
CONFRONTING CARBON INEQUALITY IN THE EUROPEAN UNION

Why the European Green Deal must tackle inequality while cutting emissions

As EU leaders meet to agree a new 2030 emissions reduction target this week, new Oxfam analysis reveals that EU emissions cuts since 1990 have been achieved only among lower and middle income EU citizens, while the total emissions of the richest 10% actually grew.

To achieve the deeper emissions cuts needed by 2030, European leaders must put fairness and a just transition at the heart of the Green Deal, targeting deeper emissions reductions from richer Europeans, while boosting support for lower income and marginalised communities. A Green Deal that tackles both inequality and emissions can help build fairer, healthier and more resilient European societies in the wake of the COVID-19 crisis.

"We cannot win our fight for greater fairness, for a just transition, if we defend an economic model that delivered growing inequality on the back of a dwindling set of resources."

Frans Timmermans, Executive Vice-President of the European Commission for the European Green Deal

INTRODUCTION

The European Council meeting on 10-11th December 2020 will decide the ambition of the EU's 2030 greenhouse gas emission reduction target. Following China's pledge to achieve carbon neutrality by 2060, and the election of a new US administration that is committed to re-joining the Paris Agreement, a strengthened EU target could prove a tipping point in accelerating international climate action. Without question, the EU leaders' decision is pivotal to keeping the Paris Agreement's goal of limiting global heating to 1.5C within reach.

The European Commission has tabled an emissions cut of 55% below 1990 levels by 2030, while the European Parliament voted in favour of a 60% cut. Neither is sufficient compared to the lowest risk emissions pathways aligned with the 1.5C goal assessed by the Intergovernmental Panel on Climate Change (IPCC). These imply EU reductions of at least 65% below 1990 levels by 2030 based on global average emissions cuts from today, and even higher to be consistent with the Paris Agreement's equity principle, that implies signatories with greater emissions responsibility and financial capacity should lead global mitigation efforts.³

But one thing is clear: it will only be possible to agree and to achieve deeper reductions by 2030, if equity and fairness are put at the heart of the transition to a new European economy. New Oxfam analysis of consumption emission estimates developed with the Stockholm Environment Institute (SEI)⁴ shows why addressing carbon inequality in the EU is key to strengthening climate ambition. It reveals that in the 25 years between 1990 and 2015, in which the EU's consumption emissions fell by around 12%, while income inequality increased across Europe⁵:

- **The EU was collectively responsible for 15% of global cumulative consumption emissions - while being home to just 7% of the world's population;**
- **The richest 10% of EU citizens were responsible for over a quarter (27%) of these EU emissions, the same amount as the poorest half of the EU population combined;**
- **The total annual consumption emissions of the poorest 50% of EU citizens fell by 24%, and those of the 40% of EU citizens with 'middle incomes' by 13%, while the emissions of the richest 10% grew by 3%, and of the richest 1% by 5%;**
- **Today, the richest 10% of EU citizens have a per capita footprint over 10 times higher than the level needed by 2030 for a 1.5C-consistent emissions pathway, while the footprint of the richest 1% is 30 times higher. By contrast the footprints of the poorest 50% of Europeans will need on average to be halved by 2030.**

Consumption emissions reflect both the emissions produced in a country and those embedded in imports of goods or services, while excluding those embedded in exports. The EU is a net importer of emissions, with slightly higher consumption than production emissions.¹

Cumulative emissions & 1.5C pathways: The climate crisis is driven by the accumulation of emissions added to the atmosphere over time. To limit global heating to the 1.5C goal of the Paris Agreement, annual emissions must fall rapidly each year until they reach net zero, before a maximum amount of cumulative emissions is surpassed.²

Since 1990, EU emissions cuts have occurred in the context of growing economic inequality⁶ - but now that must change. In order to achieve the much deeper cuts needed by 2030, it is vital that EU policy measures do more to tackle the emissions associated with the richest, highest emitters in Europe, while also supporting the livelihoods of poorer citizens in a just transition. This means tackling carbon inequality both *between* richer and poorer EU member states and *within* EU Member States.⁷

The right policies can bring multiple benefits beyond tackling the climate crisis, such as creating decent jobs in low carbon sectors, cutting energy bills for low income households, and improving air quality and public health. By re-orienting the European Green Deal⁸ to tackle inequality as well as cutting emissions, it can help build fairer, healthier and more resilient EU societies in the wake of the COVID-19 pandemic.

Box 1: Methodological approach to estimating carbon inequality in the EU

Oxfam and SEI's research estimates how carbon emissions are attributed to individuals who are the end consumers of goods and services for which the emissions were generated. Consumption emissions accounting reflects both the emissions produced in a country and those embedded in imports, while excluding those embedded in exports. This is different from attributing emissions solely to the countries in which the emissions were

produced, which is the basis on which EU targets are set. Our approach is explained in detail in an earlier published technical research report.⁹

For the EU, we first take national consumption emissions data for the current 27 member states for the period from 1990 to 2015. We then allocate those national consumption emissions to individuals within each country based on a functional relationship between income and emissions, drawing on new income distribution datasets. We assume, based on numerous studies, that emissions rise in proportion to income, above a minimum emissions floor and until a maximum emissions ceiling. These estimates of the consumption emissions of individuals in each EU country can then be compared or sorted into a single EU distribution according to income, treating the EU as one country.¹⁰

