CARE

AN ENVIRONMENTAL, ECONOMIC AND SOCIAL STRATEGY FOR CO2 TAXATION IN EUROPE

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EXECUTIVE SUMMARY

"Either we choose to go on as a civilization or we don't. That is as black or white as it gets" – Greta Thunberg. Global warming at its current pace will have disastrous effects on ecosystems, human health and well-being. It is therefore paramount to develop suitable political instruments in order for the EU to reliably fulfill its goals towards the Paris Agreement. In order to become a role model in fighting climate change, the EU needs to implement CARE, the Carbon Abatement, Reasserting Equity Program. The CARE Program incorporates: (1) environmental challenges posed by global warming as addressed in the Paris Agreement, (2) an economic solution that implements a uniform carbon tax covering all emissions and (3) a social design that reasserts social equity in the form of an equal per capita carbon dividend.

The recent position papers by renowned German research institutes fail to coherently address these three issues. Most critically, the papers by Böckler, DIW, FÖS and MCC argue for low carbon prices. Despite the political and economic reasons for relatively low carbon prices, achieving the objectives of the Paris Agreement – the central issue at stake – will not be feasible under a low carbon price.

An answer to the climate crisis needs to encompass three key dimensions: the environmental, the economic and the social. Only a holistic solution can help solve the central problem of our time. In this spirit, we argue for a carbon price based on Nobel laureate William Nordhaus' cost benefit analysis, in particular a carbon price that minimizes both the abatement costs as well as the damage costs associated with global warming, thus weighing up the economic, environmental and social issues. Let Europe lead the way!

On these premises, the price for CO_2 emissions in CARE should be...

- … set at 205€ per ton and increase annually by 5%;
- … set on a European level with the tax revenue collected on a national level;
- … set uniformly across industries;
- … subject to border carbon adjustments to prevent carbon leakage.

In order to balance the social issues regarding climate change mitigation, CARE comprises full redistribution of the revenues generated by the carbon tax via an equal per capita carbon dividend.

The equal per capita carbon dividend should …

- … be calculated as follows:

$$carbon\ dividend\ per\ citizen = \frac{carbon\ tax\ revenues\ in\ a\ country}{number\ of\ citizens\ in\ a\ country}$$

- … turn the regressive nature of a uniform carbon tax into a progressive one – thus maximizing societal approval;
- … be distributed on a national level to reassert societal equity in European countries.

THE SITUATION AT HAND

The EU's main instrument to curb greenhouse gas emissions – the Emissions Trading System – is insufficient to realistically tackle the goal of a 40% reduction of CO_2-emissions by 2030. Other approaches to taxing carbon, such as the 6.5 cents per liter price hike on diesel fuel in France, have sparked social unrest. Are Europeans not ready (yet) for a carbon-tax system? We think they are!

We need a holistic solution that…

- … fulfills the duties regarding the Paris Agreement;
- … resolves dimensions of inequality linked to CO_2-reduction policies;
- … is straightforward and therefore simple to communicate politically.

Nobel laureate William Nordhaus lays the groundwork for the CARE Program: A revenue neutral carbon-tax encompassing carbon fees and dividend.[1,2]

"Temperature rise to date has already resulted in profound alterations to human and natural systems, including increases in droughts, floods, and some other types of extreme weather; sea level rise; and biodiversity loss."[3] From the analysis of Antarctic ice cores, scientists were able to derive that during the last half-million years, the maximum experienced average global temperature never exceeded the threshold of 2°C more than today.[4] An even higher temperature would lead to unpredictable effects. Already at a temperature increase of 1.5°C, "worldwide, numerous, ecosystems are at risk of severe impacts, particularly warm-water tropical reefs and Arctic ecosystems."[5]

The Paris Agreement – Setting the target:

Signed by 195 states, the Paris Agreement sets the goal of keeping the global average temperature increase well below 2°C compared to the pre-industrial age. Admittedly, there is a consensus within environmental science that even at a benchmark of 2°C, ecosystems would be threatened, while extreme weather conditions and a rising sea level would endanger the livelihood of millions of human beings and other species.

