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The Heavy Duty Vehicle CO_2 Emissions Standards

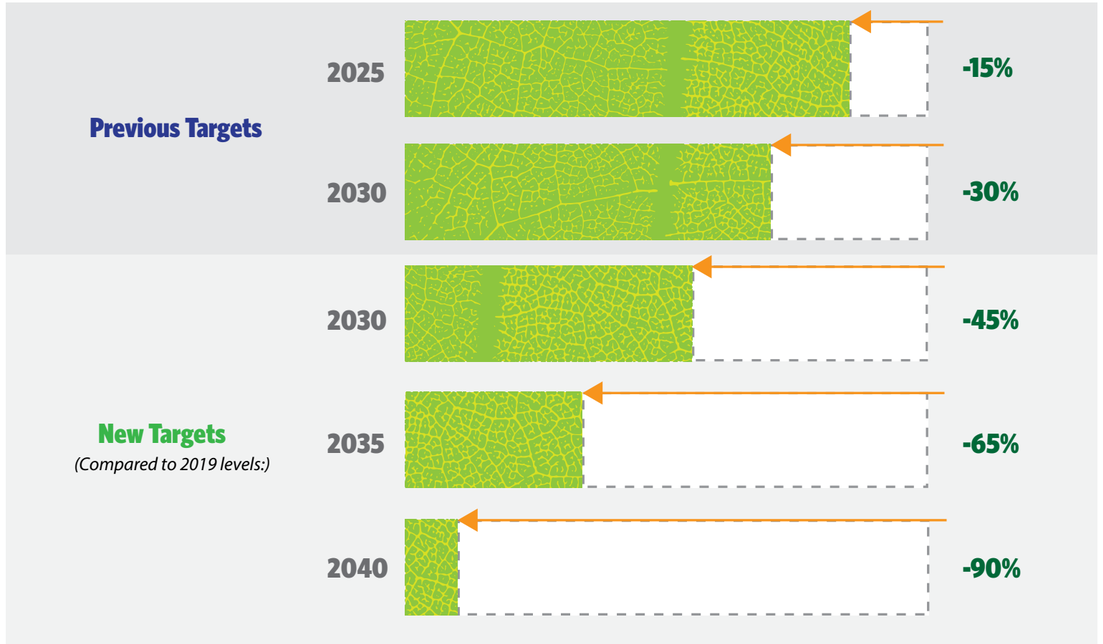
Why biofuels will continue to harm European health

The Heavy Duty Vehicle CO_2 Emissions Standards

Why biofuels will continue to harm European health

As part of the wide-sweeping EU Green Deal, heavy duty vehicle emissions will undergo review and be brought in line with net zero emissions targets for 2050. Heavy vehicles, such as buses and trucks, make up 2% of road vehicles in the EU, but contribute 28% of carbon emissions from road transport (Transport and Environment, 2023). Heavy vehicles exert a disproportionate effect on transport emissions in Europe (and by extension, also public health and environmental health), making the sector in need of revision.

The current proposal brings a higher level of ambition, from a 30% reduction in carbon dioxide (CO_2) emissions by 2030, to a 45% reduction, followed by a 65% reduction by 2035 and a 90% reduction by 2040. While there are strengths and weaknesses of the revision as it stands, a key red flag flaps; the inclusion of biofuels as part of a solution.



European Commission (2023)

An overly cautious change by the EU saw the inclusion of provision for biofuels, and a nomenclature addition around hydrogen-diesel dual engines being able to be classed as "zero pollution" (Transport and Environment, 2023). This comes on a background of a number of other loopholes and exemptions that see 20% of heavy vehicles (such as those that would contribute to urban air pollution and emissions) exempt from the regulations, and changes to fines for non-compliance (Transport and Environment, 2023).

The inclusion of biofuels isn't a solution to the current climate crisis and poses a significant health threat to Europe. It stands to compromise the health goals and wins that could have been seen through a policy that focuses purely on sustainability and renewable heavy vehicle energy. It misses an opportunity to clean the heavy vehicle road fleet and work towards the EU Zero Pollution targets of 2050, and misses the opportunity for Europe to lead in not only sustainable heavy transport, but in public health benefits.

Not a healthy solution

There are multiple concerning health factors in this change in policy to include these fuels under the guise of sustainability, including the ongoing burden of air pollution from biofuels, the increased emissions from continuing to use combustion, and the compromise of the vision of a wide-ranging system change to a fully sustainable heavy vehicle fleet.

