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The road to a fair, green, and mobile Europe
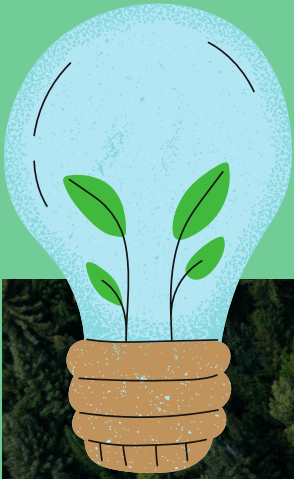
GENERATION CLIMATE EUROPE

Generation Climate Europe

Acronyms

BC	Black carbon
CO2	Carbon dioxide
DEMO	Demonstration Power Plant
EEA	European Environmental Agency
EIB	European Investment Bank
ESA	European Space Agency
EU ETS	European Union Emissions Trading Scheme
GCE	Generation Climate Europe
GHG	Greenhouse Gases
HFO	Heavy Fuel Oil
HSR	High Speed Rail
ICAO	International Civil Aviation Organization
ICCT	International Council on Clean Transportation
IMO	International Maritime Organisation
ITER	International Thermonuclear Experimental Reactor
IWT	Inland Waterway Transport
NECA	NOx Emissions Control Areas
NOx	Nitrogen Oxide
PHEVs	Plug-in Hybrid Electric Vehicles
PHV	Private Hire Vehicles
PM	Particulate Matter
SECA	Sulphur Emissions Control Areas
SO2	Sulfur Dioxide
T&E	Transport & Environment

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Executive Summary

Between 1990 and 2019, EU greenhouse gas (GHG) emissions were cut by more than 24%. However, in the same period, GHG emissions in the transport sector increased by 33%, seriously putting climate targets at risk. Transport emissions now represent 25% of the EU27's GHG emissions! To counter this risk, the European Commission aims to cut mobility GHG emissions by 90% before 2050. Worryingly, the European Environmental Agency (EEA) anticipates that based on current policies, transport emissions will not decrease but increase by a further 32% in the coming 10 years (based on the 1990 level). The transport sector therefore requires fundamental changes across the board, as business as usual policies will jeopardize the success of the European Green Deal. This position paper, representing the vision of the EU's youth to design a clean and fair mobility in Europe, aims at influencing the future European and national legislations.

Carbon Inequality & EU Mobility

The richest 10% of the EU population account for 27% of total EU carbon emissions. Their footprint is still increasing and larger than that of the poorest 50% of the population combined, whose footprint has actually begun to decline. With the transport sector, and in particular air and road transport, being the main contributor to carbon inequality, and the richest Europeans using transport of any kind more frequently, climate policies - including those targeted at the mobility sector - should focus first and foremost on those richest 10%. Taxes or bans are the most appropriate measures if they curtail luxury consumption in the transport sector. A transition to carbon-free mobility in Europe must be socially acceptable and fair.

Energy & EU Mobility

Over 90% of EU mobility remains powered with oil-derived fuels. Moreover, the EU's current biofuel policy has the effect of increasing demand for food-based biofuels in the transport sector, which drives deforestation as well as a carbon output that is often greater than that of oil-derived fuels. Therefore, we call for biofuels to be taxed based on their CO2 impact and to end the tax exemption for biomass-based fuel. Moreover, renewable energy production must be increased rapidly in order to create a zero-emission transport system.

New forms of energy production, such as those based on hydrogen, must be decarbonised before their use is increased. At the same time, consumption and mobility patterns must urgently change in order to reduce the reliance on energy-intensive mobility.

Road

Over 70% of all passenger journeys and freight transport are performed by car. Car transport still continues to increase, further raising carbon emissions as well as reducing biodiversity through its polluting impact. Road transport is distinctly unequal, as wealthier EU citizens produce disproportionately higher car transport emissions. To reduce these emissions, Euro regulations must be strengthened and EU governments must stop VAT reductions to fossil fuel vehicles and PHEVs. Moreover, walking and cycling as means of transportation for very short-distance travel need to be promoted, and families and small and medium-sized entreprises (SMEs) must be supported to enable them to transition to the use of zero emission vehicles (ZEVs).

Rural mobility

Due to a greater usage of private cars, rural areas have a higher carbon footprint per capita than other areas, yet are largely neglected in mobility policy.

Due to the scarcity of public transport services, a transition to sustainable mobility is particularly challenging in these areas. Therefore, GCE proposes to create a European-wide policy specifically tackling the issue of rural mobility, which should be related to the broader issue of spatial planning. As 80% of the rural population lives close to urban areas, strengthening rural-urban mobility is crucial, by developing demand-responsive transport and improving the intermodality of public transport services. Within rural areas, the development of carpooling car parks and car-sharing services must be ramped up to limit the number of cars on the road that carry just one passenger.

Urban mobility

Unsurprisingly, transport in urban areas is dense and the main contributor to air pollution. The current emphasis on motor vehicles causes dangerous levels of air pollution in many European cities. On top of the obvious environmental strain, this is related to many forms of disease. Therefore, GCE calls on the Commission to properly enforce the EU air quality standards. Moreover, GCE wants cities to be encouraged to take back cities from private vehicles through the establishment of EU grants for the development of adequate public transport (in the least connected and poorer neighbourhoods, particularly), the purchasing of zero-emission vehicles and the development of active mobility and active delivery.

Rail

As the cleanest and most energy-efficient mode of transport, railway transport has huge potential for decreasing the EU's transport emissions. Currently, however, the railway system in the EU is nothing but a patchwork of national systems, which needs to be developed into a real Single European Railway Area. In order to shift travel from aviation to rail, high-speed rail connections must be established between all European capitals and a European network of night trains must be revitalised. To shift travel from road to rail, rail travel must be actively promoted during the European Year of Rail and the EU institutions should lead by example in this respect.

In order to make international travel by train more appealing, GCE calls for administrative barriers to international services to be reduced by Europeanising planning and facilitating the purchase of international tickets. Urgently revitalising intermodal rail transport in rural areas is also key to redeveloping alternatives to cars.

Aviation

Air travel is responsible for 3.6% of the EU's total emissions, a figure which has more than doubled in the past 20 years and is one of the main drivers of carbon inequality. For these reasons, GCE calls for air transport to finally be subject to fair taxation through the end of the aviation fuels tax exemption and the introduction of a frequent flyer levy. In order to change consumer behaviour simultaneously, GCE proposes a ban on airline ads and the introduction of carbon footprint indicators on air tickets and labels on products transported by planes.

Shipping

The current state of the shipping sector is another cause for concern. Shipping is responsible for 2.5% of all global GHG emissions: a climate impact greater than that of Germany. However, despite their strain on the environment, the respective climate impacts of both aviation and shipping remain largely unregulated and untaxed. A CO2 levy on EU shipping through an extension of EU ETS to cover international and domestic EU maritime GHG is therefore much required. To counter shipping's considerable contribution to air pollution, GCE proposes four measures and urges the Commission and member-states to push for tighter global standards.

Space

Space projects are of great value to climate science through their ability to map land, water and sky in incredible detail. However, space travel also impacts the environment itself due to its considerable emissions. Therefore, although GCE calls on the EU to increase its space budget and further international space

cooperation, it highlights the importance of research focussing on the use of alternative fuels. Moreover, it proposes banning space tourism.

Ecotourism

Tourism still impacts the environment tremendously by invoking losses of biodiversity and increasing pollution. GCE strongly recommends that the EU modifies its growth-centric tourism policies to develop an ecotourism approach, based on keeping the impact of tourism on local societies and the environment at sustainable limits. This entails involving local populations and knowledge of fragile ecosystems in developing new tourism plans. In areas of threatened ecosystems by mass tourism, tourist numbers must be controlled by tourist taxes or quota.

Financing

Funding for the Green Deal is worryingly low and EU funding for transport infrastructure policy is down on the previous budgetary cycle. GCE calls on the closing of the investment gap for European mobility by ensuring sufficient funding for research and necessary infrastructure such as EV charging stations, railway modernisation, and cycling paths. Tax justice and fair carbon pricing is crucial for the success of a green transition in transport. To this end, user-pays and polluter-pays principles must be introduced to the transport sector. Most importantly of all, GCE calls on Member States to stop all fossil fuel subsidies immediately.infrastructure

Introduction

The climate impact of mobility

The European Union (EU) aims to achieve climate neutrality by 2050. In order to reach this target, greenhouse gas (GHG) emissions in all sectors need to be cut quickly and robustly. Bold and ambitious action is required across the border to reach the EU's 55% reduction of emissions by 2030, and even more audacious policy initiatives are needed in order to comply with the Paris Agreement (1).

Overall EU territorial GHG emissions have been cut by more than 24% between 1990 and 2019. Meanwhile during the same period GHG emissions in the EU transport sector (including international aviation and shipping) rose 33%, derailing our climate targets. Indeed, emissions from public electricity production and that of European industry decreased by 37% between 1990 and 2019. However, mobility will be much more difficult to decarbonise through cost-efficient energy substitutions only and that of transport cannot be outsourced overseas (2).

While transport accounted for 15% of transport emissions for EU27 in 1990 (4), they now represent 25% of the EU's 27 GHG emissions (5)! The EU's transport emissions increased in 2018 by 0.9 % and by 0.8 % in 2019. As mobility now accounts for a quarter of the EU-27's emissions, achieving our 2030 and 2050 climate targets is only possible if urgent and fundamental changes are made within the mobility sector.
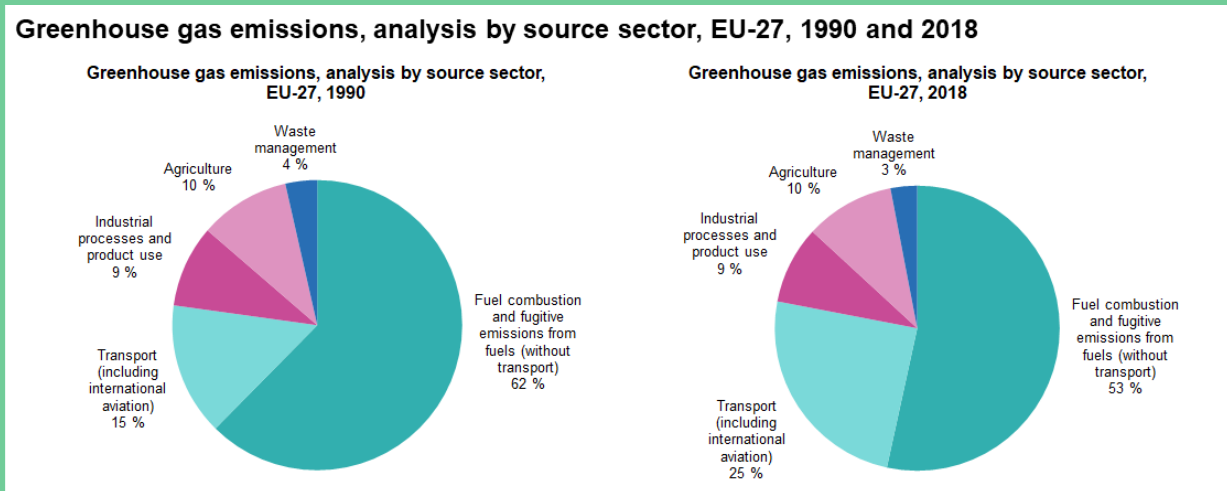
Figure 2: GHG analysis by source sector, EU27, 1990 and 2018. Eurostat, 2020 (6)

The European Commission aims to cut mobility GHG emissions by 90% by 2050. However, European Environmental Agency (EEA) projections based on existing policy measures in EU Member States anticipate that transport emissions will increase by 32% by 2030 compared to 1990's level. The EEA calculated that if the additional measures planned in national policies are considered, GHG emissions would still increase by 17% by 2030 compared to 1990 (7). While domestic navigation and railway emissions have decreased since 1990, road transport, international maritime transport have increased dramatically and aviation emissions would surge for a double.

Road transport constitutes the highest proportion of overall transport emissions (around 71% in 2018) (9) while the aviation and maritime sectors both account for about 13% of them.

Fundamental changes are therefore needed and business as usual policies will not suffice for transport to contribute to the success of the European Green Deal.

"Although action is needed in all sectors if the EU is to meet emission reduction targets, this is particularly important in the transport sector. [...] Further action is needed particularly in road transport, the highest contributor to transport emissions, as well as aviation and shipping, where transport demand is driving emissions upward in both absolute and relative terms." (EEA, 2021) (11).

The mobility's impacts on air quality

Moreover, mobility's climate impact is not its only negative externality. Transport is indeed the first cause of air pollution in Europe (12). The 2020 EEA air quality report underlines that mobility is a major contributor to carbon monoxide (CO, 23%), and to black carbon (BC, 30%) and particulate matters. Transport's contribution to nitrogen oxides (NO_x) emissions is also considerable, accounting for 47% of total Europe NO_x emissions (13).
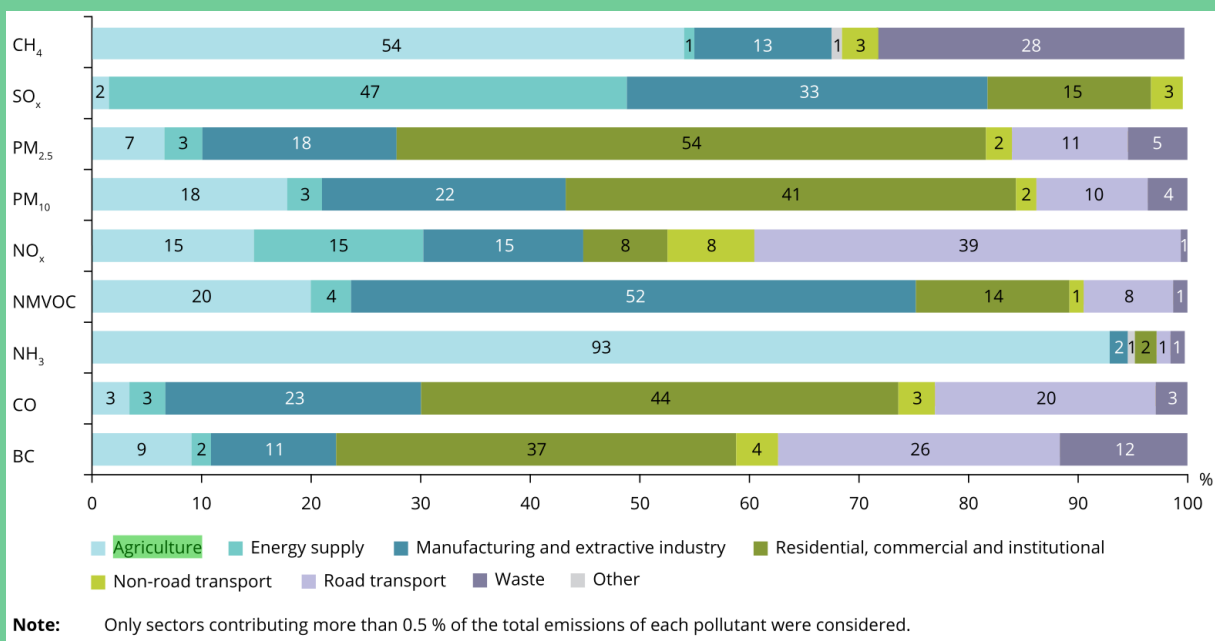
Figure 5: Contributions to EU-28 emissions from the main source sectors, 2018. Source: EEA, 2020 (14)

4% of the European population is exposed to NO_x concentration above WHO standards. and NO_x pollution is responsible for 55.000 deaths annually in Europe.

GCE's vision for a green and fair transformation of European mobility

The European Commission, in its Sustainable and Smart Mobility Strategy,has outlined its vision for the development of European mobility between today and 2050. Whilst we welcome its emphasis on greening mobility, important work still needs to be done in fleshing out the proposals. For example, the sales of Internal Combustion Engines should be phased out with a clear end date to give clarity to car manufacturers of 2028. The Strategy also fails to mention the carbon inequality inherent to EU mobility and thus fails to give appropriate answers to it such as introducing a frequent flyer levy as well as banning private jets and advertisements for SUVs.

Generation Climate Europe (GCE) has compiled a set of proposals which we deem to be crucial for the realisation of a green and fair transformation of European mobility. We adopted a problem-based methodology to constitute this position paper, creating our proposals depending on the observed problems EU mobility is facing. GCE is the largest coalition of youth-led NGOs at the European level, pushing for stronger action from the EU on climate and environmental issues. We bring together nine of the largest European youth organisations, representing over 460 national organisations in all Member States and over 20 million young Europeans.

The proposals range from high-speed rail to urban and rural mobility and from tourism to space policy. Central to all our proposals is the conviction that the green transition should be a just transition. European mobility emissions are not equally spread over European citizens. The richest 1% of Europeans have a carbon footprint that is 175 times higher than that of the poorest 10%. The EU top 1% emit 55 tCO2eq/cap on average, more than 22 times the 2.5-tonne target (by 2030) consistent with emission pathways limiting global warming to 1.5°C (15). It is the top emitters who need to make the greatest changes, and who have the financial reserves to pay for them. For the transition to be fair, it also needs to pay close attention to and accompany the workers in the mobility sector as well as those closely linked to it, such as tourism.

Reducing the negative externalities of the transport sector is one of EU's most urgent and difficult challenges, but it is also an opportunity to create jobs, improve air quality (thus making our cities more liveable), reduce our energy dependency, enhance Europe's climate ambition and help Europe retain its position as a leader in technical innovation.

Transport faces many challenges to stop its rise in greenhouse gas emissions and to pull its weight in enabling Europe to meet its climate targets. But these challenges also represent opportunities to reshape the paradigm of how we take advantage of the EU's free movement of workers, people and goods around the continent and overseas, with far reaching benefits including better air quality, liveable cities and villages, innovation and a truly sustainable future not based on burning petroleum-based fuels.

Throughout our research, we realised that the so far untapped power of public authorities to reshape mobility must be accompanied with education of the population for these radical policy shifts to be accepted. Highlighting the positive impacts of shifting toward more sustainable options (health, economic, jobs, etc. aspects) while also raising awareness on the negative externalities of our current transportation system is key for the switch to a clean transportation system to be accepted.

The unprecedented global COVID-19 pandemic has disrupted order in the entire world and has created once-unimaginable challenges, but it has also awakened the world to an invaluable opportunity to reimagine and build back better in a more sustainable and just manner. Now is the time to fundamentally restructure the essence of mobility in Europe and to redirect the focus to the EU's commitment on climate-neutrality by 2050.

The mobility sector offers significant opportunities for a sustainable transformation, but the necessary changes can only be realised if ambitious proposals are made and put into practice quickly with sufficient legislative support. Cleaning the transport system needs to be a top priority for our leaders. In this document, we encompassed our vision for a fair transition to a carbon-free mobility in Europe.

Carbon Inequality in EU mobility

What is carbon inequality and why do we need to address it?

'[...] our current economic model has been an enabler of catastrophic climate change and equally catastrophic inequality. The COVID-19 pandemic provides an incontestable imperative to rebuild better and place the global economy on a more sustainable, resilient and fairer footing. Addressing the disproportionate carbon emissions from the wealthiest in society must be a key priority as part of this collective commitment.'
Ban Ki-moon, former Secretary-General of the United Nations, in Confronting Carbon Inequality, a joint research from Oxfam and the Stockholm Environment Institute (SEI)

GCE's fight for a brighter future - one where life on the planet is preserved - takes root in scientific observations that our societies will either manage to reorganise and limit global warming to well below 2 degrees Celsius compared to pre-industrial levels as enshrined in the Paris Agreement, or risk to enter a phase of dramatic natural changes that would compromise our survival.

