

We all know that our nation's dependence on foreign oil is a problem.  
And we know that increasing the fuel economy of the cars we drive is part of the solution.  
Do your part. Ask your auto dealer for the Freedom Option Package of technologies —  
to give you more fuel-efficient choices for whatever car, SUV or other light truck you want.

# Freedom OPTION PACKAGE

## Do your part.

Ask America's automakers to give you the Freedom Option Package for whatever car, SUV or other light truck you want.  
These gas-saving technologies are on-the-shelf, just not in most vehicles. Ask for them.



**Spend Less  
on Gas**

**Continuously Variable Automatic Transmission** helps boost fuel economy through better "gear ratios." Now offered in several vehicles including one SUV (see over), and could be in more.

**Cut  
Pollution**

**Variable-Valve-Control Engine** enhances engine performance by controlling the mix of fuel and air more precisely. Could make all cars, SUVs and other light trucks get better mileage, but most automakers offer it only to boost power in "muscle cars" (see over).

**Slash  
Foreign Oil**

**Integrated Starter-Generator** — also called "idle-off" — saves fuel because it stops engines from using up as much as 15 percent of their gas while idling in traffic (see over). Toyota now offers technology like this in a sedan sold only in Japan.

Ask for these and other gas-saving technologies (see over) that will boost fuel economy  
and put America on the road to 40 miles-per-gallon — and freedom.

[www.sierraclub.org/freedom](http://www.sierraclub.org/freedom)



Explore, enjoy and protect the planet.

# All automakers COULD make their vehicles go farther on a gallon of gas.

## Here's how.

Currently available technology could make vehicles of all sizes, shapes and models — from SUVs and other light trucks to sub-compacts and luxury sedans — get better gas mileage. If automakers put the technologies in the Freedom Option Package in every vehicle possible, America's new vehicle fleet would average around 40 miles-per-gallon, a reasonable goal that would help save millions of barrels of oil every day.

### Why should you ask for the Freedom Option Package?

You should be able to choose options that will make the vehicle you want more fuel-efficient. Denying customers the option to go farther on a gallon of gas, in whatever vehicle they want, is bad customer service and bad business on the part of automakers. The technology exists — right now — to make *all* vehicles get better mileage. Responsible automakers should give you this choice.

The components of the Freedom Option Package are cost-effective building blocks to boosting fuel economy. It's past time for automakers to do their part and incorporate these into overall fuel-efficient design. The faster this happens, the faster America will be on the road to an overall average of 40 miles-per-gallon — and on the road to freedom.

## Freedom OPTION PACKAGE

**Continuously Variable Automatic Transmission (CVT)** allows for an infinite number of "gear ratios" for maximum engine performance and efficiency. With a CVT, gears are replaced by a continuous belt. The Honda Civic HX has been available with a CVT since 1996. CVT is now offered on Saturn Vue, an SUV, as well as in the Audi A6 and A4. Here's how the Milwaukee Journal Sentinel describes Audi's CVT system: "The gear ratio changes, but with no hesitation or loss of power. It's amazing." For more information on continuously variable automatic transmissions check out these Web sites:

[www.jsonline.com/wheels/test/feb02/23135.asp](http://www.jsonline.com/wheels/test/feb02/23135.asp)  
[www.hondacars.com/news/press.html?y=2000&r=443](http://www.hondacars.com/news/press.html?y=2000&r=443)

**ADDITIONAL TRANSMISSION ADVANCES:** Automatic manual transmissions are available for heavier SUVs and pickups to provide better fuel economy than a 4-speed automatic transmission. An AMT takes advantage of the enhanced efficiency of a 5-speed manual transmission, but allows for automatic shifting that is fast and smooth.

**Variable-Valve-Control Engine** controls the mix of fuel and air in an engine more precisely. The engine should also have four valves per cylinder (instead of two), individual cylinder control, use significant amounts of aluminum (for a lighter weight engine) and have reduced friction. These are all characteristics of Honda's VTEC engine. Honda, Toyota, and BMW all use variable-valve-control engines in some models. For more information, see:

[www.edmunds.com/news/innovations/articles/43849/article.html](http://www.edmunds.com/news/innovations/articles/43849/article.html)

**ADDITIONAL ENGINE EFFICIENCIES:** Cylinder deactivation, also called displace-

ment-on-demand, further enhances fuel savings by automatically closing intake and exhaust valves and sealing off unneeded cylinders when less power is required. Cylinder deactivation technology will be most useful in boosting the fuel economy of larger SUVs and pickups. Further, the fuel economy of variable-valve-control engines can be enhanced by adding a compressor, or "super-charging" them. Gasoline direct-injection technology is also a potential enhancement to variable valve engines or as a separate engine technology.

**Integrated Starter-Generator (ISG)** replaces a conventional starter-motor and alternator with a 42-volt battery "idle-off" startup system so that the gas engine can shut down when the vehicle is stopped and idling. This boosts fuel economy because cars burn as much as 15 percent of their gas while stopped in traffic. The ISG motor restarts the engine when you put your foot on the gas. "It's a very cost efficient system," says a Volvo Cars spokesperson on the swedespeed Web site. For more information on integrated starter generators check out these sites:

[www.swedespeed.com/ubb/Forum1/HTML/000107.html](http://www.swedespeed.com/ubb/Forum1/HTML/000107.html)  
[www.delphi.com/news/pressReleases/pr6333-11142001](http://www.delphi.com/news/pressReleases/pr6333-11142001)  
[www.mazda.co.nz/tms/tms\\_model6\\_content8.html](http://www.mazda.co.nz/tms/tms_model6_content8.html)

### Fuel-Efficient Design

**AERODYNAMICS:** Design changes to improve aerodynamics lead to increased fuel economy by reducing drag; auto engineers refer to the "drag coefficient." Trucks will always have a higher drag coefficient because of their height, width and flat fronts. But even so, researchers believe better design could reduce light truck drag by about 10 percent, and car drag by about 10 to 25 percent.

**HIGH-STRENGTH, LIGHTWEIGHT MATERIALS:** Greater use of high-strength, lightweight steel, aluminum and plastics can all play a role in helping vehicles shed weight while enhancing safety. Aluminum is stronger than steel and weighs 40 percent less, making it an ideal way to safely reduce weight. GM, for example, has a new aluminum four-valve overhead cam engine that's available in the Chevrolet Cavalier LS Sport and the Chevrolet Alero.

**LOW ROLLING-RESISTANCE TIRES:** Better tire design reduces "rolling-resistance" and improves fuel economy.



**The Freedom Option Package is the way that America can achieve an average fuel economy of 40 miles-per-gallon. High-mileage hybrid technology, already in cars like the Toyota Prius and Honda Civic, can help boost overall fuel economy beyond 40 mpg. Making vehicles of all sizes, shapes and models fuel-efficient puts America on the road to freedom — freedom from foreign oil, freedom from high gas prices, freedom from air pollution.**

Special thanks to the Union of Concerned Scientists for their technical analysis, "Drilling in Detroit," which is available at [www.ucsusa.org/vehicles/drill\\_detroit-exec.html](http://www.ucsusa.org/vehicles/drill_detroit-exec.html)