August 1999

TOYOTA RAV4 ELECTRIC VEHICLE

KEY POINTS

- Zero emissions pure electric version of the Toyota RAV4
- On sale in Japan since September 1996
- Five RAV4 EVs for hire to the public on Jersey from Spring 1997
- Winner of the 1995 Scandinavian Electric Car Rally
- Twice winner in class of the Monte Carlo Rally for Electric Vehicles
- Price: 4, 900, 000 Yen in Japanese market
- Three and five door versions

SHORT STORY

The electrically powered version of the RAV4 is Toyota's most advanced electric vehicle to date. It is the latest in a series of more than 10 electric vehicles that the company has developed since it began research into electric vehicle technology in the late 1960s. It is also one of only a handful that have been put into genuine limited production by its maker. The RAV4 EV produces no emissions, has a range in urban driving conditions of over 124 miles, can achieve a top speed of 77mph and can be charged from a domestic electric supply (via an on-board 200V charger) from fully drained state to full in only 10 hours.

It is a fully developed package offering twin airbags; air conditioning (run off an inverter to save energy) heated front seats and an audio system. Unlike petrol-powered RAV4s, however, the EV is front-wheel drive with a single speed integrated transaxle. State of the art Nickel metal hydride batteries developed by Panasonic are maintenance-free and offer twice the range and three times the life of lead-acid batteries. Low rolling resistance tyres, regenerative brakes (which switch the electric motor into a generator and convert the kinetic energy usual lost during braking back into electricity for the battery) also increase the vehicle's efficiency.

On sale in Japan to municipal customers since September 1996 the vehicle was then offered to fleet customers in New York and California, USA in 1998. However, Toyota decided to conduct its first ever electric vehicle evaluation scheme outside of Japan in Spring 1997 by launching an electric vehicle programme on the Island of Jersey. Five RAV4 EV three door models were placed at five prestigious hotels on the island for the public and holidaymakers to hire for around £30 per day. The project, sponsored by the Jersey Government, Jersey Electric Company, British Airways and the five hotels will run for five years.

In production and on sale

The RAV4 EV electric vehicle is in production and has been officially on sale in the Japanese home market since September 1996. In October 1997 it was also for the first time offered for lease to fleet operators in the USA. In the same month, a 5-door version, embodying a number of technical advances, entered production alongside the original 3-door model. The showroom price of the RAV4 EV in the Japanese home market is 4.9 million yen.

The RAV4 EV was developed following the highly successful introduction of the standard RAV4, and the programme included an entry in the 1995 Scandinavian Electric Car Rally, which the car won. The RAV4 EV has also won the production car class of Monte Carlo Rally for Electric Vehicles twice. The development programme also included pilot-fleet trials in Japan, the USA and Europe (where a 5-vehicle fleet continues to run on the Island of Jersey) which helped to establish realistic operating criteria for EV's, to prove reliability and to assess the reactions of normal drivers to the EV concept.

A fully capable vehicle

The RAV4 EV was developed from the onset to full production standards of safety, durability, comfort and equipment. For example, the 5-door specification includes driver and front passenger SRS airbags and safety belts with pretensioners and force limiters, anti-lock brakes, power assisted steering, heated front seats and highly efficient air conditioning.

Both versions of the RAV4 EV use a powerful permanent magnet type electric drive motor, driving the front wheels through a simple reduction gear and fed from an advanced nickel-metal hydride battery bank. The 5-door version has a more powerful motor (50kW instead of 45kW) and exploits its longer wheelbase to house the battery bank entirely beneath the cabin floor, leaving normal space for five occupants and their luggage.

Both versions have a range of around 200km per full charge under Japanese test conditions. Highly efficient regenerative braking contributes to achieving this excellent figure. Maximum speed is electronically limited to 77mph in both cases.

The battery bank can be recharged from a domestic power point via an on-board charger unit, Higher recharging rates can be achieved with specially adapted electrical power supply points. In the 5-door version, whenever the vehicle is plugged in to an external power supply, apart from recharging the batteries, the heating and the air conditioning system can be operated, with a driver-operated timer, to bring the cabin interior to a selected temperature before setting out on a journey. This increases occupant comfort while also reducing the amount of energy needed to maintain cabin temperature once on the move. The 5-door RAV4 EV is also equipped with a new and even more efficient air conditioning system with a gas injection heat pump and inverter control.

TOYOTA RAV4 EV TECHNICAL SPECIFICATIONS

Length	3,980mm (5-door); 3,565mm (3-door)
Width	1,695mm
Height	1,675mm (5-door); 1,620mm (3-door)
Wheelbase	2,410mm (5-door); 2,200mm (3-door)
Kerb Weight	1,540kg (5-door); 1,460kg (3-door)
Drive Motor	AC synchronous, permanent magnet type
Maximum power (5-door)	50kW (3,100 to 4,600rpm)
Maximum power (3-door)	45kW (2,600 to 8,600rpm)
Maximum torque (5-door)	190Nm (0 to 1,500rpm)
Maximum torque (3-door)	165Nm (0 to 2,600rpm)
Maximum speed	78mph (electronically limited)
Battery bank	Sealed nickel-metal hydride battery pack
Range per charge	215km (Japanese test conditions)
Transaxle	Single speed reduction gear
Drivetrain	Front wheel drive
Tyres	195/80-R16 low rolling resistance
Anti-lock braking	Standard
Air conditioning	Standard
Seating capacity	5 (5-door), 4 (3-door)