



Magic green fuels

Why synthetic fuels in cars will not solve Europe's pollution problems

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Claims of the e-petrol/e-diesel lobby:

E-fuel Alliance: ‘e-fuels emit significantly less nitrogen oxide and particulate matter than conventional fuels’

VDMA (Germany): ‘the combustion of e-fuels is very clean and can be brought down to a level close to zero with exhaust gas aftertreatment technology available’

But are these claims really true?



Testing of pollution from e-fuels

Mercedes A 180 petrol 6d-temp



17,000km at start of testing

All test work conducted by [IFP Energies Nouvelles based in France](#)

Baseline emissions:
E10 official fuel

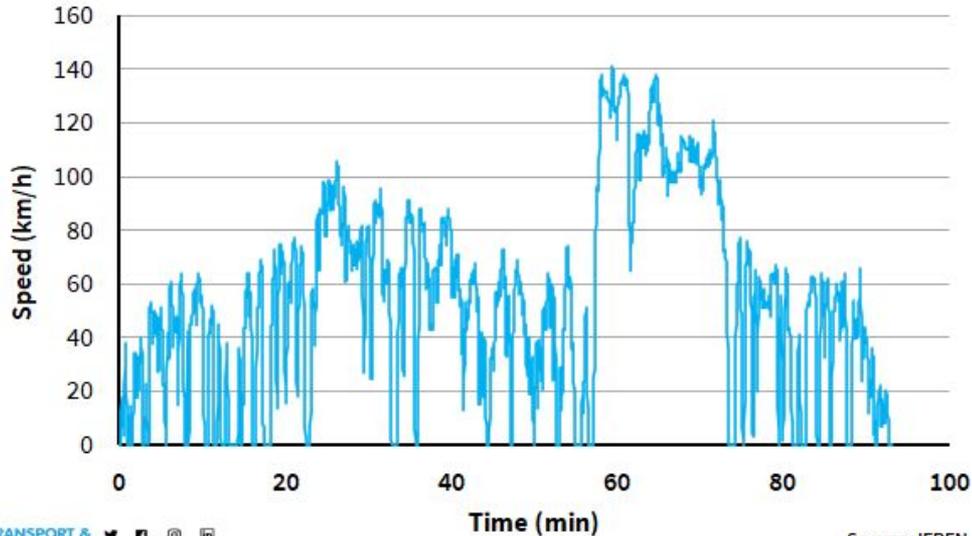
3 different e-fuels tested:

1. 100% e-fuel: 100% paraffinic
2. 100% e-fuel: 90% paraffinic, 10% aromatic
3. 90% e-fuel 1 + 10% ethanol

E-fuels match E228 EU petrol fuel specification as closely as possible to guarantee existing fleet compatibility

The tests

RDE test cycle



Source: IFPEN

All tests conducted in the lab

Each fuel was tested:

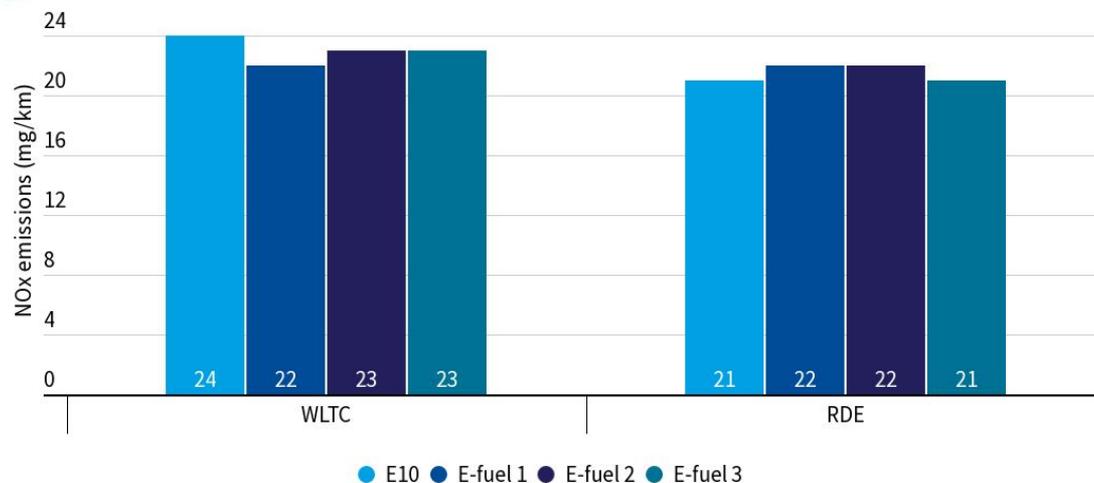
- 2x on the official WLTC cycle
- 2x on an RDE lab cycle