Biofuels, despite their green-sounding name, are not health or climate-friendly. They are a biomass-based fuel source that will continue to see the usual range of dangerous air pollutants emitted from heavy vehicles that move around Europe. Research by the International Council on Clean Transportation (ICCT) saw that while changes were observed across a number of important air pollutants from combustion engines when biofuels were used, significant pollutants, such as nitrous oxides (NO_x), showed higher levels of emission than current fuels (O'Malley & Searle, 2021). This is when compared to current fuel mixes, but when comparing to electric vehicles, which don't use combustion, the emissions are starkly higher across the board. Electric vehicles eliminate all pollutants related to internal combustion engines, contribute less to primary and secondary particle pollution, including particulate matter of under 10µm and 2.5µm, respectively PM_{10} and $PM_{2.5}$, and can also reduce other non-fuel emissions such as those from brake pads and tyres (EPHA, 2021). Ongoing use of internal combustion, whether standard or biofuel, will lead to ongoing, preventable harm by combusting fuel, instead of pushing for transport system overhaul that would see stringent use of cleaner, less polluting heavy vehicle alternatives.

Spotlight on Health: The impact of NO_2

Biofuels produce higher levels of nitrogen oxides (NO_x). Nitrogen oxides, particularly nitrogen dioxide (NO_2) are potent, toxic air pollutants that are one of the major combustion-related emissions that effects human health, and one of the most significant air pollutants in Europe. NO_2 pollution is associated with type 2 diabetes, stroke, heart attack, abnormal heart rhythms, pneumonia, asthma (including new-onset asthma in children), susceptibility to other respiratory infections, and chronic lung disease. The largest contributor to NO_x pollution in the EU is from road transport, accounting for up to 47% of NO_x air pollution in urban areas (EEA, 2022). **The health toll of NO_2 pollution is staggering; up to 430,000 deaths per year in Europe** (CREA, 2023). **Meeting the WHO Air Quality Guidelines from 2021 could reduce this number by 60% per year** (CREA, 2023); **currently 89% of Europe's urban population is exposed to levels of NO_2 pollution above this guideline** (EEA, 2022).

The impact of NO_2

SPOTLIGHT ON HEALTH:

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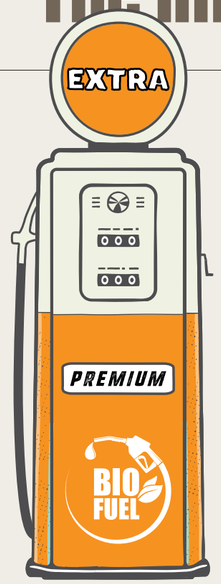
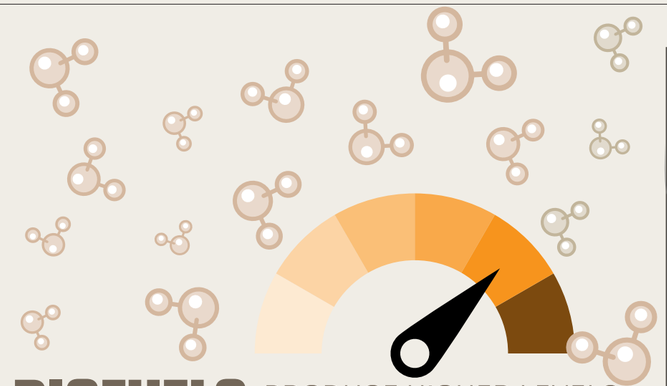
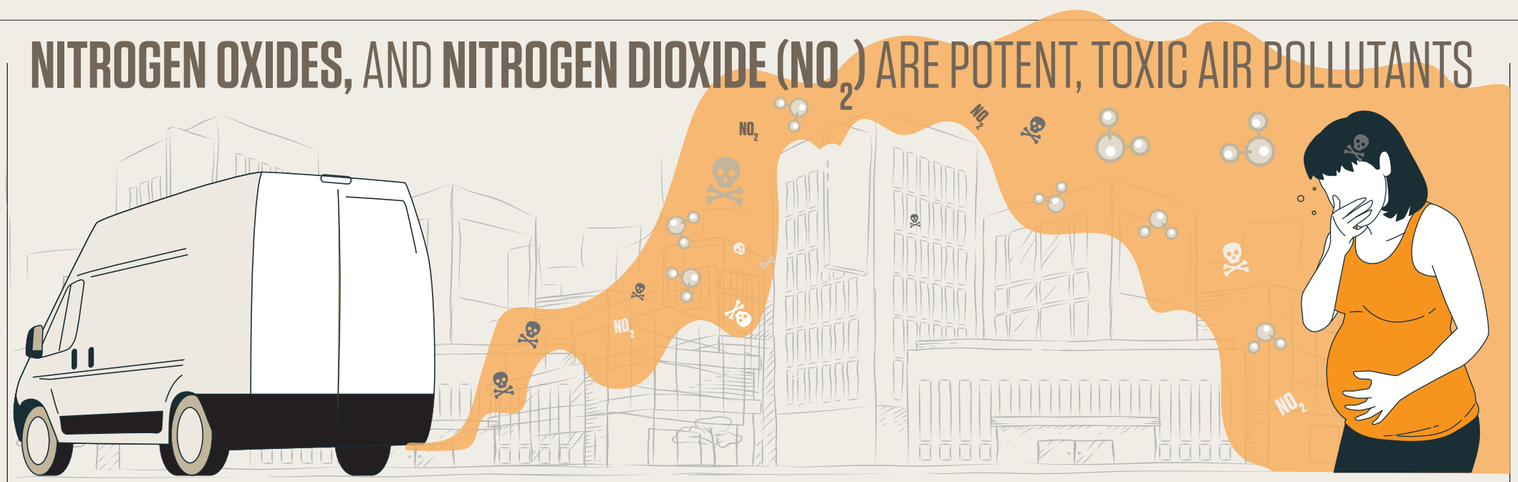




