For over 100 years, automobiles have been powered by internal combustion engines (ICE’s), and it has gone pretty well. Systems have been perfected over the decades to make the ICE function better and better. First was the clutch with manual transmission, then synchronized transmissions for easier shifting, then automatic transmissions. For noise control: mufflers. For pollution control: catalytic converters. Automatic brakes and carburetors were replaced over time with electronic ignition. Generators gave way to alternators. Timing chains gave way in some engines to timing belts. Original spark plugs have been replaced with platinum spark plugs good for over 100,000 miles.

ICE’s create lots of waste heat, so cooling the engine is important. The dissipation of that heat becomes a problem in stop-and-go traffic or in very hot weather. (Park that hot ICE in your garage and you have another heat leak in stop-and-go traffic or in very hot weather. (Park that hot ICE in your garage and you have another heat leak.) The electric drive train requires no transmission, no exhaust system, no pollution control, no starter, no alternator, no engine cooling, or many other systems. There is no fan belt to drive the power steering, air conditioning or power brakes, which are powered by electric motors of their own. With a range of 265 miles on a full charge, there is no need to plug in my Tesla except overnight. Electric motors are 90% efficient vs. the 25% efficiency of ICE’s. If you pay for electricity — I get it from the sun — your cost is 3 cents/mile vs. 20 cents/mile for gasoline.

What stands out for those who accept a test drive in a Tesla is its amazing acceleration and handling. With its low center of gravity, it holds the road exceptionally well. That low center of gravity is the result of putting the battery underneath the length of the car, taking up no space that you’d use for anything else. And the motor is located between the rear wheels, where you’d find the differential in a conventional rear-wheel drive car. The result is that you have a spacious trunk under the front hood as well as a spacious rear compartment.

I’ll be driving my Tesla to New York this fall, charging it for free during meal stops at the Tesla supercharging stations located every 50 miles along the interstates. The only cost for such a trip is the wear on my tires. The inspection of the battery underneath the trunk is done by the manufacturer every 4 years or 40,000 miles. This is not a lot of wear.

What about the Torque of Electric Motors? It is clear to me that the simple combination of battery plus motor can be an effective substitute for the ICE with all its necessary components. The electric drive train requires no transmission, no exhaust system, no pollution control, no starter, no alternator, no engine cooling, or many other systems. There is no fan belt to drive the power steering, air conditioning or power brakes, which are powered by electric motors of their own. With a range of 265 miles on a full charge, there is no need to plug in my Tesla except overnight. Electric motors are 90% efficient vs. the 25% efficiency of ICE’s. If you pay for electricity — I get it from the sun — your cost is 3 cents/mile vs. 20 cents/mile for gasoline.

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