Current measures – Insufficient to reach the ambitious target

The International Panel on Climate Change (IPCC) states that even assuming full implementation of the 'nationally determined contributions' handed in by the nations in the context of the Paris Agreement, the world average temperature would rise by 3°C, in contrast to the goal of a well below 2°C hike fixed in the agreement.[6] This analysis is shared by this year's Climate Change Performance Index (CCPI).[7] The CCPI underlines that "no country makes its necessary contribution to limit global warming to well below 2°C".[8]

[1] Nordhaus, W. D. (2013): The climate casino: Risk, uncertainty, and economics for a warming world, New Haven & London.
[2] „The main insight is that people must have economic incentives to change their activities in ways that lower emissions of CO_2, […] [which] will raise the relative prices of carbon-intensive goods and lower the relative prices of carbon-free goods […]" (ibid.)
[3] ibid.
[4] ibid.
[5] Intergovernmental Panel on Climate Change (IPCC), (2018): 'Summary for Policymakers'. https://www.ipcc.ch/sr15/chapter/summary-for-policy-makers/, 25. April 2019.
[6] ibid.
[7] The CCPI is an annually appearing report published by the NGOs Germanwatch, NewClimate Institute and Climate Action Network Europe.
[8] Climate Change Performance Index (CCPI), (2018): 'Die wichtigsten Ergebnisse 2019'. https://www.climate-change-performance-index.org/sites/default/files/documents/ksi-2019-zusammenfassung.pdf, 25. April 2019.

Current legislation is not enough

There are two strands regarding the measures in place:

(1) Some European countries have already introduced carbon taxes without harmonizing these at the European level, which leads to market distortions such as emission leakage. Emission leakage occurs when CO_2-emissions are simply created elsewhere by moving production to a jurisdiction without or lower carbon taxation.[9] Generally, CO_2-prices are set far too low at less than 10€ per ton.[10] Sweden with over 100€ per ton and Finland with over 60€ per ton should be mentioned as exceptions, even if their scope is highly limited, as they only encompass up to 40% of CO_2-emissions. Furthermore, none of the existing European carbon tax systems includes a carbon dividend.[11]

(2) The European Emissions Trading System only covers less than half of all CO_2-emissions, as it only concerns the energy sector – and politicians were too generous with the quantity target for the ETS, especially regarding the distribution of certificates to small local energy companies with strong ties to regional administrations. Therefore, the certificate price for one ton of CO_2 is far too low at around 25€ today, insufficient to stimulate sufficient investments in renewable energies and efficiency to significantly contribute to reaching Europe's climate targets. Thus, the current system fails to address the main objective of the Paris Agreement to keep the temperature well below 2°C.[12]

Current proposals – Insufficient to reach the ambitious target:

Let us take a look at the four most prominent recent German proposals regarding the taxation of CO_2-emissions. These are: "MCC"[13], "DIW"[14], "Böckler"[15], "FÖS"[16]. The general aim of the studies is either to fulfill German duties from the EU Effort Sharing Regulation (MCC), the Klimaschutzplan 2050 (DIW, FÖS) or the internalization of the cost of damages due to CO_2-emissions (Böckler). Underlying these aims is the Paris Agreement 2°C target. Regarding the scope of the CO_2-emissions covered, the MCC wants to cover all sectors, but for now limits itself to transport and heating systems. The other studies also target these two sectors and set the price on CO_2-emissions at around 35€ in 2020 with a linear increase to 180€ in 2030. In comparison, the MCC starts at 50€ in 2020 with an increase to 130€ in 2030 for a carbon tax. With regard to the redistribution of tax revenues generated by pricing CO2-emissions, the studies show a multitude of options. These range from a complete redistribution via a carbon dividend to tax cuts on electricity and other taxes or a combination of the above. Where appropriate, this paper refers critically to these studies.

