

Twitter Thread by AukeHoekstra



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Miracle cure eFuels comes to the rescue of the German car industry! That is what I understand from the recent reactions in German politics. E.g. from [@_FriedrichMerz](#) (@CDU) as discussed by [@Stefan_Hajek](#) in [@wiwo](#).

Unfortunately, reality is

You see, it IS eminently possible to power the trusted combustion engine with fuels that are produced using low carbon electricity. That's not the problem.

The problem is that you need A LOT MORE ENERGY while propping up an engine whose only advantage is that it can burn stuff.

Let's look at that engine first. Don't get me wrong: Germany should be proud at the heights to which it has taken this extremely complex marvel of engineering. The electric motor is simple by comparison. But also better on all fronts.

| Combustion | Electric motor | Electric = |
|-------------------|----------------|-------------------|
| 1,6 kW/kg | 4,3 kW/kg | 3x more powerful |
| 0,4kW/lr | 13,6 kW/lr | 40x more compact |
| 17% efficient | 92% efficient | 4x more efficient |
| Many moving parts | 1 moving part | more reliable |



**Two ways to produce
300kW at the same scale**



Actually, the higher the overcapacity of the combustion engine in normal use (e.g. for a car that can accelerate quickly) the bigger the disadvantage of the combustion vehicle. Here the relatively slow and small Porsche already uses six times as much energy.

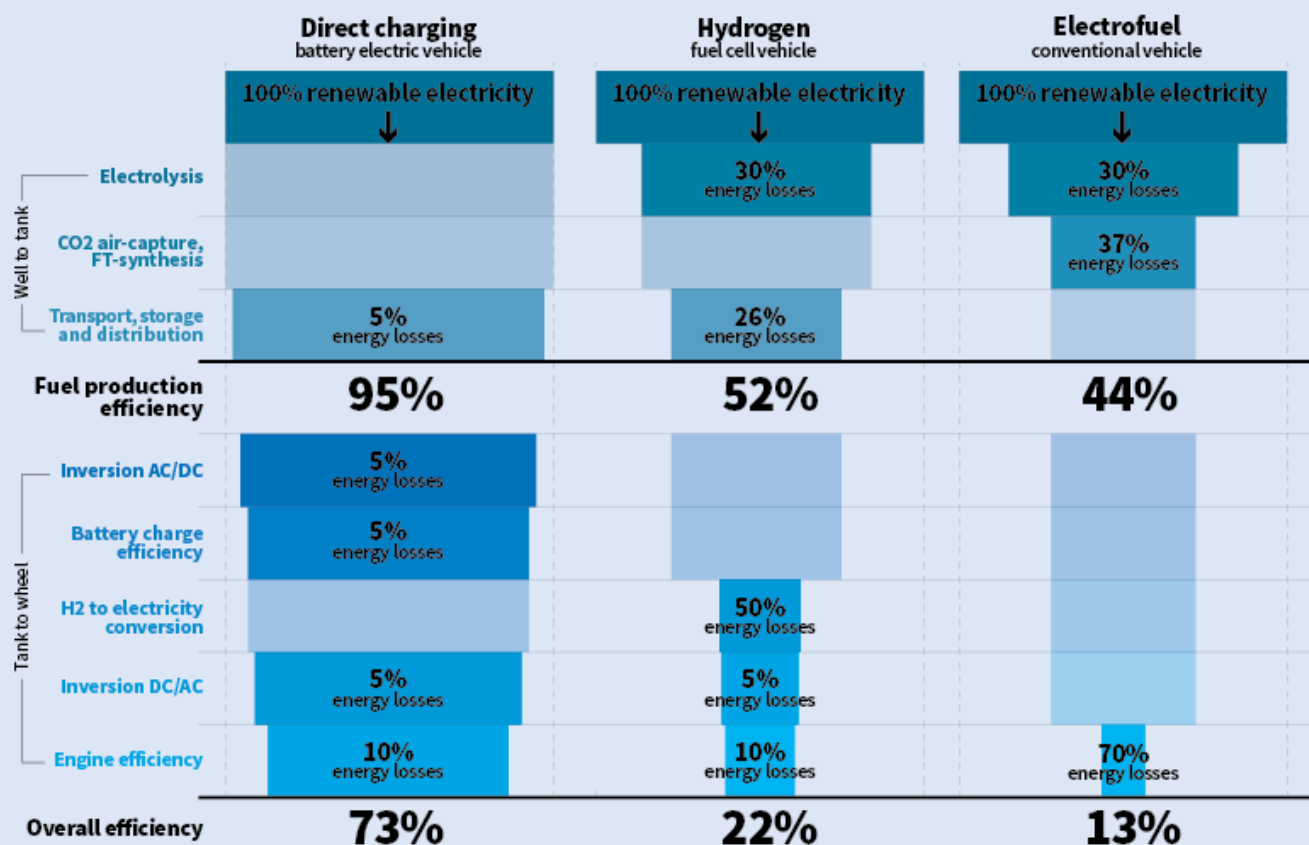
| | <u>Porsche 911 GT2 RS</u> | Tesla Model S Plaid |
|-------------------------|---------------------------|-----------------------|
| Intended use | 2 person race car | 5 person family car |
| Motor power | 515 kW | >820 kW |
| Acceleration 0-100 km/h | 2.8 seconds (1g) | <2.1 seconds (>1.35g) |
| Laguna Seca lap time | 1:28.3 | 1:30.3 |
| Top speed | 342 km/h | >322 km/h |
| Range | 460 km | 840 km |
| Energy use | 1.4 kWh/km (13.9l/100km) | 0.23 kWh/km (6x less) |
| Price | \$285.000 | \$140.000 |



Then there's the losses when producing fuel from electricity. When you add that up you end up with around 87% energy losses versus 73% losses for the electric vehicle. So eFuels need over five times ($73/13=5.6$) more energy.

<https://t.co/8iGbwQilOY>

Energy efficiency of different technologies in a passenger car



I think eFuels might be perfect for hard to electrify mobility like aviation. But building five times more windmills in order to protect an engine that is simply less efficient seems like a bad idea to me.