

Electric Mobility at Opel – Strategy. Technology. The Ampera



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Mobilis 2012, Mulhouse



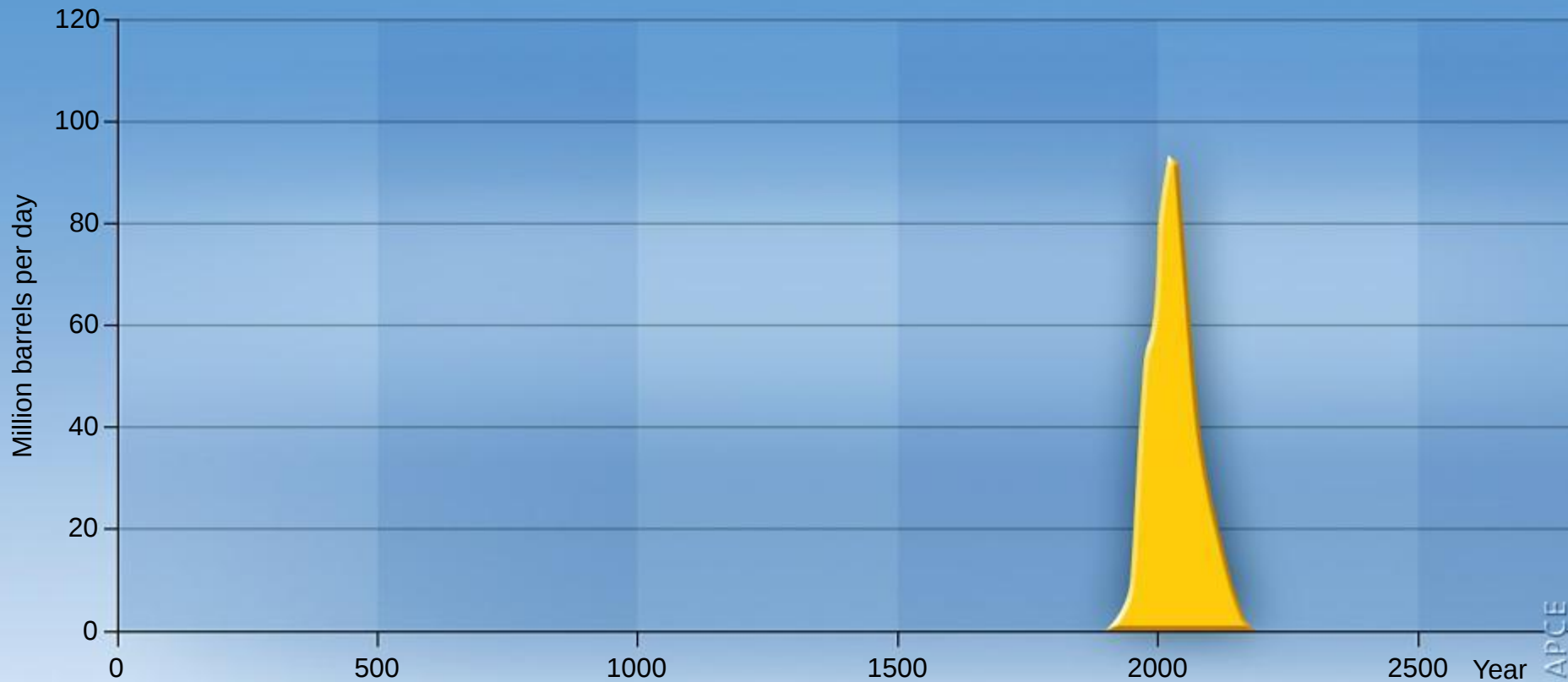
Rising Energy Demand Worldwide

- Today: 1 billion vehicles worldwide
- 98% fossil fuels
- 2020: 1.5 - 2 billion vehicles



The Petroleum Age

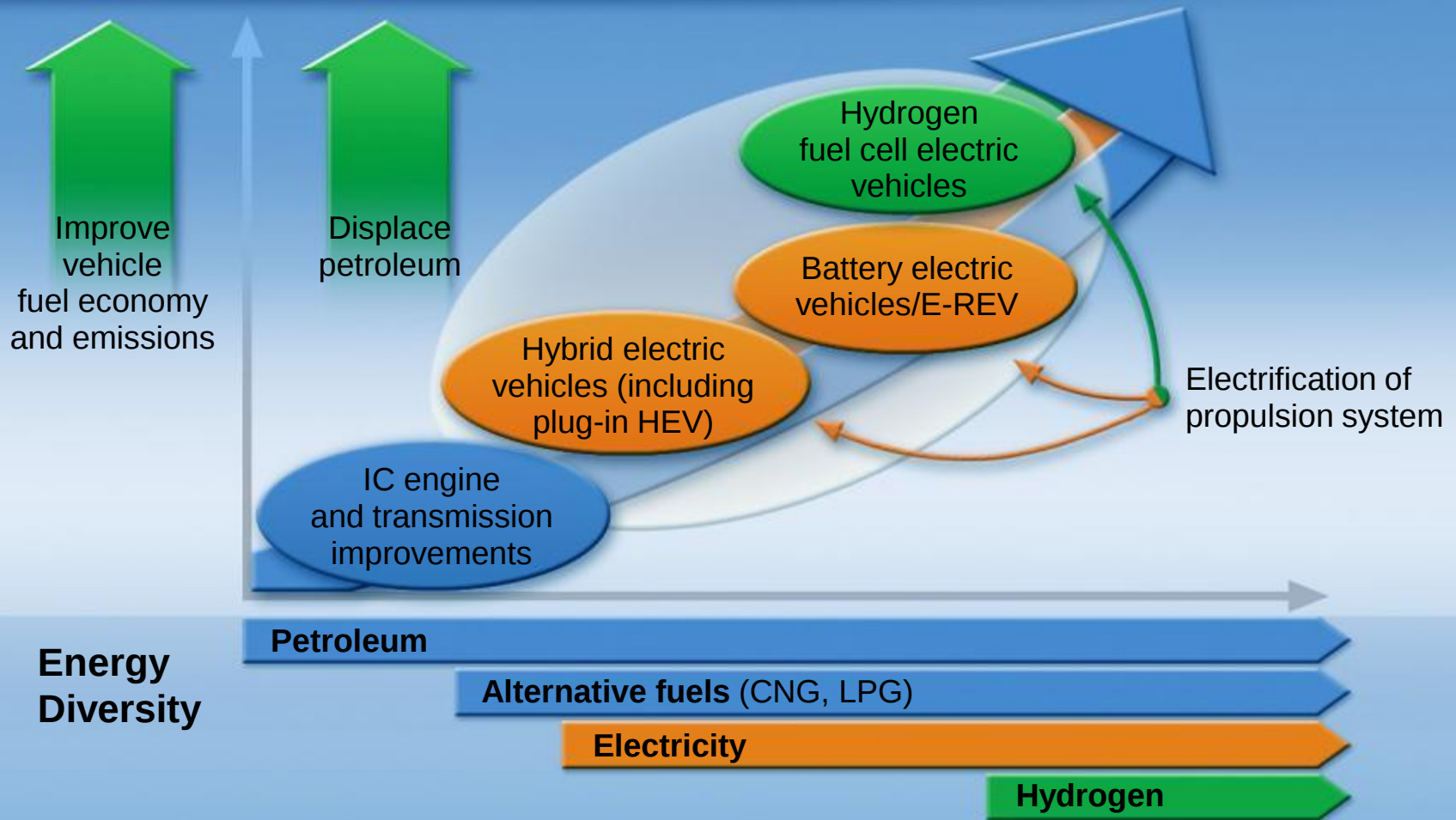
“Like a Candle in the Night”