BIOFUELS PRODUCE HIGHER LEVELS OF NITROGEN OXIDES (NO_x)

than convention fuels and electric vehicles
(O'Malley & Searle, 2021)

NITROGEN OXIDES, AND NITROGEN DIOXIDE (NO_2) ARE POTENT, TOXIC AIR POLLUTANTS



one of the major combustion-related emissions that affects human health and one of the most significant air pollutants in Europe

NO_2 pollution is associated with:

→ TYPE 2 DIABETES

→ STROKE

→ ABNORMAL HEART RHYTHMS

→ HEART ATTACK

→ PNEUMONIA

→ ASTHMA

→ RESPIRATORY INFECTIONS, AND CHRONIC LUNG DISEASE.

The largest contributor to NO_x pollution in the EU is from **road transport**

47%

of NO_x air pollution in urban areas

(EEA, 2022).

THE HEALTH TOLL OF NO_2 POLLUTION IS STAGGERING

UP TO **430,000** DEATHS

PER YEAR IN EUROPE

(CREA, 2023).

CURRENTLY **89%** OF EUROPE'S URBAN POPULATION IS **EXPOSED TO LEVELS OF NO_2** POLLUTION ABOVE THE WHO GUIDELINES

(EEA, 2022).

MEETING THE **WHO AIR QUALITY** GUIDELINES FROM 2021 could reduce this number by

60% per year

World Health Organization

(CREA, 2023);

With non-fuel vehicles, emissions for powering the vehicle occur at the source of energy production. Therefore, if the source of energy used to charge a vehicle is from a clean, renewable source, the energy for propulsion of the vehicle will not need to come from an onboard combustion engine and will also be sustainable. This significantly impacts the emissions of the vehicle, as the combustion of fuels is the major source of emissions and pollutants that a vehicles produces, both in terms of carbon emissions and other air pollutants (or as they are alternatively known, Short Lived Climate Forces [SLCF]). It should be noted that while electric vehicles significantly impact the emissions mix, they do not take emissions and pollutants to zero; tyres and brakes remain a very important source of pollution that has a health effect. The life-cycle of the vehicle, including its production and disposal, also have an environmental cost.

Noise emissions also won't be solved with biofuels and also have a significant health effect. Noise pollution related to transport has a large impact on health in Europe, and the majority of noise pollution is from road transport (EEA, 2021). The European Environmental Agency (EEA) estimates from 2017 shows that at least 95 million people in the EU are affected by road traffic noise levels above the guideline of 55 dB during the day, and at least 65 million by levels above the night time recommendation of 50 dB or more overnight (EEA, 2021). This level of noise has a significant health impact, with 70 million people in selected European countries being exposed to a level of road traffic-related noise pollution in urban areas that is deemed harmful to health (EEA, 2021). These health impacts are not trivial; they include life-threatening conditions such as high blood pressure, ischaemic heart disease, mental ill-health and changes in cognition in both children and adults.

While electric cars don't solve this problem, the differences in combustion engine vehicles and non-combustion engines could be significant in urban areas, with noise differences being due to differences in energy source at low speeds. Internal combustion engine vehicles are louder at the low speeds relevant to urban areas than electric vehicles, and thus contribute more to the health harming noise pollution of urban European environments (EEA, 2016). At higher speeds other factors like road surface noise and wind become more significant. Giving a lifeline to combustion engines will mean that a preventable health harm is enabled to continue without important reforms that could impact the state of noise across Europe. Noise pollution will go onto exert a health cost in urban areas that is significant.

