

Saab 9-3 ePower - Saab's First EV

- Saab 9-3 SportCombi with all-electric propulsion
- Projected driving range 200 km approx.
- Battery cells set benchmark for energy density
- User trials with 70-strong test fleet starting next year

Trollhättan, Sweden: Saab Automobile is taking its first step towards developing an all-electric vehicle with the Saab 9-3 ePower.

Making its public debut at the Paris Motor Show later this month, the Saab 9-3 ePower is the prototype for a test fleet of 70 vehicles which will participate in extensive field trials in Sweden early next year.

The performance of the cars will be evaluated under a variety of real world driving conditions as part of the development process for a purpose-built, electric Saab vehicle. Targets to be verified include a projected driving range of approximately 200 kilometers through the use of high density energy storage in lithium-ion battery cells.

The Saab ePower is the first electric vehicle from Saab and is a result of a co-operation between Saab Automobile, Boston Power (batteries), Electroengine in Sweden AB (electric power trains), Innovatum (project management) and Power Circle (Sweden's electric power industry trade organization).

Mid-sized sports combi with zero emissions

The Saab 9-3 ePower is the first all-electric car to offer its occupants the comfort and size of a wagon bodystyle. Saab engineers have integrated an electrical architecture within the shape and dimensions of a 'conventional' 9-3 SportCombi.

Under the hood is a 135 kW/184 hp electric motor driving the front wheels through a single-speed transmission. Instant torque enables zero to 100 km/h acceleration is just 8.5 seconds, together with a top speed of 150 km/h.

The compact yet powerful 35.5 kWh lithium-ion battery pack is accommodated in a modified floor-pan, mainly in space within the car's wheelbase previously occupied by the exhaust system and fuel tank. This enables an optimum weight distribution and excellent driving dynamics similar to those of a standard SportCombi.

Inside the cabin, a conventional, automatic-style gearshift lever provides selection of 'drive', 'neutral', 'park' and 'reverse'. The rev-counter, fuel and turbo boost displays in the main instrument cluster are replaced by read-outs for battery status, power consumption and driving range, all illuminated in green. To optimize space, an electric park brake is fitted.

Electro-hydraulic power steering is used and the cabin is equipped with full air conditioning, via a compressor powered by the battery pack. A separate 12-volt battery, for the lights and cabin ancillaries, is also charged from the battery pack via a current transformer

The operation of the vehicle's powertrain is controlled by a version of Saab's own in-house Trionic 8 engine management system, with new software written for an electric vehicle application.

Long driving range with excellent durability

The Saab 9-3 ePower's projected driving range of approximately 200 kilometers pushes out the boundaries for current EV performance. Key to its long range are battery cells which have an energy storage density substantially greater than the best currently used in EV applications. High energy density also contributes to a lower battery weight.

The battery pack has a capacity of 35.5 kWh and is designed to operate with full power in ambient temperatures as low as -30°C, at least 10°C below the operating level of other battery packs on the market today. Another key benefit is the use of air, instead of liquid, cooling which contributes to lower cost and further weight-saving in the pack's design.

The pack is intended to support re-charge cycles equivalent to about ten years average use. It can be fully recharged from a domestic mains supply in about three to six hours, depending on depletion status. Charging times can be greatly reduced if the voltage of the electrical feed is raised, as there is no limitation on the battery's input capacity.

Test driving experience is expected to validate the performance of this advanced battery pack, which is designed to operate reliably within a full depletion 'buffer' set at only 12 percent of total capacity, a much lower operating margin than used in the management of other packs.

Its lithium-ion battery cells are also the first to receive a Nordic Ecolabel accreditation for their environmental safety and sustainability, which includes manufacturing processes.

The 9-3 ePower meets the high crash worthiness standards that Saab applies to all its vehicles. The car's power pack is located outside the occupant compartment in non-deformable structural zones, well protected and encapsulated. The battery management and monitoring system supports safe performance during normal driving and in crash conditions.

Extensive user trials

Hundreds of drivers and their families will be enlisted by Saab and its development partners during an extensive test driving and evaluation program involving a 70-strong fleet of Saab 9-3 ePowers in central, west and eastern Sweden during 2011-12.

The Saab ePower project team in Trollhättan will monitor the performance of the cars across a wide variety of usage patterns and driving conditions. To log essential component data, all vehicles will be equipped with aircraft-style, black box recorders.

"This program is designed to evaluate the potential for developing a high performance, zero emission electric vehicle and is an important next-step in the extension of our EcoPower propulsion strategy," says Mats Fägerhag, Executive Director, Vehicle Engineering at Saab Automobile.

"This includes engine rightsizing, which exploits Saab expertise in turbocharging, as well as the use of alternative fuel, such as bio-ethanol through Saab BioPower technology."

Jan Åke Jonsson, Saab Automobile's CEO adds: "By 2015, annual global sales of electric vehicles are expected to reach 500,000 units and Saab is determined to be represented in this important, growing segment,

"The 9-3 ePower program is our first step towards developing a potential production vehicle that will deliver the sort of advanced performance our customers expect. We now look forward to working with

our technical partners in developing such a product."