All results shown are the average of each test



E-petrol had no impact on NOx emissions

The toxic pollution at the heart of the dieselpgate scandal



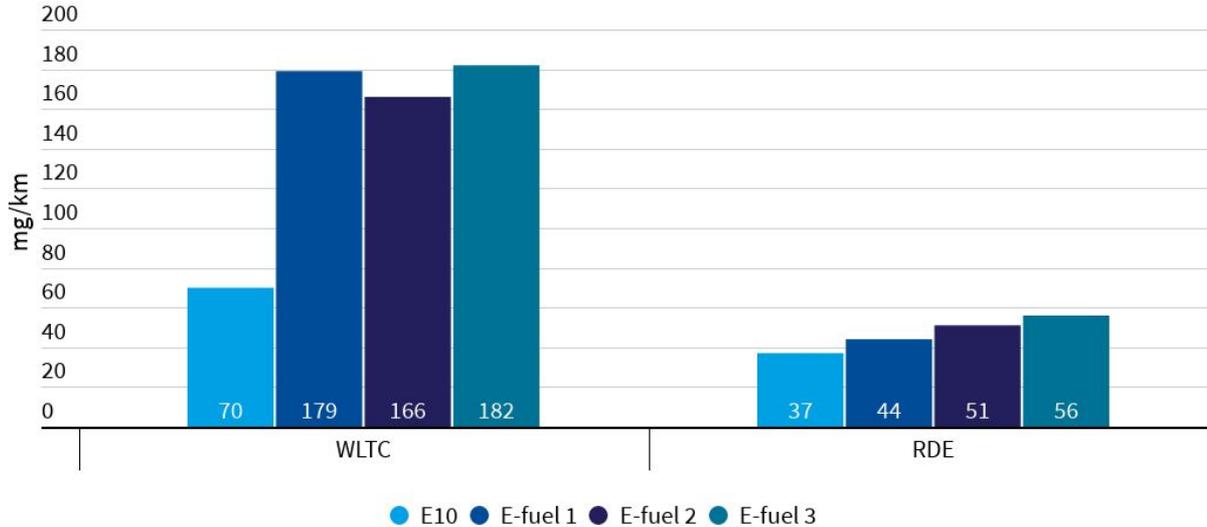
- NOx emissions **stayed the same with all e-fuels** (difference of 1 mg/km within test to test variability)

Suggests no impact on NOx emissions with use of e-petrol

Source: IPFEN (2021).



