

Vehicle Technologies: Plug-in Electric Vehicles



Overview

Plug-in electric vehicles represent a fundamentally new form of vehicle propulsion. They are exceptionally clean, quiet, smooth and efficient.

What is a Plug-in Electric Vehicle?

A plug-in electric vehicle is a vehicle propelled by electric power, in whole or in part, which permits recharging via a plug-in connection to an off-board electricity supply.

Plug-in Electric Vehicles include:

- **Pure electric vehicles (EVs)** use a large battery for energy storage and only an electric motor for propulsion.
- **Range extended electric vehicles (REEVs)** add an internal combustion engine to the EV configuration, to drive an electrical generator. The generator supplements the battery, extending the vehicle's range.
- **Plug-in hybrid electric vehicles (PHEVs)** are similar to stand-alone hybrid electric vehicles², using a both an electric motor and an internal combustion engine for propulsion. The difference is that the PHEV permits off-board battery recharging.

Plug in electric vehicles provide significant cost savings and emissions reductions when running in electric-only mode. In electric-only mode, a plug-in electric vehicle is over twice as efficient as a conventional vehicle.

Generally, plug-in electric vehicles use regenerative braking to capture and recycle energy that is otherwise lost when braking, further improving their real-world efficiency.

Can I Buy a Plug-in Electric Vehicle?

Yes, mass-produced electric vehicles have been sold in SA since 2010. Several light vehicle models, as well as motorcycles and scooters, are now available. More options are expected to enter the market over time, potentially including heavier vehicles.

How Far Can I Go in an Electric-Vehicle?

The electric-only range of any plug-in electric vehicle is limited by its battery storage capacity. For a pure EV, the electric-only range represents the total range.

REEVs and PHEVs tend to have shorter electric-only ranges due to smaller battery capacities. Their total driving range, however, is extended by other fuels.

Further information:

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PHEVs may not operate in electric-only mode at highway speeds, even if there is sufficient energy in the battery.

In the case of REEVs and PHEVs, running costs and emissions will be comparable to a conventional vehicle when operating in petrol (or diesel) mode.

When choosing a plug-in electric vehicle, you need to carefully consider your driving task to select the most suitable configuration.

Electric vehicles are best suited where: trips from base to base are up to 100 km; there is time for recharging between trips (at least 1½ minutes per km travelled, up to about 2½ hours); and vehicles are highly utilised.

Recharging

Recharging an electric vehicle takes much longer than refuelling with liquid or gaseous fuels, which can make the electric-only range a significant issue if you need to travel and the battery charge state is low. REEVs and PHEVs can ensure you're not restricted.

Most recharging is expected to be done at home or depot, though public recharging stations are available. See our fact sheet *Transport Fuels: Electricity* for more details. □

Why Consider a Plug-in Electric Vehicle?

- South Australia's relatively low emission electricity means electric vehicles are among those with the lowest full fuel cycle emissions.
- Electric vehicles offer the possibility of zero-emissions driving, provided they are charged on renewably-generated electricity. They release no toxic emissions when in electric-only mode.
- Electric vehicles are quiet and smooth. Electric motors offer

exceptional torque and power characteristics.

- Maintenance and servicing costs of pure electric vehicles are expected to be very low as there are very few moving parts or opportunity for wear. REEVs and PHEVs, of course, retain the internal combustion engine and its issues with wear and tear.

What issues are there?

- Upfront costs and a relatively limited selection can present a barrier to purchase. Costs are expected to continue to fall over time, and available models are increasing.
- The issues of range and recharging time can cause practical limitations. REEVs and PHEVs address these issues and, in any case, over 90% of SA's daily light vehicle commutes could be made in a pure EV.
- Being a new technology, drivers may be apprehensive at first.
- The near-silence of EVs at low speeds, such as in parking lots or driveways, may pose an increased hazard. At higher speeds, road / tyre interaction dominates vehicle noise.

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See Also:

- [Vehicle Technologies](#)
- [Vehicle Technologies: Conventional Vehicles](#)
- [Vehicle Technologies: Hybrid Electric Vehicles](#)
- [Transport Fuels: Electricity](#)
- [Emerging Fuels and Technologies](#)

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