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How many years until the cost of producing gasoline through synthesis rivals the cost of drilling and refining? And will battery technology be at a point then, where it can rival the gas engine?

3 days ago (2009-09-30 11:43:18) - 15 hours left to answer. (2009-10-04 11:43:18)

Additional Details

Actually, the price of gas is rising fast for a number of factors and it will continue to do so. Eventually, other fuel sources will surpass gasoline in price and availability, it's just a matter of when.

As for batteries, quick charge technology is growing in leaps and bounds, much like computer technology was in the 80s and 90s. batteries already exist that can charge in 10 seconds, they're just not commercially available yet.

The only question is when alternative sources will surpass gasoline and which it will be.

3 days ago

lithium batteries contain 1/40 the energy of gas by volume. But with the efficiency of gas compared to electric that fraction rises to 1/10. Now add the understanding that electric motors can be mounted inside the wheel off the car, that frees up space for 4 more gas tanks. So an electric drive system can have 1/2 the range of a gas system in a car that is otherwise the same, without compromising any space.

so we go from 1/40, to 1/2. once you get the whole story you see things aren't just black and white.

3 days ago

"

4 more gas tanks??? Say what? Where do you come up with that goofy math? and why are you adding gas tanks to an EV?"

The spade where the engine, transmission and radiator used to be. 4 gas tanks is about 60 gallons, which is about 8 cubic feet, plenty of space for that where the drive train used of be.

Sometimes it's best to think before you speak.

1 day ago

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Sometimes it's best to think before you speak, quiktruk.

1 day ago

 **Sir Bloodletter 4**

Answers (4)

since the fisher tropsh technology is 80 years old and it still can not compete, another 80 years will not improve it.

Define "rival" you want 300 miles between a "fill up" that only takes 10 minutes, then never. You want a cheap 30 mile commuter vehicle, then its available today.

 **Nata I**

3 days ago (2009-09-30 13:30:52)

It's a matter of whether or not investors believe that the price of oil won't drop below about \$85 a barrel. At that price point, synthetic fuels can compete but the investors would need a guarantee that they won't drop below that value so just reaching and surpassing that price isn't enough.

Basically it isn't enough for the price of gas to reach a high level but for people to believe that the price of gas will not drop below a certain level for at least a decade or two and for that price of gas to not actually drop below that value during that time period.

Recently, when prices were as high as \$140 a barrel. The oil companies started many heavy oil projects to reclaim oil from the Canadian tar sands. This involved the building of "upgraders" which were huge gasifiers to gasify the heavy bitumen into hydrogen and carbon monoxide gases which would then be synthesized into high valued hydrocarbons like diesel in Fischer Tropsch reactors. They hedged their bet by using the proven reserves of the tar sands as feedstock but even then, the projects all got put on hold when oil prices tumbled and many an advocate of the projects now have non-existent or questionable careers. The same thing happened with the '86 oil price collapse when oil dropped to \$12 a barrel.

Fact is, you're sticking your necks out big time if you're investing in synthetic fuels because the capital investment is so large, the payback period is so long and the potential for losing your shirt on a geo-political whim is very high.

Of course, once the infrastructure to produce synthetic fuels exists, the cost should go down so it's not really about when the alternative will surpass fossil fuels but when will it be cost effective to get over the cost of entry.

Now that we've had the recent oil price tumble, we'll have to wait two to three decades for a new crop of oil company executives that don't remember this price collapse in order to believe the risks are worth taking just like it took a couple of decades after the price collapse of '86.

The volumetric energy of lithium ion/polymer batteries is still 1/40th that of gasoline and both charging and discharging lithium ion/polymer batteries is very tricky. Also, most people don't realize it but lithium ion/polymer batteries permanently lose capacity with time regardless of whether they are used or not, they lose capacity the fastest when at zero charge full charge which is why they are always shipped at half charge. Also, they are stored in refrigerators to further reduce the permanent loss of capacity. Batteries have come a long way but are not anywhere near where they need to be. We've only been able to make impressive electric vehicles by compromising cargo space, compromising safety and compromising battery life.

Contributing In
3 days ago (2009-09-30 17:30:33)

Alternative Fuel Vehicles
Green Living

{ Now add the understanding that electric motors can be mounted inside the wheel off the car, that frees up space for 4 more gas tanks. So an electric drive system can have 1/2 the range of a gas system in a car that is otherwise the same, without compromising any space.
}

4 more gas tanks??? Say what? Where do you come up with that goofy math? and why are you adding gas tanks to an EV?

