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



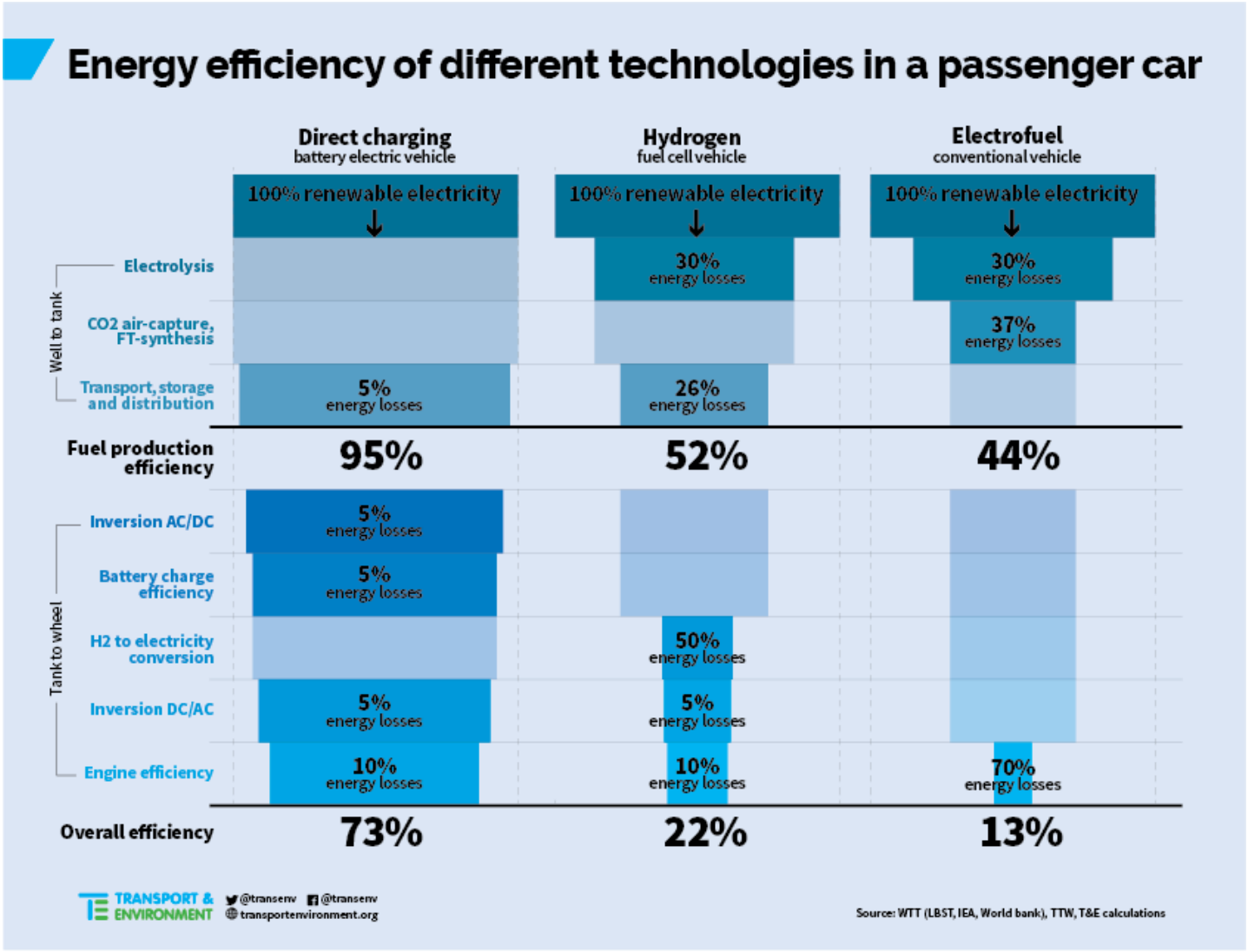
Actually, the higher the overcapacity of the combustion engine in normal use (e.g. for a car that can accelerate quickly) the the bigger the disadvantage of the combustion vehicle. Here the relatively slow and small Porsche already uses six time as much energy.

	Porsche 911 GT2 RS	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/8iGbwQiIOY



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.