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Opel's Advanced Propulsion Technology Strategy



Opel Ampera – Extended Range Electric Vehicle

40 – 80 km

Battery-Electric driving



> 500 km

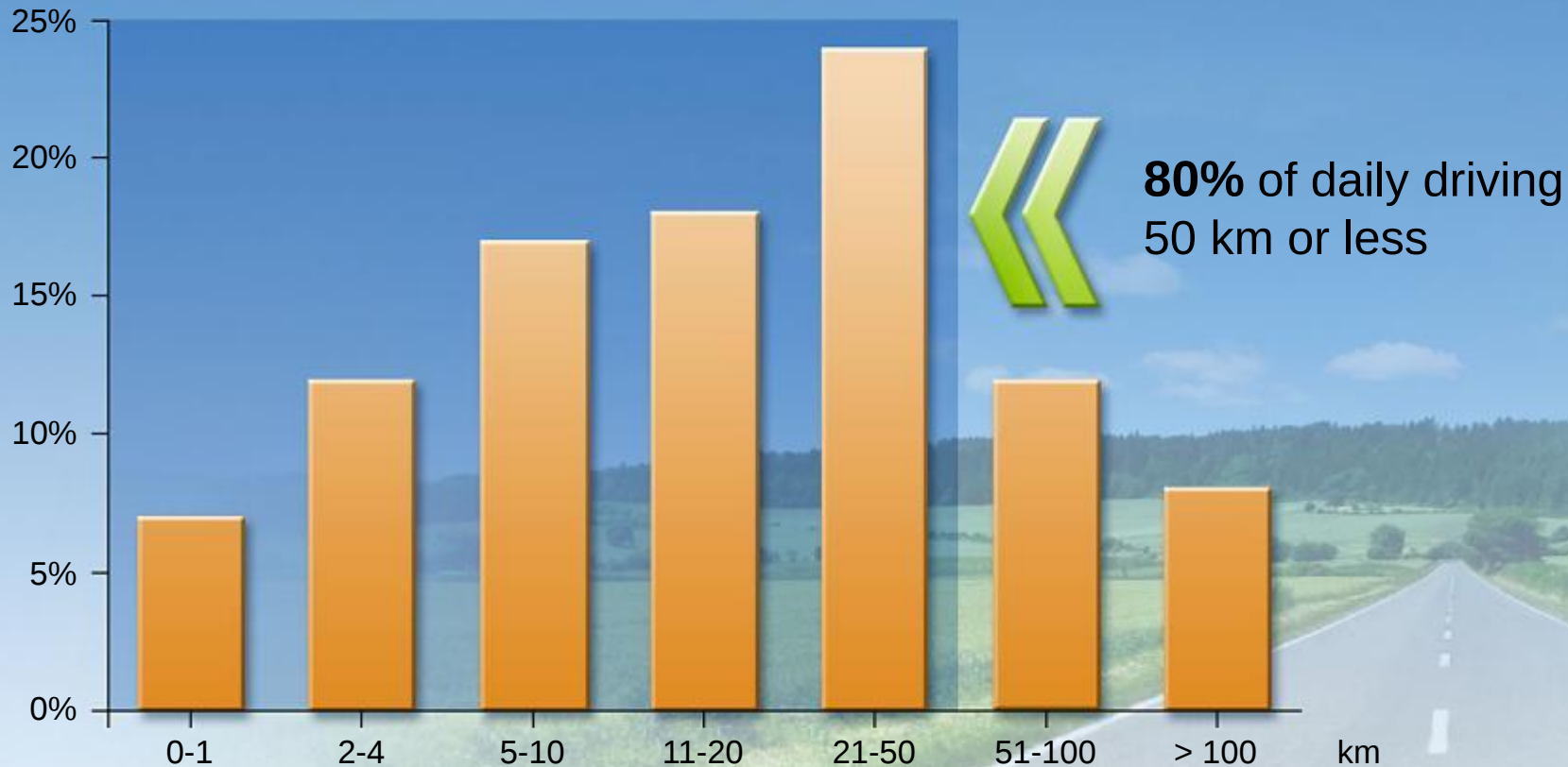
Extended Range driving



Full Usability!



Daily Mileage in Germany



Source: Mobilität in Deutschland, 2002



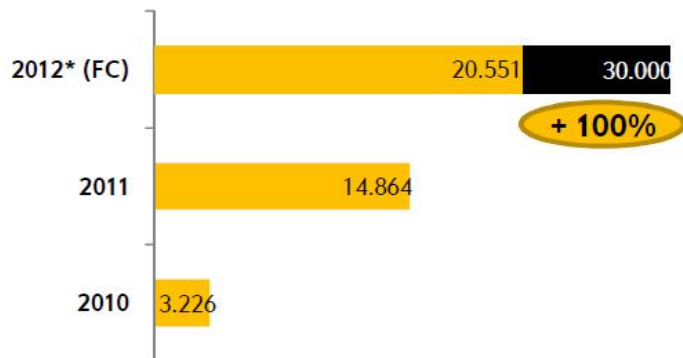
Wir leben Autos.