Carbon Inequality at global level

One important consideration when talking about GHG emission reduction, is that the world's citizens are far from having all the same impact on the planet. Indeed, new research by Oxfam and the Stockholm Environment Institute (SEI) (2020) reveals that from 1990 to 2015, a critical period in which annual emissions grew 60% and cumulative emissions doubled:

- The richest 10% of the world's population were responsible for 52% of the cumulative carbon emissions – depleting the global carbon budget by nearly a third (31%) in those 25 years alone;
- The poorest 50% were responsible for only 7% of cumulative emissions, and used a mere 4% of the available carbon budget;
- The richest 1% alone were responsible for 15% of cumulative emissions, and 9% of the carbon budget – twice as much as the poorest half of the world's population.
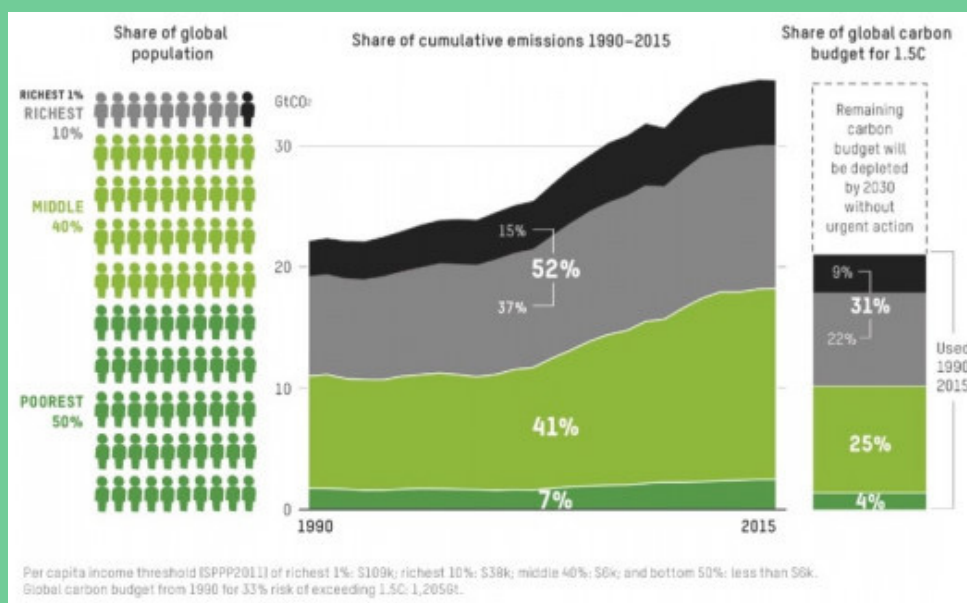

Figure 6: Share of cumulative emissions from 1990 to 2015 and use of the global carbon budget for 1.5C linked to consumption by different global income groups. Source: Oxfam and the Stockholm Environment Institute, 2020 (16)

Carbon Inequality at EU level

Whereas EU emissions reductions from 1990 to 2015 resulted in a fall of emissions for lower- and middle-income households, the emissions of the richest 10% of Europeans grew (Oxfam and the SEI, 2020)(17).

At EU level, two studies [one Oxfam and the SEI and the other one by Diana Ivanova and Richard Wood] analysed household emissions show how unequal the distribution of carbon footprints is in Europe. They show that:

- About a fifth of the top 10% of world emitters are located in the European Union;
- During this period, the richest 10% of EU citizens were responsible for more than a quarter (27%) of EU emissions. This equates to the emissions amount of the poorest half of the EU population. The 40% of 'middle income' Europeans were responsible for 46% of emissions, and the richest 1% for 7% of emissions.
- The top 10% of the population with the highest carbon footprints per capita accounts for 27% of the EU carbon footprint, a higher contribution to that of the bottom 50% of the population.
- The poorest half of EU citizens cut their emissions by 24% and 'middle-income' citizens by 13%. By contrast, the richest 10% of Europeans increased their emissions by 3% and the richest 1% by 5%.
- Only 5% of EU households live within the targets. To meet carbon footprint reduction requirements of no more than 1.5C increase in global heating, the richest 10% of Europeans' footprint must be ten times smaller by 2030. For the richest 1%, their carbon footprint must be thirty times smaller. To compare with, the footprint of the poorest 50% must only be halved.
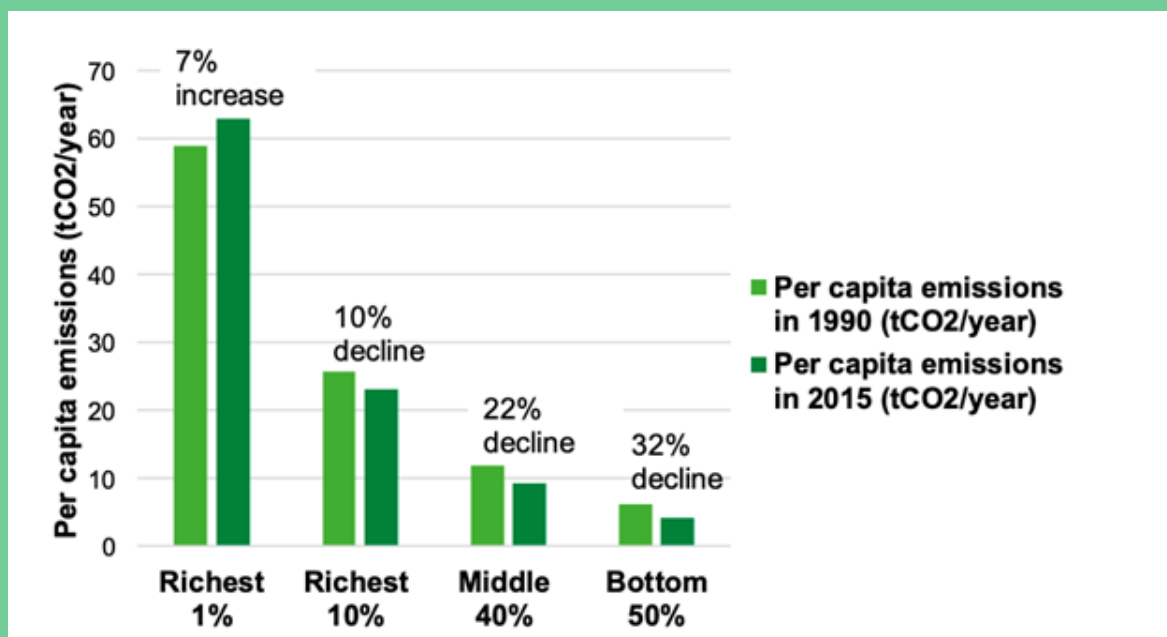
Figure 7: Per capita consumption emissions (tCO2/Year) by EU income group in 1990 and 2015. Source: Oxfam and the Stockholm Environment Institute, 2020 (18)

It is therefore very clear to GCE that politicians need to implement fairer measures in order to reduce the carbon emissions of the ones disproportionately responsible for it - the rich. Only policies aimed at decreasing the emissions of the richest 10% could protect the two groups that unjustly suffer the most from its impact: poorer people, and future generations, who will inherit a world accelerating towards climate breakdown (Oxfam, 2020). What we will develop in this paper is a collection of different measures that should be taken on a political level in the domain of mobility, in order to reduce the carbon emission of the EU, and reach the Paris Agreement targets in a fair way.

What are the causes of carbon inequality?

Transport, and especially aviation, are found to be the most unequal and carbon intensive of all categories of household consumption(19). According to Oxfam's research, transport is responsible for around a quarter of global carbon emissions today and was found to be the most unequal consumption category, with an income elasticity of demand much higher than 1 (i.e. if income increases 100%, spending on transport increases by more than 100%).

By comparison, home heating and electricity are more inelastic, implying they are more basic goods, which tend to constitute the majority of emissions footprints of lower income groups (Oxfam, 2020).

Understanding these differences is critical to identifying policy measures to reduce consumption emissions footprints equitably. Taxes or bans are more appropriate measures to curtail luxury carbon consumption of items like SUVs and high-end sports cars, or frequent business-class and private jet flights. Alternatively, public investment, such as in energy efficiency improvements in affordable housing, is more appropriate to improve footprints associated with home heating, to avoid regressive impacts on lower income households.

The majority of GHG emissions of the top EU emitters are transport-related. 'Transport use has the highest carbon intensity among the consumption categories (SI4) and shows a stable increase with expenditure and income.' (Ivanova and Wood, 2020) (20).

The figure below shows the consumption categories associated with households in the top 10% and 1% of emitters in the EU, based on another recent analysis:

Figure 8: Main categories of consumption among highest emitters in the EU (2010). Source: Oxfam, 2020 based on Ivanova and Wood, 2020 (21)

By far the largest share of emissions among high EU emitters is from transport: Car journeys, and for the very highest emitters, flights. Air transport is the most elastic, unequal and carbon-intensive consumption category.

	EU Top 1% emitters	EU Top 10% emitters	EU Middle 40% emitters	EU Bottom 50% emitters	EU Bottom 5% emitters
Average carbon footprint (tCO2eq/cap) due to road transport	**11.6**	**7.4**	2.9	0.8	0.1
Share of road transport in their carbon footprint	21%	32%	29%	17%	6%
Average carbon footprint (tCO2eq/cap) due to air transport	**22.6**	**3**	0.1	0	0
Share of air transport in their carbon footprint	41%	13%	1%	0%	0%

Figure 9: Average carbon footprint (CF) distribution by consumption category in the EU. Based on Ivanova and wood (2020)(22)

What needs to be done to design a fair climate policy?

Tackling carbon inequality in transport is essential, yet it remains mostly absent from the public debate and from political discourse.

'In order to reduce trade-offs between social and environmental goals, policies should target changes in higher-order need satisfiers, such as social structures and practices, and reimagine forms of need satisfaction within environmental constraints (Mattioli, 2016). Redesigning consumption practices (Ivanova et al., 2020), public spaces and social structures through voluntary simplicity (Jackson, 2005; Vita et al., 2020) and sharing (Ivanova & Büchs, 2020) may reconcile lower carbon emissions and higher well-being. Collective solutions and investment in social infrastructure (see universal basic services; Coote et al., 2019) hold potential to deliver the social services necessary for human well-being in coherence with the principles of equity, efficiency, solidarity and sustainability (Coote et al., 2019)' (Ivanova and Wood, 2020) (23).

The emissions contributions of land and air transport are disproportionately large among the top EU emitters. Given that land transport and, even more so, air transport are both highly carbon intensive and highly price-elastic, GCE believes that much more needs to be done to reduce pollution from these sources. Action here is likely to affect those with the highest footprints, incomes and expenditures most, but impacts on poor people are also key to keep in mind when designing carbon policies as the poorest already have significant expenditure shares on land transport. Indeed, energy poverty is a widespread problem across Europe, as between 50 and 125 million people already suffer from energy poverty (24).

The transition to a carbon-free economy will be fair or will not happen. This is why to reduce emissions from EU transport fairly, progressive carbon pricing measures must be adopted as well as restrictions for the most energy-intensive mobility patterns. Our taxation system exacerbates the climate crisis by not sufficiently pricing carbon which causes extreme carbon inequalities. As you will discover, we advocate for the introduction of carbon taxes and bans on carbon intensive luxury items – such as carbon sales taxes on SUVs and a frequent flyer levy and bans of private jets, private helicopters and yachts.

Given the absolute necessity of tackling carbon inequality while tackling our GHG emissions, our proposals ensure that the transition to carbon free mobility in Europe is **socially acceptable and fair**, especially to poor households.

Energy and EU mobility

"We have no room to build anything that emits CO2 emissions."
Fatih Birol, the executive director of International Energy Agency (IEA), 2018(25)

"The IEA said almost all of the world's carbon budget up to 2040 – the amount that can be emitted without causing dangerous warming – would be eaten up by current power stations, vehicles and industrial facilities. To limit temperature rises to 2C, either all new energy projects would have to be low carbon, which is unlikely, or existing infrastructure will need to be cleaned up." (The Guardian, 2018)

Introduction

Mobility in the European Union (EU) remains powered almost exclusively by oil-derived fuels (91.7% in 2017)(26). For Europe to become carbon neutral by 2050, we must greatly accelerate the energy transition towards renewables while ensuring that our biofuel policy doesn't drive up emissions, and drastically reduce the use of energy-intensive mobility.

Freeing ourselves from our addiction to oil is also the best way to secure energy imports independence, given that crude oil largely dominates the EU imports in energy products with a share of 69%, 30% of which comes from Russia (Eurostat, 2020)(27). Since 1998, the overall volume of oil imports into Europe increased from 11 million barrels per day to almost 15 million in 2019 (Sönnichsen, 2020)(28). In 2018, total spending on crude oil imports in the EU was €211 bn (equivalent to 1.5% of EU GDP, or €473 per capita) (Cambridge Econometrics, 2020) (29)

The problem with the EU biofuels policy

The share of energy used for transport that comes from renewable sources reached only 8.9% in the EU in 2019 (Eurostat) (31). And even within these 9%, the production of some biofuels reveals to be worse than burning oil.

A study for the European Commission found that biodiesel from vegetable oils, projected to be brought in by the Renewable Energy Directive, leads to around 80% higher emissions than the fossil diesel it replaces (32).

The EU biofuels policy increases demand for food-based biofuels in transport – driving deforestation as well as releasing more carbon emissions. Currently, around 80% of the EU biofuels market is made of biodiesel, mainly produced from vegetable oils, and 20% consists of bioethanol (ethanol derived from biomass). In addition, EU vehicle owners are the top consumers of palm oil – more than half of all EU imports of palm oil end up in EU citizens' cars and trucks. Palm oil production – mainly for biofuels – is one of the main drivers of environmental destruction in Southeast Asia and increasingly in South America (34).

GCE calls on EU governments to tax biofuels based on their CO2 impact and end the tax exemption for biomass-based fuels.

In some cases, biofuels lead to higher GHG emissions than the fossil fuel they replace when taking into account the whole life-cycle emissions. Biodiesel from soy oil is twice worse in terms of emissions than regular diesel, while biodiesel from palm oil is three times worse (Transport & Environment, 2016)(35). The EU is the second-largest importer of crude palm oil in the world, and the majority of those imports (53%) are currently subsidised to make 'green' fuel for cars and trucks. This increases pressure on agriculture to deliver palm oil, which leads to deforestation in and outside of the EU.

GCE calls on EU governments to ensure an ambitious and robust implementation of the new RED for 2020-2030, and to phase out food-based biofuels.

For the upcoming Revision of the Renewable Energy Directive (RED) and for the upcoming ReFuel EU Aviation and Fuel EU Maritime initiatives, GCE calls on the EU to adopt biofuels targets that do not count food- and feedstock-based biofuels towards sustainable fuels and do not drive unsustainable volumes of alternative fuels. All food-based biofuels – not just palm oil – should be phased out from 2021. It is time for the EU biofuels policy to take into account water use, threats to food security, limits of land availability and the need to rewild. The RED targets should therefore remain focused on road and rail transport and be based on a robust impact assessment of the availability of sustainable fuels (Transport & Environment, 2020)(36).

"By 2030, advanced biofuels are expected to contribute only 3% of all transport fuels (including cars, trucks, aviation) and their growth beyond this date is likely to be constrained due to land availability and competing industries" (37).

GCE calls for the revision of the EU bioenergy policy and for all renewable energy policies and projects to be based on robust analyses of all direct and indirect impacts. If these analyses show negative environmental and social impacts, the project must not be approved.

The EU biofuels policy is not the only problem with the EU renewable energy production policy. The EU biomass policy (another bioenergy source) is another example of destructive renewable energy policy. Biomass energy is considered by the EU as "carbon neutral" despite its several negative impacts on nature such as the problem of "carbon debt" (trees take decades to regrow, thus leaving CO_2 in the atmosphere once burnt) (38).

Between 2008 and 2018, subsidies for biomass, of which wood is the main source, in fact increased by 143% in the EU-27. This led to 63% of wood used in the EU to be burnt for bioenergy, some of it from natural reserves(39). "Biomass, of which wood from forests is the main source, now makes up almost 60% of the EU's renewable energy supply, more than solar and wind combined" (The Guardian, 2020) (40).

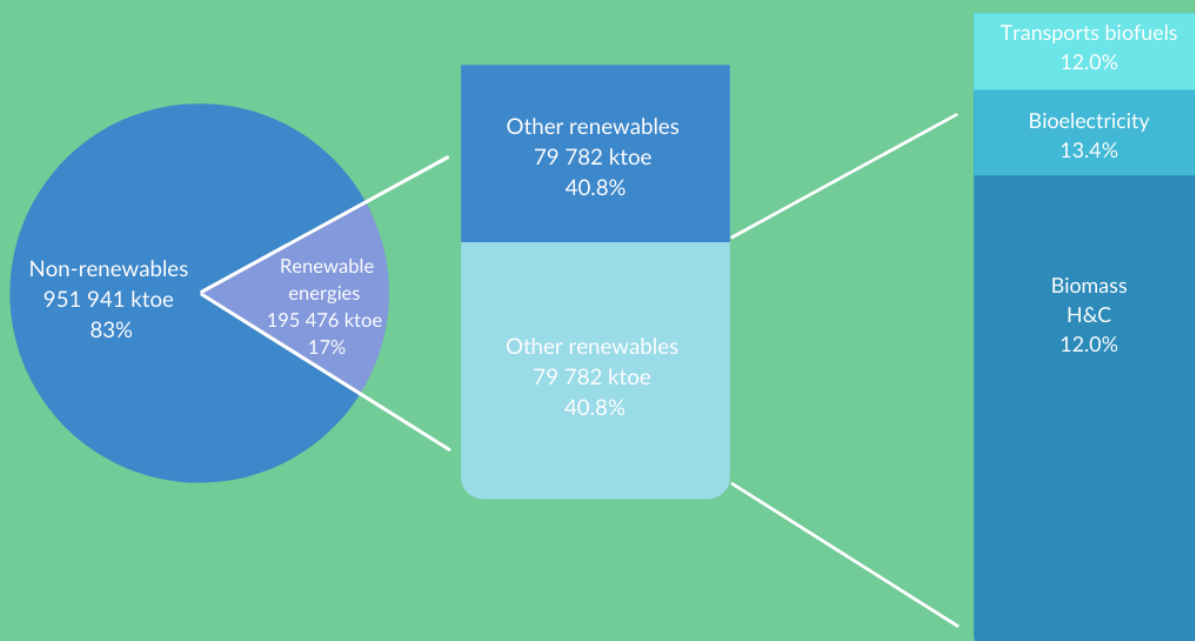These figures prove that the EU bioenergy policy needs to be urgently and fully revised.

Figure 12: Share of renewables in the EU's gross final energy consumption for 2016 and breakdown of the bioenergy contribution. Based on Brief on biomass for energy in the European Union (41)

In order to fully decarbonise our energy consumption, renewable energy production must be quickly speeded up while reducing environmentally destructive forms of bioenergy extraction such as burning trees and crops. Conserving and rewilding forests is fundamentally important as forests are our best allies in combating climate change. According to a Naturwald Akademie study, if logging in Europe's forests was reduced by a third, their carbon absorption potential could be doubled (from 245.4 million tonnes of CO_2 per year to 487.8 million tonnes) – more than the entire annual domestic emissions of France – while simultaneously benefitting biodiversity and increasing the resilience of forests (42).

Decarbonising energy production

Decarbonising energy production is essential but as we will see in the set of policy proposals, it shall go hand-in-hand with reducing energy consumption given the slow speed at which renewable energy is replacing fossil fuels to power European mobility.

We call for rapid increase in renewable electricity production given that the entire decarbonisation of the power sector is a prerequisite for a zero-emission transport system.

As detailed in the Transport & Environment's study "How to Decarbonise European transport by 2050", a colossal amount of additional electricity will be needed to meet the expected demand for mobility, especially for energy intensive modes of transport. "The amount of additional clean electricity required to power a fleet of battery electric cars in Europe in 2050 would be 14.7% of the electricity generated in the EU in 2015 (475 TWh). [...] Using electrofuels to meet the expected remaining fuel demand for EU aviation in 2050 would require renewable electricity equivalent to some 28% of Europe's total electricity generation in 2015 or 95% of the electricity currently generated using renewables in Europe. [...] The complete decarbonisation of EU-related shipping in 2050 would require 11-53% additional renewable electricity generation across the EU28 over the 2015 levels" (T&E, 2018)(43). Supplying the Paris-Charles-de-Gaulle airport with hydrogen would for example require 16 additional nuclear reactors or more than 10.000 wind turbines (44). Furthermore, we also must bear in mind that mobility is not the onlysector whose decarbonisation will lead to additional electricity needs (heavy industry, heating, etc.).

Indeed, electrifying mobility to move away from oil-powered mobility is essential, however, we have to ensure that the electricity used to power mobility is generated from renewable sources. In the EU in 2018, 40% of the electricity consumed came from power stations burning fossil fuels and 33% from renewable energy sources, while 26% came from nuclear power plants. (Eurostat, 2020) (45).

GCE urges European governments to build no more fossil fuels infrastructure and power stations.

Building more natural gas infrastructure and plants to use gas as a "transition fuel" or "bridge fuel" would only extend our dependency on fossil fuels and lead to 'locked-in emissions' for many more decades while we have to phase out fossil fuel energy production entirely as soon as possible. To limit temperature rises to 2°C, the International Energy Agency (IEA) warns that the world cannot afford to build any more polluting infrastructure. By 2040, the IEA predicts that the amount of carbon emissions that can be emitted without causing dangerous warming would be eaten up by today's power stations, vehicles and industrial facilities (46). This should also be reflected in the EU Taxonomy by classifying gas infrastructure as environmentally unsustainable.

GCE also calls for public investment to be ramped up for alternative energy sources.

Nuclear fusion projects such as ITER (International Thermonuclear Experimental Reactor) and DEMO (demonstration power plant) can offer an alternative source of energy beyond fossil fuels and their roll-out should thus be accelerated(47). More investment is also needed in exploring the potentials of ocean energy — an almost untapped yet promising renewable (and sustainable) energy source in the form of floating windmills, tidal energy, wave energy or ocean thermal energy conversion.

