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Preview: Hyundai Propane Hybrid



by Bill Siuru

07/21/2008



Korea's Hyundai Motor Co. has developed and will soon market a hybrid electric vehicle that combines hybrid power with an alternative fuel, in this case LPG (liquid propane gas, or propane). This is the first time that a major automaker has moved in this direction with LPG, which is a popular alternative fuel in some countries but a distant candidate for the job in the U.S. Several automakers, including Ford with its E85 ethanol Escape Hybrid demonstrator, are actively exploring ways to remove gasoline from the hybrid equation.

Hyundai's Avante/Elantra LPI (Liquefied Petroleum Injection) model also accomplishes a first with its use of advanced lithium-polymer (Li-Po) batteries with an internal combustion engine. It will use Hyundai's 1.6 liter, four-cylinder Gamma engine. A 20 hp (15 kW) DC electric motor and continuously variable transmission (CVT) are used in a mild hybrid configuration. Hyundai has not provided fuel economy numbers but says they will be competitive.

The Avante/Elantra LPI hybrid will have the lowest operating cost of all currently available hybrid vehicles, Hyundai claims. In fact, based on the cost of gasoline and LPG in Korea, the LPI hybrid could be as much as 40 percent cheaper to operate than other hybrids and 50 percent cheaper than a gasoline-only Elantra. Plus, it's expected to emit 103 g/km of CO₂ and 90 percent fewer tailpipe emissions compared to an equivalent gasoline-powered Elantra, thus meeting Super Ultra Low Emission Vehicle (SULEV) emissions levels.

The lithium-polymer battery is supplied by LG Chem in Korea. In a Li-Po battery, the electrolyte is held within a solid polymer composite rather than in an organic solvent, as is the case in a lithium-ion battery. According to Hyundai, this results in higher energy density, lower manufacturing costs, and an increased number of charge-discharge cycles before battery storage capacity begins to degrade and batteries have to be replaced. The Li-Po batteries are also said to be more robust and thus less prone to damage.

Hyundai plans to begin retail sales of its LPI hybrid in July 2009, initially in Korea where it will be badged as an Avante, a name used for Elantra models in many markets. This could later be expanded to other markets with established LPG distribution infrastructures.



Of course, the LPI will have a higher initial cost because it is a hybrid with additional components like Li-Poly batteries, an electric motor, and an associated electrical control system. However, Hyundai says that the added cost should be recovered in about two years through fuel savings and the use of lower cost LPG fuel.

This is not Hyundai's first hybrid. The company developed its first hybrid prototype in 1995, and then followed with an Elantra hybrid in 1999 and an Accent hybrid in 2000, both research projects. In 2004, Hyundai delivered 50 Getz gasoline-electric hybrids to Korean government agencies for a fleet demonstration project. These used mild hybrid systems with 12 kW electric motors and nickel-metal-hydride batteries. Between 2005 and 2007, Hyundai and its affiliate Kia Motors Corp. delivered 2,762 more hybrids to the demonstration fleet. Current plans call for expanding Hyundai's [hybrid vehicle](#) lineup to include mid-sized sedans in 2010.

Want to know more about Hyundai's advanced vehicles? Be sure to check out these articles on GreenCar.com:

- [Hyundai i-Blue Fuel-Cell Vehicle Gets Serious About Hydrogen](#)
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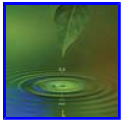
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