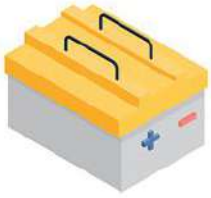
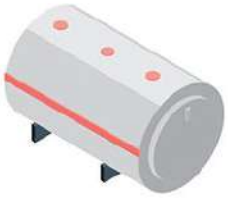
ENERGY STORAGE COMPARISON

Characteristics





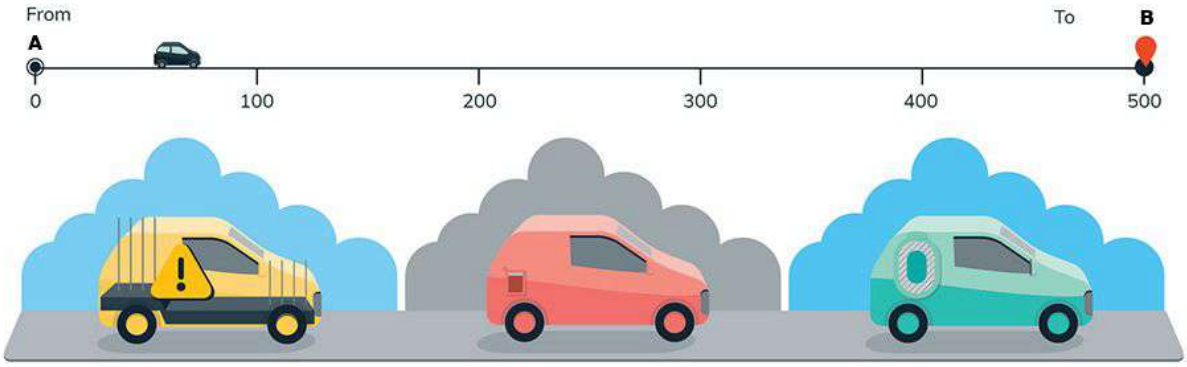
	BATTERIES	DIESEL	HYDROGEN STORAGE
Energy density	0.05 kWh/kg	13 kWh/kg	33.3 kWh/kg
Safety	• Complicated management system • Small window of safe operation condition	Safe and easy to handle	Safe and easy to handle, similar to CNG, LPG, etc
Environmental impact	Some dangerous materials, no recycling concept for lithium battery enabled	Dirty, noisy	No concerns
Degradation	Degrades happen, performance drops over time, required replacement every few years	High maintenance, short lifetime, frequent replacement	10,000hr+ 100 years tank Degrades slowly, 10,000hr+ lifetime for machines, 100 years for steel tanks
Strorage time	Loses charge over time	Diesel will degrade through time within 6-12 months	Can store energy indefinitely

Applications

Short-term backup (less than 4 hours)	Suitable	Suitable	Available power is determined by fuel cell
Long-term backup (more than 4 hours)	Big and expensive	Dirty, noisy, high maintenance	Suitable
Seasonal storage	Impossible	Dirty, noisy, high maintenance	Suitable

VEHICLE COMPARISON FOR 500 KM DISTANCE

Energy for a Passenger Car of **500 km** Range



	ELECTRICITY	DIESEL	HYDROGEN
Fuel Usage	100 kWh	37 Litre	6 Kg @ 700 bar pressure
System weight & capacity	weight 830 Kg, volume 760 L	weight 43 Kg, volume 46 L	weight 125 Kg, volume 260 L
Fuel weight & volume	weight 540 Kg, volume 360 L	weight 33 Kg, volume 37 L	weight 6 Kg, volume 170 L
Time to refill	12 hour / 50 min	3 min	3 min

Recycle and Environmental Issue

	BATTERY	DIESEL TANK	HYDROGEN TANK
Life span of energy source	Short	Long	Long
Recyclability	Difficult disposal	Can recycle the tank	Can recycle the tank
Carbon emission	0 emission locally	500km will give 6.6 kg of CO2 emission	0 emission locally

SETTING UP ENERGY STATIONS WITH DIFFERENT ENERGY SOURCES

Energy storage for 1,000 cars