VAUXHALL

European EV Market Overview

European EV Sales



Total Market

18,882 mio. units
 19,854 mio. units
 18,940 mio. units

Annotations: -5% (2012* vs 2011)

Markets with favorable EV schemes



✓ Effective in Market

✓ Planned/In Discussion

Models - Top 10 Ranking Europe

	2011	Jan-Aug 2012
Electric	14.864	20.551
1 Opel/Vaux Ampera	323	3.611
2 Renault Kangoo	982	3.517
3 Nissan Leaf	1.728	3.012
4 Citroen C-Zero	1.836	2.157
5 Peugeot iOn	1.931	1.789
6 Bolloré Bluecar	399	1.383
7 Mitsubishi i-MiEV	2.625	1.193
8 Renault Fluence	536	1.110
9 MIA Electric	257	433
10 Chevrolet Volt	87	389

Markets - Top 10 Ranking Europe

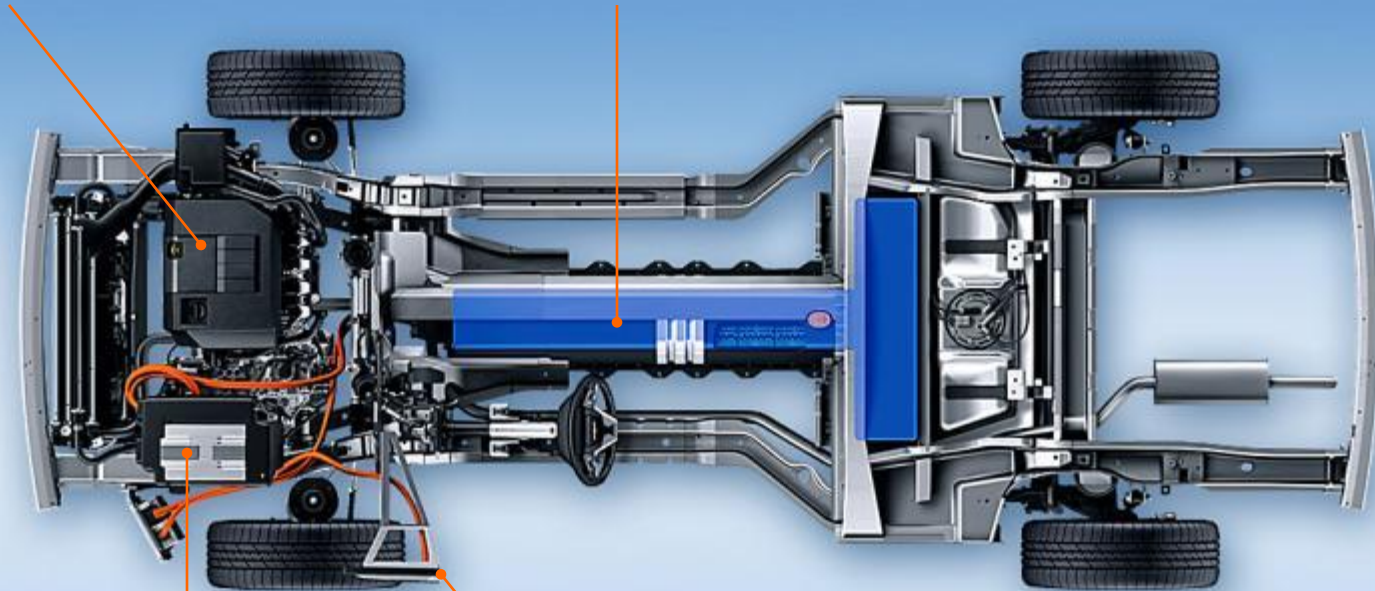
	2010	2011	Jan-Aug 2012
Electric	3.226	14.864	20.551
1 France	980	4.349	6.069
2 The Netherlands	162	957	2.789
3 Norway	356	2.043	2.439
4 Germany	468	2.665	2.878
5 UK	229	1.162	1.161
6 Italy	336	493	735
7 Belgium	72	353	694
8 Switzerland	208	503	677
9 Austria	146	690	648
10 Spain	129	485	546



