

Anatomy of a “mild hybrid”

New high-voltage “mild hybrids” – which use 48-volt batteries – cut both fuel consumption and emissions by boosting acceleration with electric power following Stop/Start, and using regenerative braking

1 Hybrid controller

Manages Stop/Start and tells electric motor/generator when to charge battery or accelerate car

2 Battery controller

3 48-volt battery

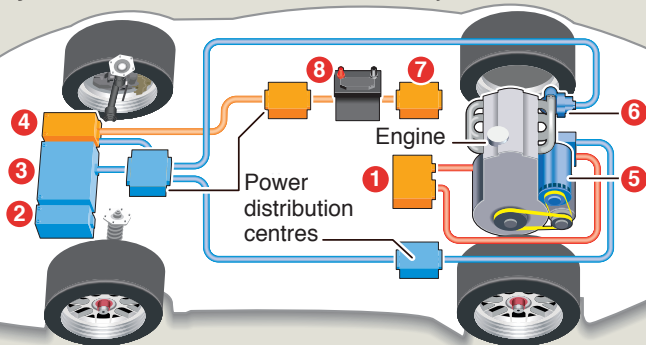
Lithium-ion. Charges or discharges at each Stop/Start cycle

4 AC/DC converter

Changes AC generator current to DC for battery

5 Electric motor/generator:

Starts engine. Drive belt connects to crankshaft to boost torque. Charges battery during braking



6 Electric supercharger

48-volt turbine forces extra air into engine when spurt of power is needed

7 DC/DC converter

Steps down 48-volt power for 12-volt accessories such as climate control, sat-nav, gadgets

8 12-volt battery

Conventional lead-acid battery

Global CO₂ emissions

18.2%

Manufacturing and construction

4.6%

Other energy industries

15.7%

Other

3.3% Shipping

1.9% Aviation

35.7 billion tonnes carbon dioxide (2014)

21.3% Road

35.0% Electricity, heat

Auto emissions targets (grams CO₂ per km)

Mexico	145	2016
Brazil	138	2017
Japan	122	2020
China	117	2020
India	113	2021
South Korea	97	2020
U.S.	97	2025
Canada	97	2025
EU	95	2021