Future Powertrain Solutions for BMW Characteristic Driving Dynamics

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FUTURE POWERTRAIN SOLUTIONS FOR BMW CHARACTERISTIC DRIVING DYNAMICS.

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SENIOR VICE PRESIDENT POWERTRAIN DEVELOPMENT.

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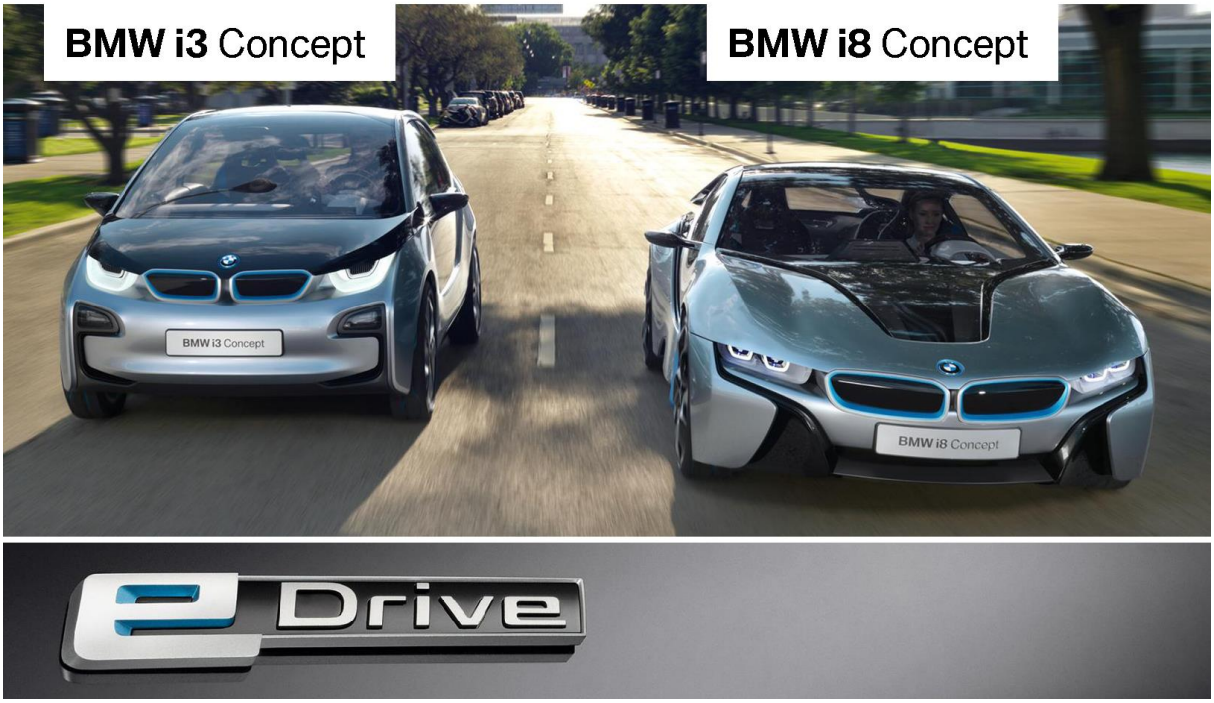
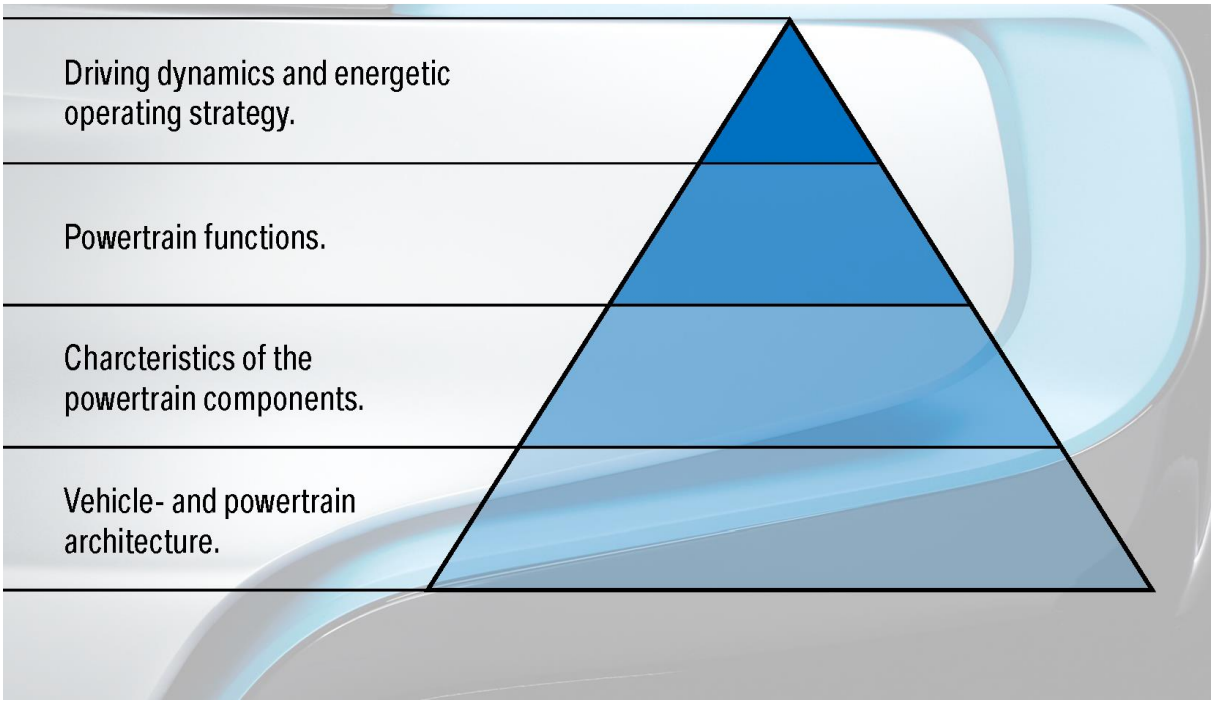
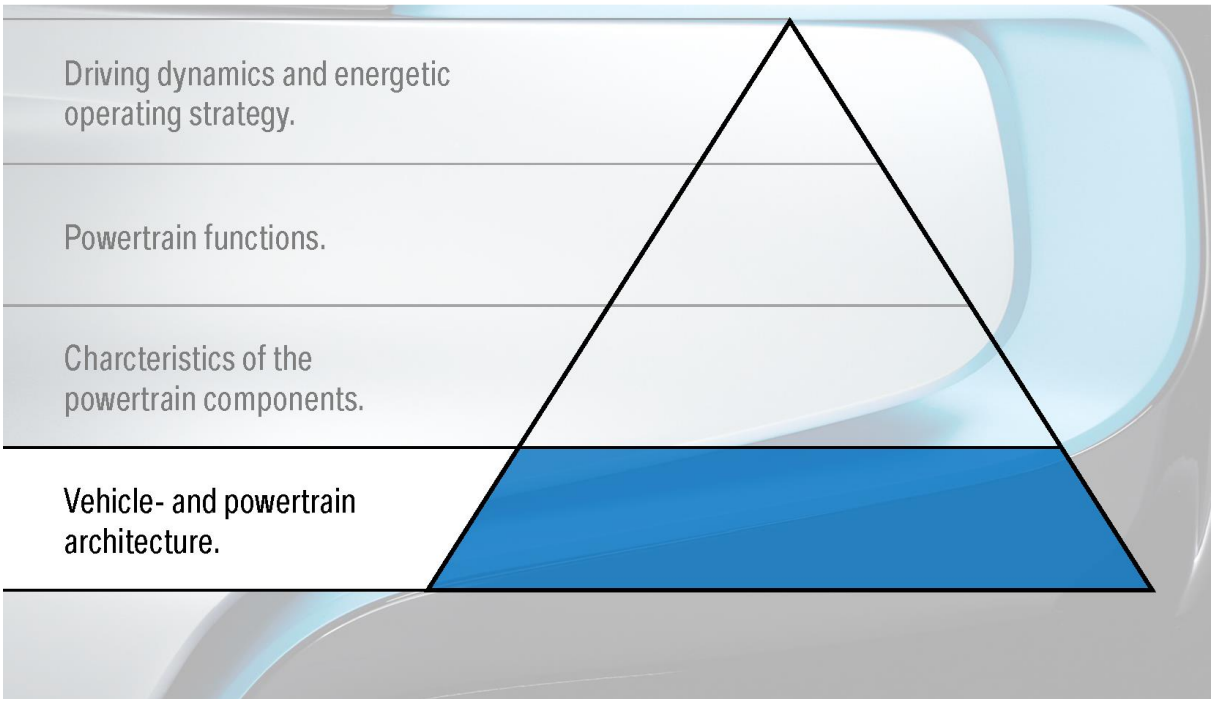
BMW CHARACTERISTIC DRIVING DYNAMICS. BMW i CONCEPT VEHICLES.