Spotlight on health: Road transport-related noise pollution

> **Biofuels require a combustion engine, which produces noise, with combustion engine vehicles being louder than electric-powered vehicles at low speeds** (EEA, 2016). **Noise can have a significant health impact and is the second most significant environmental health risk that Europeans face** (European Commission, 2021). **The health effects include short and long-term effects, and direct and indirect effects. Direct effects include damage from noise energy, such as tinnitus and hearing loss. Indirect effects are mediated by chronic noise stress and inflammation, and include sleep disturbance and annoyance, as well as serious medical conditions such as hypertension (high blood pressure), ischaemic heart disease, cognitive impairment in children and cognitive decline in adults, and mental ill-health** (European Commission, 2021; WHO, 2018). **Emerging evidence suggests effects outside of cardiovascular health, including respiratory diseases, cancer, neurodegenerative diseases, and psychiatric disorders (**Cole-Hunter et al., 2022). **There are serious social effects, such as impairment of social interaction, including on a community level** (European Commission, 2021). **The health burden has been estimated at at least 1 million healthy years lost in Europe each year due to noise pollution, the bulk of which is traffic noise (WHO, 2018), and there is an association between exposure to traffic noise and all-cause mortality (independent of air pollution)** (Cole-Hunter et al., 2022).

SPOTLIGHT ON HEALTH:

Road transport-related noise pollution

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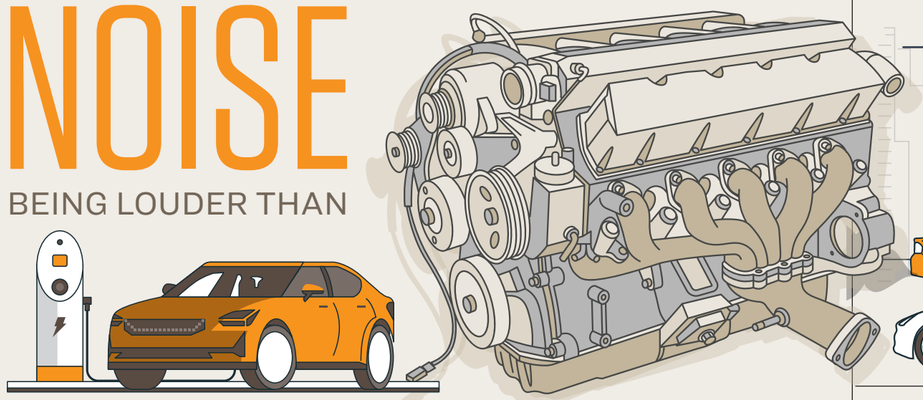
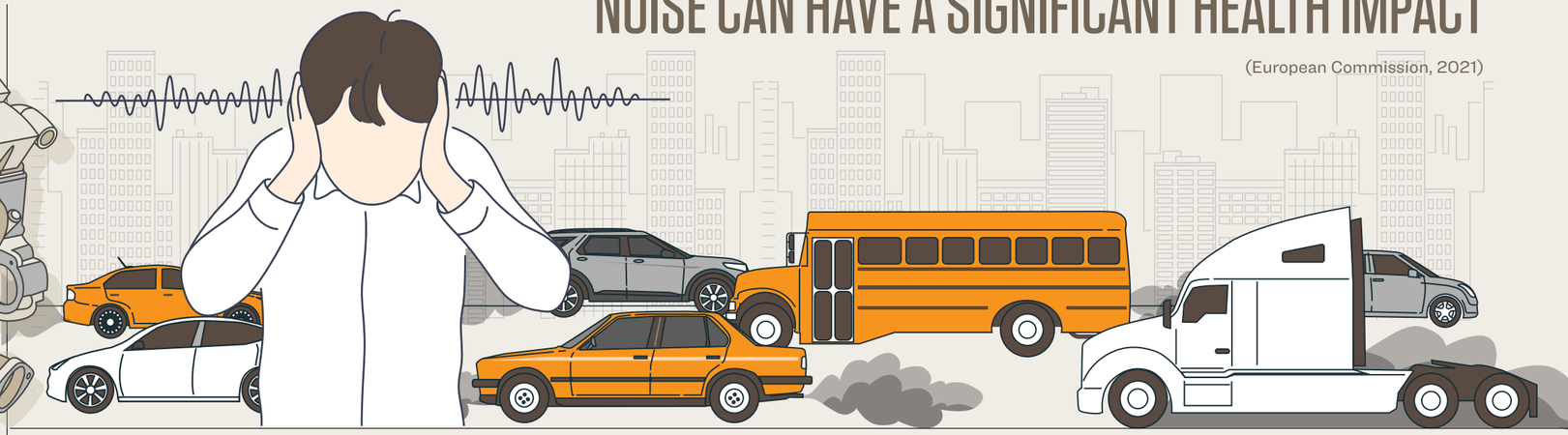
BIOFUELS REQUIRE A COMBUSTION ENGINE WHICH PRODUCES NOISE BEING LOUDER THAN ELECTRIC-POWERED VEHICLES AT LOW SPEEDS (EEA, 2016)