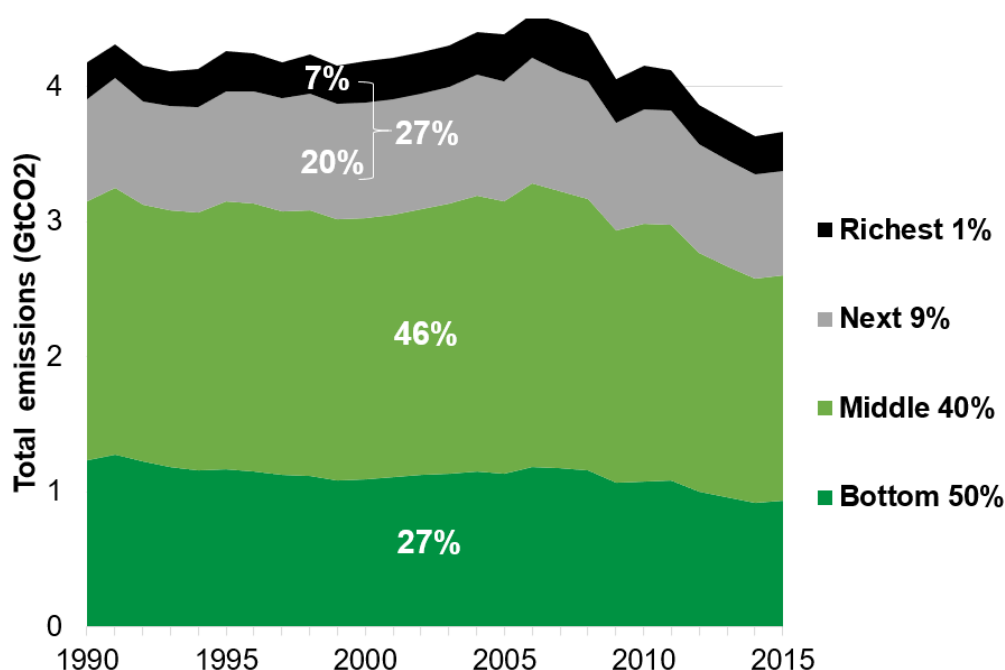
KEY FINDINGS

Building on Oxfam's earlier work with SEI to estimate global carbon inequality (see Box 1), in this briefing we look first at the inequality between the richest and poorest citizens in the EU, wherever in the EU they live. We then compare the emissions of the richest and poorest citizens of each EU Member State. Four principle findings stand out.

1/ Responsibility for emissions is highly unequal among EU citizens

- Between 1990 and 2015, the EU as a whole was responsible for 15% of global cumulative CO₂ consumption emissions, using about 10% of the global carbon budget for 1.5C in this time,¹¹ despite being home to only 7% of the global population.
- However, these EU emissions were not shared equally among EU citizens. As shown in Figure 1, the richest 10% of EU citizens (c. 43.6m people) were responsible for 27% of these emissions, the same amount as the poorest 50% of EU citizens combined (c. 216m people). The 40% of Europeans with 'middle incomes' (c. 173m people) were responsible for 46% of the EU total. The richest 1% (c. 4.7m people) were alone responsible for 7%.

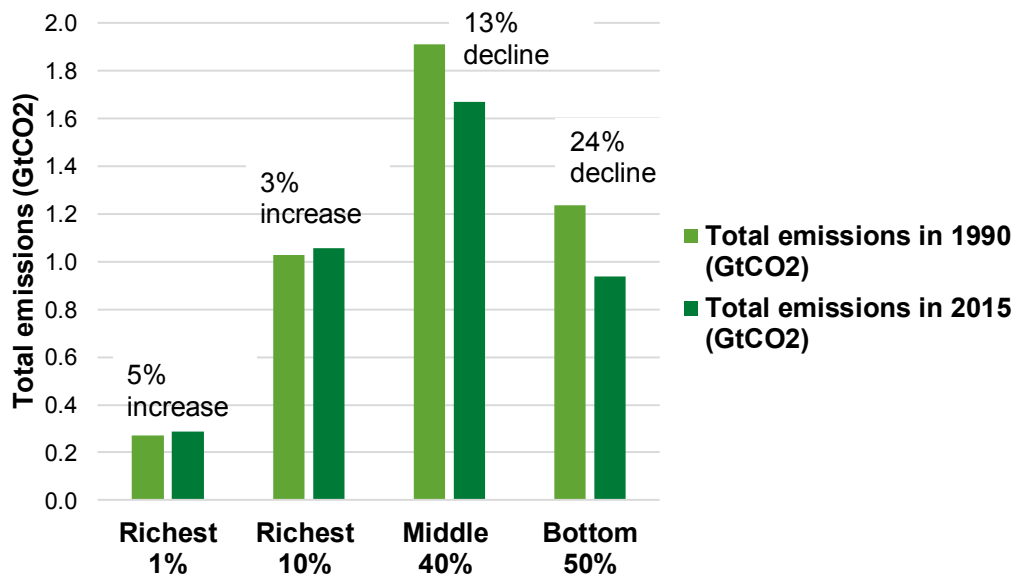
Figure 1: Total EU consumption emissions 1990-2015 (GtCO₂), and share of cumulative consumption emissions 1990-2015 by income groups¹² (%)



2/ Since 1990, emissions have fallen among poorer EU citizens, but increased among the richest