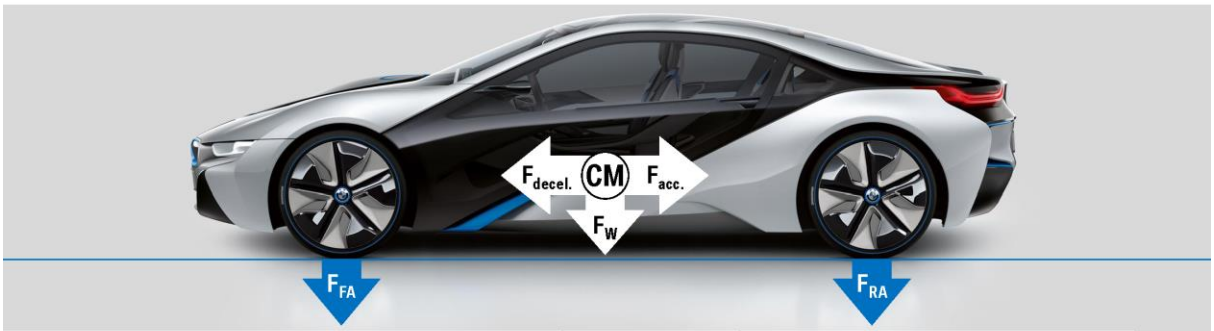
BMW CHARACTERISTIC DRIVING DYNAMICS. GENERAL CONCEPT.



BMW CHARACTERISTIC DRIVING DYNAMICS. VEHICLE- AND POWERTRAIN ARCHITECTURE.



BMW CHARACTERISTIC DRIVING DYNAMICS. BMW i8 CONCEPT CAR - POWERTRAIN DESIGN.



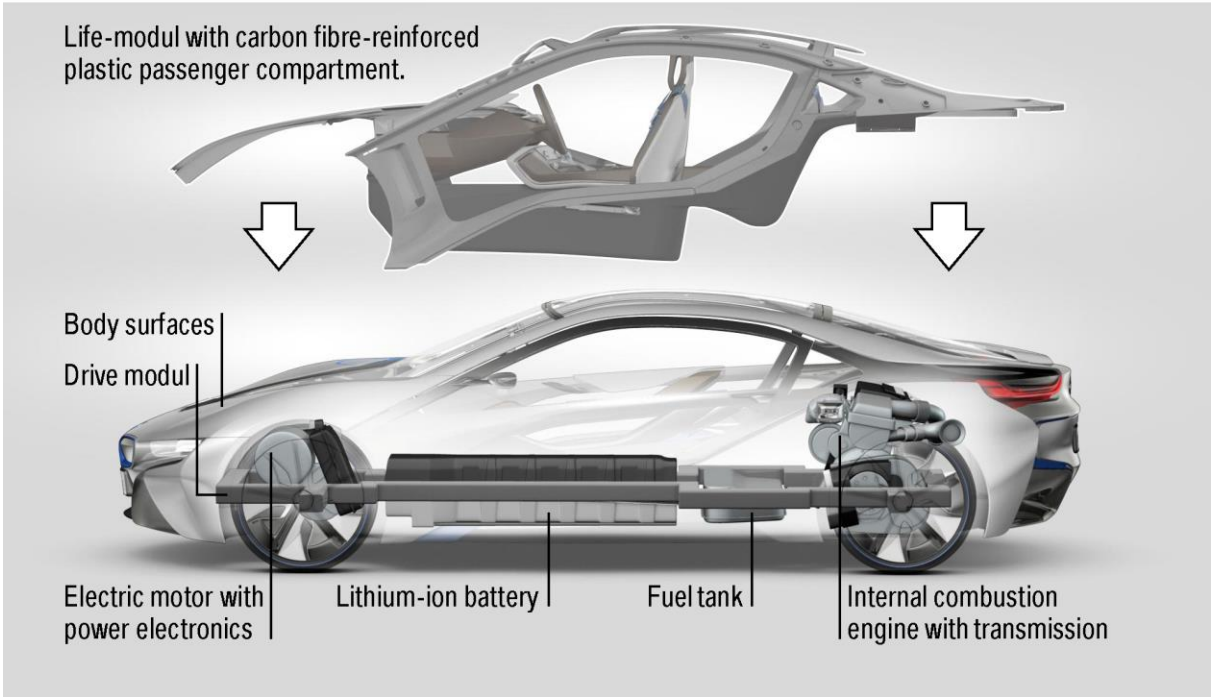
		FA Load*	RA Load*
Static		50 %	50 %
Acceleration	(0 - 100 km/h: 4.6 s, a = 6 m/s²)	40 %	60 %
Decelaration	(100 - 0 km/h: 4.6 s, a = - 6 m/s²)	60 %	40 %

- For the maximum acceleration approx. 2/3 of the power should drive the rear axle.
- For the maximum decelaration approx. 2/3 of the power should drive the front axle.
- To achieve an optimal recuperation the front axle should be electric.

