

The Powerhouse

The Panamera S E-Hybrid, the world's first luxury-class plug-in hybrid car, transforms fascinating technology into a completely new sports-oriented driving experience.

By Oskar Weber **Photos by** Victor Jon Goico

A day at the wheel of a Panamera S E-Hybrid starts with a soft humming. The 70 kW (95 hp) electric motor drives the car with a peak torque of 310 Nm.



Our excursion into the modern age of private cars starts with an obligatory look into the rearview mirror. When bidding farewell, it's always a good idea to listen to the words of the wise. Let's start with the philosopher Karl Jaspers: "The future is the realm of our possibilities, and thus also the realm of our freedom." And then let's add this superb comment by Picasso: "What is art? If I knew, I'd keep it to myself." And we'll conclude by noting a prediction ventured by the last German emperor, Wilhelm II: "I believe in the horse. The automobile is only a temporary phenomenon."

Progress and art and the future—who really is an expert in these vast topics? Electric motors in a car? Until just a few years ago, specialists were saying they're just for automatic window operation and seat adjustment. Power from a battery? You're better off letting it run your boom box. Alternative drives? That's something for forklift trucks and golf carts, and of course that little vehicle on the moon. Sure. And blacksmith is the latest rage in new careers.

Nearly silently through the city and far beyond: The Panamera S E-Hybrid has a purely electrical range of up to 36 kilometers



The Porsche Panamera is the undisputed trendsetter in the high-end class. Sports-car brandname, sports sedan, sports-oriented clientele. The first generation went onto the market in the fall of 2009: the first real



Plug-in: Charging at an electrical outlet takes two and a half to four hours



The Panamera S E-Hybrid is a flying carpet on the way to work, with an occasional touch of turbulence from bumps on the road.

crossover between a sports car and a luxury sedan—or in other words, the first sedan with Porsche performance, and the first sports car with the option of driving it yourself or being chauffeured.

The second generation was launched in the summer of 2013: even more fuel-efficient engines, an extended-wheelbase version for predominantly chauffeured use in selected markets, sharper visuals, enhanced furnishings, and a full lineup of assistance systems.

This trendsetting, avant-garde automobile has matured into an unchallenged pioneer in technology. It leads the way through innovation. With the Panamera S E-Hybrid, Porsche has produced the first plug-in hybrid in the luxury class. With the power of two hearts and electricity from wall outlets, it's moving full speed ahead into a clean and zero-emission future for drive systems.

For the new avant-garde, driving represents a three-dimensional squaring of



No fuel consumption:
The hybrid display shows
zero-emission driving

the circle: mobility and fuel efficiency, sustainability and technology, emotion and rationality.



A day at the wheel of a Panamera S E-Hybrid starts with a soft humming. The 70 kW (95 hp) electric motor drives the car with a peak torque of 310 Nm. It's powerful, sublime, and nearly silent. When the three-phase synchronous motor pulls like a powerful fist on an invisible rubber band, the only muffled sound to reach the ears of the passengers is that of tires rolling on asphalt. Electric motors provide their enormous power literally from a standstill.

The combustion engine is silent, ushering in a new dimension of driving. The Panamera S E-Hybrid is a flying carpet on the way to the office, the golf course, or the yacht harbor, with an occasional touch of turbulence from bumps on the road. Driving by electric power promises what may well be record-setting ranges. A deft foot on the gas and brake pedals will give the S E-Hybrid up to 36 battery-driven kilometers in the New European Driving Cycle (NEDC).

Within certain distance parameters, this Gran Turismo can be driven solely on electric power for everyday use. And at Porsche, progress doesn't mean a snail's pace, as the figures for purely electric drive demonstrate: 6.1 seconds for the sprint from 0 to 50 km/h and a top speed of 135 km/h.

The powerhouse's energy storage system is based on a maintenance-free high-voltage lithium-ion battery with 104 prismatic cells, divided into eight 13-cell modules. As for its power figures, these are nominal

A system output of
306 kW (416 hp)
means performance
typical for a Porsche



The evolution of braking. Thanks to new technology, the surest way to lose energy has matured into an efficient way to charge the battery.

voltage of 384 volts and nominal energy content of 9.4 kilowatt hours, of which 7.5 are available for driving. Every bit as important is the fact that the Panamera battery can be charged from a standard electrical outlet—in your own garage, at work, or at the public charging stations that are springing up as part of targeted e-mobility infrastructure development programs. The onboard charger converts alternating current from the mains into direct current, which is best suited for storage. Depending on strength and voltage of the current, charging time takes from two and a half to four hours.

If the power from the mains comes from clean wind, water, or solar sources, the Panamera S E-Hybrid operates without emissions—a fabulous environmental feat which advanced automotive engineering helps to maximize. Kinetic energy is not irrevocably lost when braking, but rather recovered and fed back into the battery. The braking system of the S E-Hybrid is therefore designed to make maximum use of the motor's retardation torque and thus recover



Of the three main gauges, the one on the right shows energy flow and range

the most energy for all tolerance settings before the hydraulic system sets in. Thanks to new technology, the surest way to lose energy has matured into an efficient way to charge the battery. The old adage that “if you brake, you lose” no longer applies.