E-petrol increased carbon monoxide emissions



- Increased for all e-petrols

WLTC **2.4-2.6 times**

RDE **1.2-1.5 times**

- Largest increase when engine first switched on

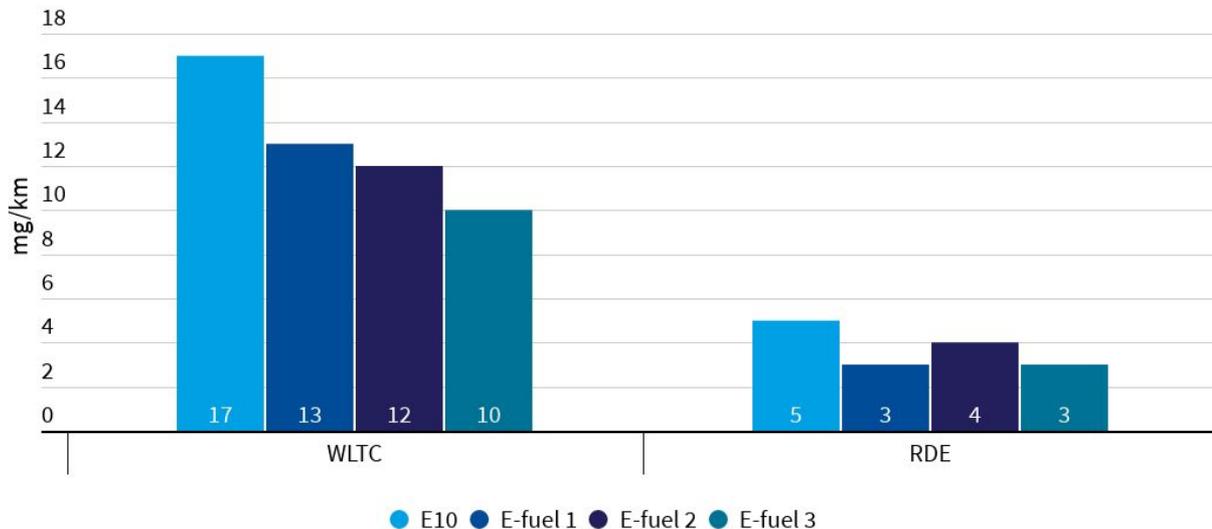
Use of e-petrol in cars may increase carbon monoxide emissions

Source: IPFEN (2021).

Increase appear to be due to the exhaust emission control system- could probably be solved for new cars tailored for e-petrol but could be a problem for the existing fleet



E-petrol somewhat reduced hydrocarbon emissions



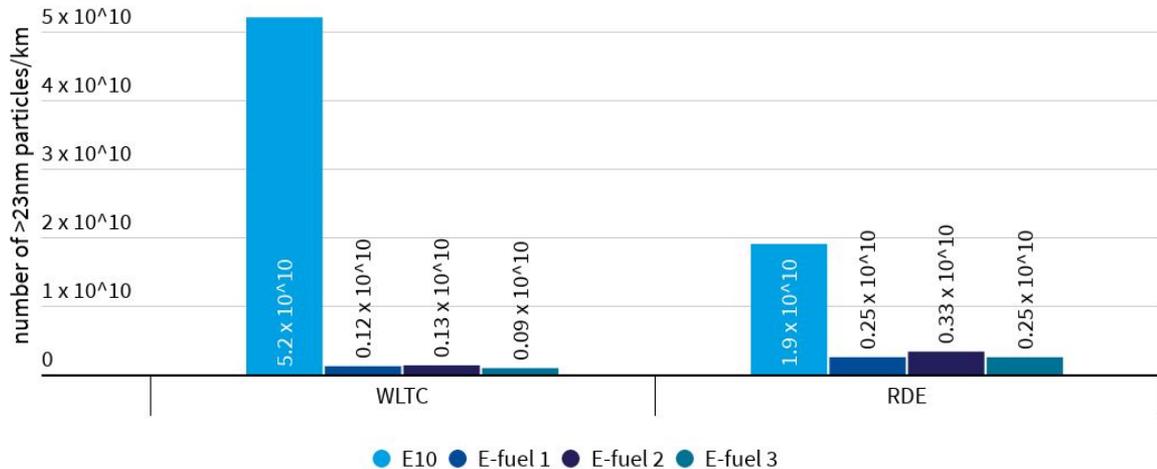
Source: IPFEN (2021).

- Emissions decreased during WLTC test **-23 to -40%**
- Due to low emissions on RDE no impact observed
- Formaldehyde and aldehyde emissions decreased during cold start period but levels generally very low on rest of test

Data suggests there may be some decrease in hydrocarbon emissions with e-petrol use