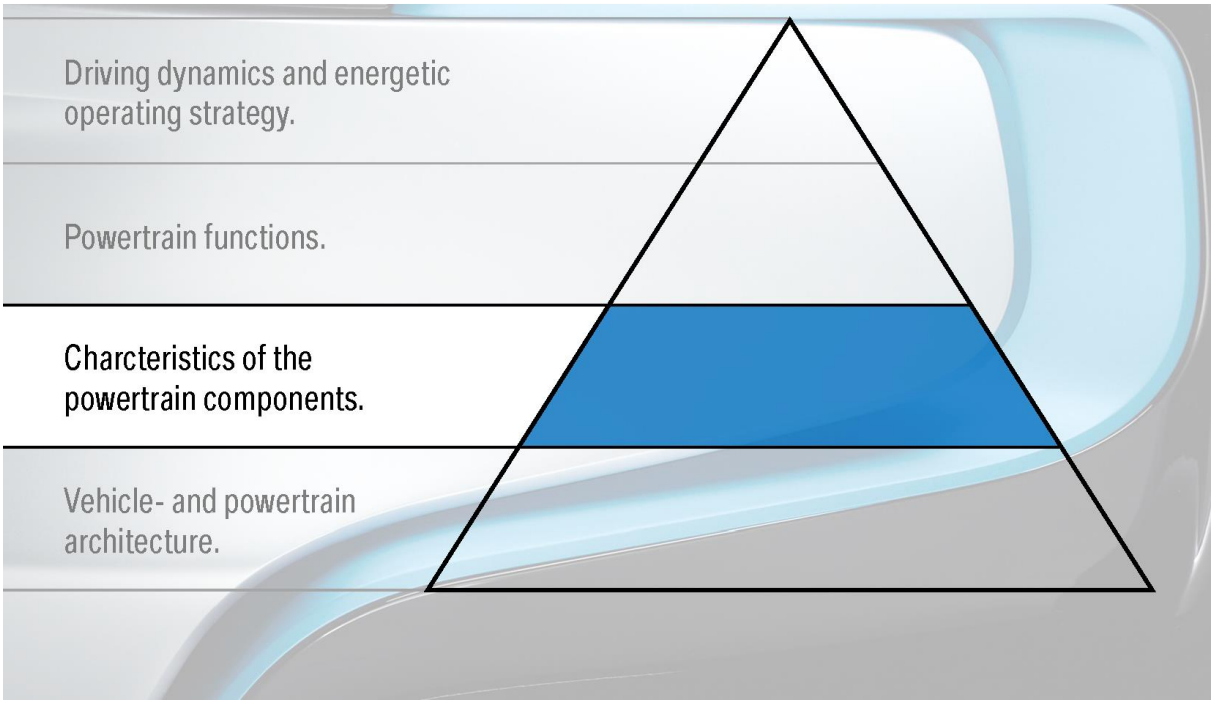
FA: Front axle
RA: Rear axle

* Approximate values.

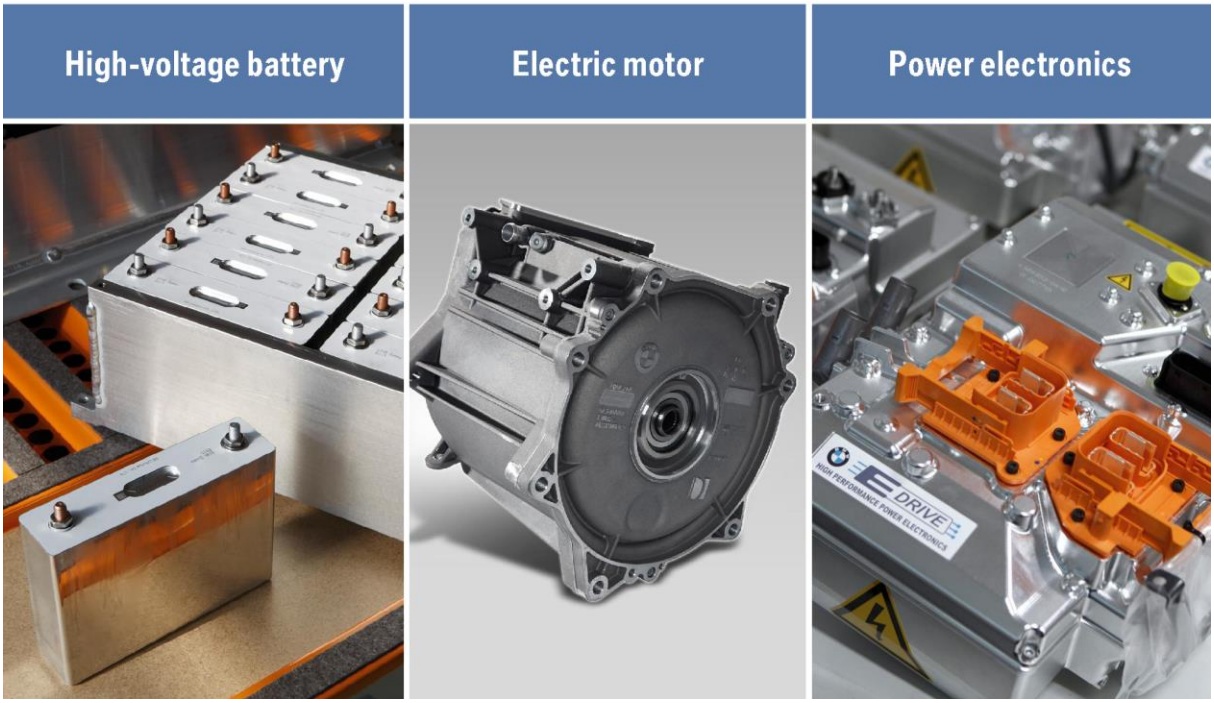
BMW CHARACTERISTIC DRIVING DYNAMICS. LIFE DRIVE - ARCHITECTURE.