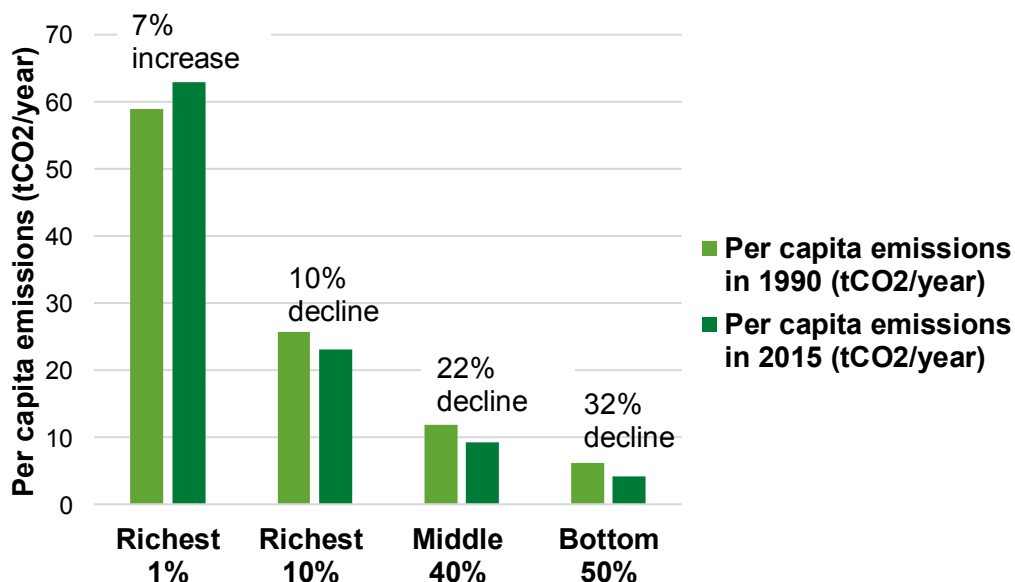
- Between 1990 and 2015, annual consumption emissions in the EU fell by around 12%. But in the context of growing economic inequality in the EU¹³, our estimates suggest that these emission reductions were not shared equally among EU citizens.
- The consumption emissions of the poorest 50% of EU citizens fell by nearly a quarter (24%), and those of EU citizens with 'middle incomes' by 13%. By contrast the consumption emissions of the richest 10% *grew* by 3%, and of the richest 1% by 5%, as indicated in Figure 2.

Figure 2: Total consumption emissions (GtCO₂) by EU income group in 1990 and 2015¹⁴



- On a per capita basis, in the context of a growing population, the poorest 50% reduced their emissions by 32%, those with 'middle incomes' by 22%, and the richest 10% by just 10%,¹⁵ while the emissions of the richest 1% *increased* by 7%, as indicated in Figure 3.

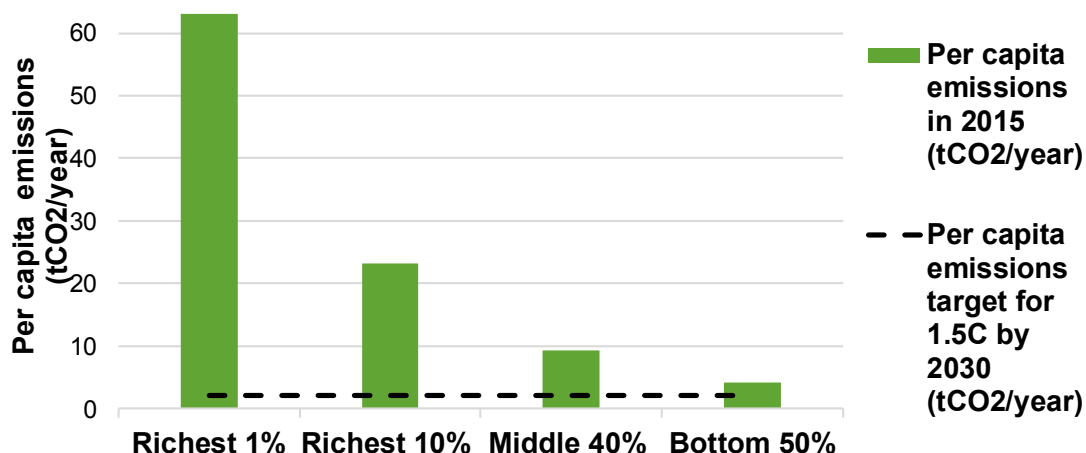
Figure 3: Per capita consumption emissions (tCO₂/year) by EU income group in 1990 and 2015¹⁶



3/ To achieve emissions reductions by 2030 that are in line with a 1.5C global emissions pathway, the EU must do more to address the excess emissions of its richest citizens

- Oxfam estimates that global average per capita emissions must be reduced to around 2.1tCO₂/year by 2030 to get on track to limit global heating to 1.5C (based on the lowest risk emissions pathways assessed in the IPCC 1.5C report).¹⁷ The 2030 target supported by the European Parliament - a 60% cut below 1990 levels - if applied to the EU's consumption emissions, would translate to a per capita target of approximately 3.7tCO₂/year - over 50% higher than is needed.
- Even the per capita emissions of the poorest 50% of European citizens are currently twice as high as the 2.1tCO₂ target, at approximately 4.2tCO₂/year in 2015. However, as shown in Figure 4, the richest 10% of citizens in the EU have per capita emissions that are currently over 10 times higher than these targets, while for the richest 1% they are 30 times higher.
- Achieving the deeper emissions cuts needed by 2030 will therefore require a much greater focus on measures to address the excessive carbon consumption of the richest EU citizens.

