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# BRAKE ENERGY REGENERATION SYSTEM

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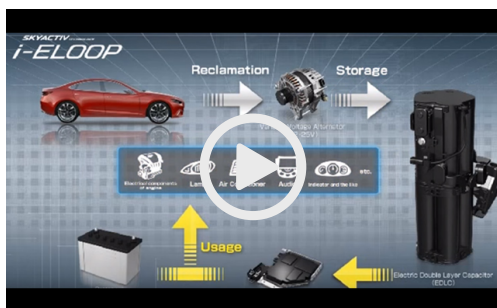
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# i-ELOOP continuously recovers kinetic energy as the vehicle decelerates and reuses it as electricity

Brake energy regeneration systems convert a vehicle's kinetic energy into electricity as the car decelerates. The electricity is then stored for later use. It can be used to power the headlights, climate control, audio system, or any other electrical equipment. This reduces the need for the engine to burn extra fuel in order to generate electricity, and thereby improves fuel economy.



[Click here to see a video about i-ELOOP](#)



## i-ELOOP

i-ELOOP performs three functions; 'regeneration,' 'storage' and 'use.' A big focus of the development was how to generate and store electricity as efficiently as possible because the opportunity to do this, the period when a car is braking or decelerating, is by nature very short. In order to develop a system which efficiently recaptures kinetic energy, generates electricity, quickly stores that electricity, Mazda has utilize variable voltage alternator and low-resistance, high-capacity electric double layer capacitor (EDLC).

Conventional alternator charges at around 12 volts (V), however i-ELOOP's variable voltage alternator can vary its output voltage from 12 V to 25V in

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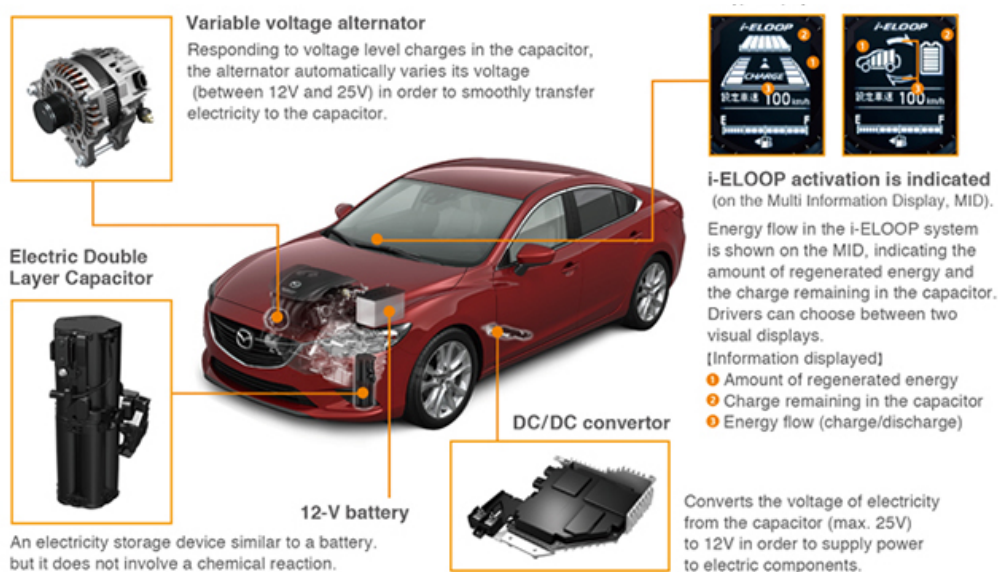
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response to the voltage level of the capacitor and making it possible to continually supply electricity to the capacitor.

Unlike a battery that works via chemical reaction, capacitors store energy as electricity and for this reason it can charge and discharge large amounts of electricity very quickly. It also exhibits very little deterioration of the electrodes even after prolonged use. Using capacitors as electricity storage devices in brake energy regeneration systems not only improves fuel economy, it is also expected to prolong the life span of the vehicles lead-acid battery. Furthermore, the capacitor used with i-ELOOP requires no heavy or precious metals, and its main component is activated charcoal making it very environmentally friendly.

## Components



\* Example in Mazda6/Atenza

## Basic mechanism

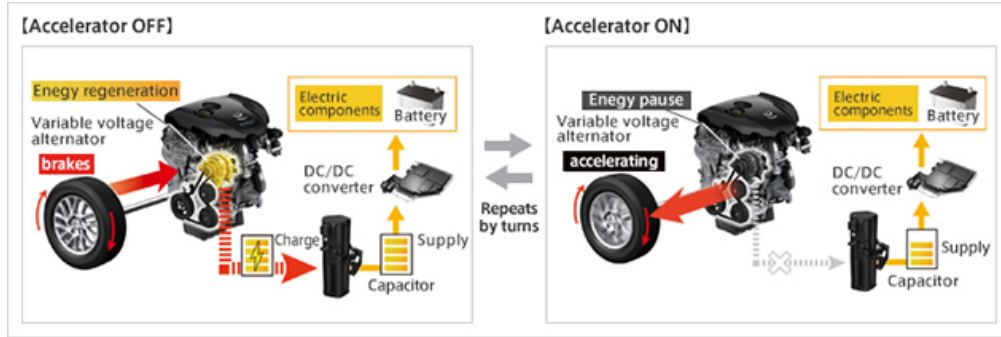
### Recapture kinetic energy when car decelerates (accelerator released)

energy that previously went to waste. When the accelerator is released, a high-performance alternator driven by the rotation of the tires generates

electricity which is transferred to the capacitor.

### Improved engine efficiency (when accelerating)

The alternator is switched off when the driver steps on the accelerator and the capacitor supplies electricity to the car's electronic components. The engine is relieved from the task of producing electricity resulting in improved fuel economy.



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