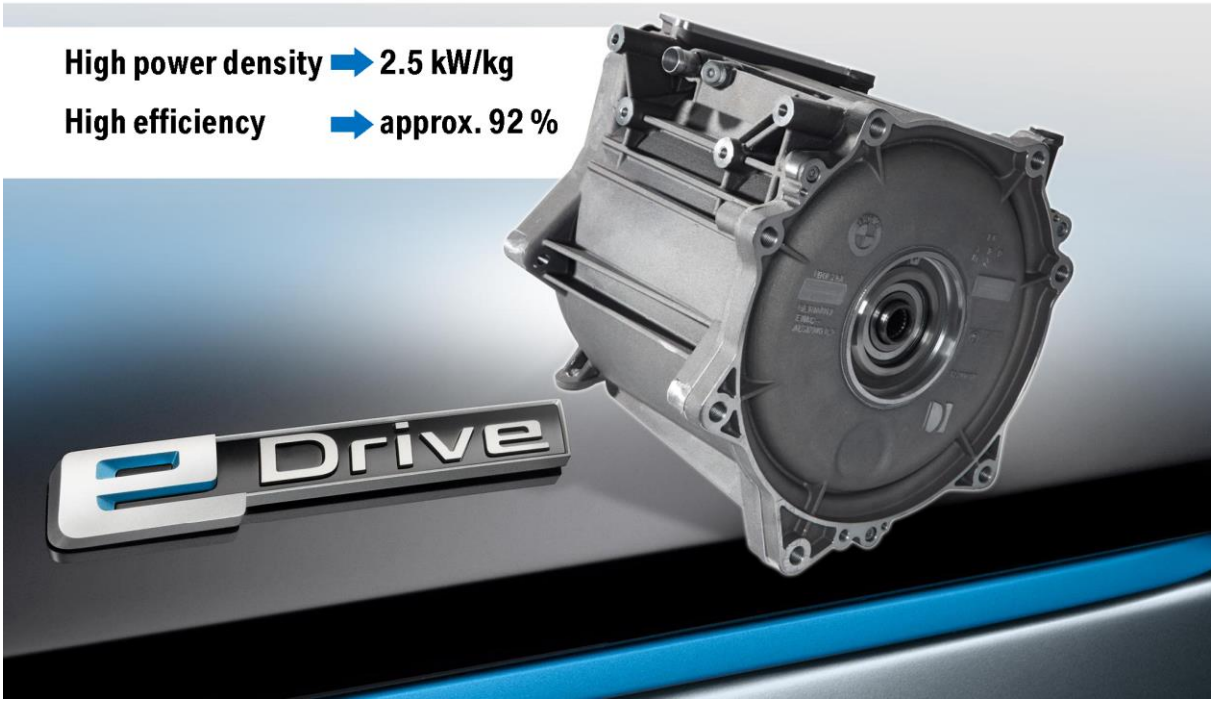
BMW CHARACTERISTIC DRIVING DYNAMICS. CHARACTERISTICS OF THE POWERTRAIN COMPONENTS.



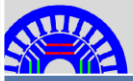
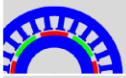
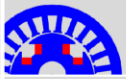
BMW CHARACTERISTIC DRIVING DYNAMICS. MAIN ELECTRIC COMPONENTS.



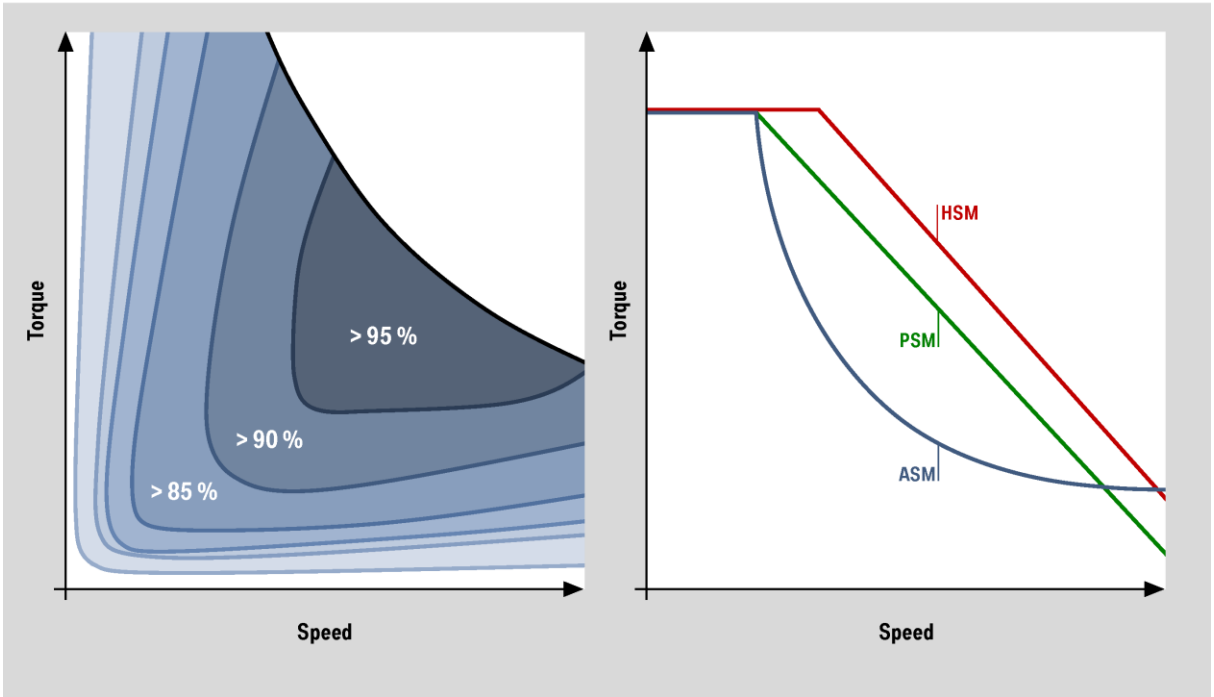
BMW CHARACTERISTIC DRIVING DYNAMICS. ELECTRIC MOTOR.