Figure 4: Per capita consumption emissions (tCO₂/year) by EU income group in 2015 compared to global per capita 2030 target for a 1.5C-consistent emissions pathway¹⁸



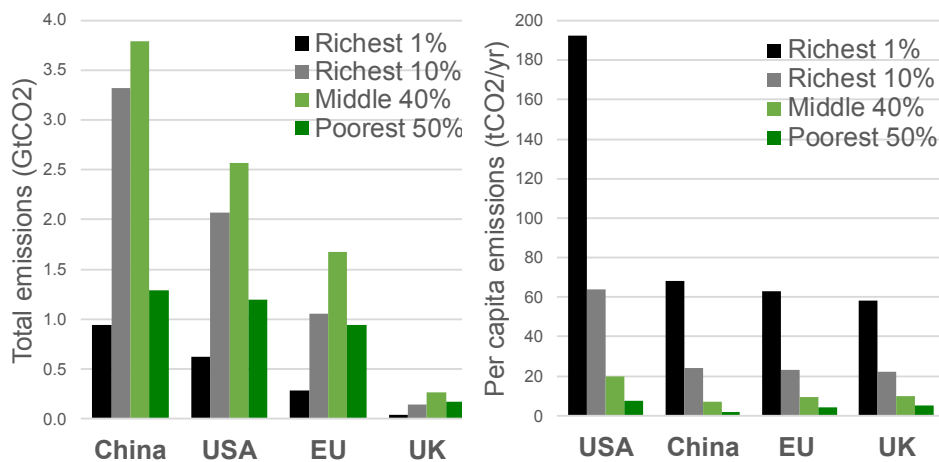
Box 2: Comparing the footprints of EU income groups with those of other countries

To put these findings into some international context, we can compare the current consumption emissions of EU citizens in different income groups with those of China and the USA, the two biggest emitting countries, and the UK.

In absolute terms, the richest 10% of people in China (c. 139m people) are responsible for nearly the same quantity of CO₂ as the entire population of the EU (c. 449m people). But on a per capita basis, the richest 10% in China have a similar footprint to the richest 10% of people in the EU or UK (and similar to the richest 10% across the African continent¹⁹). However, the carbon footprint of the poorest 50% of people in China is less than half that of the poorest 50% of people in the EU or UK.

The USA stands out as having by far the highest per capita footprint of the richest 1% - 3 times higher than the richest 1% in the EU, China or the UK, while the carbon footprint of the richest 10% of US citizens is double that of the richest 10% in those countries.

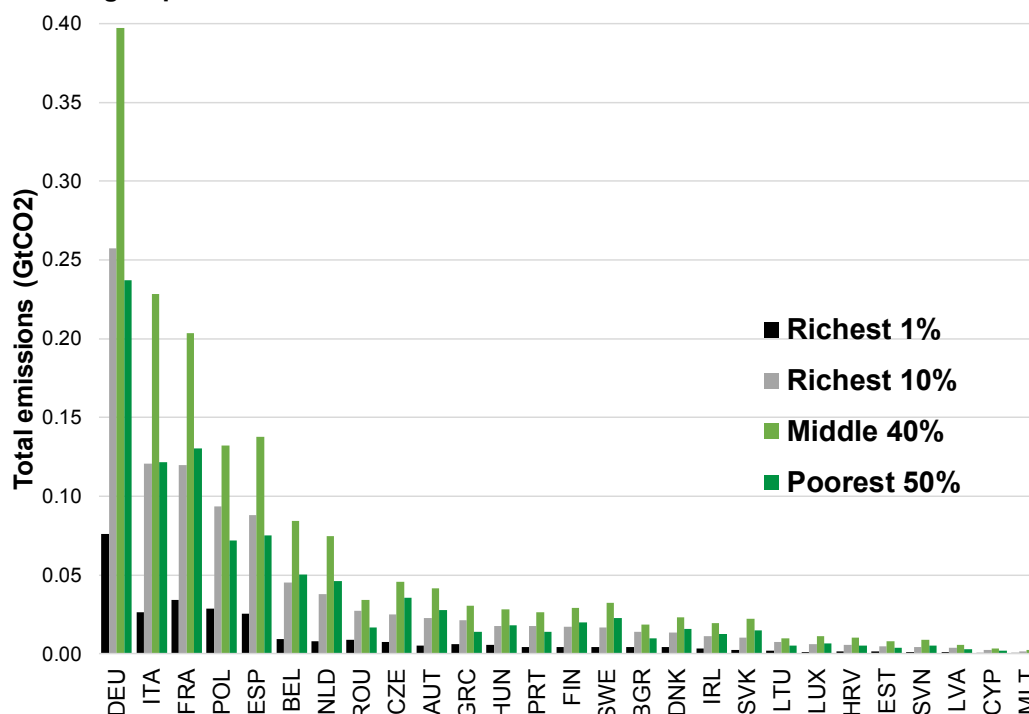
Figure 5: Comparison between absolute and per capita consumption emissions of different income groups in 2015 in China, the USA, the EU and the UK²⁰