THE ECONOMIC PERSPECTIVE

Fighting climate change does not only make sense from an environmental perspective. Pure economic considerations suggest that not setting an ambitious temperature limit would entail much higher costs in

[9] Boehringer, C. et al. (2012): The role of border carbon adjustment in unilateral climate policy: Overview of an Energy Modeling Forum study (EMF 29), Energy Economics.

[10] Kettner-Marx, C., and Kletzan-Slamanig, D. (2018): Energy and carbon taxes in the EU: Empirical evidence with focus on the transport sector, WIFO Working Papers.

[11] This issue is explained in detail in The "RE" in CARE – Reasserting equity by carbon dividend.

[12] The lack of a psychological effect of the ETS on consumer behavior makes the system less compelling. In addition, Nordhaus (2013) shows that volatility in the certificate price of the EU-ETS is too high to give sufficient planning security. / Paris Agreement (2015)

[13] Edenhofer, O., Flachsland, C., Kalkuhl, M., Knopf, B. and Pahle, M., 2019: Optionen für eine CO2-Preisreform (No. 04/2019). Arbeitspapier.

[14] Bach, S., Isaak, N., Kemfert, C., Kunert, U., Schill, W.P., Wägner, N. and Zaklan, A., (2019): Für eine sozialverträgliche CO2-Bepreisung (No. 138). DIW Berlin: Politikberatung kompakt.

[15] Gechert S., Rietzler K., Schreiber S., Stein, U. (2019): Wirtschaftliche Instrumente fur eine klima- und sozialverträgliche CO2- Bepreisung. LOS 2: Belastungsanalyse, IMK, Abschlussbericht.

[16] Zerzawy, F., Fiedler, S. (2019): Lenkungs- und Verteilungswirkungen einer klimaschutzorientierten Reform der Energiesteuern, FÖS, Hintergrundpapier.

the future. In the following, we refer to the Nordhausian Dynamic Integrated Climate-Economy model (DICE model), which allows a weighing of economic costs and benefits with respect to carbon abatement policies.[17] The cost-benefit analysis asks for a target temperature that is optimal in the sense that it minimizes all abatement and damage costs in relation to different scenarios of participation by the nations.

The green lines of Figures 1, 2 and 3 illustrate the abatement costs necessary to restrict the global temperature to different target values. The red lines represent future damages caused by climate change with regard to the respective global temperatures. These show that an objective with a relatively low rise in global temperature means high abatement costs and low future damage costs, while setting a large temperature limit implies low costs for abatement, but all the more future damage costs.

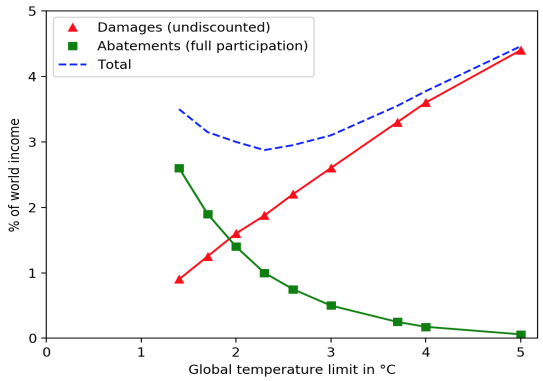

Figure 1. (Nordhaus, 2013).

In the most optimistic scenario, Nordhaus assumes full carbon abatement participation by all countries. The sum of all costs (blue line) then attains a minimum of 2.9% of global income at a temperature target of about 2.3°C. The next and probably more realistic scenario assumes that only 50% of global emissions are covered by some carbon reduction program over the next century (cf. Figure 2). It can be observed that the economically optimal target temperature moves from 2.3°C in the first scenario to 3.8°C in the second scenario bringing along an increase in total costs from 2.9% to 3.8% of global income.