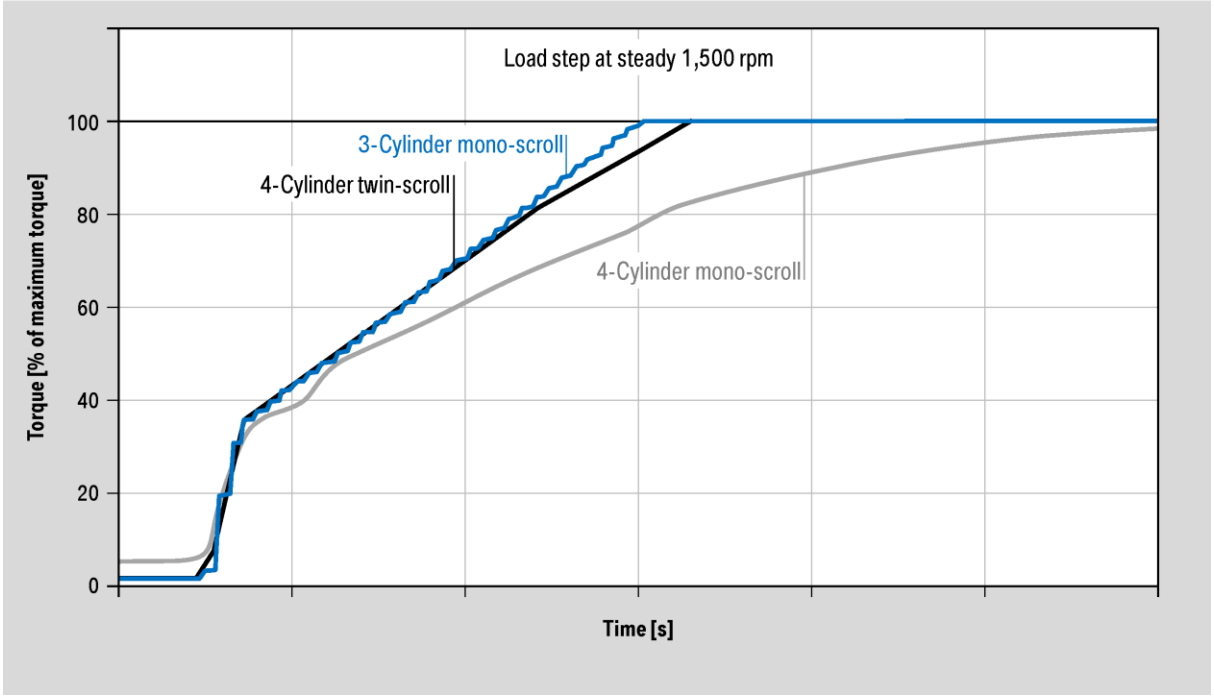
BMW CHARACTERISTIC DRIVING DYNAMICS. COMPARISON OF ELECTRIC MOTOR CONCEPTS.

	HSM Hybrid Synchron Machine	**PSM** Permanent Energised SM (Surface Magnetism)	**ASM** Asynchronous Machine	**ESM** Electrically Energised Synchronous Machine
Typical values				
Magnet mass ⇨ Costs	50 %	100 %	0 %	0 %
Continuous torque per active rotor volume	40 - 50 Nm/l	40 - 50 Nm/l	20 - 30 Nm/l	40 - 50 Nm/l
Phase current I_{AC} ⇨ Costs PE	75 %	100 % reference	110 %	75 %
Average efficiency ⇨ Range	approx. 92 %	88 %	86 %	92 %
Dynamics ⇨ Braking/ Acceleration	a few 10 ms	approx. 10 ms REFERENCE	a few 100 ms	< 250 ms

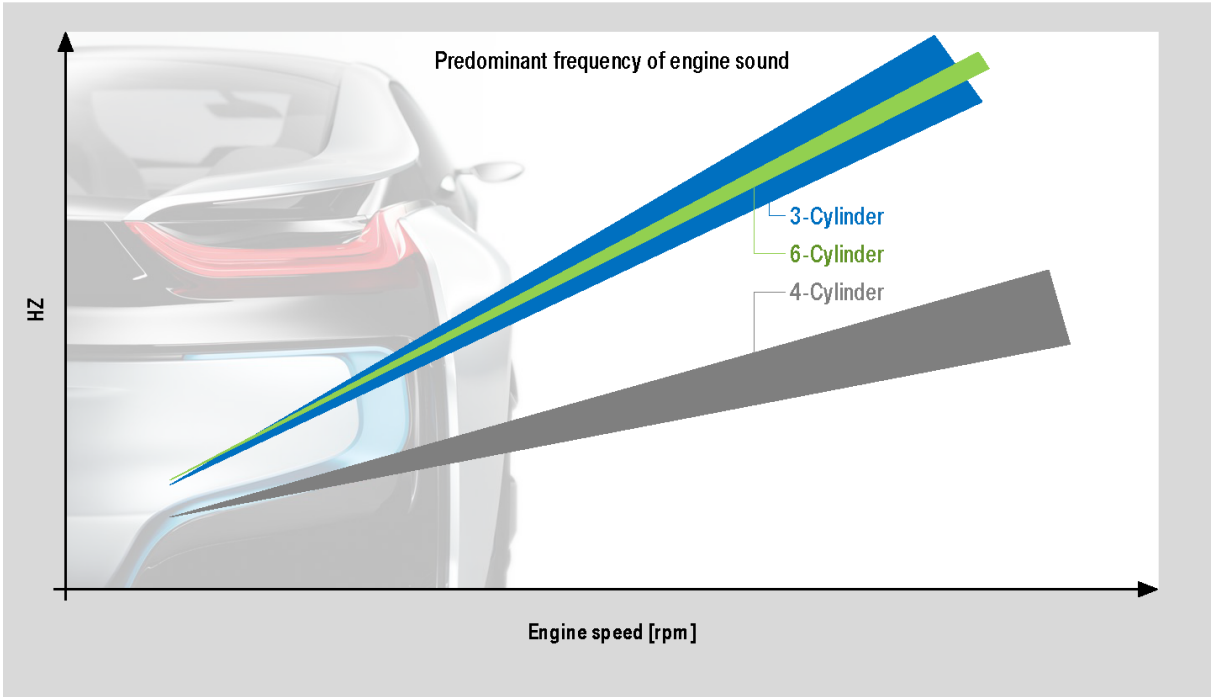
BMW CHARACTERISTIC DRIVING DYNAMICS. EFFICIENCY AND TORQUE OF ELECTRIC MOTOR.