Reducing energy consumption

GCE warns that the European Green Deal will not be achievable if we do not radically and quickly decrease our dependence on fossil fuels and change our consumption patterns to drastically reduce energy-intensive mobility.

In 2018 in the EU, nuclear heat and renewable energy accounted for only 13.2% and 15.0% respectively of all energy, while over 70% was produced from fossil fuels (coal, crude oil and natural gas)(48). And in addition to a still extremely fossil-dominated energy production, our energy consumption keeps increasing and mobility is the sector that consumes the most energy. Annual energy consumption in transport increased by 32% since 1990 and by 8% since 2013. Six Member States more than doubled their transport energy consumption between 1990 and 2017(49). European transport (excluding international aviation) accounted for 30.8% of final energy consumption in the EU28 in 2017 (Eurostat, 2019) (50).
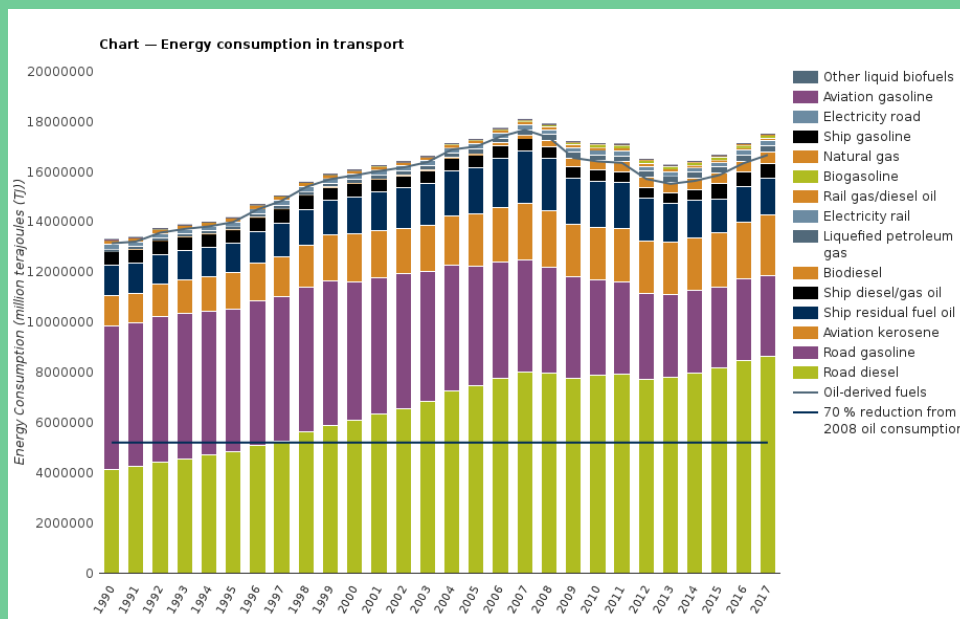
Figure 13: Energy consumption in transport from 1990 to 2017.
Source: European Environment agency, 'Use of renewable fuels in transport in Europe' (51)

Additional electricity consumption needs to be minimised, and so does the overall energy consumption of European mobility. Given that the share of energy used for transport that comes from renewable sources reached only 8.9% in 2019 (Eurostat, 2020) (52), it is obvious that we cannot count on its increase while not changing our mobility patterns.

A rapid mass reduction in the use of energy-intensive modes of transport (planes, cruise ships, trucks, SUVs...) needs to occur if we are to cover our energy needs sustainably in the near future. We indeed must tackle in an even more determined way the increasing side effects of energy-intensive modes of transport.

The European Green Deal in fact cannot only rely on technological change, as the European Environmental Agency Growth Without Economic Growth briefing points out, it must also lead to "changes in consumption and social practices" (53).

We call on decarbonising hydrogen production before increasing its use

Hydrogen is currently being branded by many industries such as air transport as the innovative solution to their pollution problems. First of all, we cannot forget that it is not the first time that hydrogen is used as a promising and green alternative to power mobility. Moreover, although hydrogen might prove to be a credible alternative to fossil fuels in the future for heavy mobility modes, for which carrying batteries is too heavy, we must not forget that today, 99% of hydrogen is still made using fossil fuels, usually through a pollution-heavy process. Green hydrogen is produced using electricity from renewable resources, however, given that only 33% of today's electricity in the EU comes from renewables, we cannot see hydrogen as Europe's only policy to reduce the negative externalities of the EU's heavy transport. Policies aiming at downscaling the use of energy-intensive modes of transport are essential to meet our energy and climate targets (56).

GCE calls on the anticipation of economic and social consequences for workers

According to a 2018 study based on Cambridge Econometrics' models, the transition to cleaner mobility is expected to have a positive impact on jobs until 2030 in Europe (i.e. 206,000 net additional jobs) (57). In France for example, rail travel has an employment potential almost twice higher as aviation (58).

However, given the inevitable need for reduction in air traffic and of individual motorised mobility (because increasing their use or continuing business as usual would lead to unreachable renewable electricity production levels), the EU and European governments must anticipate consequences for workers. As the Cambridge Econometrics authors point out, "efforts must be made to ensure workers who are currently producing legacy technologies are retrained for quality jobs in producing the technologies of the future". Special care must indeed be provided to those who will suffer professionally from the carbon-free transformation of Europe. Public authorities must ensure a fair transition for workers, notably by providing training to learn new skills needed for a decarbonised economy's jobs.

Road Mobility

"Air travel and car journeys are responsible for the largest share – around 30-40% – of the carbon footprint of the highest emitting Europeans. This is in part because of the growth in demand for polluting luxury vehicles such as SUVs which account for a third of new cars sold in the EU today."
Oxfam, 2020 (59)

Introduction

In 2018, within the transport sector, road transport's share was equivalent to 71.7%. Of these road transport-related emissions, 44% were from passenger cars, 9% from light commercial vehicles, and 19% came from heavy-duty vehicles (60).

Car dependency and the fact that only road transport carries 75% of inland freight(61) make road transport the main source of transport emissions by far. "In 2016, more than 70% of passenger journeys were performed by car(62), and car trips represented 81% of the passenger-kilometres travelled in the EU-28, while road freight transport accounted for almost 73% of all tonne-kilometres driven(63)" (European Parliament, 2020) (64).

Furthermore, estimates predict a sharp increase in road mobility: Road passenger transport is expected to grow by 16% during 2010-2030 and 30% during 2010-2050, while road freight transport will increase by 33% by 2030, and 55% by 2050(65). Moreover, the effects of road transport pollution lead to the destruction of biodiversity, worsen the climate crisis and the development of diseases/chronic conditions that considerably decrease our wellbeing and shorten our lifespan. Tyre pollution also accounts for 28% of primary microplastics in the world's oceans (66).

Gruebler (1998), reviewing 300 years of technological history, singles road transport out as the paradigmatic example of a sector where huge activity growth had negatively affected efficiency improvements: Road transport's historic growth has actually hampered innovation into more efficient/sustainable alternatives.

Furthermore, the global transport industry´s revenue is worth $4 trillion (2019), with 67% of its global production in the hands of 10 manufacturers (2017), making governments dependent on them. As such, the system cannot change its functioning, only providing soft sanctions but not hindering the industry. This inequality also translates to everyday citizens, as according to Cambridge's previously cited study (2020) the contribution of the top 1% emitters amounts to 41% for air travel and to 21% for land transport.

This has been paralleled by illegal practices which were not adequately dealt with by the Member States, despite ample evidence of foul play: in 2011 (4 years before the Dieselgate scandal broke) the research body of the European Commission, the Joint Research Centre (JRC), published a report highlighting the large and growing discrepancies between laboratory and on-road emissions, especially for nitrogen oxide (NOX) emissions from diesel cars. Even the test procedure to measure their emissions (i.e. NEDC, -NEDC WLTP) was found to not adequately measure real-life conditions. Yet, governments did not take further action.

Moreover, road transport is worryingly unequal, as wealthier citizens have disproportionately increased their emissions, to the detriment of the rest of society. The International Energy Agency calculated that the luxury car market for Sports Utility Vehicles (SUVs) was the biggest driver of carbon emissions growth from 2010 to 2018 after the power sector. Today, almost half of new cars sold in the USA and a third in the EU are SUVs.

As a matter of fact, T&E suggests that the uptake in the sale of SUVs is partly responsible for the increase in CO2 emissions, given that since 2013 the surge in sales of SUVs has resulted in a CO2 increase of 2.6g/Km, which is 10 times more than the emissions coming from the declining use of Diesel (0.25g/Km).

Land travel (purchase of vehicles, transport fuels and services) drives 32% of the Carbon Footprint (CF) of the top 10%, making it the consumption category with the highest contribution among the biggest emitters (69).

A more worrying factor besides the carbon intensity of SUVs are their sales. While European vehicle sales grew by 1.4% in 2019 (to 15.3 million cars), **more than a third of these sales were SUVs**. Volumes of SUVs and crossovers of every size and price grew by 13% to 5.7 million, **adding 650.000 annual sales** to the automobile sector, which in 2018 grew by 18 percent — or 800.000 units — to 5 million. The latest surge in demand meant that SUVs and crossovers grew to 37 percent of total European sales, up from 33 percent in 2018 and 29 percent in 2017 (70). Similarly, demand for large minivans also increased by 4.5%, while the segment that seemed to fare the worst were (ironically) small cars, the sale of which decreased by more than 150.000 units.

Original Equipment Manufacturers (OEMs) such as Toyota, Volkswagen, or Renault, have an incentive to sell these types of vehicles, as they maximise profit in an industry that is known for having a very slim margin of profit per product, which is why the sale of SUVs as a part of total sales is approaching 50%. As a result, even though EU regulators have been regulating CO2 emissions for almost a decade, carbon emissions from transport have kept rising since 2017 due to the uptake of SUVs (71). Germany is an excellent example of this increase, as well as of the carbon inequality inherent to SUVs, since German high income groups have 10 times more SUVs and Off-Road Vehicles than very low income families, as the below figure indicates.

Last but not least, SUVs, vans and light trucks, sometimes bought because viewed by families as offering greater protection, pose an increased danger to occupants of smaller vehicles and to pedestrians and bicyclists (73).

Reducing Road Mobility Pollution

GCE proposes yearly periodic reviews of CO2 standards, which includes the perspectives from civil society.

These reviews should be supported by best practices, these should be gathered and shared from its implementation in different EU cities. Furthermore, civil society must be involved throughout the process. Individuals can have a great impact, through their consumption habits, the CO2 emissions. This is explicitly demonstrated with the #TrueCostOfUber campaign, which shows the arrival of Uber in London added 23% in CO2 emissions for the taxi and Private Hire Vehicles (PHV) sector in 6 years (74).

The EU should establish stronger constraints on Euro regulations and stronger reglementations on manufacturers.

90% of vehicles circulating in the EU do not respect the Euro 6 regulations (75) on NOx, Particulate Matter, Carbon Monoxides etc. At the same time, vehicle manufacturers and part suppliers must have legally-binding eco-friendly production processes.

Public transport services should be exclusively fueled with renewable energy.

To this end, the Clean Vehicle Directive should only allow for the public procurement of "clean buses" (e.g. not running on natural gas). We support the joint call for revision of the Directive to give priority to zero-emission vehicles and phase out natural gas vehicles (76). In addition, the EU should help/fund small cities to procure electric buses, who then in turn should exchange and apply best practices to reduce costs (e.g. establishing partnerships with other cities across the EU). We support an infrastructure roll-up with priority on the TEN-T network starting with urban and regional delivery (e.g. high-capacity truck re-chargers). Furthermore, the European Investment Fund should support SMEs in their installation of private charging infrastructure. We also call for shifting freight from trucks to trains.

The EU should incentivise MS to promote measures that enable efficient and qualitative teleworking, as often as possible and for as many people as possible.

The COVID-19 crisis was an opportunity to rethink where we work. Increasing the share of EU citizens working from home, even occasionally, has considerable environmental advantages:

substantial reduction in GHG emissions, less congestion, better air quality. In Ireland for example, the most common reason for making a journey is to travel to and from work, and 66% of work trips are made in a car (77). Moreover, additional carbon footprint savings come from teleworking: office energy, roadway repairs, urban heating, office construction, business travel, paper usage, etc.

The EU needs clear and predictable policies, coupled with efficient awareness raising campaigns.

As with the rest of our proposals, for these policies to be successful we need to change human behaviour through a clear and plausible calendar communicated to the public, transparent and understandable account of costs and generated revenues, high standards regarding the allowance of clean vehicles into Low Emission Zones (LEZs), proper enforcement and penalties and, above all, transparency and enforcement.

Another essential way to ensure change in our consumption habits is the promotion of carbon-free lifestyles. EU funds should also be used to finance awareness raising campaigns promoting environmentally-friendly consumption all across Europe. These campaigns should include the promotion of past-private-car lifestyles and particularly of active mobility, while making citizens discover alternatives such as carsharing (car rental where people rent cars for short periods of time).

Tax justice in EU road mobility

GCE demands from EU governments that they end the subsidies (e.g. VAT deductions) on fossil fuel vehicles and PHEVs.

These subsidies currently cost EU citizens €32bn a year(78). Despite the total cost of owning an EV being 9% cheaper than a diesel, last year a striking majority (96%) of companies still registered petrol and diesel cars. Today, 6 out of every 10 cars is a company one, making electrification of the segment 'low hanging fruit' for governments. The fact that company cars drive on average 2.25 times further than private cars makes the transition for the private industry imperative now. GCE demands that by 2025 leasing companies exclusively purchase Zero-Emission vehicles (ZEVs)(79). Furthermore, much like internal combustion engines during Dieselgate, plug-in hybrid electric vehicles (PHEVs) in real-world conditions pollute 2,5 times higher values listed from official tests (80). When driven in battery-charging mode, which could become more common as motorists charge up ahead of using electric mode in low-emissions zones, the PHEVs emitted three to 12 times more (81).

Parallel to this, we must encourage through fiscal and regulatory measures that car producers make their cars more energy efficient and lighter.

GCE calls for a harmonisation of fuel taxes to prevent fuel tourism.

There are still major differences in fuel taxes between member states, even between neighbouring states which leads to fuel tourism (a financial incentive to drive across a national border to fill up more cheaply). For example, France charges €0.61 while Luxembourg rate is €0.35 (82).

GCE demands an end to diesel tax advantages.

Europe, unlike other industrialized countries, gives tax breaks to NOx rich diesel. Truck diesel tax rebates totalled around €4 billion in 2018, up from zero in 1999. EU countries lost €24bn for under-taxed diesel in 2019 (83). Even parity of taxation between petrol and diesel would be favourable for diesel, because it would mean diesel is still taxed 10% less per unit of energy (84).

GCE asks for the introduction of road users charging for lorries and the end of their tax breaks.

Lorries, while accounting for only 2% of the vehicles on EU roads, emit 22% of road transport CO_2 (85). Despite that, in the EU trucks paid on average 5 cents less diesel tax than cars in 2018 (86), and while truck diesel tax rebates were €0 in 1999, they amounted to €2.4 billion in 2018. In Switzerland on the other hand, lorries pay a fair price for every km driven. Similarly, the EU should introduce road user charges for lorries to incentivise modal shift.

Ensuring a swift transition to ZEVs

ZEVs can be polluting as well, albeit almost three times less CO_2 than equivalent in average(87) than its fossil-fuel combustion engine counterpart; the ZEVs energy source can come from fossil fuels (e.g. coal power plant), its batteries' materials are rare, produce waste (leaks lead acid and nickel cadmium), its production is polluting and its mining entails severe social issues. Aluminium and magnesium batteries are being researched as alternatives.

In addition, we support Transport & Environment"s recommendations regarding decarbonising transport through anti-consumerist incentives. Introducing policies to reduce demand for privately-owned transport is vital, as all IPCC scenarios from 2020 to 2050 predict increases in per capita passenger travel demand for all world regions, which will continue to outweigh climate mitigation policies (IPCC, 2014).

GCE demands that public authorities promote walking and cycling over the purchase of vehicles whilst helping Small and Medium Enterprises (SMEs) and families transition to zero emission vehicles (ZEVs).

75% of trips in the EU are below 10km as most citizens live in urban areas, making this policy very feasible (88). It is essential to always promote alternatives, where possible, to the purchase of a car given that the most optimal road mobility is one that doesn't involve a personal vehicle given the enormous needs in materials and energy private vehicles lead to. In 2018 in the EU, the average car ownership rate was 0.51 passenger cars per inhabitant, meaning that over half Europeans own a car (EEA, 2019) (89). This number will need to shrink if we are to respect climate targets as owning a personal vehicle implies very high energy (and materials) consumption.
Actors who depend on the use of vehicles (small businesses, sole traders, charities and low income families in peri-urban and rural areas) should be given targeted financial support to transition to zero-emission alternatives.

GCE calls for a ban on advertisements of SUVs and other fossil fuel-driven combustion engines.

In order to ensure that the sale of SUVs and other internal combustion engine (ICE) vehicles do not continue jeopardising our climate objectives, their advertisements must be banned, drawing lessons from the tobacco advertising case study and the UK's "Badvertising" campaign.

It is also crucial to accompany these measures by restricting their sales, as 38% of new sales are for SUVs in the EU (90). We propose a combination of a tax on vehicle weight and a quota of SUVs to sell for vehicle makers to produce less and to incentivise the sale of lighter vehicles.

GCE calls for a ban on ICE sales, including hybrids, by 2028, and for an increase in the fleet and funding of Zero-Emission Vehicles (ZEVs).

As such, and taking into account the turnover of the fleet (over a decade), sales of ZEVs in 2028 should reach 100% through a ZEV mandate(91) (excluding the small-volume manufacturers - less than 4500 vehicles sold annually - and putting special emphasis on SUVs), and add ZEVs quotas on traditionally polluting sectors. Given that GCE believes that the EU should be a carbon-neutral area before 2050, it is essential to put an end to fossil powered vehicles as early as possible(92).
Public financial aid related to ZEVs (infrastructure, manufacturers, suppliers) should be conditional upon renewable sources of energy, sustainable extraction of materials and human wellbeing in the value chain both in the EU and abroad. This should be paralleled by policies such as a minimum number of traffic-free areas in urban city centres and standards enabling cross-border recognition of vehicle characteristics (i.e. size, weight, CO2 emissions and Euro standards), as well as a detailed chart regarding ZEV performances, polluting rates, etc. compared to fossil-fuel engines in order to increase transparency. In addition, the European Investment Fund and the European Investment Bank should support Small and Medium Enterprises (SMEs) in their acquisition of ZEVs and the installation of private charging infrastructure.

GCE demands that the EU ensures a faster and homogenous development of charging points all across Europe.

The Alternative Fuels Infrastructure Directive requires Member States to have an appropriate number of charging points defined in relation to their territory. However, the development of charging points across Europe is heterogeneous and it is well known that the development of electric vehicles is taking place in parallel with the development of charging points. Estimates suggest that we need 1.3 million charging points by 2025, and 3 million by 2030 to meet our targets (93). GCE recommends that their development be homogeneous across the EU to ensure their equal access to all citizens thanks to binding targets. Only €2 billion in investment are needed per year to deploy public charging infrastructure for electric vehicles until 2030 in the EU(94). Therefore, a growing part of EU funds should be oriented towards EVs charging points.

Push to 100% electrification of car-sharing companies' fleets.

Shared electric mobility is key to solving congestion and pollution problems and to solve car dependency. The expensive upfront costs of electric vehicles can be eased in the long run for the shared mobility companies, due to the high use of the vehicles and the lower maintenance and fuel costs compared to fossil fuelled private vehicles.

Push to 100% electrification of public authorities' vehicles.

All public authorities (local, regional and national authorities) should adopt a roadmap to reach 100% ZEVs for public vehicles by 2030.

Ensuring high standards for EVs materials

To ensure a successful energy transition, the extraction of rare materials needs to increase. Rare materials are indeed increasingly needed as electric mobility is developing. The extraction of rare materials to cover the needs of EVs is increasingly put under scrutiny because it is responsible for a growing pollution where these materials are extracted (China, DRC, Chile, etc.)

GCE believes the EU should ensure that imported materials respect high sustainability and social standards.

Production of batteries for electric cars puts pressure on the extraction of lithium, cobalt, nickel, manganese and platinum and leads to a destructive and growing pollution, the effects of which Europeans do not suffer from (European Environmental Bureau, 2019) (95). In order to reduce pollution in third countries, Europe should aim to extract more of these materials from European soil when possible, while improving extraction conditions overseas. EU regulatory measures on mining and sourcing raw materials, be it in the EU or elsewhere, should ensure binding sustainable and responsible practices whilst respecting human dignity and workers' rights in the process.

