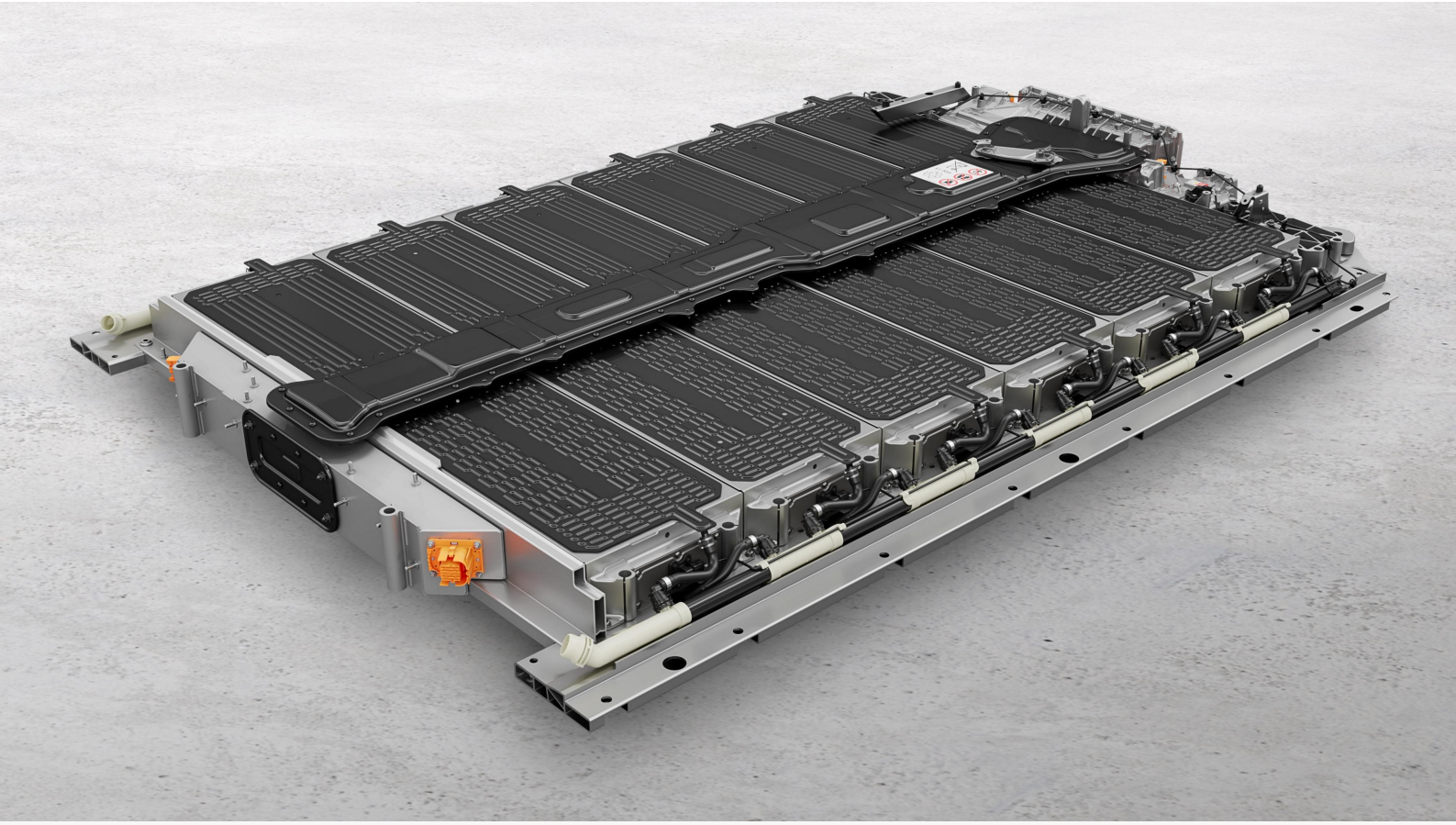

Battery technology of the future: intelligent, powerful, robust and efficient

24/07/2026 Battery technology of the future: intelligent, powerful, robust and efficient

The new Cayenne features what is referred to as a 'function-integrated' high-voltage battery. With this design, the battery becomes part of the body and performs other functions in addition to energy storage. This approach reduces weight and allows for a more spacious interior. At the same time, the integrated battery increases body stiffness and lowers the centre of gravity even further. This makes the Cayenne Electric (**Cayenne Electric (WLTP)*:** Electrical consumption combined: 22.0 – 19.7 kWh/100 km; CO_2 emissions combined: 0 g/km; CO_2 class: A) even more direct and agile to drive. There are also benefits in passive safety: the battery modules have a special extruded profile that absorbs impact energy in a targeted manner in the event of an accident.

High energy density and double-sided battery cooling

The battery modules for the new Cayenne, which are manufactured in-house, were developed from the ground up by Porsche. This approach is in line with the company's commitment to developing key technologies of the future in-house. The high-voltage battery is much more than just an energy storage device – it shapes the performance, efficiency and everyday practicality of the entire vehicle.

