

More on ICE: No, I don't mean Immigration and Customs Enforcement, but Internal Combustion Engines. They pretty much all run now on some refined petroleum product. But what about alternative fuels? There are a lot of alternatives out there, but each has challenges or else they would be in wide distribution already.

The most commonly know is E85, which is a blend of 85% ethanol with 15% gasoline. Cars in Brazil can run on 100% gasoline, 100% ethanol, or any mixture in between. Ethanol is most efficiently produced from sugar cane – something Brazil has a lot of. We don't have much. So, we tend to produce it from corn. Virtually all gasoline in the US now contains 10% ethanol. We may be able to go to 15% without damaging existing cars. We cannot produce enough ethanol domestically to go entirely to E85 or even E25, and we currently have a 30% tax on imported ethanol. I have cosponsored a bill to remove that tax, which was initially intended to protect US sugar producers, but is now interfering with energy policy. Plus, ethanol has downsides. In addition to the fact that it results in more emissions than gasoline, it is corrosive and cannot be used at too high a percentage in existing cars or existing distribution infrastructure. There is much more to say about this, but as this a laptop report and not a book, suffice it to say that ethanol is and will be a partial fuel for our transportation needs, but it is unlikely to become a major gasoline replacement.

Methanol is arguably a better alternative than ethanol. Methanol has been used as fuel in car racing since World War II. It is made from natural gas or coal. As has been mentioned, we have plenty of both, so there is potential here. But, since both resources are "fossil fuels", the global warming crowd doesn't like methanol because of the carbon emitted when the liquid is produced.

Biodiesel is another alternative fuel that is made from soybeans, and can also be made from algae. Although this fuel can replace oil-derived diesel, it is estimated that the entire US would have to be covered in soybeans to produce enough biodiesel to replace oil. Production from algae is promising, but not available yet. You can also make diesel fuel from natural gas, coal, or methane. This is another possibility in the future. Of course, heavy trucks in America run on diesel, but few cars do now.

You may have heard T. Boone Pickens and others selling compressed natural gas (CNG) as an alternative. It is an option out there, too. Cars can be converted to run on this fairly cheaply. The cost comes from the weight and construction of a tank capable of holding the gas at 3500 psi.

So, there are various alternatives out there with varying pros and cons. But, they all share one major con. That is the investment necessary to turn any one of them from a boutique fuel into a major source of energy. Nearly 10% of the cars on the road today will run just fine on E85. But, in the greater Los Angeles area, home to over 12 million people, there is only one gas station (in Santa Monica) where you can fuel with E85. So nobody does.

It is the proverbial chicken or the egg. But, clearly, this experience shows that the production, distribution, and infrastructure of the fuel will have to be in place or it does no good to have cars that run on something else. I would like to say that we should set up a national policy requiring the availability and distribution of some alternative fuel and let the CNG, ethanol, biofuel, and methanol people battle it out. But, I fear that the huge costs involved with distribution might condemn them all to failure. We have become accustomed to having fuel available on every corner. Perhaps, we need to pick one or two and move in that direction.

Gasoline: There is a reason that gasoline has survived as the primary transportation fuel for over 100 years. It holds a tremendous amount of energy very efficiently in a small package. It is cheap (less than bottled water) and abundant. Continuously, since the 1920s, forecasters have predicted that the world would run out of oil, but we always seem to find more and find better ways to extract it.

One alternative, which is not getting much talk, has to do with the fact that much of the energy in a gallon of gasoline is lost in your engine due to heat and friction. Over the last 100 years, gasoline engines have become hundreds of times more efficient in both converting that energy into horsepower and torque and losing less in waste, heat, and friction. Mercedes, amongst others, believes that we are only about half-way through the development of the internal combustion engine. They believe there are many new technologies with the potential to harness more and more of that gallon's energy with significantly less lost to heat, friction, and waste. There is direct fuel injection, direct injection turbo-charging, variable displacement, variable ignition, variable valve timing and lift, variable compression, and start-stop systems, to mention just a few. Now, I don't want this to degenerate into a complete motorhead piece, but suffice it to say that gasoline engines can become way more efficient in the future. And, the costs of these efficiencies are much less than just about anything else I have talked about in the last 3 days.

What does all this mean for mobile-source energy policy? For one, we should be putting more emphasis on alternatives to oil use in industrial, non-energy production. And, we should adopt some alternative fuel strategy, although exactly what that should be is not yet clear. But, we should be doing everything we can to encourage the extraction of every drop of domestically sourced oil that we can. Even if there were to be a battery breakthrough tomorrow or we figured

out a viable alternative fuel, it will take decades to replace or convert the existing fleet and produce and distribute enough of this fuel or batteries to serve everyone. And, under another scenario, gasoline cars could simply become more efficient, plug-in hybrids continue to run on gas but just less of it, and there is no alternative fuel. We continue to use gasoline, but just less of it. One way or the other, oil usage should go down in the US, but it will not go away. So, we will be using a lot of oil under absolutely any scenario for at least 20 more years, and maybe beyond. We should strive to make every drop of that oil be our oil.

I hope you have enjoyed this 3-part analysis of our energy challenges and opportunities. There is hope here. We can do this. We can have all the domestically-sourced, cheap electricity and heating we need with low or zero emissions and no sacrifices. We can wean ourselves off of foreign oil and still have cars and the freedom of personal transportation. The solutions are out there and within reach if we have the national will and political courage to grasp them.

I remain respectfully,

Congressman John Campbell
Member of Congress