4/ Carbon inequality is stark within, as well as between EU Member States

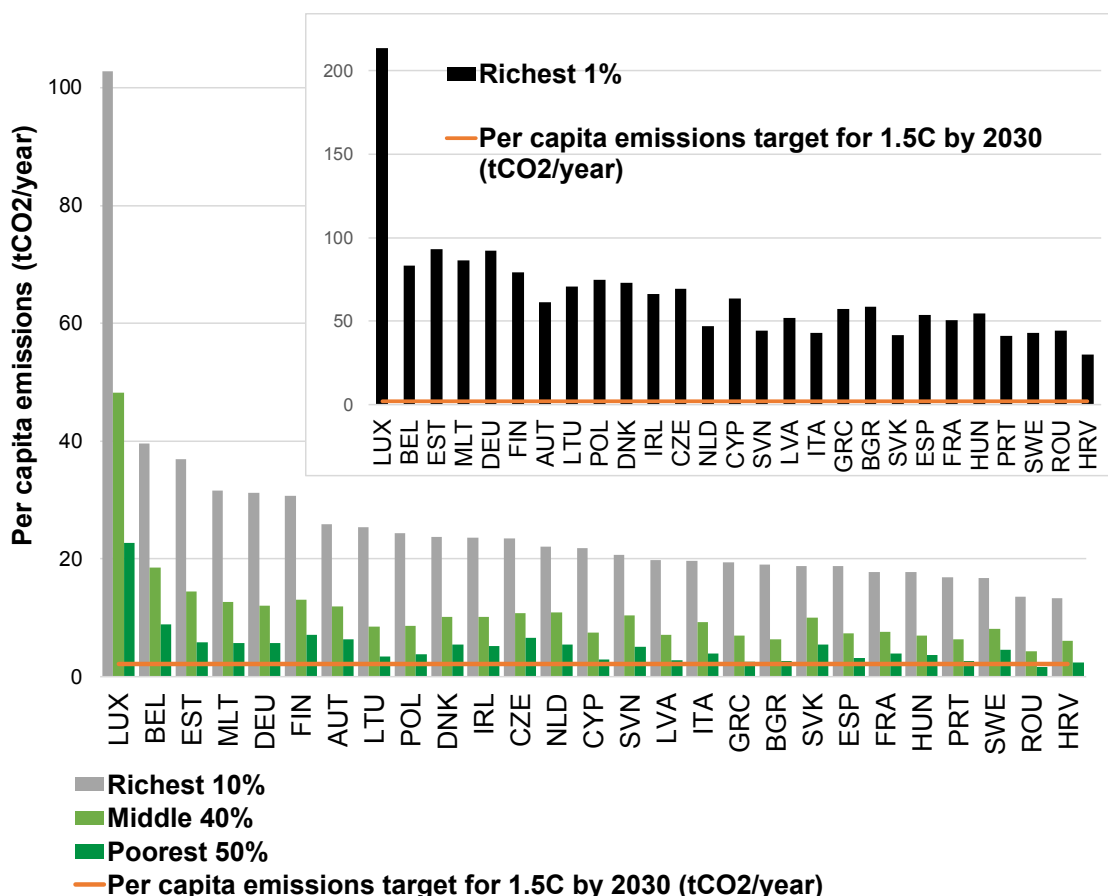
- Unsurprisingly, the majority of the emissions linked to the richest 10% of Europeans are from citizens of richer EU Member States, and the majority of the emissions linked to the poorest 50% from citizens of poorer Member States. But significantly there are citizens in *all* EU income groups from *all* Member States, showing the stark inequalities *within* as well as *between* the Member States.²¹
- In absolute terms, as shown in Figure 6, the richest 10% of citizens from rich, populous Member States such as Germany, Italy, France and Spain are the biggest contributors to EU emissions. Together the richest 10% of citizens in those 4 countries alone (c. 25.8 million people) are responsible for more emissions than the entire populations of 16 other EU Member States combined (c. 84.8m people).²²

Figure 6: Total consumption emissions (GtCO2) in 2015 in EU Member States by national income groups²³



- However, the richest 10% in Poland – a far poorer Member State – is also a major contributor to EU emissions because of the country's reliance on coal power, and sharp increases in inequality in Poland.²⁴ The emissions of the richest 10% of Polish citizens (c. 3.8m people) are greater than the entire population of Sweden (c. 9.8m people) or Finland (c. 5.5m people), and over 50% higher than the population of Hungary (c. 9.9m people), Greece (c. 10.9m people) or Portugal (c. 10.5m people).
- Absolute emissions are also high among the richest 10% in far smaller Member States such as Belgium and the Netherlands, as a result, in particular, of these countries' high dependency on imports of oil and gas, and use of gas for residential heating. The richest 10% in Belgium and the Netherlands (c. 3.7m people) are responsible for higher emissions in absolute terms than the total population of many other Member States, including Hungary (c. 9.9m people), Bulgaria (c. 7.3m people), Greece (c. 10.9m people), Denmark (c. 5.7m people), Sweden (c. 9.9m people) and Finland (c. 5.5m people).
- In per capita terms, the picture is quite different. As shown in Figure 7, the highest emitters in the EU are by far the richest citizens of Luxembourg, and thereafter the richest citizens of Belgium, Estonia, Malta and Germany.

Figure 7: Per capita consumption emissions (tCO₂/year) in EU Member States by national income groups²⁵



- The richest 1% of Luxembourgers have a footprint of 214tCO₂/year, 26 times higher than the EU average, and among the highest emitters anywhere in the world. This reflects the very high incomes and spending power of this group and the country's high dependency on imported fossil fuels. The per capita emissions of the richest 10% of Belgian citizens are also very high in international terms, for example they are nearly twice as high as the richest 10% in China or the UK (see Box 2).
- Member states with relatively lower per capita emissions, even among their higher income groups, include relatively rich countries such as Sweden, Portugal, France and Spain,

where renewables (or nuclear in the case of France²⁶) make up a larger proportion of their energy mix including in residential heating. This demonstrates that it is possible to achieve lower per capita emissions even in relatively affluent countries.