Opel Ampera Propulsion System

Engine generator

Lithium-ion battery



Electric drive unit

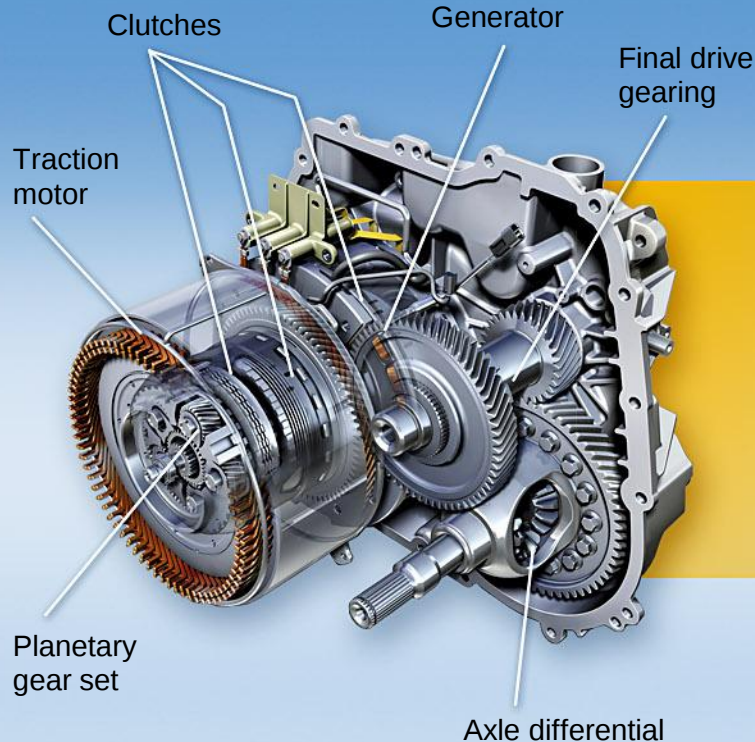
Charge port

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Opel Ampera Drive System

On-axis electric drive

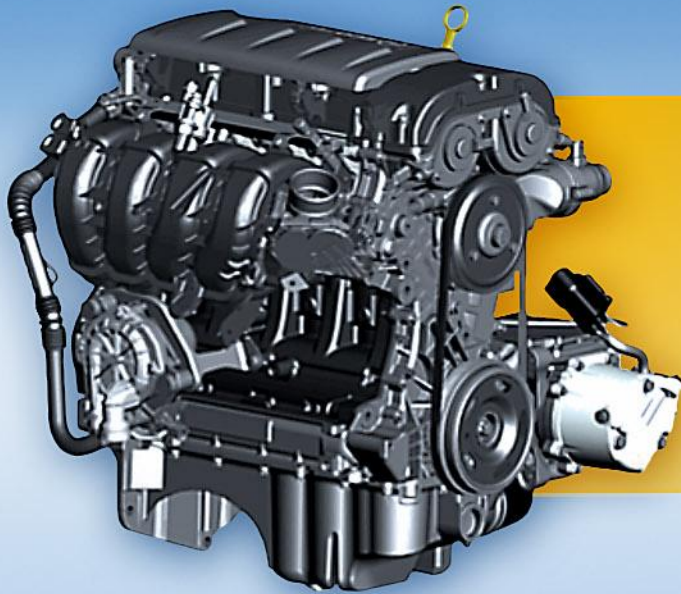


- Two electric motors
Traction: 111 kW, 370 Nm
Generator: 54 kW
- One planetary gear
- Geared final drive
- Three clutches



Opel Ampera Drive System

1.4L DOHC I-4 engine



- Power: 63 kW @ 4800 rpm
- Max. engine speed: 4800 rpm
- Displacement: 1.4 L
- Compression ratio: 10.5 : 1



Opel Ampera Battery

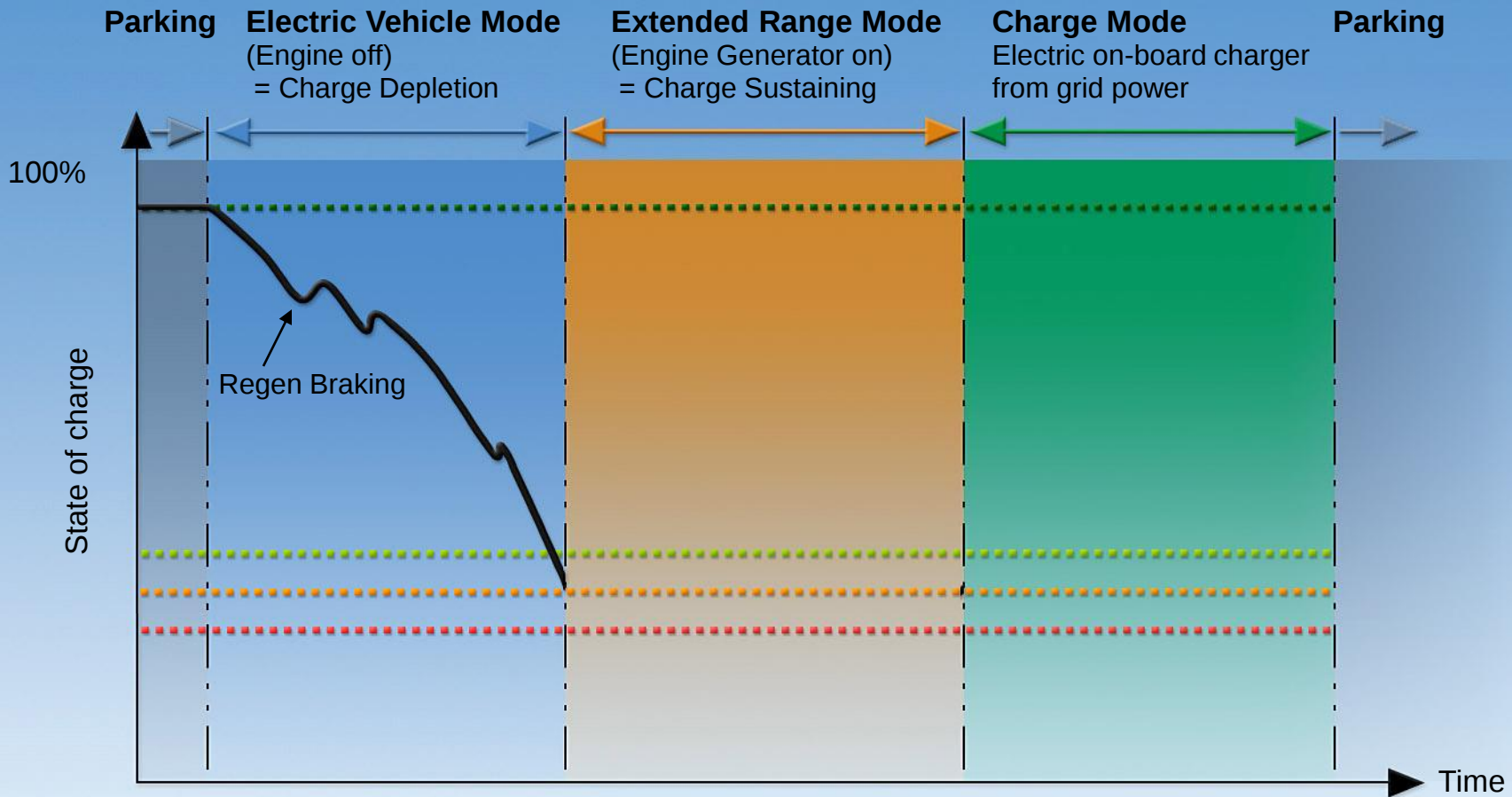
- Li-ion technology
- Pouch cells
- Liquid cooling
- 360 V nominal voltage
- 180 kg system weight



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Opel Ampera Electric Drive System