[17] Nordhaus, W. D. (2013)

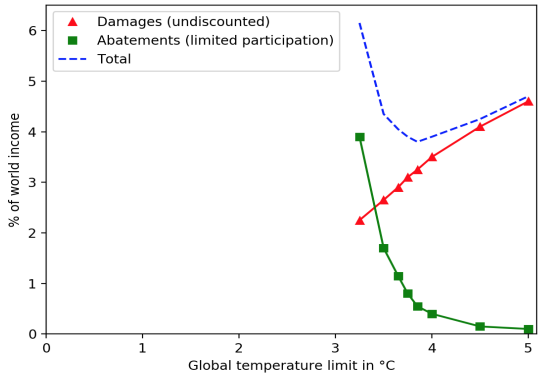

Figure 2. (Nordhaus, 2013).

In the third scenario, we continue presuming limited participation in abatement actions but take into account the existence of a tipping point at a global temperature of 3.5°C.

TIPPING POINT: A tipping point is a threshold, whose exceedance can lead to large, highly nonlinear changes in the world's climate system. Examples include the melting of the Arctic ice still reflecting a large proportion of the sun's radiation reaching the earth as well as the release of large amounts of methane trapped in the form of methane hydrates inside ice crystals of permafrost regions.

Our assumptions show that even a small exceedance of the threshold of 3.5°C leads to rapidly increasing damage costs.

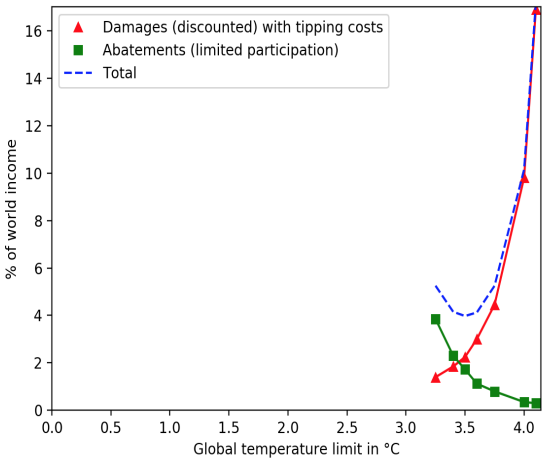

Figure 3. (Nordhaus, 2013).

Admittedly, this analysis is subject to some degree of uncertainty. Some impacts of climate change, such as ocean acidification, are hard to quantify and therefore omitted in the model. Moreover, the integration of tipping points is rather challenging. This is because there is no reliable assessment of their likelihood, the thresholds at which they occur as well as their economic impacts. However, it is known that discontinuities can occur in complex systems like the world's climate. We conclude that the more countries participate in multilateral actions and the faster they do so, the lower the optimal target temperature and the lower the global costs to fight climate change, while reducing the probability of surpassing tipping points.

DESIGNING CARE

As outlined above, achieving the objectives set forth in the Paris Agreement must be the central goal of any holistic action to combat climate change. Major challenges require courageous and to some extent radical solutions. The carbon tax developed by Nordhaus forms such a solution, and is therefore predestined to achieve the ambitious 1.5 degree target. In the following, we discuss and flesh out his model from a European perspective.

Generally speaking, the current formation of prices in European social market economies externalizes environmental costs. This means that any product that causes CO_2-emissions is offered at a market price that does not include its potential environmental damage. Consequently, such products are priced too cheaply, since neither the producer nor the end customer has to pay for the environmental damage caused. This leads to a market distortion and hinders both the development and market diffusion of environment-friendly products and technologies. In 2016 alone, the German economy produced 164 billion Euro in environmental costs.[18] Climate change, however, prescribes that the environmental burden of production and consumption must decrease. Therefore, the costs resulting from CO_2-emissions must be internalized in our price formation. This is the only way to rectify the market distortions in favor of the climate.