- However, even in these relatively better-performing countries the challenge remains stark. The carbon footprint of the richest 10% of Swedes (approximately 16.7tCO₂/year) is around 8 times bigger than it needs to be by 2030 if we are to get on track to limit heating to 1.5C, while the carbon footprints of the richest 10% of French and Spanish citizens (17.8tCO₂/year and 18.8tCO₂/year respectively) are around 9 times bigger.

Box 3: What accounts for the footprints of Europe's richest, highest emitters?

A recent study by Ivanova and Wood, using a slightly different methodology, found that air and road transport accounts for the biggest share - approximately 30-40% - of the carbon footprint of Europe's highest emitters.²⁷ Other recent studies have also found transport, and especially aviation, to be the most unequal and carbon intensive of all categories of household consumption.²⁸ Transport accounts for over a quarter of emissions produced in the EU, and has been rising in all but two EU member states since 1990 - more than doubling in Luxembourg and Ireland in this time.²⁹ Emissions from aviation are also rising sharply, more than doubling since 1990.³⁰

By contrast, food and home heating were found to make up more than half of the emissions footprints of the lowest EU emitters, with land transport the next biggest contributor.³¹ This suggests that policy options such as taxation or outright bans are appropriate approaches to tackle transport emissions, provided that support and public transport or electric vehicle alternatives are provided for lower income or marginalised groups that are reliant on car use as a necessity. However public investment and regulation of private landlords will be vital in areas such as home energy efficiency improvements, to ensure wide uptake and to avoid regressive impacts on the poorest.

CONCLUSION: THE EU GREEN DEAL AS A TOOL TO FIGHT INEQUALITY

Addressing equity is key to raising the ambition of emissions cuts at every level.

Internationally, the EU should set emissions reductions targets that are in line with the latest science *and* that reflect the EU's high historic responsibility for emissions and its capacity to pay for a low carbon transition. On this basis, a target to cut emissions by more than 65% below 1990 levels by 2030 is needed. By committing to deliver its fair share of the global emissions reductions needed, the EU can also help to unlock greater ambition from others - and trigger a race to the top among major emitters, from the USA to China.

But as this analysis has shown, it is also vital that the EU places the fight against inequality at the heart of its domestic efforts to reduce emissions. To date, EU emissions reductions have coincided with rising economic inequality, leaving emissions among the richest Europeans unacceptably high even as they fall among lower income groups. To achieve the deeper reductions that are now needed, all sections of European society must do their fair share. The experience of the 'yellow vests' in France is a reminder of how quickly attempts to cut emissions can unravel if policies are not considered by citizens to be fair or equitable.

As Europe struggles to recover from the COVID-19 crisis, the European Green Deal should be used not just to cut emissions but to fight inequality, building fairer, healthier and more resilient EU societies. For example, the European Commission, EU governments and the European Parliament should:

- Use the revision of the **Energy Taxation Directive** to end fossil fuel subsidies in Europe including tax exemptions for aviation and shipping fuel, and align minimum tax levels with the social costs of the climate crisis, while ensuring revenues are recycled to benefit lower income and marginalised groups (e.g. through progressive tax cuts in other areas, direct payments to lower income households, or investment in home energy efficiency improvements).
- Accelerate the '**Renovation Wave**' proposed by the European Commission to scale-up energy efficiency improvements to residential buildings, focusing on measures to benefit lower income and marginalised communities. This should include a major programme of re-skilling and training to create decent jobs across the buildings renovation sector, providing grant-based support for renovations, promoting community and tenant energy ownership models, and establishing rent caps or freezes until energy efficiency performance standards are met and preventing rents from increasing following renovations.
- Use the revision of the **Performance Standards for Cars and Vans Regulation** to ban sales of new combustion-engine cars and vans in the EU by 2035 at the latest, allowing EU Member States to set earlier dates, with progressively tightened standards each year until then. The wider **Sustainable Mobility strategy** should be used to shift the European economy beyond reliance on car ownership with greatly expanded public transport and digital infrastructure investments - prioritising low income, rural and marginalised areas - and the promotion of car-free cities, cycling and electric car pooling schemes.
- Revise the **Non-Financial Reporting Directive** and include provisions in the new **Sustainable Corporate Governance** legislation to curb corporate short-termism and shareholder primacy, that make it harder to address the ecological consequences of excessive consumption. Companies should be required to disclose their carbon emissions and transition plans towards net zero; and the amount of profits distributed to shareholders should be capped, and companies required to invest instead in a social and ecological reserve to fund the company's low carbon transition, to ensure the cost is borne by shareholders not workers in affected industries.
- Continue to move beyond the mantra of growth in economic planning, including in the **European Semester**. Alternative metrics should be established for monitoring social and ecological wellbeing in Europe, and ensuring that budgetary decisions - whether in the context of **stimulus measures** in response to COVID-19 or the EU's **Multiannual Financial Framework** - prioritise measures that benefit low income and marginalised communities, while transitioning to a low carbon society, rather than growth at any cost.
- Ensure the proposed **Carbon Border Tax Adjustment Mechanism** does not undermine the international trust needed to strengthen global mitigation action, and risk regressive impacts on lower income groups in exporting countries, and focus on strengthening EU performance standards in key sectors while supporting international partners with their own just transitions to low carbon economies.
- At **Member State level**, EU governments can pursue a range of further policies to cut emissions while reducing inequality, including introducing wealth taxes and luxury carbon consumption taxes - such as frequent flier and business class flight passenger levies, or SUV car sales taxes - to fund the expansion of universal public services, or experiments with universal basic income payments.
- At all levels, principles of **social dialogue** should be incorporated into policy planning to ensure the voices of workers in affected industries, women, low income and marginalised groups are heard.