GCE calls for the EU to implement an effective circular economy regulatory framework to help companies and households recycle rare materials effectively.

The EU needs to import more than 90% of its rare earth elements, mainly from China(96). Circularity of metals and recycling of raw materials from low carbon technologies are essential, yet "significant amounts of resources leave Europe in the form of wastes and scrap, which are potentially recyclable into secondary raw materials" (European Commission, 2018). This needs to change to ensure that used materials remain in the EU and are adequately recycled for reuse.

Rural Mobility

"Transport poverty or lack of connectivity was never properly defined and communicated to the transport sector, yet it is a problem that adversely affects the daily lives of millions of people across the globe"
Luis Camarero & Jesús Oliva (97)

Introduction

Mobility is at the heart of all territories and a major issue when it comes to the spatial distribution of economic activity and public services. Implementing sustainable urban and rural mobility policies is thus necessary for everyone's health and the environment, but also for equality purposes.

While sustainable urban mobility is already very high on the European agenda, rural mobility is a forgotten part of European mobility policies, though being unmissable considering overall sustainable mobility. Indeed, rural areas tend to have a higher carbon footprint because of a greater use of private cars. A study evidences that German cities with 5.000 inhabitants have an overall carbon footprint per capita 13% superior to that of inhabitants in German cities with 100.000 to 500.000 inhabitants (98). This is due to the scarcity and spread of services, which ties rural dwellers to owning a private car. For instance, more than 63% of the Spanish rural population do not use public transport compared to 11.6% for the urban population (Camarero & Oliva, 2019). Moreover, while many rural areas had developed around railway stations, these are gradually closing down, diminishing more and more the alternatives to private cars. Since 1994, in Germany, 3,600 kms of passenger train paths and 6.000 kms of freight train paths have closed (99). In the UK, "The 27.171 route-km open in 1963 were reduced by about 30% to 18.878 in 1975. In the same period 45% of the passenger stations and 59% of the freight depots were closed" (100). Those are two examples of a general trend of closing rail routes to the benefit of roads in the last century, which entailed especially the closing of more modest, unprofitable, rural stations and routes. This contributed to reducing the possibility for rural dwellers to enjoy any alternative to the individual car.

Rural areas have to face specific characteristics (massive rural emigration, austerity policies, and territorial concentration of key services) which led rural communities into precarious situations risking to degrade even more with the effects of the recent pandemic (101).

Given that rural areas face multiple and deeper challenges in their transition to clean mobility, it is of paramount importance for the EU to help rural communities transition to a carbon-free mobility.

Raise the issue on the EU agenda.

Rural mobility has not been widely considered as an issue in its own right, both in European and Member State's mobility policies. Indeed, it is usually in rural development, tourism, agricultural, or broader mobility policies, which often reduces the rural mobility issue as very peripheral, if tackled at all. However, rural mobility has to be taken into account for designing both a comprehensive sustainable mobility policy, and for addressing its specificities. The actual legislative vacuum reflects the urbanisation trend that has been ongoing for the last centuries in Europe and the world, and has been steadily supported and reinforced by policy choices in mobility and spatial planning. Rural mobility is thus also linked to the broader topic of urban/spatial planning. We thus propose first to build a European-wide policy specifically tackling the issue of rural mobility that would be a reference in said matter.
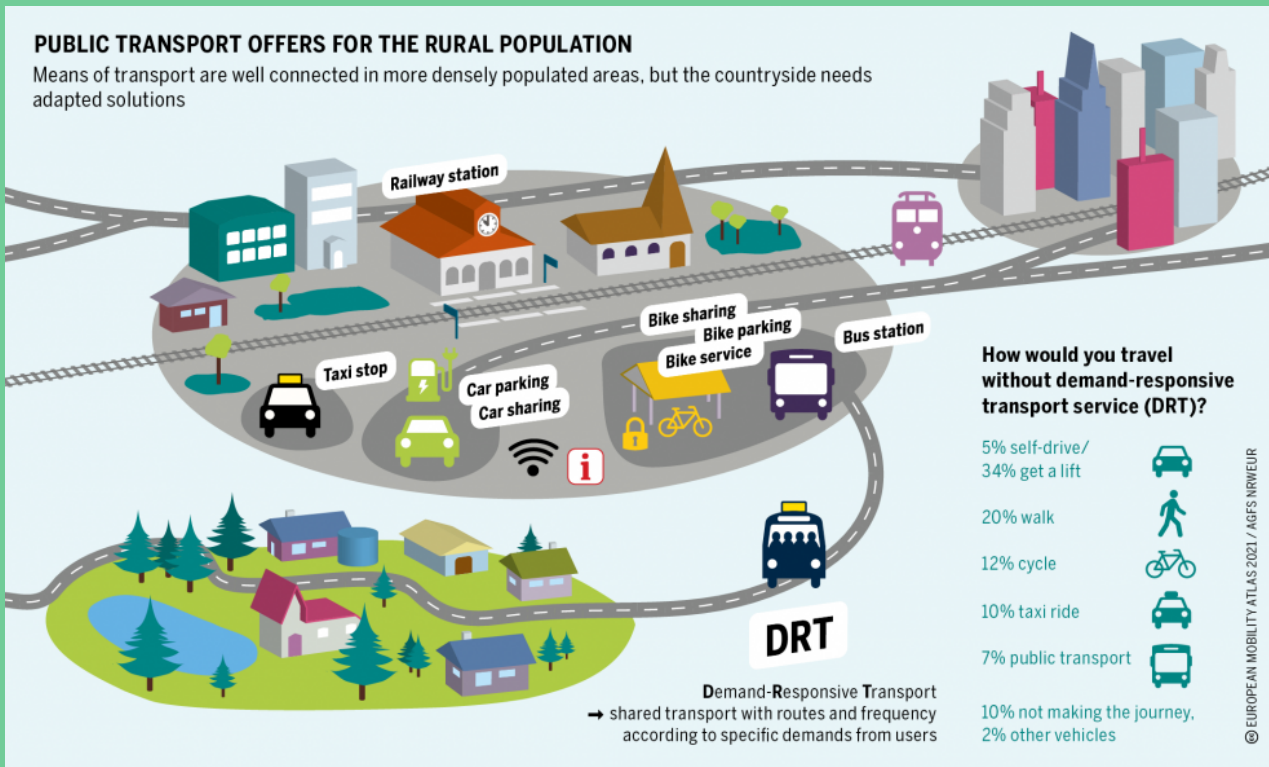
Figure 15: Public Transport offers for the rural population. Source: Heinrich-Böll-Stiftung (102)

Ensure an adequate development of carpooling car parks.

Due to the major deficit of transportation alternatives in rural areas, the motorisation rate per individual is very high (see above). The costs to develop an alternative collective transport infrastructure in rural areas are prohibitive and providing individuals with a secure alternative to the individual car is both technically and financially complicated in rural areas. Carpooling represents a quick and easy alternative to people driving alone in 5 seater cars. As far as the data can tell us, passenger car occupancy is falling. The average number of passengers per car (including the driver) for the EU countries sampled between 2004 and 2008 is approximately 1.5 passengers per vehicle (EEA, 2010) (103). Moving beyond car dependency by sharing cars requires the planning or construction of dedicated carpooling car parks. National and local authorities can also promote carpooling, for example by setting up a public, free of charge e-platform for drivers sharing the same needs to find each other.

Facilitate the development of car sharing services all across Europe to help citizens move beyond car dependency.

The development of car sharing services should be facilitated to ensure that these services are available to most citizens living in rural areas. When private companies do not offer these services, local authorities should consider offering these services themselves, or through a Private Public Partnership (PPP).

GCE calls to develop Demand-Responsive Transport in most isolated rural areas.

Demand-Responsive Transport corresponds to shared transport with routes and frequency according to specific demands from users. The advantages of on-demand transport are diverse, allowing both spatial and temporal flexibility, ideal for rural areas where a daily network does not exist. In addition, the solution has a limited environmental impact as well as a financial impact since fewer vehicles are on the road. The development of Demand-Responsive Demand would provide an alternative to the use of private cars but also help isolated people in rural areas who cannot drive or

access a car.

GCE calls for lower speed limits on motorways to at least 110 km/h.

Generation Climate Europe calls on national governments to adopt at least 110 km/h limits on highways. Fuel savings can be achieved by restricting vehicles' speed (eco-driving). The EEA calculated that cutting motorway speed limits from 120 to 110 km/h could deliver fuel savings for current technology passenger cars from–18% (assuming smooth driving and 100% compliance with speed limits) to -2%. According to the EU agency, cutting speed "can also significantly reduce emissions of other pollutants, particularly reducing NOx and particulate matter (PM) output from diesel vehicles. The safety gains from slower driving are also indisputable" (104).

When train connections are not possible, bus connections must be enhanced between rural and urban areas and in peri-urban and rural areas.

Bus connections in rural areas are essential to both fight transport poverty and car dependency. Bus connections must be daily and cover needs from morning to evening.

GCE calls for the improvement of intermodality.

Rural-urban linkages need to be more efficient and lower their carbon footprint. Usually, when journeys have too frequent interchanges between transport modes and travel fares are too high, people will opt for the private car, and for those who can't afford it their mobility choices would be limited. This is where intermodal mobility can help to fill the gap. Defined as the way of involving two or more transport modes in one single journey, intermodality can leverage better transport operator cooperation resulting in ticketing, fares, timetable, and interchange standardisation. The use of Information and Communication Technology (ICT) (centralised information on a single platform) is important for users for journey planning and anticipation. An efficient planned intermodal system is necessary to improve rural-urban linkages and discourage users to use private transport to decrease carbon emissions (105). In order to densify interconnectivity in peri-urban, and between rural and urban areas, innovative tram-train services and shuttles should be further developed.

GCE calls for the set up of integrated land use and transport planning.

Transport planning interacts with many sectors such as healthcare, employment, education, housing and energy. Even if planning is usually done in isolation, land use and transport planning should not be separated. Any mobility development should be centred on transport planning. Integrating land use and transport in the planning process can avoid unnecessary trips and thus, carbon emission, but can also raise awareness of low carbon mobility alternatives and reduce urban sprawl (106). Good integration and links between rural and urban areas enable to reduce the reliance on private cars. Vauban district in Freiburg, Germany is a good example of an area that used an initial integrated planning process based on transport. It created excellent access to the city centre and helped to reduce car usage (16% of all trips) (107). The city of Leipzig in Germany is also an example of an integrated mobility structure where smart technologies (application, real time information, shared bicycles etc.) and local and regional collaboration allowed to reduce urban sprawl by increasing rural-urban linkages and incentivise people to come back to the city centre (108). Including rural areas and considering rural mobility in transport planning is crucial to improve access of these populations to services and infrastructures. Thus, integration in the planning process is essential as it will increase profitability, efficiency and the possibility to share costs and revenues. Such partnerships can help rural populations to have better access to cities and their surroundings, reducing their reliance on private transport.

GCE calls for the union of mobility option between urban and rural areas

To support inclusive and efficient mobility policies, rural-urban links should be addressed in terms of people, goods, services, and knowledge. The fact that 80% of the rural population live close to urban areas and more people will live in cities in the future, the need to find innovative ways of linking rural to urban areas is increasing (109).

Urban Mobility

"The outcome of the city will depend on the race between the automobile and the elevator, and anyone who bets on the elevator is crazy."
Frank Lloyd Wright

Introduction

The European Union is already working with cities, conurbations and regions to implement a sustainable urban mobility policy, including efficient public transport systems and good connectivity throughout the territory of EU Member States. However, even if the first policies are put in place, there is still a long way to go for the development of sustainable urban territories. Improving mobility while reducing congestion and pollution is a challenge shared by all European cities. The cost of congestion in Europe remains extremely high, estimated at around €130 billion annually, or just over one percent of the EU's GDP, by 2017 European Commission study (110).

Urban mobility accounts for 40% of all CO2 emissions of road transport and up to 70% of other pollutants from transport(111). Transport is indeed the first cause of air pollution in Europe (112). The scientific literature is clear, as more than 70.000 studies demonstrate the negative effect of air pollution on health, mainly caused by the use of motor vehicles (113). This includes 8.8 million premature deaths a year worldwide, 400.000 of which are in the EU with 1 in every 8 deaths caused by the environment (EEA, 2019) (114), leading to heart attacks, strokes, dementia, miscarriages, infant health problems, bronchitis, asthma, and type II diabetes among many others. Air pollution is estimated to cost the European economy between €427bn and €790bn per year while it is also a social justice matter as people living in areas with poor air quality are also more susceptible to die of COVID-19(115).

European cities are facing daunting problems in meeting air quality legal standards (116). The 2020 EEA air quality report underlines that road transport's main contribution to air pollution is nitrogen oxides (NOx) accounting for 39% of total Europe NOx emission(117). 4% of the European population is exposed to NOx concentration above WHO standards. and NOx pollution is responsible for 55,000 deaths annually in Europe. Unequal access to clean air is another problem: "People living on low incomes are, in large parts of Europe, more likely to live next to busy roads" (EEA, 2020) (118). Many poor households, by lack of alternative, are indeed forced to live in the most polluted parts of cities and therefore exposed to higher levels of urban pollutants (EEA, 2018) (119).

Noise pollution also causes physical and mental health issues(120). It is the second most important cause of ill health in Western Europe, behind air pollution(121). Exposure to it may be involved in the development of "some breast cancers, psychological stress exacerbating respiratory diseases and rising levels of depression and anxiety. The EEA estimates that 100 million people in the EU are exposed to higher than recommended noise levels and are thus likely to develop ill health (122).

For cities and conurbations to adopt tougher regulations on vehicles and to give back roads - most of public space in cities - for active mobility, the EU has a role to play in supporting municipalities financially and by promoting best practices. Cities must now take bold decisions.

Measures at EU Level

GCE calls on the European Commission to properly enforce EU air quality standards.

About 130 cities across Europe do not meet EU air quality standards (123). The European Commission must ensure the proper enforcement of the Air Quality Directive or take strict legal

action to enforce air quality standards.

GCE calls on the EU to introduce a grant scheme to support cities developing adequate public transport, with special attention to least connected and poor neighbourhoods.

EU fundings should also be increased for cities to develop their carbon-free public transport options. Special attention should be given to the development of public transport in the most isolated and poor neighborhoods. The latter tend to be discriminated against in public transport services. As Mutsumi Mizuno puts it *"This time, the question is not whether Rosa Parks can sit at the front of the bus – it's whether she gets to ride the bus at all."* Discrimination in transportation is no longer a matter of racism but of wealth. Indeed, many poor people find public transportation services inadequate (124). Similarly, disabled people still suffer too often from inaccessibility (e.g. no access for wheelchairs) (125). Enforcement of anti-discriminatory laws for all modes of public transport should be strengthened because affordable and accessible public transport is a prerequisite for a successful ecological transition.

GCE calls on the EU to establish a grant scheme to support cities purchasing zero-emission vehicles.

A scheme that will be fully compatible with existing national and European funding schemes. That way, by the mid 2020s, all the newly purchased buses, refuse collection trucks and municipal vans could be zero-emission vehicles. The EU and its Member States should also support cities in the funding for public transport, cycling and walking strategies.

GCE calls on the EU to introduce a grand scheme to support the development of active mobility and active delivery.

Introduce an active mobility grant scheme for cities for developing cycling and walking infrastructure, as well as improving the existing ones, or increase the funding from existing schemes. The great walk of Athens(126) and Milan's plans for new 35km bike lanes (127) are examples of such infrastructure development. The scheme could also be used for subsidizing the purchase of new e-bicycles and cargo e-bikes and increasing the availability of public e-bike fleets.

Measures at local level

GCE calls for major cities to considerably expand Low Emission Zones (LEZ).

Limiting car speed to 30 km/h presents various benefits to cities and their inhabitants (cleaner air, less noise and emissions and safer roads). The risk of a pedestrian dying is indeed 5 times higher at 50 km/h than it is at 30 km/h (128). Special rules should be considered for LEZ residents and disabled people. A package of countermeasures should also be adopted against speeding through road engineering measures (e.g. speed bumps).

GCE calls on cities to adopt bold measures to take back cities from private vehicles.

Cities were reshaped in the 20th century to be hubs for cars. Roads now take a disproportionate amount of space in most cities. It is time for active mobility and public transport to take back cities from private vehicles. For this, cities should:
- Introduce smart kilometre charge urban tolls for major cities.
- Introduce a monthly car free-day. One car-free day per month, breaks up mobility-routines and allows people to explore other forms of mobility.
- Expand car-free areas in city centres.
- Forbid access of some dangerous and/or underused roads to private vehicles and expand one-

way streets, leaving both ways for bikes
- Make cyclists safer by expanding considerably bike lanes and advantage bikes over cars at intersections

GCE calls on major EU cities to ban diesel cars and lorries by 2025.

NOx in cities mainly originates from the emissions of diesel vehicles, according to a 2019 European Commission report (129). Indeed, except in Greece, diesel fuelled vehicles are responsible for the bulk of road transport NOx emissions across all EU countries (130). In the 30 European cities analysed in the report, 47% of NOX emissions are caused by transport on average.
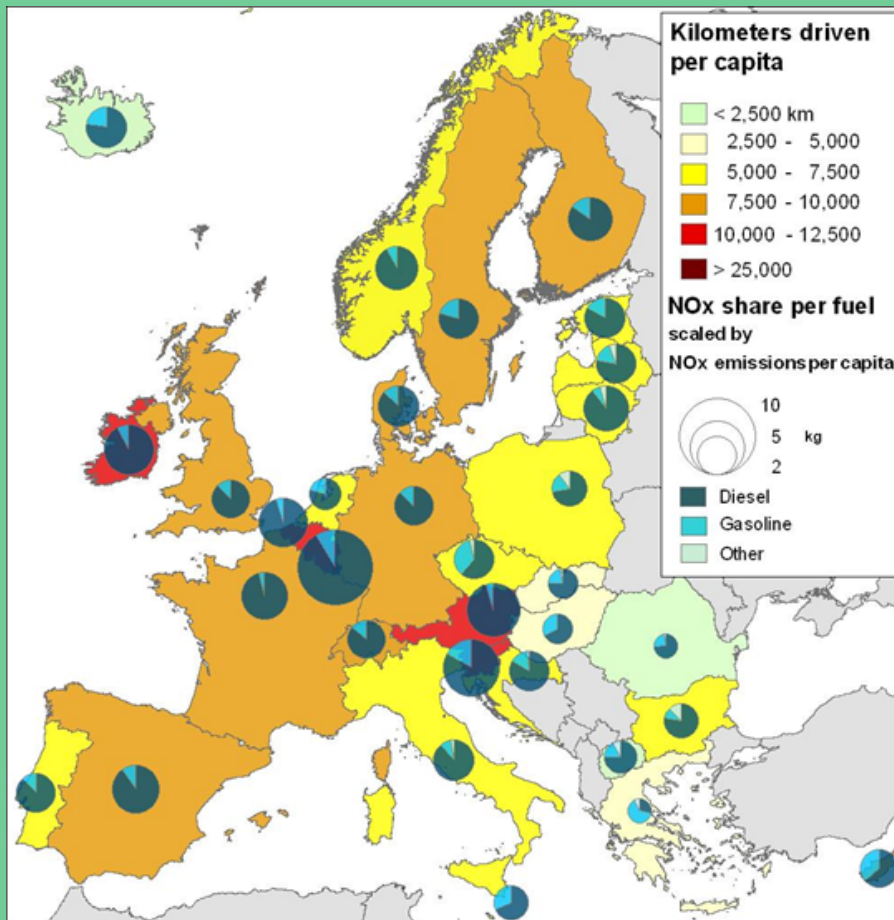
Figure 16: Kilometers driven per capita in the EU in 2019. Source: European Commission, 2019 (131)

In a move to reduce NOx emissions, Milan plans to ban all diesels by 2025 (132). Other major European cities should follow suit and give incentives for alternative mobility.

GCE calls on EU cities to gradually reduce the number of parking lots in the city centers.

It is estimated that cars are being used only between 3 and 5% of the time (133; 134). Most of a car's life is therefore spent on parking lots. In cities, availability of parking lots is strongly correlated with car ownership and has proven to reinforce car dependency (135). European cities should gradually reduce the number of parking lots and dedicated car parks at the entrance of cities and close to public transport connections for visitors.

GCE calls on cities to give the advantage to electric vehicles (EVs).

Beyond promoting public transport, cities should quickly adopt temporary regulations that benefit 100% electrified car-sharing companies and EVs owners, for example with free parking and free access to the inner city (136).

GCE calls on cities to go green.

Initiatives to bring greenness back into cities must be actively promoted. Trees are key to fighting urban heat, yet, they tend to be where rich people live. It is well documented that trees protect from the heat. Given that trees are mostly planted in rich neighborhoods, they tend to remain colder, leading to a strong correlation between heat and income (137). Besides trees, municipalities, where possible, should replace sites, streets, or parts of streets made of concrete with city gardens. This proves to have various advantages (increase farming skills, community-sense and improve mental and physical health) (138). Cities should also slow down their expansion by building up instead of further.