THE "CA" IN CARE – MASTERING CARBON ABATEMENT

The answer could not be simpler: Each product must be taxed according to its CO_2-emissions, so that "everyone, everywhere and for the indefinite future must face prices that reflect the social cost of their activities."[19] The CARE Program incorporates the following key ideas based on Nordhaus.[20]

The price of CO_2 emissions...

- … is set at 205€ per ton;
- … is set on a European level;
- … is set uniformly across industries;
- … will experience an annual increase of 5%;
- … and its resulting tax revenue is collected on a national level;

In contrast to this concept, the German position papers mentioned above advocate taxation of the transport and heating sectors in conjunction with the existing ETS system. In our opinion, these approaches are not holistic enough to guarantee the achievement of the objectives, as they neither encompass all CO_2-emissions of all sectors, nor do they set a sufficiently high carbon price. Even if the necessity of a European solution is pointed out, national approaches do not suffice to achieve the set climate targets. The complexity of the climate crisis requires the development of effective solutions at the highest possible level and with the broadest scope. Thus, with regard to EU Member States, national approaches prove inadequate.

[18] Umweltbundesamt, 2019: 'Gesellschaftliche Kosten von Umweltbelastungen', https://www.umweltbundesamt.de/daten/umwelt-wirtschaft/gesellschaftliche-kosten-von-umweltbelastungen, 25. April 2019.
[19] cf. Nordhaus, W. D. (2013)
[20] Nordhaus, W. D. (2017): Revisiting the social cost of carbon, Proceedings of the National Academy of Sciences.

To elaborate on the above concept, goods exported from the EU are exempted from the tax, while goods imported into the EU are taxed according to their CO_2-emissions as proposed by Böhringer et al.[21] Why so? There are two central aspects regarding imports and exports when assuming a unilateral implementation of CARE in the EU: Emission leakage and competitiveness. Emission leakage is defined as the relocation of emissions to parts of the world economy subject to no (or weaker) regulation. By default, a carbon tax would only be levied on products manufactured in the EU while imports to the EU would not be taxed, carbon intensive production would inevitably be shifted to less regulated countries. In addition, issues regarding the competitiveness of EU companies arise. As a result of the carbon leakage, the cheaper imports would have a competitive advantage. Furthermore, EU companies exporting to non-EU countries would have a competitive disadvantage, as companies in non-EU countries would not pay the carbon tax.[22] For both reasons, carbon border adjustments, which create a level playing field for companies[23], are necessary to attenuate disadvantages for EU companies. As a result, EU imports must be taxed according to the CARE scheme, while EU exports need to be exempted from the carbon tax. On this topic the MCC[24] limits the border carbon adjustments to aluminum and steel for practical reasons, as embedded carbon emissions in other products might be difficult to assess. As this approach does not cover the full range of emissions, we do not support this simplified approach. In addition, the MCC highlights potential conflicts of border carbon adjustments with WTO rules, which should be considered in further research.

In addition, the means of production[25] of companies are not subject to CO_2-taxation under CARE. There are a number of reasons for this. One decisive factor is that an outsourcing process of production facilities to non-European countries must be prevented. This would be a conceivable scenario with the introduction of a CO_2-tax, as the establishment of a production facility would become significantly more expensive due to CO_2-taxation. In the CARE model, this effect would initially only arise within the European Union and could not be offset by the border adjustment system, so that European companies would suffer a competitive disadvantage compared to non-European companies when these production sites were to be established in Europe. Moreover, only means of production are expressly excluded from this tax. Company cars, for example, which are part of the remuneration and used privately by employees, are taxed according to the system described. The tax sum generated in this way is not returned along the same lines as described in the following section, but is allocated to the federal budget. It would be desirable to use this tax primarily for sustainable climate protection projects.

