GE’s hybrid concept is modeled on the Evolution locomotive, but—like a hybrid car—it stores energy generated when the brakes are applied.

The engine, a 12-cylinder, 4400-hp diesel (1), turns an alternator (2) to produce raw AC power, which is rectified into DC current and fed into a power bus (3). The bus distributes the power, which is inverted back to AC to drive the six axle-mounted motors (4). During braking, some of the energy of the wheels is converted into electric current (5). In the hybrid, some energy is dissipated as heat using a resistor grid on the roof (6), as in conventional locomotives. But most of the electricity is stored in a massive array of batteries (7), then used to help power the motors. The batteries would weigh approximately 40,000 pounds with today’s technology, pushing the 210-ton locomotive past practical weight limits. GE is planning to compensate by refining the batteries and building the hybrid from lightweight composite materials.