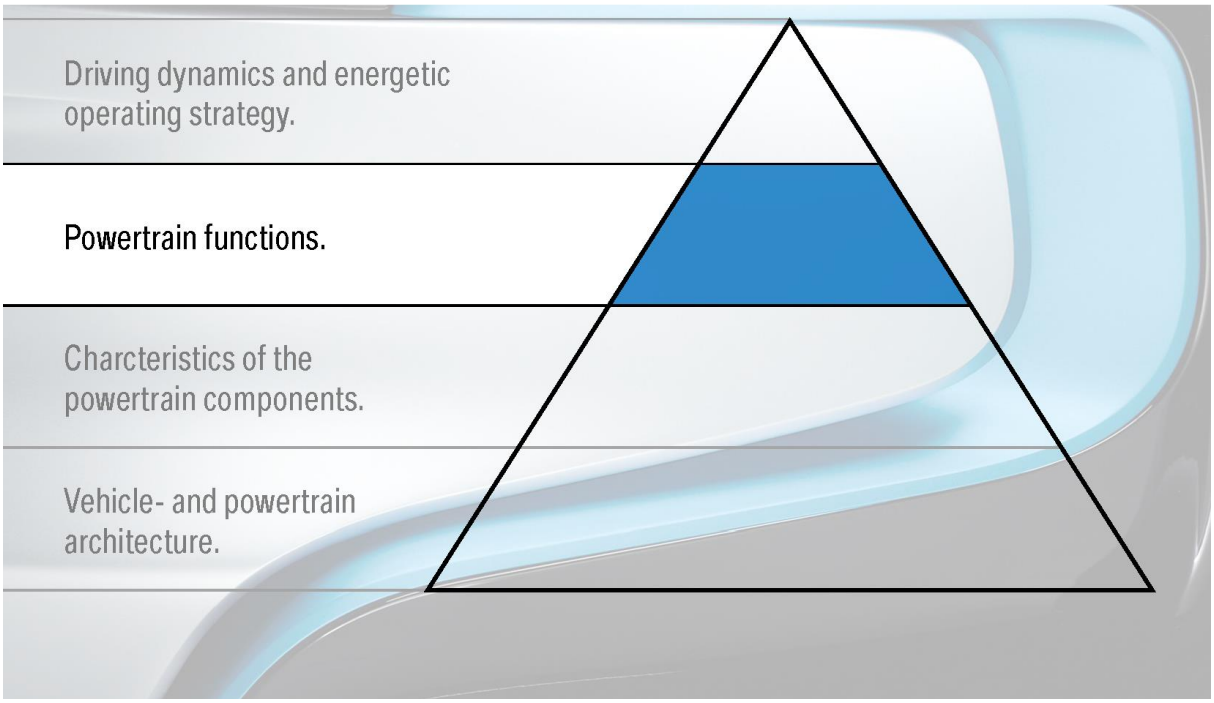
BMW CHARACTERISTIC DRIVING DYNAMICS. RESPONSE OF BMW TWIN POWER TURBO 3-CYLINDER ENGINE.



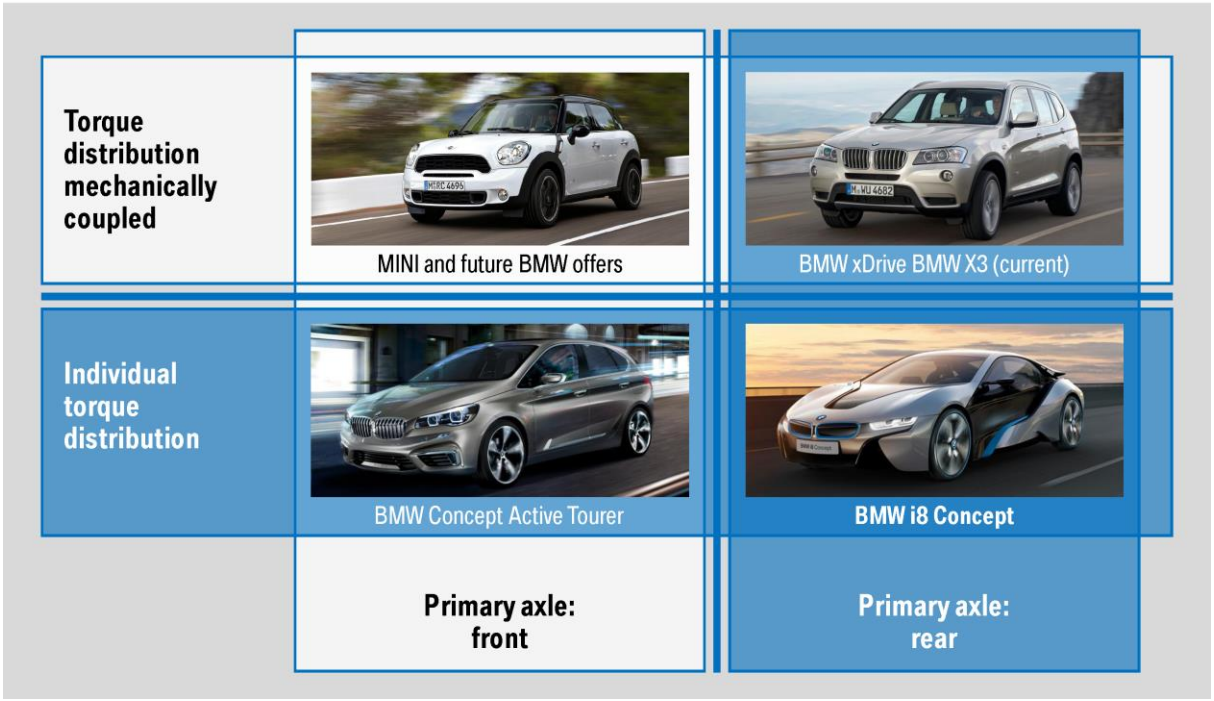
BMW CHARACTERISTIC DRIVING DYNAMICS. SOUND CHARACTERISTICS OF 3-CYLINDER ENGINE.



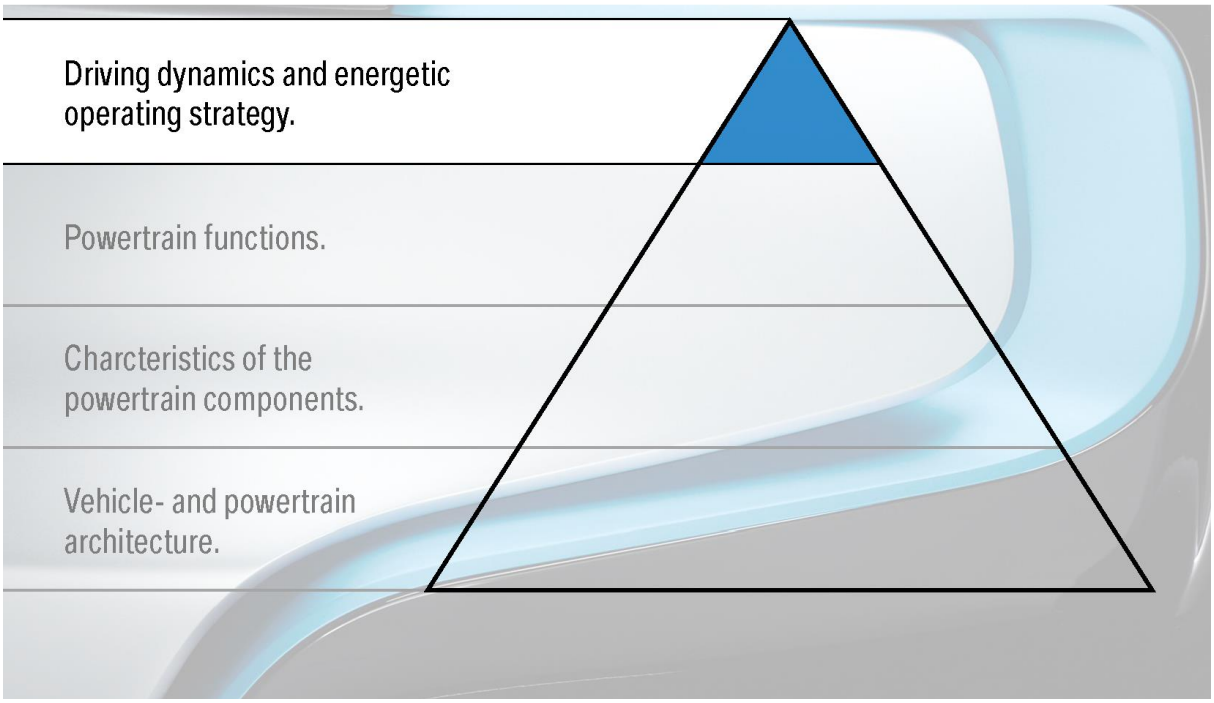
BMW CHARACTERISTIC DRIVING DYNAMICS. POWERTRAIN FUNCTIONS.