Regulated particle number (PN) emissions reduced

All solid particles larger than 23nm



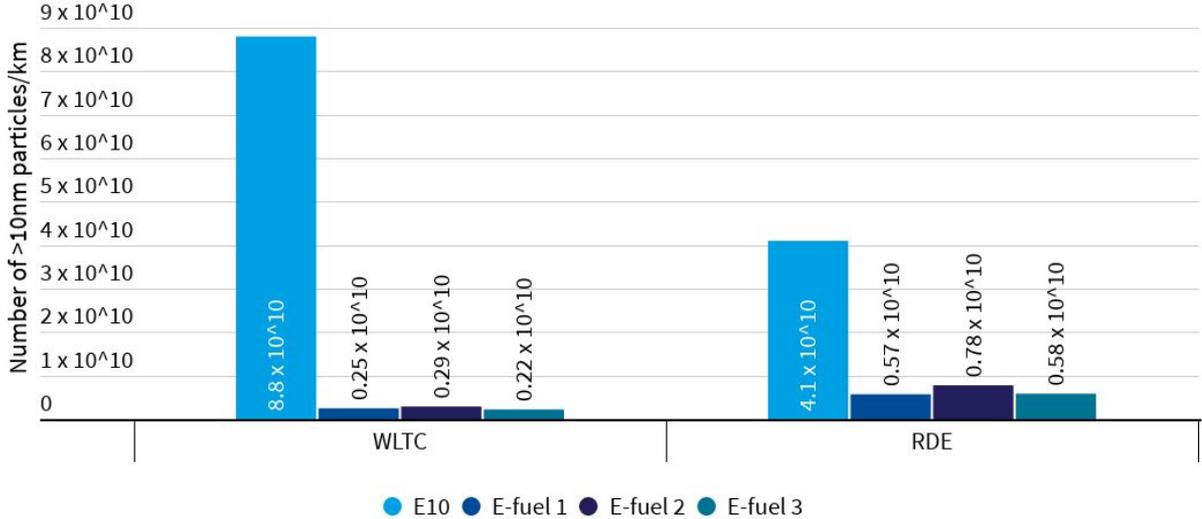
Source: IPFEN (2021).

- Large reduction in PN emission **with e-petrol**
- WLTC **-97 to -98%**
- RDE **-82 to -87%**
- Likely due to low aromatic content of the e-petrol tested

Suggests there could be a substantial reduction in particle number emissions with e-petrol

Unregulated particle number (PN) emissions

All solid particles larger than 10nm

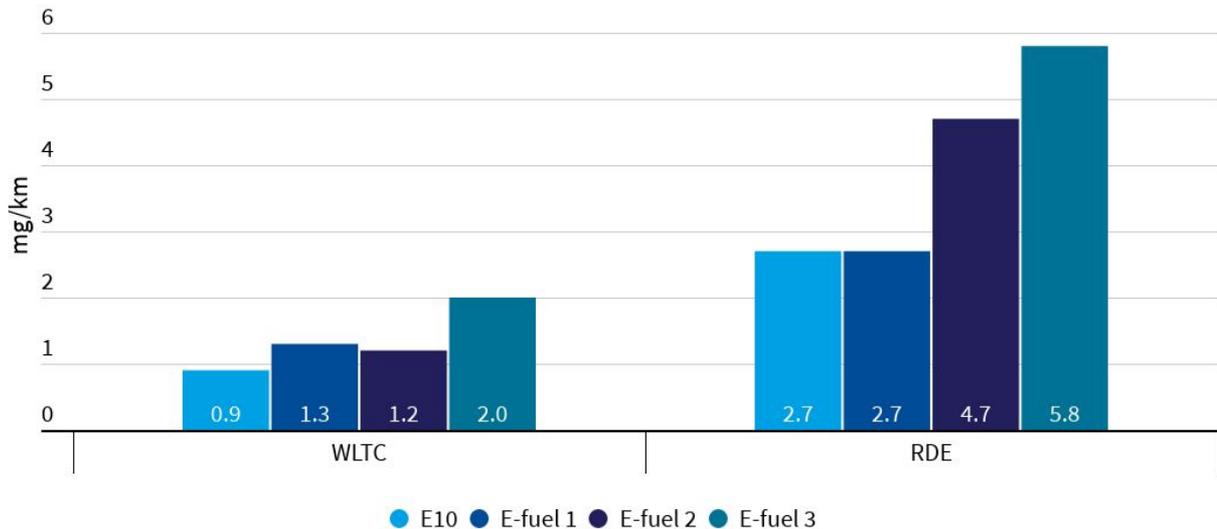


- Similar reduction as for regulated particles
- WLTC -97
- RDE -81 to -86%
- When 10-23 nm particles were included in measurement number of particles ~doubled

Source: IPFEN (2021).

