Kia reveals solar charging system technology

Kia Motors and Hyundai Motors have announced plans to introduce 'solar roof' charging technology on selected Hyundai Motor Group vehicles.

Electricity-generating solar panels will be incorporated into the roof or the hood of vehicles and will support internal combustion, hybrid and battery electric vehicles with additional electrical power, increasing fuel efficiency and range.

The solar charging technology is being developed to support the vehicle's main power source, improving mileage and reducing CO_2 emissions. The system will have the capability to charge the batteries of eco-friendly electric and hybrid vehicles, as well as those of internal combustion engine (ICE) vehicles, helping to improve fuel efficiency.

The company is developing three types of solar roof charging systems: The first-generation system is for hybrid vehicles, while the second-generation technology brings a semi-transparent solar roof system to ICE vehicles. The third generation of the technology will see the introduction of a lightweight solar roof for battery electric vehicles.

The first-generation system, which will be applied to hybrid models, is created out of a structure of silicon solar panels that are integrated into a standard car roof. This system is capable of charging 30- to 60% of the battery over the course of a normal day, depending on weather conditions and other environmental factors.

Image supplied by motorpress.co.za

The second-generation semi-transparent solar roof will be applied to ICE vehicles, representing a world-first application for the technology. The semi-transparent technologies can be integrated with a panoramic sunroof, letting light through into the cabin, whilst charging the vehicle's battery at the same time. Applying solar charging systems to ICE vehicles will help them comply with ever more stringent global environmental laws regulating CO2 emissions.

The third-generation system is currently in testing. It is designed to be applied to the hood and roof of eco-friendly battery

electric vehicle models in order to maximise energy output.

How solar panel technology works

The solar charging system is composed of a solar panel, a controller and a battery. As the panel absorbs photons of light from the sun, it creates electron-hole pairs in silicon cells, enabling current to flow and generating electricity.

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When a 100W solar panel is equipped, it can produce up to 100 Wh of energy (in ideal conditions: summer noon, 1000 W/m2 intensity of radiation). The controller features Maximum Power Point Tracking (MPPT), which controls voltage and current to increase the efficiency of electricity harvested by the solar panel. This power is converted and stored in the battery, or utilised to decrease load on the vehicle's alternating current (AC) generator, thereby increasing vehicle range.

"In the future, we expect to see many different types of electricity-generating technologies integrated into our vehicles. The solar roof is the first of these technologies, and will mean that automobiles no longer passively consume energy, but will begin to produce it actively," said the developer of the technology Jeong-Gil Park, executive vice president of the engineering and design division of Hyundai Motor Group. "It is an exciting development for us, designing a technology for vehicle owners to help them shift from being energy users to being energy producers."

The company will launch the first generation of this technology into its vehicles after 2019 to help meet global regulations targets and improve vehicle fuel efficiency