will increase to more than 74% in 2022. Moving beyond cars, investment is also being directed towards electrification of buses and heavy-duty trucks. In early 2022 India ran a tender for the purchase and deployment of more than 5 000 electric buses across five major cities. The contract was awarded for half the price reached in previous tenders. [A public-private joint venture in Chile](#) is also seeking financing to fund an 1 000-strong electric bus fleet in Santiago.**

# Conclusion

**The progress that the electric vehicle industry has seen in recent years is not only extremely welcomed, but highly necessary in light of the increasing global greenhouse gas levels. As demonstrated within the economic, social, and environmental analysis sections of this webpage, the benefits of electric vehicles far surpass the costs. The biggest obstacle to the widespread adoption of electric-powered transportation is cost related, as gasoline and the vehicles that run on it are readily available, convenient, and less costly. As is demonstrated in our timeline, we hope that over the course of the next decade technological advancements and policy changes will help ease the transition from traditional fuel-powered vehicles.**