Despite reductions at least 2.2 billion particles emitted for every kilometer driven so particles are not eliminated

E-petrol increased ammonia emissions



- Emissions generally low on WLTC
- RDE emissions for e-fuel 2+3 increased by **1.7-2.2 times** on the RDE

Suggests there could be an increase in ammonia emissions with e-petrol use bad for PM2.5 pollution



E-petrol and e-diesel are not climate neutral

While synthetic petrol or diesel is generally considered GHG neutral when additional renewable electricity is used for production...

T&E's testing of e-petrol and CONCAWE's testing of e-diesel has shown that burning these fuels in an ICE **produces the more potent greenhouse gases methane and nitrous oxide.**

An average petrol car would emit the equivalent of 7-9 kg of CO₂ and a diesel car 24 kg of CO₂ a year running on e-fuels

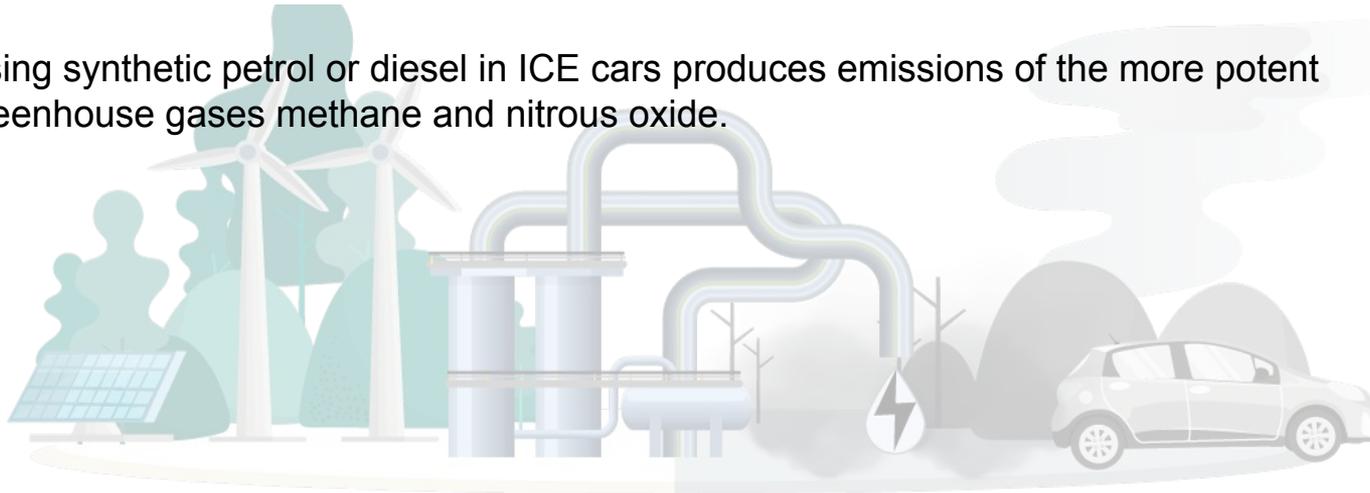
While emissions from individual vehicles are small if all new diesel and petrol cars sold in 2020 ran on e-fuels the emissions of those greenhouse gases would be equal to putting an additional **50,000 ICE cars on the road.**

