From some of the material I was able to read, from the University of California San Diego, the idea of an 100 mpg car is impossible when you start looking at the math. There are many enemies when designing successful cars, the first of which is drag. This drag comes mainly from the air the vehicle has to push out of the way while driving. To summarize the article the energy expended by drag can be found using the formula. Edrag=½cDρADv².

CD = Drag Coefficient (This ranges from .25 for smaller aerodynamic cars to .6 for Trucks and Suvs)

p = Volume x Density (At sea level p = 1.3 kg/m3)

A = Cross-sectional area of the car

D =  Travel Distance

v2 = velocity squared

The second enemy to this concept is the inefficiency of gas powered engines. The paper goes more in depth based on limitations of Entropy but the main thing we need is that gas powered engines run at a very low efficiency around 15-25 percent. With that percentage we can use the power delivered per gallon of Gasoline, which is 132 MJ, and use it at the average efficiency of our engine. This gives us 26 MJ of power that is delivered to the Drive Train.

These 2 enemies are enough to lock an average car down to 31 mpg at freeway speeds far from 100 but that ignores the last enemy to our car. Rolling Resistance.

With a rolling friction coefficient around 0.01, a 1 ton car requires 100 newtons of force to push along independent from velocity. While in a vacuum this would limit our car to 160 mpg we must account for drag as well. Accounting for it drags our 31 mpg vehicle, about the mpg of a sedan, falls down to 26 mpg.

While the author manages to make a realistic car that gets 63 mpg, we are still unable to get above 100 mpg unless you go way beyond a cars limitations. The main problems with making a vehicle are the three enemies above I’ve stated above and will need to be solved for. While Drag and Rolling Friction are harder to change there is one area we can improve, the engine. If we can raise the efficiency of our engines to 50%, which are on par with train engines we could get very close to 100 mpg.

https://dothemath.ucsd.edu/2011/07/100-mpg-on-gasoline/