NOISE CAN HAVE A SIGNIFICANT HEALTH IMPACT

(European Commission, 2021)



AND IS THE SECOND MOST SIGNIFICANT ENVIRONMENTAL HEALTH RISK THAT EUROPEANS FACE

THE HEALTH EFFECTS INCLUDE **SHORT** AND **LONG-TERM EFFECTS,** AND **DIRECT** AND **INDIRECT EFFECTS** (European Commission, 2021; WHO, 2018).

DIRECT EFFECTS INCLUDE DAMAGE FROM NOISE ENERGY

HEARING LOSS

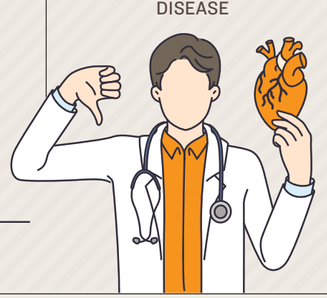
TINNITUS

INDIRECT EFFECTS ARE MEDIATED BY CHRONIC NOISE STRESS AND INFLAMMATION, AND INCLUDE

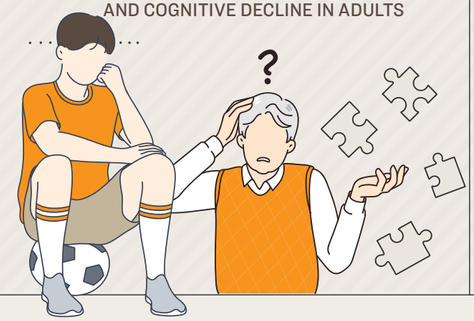
SLEEP DISTURBANCE AND ANNOYANCE

HYPERTENSION

ISCHAEMIC HEART DISEASE



COGNITIVE IMPAIRMENT IN CHILDREN AND COGNITIVE DECLINE IN ADULTS

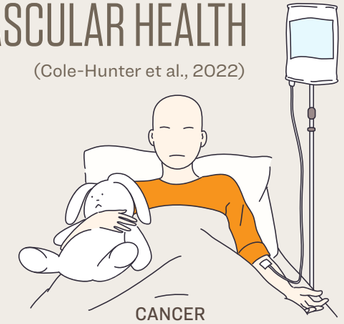


MENTAL ILL-HEALTH

EMERGING **EVIDENCE SUGGESTS** EFFECTS OUTSIDE OF CARDIOVASCULAR HEALTH

(Cole-Hunter et al., 2022)

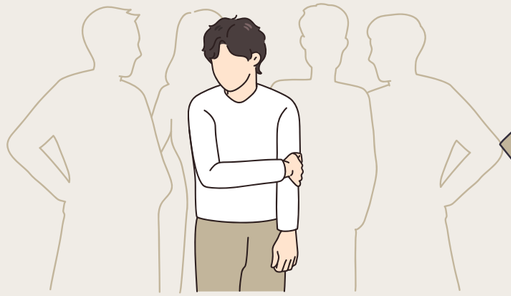
INCLUDING RESPIRATORY DISEASES



CANCER

PSYCHIATRIC DISORDERS

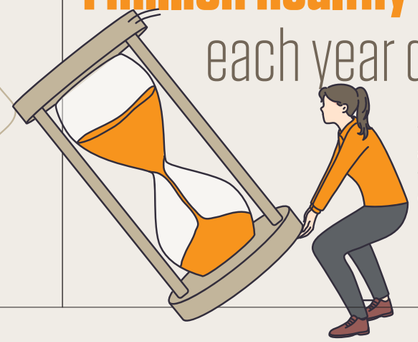
SERIOUS **SOCIAL EFFECTS**



IMPAIRMENT OF SOCIAL INTERACTION, INCLUDING ON A COMMUNITY LEVEL

THE HEALTH BURDEN HAS BEEN ESTIMATED AT AT LEAST

1 million healthy years lost in Europe each year due to noise pollution



the bulk of which is traffic noise (WHO, 2018), and there is an association between exposure to traffic noise and all-cause mortality (independent of air pollution)

The wider environmental health system

Outside of direct pollutants, there is the issue of carbon emissions. Carbon dioxide is not generally seen as an air pollutant through direct toxicity, but as the term "Short Lived Climate Forces" demonstrates, the emission of air pollution and the emission of carbon both have an impact on climate, and both have an impact on human health. They are two sides of the same coin. And biofuels contribute carbon emissions to the atmosphere.

