Transport: Heavy Vehicles - Electric

This lever controls the sub-levers listed in the table, and ambition levels are for the end year shown on the right-hand side. Units of 'Index' are relative to 2015.

The heavy loads and long distances involved with heavy duty vehicles pose significant problems when considering electrification to eliminate tailpipe emissions. One such problem is the size of the battery required to provide sufficient range. The increased size and weight of the battery reduces the amount of cargo the vehicle can carry. Charge times also increase. Batteries are appropriate for vehicles travelling shorter journeys with lower payloads, such as local bus routes or a subset of HGV journeys. However, long distance and heavy transport services, such as freight and passenger rail, and articulated HGVs may require a different solution.

Overhead power lines avoid the need for large batteries and are more appropriate for these types of applications since there are plans to electrify the Standard Gauge Railway (SGR) in Kenya

The base year selected is 2015. Four ambition levels are assumed as below.

Key interactions

Low-carbon electricity must be generated to maximize emissions savings from electrified transport.

Level 1

Efforts to increase uptake of electric vehicles are abandoned and shares remains at current levels.

Level 2

Electric vehicle share increases gradually to 80% of passenger rail, and 40% of rail freight and 20% of buses.

Level 3

Electric vehicle share increases more rapidly to 90% of passenger rail, 75% of rail freight, 30% of buses and 10% of articulated HGVs.

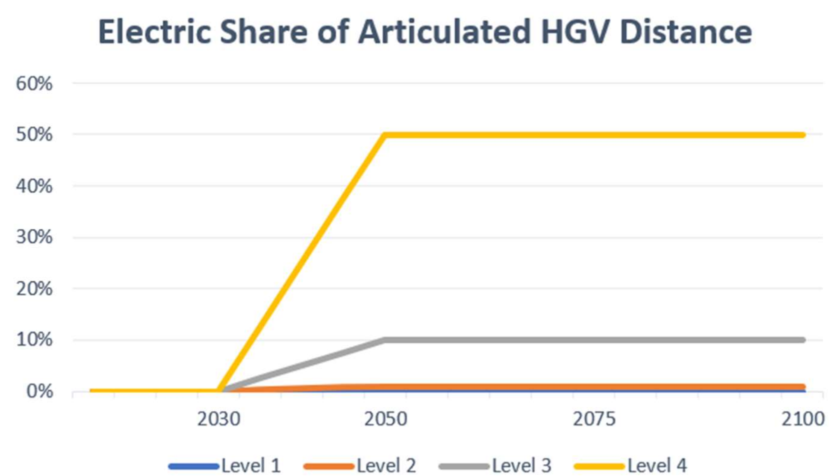
Level 4

Battery technologies allow 50% of buses and lorries to be electrified. 50% of Articulated lorries and 100% of the rail system (SGR) are electrified by overhead powerlines rather than batteries.

Default Timing

Start year: 2020, End year: 2050

Sub-Lever	Units	2015	Level 1	Level 2	Level 3	Level 4
HGV Articulated	share	0.0	0	0.01	0.1	0.5
Bus	share	0.0	0	0.2	0.3	0.5
Rail Passenger	share	0.0	0.65	0.8	0.9	1
Rail Freight	share	0.0	0.08	0.4	0.75	1



Ministry of Energy

Transport: Heavy Vehicles - Hydrogen

This lever controls the sub-levers listed in the table, and ambition levels are for the end year shown on the right-hand side.

Market trends suggest natural gas fuelled heavy goods vehicles (HGV) are becoming more popular. Fuelling these vehicles with hydrogen is a natural next step towards eliminating tailpipe emissions in heavy vehicles as an alternative to electrification.

Fuel cells are one way to eliminate tailpipe emissions in articulated HGVs and have some advantages over batteries, such as quicker refuelling times which means range is not an issue.

However, the challenges for widespread H2 vehicle adoption are the high upfront costs of vehicles and producing enough low carbon hydrogen of sufficient purity if fuel cells are to be used. A lack of hydrogen refuelling infrastructure, including storage, also poses a challenge.

Key interactions

The carbon intensity of H2 production would need to be significantly reduced for example using carbon capture, in a scenario in which H2 vehicles play a large part in reducing Kenya`s CO2 emissions.

Level 1

Efforts to increase uptake of hydrogen vehicles are abandoned and the share remains at current levels, zero.

Level 2

1% of articulated HGVs and 20% of buses are fuelled by hydrogen.

Level 3

40% of articulated HGVs and 30% of buses are fuelled by hydrogen.

