Transport Demand on the Rise

Transport accounts for about a quarter of global energy-related carbon emissions. This contribution is rising faster than for any other energy end-use sector. Without aggressive and sustained policy intervention, direct transport carbon emissions could double by 2050.

Better air traffic management can reduce CO₂ emissions through more direct routings and flying at optimum altitudes and speed.

Electric hybrid drive trains, buses and cars can reduce consumption by 35% compared with conventional engines.

In China, electrification and other measures on train infrastructure from 1975 to 2007 helped reduce CO₂ emission intensity by 87%.

The high-speed ‘Shinkansen’ commuter train in Japan reduced energy consumption by 40%.

Fuel efficiency gains of 40–50% from 2030–2050 can be achieved through improved design.

Port infrastructure may need to be rebuilt to avoid the worst impacts of sea-level rise. Efficiency of new-built vessels can be improved by 5–30%.

Rail

Increased rainfall, flooding and subsidence, sea-level rise and increased incidence of freeze-thaw cycles undermine the stability of railways.

Aviation

More storms in some regions may increase the number of weather-related delays and cancellations. Higher temperatures at high altitude and low-latitude airports may reduce the maximum take-off weight or require longer runways due to less dense air.

In China, electrification and other measures on train infrastructure from 1975 to 2007 helped reduce CO₂ emission intensity by 87%.

Road

Extreme heat will soften paved roads. Unpaved roads and bridges are especially vulnerable to intense rainfall. Frequent freeze-thaw cycles in cold regions will damage both the base and paved surface.

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Truck modernisation including increased freight load, along with engine, tyre and vehicle maintenance, can significantly improve fuel economy.

For international shipping, combined technical and operational changes can massively reduce energy use.

Co-Benefits

Efficient, low-carbon transport systems have significant co-benefits, such as better access to mobility services for the poor, time saving, energy security, and reduced urban pollution leading to better health. Some studies suggest that the direct and indirect benefits of sustainable transport measures often exceed the cost of their implementation.

Reduced Road Traffic

Reduced road traffic and congestion often lead to fewer traffic crashes, less noise and less road damage.

Health

Walking and cycling and rapid transport/public transport combined with improved land use can bring great health benefits; reducing CO₂ emissions could increase emissions of health-damaging small particulates.

Energy Security

Cutting carbon emissions is likely to be more challenging than for other sectors given the continuing growth in global demand and scale of change needed. However, doing so will assist with longer-term energy security.

Cost Savings

Many energy efficiency measures have a positive return on investment. Improving aerodynamics and cutting the weight of vehicles and optimising design may have a negative lifetime cost.

Low-Carbon Cities

Cutting CO₂ and improving air quality can help improve the health of urban residents. This can be achieved by reducing congestion and pollution.