GCE calls on anti-car policies to be furthered and accompanied with reductions of public transport ticket prices and the development of public transport options.

Given that anti-car policies reach their full potential only when coupled with the promotion of public transport and active mobility, we call on cities to match anti-car policies with a reduction in public transport prices and an increase in their options and enhancing their accessibility. Given that cities often have thin financial room for maneuver, they should use taxes on dirty mobility (e.g. urban tolls and parking charges) to invest in their public transport. Member States, with considerably greater fiscal powers, should also help cities maintain accessible public transport. Cities should also consider subsidising tickets for young and poor people.

GCE calls on cities to promote the use of cargo bikes in cities.

The growth of e-commerce, number of vehicles and pedestrianisation make the "last kilometre" of urban deliveries increasingly difficult. Since 2008, van mileage has increased by a fifth, and vans now contribute to 15% of traffic and to over 30% of NOx and particulate emissions (139). It is estimated that about half of all motorised trips for the transport of goods within European cities could be shifted to bicycles thanks to modern cargo bikes and bike trailers (140). Active delivery strategies in cities must be developed in parallel to active mobility.

Rail

"Rail could play a key role in the future transport system because it is clean, safe and reliable, and it could become a symbol for the European Green Deal. Europe needs to become more climate friendly, and Europe needs to grow closer together"
Europe on Rail, 2020 (141)

Introduction

Rail is the cleanest and most energy-efficient mode of transport (142). EU rail makes up less than 1% of the EU's total transport emissions (143) as a result of its high degree of electrification, enabling low-carbon energy to play a central role (144). *"Rail is the cleanest mode of transport. A flight from Paris to Berlin causes at least six times the CO2 emissions of a train journey. Counting also the non-CO2 impacts of aviation, the flight is responsible for 18 times the climate impact of a rail trip"* (145). With further electrification and decarbonisation of power generation, the climate impact of rail could be reduced to close to zero. Rail is also the motorised mode of transport that best respects the user-pays and polluter-pays principles (146). Despite rail being the cleanest mode of transport, its low-carbon potential is structurally untapped for both passengers and goods. Indeed, only 7% of passengers and 11% of goods travel by rail (147).

f used to its full potential, rail transport could significantly contribute to the enhanced 2030 EU emission reduction target. To increase this potential, the EU set several goals for rail in its 2011 White Paper on Transport (148) such as creating a truly European High Speed Rail Network by 2050, shifting road freight and passenger traffic to rail, connecting all airports and seaports to the rail network, and shifting the majority of medium distance passenger transport to rail. This would mean intermodality has to be organised to make rail the future centrepiece of European mobilities.
With transport's decarbonisation being the primary goal and challenge for the next decades, using more sustainable, energy-efficient, and innovative modes of transport such as trains, must be at the centre of mobility policies. Therefore, the following section focuses on how rail transport can help reduce the emissions of the transport sector. Moreover, the following section outlines multiple recommendations on how rail can contribute to the sector's emission's reduction targets.

More recently, the designation of 2021 as the *European Year of the Rail* (149) in combination with the full implementation of the Fourth Railway Package (150) in the same year and the Strategy for Sustainable and Smart Mobility (151) will renew the emphasis on rail as a significant player in all future multimodal transport. The rail system in the EU is currently not more than a patchwork of national systems, with no comprehensive European strategy.

These legislative and promotional activities in combination with the slump in the airline industry caused by the global pandemic, could prove to be the final push to achieving an efficient Single European Railway Area. *"The rail sector employs more than 2.3 million people (directly and indirectly) and creates a gross value added of €143 billion, of which €66 billion is created directly by the sector. This is larger than the gross value added of air transport"* (152). Moreover, investing in the European rail renaissance would give a green boost to the European economy post-Covid-19.

Beyond connectivity, costs are also an important barrier to the development of rail and to the modal shift from road and air to rail, for both passengers and goods. Reducing costs is essential to make rail more appealing and is therefore key for the modal shift.

Nevertheless, considerable work remains to be done, specifically regarding further reduction of emissions, reducing costs for passengers, goods and railway companies, and regarding the enhancement of connectivity.

Lastly, railway operators tend to use considerable amounts of glyphosate to weed railways(153). They must phase out the use of glyphosate and use alternatives to this dangerous herbicide.

Reducing emissions

- ### Renewable energy and a greener fleet

Continuing the electrification of railway infrastructure and ensuring renewable electricity.

Electrification remains an efficient solution for most of the railway lines to eliminate fossil fuels in the rail sector. There is, however, still a huge gap between member states when it comes to the percentage of electrified railway lines (154; see annex). We would like to see the countries lagging behind catching up by increasing investments in electrification in the short term, supported by EU investments. Electrification and the procurement of renewable electricity sources should go hand-in-hand.

Invest in a modern fleet of zero-emission and energy-efficient rail vehicles and driving.

Technological advancements are bringing energy savings to the rail sector. Therefore GCE underscores the importance of modernising the rail fleet, equipped with the newest technology, or - where possible - to recondition technological components. A zero-emission purchasing policy should ensure that these new rail vehicles include fossil fuel-free and future-proof driving technology, whether it is electricity, e-battery or hydrogen. Lastly, the automation of certain tasks such as acceleration, braking and coupling wagons has a huge potential for gaining both time- and energy-efficiency.

Create an eco- or energy label for rail vehicles to indicate their energy-efficiency and climate impact.

Introducing an eco-labelling methodology enables consumers to get a true indication of the climate impact of their rail journey, and encourages investors to invest in rail vehicles that are optimal for reducing emissions. This will also stimulate the development of more energy-efficient rail vehicles and as a result reduce energy costs in the rail sector. Energy standards, such as EN 50591, are key to evaluate the energy consumption and to adequately label rail vehicles.

Convert the remaining unelectrified rail connections in the EU to zero-emission alternatives.

46% of all railway lines are yet to be electrified, and this process is both extremely time-consuming and expensive. In recent years, some Fuel-Cell Hydrogen (FCH) passenger train prototypes have been developed and tested. The interest of many Public Transport Authorities (PTAs), both in EU and abroad for this technology has led to orders being placed in Austria and Germany for small fleets of vehicles to be put into service in 2021 – 2023. Several different OEMs are therefore committed to deliver FCH powered trains and intend to enter the market(155). Under the condition that hydrogen is fully powered by renewable energy and that its challenges are solved (i.e. fragmented regulatory environment), GCE encourages its deployment as a short-term solution to zero-emission rail.

- ### Shifting from Aviation to Rail

Improving High Speed Rail (HSR) connections between all European capitals.

GCE firmly believes in shifting the majority of consumer's preferences from air-travel to train travel. Air travel is the most carbon-intensive mode of transport and it was recently estimated that the

sector's overall share of responsibility in climate change is expected to triple by 2050. The drastically increasing climate impact of the sector could be reduced by utilizing rail instead, which is its closest substitute for distances below 1.000 km while also being the most energy-efficient motorised mode of in-land transport(156). Hence, there are 2 policies that should be adopted at EU level, which aim at enhancing and accelerating the transition from aviation to rail to reduce emissions in the transport sector. 17 of the 20 most frequented air routes in Europe are for distances less than 700 km (157). These journeys could be very easily shifted to rail, this is why improving rail connectivity on these routes must be prioritised.

The European Court of Auditors in a special report finds that the European planning on the development of HSR infrastructure has been nothing short of incomplete and inefficient(158). Since the beginning of this century and on an EU level, €23.7 billion has been spent on advancing the HSR infrastructure of HSR, but results show the project under-achieving mainly due to a lack of coordination and cooperation between Member States(159). Consequently, HSR network lines lack intra-EU connections between Europe's biggest cities, a major hurdle in the process of shifting from aviation to rail. Therefore, in the upcoming revision of the Trans-European Transport (TEN-T) Regulation, GCE urges the European Union to better enforce cross-border cooperation among Member States to improve existing HSR connections between Europe's biggest cities and construct new ones. Additionally, the technical standards used in evaluating the compliance rates and efficiency of TEN-T network need to be specified and developed to capture the real progress of the project, as a recent report shows that current standards might be hindering an objective evaluation of the network(160). Therefore, the development of the TEN-T network should be a priority for the EU since its completion is estimated to create €4.5 trillion cumulated GDP.

The investments needed for the realisation of the Trans-European Transport (TEN-T) core network is estimated to create €4.5 trillion cumulated GDP and 13 million job-years EU-wide.

Furthermore, GCE welcomes the pledge of EU transport ministers to revitalise the Trans-Europe Express network including the improvement of high-speed rail connections between focal European cities and the modernisation of night trains. These are positive developments, nevertheless GCE expects that in the short term more concrete actions seeking to realise these goals will follow.

Revitalising trains

As research indicates(161), night trains are a viable alternative to flights, but their services have witnessed a significant decline over the last couple of decades. Reasons for observing such a decline in night train services are the fierce and unequal competition with low-cost airlines, but also the decreasing volumes of investment in these services. However, the revitalisation of night trains to curb the EU's transport emissions is a crucial step towards achieving net-zero emissions by 2050. As a result, GCE urges the European Commission to revitalise the night train network in the EU by (see Annex):

- **Establishing night train connections between major European cities** including the most peripheral capitals of the Union; an important step towards fostering sustainable intra-EU travels.
- **Reducing the price of train tickets for the consumer.** The ERA (2020) finds that to make night trains more competitive with short distance flights, passengers should have access to more affordable rail tickets, this can be done by subsidising the purchase of train tickets, and reducing track access charges. Night trains should be more clearly categorised as a distinct market segment, by amending Directive 2012/34/EU.
- **Mechanisms to purchase new night trains**. Night train operators have an especially hard time finding trains that can operate in more than one country and interoperable rolling stock. The EU should incentivise operators to buy new night trains or retrofitting the existing fleet (162), create a mechanism to overcome the lack of rolling stock, and consider establishing a publicly managed

rolling stock pool. In this way, the EU would show the feasibility of revitalising night trains as this remains one of the most significant cost hurdles to introducing new routes or continuing to operate current ones.

- **Shifting from Road to Rail**

Create a European label for goods through which citizens can check if goods were transported in a sustainable way.

In line with art. 3, §1a of the Decision on a European Year of Rail (163), GCE supports the creation of a label which would enable citizens to check if goods were transported sustainably and adjust their behavior accordingly. This would encourage businesses to switch their transport from road and aviation to rail.

Promote rail transportation during the EU Year of the Rail and lead by example.

The European Year of the Rail should put (international) train travel at the forefront and actively encourage all citizens, in particular young people, to make use of it as a sustainable alternative to flying and driving a car. In this respect, it is important to consider the diversity and differences among citizens (financial means, rural vs. urban areas, age) and between Member States. We expect the Commissioners, EU civil servants and our heads of State and Government and their ministers to lead by example in this respect.

Create a travel policy for the staff of the European institutions and other public authorities, obliging them to take the train if they can reach their destination within 8 hours.

It will not be sufficient for Commissioners to take the train once in a while to promote rail. The modal shift implies that taking the train for international journeys becomes mainstream. Moreover, the COVID-19 proved to everyone that e-meetings are always possible. To ensure this, the European institutions and their national governments should introduce a sustainable travel policy for their members and staff for all work-related travel. An obligatory journey by train of up to 8 hours seems fair whereas voluntary train travelling for longer distances is very welcome. Several NGOs and universities have already adopted such a policy (164).

Improving Connectivity and make rail more appealing

- **Stop prioritising high-speed lines**

GCE believes that EU funding shouldn't prioritise high-speed lines.

Cross-border passenger rail connections are being closed and services cancelled, despite passenger demand. The focus on expensive high-speed rail infrastructure and services, which receive beneficial treatment from EU funds, feeds this harmful trend (165).

"Too much money also goes into mega-projects with exploding costs and long delays. The European Court of Auditors (2018) cautioned that rail infrastructure projects were often chosen based on political decisions and not on thorough cost-benefit analyses. The evaluated high-speed projects took 16 years on average, cost on average €25 million per track km, but often do not deliver on expectations: average speeds rarely reach 200 km/h, and only few lines transported more than nine million passengers per year (the benchmark for a successful high-speed line)" (166).

Moreover, the cost of building and maintaining high-speed lines has taken its toll on regional and local lines. For example, 13.1% of the entire length of the French network was closed between 1998 and 2018 and many regional lines all over Europe are in urgent need of renewal (167). Similarly, small

cale interventions with greater European potential are often not implemented. This could be transitioning all railway lines to zero-emissions, building a second track or bypasses to increase capacity and speed, or minimise gaps between borders. For example, there were once 24 rail links between Germany and Poland and today only seven remain in operation while only the border crossing at Frankfurt (an der Oder) is electrified (168).

Connecting Europe Facility (CEF) funding and other EU fundings should only go into projects that are key to cross-border connectivity (e.g. for key corridors) and their electrification, and should focus more on low-hanging fruits than on new mega-projects. Such interventions should be based on sound cost-benefit analysis. European governments should invest in the often under-financed regional and local lines and focus on small-scale interventions as well as on the projects essential for intra-European rail services.

- **Europeanise rail and remove barriers to international services (extracted from the Europe on Rail network report Hop on Rail: A Rail Renaissance for Europe (169))**

Remove administrative obstacles to international services.

A European Commission report found that out of 202 operational cross-border rail links, only 57 were fully exploited in 2017 (European Commission 2018) (170). Administrative hurdles make international services less attractive for operators. For example: they need to apply for track capacity with various infrastructure managers; drivers are required to speak several languages; and rolling stock needs to be designed and licensed for different national electricity, signalling and safety systems.

Europeanise rail planning.

Another important obstacle to international rail services is the inherent national perspective rail actors have. Incumbent operators focus on their national market (especially on lucrative main routes) and often lack an international vision and experience (e.g. market potential, administrative). Trains stop 'at every haystack', which might make sense from a national perspective, but leads to additional travel times for international services.

A Stronger Voice for European rail thanks to a stronger European Rail Agency.

International rail has no strong voice in the current system because member states and incumbent railway operators tend to focus on their own national markets. There is also a lack of coordination of infrastructure managers across borders. The EU should strengthen the European Rail Agency (ERA) as a traffic control and coordination authority for international rail transport. The ERA should be entrusted with forecasting demand, assessing the level of required services (destination, frequency, speed) and allocating capacities. The ERA could identify routes that may be of interest to travellers but which are not yet fully exploited, and could make this information available to train operators. It could also determine which sections of the desired network services would be commercially viable and where public service obligations (PSOs) would be needed in order to guarantee a service.

- **New rules to make European Rail more appealing and facilitate purchase of international tickets**

The EU needs to establish rules to guarantee that international rail passengers arrive at their final destination and can hop on the next train in case of missed train connections. Rail passengers often need to buy individual tickets from different rail operators for a multi-leg journey—and under current

rules passengers bear the risk if a connection is missed.

The EU needs to require rail operators to share all necessary data for easy booking of international rail trips.

Generation Climate Europe sees a dire need to reform the EU-wide integrated ticketing and payment system as there is no legal framework for establishing a single access point, or one stop-shop, operators are reluctant to share the necessary data among them or with independent ticket vendors (171). EU law currently obliges transport operators to share only some basic data, such as static travel and traffic data (Intelligent Transport Systems (ITS) Directive). The regulation does not cover fare data and also leaves it open to member states to require dynamic travel and traffic data (e.g. information on platform numbers and changes, accurate seat plans, real-time delays and cancellations, predicted arrival time), this creates fragmentations in the market.
As such our demand is to create such a system to, on the one hand, make rail travel as easy and attractive as possible, and, on the other hand, ensure that timetables and ticketing of all trains are available to third parties in an open data format. A key hurdle for the promotion of rail travel remains that information on fares may vary considerably from platform to platform for the same exact train. A solution would be to revise regulation EU 1926/2017 to make access to both static and dynamic data mandatory, require sharing data via an open Application Programming Interface, and allow vendors to assemble their own discount packages.

GCE recognises the impact that the collection, use and exploitation of citizen's data has had on our rights and democracies, we therefore recommend in the strongest possible terms that any policy involving data collection must be transparent and safeguard people's integrity and digital rights.

Harmonise rail fiscality to facilitate international journeys.

Seven EU member states still apply VAT on international journeys (172). Harmonising rail fiscality across Europe would facilitate and encourage international train journeys.

Establish a single European transportation card.

A single ticket that would allow passengers to travel using different modes of transport, provided by all transport operators across the EU. The purpose is to make the multimodal transport more attractive for users and to promote a more efficient use of existing infrastructure and services(173). Consumers should be able to book rail tickets for any connection in the EU via one-stop shops. In the best case, this should integrate with other sustainable modes for the first and last miles of the passenger's journey, such as buses, trams, shared bikes, etc.

Improve rail passenger rights as proposed by the European Parliament.

Generation Climate Europe is disappointed with the agreement reached between the European Parliament and the Council during trilogues for the reform of rail passenger rights. It only pays lip service to the principle of improving the overall experience of travellers and is a disheartening way to end 3 years of negotiations. For example, the reform does not end the many national exemptions from the application of the EU passenger rights legislation which are granted by Member States to rail companies. Moreover, a force majeure clause was introduced but it is too broad and risks creating more disputes than it solves (174). It does not suffice to designate 2021 as *Year of the Rail* and have lofty ambitions of green mobility if we do not account for the experience and perception of the passenger. Consequently, we urge the Commission to propose stronger legislation on rail passenger rights or for the current proposals to be voted down and rewritten (see Annex).

Reducing Costs

GCE, along with the Europe on Rail coalition, call for a reduction of track access charges.

"Track access charges are prohibitively high in some EU member states. EU Regulation suggests that charges should cover only marginal costs, but some member states ask for much higher mark ups, for example on highly frequented routes or during rush hours. This creates an unfair advantage for road transport, which pays only infrastructure charges on approximately 3% of the EU road network. For freight rail, some member states have reduced charges, but not so for passenger rail. EU member states should agree to reduce track access charges on ato direct cost levels. This would increase the use of tracks and could bring higher income for infrastructure managers in return" (Europe on Rail, 2020) (175).

GCE calls on other modes of transport to be better carbon priced.

Aviation and road carbon emissions are under carbon pricing, if priced at all for the maritime sector. Companies and households (especially young and poor people) pay close attention to the transport costs. It is therefore essential to financially incentivise clean cargo transport by making rail freight cheaper compared to its competitors.

Tax Justice and Rail

Reduce diesel fuel taxes.

Rail, despite being the cleanest motorised mode of transport, remains much more taxxed than air travel. On average, trains powered by diesel pay 44 cts per litre. 17 EU member states tax electricity used by electric trains (from 0.037cts / kWh in DK to 1.379 cts / kWh in AT). CO_2 emissions of electricity production to power trains is covered by the ETS while other modes of transport are very little, if at all in the case of shipping, carbon priced.

Delete VAT on rail tickets.

Generation Climate Europe supports the Commission's proposal to reform the VAT* rate structure which has the aim to introduce more flexibility for Member States to change the VAT rates they apply to different products. This would leave enough leeway for Member States to suppress VAT on rail fares.
The example of Germany lowering their VAT rate on long-distance rail fares from 19% to 7% in January 2020 should inspire other European governments to follow their example as the train operator DB expects an additional 5 million passengers a year thanks to lower fares.

*see https://ec.europa.eu/taxation_customs/business/vat/action-plan-vat/proposal-vat-rates_en

Aviation

Introduction

Aviation emissions have more than doubled in the last 20 years and the sector accounts for 2,9% of global CO2 emissions (177). Before the COVID crisis, it was estimated because of the skyrocketing growth of the air transport industry that aviation alone could consume up to 27% of the remaining carbon budget to keep global temperature rise below 1.5C. Within Europe alone, CO2 emissions have grown 27.5% between 2013 and 2019 (178). Direct emissions from aviation now account for 3.6% of the EU's total GHG emissions (compared to 1.5% in 1990) (179) and aviation pollution is responsible for a large part of the carbon footprint of a small group of high-income households. In fact, 1% of the world population was found to be responsible for 50% CO2 emissions from commercial aviation (180). 1.034 billion air passengers were transported in the EU in 2019)181). Moreover, it is now well accepted that non-CO2 effects of flying (NOx emissions, soot particles, oxidised sulphur species, and water vapour) actually triple the climate impact of flying (182). In 2018, from oil well through flights, aviation accounted for 5.9% of all human-induced climate heating (183).

Air transport is a major driver of carbon inequality among world countries

Globally, the richest half of countries emit 90% of CO2 emissions from passenger air travel. The poorest half of the world only emit 10%(184). Furthermore, only between 10% (185) and 20% (186) of the world population ever set foot on a plane.