ANNEX

Table 1: Minimum income thresholds by regional income group for EU27 in 2015 (€1000/per capita/year)

Region	Richest 1%	Richest 10%	Middle 40%	Poorest 50%
EU 27	89	41	20	0

Table 2: Minimum income thresholds by national income group for EU 27 Member States and China, USA, and UK in 2015 (€1000/per capita/year)

	Richest 1%	Richest 10%	Middle 40%	Poorest 50%
EU Member States				
Austria	148	62	35	4
Belgium	139	65	32	5
Bulgaria	81	27	11	1
Croatia	76	34	17	1
Cyprus	105	37	15	1
Czech Republic	99	38	24	4
Denmark	161	61	35	5
Estonia	114	46	19	1
Finland	134	58	29	5
France	133	54	29	4
Germany	171	67	32	4
Greece	111	40	17	2
Hungary	99	34	19	2
Ireland	212	86	46	8
Italy	114	54	27	3
Latvia	104	38	16	1
Lithuania	129	45	18	2
Luxembourg	312	145	74	9
Malta	134	53	25	2
Netherlands	140	71	37	1
Poland	116	38	18	2
Portugal	113	46	19	2
Romania	108	32	14	1
Slovakia	79	40	24	2
Slovenia	89	43	24	2
Spain	113	46	19	2
Sweden	136	62	37	6
China, USA, UK				
China	74	25	7	0
USA	292	83	33	3
UK	127	57	31	4

Table 3: Share of population and share of emissions from EU Member States by EU regional income group in 2015

	Richest 1%		Richest 10%		Middle 40%		Poorest 50%	
	Share of emissions (%)	Share of population (%)	Share of emissions (%)	Share of population (%)	Share of emissions (%)	Share of population (%)	Share of emissions (%)	Share of population (%)
EU	8% of total emissions	1% of total population	29% of total emissions	10% of total population	46% of total emissions	40% of total population	26% of total emissions	50% of total population
Austria	2%	2%	3%	3%	3%	3%	1%	1%
Belgium	3%	3%	6%	4%	5%	3%	3%	2%
Bulgaria	1%	0%	1%	0%	0%	0%	3%	3%
Croatia	0%	0%	0%	0%	0%	0%	1%	2%
Cyprus	0%	0%	0%	0%	0%	0%	0%	0%
Czech Republic	2%	1%	1%	1%	3%	2%	5%	3%
Denmark	1%	1%	2%	2%	2%	2%	1%	1%
Estonia	0%	0%	0%	0%	0%	0%	1%	0%
Finland	1%	1%	2%	1%	2%	1%	2%	1%
France	11%	13%	11%	13%	15%	19%	10%	12%
Germany	38%	36%	32%	29%	25%	23%	15%	13%
Greece	2%	1%	1%	1%	1%	1%	3%	4%
Hungary	1%	1%	1%	1%	1%	1%	4%	3%
Ireland	2%	3%	2%	4%	1%	1%	0%	0%
Italy	7%	8%	11%	12%	15%	15%	12%	13%
Latvia	0%	0%	0%	0%	0%	0%	1%	1%
Lithuania	1%	1%	1%	0%	0%	0%	1%	1%
Luxembourg	2%	1%	2%	1%	0%	0%	0%	0%
Malta	0%	0%	0%	0%	0%	0%	0%	0%
Netherlands	3%	4%	6%	9%	4%	5%	2%	2%
Poland	8%	6%	6%	3%	6%	4%	15%	13%
Portugal	1%	1%	1%	1%	1%	1%	3%	3%
Romania	2%	3%	2%	2%	1%	1%	5%	8%
Slovakia	0%	0%	0%	0%	1%	1%	2%	1%
Slovenia	0%	0%	0%	0%	1%	0%	1%	1%
Spain	8%	9%	7%	7%	8%	10%	10%	12%
Sweden	1%	2%	2%	3%	2%	3%	1%	1%
	100%	100%	100%	100%	100%	100%	100%	100%