Typical Porsche performance: the driver brakes, and the car decelerates anywhere from slightly to dramatically depending on how much pressure is exerted on the pedal. The associated technology is not evident—at best, technology aficionados sense what's going on in that peripheral realm where an understanding of physics merges with an expertise in braking, for the recovery characteristics and the pedal dynamics have been mutually adjusted in the best possible manner to achieve Porsche-worthy drivability. Only the power meter shows when kinetic energy flows into the battery, by means of a green wave on the power flow display.

That unleashes a competitive spirit in drivers, who are quickly captivated by a completely new interpretation of Porsche and sports-oriented driving. They can drive cleverly, save energy, make use of energy recovery, charge the battery, and coast with a disengaged drive system. Recovery-based driving is an utterly fascinating new side of this car.

The fact that the Panamera S E-Hybrid is also a classic Porsche for country roads and extended trips goes without saying. The combination of a three-liter V6 engine (245 kW/333 hp) and an electric motor generates a system output of 306 kW (416 hp) and catapults the plug-in hybrid up to the performance level of a classic V8 assembly.

It goes from zero to 100 km/h in 5.5 seconds, with an NEDC fuel consumption of 3.1 liters per 100 kilometers. That corresponds to CO₂ emissions of 71 g/km.

Anymore questions? Oh, yes: the decoupler, a key element of the drivetrain in this parallel full-hybrid design, seems to operate as if by magic. That component, namely, the clutch between the combustion engine and the electric motor, operates so subtly that neither drivers nor passengers sense when the combustion engine starts or stops.

But drivers can observe the process if they so desire. For that, however, they need to keep an eye on the rpm needle or the power meter. It's like watching a great technology movie. Or rather, observing technology of the future in the Porsche Panamera of today.

Every drive starts with a look into the rearview mirror. Nobel Prize-winning author John Steinbeck compared the younger generation to an arrow and the older generation to a bow. Or in other words, the Porsche brandname is the bow and the Panamera S E-Hybrid is the arrow.

Porsche Car Connect

The new Porsche Car Connect (PCC) smartphone app lets you operate some functions of your car remotely.

By Oskar Weber

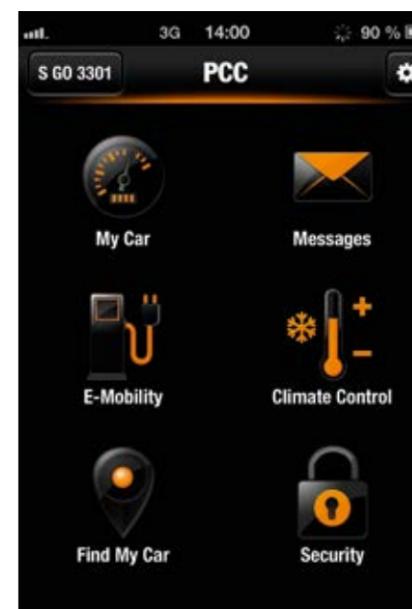
The design of the Panamera S E-Hybrid includes a range of comfort features that can be accessed and activated via the new Porsche Car Connect (PCC) smartphone app. Porsche Car Connect has three main categories: e-mobility with hybrid-specific content, remote control of general features, and the Vehicle Tracking System (VTS).

Drivers can use the smartphone app to access and control important information. The e-mobility features fall under four headings: charge status, charge time, range, and optional remote control of the car's climate control system when parked.

In addition to the battery-charging status and the remaining charge time, the app shows the available range in a visual display on a navigation map. The charge-time function has three different settings based on trip departure time, which means that the battery can be charged in the easiest and most cost-efficient manner.

The climate control option for the car when parked can be activated whether or not the charging cable is connected. Drivers have two options in this case. They can run the climate control system per smartphone for a period of 30 minutes. Or they can program and activate the air-conditioning to go on at a certain time independently of the charging timer. The system will then pre-heat or pre-cool the interior to the desired temperature before the trip begins.

As a positive side-effect, when the charging cable is connected the preset heating or cooling process will be powered by the mains and thus will not reduce the driving range.



Porsche Car Connect is a further developed version of already existing online services from Porsche. This new car-oriented service is based on its own architecture, which connects the car to a server by means of an internal communications unit and the mobile phone network.

The e-mobility services for the Panamera S E-Hybrid are free of charge for five years. The Remote and Vehicle Tracking System categories in Porsche Car Connect come in market-specific configurations for all Panamera models.

The Porsche Car Connect smartphone app is not yet available in all markets. For more information, please consult with your Porsche Center.

PANAMERA S E-HYBRID
 Engine: Supercharged V6 engine
 Displacement: 2,995 cc
 Power: 245 kW (333 hp)
 Maximum torque: 440 Nm at 3,000–5,250 rpm
 Power electric motor: 70 kW (95 hp)
 Maximum torque electric motor: 310 Nm at 0 to 1,700 rpm
 Total power: 306 kW (416 hp)
 Total maximum torque: 590 Nm at 1,250–4,000 rpm
 0–100 km/h: 5.5 sec.
 Top track speed: 270 km/h (168 mph)
 CO₂ emissions: 71 g/km
 Fuel consumption (combined): 3.1 l/100 km
 Electric power consumption (combined): 16.2 kWh/100 km