

POWER = WORK/TIME = Fv , Units 10 & 11 Dr. John P. Cise, Professor of Physics, Austin

Com. College, 1212 Rio Grande St., Austin Tx 78701 jpcise@austincc.edu & NYTimes Feb. 26, 2012 by Jerry Garrett
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Stepping Out With Style and Batteries



SHOWTIME: The design of the Fisker Karma, a plug-in gas-electric hybrid, has changed little since its debut at the 2008 Detroit auto show.

INTRODUCTION: This car received a \$169,000,000.00 start up loan from the US Government which is assembled in Finland????? This writer finds that strange!

QUESTIONS: (a) Find the mass of the Karma using information in region (A)? (b) Find final kinetic energy of the Karma at 60 mph? (c) Find work done by Karma engine in region (B) to achieve 60 mph? (d) Find power of Karma in region (B) below in ft lb/s and HP? (e) Answer (d) for sport mode Karma in region (C) below? (f) Why is the answer to (e) less than the stated HP for the Karma in sport mode?

ANSWERS: (a) 175 slugs , (b) 677,600 ft lb, (c) work = 677,600 ft lb, (d) 85,772 ft lb/s or 156 HP, (e) 112933 ft lb/s or 205 HP , (f) Other Accessories(e.g.....power steering, power breaks, alternator, generator, water pump, fuel pump, work due to friction inside engine, work due to friction inside the drive train from engine to wheels, etc) need power from the engine. Thus, not all the power the engine puts out ends up in the kinetic energy of the car.

LOS ANGELES — MOVIE critics are always a bit suspicious when they aren't allowed to preview a film until it's already in theaters. Does the studio know that it has made a stinker, and fears that bad reviews will warn the public away?

CLOSE VIDEO I felt similar trepidation when an invitation finally arrived to drive the Fisker Karma. After all, this luxurious plug-in hybrid — like the [Chevrolet Volt](#), it is electrically driven, with a gasoline engine that extends the range of its battery pack — has been on sale since summer, with cars delivered to customers in December. What took Fisker Automotive so long to show off its pretty baby?

The road to market proved bumpy, with the Karma arriving two years later than promised with a base **(((price (\$103,000))))** some \$20,000 over the original estimate. **Along the way, Fisker got a \$169 million start-up loan from the federal government)))) for the car, which is assembled in Finland.)))**

My \$116,000 test car had the EcoChic package that includes textile — not leather — upholstery and salvaged wood trim.

Though the Karma is made for the slim, the car could stand a diet; **(A) at 5,600 pounds, it weighs nearly as much as the mammoth Rolls-Royce Phantom. Despite its aluminum components, the Karma carries the weight of batteries, electric motors and a gas generator. (B) (((((In battery-only Stealth mode, it accelerates to 60 m.p.h. in 7.9 seconds))))))**, on par with a [Honda Odyssey](#) minivan. The top speed in that mode is 95 m.p.h.

For a jolt of performance there is **Sport mode**, when the output of the 600-pound, 22-kilowatt-hour battery pack is supplemented by a 2-liter turbocharged 4-cylinder engine from General Motors. In Sport, **(C) the car reaches 60 m.p.h. in about 6 seconds**, right up there with a [Volkswagen Golf GTI](#).

Running on either battery or generator power, the Karma is driven electrically by a pair of motor-generators between the rear tires; they deliver a little over 400 horsepower to the single-speed limited-slip rear differential. Torque is stated to be nearly 1,000 pound-feet — a rather stunning figure — all available as soon as the car starts moving.