Carbon emissions change the global climate system. The health effects are well known, and the most recent Intergovernmental Panel on Climate Change (IPCC) report has yet again increased the level of alarm about the health effects that are already occurring, and will intensify (IPCC, 2023). Predictions are that billions of people will have an increased health risk in the coming decades. Every industry and link in the chain has a role to play, and transport policy is part of this chain. Ongoing allowances and compromises on the push for sustainability in the transport sector will contribute to climate-related harm as the weather system we rely on for food, economy, prosperity and safety change.

Spotlight on health: Climate change in a nutshell

Biofuels aren't sustainable or clean, and will emit carbon dioxide. The findings from the latest IPCC report (IPCC, 2023) **summarise the evidence on the health impacts of climate change (which biofuels will contribute to).**

They include, but are not limited to:

- **Increased infectious disease and pandemic risk**
- **Increased heat stress**
- **Decreased water security**
- **Distorted and strained food systems**
- **Forced migration**
- **Negatively impacted mental health**

Biofuels do not fix this problem; they continue this problem.

Other factors of environmental degradation also come along with this policy change. Biofuels have been shown to negatively impact biodiversity, and will require increasing amounts of land to be dedicated to fuel production (Transport and Environment, 2023a). The ability of this dedicated land to act as a carbon sink will be compromised, as will its ability to produce food (Transport and Environment, 2023a). This is at a time when use of this land for renewable energy instead of biofuel production, such as solar power farms, can yield multiple times the energy utility of biofuels, and can be used to power sustainable transport more efficiently (Transport and Environment, 2023a). Of note also is that the above air pollutants (SLCFs and CO_2), as well as noise

SPOTLIGHT ON HEALTH:

Climate change in a nutshell

BIO fuel

Biofuels aren't sustainable or clean, and will emit carbon dioxide.

epha european public health alliance

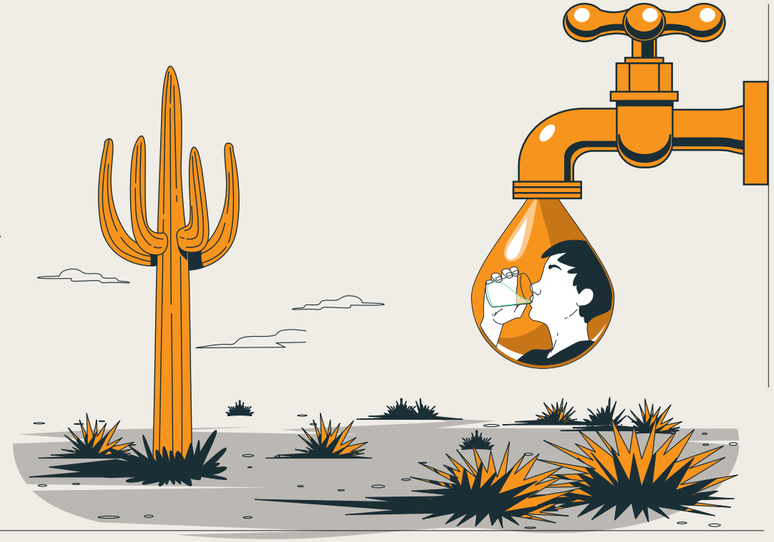
BIOFUELS CONTRIBUTE TO CLIMATE CHANGE, WITH DAMAGING HEALTH IMPACTS SUMMARISED IN THE LATEST IPCC REPORT

THEY INCLUDE, BUT ARE NOT LIMITED TO:

INCREASED INFECTIOUS DISEASE AND PANDEMIC RISK

INCREASED HEAT STRESS

DECREASED WATER SECURITY



DISTORTED AND STRAINED FOOD SYSTEMS

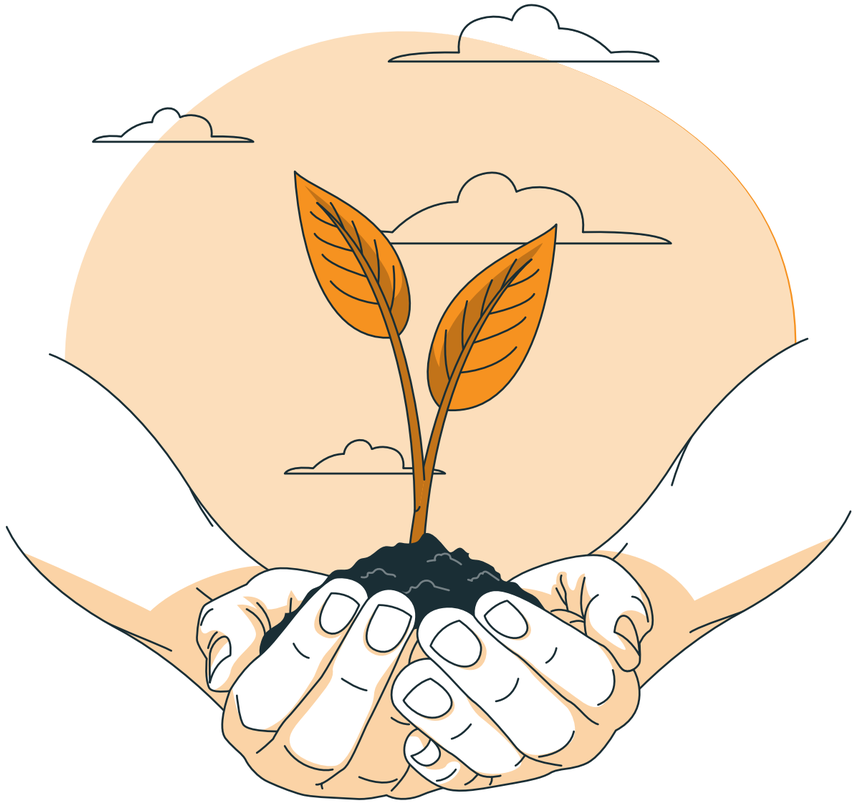
FORCED MIGRATION

NEGATIVELY IMPACTED MENTAL HEALTH

BIOFUELS DO NOT FIX THIS PROBLEM; THEY CONTINUE THIS PROBLEM

pollution, also exert a degradation effect on the environment. Air pollution negatively affects flora and fauna, and impacts biodiversity, while noise causes stress in all vertebrates (European Commission, 2022; WHO, 2011).

When looking at health through a Planetary Health lens, the health of the environment, animals and humans are all inextricably linked. Human health cannot continue while environmental health continues to be compromised. This was demonstrated recently. The world suffered a massive health challenge with COVID-19, and zoonotic disease spillover becomes more of a risk as land is degraded and natural areas and impinged upon by humans for exploitation and growth. Planetary Health see these links between a healthy environment and healthy human life. Biofuels will negatively impact on Planetary Health, inhibiting system change that is essential and urgent.



Spotlight on health: Planetary Health and human health

Biofuels will contribute to environmental degradation. Planetary Health is an all-inclusive concept for human, animal and environment health that recognises the interlinkages and interdependencies that human health has on the surrounding environment. Human health is dependent on environmental health, and environmental degradation negatively effects human health.

Examples of specific environmental degradation factors, and established impacts on human health include:

- **Deforestation and land clearing for agriculture, leading to increased human-animal interface, with the chance of infectious disease spillover** (Pathak & McKinney, 2021)
- **Air pollution decreasing agricultural crop yield** (European Commission, 2022)
- **Environmental chemical pollution leading to reduced insect numbers (especially pollinators such as bees), decreased biodiversity, and disturbed natural systems, impacting human food systems** (Pathak & McKinney, 2021)
- **Chemical pollution of waterways, such as with antimicrobials** (Wilkinson J et al., 2022), **posing an increased health risk for humans, animals and environment**
- **Altered climate systems due to emissions leading to increased risk for catastrophic weather events** (IPCC, 2023)

Biofuels contribute to ongoing environmental degradation, negatively impacting Planetary Health

SPOTLIGHT ON HEALTH:

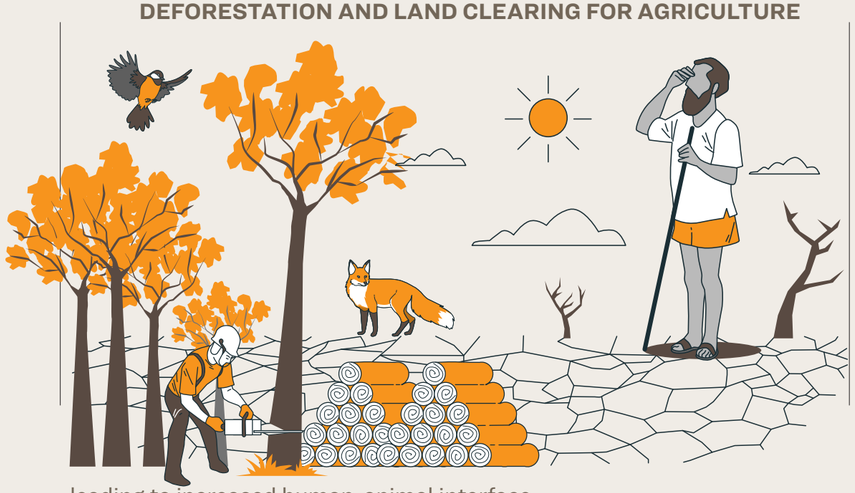
Planetary Health and human health

Biofuels will contribute to environmental degradation

Planetary Health is an all-inclusive concept for human, animal and environment health that recognises the interlinkages and interdependencies that human health has on the surrounding environment. Human health is dependent on environmental health, and environmental degradation negatively effects human health.