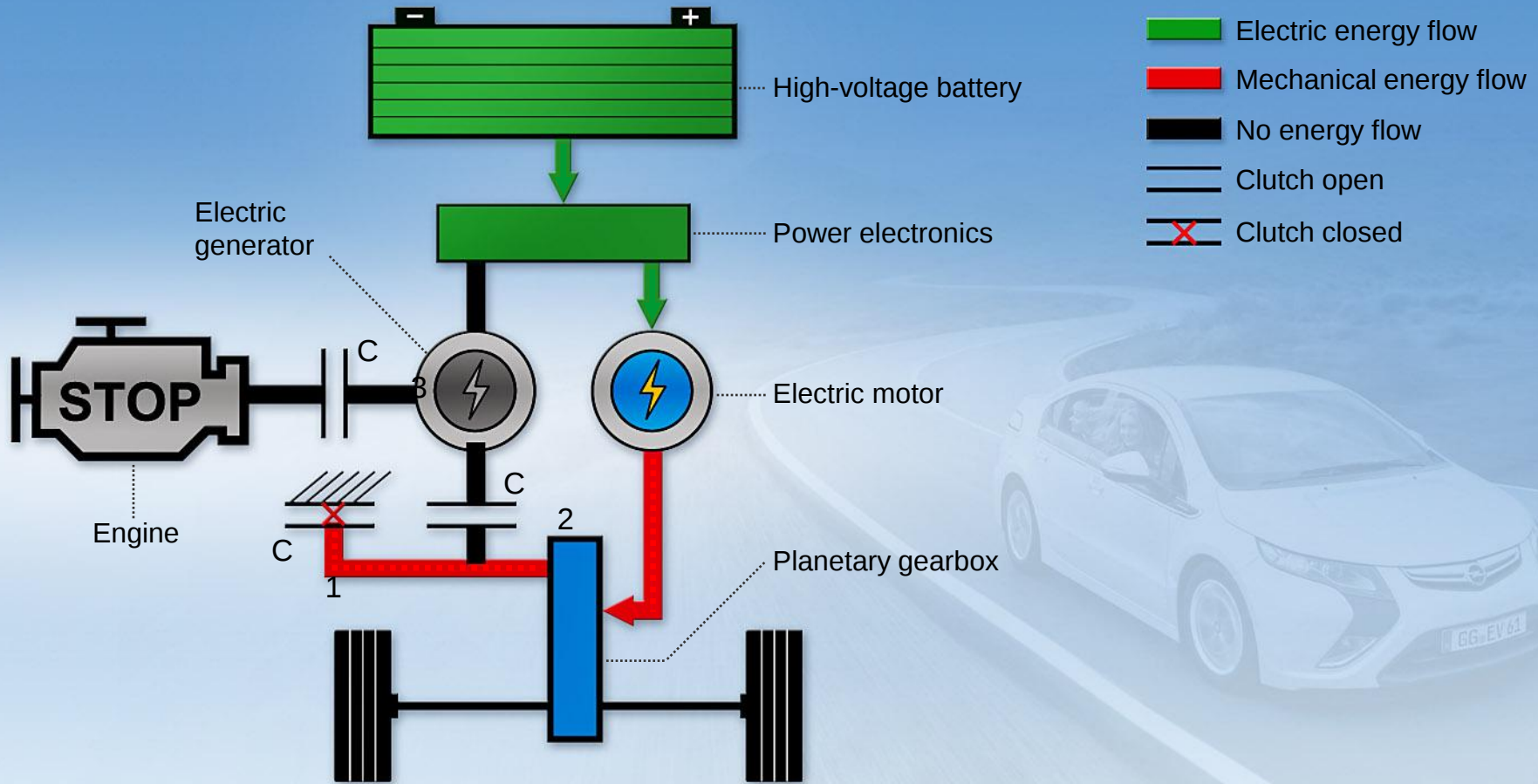


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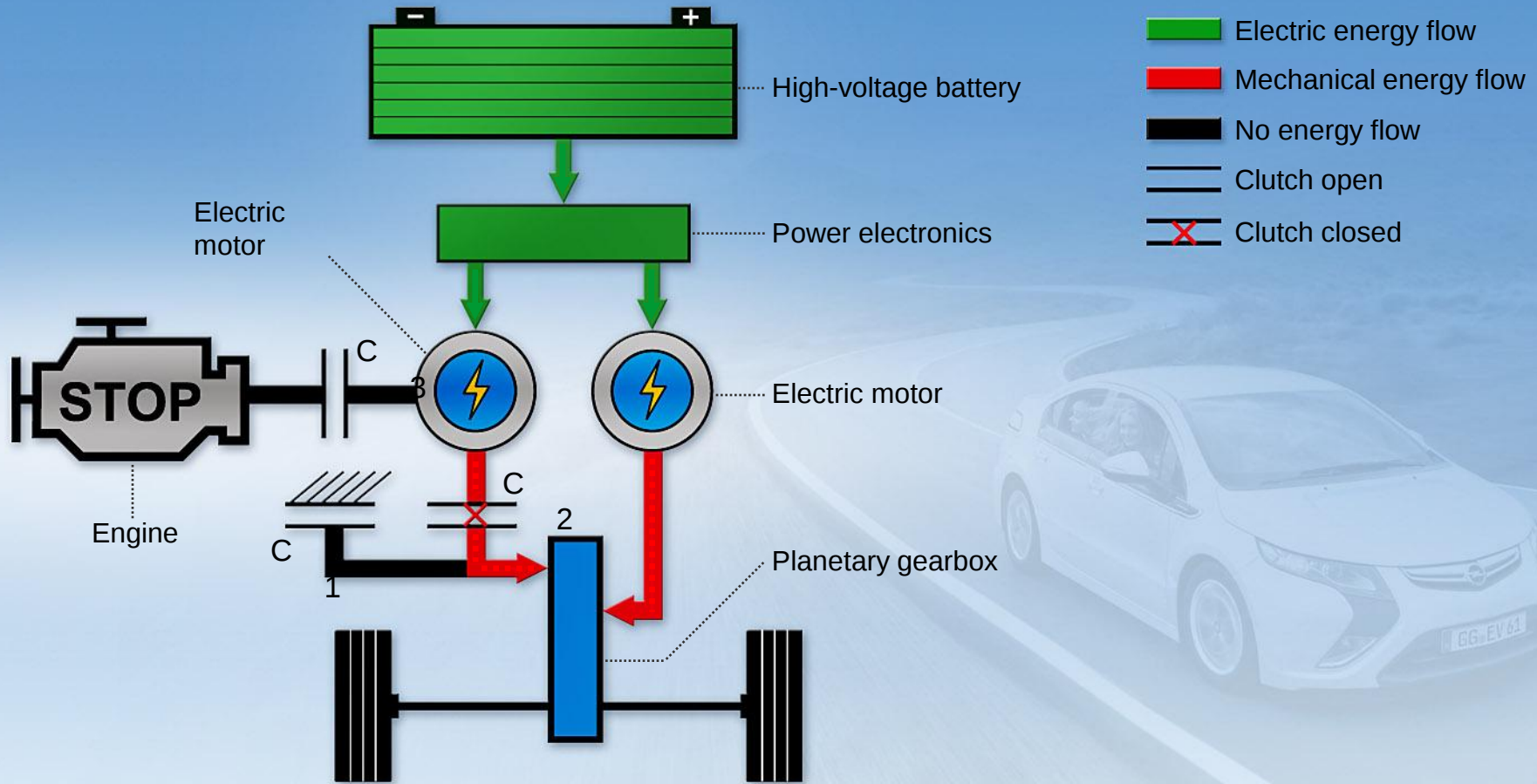
Ampera Electric Drive System