NOTES

- ¹ From 1990 to 2015, EU27 cumulative production emissions were 92.8GtCO₂ and cumulative consumption emissions were 108.4GtCO₂. In 2017, annual production emissions were 3.1GtCO₂ and annual consumption emissions were 3.7GtCO₂. See <http://www.globalcarbonatlas.org/>
- ² The IPCC Special Report on 1.5C notes that in "model pathways with no or limited overshoot of 1.5°C, global net anthropogenic CO₂ emissions decline by about 45% from 2010 levels by 2030 (40–60% interquartile range), reaching net zero around 2050 (2045–2055 interquartile range)". See https://www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15_Full_Report_High_Res.pdf
- ³ There are many ways to consider equity with regard to international climate commitments. For example, we can compare the EU 2030 target to the global emissions reductions needed from today. The UNEP Emissions Gap Report 2019 notes, based on the models assessed by the IPCC, that to have the best chance of limiting global heating to 1.5C, global emissions should be approximately 25GtCO₂e in 2030, representing a reduction of approximately 55% below 2018 levels. The same proportion of reductions in the EU27 - 55% below 2018 levels - equates to approximately 65% below the EU27 level in 1990. Given the EU's high historic responsibility for emissions and capacity to pay, it is reasonable to think that the EU should be delivering more than the average global emissions reductions needed from today by 2030.
- Alternatively, we can compare the EU's target with the global reductions needed by 2030 in per capita terms. If we assume a global population of 8.5bn in 2030, based on UN projections, the 25Gt global target would mean global per capita emissions of approximately 2.9tCO₂e/year. For EU27 emissions to reach this level by 2030, assuming an EU population of approximately 450m in 2030 as projected by Eurostat, they should be reduced to approximately 1.3GtCO₂e. This equates to a fall of approximately 73% below EU27 emissions in 1990.
- ⁴ Kartha, S., Kempt-Benedict, E., Ghosh, E., Nazareth, A. and Gore, T. (2020) The Carbon Inequality Era: An assessment of the global distribution of consumption emissions among individuals from 1990 to 2015 and beyond. Oxfam <https://policy-practice.oxfam.org.uk/publications/the-carbon-inequality-era-an-assessment-of-the-global-distribution-of-consumpti-621049> and Gore, T. (2020) Confronting Carbon Inequality: Putting climate justice at the heart of the COVID-19 recovery. Oxfam <https://policy-practice.oxfam.org.uk/publications/confronting-carbon-inequality-putting-climate-justice-at-the-heart-of-the-covid-621052>
- ⁵ Across the EU as a whole, and in nearly all EU member states (with the exception of Belgium), the share of total income captured by the richest 10% increased over the period, while across the EU as a whole and all EU sub-regions, the share captured by the poorest 50% declined. See <https://wid.world/europe2019/>
- ⁶ *Ibid.*
- ⁷ Income inequality *within* countries (rather than *between* countries) explains the largest - and an increasing - share of European income inequalities over this period. See <https://wid.world/europe2019/>
- ⁸ The European Green Deal is an extensive package of proposed legislation designed to make the EU "climate neutral" by 2050. See https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en
- ⁹ *Op. cit.* Endnote 4.
- ¹⁰ While the UK was an EU member state between 1990 and 2015, we exclude the UK in the EU regional dataset as the EU's climate targets for 2030 concern only its current 27 Member States. A comparison with the emissions of different income groups in the UK is however included in Box 2.
- ¹¹ Based on the lowest risk scenarios assessed by the IPCC, we assume the global carbon budget from 1990 is 1,205 GtCO₂.
- ¹² For an indication of the incomes of the different income groups, see Annex Table 1 for income thresholds for EU income groups in 2015.
- ¹³ *Op. cit.* Endnote 5.
- ¹⁴ See Annex Table 1 for income thresholds for EU income groups in 2015.
- ¹⁵ The per capita footprint of the richest 10% fell slightly, even though the aggregate footprint of the richest 10% grew, because of the growth in the EU population over the period (including in many richer Member States whose citizens make up a large share of the EU's richest 10%). It is notable nonetheless that the per capita footprint of the richest 10% declined by a significantly smaller amount than that of the 'middle 40%' and the poorest 50% (while the richest 1% even increased their per capita footprint, in spite of the growing population and emissions falling across the EU as a whole).
- ¹⁶ See Annex Table 1 for income thresholds for EU income groups in 2015.
- ¹⁷ Based on the median estimate of 'Below 1.5C' pathways assessed in the IPCC 1.5C Report for gross CO₂ emissions from fossil fuels and industry in 2030 of 18Gt divided by UN population estimate for 2030 of 8.5bn. See Table 2.4 in https://www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15_Full_Report_High_Res.pdf

- ¹⁸ See Annex Table 1 for income thresholds for EU income groups in 2015.
- ¹⁹ Analysis of carbon inequality in the African continent is forthcoming.
- ²⁰ See Annex Table 2 for income thresholds for national income groups in 2015.
- ²¹ Indeed, economic inequality within countries has been a far bigger driver of EU inequality than inequality between countries. See <https://wid.world/europe2019/>
- ²² The 16 Member States are (in order of total emissions in 2015): Finland (c. 5.5m people), Greece (c. 11m people), Hungary (c. 9.9m people), Portugal (c. 10m people), Denmark (c. 5.7m people), Slovakia (c. 5.5m people), Ireland (c. 4.7m people), Bulgaria (c. 7.3m people), Luxembourg (c. 575k people), Lithuania (c. 2.9m people), Croatia (c. 4.2m people), Slovenia (c. 2.1m people), Estonia (c. 1.3m people), Latvia (c. 2.0m people), Cyprus (c. 1.2m people), and Malta (c. 450k people).
- ²³ See Annex Table 2 for income thresholds for national income groups in 2015.
- ²⁴ The share of national income of the richest 10% in Poland increased from around 24% in 1990 to 40% in 2015. See <https://wid.world/europe2019/>
- ²⁵ See Annex Table 2 for income thresholds for national income groups in 2015.
- ²⁶ France is currently not on track to meet its share of the EU 2020 renewable energy target, see <https://www.connaissancedesenergies.org/sites/default/files/pdf-pt-vue/Rapport%20Union%20de%20l%27%C3%A9nergie%202020.pdf>
- ²⁷ Ivanova, D. and Wood, R. (2020). The unequal distribution of household carbon footprints in Europe and its link to sustainability. *Global Sustainability* 3. e18. https://www.cambridge.org/core/services/aop-cambridge-core/content/view/F1ED4F705AF1C6C1FCAD477398353DC2/S2059479820000125a.pdf/unequal_distribution_of_household_carbon_footprints_in_europe_and_its_link_to_sustainability.pdf
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- ³⁰ European Environment Agency (2018). Progress of EU transport sector towards its environment and climate objectives. <https://www.eea.europa.eu/themes/transport/term/term-briefing-2018>
- ³¹ *Op. cit.* Endnote 27.

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