Therefore synthetic fuels in road transport are not climate neutral

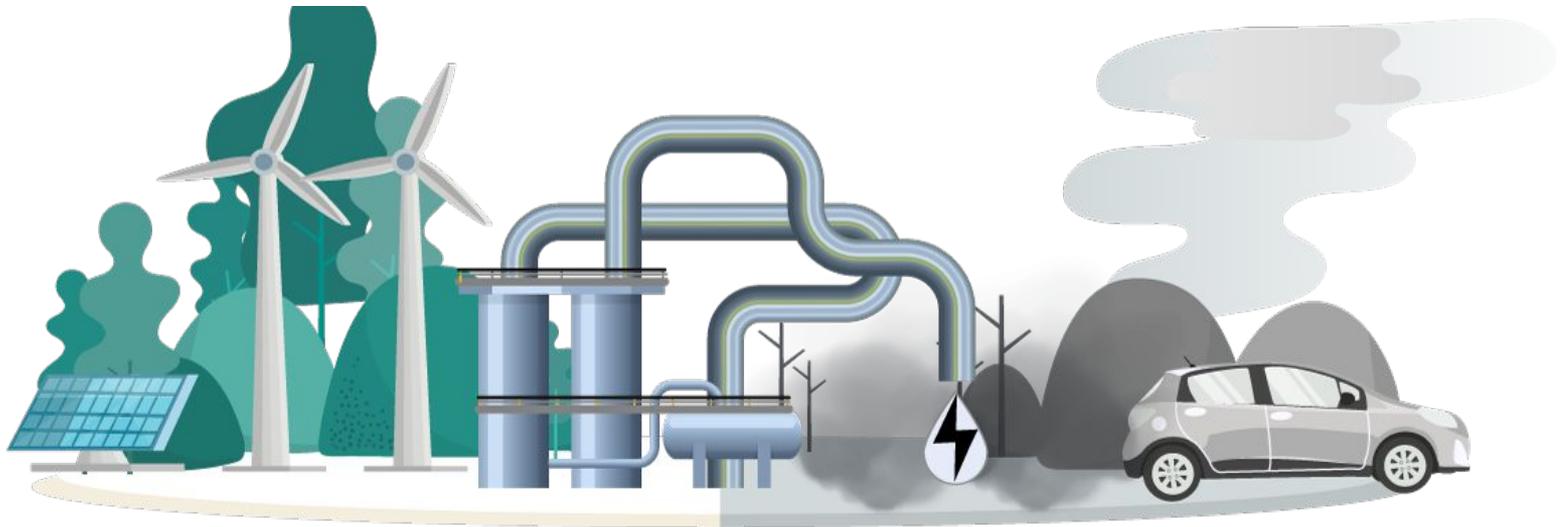


Summary of results

- The **e-petrol tested had no impact on NO_x** and **increased carbon monoxide and ammonia** emissions. There was a substantial decrease in particle number and some decrease in hydrocarbon pollution.
- Overall due to an increase in some pollutants and decrease in others the e-petrol makes no real difference to air quality compared to fossil petrol.
- Using synthetic petrol or diesel in ICE cars produces emissions of the more potent greenhouse gases methane and nitrous oxide.



Green myth busted.



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No clean burning: E-petrol will do little to reduce toxic pollution (beyond particles)

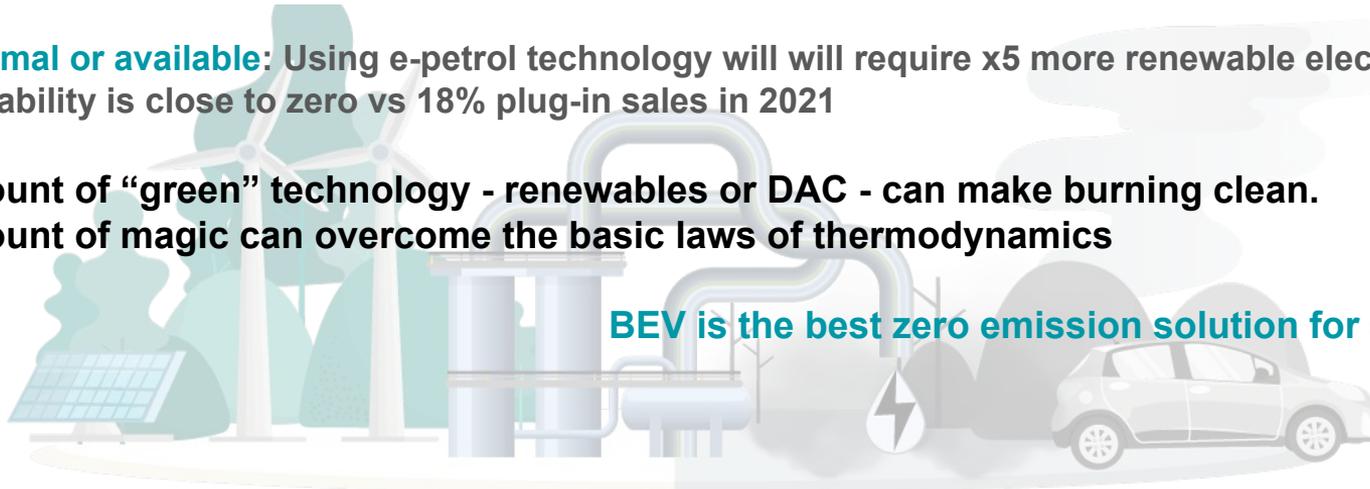
Not fully climate neutral: claims rely on 100% green H₂ & Direct Air Capture (DAC). Additional GHG (methane & N₂O) emissions ignored