Europeans disproportionally fly compared to the rest of the world. Aviation emissions for the EU28 account for 19% of the global aviation emissions in 2018 while Europe only accounts for 7% of the world population (187).

Air transport is a major driver of carbon inequality within EU countries

'The EU top 1% emit 55 tCO2eq/cap on average, more than 22 times the 2.5-tonne Paris-compatible annual carbon budget. Aviation particularly stands out, with a substantial carbon contribution and the highest expenditure elasticities for the highest emitters. The EU top 1% of households have an average carbon footprint share associated with air travel of 41%, making air travel the consumption category with the highest carbon contribution among the top emitters' (189).
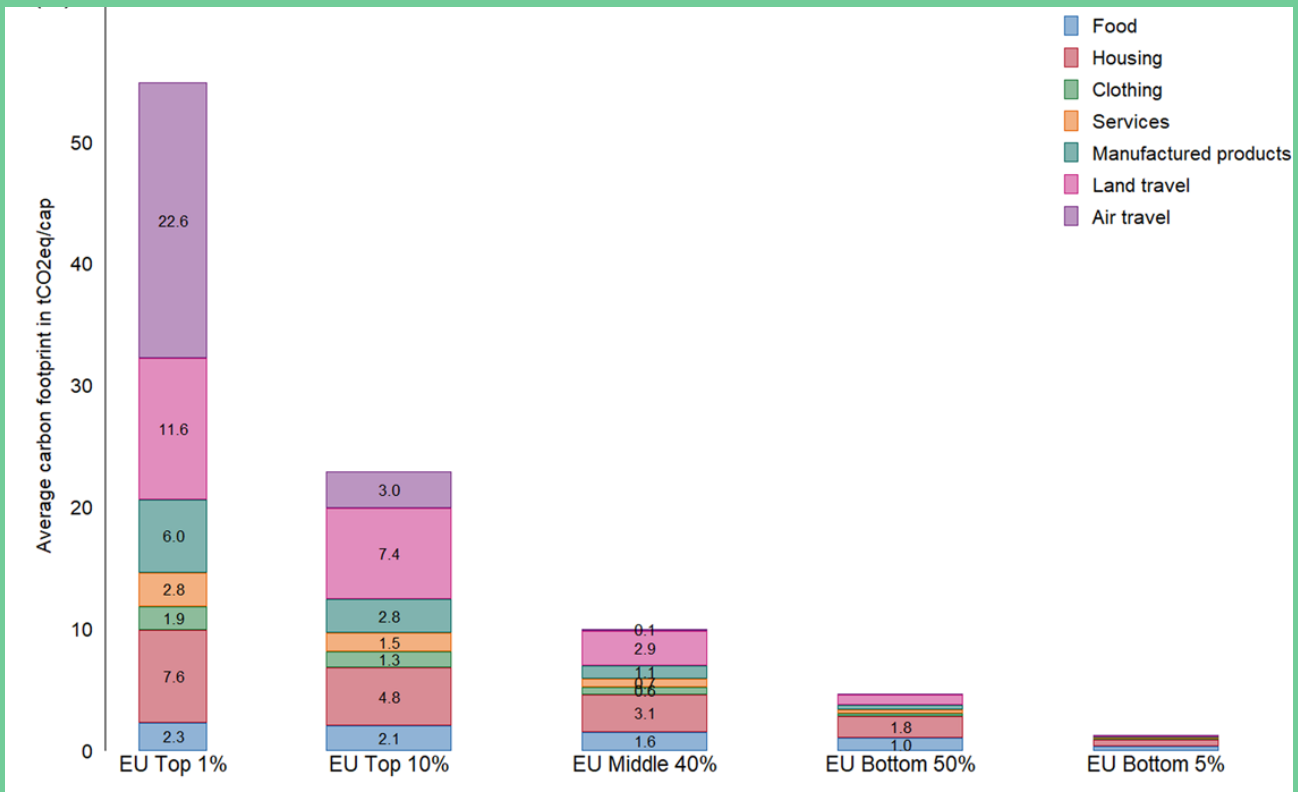
Figure 18: Average carbon footprint (CF) distribution by consumption category in the European Union (EU) (top).
Source: Ivanova and Wood, 2020(190)

The graph above depicts the average CF shares by consumption category and countries of EU top 10% emitters on the left (with CF >15 tCO2eq/cap) and EU bottom 5% of emitters on the right (with CF <2.5 tCO2eq/cap).

Air transport also accounts for a substantial part of the EU top 10% climate impact with air travel accounting for about 7.7% of their carbon footprint (191). For the poorest 50%, on the other hand, air transport has no impact on their carbon footprint, hence the importance for aviation to be treated by policy-makers as a highly carbon-intensive luxury. Indeed, because air transport is the source of carbon that increases the most with rising expenditure and income, it is time to legislate on it as such.

'Package holidays and air transport are luxury items with high energy intensity (Oswald et al., 2020); at the same time, they receive extremely low policy attention, with only 1% of policies targeting aviation (Dubois et al., 2019). This lack of policy focus on high-carbon polluting activities of high-income actors – who have both high responsibility and capacity for climate change mitigation – raises substantial ethical and equity concerns' (Ivanova and Wood, 2020) (192).

Air traffic has to be reduced because aviation is the main contributor to carbon inequality (193) and will remain extremely energy intensive for many decades to come. Moreover, despite being the most carbon intensive mode of transport, air transport enjoys competitive and fiscal advantages, enabling it to outcompete much more climate-friendly alternatives, even for short distances. Air transport benefits from an estimated annual €3bn state aid given to air transport in the EU (in direct subsidy for operation and infrastructure developments.) (194) In *"A cheap airline ticket doesn't fall from the sky"*, Tim Joos concluded that society pays €86.24 in subsidies, €43 in state debt and

trade war while a passenger only pays €81.65 per person for a round trip flight with KLM from Amsterdam to Toulouse (195). As a matter of fact, 42% of European airports are making economic losses (196). Boosted with public money, the number of airports has also been rising exponentially: 63% EU citizens now live within a two-hour drive from at least two airports (197).

At ICAO, the UN aviation body, agreed policies are far from in line with the Paris Agreement. CORSIA (Carbon Offsetting and Reduction Scheme for International Aviation) is the global market-based measure to address the growth in CO2 emissions from international aviation above 2020 levels. It aims to stabilise CO2 emissions at 2020 levels by requiring airlines to (only) offset the growth of their emissions after 2020, not reduce their overall emissions. Airlines would pay only 0.2% of their operating costs to "offset" their emissions. The ticket price for long-haul trips outbound from Europe would increase by an astonishing 17 cents on average(198). However, CORSIA will be voluntary until 2027, and will, at a maximum, offset only 21.6% of international aviation emissions. The problems with offsetting, beyond negative incentive to offset and not cut emission (and therefore responsibility), have been made clear by a European Commission study. They found that "73% of offsets from projects registered under the UN's Clean Development Mechanism only partially delivered or failed to deliver the claimed emissions reductions" (T&E, 2020)(199). Therefore, GCE calls on the EU to take urgent and bold measures to mitigate aviation's climate impact.

Reducing Emissions

GCE calls for an introduction of alternative fuels blending quotas at EU airports, although it should not delay an urgently needed reduction of air traffic.

Alternative aviation fuels (advanced biofuels and electro-fuels) only represent 0.002% of total jet fuel consumption despite the industry's (IATA) 2008 goal for 10% alternative fuel deployment by 2017 (200). In fact, fossil jet fuel use has grown 13 000 times faster than alternative jet fuel use between 2013 and 2018 (201). The deployment of alternative aviation fuels should be sped up through mandatory quotas. Fueling air transport in a greener way should however neither lead Europe to producing unsustainable biofuels nor importing biofuels as demand for used cooking oil (UCO) for example is soaring all around the world. Furthermore, powering aviation with electro-fuels (including hydrogen) remains problematic because it is very energy inefficient and renewable electricity will remain a very scarce resource for decades. Due to the renewable energy production constraints we are going to face and which are in more detail explained in the Energy & EU Mobility chapter above, it is urgent to reduce such an energy-intensive mode of transport. *"Indeed, delivering 50% of the EU's energy demands for aviation in 2050, would require adding the equivalent of 24% of the current electricity generation"* (Transport & Environment, 2017) (202). Reducing aviation emissions has to go hand in hand with an urgent reduction of air transport, despite the industry's greenwashing efforts.

GCE calls for the removal from the Emission Trading System of free allowances allocated to airlines, and for the inclusion of inbound and outbound extra-EU flights.

Airlines have been benefiting from an inefficient EU carbon market that does not reflect the damage and harms caused by air travel. At the moment, airlines must now pay for only 53% of their emissions, only for their emissions caused by flights within Europe (203). Free allowances must end, and emissions from inbound and outbound extra-EU flights should also be covered by the EU ETS.

GCE calls on the inclusion of aircraft NOx emissions under the EU ETS, on avoiding climate sensitive flight-paths and reducing short-lived climate pollutants.

European policy-makers have kept the non-CO2 effects of flying off their policy radar for way too long. Given the major non-CO2 contribution of flying to climate change (nitrogen oxide, soot particles, oxidized sulfur and water vapor) which triple the climate impact of aviation, GCE calls for

the inclusion of aircraft NOx emissions under the EU ETS. This would further incentivise manufacturers and airlines to reduce these emissions and need to take account of the associated trade-offs. Avoiding flight paths in climate-sensitive areas and developing operational requirements and standards to manage short-lived climate pollutants (204).

GCE calls on air freight to be restricted to essential goods.

In 2018, air freight was responsible for 19% of all global aviation emissions (ICCT, 2019) (205). In 2019, 13.7 million tons of merchandise and post were transported by airplanes in the EU (206). Transport of goods by cargo planes needs to be restricted to essential goods (such as medical supplies but not flowers nor food). Carbon pricing dirty mobility is crucial to incentivise a modal shift for freight, as freight operators consider cost as the main factor for choosing this mode of transport.

GCE calls on Member States to accept the creation of the Single European Sky.

Since 2015, Member States have been blocking the European Commission's proposal for a Single European Sky whose objective is to modernise the management of European airspace and to establish more sustainable and efficient flight paths. Completing the Single European Sky would enable planes to fly straight and no longer zig-zag between different blocks of airspace which in turn increases delays and fuel consumption. In 2019, delays alone cost the EU €6 billion, and led to 11.6 million tonnes (Mt) of excess CO2. The Single European Sky could reduce up to 10% of air transport emissions) (207).

Changing Consumer Behaviour

Ban airlines ads.

We banned tobacco advertising because smoking is extremely detrimental for our health, while smoking is estimated to be the leading cause behind 12 out of every 100 deaths (208), air pollution from fossil fuels is behind 1 in every 5 deaths (209). In order to ensure that an artificially boosted air travel demand does not continue jeopardising our climate objectives, advertisements by airlines as well as ads promoting air travel, must be banned.

Indicate Carbon Footprint on air tickets and introduce a label for products transported by plane.

The climate impact of air transport is often poorly known or underestimated by its users. Air tickets should display an estimation of the climate impact (carbon emissions as well as non-CO2 effects) caused by the flight offered (e.g. compared to a Paris-compatible carbon budget). It is crucial to increase transparency of the environmental impacts of flying for the public, also for their day-to-day consumption.

Changing the rules

Ban short haul flights

In order to quickly realise the needed modal shift from air to rail for short distances, where rail is a very credible alternative, short haul flights should be banned. 62% of the EU population supports this proposal (210). GCE supports prohibiting airline connections covering distances that could be travelled within 5 hours by train. Open slots from banned short-haul-flights must be cancelled and not taken over by long-haul flights.

Ban private jets and helicopters.

Private jets carry an average of just over four people per flight (211), and they fly empty 40% of the

the time (212). They are the ultimate example of excessive (energy) consumption. Private jets are a prime reason why the richest 1% have a carbon footprint of 175 times someone in the bottom 10 percent (213; 214). Business aviation (flights that are not conducted by the military or scheduled airlines) represent 7% of all flights in Europe (215). Between 2006 and 2016, private jet ownership doubled in Germany and increased by 68% in France (216). And business aviation recovers much faster than commercial aircraft from the 2020 sharp decline in air travel (217). A typical private jet passenger journey within Europe emits around seven times as much greenhouse gases as the same journey made in business class on a typical airliner, around ten times as much as an economy class flight - and ~150 times as much as an equivalent journey made by high speed rail. European private jet CO2 emissions have skyrocketed over the last years: they indeed increased by 31% between 2005 and 2019 (218). In one hour, a single private jet can emit two tonnes of carbon dioxide. In comparison, the average person in the EU emits 8.2 tCO2eq over the course of an entire year (219).

Hence, private jets (which can be defined as passenger airplanes that do not provide a public service such as air rescue, defense, fire fighting, etc. and where seating is not available to the general public) should be banned. A similar logic applies to flights with private helicopters or propeller machines for personal transportation or recreation. This includes taxi-flights, heli-skiing or flights to move mountain bikes uphill (220). Policy details and exemptions will be worked out when drafting the legislation. Until the ban is enforced, Member States and European institutions, officials and civil servants should stop using private jets (221).

No state aid for air transport and no public bailout for airlines without strong environmental conditions and guarantees for workers.

Member States should stop bailing out airlines without strong environmental and social conditionality. Since the beginning of the global COVID-19 pandemic, Member States have granted a total of €37.3 billion to airlines and the number is very likely to increase in the near future (222). Exempting air transport from the just environmental transition is counterproductive, and unnecessarily expensive to all citizens.

Tax Justice

Air travel benefits from unfair tax advantages. Airlines still pay no fuel tax and international air tickets are VAT free. Only 6 EU countries tax international aviation (through ticket taxes which usually exempt transfer passengers) (223). A weak and too cheap carbon market (ETS) is not enough to apply the polluter pays principle. On average, airlines buy ETS allowances for only 53% of their intra-EEA CO2 emissions (224).

End the aviation fuel tax exemption at EU level.

We demand to end the aviation fuel tax exemption at EU level, equivalent to €27bn (225) during the upcoming revision of the Energy Taxation Directive, or between participating countries (€8bn (226)).

End the VAT exemption on international air tickets (€11bn)(227).

Ban Frequent Flyer Programmes (FFP) and introduce a frequent flyer levy.

Members of FFPs receive mileage (bonus) points based on distances travelled, the number of flights made, and/or the fares paid. These programmes reward aeromobility and thus increase interest in it, which is counterproductive to discouraging flying, and hence our health and that of the planet (228). A frequent flyer levy (that taxes people according to how often they fly) is an essential instrument to ensure that even the top 10% of EU households are affected by rapidly rising air ticket prices, preventing deep air travel inequalities (229).

Shipping

"How inappropriate to call this planet Earth when it is clearly Ocean." **Arthur C. Clarke**

The Climate Problem of Shipping

Shipping remains the only sector to have escaped any regulatory measure for reducing emissions. According to the Third IMO GHG Study *"international shipping emits around 1Gt of CO2 per year and is responsible for about 2.6% of global man-made CO2 emissions. If the shipping sector were a country, it would have the 7th largest CO2 emissions in the world, comparable to Germany's total national emissions" (CAN & CSC, 2018) (230). Official IMO projections suggest that were we not to act, shipping emissions will increase by 50- 250% by 2050. Shipping could be responsible for 17% of all emissions by 2050(231).*

At the EU level the situation is no different, CO2 emissions from maritime transport represent 13% of Europe's annual transport greenhouse gas emissions, having increased by 48% between 1990 and 2008, this of course threatens our climate targets (European Commission, 2019) (232). In the EU, CO2 emissions from maritime transport are expected to increase by 86% above 1990 levels by 2050 if left unregulated according to a European Commission impact assessment (European Commission, 2019) (233). The non-CO2 emissions present an equally ghastly picture as it will be laid out below. On the other hand, "domestic emissions, already addressed by national measures, have decreased 34% compared to 1990 levels. This clearly shows the need for enhanced action on shipping emissions." (European Commission, 2019) (234).

Furthermore, ships have a relatively long life-span, meaning that regulations on ships' features that can positively impact the emissions will require a significant transition period. Therefore, action is urgently required.

At the UN level, decisions taken at the International Maritime Fund fall far behind necessary reduction aligned with the Paris Agreement. By 2030, a package of short-term technical and operational measures which include reducing vessels' engine power and the introduction of a ship-level carbon intensity target was adopted in 2020. According to the ICCT, by 2030, this package would reduce by 1% the sector's emissions growth, thus giving no chance to meet the IMO 2030 targets (235). Annual emissions from shipping are forecast to grow 14% with the newly approved measures by 2030 compared to 15% under business as usual. Given that policies agreed at IMO are deeply insufficient, much more ambition is needed at EU level.

Reducing the climate impact of shipping

From Transport & Environment's *How can European transport can contribute to an -55% GHG emissions target in 2030, 2020** (236)

Enact CO2 levy on EU shipping by extending EU ETS to cover international and domestic EU maritime GHG.

This will ensure that shipping starts paying for its CO2 emissions and would generate over €3.6 billion/year in revenues. Given the low pass-through freight costs of shipping, as well as high emissions abatement costs specific to the maritime sector, a multiplier (e.g. 2x) could be applied to maritime CO2 under the ETS to double the revenues, bringing them up to €7.2 billion. CO2 multipliers can help fill the "fuel subsidy gap" (ship fuel is tax exempt) for the maritime sector by increasing the level of carbon pricing while maintaining the scope of emissions covered.

* https://www.transportenvironment.org/sites/te/files/publications/2020_02_TE_EGD_vision_How_EU_transport_can_contribute_minus_55.pdf

Implement an operational CO2 standard for ships calling at EU ports to be 40% more efficient (i.e. less carbon intensive) compared to the 2018 baseline.

Decarbonising shipping by mid-century requires ships calling at EU ports to be above 40% more operationally efficient (i.e. less carbon intensive) in 2030 compared to 2018.

GCE calls on the EU and its Member States to use their influence at IMO to introduce slow streaming.

Slow steaming refers to the practice whereby the (operational) speed of the ship is reduced. It means that the ship's engine is not used at full power, thus saving fuel, reducing CO2 and air pollutant emissions. Reducing the fleet's speed by 10% would lead to overall CO2 savings of 19% (237). Slow streaming also leads to lower emissions of air pollutants such as NOx and particulate matter (PM) (238). While the EU and Member States must use their influence and power at IMO to introduce slow streaming at global level, the EU should conduct an impact assessment on the introduction of slow streaming in EU waters.

Implement a zero-emission berth standard at ports.

Ships at berth emitted 7 MtCO2 in 2018, or 5% of total emissions. These emissions could be cut from the sector and would also facilitate the infrastructure required for a zero-emission shipping future.

Air pollution and shipping

Shipping contributes to 13% of global sulphur oxide (SO2) emissions and 15% of global nitrous oxide (NOx) emissions (IMO, 2014) (239). In the sea surrounding Europe, emission figures of SO2 and NOx were released in 2005, revealing yearly amounts of 1.7 and 2.8 million tons respectively (T&E, 2020) (240). NOx from shipping is set to exceed NOx from all EU land-based sources in the coming decade, due to sector growth. Ships also emit black carbon, which is directly caused by the burning of fossil fuels, or the fuels commonly used in ships.

A common fuel used in ships is Heavy Fuel Oil (HFO), which is the main cause of black carbon and sulphur oxide emissions(241). Black carbon in particular was responsible for 16% to 23% of the total climate impact from shipping, 83% of which emission were caused by the usage of HFO (242). During the 1918-1919 flu pandemic, cities with high black carbon pollution saw 10% higher mortality rates (243), and nowadays approximately 6200 premature cardiopulmonary and lung cancer mortalities per year are estimated just from black carbon emissions in latitudes 40°N and above (244). While steps taken now to reduce air pollutants will not have an immediate effect, the reduction in sulphur oxides, nitrous oxides, and particulate matter in the atmosphere will start to see a gradual reduction in the number and impact of diseases and mortality.

Reducing air pollution from ships

In order to reduce air pollution from ships, the EU and its Member States should adopt the following measures (245).

GCE calls on the EU to develop a short sea shipping strategy to transition to zero emission vessels, starting with converting ferries, Ro-Ros (ships for wheeled cargo), and cruise ships to battery-electric propulsion.

GCE demands that the EU transposes the international IMO standards for NOx emissions into EU law and **includes ships NOx emissions under the EU ETS**.

Include a NOx restriction to the Emission Control Areas (ECAs) in the North Sea and the Baltic Sea.

Extend SECA (Sulphur Emissions Control Areas) and NECA (NOx Emission Control Areas) standards to the rest of the EU seas: Mediterranean, Adriatic, Black and Irish Seas and the North East Atlantic.

These standards should be properly enforced and the EU should have human and financial means to verify proper enforcement. Moreover, Member States and the European Commission should also use their power and influence at the IMO to achieve much more ambitious global measures to combat air pollution.

