FAQ

Frequently Asked Questions (FAQs)

FAQ 10.1 | How important is electromobility in decarbonising transport and are there major constraints in battery minerals?

Electromobility is the biggest change in transport since AR5. When powered with low-carbon electricity, electric vehicles (EVs) provide a mechanism for major GHG emissions reductions from the largest sources in the transport sectors, including cars, motorbikes, autorickshaws, buses and trucks. The mitigation potential of EVs depends on the decarbonisation of the power system. EVs can be charged by home or business renewable power before or in parallel to the transition to grid-based low-carbon power.

Electromobility is happening rapidly in micromobility (e-autorickshaws, e-scooters, e-bikes) and in transit systems, especially buses. EV adoption is also accelerating for personal cars. EVs can be used in grid stabilisation through smart charging applications.

The state-of-the-art lithium-Ion batteries (LIBs) available in 2020 are superior to alternative cell technologies in terms of battery life, energy density, specific energy, and cost. The expected further improvements in LIBs suggest these chemistries will remain superior to alternative battery technologies in the medium term, and therefore LIBs will continue to dominate the electric vehicle market.

Dependence on LIB metals will remain, which may be a concern from the perspective of resource availability and costs. However, the demand for such metals is much lower than the reserves available, with many new mines starting up in response to the new market, particularly in a diversity of places.

Recycling batteries will significantly reduce long-term resource requirements. The standardisation of battery modules and packaging within and across vehicle platforms, as well as increased focus on design for recyclability, are important. Many mobility manufacturers and governments are considering battery recycling issues to ensure the process is mainstreamed.

The most significant enabling condition in electromobility is to provide electric recharging opportunities and an integration strategy so that vehicles support the grid.

FAQ 10.2 | How hard is it to decarbonise heavy vehicles in transport like long-haul trucks, ships and planes?

There are few obvious solutions to decarbonising heavy vehicles like international ships and planes. The main focus has been increased efficiency, which so far has not prevented these large vehicles from becoming the fastest-growing source of GHG globally. These vehicles likely need alternative fuels that can be fitted to the present propulsion systems. Emerging demonstrations suggest that ammonia, advanced biofuels, or synthetic fuels could become commercial.

Electric propulsion using hydrogen fuel cells or Li-ion batteries could work with short-haul aviation and shipping, but the large long-lived vessels and aircraft likely need alternative liquid fuels for most major long-distance functions.

Advanced biofuels, if sourced from resources with low GHG footprints, offer decarbonisation opportunities. As shown in Chapters 2, 6, and 12, there are multiple issues constraining traditional biofuels. Sustainable land management and feedstocks, as well as R&D efforts to improve lignocellulosic conversion routes, are key to maximising the mitigation potential from advanced biofuels.

Synthetic jet and marine fuels can be made using CO_2 captured with DAC/BECCS and low-carbon hydrogen. These fuels may also have less contrails-based climate impacts and lower emissions of local air pollutants. However, these fuels still require significant R&D and demonstration.

The deployment of low-carbon aviation and shipping fuels that support decarbonisation of the transport sector will likely require changes to national and international governance structures.

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FAQ 10.3 | How can governments, communities and individuals reduce demand and be more efficient in consuming transport energy?

Cities can reduce their transport-related fuel consumption by around 25% through combinations of more compact land use and less car-dependent transport infrastructure.

More traditional programmes for reducing unnecessary high-energy travel through behaviour change programmes (e.g., taxes on fuel, parking, and vehicles, or subsidies for alternative low-carbon modes) continue to be evaluated, with mixed results due to the dominance of time savings in an individual's decision-making.

The circular economy, the shared economy, and digitalisation trends can support systemic changes that lead to reductions in demand for transport services or expand the use of more efficient transport modes.

COVID-19 lockdowns have confirmed the transformative value of telecommuting, replacing significant numbers of work and personal journeys, as well as promoting local active transport. These changes may not last and impacts on productivity and health are still to be fully evaluated.

Solutions for individual households and businesses involving pledges and shared communities that set new cultural means of reducing fossil fuel consumption, especially in transport, are setting out new approaches for how climate change mitigation can be achieved.