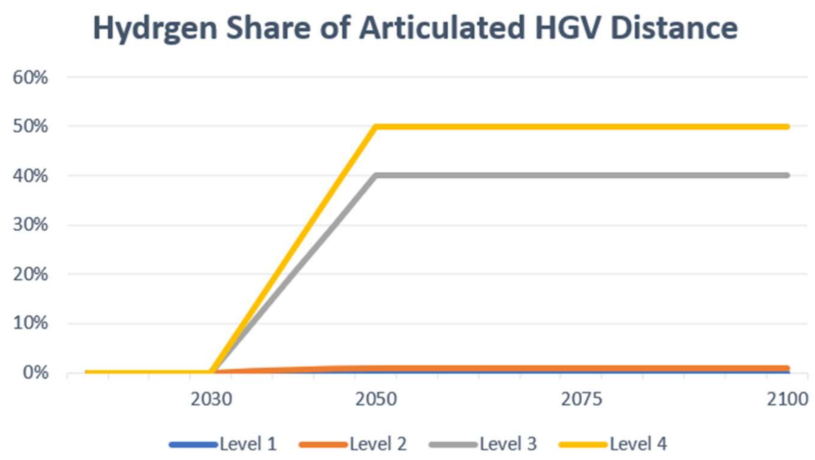
Level 4

50% of all articulated HGVs and buses are powered by hydrogen.

Default Timing

Start year: 2020, End year: 2050

Sub-Lever	Units	2015	Level 1	Level 2	Level 3	Level 4
HGV Articulated	share	0.0	0	0.01	0.4	0.5
Bus	share	0.0	0	0.2	0.3	0.5



Ministry of Energy

Transport: Heavy Vehicles - Hybrid

This lever controls the sub-levers listed in the table, and ambition levels are for the end year shown on the right-hand side.

In 2015 all of Kenya`s heavy vehicles were powered by fossil fuels (petrol or diesel) despite other lower carbon options, such as plug-in hybrid electric vehicles (PHEVs), being technically feasible.

PHEVs are primarily fuelled by a battery which is charged in the same way as in a standard EV, however they also have a secondary power supply in the form of an internal combustion engine (ICE) (fuelled by fossil fuel or biofuel) which can power the vehicle (or re-charge the battery) when the battery runs out of charge. This gives the vehicle a greater range and hence higher flexibility.

However, the ICE means it does not have zero emissions at the tail pipe if the ICE is fuelled by fossil fuel.

Key interactions

Low-carbon electricity must be generated to maximize emissions savings from electrified transport.

Level 1

Efforts to increase uptake of PHEVs are abandoned and the share remains at current levels.

Level 2

1% of articulated HGVs and 20% of buses are hybrid.

Level 3

30% of articulated HGVs and buses are hybrid.

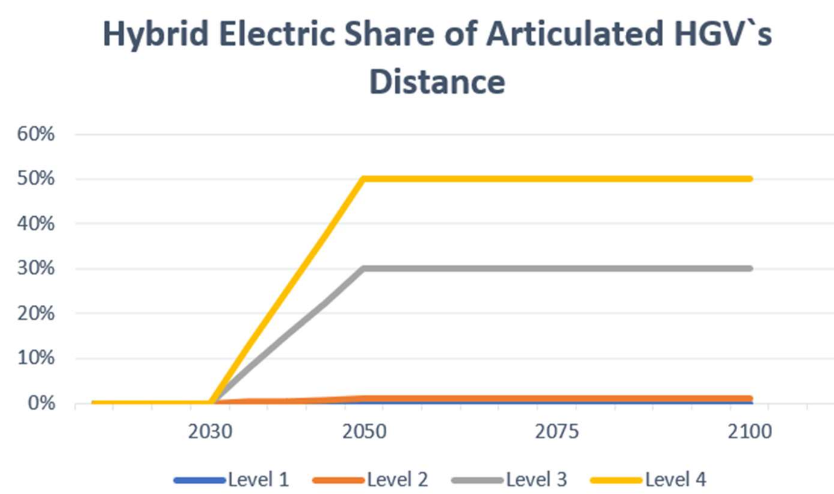
Level 4

50% of articulated HGVs and buses are hybrid.

Default Timing

Start year: 2020, End year: 2050

Sub-Lever	Units	2015	Level 1	Level 2	Level 3	Level 4
HGV Articulated	share	0.0	0	0.01	0.3	0.5
Bus	share	0.0	0	0.2	0.3	0.5



Ministry of Energy