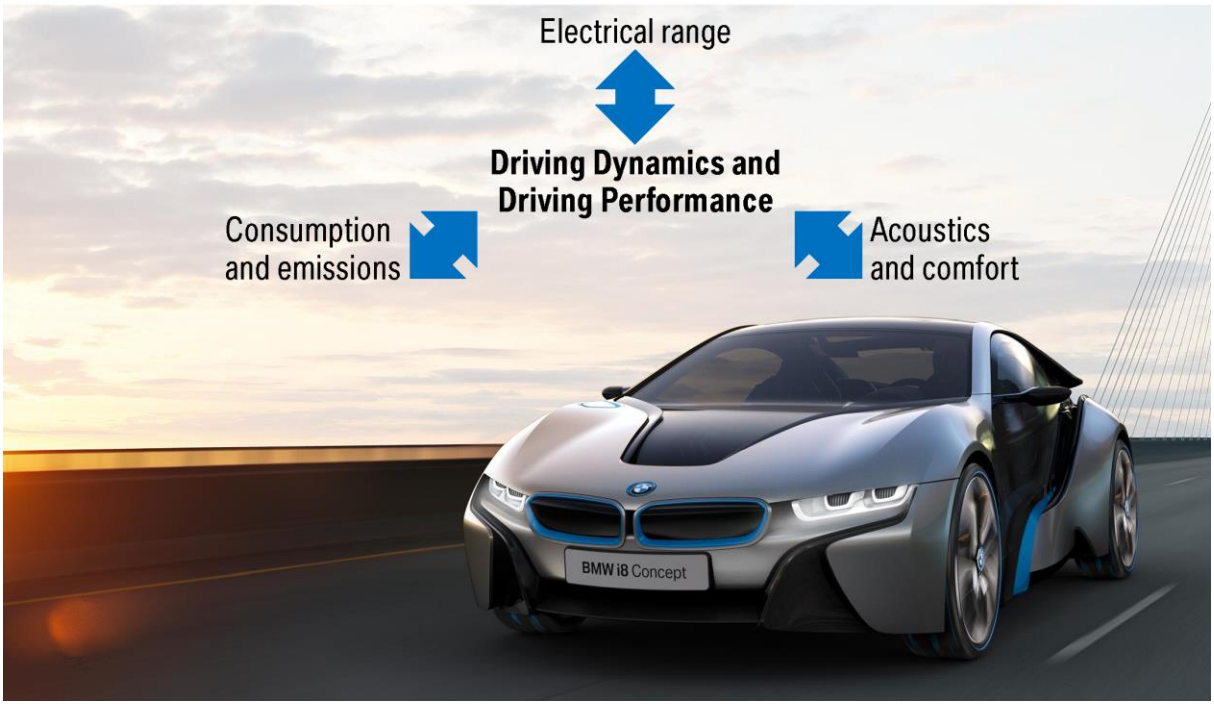
BMW CHARACTERISTIC DRIVING DYNAMICS. FUNCTIONAL ARCHITECTURE FOR ALL-WHEEL DRIVE VEHICLES.



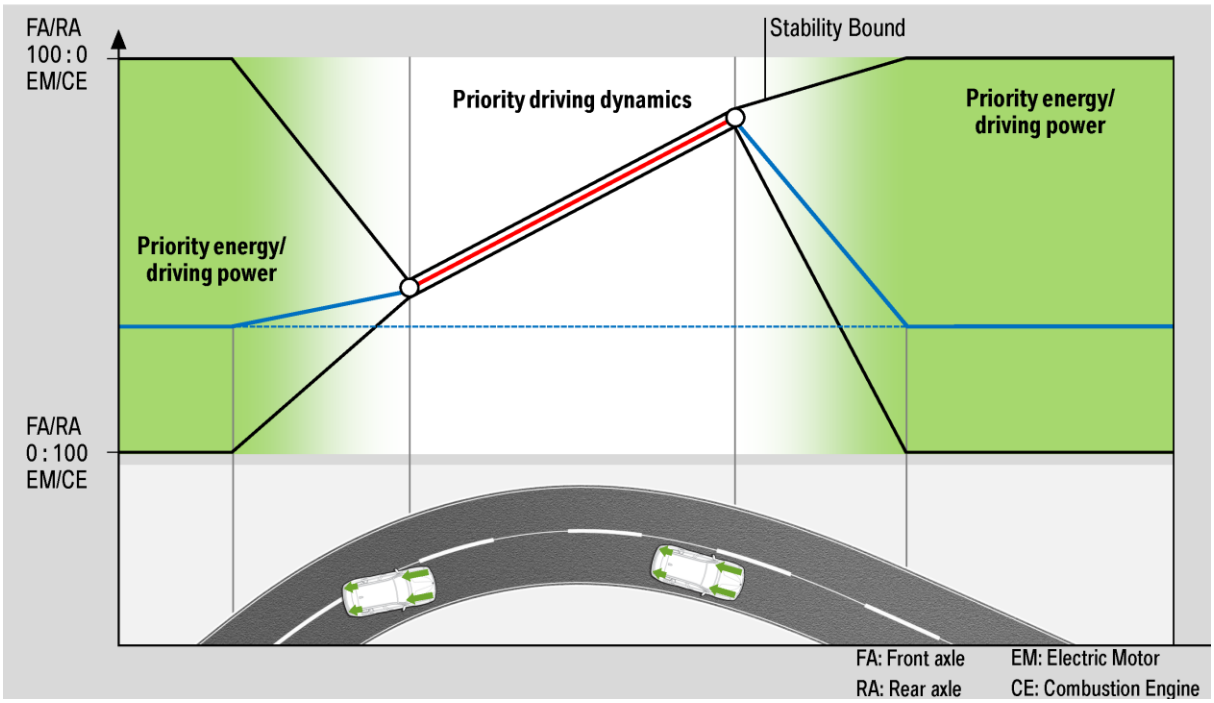
BMW CHARACTERISTIC DRIVING DYNAMICS. DRIVING DYNAMICS AND ENERGETIC OPERATING STRATEGY.