Moreover, in order to quickly reduce black carbon emissions,the EU first needs to incentivise considerably more the switch to cleaner distillate fuels for the maritime sector, especially as an alternative to HFO in the Arctic, and then force the transition to zero emission renewable fuels.

Reducing the impact of ships on marine biology and water quality

GCE calls for ships built in the EU to be environmentally-friendly
Aquatic plants and animals have environmental specific requirements such as for light, temperature and pH level. However, deposits left from boats can change the water's chemistry, making the water overly alkaline or acidic, or adding too much of certain compounds, like copper and zinc. Moreover, toxins from detergents, paints, petroleum products, batteries, and metals have disastrous effects on the wildlife and might cause cancers, mutations, birth defects, and outright death. Finally, chemicals used to clean, protect, and run watercraft often leach into the water, severely impacting both the water quality and wildlife (246). Environmentally friendly alternatives should be mandatory when possible. An example of this is "Finsulate", an environmentally friendly antifouling wrap inspired by sea urchins (its prickly surface naturally repels unwanted "settlers" such as algae, barnacles or mussels) (247).

Revitalising inland waterway transport (IWT) to reduce freight emissions

With inland waterway transport, goods are transported by ships via inland waterways, such as canals, rivers and lakes, between inland ports and wharfs. Europe has more than 200 inland ports, and more than 37.000 kilometres of waterways. Half of Europe's population lives close to the coast or to an inland waterway and an important number of European industrial centres can be reached by inland navigation (248).

Transporting freight on inland waterways is very advantageous, as compositions of pushed barges can transport more goods per distance unit (tkm) than any other type of land transport and it helps reduce road traffic. Given that inland navigation vessels have a loading capacity that is equivalent to hundreds of trucks, IWT saves transport costs, reduces emissions and decongests roads.

Inland waterway transport in fact presents several environmental benefits: it causes the minimum CO_2 emissions and noise pollution in comparison with other modes of transportation.

In terms of capacity, inland vessels beat road and rail.

Yet, despite its various environmental advantages, interland waterway transport is far being used to its full extent and according to the Court of Auditors, *"the policy objective of shifting traffic from roads to inland waterway transport and of improving navigability had not been achieved. Between 2001, when this objective was set, and 2012, the year for which the latest statistical information is available, the modal share of inland waterway transport did not increase substantially, fluctuating around 6%."* (250).

Generation Climate Europe therefore calls on the EU and Member States to eliminate the identified infrastructure bottlenecks, key requisite for the development of inland navigation in Europe. For this, we need to improve the effectiveness of the EU funding of inland waterway transport and to ensure better project performance.

GCE also calls for the enhancement of coordination between Member States for the future development of the EU's strategy for inland waterway freight transport.

Shipping in the Arctic

While the environmental and social impacts of shipping are the strongest in the Arctic, Arctic shipping activity is increasing fast. And the use of HFO (heavy fuel oil) in the Arctic is also increasing fast. HFO is the dirtiest fuel of any transport activity for its emissions and pollution and its use in the Arctic grew 75% between 2015 and 2019 (251). The overall shipping activity in the Arctic is expected to increase by more than 50% between 2012 and 2050 (252). The cruise shipping sector is also experiencing a fast increase, despite its highly negative environmental impact. For example, Norway has 20% year-on-year growth in cruise tourism (253).

Shipping in the Arctic also poses a greater threat to the already endangered delicate ecosystems. It is understood that because of its climate and geographical properties, the climate impact there is twice as pronounced (254). Through the emission of black carbon, SOx and NOx, shipping activities contribute to air pollution that accelerates climate change. Recently, the situation has worsened, as the permanently melted ice allows for new shipping routes, also accessible to non ice-class vessels.

Generation Climate Europe calls on EU Member States to act at IMO level to create an Emission Control Area (ECAs) in the whole Arctic, so that stricter controls can be established in the area as well as to create Particularly Sensitive Sea Areas (PSSA). If this does not prove possible, GCE calls on governments to implement strict regulations on EU countries' access to the arctic.

The spillover of HFO would be even more detrimental in the Arctic as the lack of equipment in the area would not provide an adequate response. Further, the spilled oil is trapped under the ice, spreads faster and lasts longer; it would be a catastrophe for ecosystems and indigenous residents. Moreover, all these environmental damages have a huge social impact, as the local population depends on the resources of the Arctic territories.

The EU is a major actor in Arctic shipping as most ships active in the Arctic arrive or depart from an EU port, which gives it a relatively great influence on Arctic shipping. Despite strong commitments, the EU still has not done much to protect the Arctic. **The EU and its Member States should demand at IMO a much tougher and earlier regulation on the use of HFO in the Arctic** as the agreed rules contains many exemptions and waivers which would mean a complete HFO ban would only come into effect in mid-2029.

GCE suggests banning the use of HFO by cruise ships in the Arctic immediately.
86% of cruise ships visiting the arctic are burning HFO (255).

Space

"In addition to being the most daring and complex engineering achievement in human history, the International Space Station is one of history's most successful examples of cooperation among the world's governments. For the last decade, countries with diverse and very different goals – and aspirations – have come together to build the International Space Station. These nations have achieved something together that none could have achieved alone."
Jean-Jacques Dordain, former Director General of the European Space Agency

Introduction

Space has become a crucial territory. More so, in a world of ever-increasing climate breakdown, it becomes more critical than ever before to understand our atmosphere and oceans. To meet skyrocketing energy demand it is imperative that we turn our eyes upward to the resources and technologies of the future. Beyond this urgent need to reform the manner in which we, as societies and nations, treat energy and our planet, space offers limitless sources of energy, materials and knowledge that must be used. There are indeed several resources to gain, despite the economic and environmental costs to launch rockets and goods into space. Launching a rocket into space is fuel consuming and extremely polluting (257). Even more so that for a rocket to reach its target, it consumes fuel, which thus adds to the rocket's weight, thus necessitating more reserves of fuel. A never ending cycle. As such, the world's heaviest rocket burns approximately 400 tons of kerosene in a few minutes. This is more than an average car would consume in two decades (258).

The challenge is thus to make launching and space exploration "carbon-free" following the current trends in the space industry. Valuable resources are plenty found in space, and would make these activities more profitable without depleting the Earth's own. Another concern lies in how space activities actually impact Earth: the pollution generated by space exploration, if intensified, will not only deplete the Ozone layer due to harmful substances - trace gases, soot, particulate matter, CO2- but also participate in global warming as they remain in the stratosphere and interact with sunlight absorption (259). For scale, a SpaceX Falcon Heavy upon reaching orbit burns 400 metric tons of kerosene, creating more carbon dioxide in a few minutes than the average car would in two centuries (260). Other emissions are also observable, such as black carbon from kerosene-fueled rockets such as SpaceX's Falcon 9 and Falcon Heavy (whose particles stay in the stratosphere for 3 to 4 years) (261). Another example is chlorine, as it creates ozone holes which can last from a few hours to days (as the chlorine reacts with oxygen, creating ozone-destroying chlorine oxides) (262). Another issue lies with the Ozone layer depletion due to suborbital flights (263). More so, the junk pieces from rockets that ended up in orbit around Earth accumulate and lead to collisions with other satellites, creating a cascade effect of space debris, which if it reaches enough magnitude will forever lock the human race on Earth. Given thus ample evidence of environmental destruction and yet the ever-increasing uptake of space missions, we must separate ourselves from the belief that private interests such as SpaceX carry out their activities "for the benefit of all humankind".

This is highly concerning, as space holds a crucial importance in our daily lives: not only for communication networks (Google Maps, 4G, etc.) but also for scientific discoveries (finding the origin of life through the Hayabusa2 mission, experimentations in space, etc.).

Policy Recommendations

GCE recommends continued investment in existing and subsequent programs.
We have already seen the benefits of the European Space Agency's (ESA) many programs. Sentinel/Copernicus has offered us in-depth insights into the notoriously difficult and complex field of climate science by monitoring land, sea, and sky in incredible detail (265), allowing us to better monitor and improve air quality and keep track of energy consumption and emissions. The maintenance, improvement, and replacement of this program brings tangible health and environmental benefits to European citizens. Galileo provides meter-accurate global positioning services that allow for superior agricultural management, search and rescue (266), and many other functions that will only become more integral to our societies' well-being in the future. Mars Express (267), on a relatively small budget, has mapped and decrypted Martian topography and geology in a manner that has significantly deepened our understanding of the Red Planet. The scientific value of programs such as these is obvious, but there are true real-world benefits for Europe bothin the short and long term.

If Europe wants to remain competitive in space, if we want to build facilities in space, and, most importantly, if we want to understand and address the dire environmental needs of our times, continued and increased investment in programs like these is essential.

GCE calls upon the EU to increase its space and space-related research budget each year until 2030, with a goal of representing 1% of EU GDP.

The European Commission has proposed a budget of €13.2 billion for the 2021-2027 period - a slight increase compared to the previous €11bn budget (268). While this demonstrates a recognition of space's growing importance, it remains tragically short. It represents a measly 0,094% of European GDP. A 0.094% investment in an industry that will shape the next century and beyond is woefully insufficient. For comparison, NATO mandates a 2% spending of GDP by country for defense. The Common Agricultural Policy of the EU (CAP) represents a vast 34.5% of the EU budget. The Union cannot afford to be left behind, grounded on Earth, while other nations soar ahead. Nor can we allow unregulated private enterprise to dictate the future stakes and rules of space exploration.

GCE recommends the EU to consider the construction of a clean space travel infrastructure.

It is impossible to overstate the future importance of this infrastructure. The materials exist, the science is sound, and the benefits are clear. If we prioritise effectiveness over "efficiency", and minimise fuel and energy consumption for getting to orbit by utilising sustainable and affordable methods, we can expand our footprint in space without ravaging the Earth's resources and polluting the atmosphere with particulates and greenhouse gases.

Examples of these methods are Space Tethers like the Skyhook: these consist of hanging a cable from geostationary orbit down to the surface of the Earth and moving people and freight from the Earth into space on an elevator which would ascend and descend along the cable (269). Multiple concepts have already been developed by academics (270) and Boeing (with funding from NASA) already carried out a feasibility report almost 20 years ago (271), it stands to reason that the EU should not be left behind in these technologies. The fundamental conclusion of the study is that "the concept is technically feasible", adding furthermore that "the systems are completely reusable and have the potential of drastically reducing the cost of Earth-to-orbit space access".

Moreover, It is obvious that this infrastructure cannot run on dirty kerosene or carcinogenic Hydrazine, and so it follows that low-impact electrical ion-thrusters are well-suited to orbital infrastructure (272), while metal-organic frameworks (MOFs) could service in-atmosphere (273). If Europe could construct this infrastructure either on its own or with international collaboration, it can provide the stepping stone into the rest of the solar system. Lunar and martian settlements, asteroid mines, and more, suddenly become not just feasible but comparatively easy and wildly less polluting.

Powering space exploration

GCE recommends that the ESA develop standards of quality and new protocols when building boosters.
Not only do rockets consume fuel, but as time passes their degradation in orbit leads to space debris, which could render future space exploration impossible (274). As we launch between 70 to 90 bundles of satellites per year, thus injecting 30 or more objects at once in our orbit , it is expected that debris will be generated up to four to five per year (275). Space debris poses two main issues: they hinder space exploration, destroy existing satellites and multiply as they collide with other debris(276). ESRI created a tool to identify the current satellites and debris orbiting our planet (277).

Designing new boosters is an easy way to reduce environmental impact from space exploration. Boosters are linked to the main pollutants, which are carbon emissions, Particulate Matter, oxide particles and hydrochloric acid production (278). This pollution can be reduced through the choice of materials used in the booster rockets' construction and combustion elements. Solid boosters in particular emit primarily aluminum oxide, soot or black carbon, CO_2, hydrogen chloride, nitrogen oxides, hydrogen (279).

Current designs usually see the materials and fuel used in boosters are highly polluting and thus should move toward more sustainability (281). The European Space Agency launched Life Cycle Assessment programs as part of its Eco-design program. This will be useful in solving issues in sectors as diverse as ozone depletion, water use and land use as well as the life cycle of everything used (282). As such, GCE recommends the continuous use of these assessment programs to build more sustainable boosters and more ambitious air quality standards.

GCE encourages a binding and accelerated research focus on alternative fuels in space in order to reduce GHG emissions from space exploration.

It can be done through the use of helium 3 and heat energy. The former is hard to find on Earth, but is easier to find on the Moon. The advantage of using it in the energy industry lies in its molecular structure, which would reduce energy production costs as well as nuclear central's composition, thus saving space, resources and money (283). In regard to heat energy, outer space's cold can be transformed into energy, through thermoelectric reaction. Despite its lower energy production than solar panels(284), it is an interesting way of using space's specificities (285). Both technologies are still being researched but bear great potential (286).

GCE calls to promote the use of 3D printing technologies.

To do so would result in a gain of time and resources for industries and state programs alike. The ISS requires 7,000 pounds of spare parts to the station yearly, with 29,000 pounds of spaceflight hardware spares additionally stored on the station and 39,000 ready to be sent anytime (287). Focusing on space research and printing technology can make the whole sector more renewable by saving space in the spacecraft, thus making the launching less costly and fuel-consuming (288).

Most hurdles disappear when manufacturing is done into space, 3D-printing technology does opens more possibilities for the space industry without being imparied by microgravity (289).

Space Tourism

GCE calls on the European Union and the European Space Agency to ban space tourism and cease support to private companies which aim to develop space tourism ventures.

Since 2010, there has been a lot of global enthusiasm around space tourism especially in the US where Virgin Galactic, Blue Origin and SpaceX are very close to regularly launching rocket planes for the amusement and entertainment of an extremely wealthy segment of the population (290). The hype has not been substantiated in Europe yet, with only a very few countries like Sweden, Italy, Portugal and the UK planning on developing space tourism services. Despite recent immaterialised efforts to accelerate the pace at which Europe will take tourists to space, the environmental impact of such an endeavour should definitely be closely evaluated as recent research shows that its likely market increase will have astronomically negative outcomes on the planet's climate (291). The fact that the space tourism market is still at its infant stage must encourage policy makers to regulate it, by banning its proliferation to safeguard our environment.

Space tourism, despite it being an underdeveloped market with serious scalable potential, has serious environmental red flags that render the endeavour environmentally unfeasible and thus the EU should refrain, and advocate against space tourism.

Space Debris

GCE calls on the ESA to ensure the long-term viability of space exploration, through major sustainability shifts (e.g. exclusive use of sustainable materials).

Resources are limited in spacecrafts (292). Space is however included in several plans to boost our scientific knowledge and economies (including missions to Mars and asteroid mining) (293). As such, measures must be taken to maximise the efficiency and sustainability of the materials and mission protocols to ensure space can be explored for decades to come. The current priorities outlined by the European Space Agency (294) however focus on launching more satellites, which would only add to the clutter of orbiting satellites. Space is a precious resource that can and must be protected for the sake of our children's space exploration activities.

To reduce the production of space debris, **GCE is in favour of investing in different materials and ways of building spacecraft** to diminish the probability of left-over pieces (rockets launches, disposable crafts etc.) exploding. This can be done through a different design of the rocket which should be emptied of any fuel that might explode; as well as manufacturing reusable rocket launches.

GCE also advocates for increasing **space program commitment to clean space debris**, as other methods of disposing of satellites are inefficient at best (295).

GCE emphasises the need to develop recycling chains for space materials that currently cannot be reused. Satellites's lifetime could be doubled, thus diminishing the creation of debris (296).

Rise of private actors in space activities

The EU should facilitate a better public-private partnership to foster and absorb innovation from the private sector for public undertakings.

Throughout the last decade, the space sector has gone through unprecedented transformation and has significantly and rapidly evolved. *"Major technological advancements, a new entrepreneurial spirit and a renewed policy focus have put the space sector under the spotlight on the global innovation stage"* (297) with Europe also notably progressing in this direction. Moreover, the space economy has grown exponentially as a result of an unprecedented rise in the level of participation from the private sector. This, according to the previously cited EIB Report, highlights the "New Space Phenomenon" which involves numerous private sector firms applying innovative technological and business models which allow for a remarkable decrease in costs and commercial innovations. Furthermore, the sector's market has demonstrated growth due to investments made by public authorities who have found the new private-public partnership beneficial. As a result, the space sector is nowadays being transformed and public authorities need to adjust to this new reality and foster the growth of the private sector to fit the public sector needs.

Therefore, Generation Climate Europe suggests that the EU facilitate a better public-private partnership to foster and absorb innovation from the private sector for public undertakings.
As ESPI (2019) outlines, European public actors have taken significant steps in helping the establishment of a strong private sector whose *"commercially-driven innovation"* (p. 9) is now being supported by public instruments. However, the public-private relationship needs to be strengthened to the extent that procurement mechanisms are in place so that technological development is anchored in public sector needs. Resultantly, such a relationship will allow the growth of commercial innovation in space activities while European public actors will be able to enjoy the technological developments in fields which are highly relevant to its space missions.

Global Integration of space policy

GCE advocates not merely for international collaboration between various space programmes, but a merging of programmes and goals.

Amplifying and exporting the benefits of space programs not only fits well into the EU's stipulated space policy goal of autonomy, but would be of benefit to all humankind. But there are even simpler ways to utilize the data offered by European space programs. If Europe can take a lead in proposing a unified approach to space exploration, study, and construction, we can ensure not only the autonomy of the Union, but also speed up the development of space technology while decreasing its cost. The International Space Station was a joint effort by 15 countries, both out of a genuine human desire for cooperation, as well as need. No single nation-state, private enterprise, or even the European Union itself is up to the task of establishing meaningful infrastructure in space by itself. A co-operative space program gives each actor a vested interest in maintenance, investment, and will also serve to reduce the number of orbiters and debris cluttering our immediate planetary neighbourhood.

GCE calls on the EU to lead global efforts in the creation of a "Global Space Community", so that:

1. Manufacturing costs are considerably reduced as the cost and know-how of space exploration is shared among world governments.
2. Space privatisation can be curved to avoid further irreversible degradation to our space exploration and observation activities.
3. Space activities can stay true to their purpose of being carried out for the benefit of all countries, and be the providence of humankind as established in the UN Outer Space Treaty of 1967(298).
4. Eliminate the danger of a Kessler Syndrome in which ever-increasing space debris will render space exploration impossible.
5. The common pooling of space resources will inevitably further forge global economic dependency, foster diplomatic relations and thus decrease the likelihood of future conflicts.

Ecotourism

Tourism contains the seed of its own destruction; tourism can kill tourism, destroying the very environmental attractions which visitors come to a location to experience'' (299)

Introduction

Europe is the world's most visited tourist destination. In fact, tourism is the third largest socio-economic activity in the EU and accounts for 5% of the jobs, although their distribution is very uneven across countries (300). Tourism generates many economic benefits to touristic areas and can lead to further positive developments, such as the preservation of historic sites and cultural rights, notably through cultural tourism. It is a growing market globally with 1.5 billion arrivals (+4%) and 50% of those were in Europe (301).

Since 2006, the European Commission has created policies and guidelines for sustainability concerns, raised by the 2007 *"Agenda for a Sustainable and Competitive European Tourism"*. It is an addition to the Lisbon Treaty, which recognised the need for touristic areas to sustain a clean environment, protect local biodiversity and ensure the well-being of citizens. That means tourism should provide direct financial benefits for conservation and local communities. The impacts of tourism on the environment are tremendous. This is why touristic areas should provide both citizens and travellers with information regarding incentives for low-carbon options.
as well as

Despite these praiseworthy goals, tourism still impacts the environment tremendously: losses of biodiversity, increased pollution (noise, air, waste) and several adverse effects of having a hundredfold population a few months per year. Given the nature of tourism, tourism policies are intrinsically linked to mobility policies. That means that by tackling EU transport environmental externalities, GCE also needs to propose changes to EU, national and local tourism policies. At global level, emissions from transporting tourists have grown steadily over the past decades, reaching almost 1.600 million tonnes of CO_2 in 2016, whilst three quarters of CO_2 emissions from tourism are transport-related (302). The tourism sector is closely tied to mobility and most particularly to the aviation sector. Indeed, 55% of tourists in the EU reach their destination by plane and 39% by road (303). This leads to the European tourism sector contributing to an estimated 3% of the total carbon dioxide emissions (304). More so, it also impacts air, water and soil qualities, partly because of the strain tourists put on local biospheres, but also because of the infrastructures needed to provide services (hostellery services, attractions, roads, etc.). Mass tourism practices and unsustainable mobility causes extreme stress on the environment. Thus, the current harmful tourism habits are more than questionable and we should urgently seek more respectful practices towards the environment and locals.

Currently, 32% of world travelers feel guilty about their impact on the environment while the same percentage of travellers would like to travel sustainably but lack information on how to do this (305). Raising awareness on the environmental impact of traveling is therefore essential (e.g. by displaying the carbon footprint of air tickets and banning climaticide ads).