Electric Driving (Low Speed)

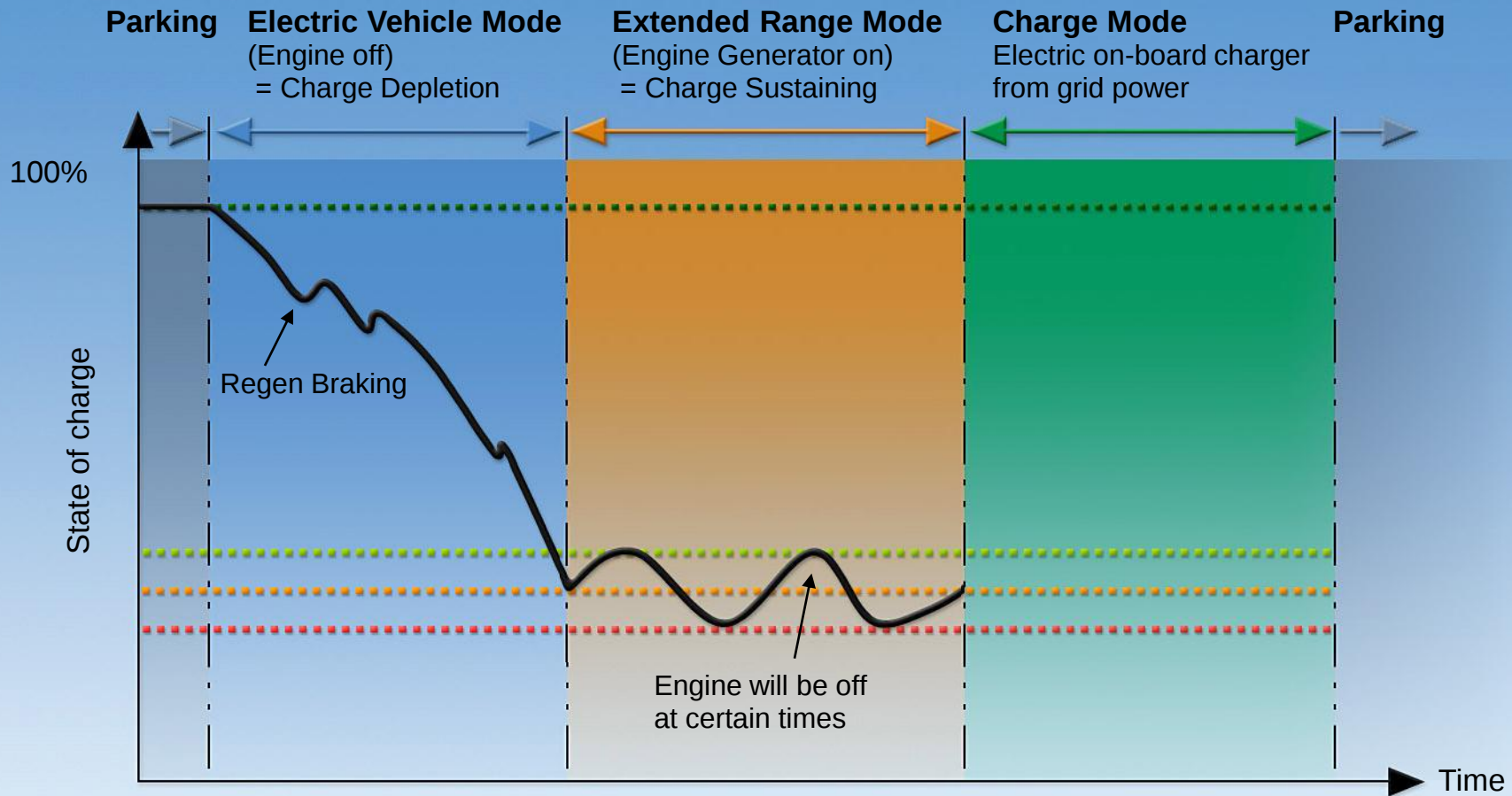


Ampera Electric Drive System

Electric Driving (High Speed)