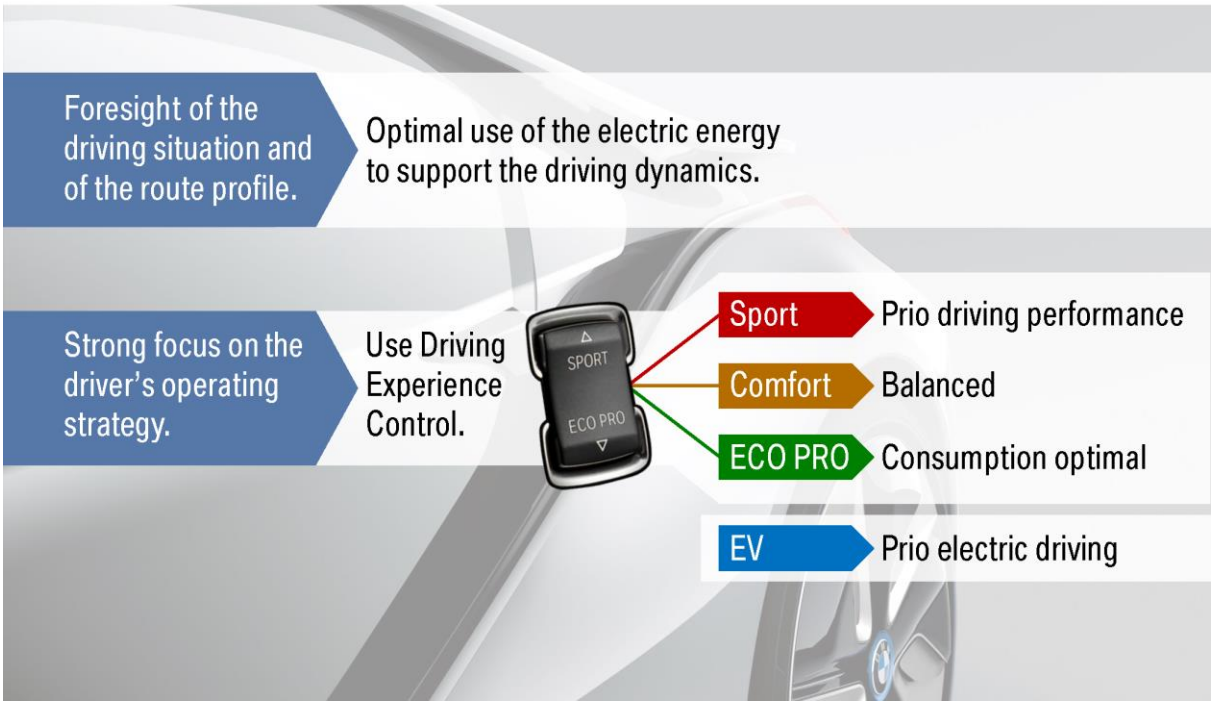
BMW CHARACTERISTIC DRIVING DYNAMICS. DRIVING DYNAMICS AND TARGET CONFLICTS.



BMW CHARACTERISTIC DRIVING DYNAMICS. DRIVING DYNAMICAL ALLOCATION OF DRIVING TORQUE.



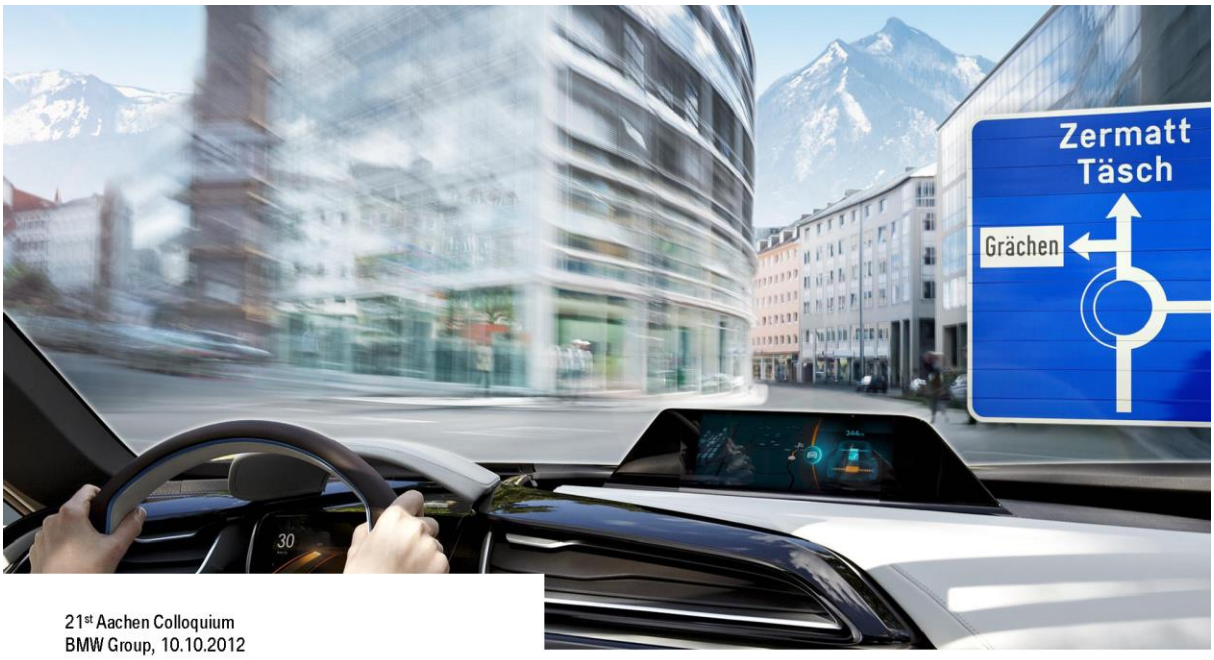
BMW CHARACTERISTIC DRIVING DYNAMICS. FURTHER APPROACHES.



BMW CHARACTERISTIC DRIVING DYNAMICS. FORESIGHT FUNCTIONS IN CURRENT PRODUCTS.

BMW CHARACTERISTIC DRIVING DYNAMICS. BMW i8 CONCEPT VEHICLE DATA.

Length Height Width	4632 mm 1280 mm 1955 mm
Wheelbase	2800 mm
No. of seats	2 + (2)
Kerb weight	1480 kg
Top speed (limited)	250 km/h 155 mph
Acceleration (0-100 km/h 0-62 mph)	4.6 s
Fuel consumption (EU cycle)	2.7 l/100 km 104 mpg imp (66 g CO_2)
Luggage compartment	approx. 150 litres



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