The high-voltage battery has a gross energy capacity of 113 kWh. In combination with the 800-volt technology and the highly efficient drive system, this enables a range of more than 600 km – ideal for long-distance travel. In the Cayenne Electric, Porsche uses a lithium-ion battery with six modules and 192 cells. The cells themselves are of the type known as pouch cells. A flexible aluminium-polymer film surrounds the electrode stack. The anode consists mainly of graphite, with six per cent silicon. Graphite anodes offer high mechanical stability and strong deep-cycle stability. Silicon increases the specific energy density and improves the fast-charging capability. Nickel-manganese-cobalt-aluminium (NMCA) is used for the cathodes. In order to achieve the highest possible energy density, a particularly large proportion of nickel is used in the NMCA material, with a nickel content of 86 per cent. The additional use of aluminium increases the energy content and ensures better electrical stability, which in turn has a positive effect on the service life of the cell.

Intelligent thermal management significantly contributes to the high charging performance and long service life of the high-voltage battery. A key main innovation here is the cooling strategy of the high-voltage battery; in the Cayenne Electric, two cooling plates are used per module. They cool or heat the battery from above and below as needed, enabling the optimal temperature to be reached more effectively. The cooling capacity is roughly equivalent to the performance of about 100 large household refrigerators. The newly installed fans are particularly efficient. Compared to conventional suction fans, they require around 15 per cent less energy.

Integrated intelligence thanks to the Charging Planner and predictive thermal management

The Porsche Charging Planner ensures intelligent control of charging processes. Once route guidance is active, the system helps the customer to travel in a relaxed manner and without wasting time, especially on long journeys. In the new Cayenne, the system has become even more intelligent as the Charging Planner now also enables certain charging stations to be avoided or preferred charging locations to be saved. For example, it is possible to set the system to only use charging stations with Plug & Charge technology or high-power charging stations with capacities of more than 350 kW. To make optimum use of the available charging power, the Charging Planner is able to initiate preconditioning of the battery while on the go.

Porsche is now taking a big step further in this area; with predictive thermal management, the Cayenne

Electric offers even more efficiency, performance and convenience. At the same time, the new function significantly extends the service life of the battery cells.

With predictive thermal management, all cooling circuits in the vehicle and their heating and cooling elements are networked with each other. Innovative software optimises heat flows, calculates the required cooling output and plays a key role in preconditioning as well as planning and performing charging processes. Almost all the high-performance computers in the electronic architecture are involved in the calculations.

When route guidance is active, it uses data from the driver's navigation, route plotting, departure time and driving style to predict the heating or cooling requirements in advance and satisfy them accordingly. Thanks to the underlying mathematical model, range predictions are even more accurate. Battery management and advanced charging functions are also influenced by predictive thermal management. The intelligent control system selects the appropriate strategy depending on the type of destination. For example, if the selected destination is a fast-charging station, preconditioning is carried out with a focus on maximum charging performance. If the driver instead plans to charge at home, then predictive thermal management ensures the best conditions for AC charging.

Due to the high charging rate of the Cayenne Electric, charging during very hot weather can lead to the cooling system producing a relatively higher level of noise. If quieter charging is desired in such a case, then customers can reduce the noise level by using the 'Quiet Charging' mode. This turns down the fans, and the charging power is adjusted accordingly.

MEDIA ENQUIRIES



Ben Weinberger

Spokesperson Cayenne und Macan
+49 (0) 170 / 911 2097
ben.weinberger@porsche.de

Consumption data

Cayenne Electric (WLTP)*: Electrical consumption combined: 22.0 – 19.7 kWh/100 km; CO_2 emissions combined: 0 g/km; CO_2 class: A

Cayenne Turbo Electric (WLTP)*: Electrical consumption combined: 22.5 – 20.4 kWh/100 km; CO_2 emissions combined: 0 g/km; CO_2 class: A

*Further information on the official fuel consumption and the official specific CO_2 emissions of new passenger cars can be found in the "Leitfaden über den Kraftstoffverbrauch, die CO_2-Emissionen und den Stromverbrauch neuer Personenkraftwagen" (Fuel Consumption, CO_2Emissions and Electricity Consumption Guide for New Passenger Cars), which is available free of charge at all sales outlets and from DAT (Deutsche Automobil Treuhand GmbH, Helmuth-Hirth-Str. 1, 73760 Ostfildern-Scharnhausen, www.dat.de).

Video

https://newstv.porsche.com/porschevideos/newstv.porsche.com_327847_en.mp4

Link Collection

Link to this article
https://newsroom.porsche.com/en/press-kits/Cayenne-Electric-and-Cayenne-Coupé-Electric/High-voltage-system.html

Dr. Ing. h.c. F. Porsche Aktiengesellschaft
Porscheplatz 1
70435 Stuttgart