Not a solution for existing fleet: E-petrol in 2nd hand cars will be EUR 10,000 more expensive than a 2nd hand battery electric car in 2030 (even new BEV will be cheaper).

Not optimal or available: Using e-petrol technology will require x5 more renewable electricity; its availability is close to zero vs 18% plug-in sales in 2021

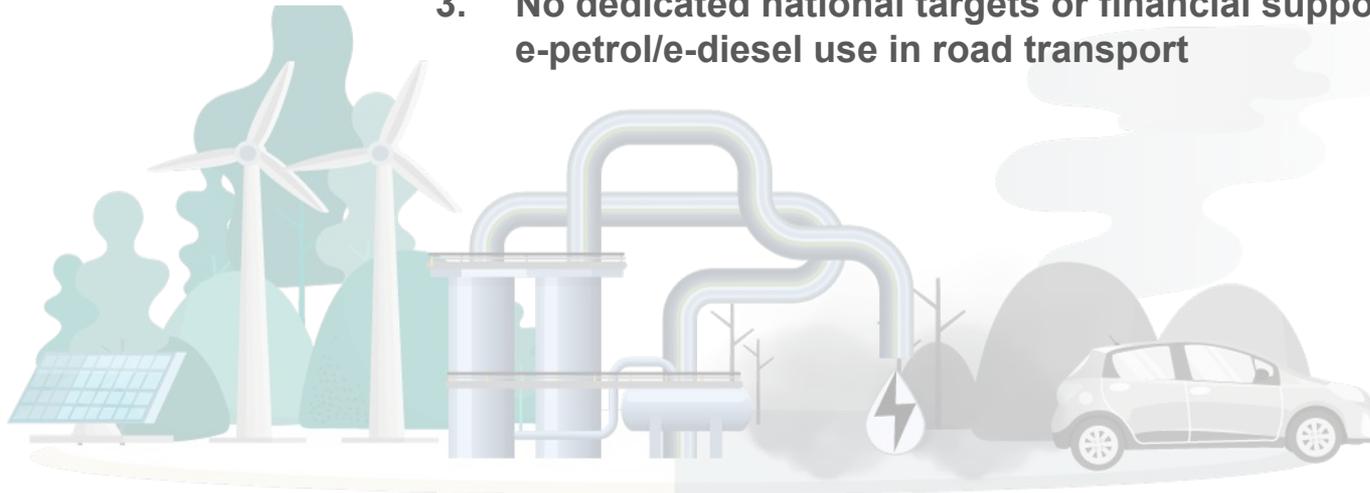
**No amount of “green” technology - renewables or DAC - can make burning clean.
No amount of magic can overcome the basic laws of thermodynamics**

BEV is the best zero emission solution for cars.



Recommendations

1. **No credits for e-fuels in car, van or truck CO2 standards**
2. **Strict Euro 7 standard should apply to all tech, including synthetic fuels**
3. **No dedicated national targets or financial support for e-petrol/e-diesel use in road transport**



**Thank you for listening! Now it's
time for the Q+A**

