

## Passenger transport - shift to low emission technologies

In 2006, there were no electric and hybrid vehicles in South Africa. Most privately owned vehicles ran on petrol and public vehicles on diesel, except for minibuses, 90% of which ran on petrol. Lower emissions vehicle technologies include electric vehicles, fuel cell vehicles and compressed natural gas vehicles, and hybrids petrol or diesel and electric vehicles.

The *shift to low emission technologies* Lever replaces the use of petrol or diesel road vehicles with lower emission vehicles.

### Level 1

Level 1 assumes that by 2050 2% of public vehicles run on electricity or compressed natural gas. In the minibus fleet there is a shift towards diesel (13%) and diesel/electric hybrid vehicles (5%). Of the private vehicle fleet, hybrid vehicles starts take a small market share 10% of cars and 3% of SUVs. In total, 1% of public and private vehicles vehicles sold in 2050 are electric vehicles. Because of a lack of investment in the hydrogen economy and no natural gas policy for transport, no hydrogen or compressed natural gas vehicles are sold in South Africa by 2050.<sup>1</sup>

### Level 2

Level 2 assumes that by 2050 50% of public vehicles are electric, and 5% of minibuses are hybrid diesel/electric.

A small percentage of buses and BRTs (5%) and of minibus taxis (1%) is hydrogen fuelled. Of the private vehicle fleet, around 50% of cars are electric and around 20% are hybrid; more than a third of SUVs are hybrid vehicles. 1% is hydrogen fuelled.

### Level 3

Level 3 assumes that in 2050 85% of new public vehicles and 70% of new cars are electric. 10% of new public vehicles are natural gas or hydrogen fuel cell vehicles. *90% of new private vehicles are hybridised.*

### Level 4

Level 4 assumes that in 2050 95% of new public vehicles are electric or hydrogen fuel cell. The remaining 10% is electric/diesel hybrid or compressed natural gas. Of new private vehicles in 2050 95% of SUVs are hybridized. All new conventional cars are electric, hybridized or hydrogen fuelled.

### Interaction with other options

Level 1 interacts with the electricity supply Levers. If the main fuel for electricity is coal then a shift to electric vehicles will have a negligible impact on overall emissions. For a shift to electric vehicles to reduce greenhouse gas emissions, a shift is also required in electricity production.



The Nissan Leaf electric car is powered by a 24 kWh lithium-ion battery pack. Source: [www.engineeringnews.co.za](http://www.engineeringnews.co.za)

Percentage of vehicle sold by 2050 for each level

Technology	Fuel	2006	In 2050			
			Level 1	Level 2	Level 3	Level 4
SUV	diesel	33%	45%	10%	1%	-
	gasoline	67%	74%	20%	1%	-
	diesel/electric	0%	-	34%	48%	45%
	gasoline/electric	0%	3%	35%	45%	45%
	hydrogen	0%	0%	1%	5%	10%
car	diesel	3%	7%	5%	1%	-
	gasoline	97%	79%	5%	1%	-
	diesel/electric	0%	5%	19%	13%	2.5%
	gasoline/electric	0%	5%	20%	10%	2.5%
	electricity	0%	4%	50%	70%	85%
hydrogen	0%	0%	1%	5%	10%	
motorcycle	gasoline	100%	100%	100%	100%	100%
bus/BRT	diesel	100%	93%	44%	65%	-
	compressed natural gas	0%	1%	5%	15%	5%
	electricity	0%	1%	50%	5%	85%
	hydrogen	0%	0%	5%	15%	10%
minibus	diesel	2%	13%	10%	5%	-
	gasoline	98%	75%	29%	5%	-
	diesel/electric	0%	5%	5%	10%	5%
	compressed natural gas	0%	1%	5%	5%	5%
	electricity	0%	1%	50%	70%	90%
hydrogen	0%	0%	1%	5%	5%	