How to set the price for CO2

The pricing for CARE is based on the pricing model of Nordhaus. In his analysis, Nordhaus shows that the limitation of global warming to 2°C in accord with the Paris Agreement is not feasible in our existing economic system with regard to the globally implemented environmental protection laws and can therefore not be achieved from an economic perspective. According to Nordhaus, 2.5°C would be a suitable compromise from an environmental as well as economic perspective. Nordhaus proposes a price per ton of 205€, which would be increased by 5% each year.[26] Accordingly, the great challenge posed by the 2°C target of the Paris Agreement becomes even clearer. At this point, this study differs from the other studies mentioned in chapter 1, which theoretically share the same objective, the

[21] Boehringer, C. et al. (2012): The role of border carbon adjustment in unilateral climate policy: Overview of an Energy Modeling Forum study (EMF 29), Energy Economics.
[22] These issues negatively affect the competitiveness of EU companies, this also applies to the current ETS system.
[23] cf. Boehringer, C. et al. (2012)
[24] cf. Edenhofer, O., et al. (2019)
[25] Means of production: All objects required for the production of goods, such as buildings, machines, plants, tools, raw materials, auxiliary or operating materials (translated by the authors according to Duden, 2016).
[26] Subsequently, the calculations are inline with Nordhaus' 2.5°C target.

Paris Agreement, but set CO_2 prices at 35€ to 50€ for 2020. When compared to Nordhaus' calculations, these prices are far too low to achieve the target of the Paris Agreement. Even the price of 180€ called upon for 2030 is lower than CARE's entry-level. In addition, the studies do not sufficiently explain the causal relationship between price setting and goal attainment. The 3% percent discount rate of the MCC study, for example, only quotes another study by the National Academies of Sciences, Engineering, and Medicine,[27] which does not give a clear hint that 3% should be the appropriate discount rate. The Stern review[28] uses 1.4 percent, while numerous Nobel Laureates in Economic Sciences[29] question the practice of discounting policy decisions on climate change.[30] This relatively high discount rate leads to the comparatively low CO2-emission prices proposed by the study of the MCC. All in all, while we understand the political and economic reasoning for relatively low carbon prices, achieving the objectives of the Paris Agreement – the central issue at stake here – does not seem to be feasible under these circumstances.

CARE – Reclassifying CO2

CO_2 is a "waste product" which often occurs alongside other industrial wastes in the product manufacturing process. The disposal of industrial waste from these processes is usually associated with costs that are included in the price of a product. Thus, waste is to be classified as a commodity. On the contrary, nature, the environment and air are regarded as free goods in our society at present. Accordingly, they are available to everyone free of charge, so there are no costs associated with CO_2 as a waste product. Global warming necessitates fundamental rethinking: To save our climate, the waste emitted into it needs to be classified as a commodity. The Nordhausian carbon tax takes this crucial step by pricing emission according to the method mentioned above. By ascertaining a realistic price from both an environmental as well as an economic perspective, CO_2-emissions become a commodity. Thus, the aforementioned issue regarding the externalization of environmental costs can be abated by the internalization of costs stemming from CO_2-emissions.

CARE – A market-based way of regulating the future economic system

In addition, following the state-imposed pricing of the ton of CO_2, the system is of a market-based nature. It is characterized in particular by the fact that it does not rely on individual bans, but that the price of a product continues to be based on the rules of our proven social market economies. This has the advantage that individual companies and consumers can continue to operate in the system they are familiar with. Thus, having a clear and transparent set of rules does not unnecessarily complicate future investment and planning decisions for firms in the EU. Again, CARE makes precisely this possible, while not putting business in the saddle. Under CARE, all relevant stakeholders must make their contribution. In turn, to gain political feasibility, the various interests of different stakeholders must also be considered. On this note, the EU should carefully evaluate given regulations. This does not entail that we want to replace all regulation with CARE. Thus, one needs to emphasize that the carbon tax should be an important part of a holistic solution needed to overcome the climate crisis, but can by no means play the role of chief cook and bottle-washer.