Moreover, tourism plays a big role in the discrepancy of individuals' mobility-related carbon footprint. Indeed, tourism remains an unevenly distributed activity among the population. Only 64% of EU residents made at least one personal tourism trip in 2018 (306).

Given the potential negative consequences of GCE's tourism and mobility proposals, the EU and its Member States should pay close attention to the developments of tourism all over Europe and its impacts on the workforce. The fossil-free transformation of Europe must not leave anyone behind.

GCE's recommendations to make rail a crucial tool to green tourism can be seen in the **Rail chapter**.

Develop an ecotourism approach

The main support of the European Commission is provided by initiatives (307) (Digital tourism network, webinars and dedicated platform*) to improve employee skills, guidance on going digital and tools to optimise daily management and increase the number of tourists. GCE is strongly recommending the EU to modify its growth-centric tourism policies to develop an ecotourism approach. Ecotourism aims at keeping the impact of tourism at bay, seeking to conserve the environment, sustaining the well-being of the local population as well as promoting awareness and education. Ecotourism is a form of tourism involving visiting fragile, pristine, and relatively undisturbed natural areas, often intended as a small-scale alternative to standard commercial mass tourism. To adopt an ecotourism approach to tourism, GCE recommends the EU, national and local authorities to:

- Have a systematic and holistic environmental assessment of tourism sites.
- Favour measuring implementation through side-activities involving all actors in the project (apps, measurement tools, installation of needed infrastructures etc.)
- Involve local communities to design better frameworks, emphasizing the transparency and understand the needs of population regarding tourism infrastructure (guidance, funds to make it environmentally-friendly, etc.).
- Promote and finance sustainable tourism practices. A new EU fund to finance ground repair, site restoration and ecosystem diversity should be created. The EU should also help launch information campaigns on the impacts of mass tourism and on sustainable and eco-tourism alternatives, including behavior training, conservation efforts while promoting local culture.
- Focus on ecosystem-based management particularly of the maritime areas as competing economic activities (tourism and fishing) grow simultaneously with degrading resilience of the respective ecosystems.
- Incentivise low-impact and sustainable accommodations in coordination with eco-efficient suppliers such as emerging biohotels or ecohotels.
- Create frameworks and local assessments to avoid water stress, and the creation of infrastructures to better manage existing resources. We propose to reduce the environmental impact through three steps: assessing where the impact comes from ; selecting partnerships (supply chains, etc.) that prioritize minimizing their ecological footprint ; raising awareness within the administration and employees.
- Include transport into the EU Ecolabel process and create a point system, which establishes in its implementation an EU-wide standard on clean mobility to access touristic places and explicitly advertise for it.
- Facilitate motorised clean mobility alternatives at touristic places (car sharing, improved (night) train connections, option to take bikes in trains and buses).
- Control tourist numbers in threatened mass tourist destinations by introducing additional tourist levies or quotas (similar to the limit introduced in 2017 in Dubrovnik for cruise tourists) (308).
- Allow for more flexibility in the way workers take days off to allow for Europeans to travel more conveniently and slower. Teleworking while traveling should also be allowed.

Develop cycle tourism

Cycling tourism already makes over 500 000 jobs in the EU and the industry has a great potential to expand (209). Given the certain environmental and economic benefits of cycle tourism, the EU and local authorities should promote and facilitate it.

GCE demands that clean multimodal transport be facilitated and bike infrastructure to be improved.

*see: https://ec.europa.eu/growth/sectors/tourism/business-portal_en

We support the updated legislation on rail passengers' rights that reinforces the right to take bikes on trains(310). On the other hand, we call on the European Commission to forbid railway operators that refuse or restrict bicycle carriage for "*safety or operational reasons*" when passengers are entitled to take bicycles on board the train. It should also be possible to take bikes on long-distance coach travels.

Bike infrastructure should be improved in touristic areas to promote clean mobility. Moreover, the development of services for cyclists should be promoted and facilitated by local authorities. Crucially, a sufficient number of e-bikes charging points and safely parking bikes and bike trailers should be ensured near touristic sites.

GCE calls on local authorities to create incentives for using bikes while sight-seeing
Cooperation projects should be encouraged by the EU between stakeholders of the tourism and clean mobility sectors (hotels and bike rental companies): Procedures to be put in place by the hotel management to provide primarily sustainable travel solutions (bikes rental, travel cards, apps); combine transport modes: between sustainable mobility modes (bike sharing, on bike sharing card offer discount for electric car rental).

GCE asks for EuroVelo to be recognised as part of Trans-European Transport Network (TEN-T)
EuroVelo is a network of 19 long-distance cycling routes criss-crossing Europe in various stages of completion. In addition to existing networks such as road, rail or inland waterways, in the upcoming TEN-T revision, EuroVelo routes should be recognised. This will make the Europe-wide cycling networks easier and cheaper to be completed (28% of the routes are currently dedicated bicycle lanes or paths), and develop more cross-Europe bicycle tourism routes in the future.

A cleaner cruise tourism

Cruise tourism is an ever growing sector, from catering 8.5 million customers in 1997 to 21 million in 2015 and an increase as high as 20.5% increment of cruise passengers in five years from 2011 to 2016 (312). Not only does it involve multiple stakeholders (tourists, local communities, regional governments, national authorities, tour operators, port authorities, shipping operators), it also generates jobs and revenue for thousands more (313). However, it also means its impact on the environment is equal to its worth: cruise ships emissions are not only superior to other means of transports by route and time efficiency, they also pollute water and air across the world (57 ships emit as much NOX emissions as 340.000 passenger cars in 2017) (314). The carbon emissions per passenger kilometres produced vary between 246 to 2500 g per passenger kilometres(315). More so, their main fuel, heavy fuel oil (FHO), is a dirty fossil one (316). Yet, these cruise ships most of the time do not possess filters or selective catalytic converters, which, combined with their high fuel consumption (due not only to their very slow pace near coasts but also to the facilities on board), is disastrous for the environment (317). As an example, the Carnival Corporation & PLC ships emitted more than 10 times the amount of sulphur oxides than 260 million plus passenger vehicles (2017) (318). Such sulphur emissions can lead to various diseases for human beings. There are however ways to lower the environmental and human negative impacts for this industry: experts highlighted controlling emissions, sewage treatment, fuel efficiency and recycling as priorities for cruise ships (319).

GCE calls for enhanced protection of harbour cities and their local environment.
That means maximising the total number of visitors and ships per day in consultation with local communities, environmentalists and conservationists.

GCE calls for more stringent air pollution and CO2 operational standards
The SECA standard (Sulphur Emission Control Area) in Europe should be tightened for cruise ships to 10 ppm, equivalent to fuel used in road transport. ZECA and ECA standards should be higher for cruise ships.
Operational zero emission vessel (ZEV) mandates should also be introduced to fully decarbonise the sector by accelerating the uptake of zero-carbon fuels (321).

GCE demands that cruise ships become first-movers to decarbonise the sector
Cruise ships should be the first required to switch to zero emission propulsion in EU territorial waters and EEZ. To reduce their pollution near coastal communities, cruise ships should be the first required to adopt zero-emission at berth policies. Luxury cruise ships and new cruise ships should face tougher regulation.

GCE calls for the inclusion of cruise NOx and SOx emissions in the EU ETS
"In 2017, luxury cruise brands owned by Carnival Corporation & PLC emitted 10 times more disease-causing sulphur oxide (SOx) in European seas than all of Europe's 260 million plus passenger vehicles. [...] In Denmark, for example, the coasts of which are entirely within SECAs, cruise ships emitted 18 times more SOx in 2017 than all of the country's 2.5 million passenger vehicles in a year" (T&E)(322).

NOx emissions from cruise ships should also be a greater concern for EU policy-makers. *"In Denmark again, 107 cruise ships emitted as much NOx in the Danish maritime economic exclusive zone (EEZ) as half the passenger cars operating in the country itself"* (323). Hence, including emissions in the EU ETS will ensure that cruise tourism will compensate for its GHG and in particular NOx and SOx emissions under the ETS to cover international and domestic EU maritime. Given the "fuel subsidy gap", a multiplier (e.g. 2x) could be applied to cruise ships' NOx and SOx emissions under the ETS.

Yachts and recreational boating

Given that yachts are another highly carbon-intensive luxury mode of transport used by a very tiny privileged part of the population, GCE suggests banning yachts of 24 meters over in load line length from EU waters.

Yachts can be defined as motorised vessels used for sports or pleasure; usually having a length of 24 meters and longer in load line; carrying no cargo and no more than 12 passengers.

The average diesel consumption of a 70-meter-long yacht approximates 500 l/h, without mentioning anchoring or water movement effects on marine ecosystems, compounded as the boat's size increases. As a matter of comparison, an average car in 2017 consumed 7.2 Lge/100km, and a 2011 heavy-duty vehicle had a 32 Lge/100km (324). As such, a 70-meter-long yacht consumes more than 10 heavy-duty vehicles without any maneuvers. The whole industry, from the conception, to the destruction of a yacht, is highly polluting. The boat's superstructure, its hull, or its sails, for instance, all come from the petrochemicals industry, even though the critical criterion remains the size of the yacht. Moreover, superyachts are on average kept by their owners only for five years (325).

Apart from the extremely serious air pollution it causes globally, recreational boating poses a set of problems similar to that of cruise ships: rejection of grey waters into the sea, tourism, resource depletion, anchorage and mere boat's movements into waters heavily disturbs marine ecosystems.

And the bigger the boat, the more serious those issues are. The problems may stay the same as for cruise ships, only that yachting is directed at a ridiculously small number of extremely wealthy people. Only High and Ultra High Net Worth Individuals (UHNWI) can afford such luxury products. UHNWI are individuals who have at least $30 million in investable assets. They are generally men over 50 years old (326). In 2018, it is estimated by the Global Wealth Report of that year that there were 198,342 UHNWIs in the world. The world total population equalled 7.5 billion in 2018, those individuals thus represented 0.003% of the world total population.

Yachts dock in most cases in harbour basins that are not designed for large-size ships, which require specific amenities, raising security and environmental issues (327). Those yachts, by their dimensions and concentration (yachting is a social activity), contribute in fact to deteriorate the natural surroundings they are meant to enjoy. They also maintain an environmentally vicious momentum to seaside cities that are currently economically dependent upon yachting. It is particularly true for the Mediterranean Sea, where Posidonia, an essential alga for Mediterranean marine life, is threatened by yachts' hulls and boaters' carelessness when it comes to anchor in unauthorised anchoring zones (328). Regular gaps between harbours' actual docking capacities and the number of yachts are often observed (329).

The greenwashing efforts from the yacht industry, as that of many luxury mobility industries, cannot withstand the fact that a sustainable yacht is scientifically an oxymoron. A yacht is intrinsically designed to provide a luxury service revolving around comfort and leisure. Hence, it has to be provided with all the trappings necessary to enjoy a pleasant trip on board, generally electrical equipment (heating system, air conditioning, fridge, washing machines, but also spa and swimming pool).

Financing

The traditional cost-benefit analysis assumes a reduced travel time as efficiency despite its correlation with externalities such as traffic accidents or emissions, the consequences of which can considerably skew the expected benefits. No transport project should be financed without due consideration for safety, equity and climate impact.
(The World Bank, 2017) (330)

Introduction

The current funding of the European Green Deal is to say the least, worryingly low, and falls very short from filling the massive green investment gap (excluding transport) estimated between €401 and 438bn a year in 2021-2030 to cover annual energy system investments needs (excluding transport) to achieve the 55% level of ambition (European Commission, 2020) (331).

And the additional investment needed to complete the European rail network (TEN-T) and to clean mobility are also massive. According to the European Commission "*the estimated investments needs in EU27 for the period 2021-2030 to complete the TEN-T core network are about EUR 500 billion, and about EUR 1.000 billion for the TEN-T comprehensive network and other transport investments such as decarbonisation* (with former EU climate targets), *digitialisation, safety, maintenance, etc*" (European Commission, 2018) (332). Infrastructure represents indeed the largest investment needs in the transport sector towards the green transformation (333) although powering EU mobility without oil will also require massive investments in renewable electricity production.

Despite growing massive investment needs to green mobility, the Connection Europe Facility for Transport (CEF-Transport) programme (EU funding instrument to realise European transport infrastructure policy) went from €12.1bn (over the last MFF (2013 - 2020) to €11.4bn for the 2021-2027 period (European Parliament, 2020) (334). The €750bn of the EU Recovery Plan NextGenerationEU must be invested wisely and give absolute priority to clean mobility projects: public transport, bike lanes, EV charging points.

Yet, it is essential that the European institutions ensure that investment needs are met for transport-related expenditures. The investments needed for the realisation of the Trans-European Transport Network (TEN-T) core network is estimated to create €4.5 trillion cumulated GDP and 13 million job-years EU-wide (335; 336). If invested with a truly long-term vision, investing in our mobility infrastructure has not only clear environmental benefits, but also financial, economic and societal benefits. We must urgently close the investment gap for European mobility by ensuring sufficient funding for research and necessary infrastructure (e.g. EV charging stations, modernise railways, hydrogen stocking facilities, cycling paths...). "*Such investments will help provide the adequate environment for clean transport modes, give investment certainty and opportunities to companies, support changes in behaviours, while pursuing the long-term transformation of our mobility. Such investments also make sense from economic and social points of view – e.g. a recent analysis of cost-benefits estimates that a kilometre by car has an external cost of €0.11 per rider while the same distance cycling or walking brings respectively a benefit of €0.18 and €0.37 as they reduce health related expenditure (e.g. sick leave, insurance)*" (Jacques Delors Institute, 2020) (337).

A profound lack of funding is likely to jeopardise our climate targets in the transport sector. In the very near future. Yet, it is clear where we can raise sufficient amounts of money from, starting with using current subsidies differently followed by creating new EU own resources and greening the EIB and the ECB.

Stop fuelling the climate crisis with public money

GCE calls on Member States to immediately stop all fossil fuel subsidies
European countries spend more than €112 billion per year subsidising oil, gas and coal production or consumption despite pledges to phase out fossil fuels completely by 2020. The transport sector is the main beneficiary of fossil fuels subsidies, with more than €49bn (44%) used to support the use of fossil fuels including tax breaks on highly-polluting diesel (338).
Governments should phase out subsidies for high energy intensive modes of transport and apply the user. For example, air transport is estimated to receive €3bn a year in direct subsidy for operation and infrastructure developments in the EU (339). Clear information on fossil fuel subsidies should be available to the public, following the German model of the biannual Subventionsbericht der Bundesregierung (Subsidy Report of the Federal Government) - supplemented by a regular report by the German Environment Agency (UBA).

GCE calls for the application of the user-pays and polluter-pays principles
Transport currently receives an estimated implicit operations subsidy of €396bn per year for EU28 (or well over €300bn per year for EU27), especially for road transport, aviation and shipping (340). Governments should end these subsidies by properly applying user-pays and polluter-pays principles in transport. A 2019 study for the European Commission called *Sustainable Transport Infrastructure Charging and Internalisation of Transport Externalities* concluded that rail is the mode of transport which respects the best the polluter-pays (external-cost charging for all transport modes) and user-pays (distance-based infrastructure charging on all major roads) principles. Rail proved to be great at covering its variable infrastructure costs and externalities like air pollution, CO2 and noise through charges, with smaller cost-coverage gaps in € per passenger-km or ton-km than other modes (341). It also shows that rail's externalities are small in comparison with other modes, both for passengers and freight. Governments should urgently revise their subsidy policy to properly apply user-pays and polluter-pays principles in transport.

GCE calls for a profound reorientation of EU funds and for the TEN-T as well as the EU Taxonomy to be aligned with the Paris Agreement.
"EU transport funding has not always been used wisely. Too much funding went into road and airports, and too little into rail. This is especially the case for EU cohesion funding: around 50% of transport cohesion funding goes into road, and only 25% into rail projects" (Europe on Rail, 2020) (343). In Central and Eastern Europe, the share of investments in rail infrastructure is decreasing while that for road is rising exponentially (344). And only 5% of the EU Regional Development Fund in low-density and depopulating areas go to rail (345). As the authors of the report for the European Parliament noted, 'road infrastructure remains the cornerstone of EU policies in low-density and depopulating areas' (Bisaschi, Romano et al, 2021) (346).

The TEN-T should be entirely aligned with the Paris Agreement, thus, road and airport expansion and creation projects should be reconsidered. The EU Taxonomy, the classification system establishing a list of environmentally sustainable economic activities, must also strictly reflect the urgent need for investments in truly clean mobility.

Spend smart, spend more

GCE stresses the importance of applying a comprehensive methodology with the inclusion of safety, sustainability, equity and inclusivity concerns in economic valuations of transport projects
The methodology should include socio-economic cost-benefit analysis and environmental impacts to justify the final project selection (349). Additionally, the methodology should be transparent and applied consistently.

GCE calls on Europe to develop bike infrastructures for which massive public investments are needed

Not only are cycling roads lacking in most of the EU, but there is a need for a developed network in order to form touristic circuits. The current cycling roads are circumvented to some countries only, and limit drastically the possibility of cycle tourism. We support the European Cyclist' Federation demands: "*10% of all public investments in transport to be used for cycling-related measures and all public investments to take into account the needs of bicycle users*" (350). There are massive disparities between European countries regarding multimodal transport. Some European countries have much more cycling opportunities than others, which is why it is urgent for the EU to help all regions in this regard by allocating more resources for bike lane development.

GCE calls on Member States to give more visibility to active mobility and include infrastructure deployment in their NECPs

"In addition to better funding for urban planning and for cycling infrastructure, the EU should also improve the collection and visibility of statistics related to walking and cycling: e.g. kilometres of bike lanes, kilometres travelled by Europeans while walking and cycling, share of modal split, bike sales, employment. Current EU statistics do include such data on urban transport and motorcycles for instance. This could give policy makers more visibility on developments in these soft modes and their growing importance in daily mobility" (351) . Moreover, the Commission should also require Member States to provide quantitative targets for cycling and walking infrastructure deployment in their National Energy and Climate Plans (NECP).

GCE states that tax justice and fair carbon pricing is crucial

Carbon pricing is an essential tool in our fight against the climate crisis. However, not all sources of pollution are equally carbon-priced. As an example, only 52% of all EU emissions are covered, sometimes leading to a non-existent decarbonization due to inadequate carbon pricing (352). All sources of pollution must be subject to carbon pricing in order to disincentivize their use. However, special attention must be paid to citizens' needs on the value of certain products (e.g. a sudden rise in car fuel price led to the Yellow Vests movement in France which had at its heart tax justice demands). In the meantime, It is inconceivable that airlines and cruise ships pay so little for their pollution. Wealth and pollution taxes must take into account rising income inequalities (353) and the climate crisis. Tax justice must be at the cornerstone of our public policies, especially climate policies.

GCE calls on the creation of new EU own resources to fill the green investment gap

New fiscal tools must be created at EU level if the EU is to help finance the enormous green investment gap should include environmental measures. Besides the plastic tax, Member States should revert all the auction revenues from the sale of emissions allowances and the revenues of new environmental fiscal tools set up at EU level should be reverted to EU green funds such as the European Maritime Climate Fund. For example, in the maritime sector, the sale of emissions allowances can be reinvested into refurbishing ships, subsidizing technological updates such as battery or hydrogen-powered ships and extending emission control areas (ECAs). Member States are often very reluctant to create new resources, yet, they are essential if we are to find the necessary funding to pay for Europe's and the developing world's green transformation. New EU own resources should include, among others, a tax on aviation fuel.

The EIB should become a real Climate Bank (354).

GCE calls on the EIB to review its recently adopted 2021 - 2025 Climate Bank Roadmap to end financing for projects that are non-compatible with the Paris Agreement and to require its clients to adopt robust decarbonisation plans.

On 11th November 2020, the EIB Board of Directors approved a weak Climate Bank Roadmap 2021-2025. The Roadmap was very disappointing given that a year before, the EIB took the commitment to become the *'EU Climate Bank'*. Now, the EIB board of Directors should revise its Climate Bank 2021-2025 Roadmap and urgently abandon its transition period allowing the EU bank to continue supporting climaticide projects until the end of 2022. The EIB should require its clients benefiting from its funds to adopt solid decarbonisation plans (355).

GCE calls on the European Investment Bank to update its transport lending policy to align it with the Paris Agreement

Transport accounts for about 1 in every 4 euros invested by the EU bank(356). Despite transport being the sector in which it invests the most, the current EIB transport policy allows for lending to fossil-fuel vehicles, airports, and biofuels and will therefore need to be urgently updated (357). The EIB indeed keeps signing loan agreements with airports (e.g. Copenhagen in 2018 (358) and Dublin in 2019 (359)). In the upcoming review of the EIB's Transport Strategy, it must decide to stop funding any road network expansion or airport infrastructure. The EIB should increase its funding for electric cross-border rail projects and rolling stock instead (360).

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