2 days ago (2009-10-01 12:16:09)



qwiktruk

It is not a question of years but of costs, a will to invest and the wisdom of doing so.



?

John W is very much a proponent of this technology. I would differ somewhat to his interest and concentration but I have several issues that remain unresolved.

Badge Image:

First the **TOP CONTRIBUTOR** Richard Muller's book "Physics for Future Presidents" (2008) it is said that the price of oil only has to be \$50 per barrel for the process to be cost competitive with oil when converting coal and water to oil. I wonder at the significance of this number and the \$85 cited by John W: A richer source of hydrocarbons? Muller also

agrees that the cost of oil must remain stable and high for investments to be made in production facilities.

The other side: Of the two factors we have seen the price of oil become high, but oil is bought and sold in a marketplace. It is subject not only to supply and demand but speculation and competition. The price is therefore inherently unstable. Embargoes have led to factories in South Africa, more recently, and Germany, during the war. Competition was eliminated and need gave rise to the will to build such factories. Once built they may continue to be used.

John W frequently mentions this process as a way to clean the air of carbon which promises to clean the air of the greenhouse gas CO₂. But Carbon Dioxide is only about .0384% of the atmosphere and most of that is Oxygen. Coal is from 60 to 90% carbon. Given the choice, what factory owner is going to willingly choose a more expensive raw material for their factory? Processing coal into oil and then refining it into gasoline will increase overall energy costs as well as put more carbon into the atmosphere, but we may never run out of oil.

I wonder who will build such plants. Coal companies? This is unlikely as they are primarily a mining industry. Oil companies however not only "produce" their product but also refine it. Muller further mentions that investors are waiting for government subsidies and guarantees before they build such plants. Government subsidies, grants and tax credits is what the oil lobby is all about. They seem ideally situated to maintain limited control of this energy source, but it would be a domestic source.

In your question, you mention competition from a different source other than cost. Biodiesel, especially from algae, may be serious competition, but I will currently leave that discussion out of this overly long answer.

The electric motor is an entirely different technology than the gasoline or diesel engine. It is also an old technology. We have had electric vehicles with electric trains, busses and trams for decades. The first battery electric cars predated gasoline powered vehicles.

You have some quick and dirty percentages in your question. Some, I might take issue with, but it is true that some EVs like the EV1 and the Rav4ev as well as many conversions have a battery capacity equal in energy to about 1 gallon of gasoline. With this they might go about 1/3 the distance of a similar sized gasoline powered vehicle using a full tank of gasoline. The battery capacity of the Tesla Roadster is equal to about 2 gallons of gasoline. Performance is fantastic, but it is not quite so efficient.

What makes this work is the 85 to 90% efficiency of the EV at the wheels compared to the 15% efficiency or less of a gasoline vehicle. So 85% of your vehicle cost and pollution is just waste and that is about as good as it can get. Battery technology is advancing with great potential strides. Even the ovonic battery in 1992 could take an EV from Boston to NY and ultracapacitor-batteries have yet to see the market. Electrifying roadways and genset trailers could dramatically extend range for the EV with today's technology.

In the US coal plants produce about 46% of our electricity and that percentage is going down as renewable production facilities come on line. A typical coal plant is now around 30% efficient but may eventually go as high as 60%. Even with a transmission line cost of about 5 to 10% electricity from coal plants means less operating cost, less carbon in the air and more efficiency than any possible gasoline powered vehicle.

Renewable electrical production in the US is now about 7% and rising quickly. As the percentage of renewable electrical production increases our entire fleet of electrical vehicles become cleaner with no mechanical changes to the vehicles. Someone who charges their electric vehicle from a rooftop PV array has no operating carbon or energy costs. The US electrical grid current capacity could handle about 80% of current vehicle fleet if they were electric and charged during off peak periods, at night.

This is all very stiff potential competition from this other technology. Against this is the argument that gasoline engines are what we have been doing and it would be cheaper in construction costs to keep the same inefficiently operating vehicles. In the past, the US has not been shy about innovation, no matter the cost. But when it comes to oil, so far it seems the rest of the world is more innovative than we are. This again could be another long discussion.

One place the fischer-tropsch process might make a great deal of sense would be at coal fired power plants as a method of carbon sequestering. Instead of producing a toxic waste the scrubbing process could then provide a usable by-product of electrical power generation, but then it would be in the hands of electric companies instead of oil companies.

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Source(s):

References furnished upon request.

(This is already very long, but thanks for reading if you have gotten this far.)

1 day ago (2009-10-02 18:01:29)