Examples of specific environmental degradation factors, and established impacts on human health include:

DEFORESTATION AND LAND CLEARING FOR AGRICULTURE



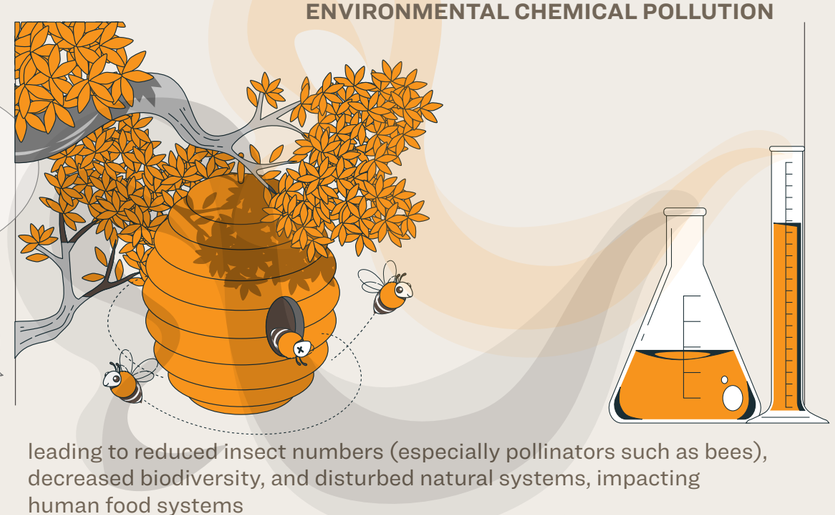
leading to increased human-animal interface, with the chance of infectious disease spillover

(Pathak & McKinney, 2021)

AIR POLLUTION DECREASING AGRICULTURAL CROP YIELD

(European Commission, 2022)

ENVIRONMENTAL CHEMICAL POLLUTION



leading to reduced insect numbers (especially pollinators such as bees), decreased biodiversity, and disturbed natural systems, impacting human food systems

(Pathak & McKinney, 2021)

CHEMICAL POLLUTION OF WATERWAYS

ALTERED CLIMATE SYSTEMS

SUCH AS WITH ANTIMICROBIALS POSING AN INCREASED HEALTH RISK FOR HUMANS, ANIMALS AND ENVIRONMENT AND DUE TO EMISSIONS LEADING TO INCREASED RISK FOR CATASTROPHIC WEATHER EVENTS

Public and environmental health as a priority

The Zero Pollution ambitions of the EU will mean that all forms of pollution are to be dramatically reduced. Biofuels do not fit into this vision, and will continue exerting a pollution effect on air, noise and the environment. Importantly, they are not a climate-friendly solution, and will continue to contribute to changing the climate and posing a threat to public health.

The European Green Deal and its constituent policies present the opportunity for the EU to be the global leader in sustainability, pollution reduction and clean transport, but continued loopholes, exceptions, allowances and watered-down ambitions mean this opportunity is closing. The EU has the chance to champion these causes, and in doing so, demonstrate and benefit from the significant health, social and economic gains that will come with more healthier systems, including mobility systems. The allowances for biofuels will mean the health prospects presented by the Heavy Duty Vehicle CO_2 Emission Standards will be wasted.

Biofuels are not the future. They are continuing a lingering past of a transport system which has had a significant negative impact of public health and the environment. The EU needs to pursue a strong policy that does not include or allow for biofuels. Where the heavy vehicle fleet is brought into the vision of the 100% reduction in carbon emissions. And where avoiding unnecessary, preventable health and environmental impacts are treated as a priority.

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About EPHA's work on global public health

EPHA's work on Global Public Health focuses on the leading transboundary health concerns of Europe: antimicrobial resistance (AMR), air pollution, climate change, Planetary Health degradation and Global Health strategy. Each of these concerns poses an unprecedented risk to public health, environmental health, health systems and society. Our work therefore strives to ensure that these concerns remains high on the political agenda, with health considered in all policies.

By Cale Lawlor, Senior Policy Manager, EPHA.

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