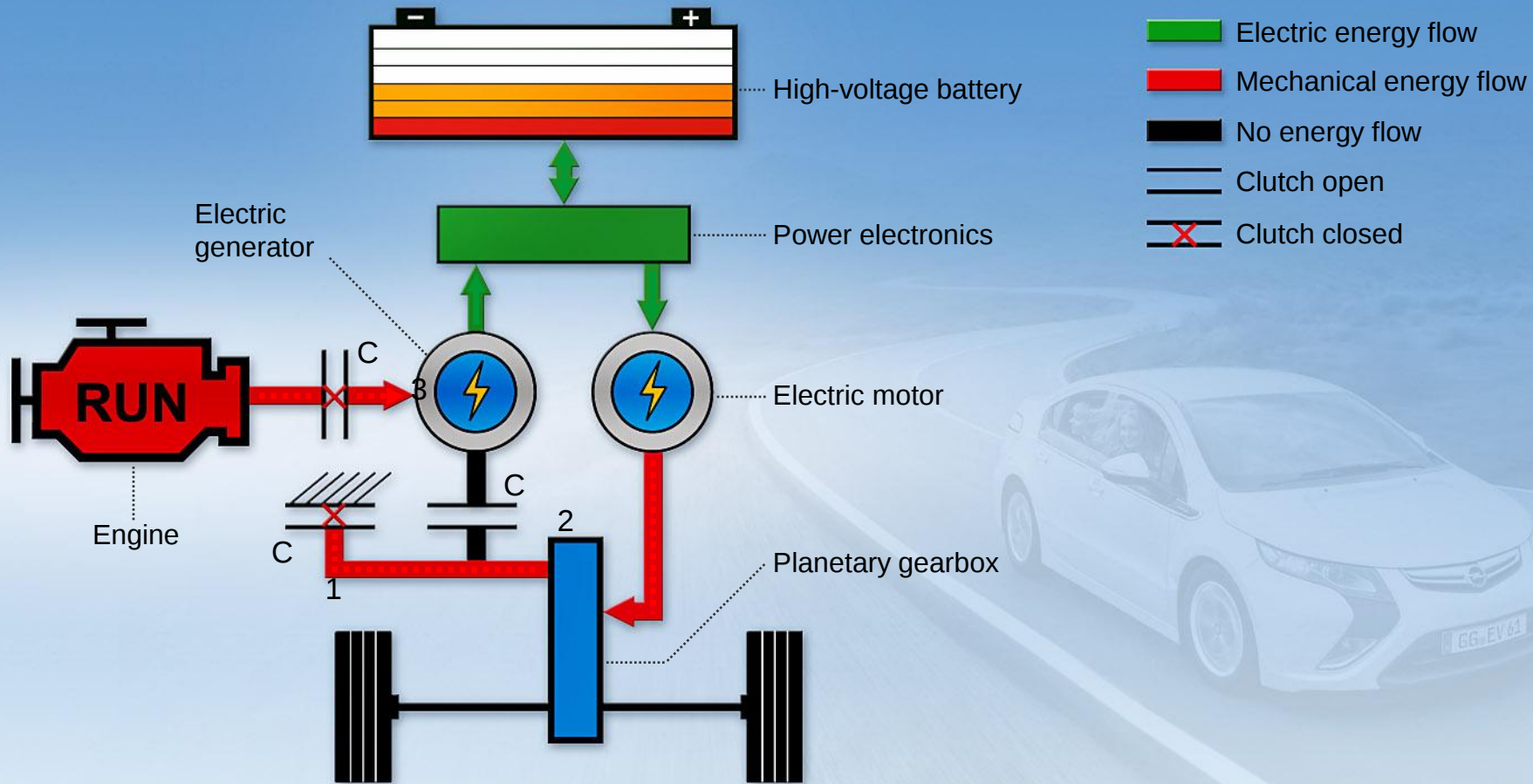


Opel Ampera Electric Drive System



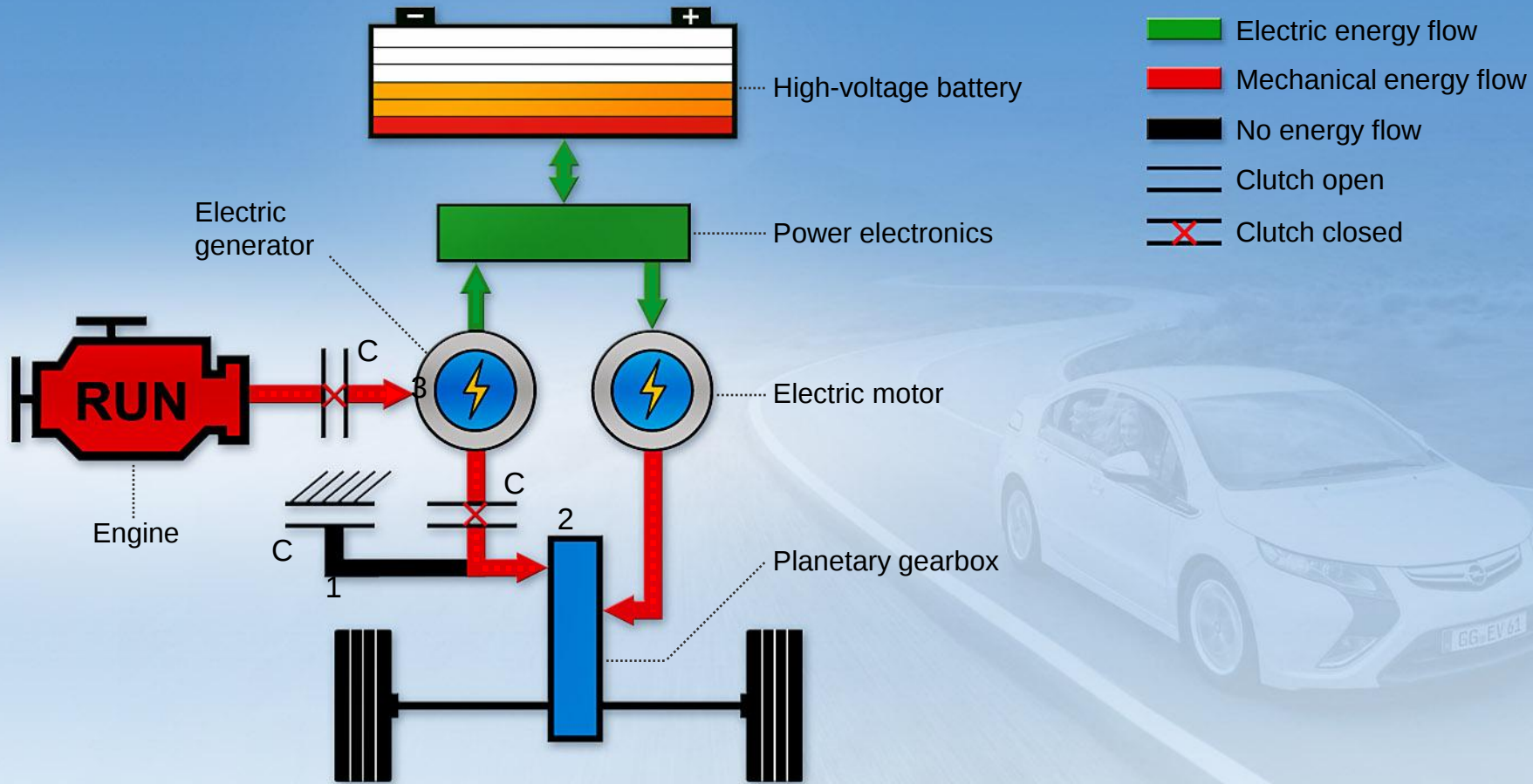
Ampera Electric Drive System

Extended-Range Driving (Low Speed)

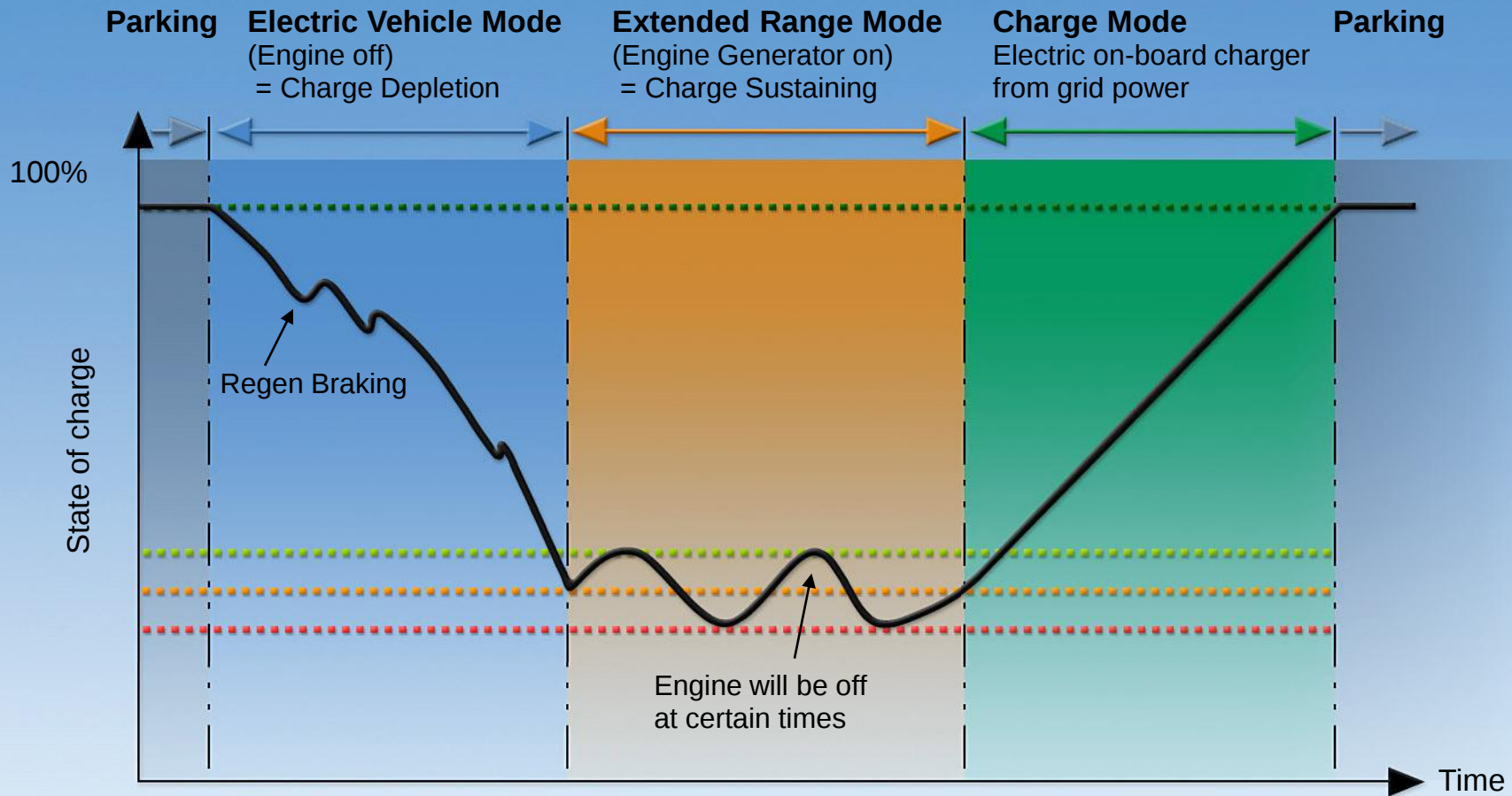


Ampera Electric Drive System

Extended-Range Driving (High Speed)



Opel Ampera Electric Drive System



Important: Independence from Specific Infrastructure Solutions

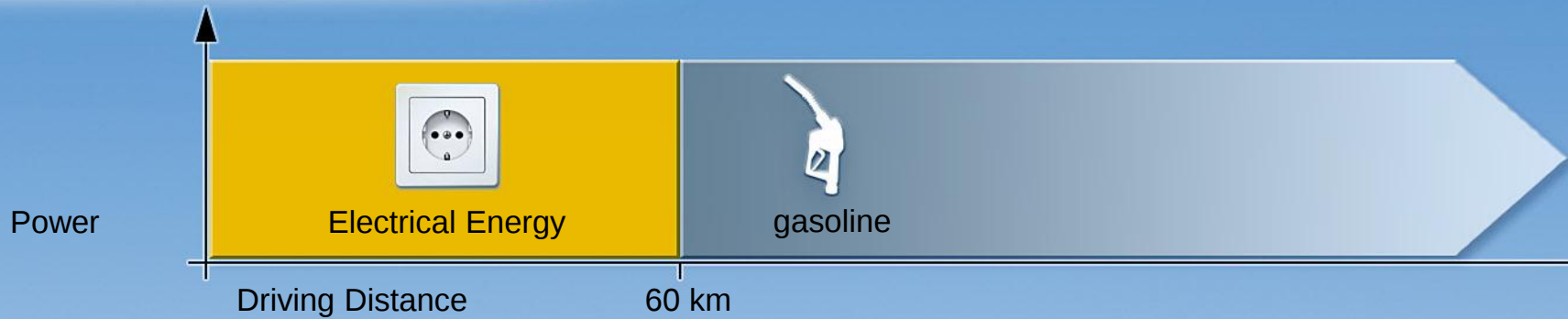
- Recharging of Ampera possible at European power outlet
- Recharging at home or workplace
 - ➔ Will account for more than 85% of all charging events in the future

230 V



Comparison E-REV vs PHEV

E-REV



PHEV



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Thank You!