CARE – Accelerating sustainable technologies

In a functioning market economy that internalizes the environmental costs, the more innovative and sustainable products prevail under uniform market conditions due to their competitive advantage. CARE provides incentives to curb a product's CO_2-

[27] National Academies of Sciences, Engineering, and Medicine. (2017). Valuing climate damages: updating estimation of the social cost of carbon dioxide. National Academies Press.
[28] Stern, N., 2007. The Economics of Climate Change. Cambridge University Press.
[29] Portney, P.R., Weyant, J.P., 1999. Discounting and intergenerational equity. Routledge.

[30] To quote Robert M. Solow: "If today's policy choice is made to depend on the relative weight attached to benefits 150 years from today and to those enjoyed 1,225 years from today, just whose impatience are we supposed to be reflecting? Certainly not yours or mine. [...] The usual rationale begins to seem a bit ridiculous" (ibid.)

emissions through innovation. These innovative low emission products incur a lower carbon tax, consequently enabling a price advantage for the consumer when compared with competing products. Accordingly, the CO_2-taxation forces energy-intensive industries in particular to reduce the carbon tax burden for their products by implementing sustainable technologies as quickly as possible. These innovations will not solve the climate crisis alone, but they will play an important role in the successful achievement of CO_2-reduction targets.

CARE – Changing the purchase behavior

It is also of great importance that CO_2-taxation, in contrast to CO_2-certificate trading, becomes a relevant and obvious factor for consumers when buying a product. The end customer can clearly see the CO_2-emissions of the product they are purchasing and consequently the carbon tax associated with the purchase of said product. Both these components have a decisive influence on purchasing decisions and thereby lead to a change in purchasing behavior. To give an example: Rivers and Schaufele[31] show that a carbon tax levied on gasoline, which is explicitly disclosed, leads to a sevenfold higher reduction of consumption when compared to the expected economic reaction to such a market price increase of gasoline.

Challenges and opportunities for carbon-intensive industries:

"A sizeable carbon tax is going to disrupt the economy. That is a feature, not a bug. In order to combat climate change, we must restructure our economy and rapidly transition from our fossil fuel binge to #KeepItInTheGround".[32] The price indicated per ton of CO2 will therefore become a challenge, at least for some industries. The aviation industry is a prime example for such carbon-intensive industries. For a flight from Berlin to Paris, the price would increase by approximately 40 Euro.[33] Even if, as will be shown in the next section of this paper, part of the carbon tax paid flows back to consumers, intra-European flights would become significantly more expensive in relative terms when compared to other products and services. If so, is this a problem? From a labor market perspective, the price hike poses a challenge in the short term, as the airline industry is a major employer. The rebuttal is on a different level. Adding the previously externalized environmental costs to the price does not distort competition for air transport, but rather reduces the existing distortion of competition between the various forms of mobility. As a result, the ticket price for a flight would, for the first time, include all costs incurred. Thus, in contrast to the current situation, taking the train would, as a climate-friendly way of travelling, be relatively cheaper than a flight. Consequently, on the one hand, the price increase would significantly reduce the number of short-haul flights and thus reduce the burden on the environment, while on the other hand force the airline industry to develop sustainable technological innovations as quickly as possible to remain viable. Is the short-term, labor market problem more important than climate change? – We vote no! Our economy, society and individual industries must radically change to effectively contain the climate crisis and save our planet.

THE "RE" IN CARE – REASSERTING EQUITY BY CARBON DIVIDEND

Assuming the implementation of a carbon tax, one pressing issue arises. What should be done with the vast amount of revenue collected? An equal per capita carbon dividend should be paid to citizens via this simple equation:

$$carbon\ dividend\ per\ citizen = \frac{carbon\ tax\ revenues\ in\ a\ country}{number\ of\ citizens\ in\ a\ country}$$

[31] Rivers, N. and Schaufele, B. (2015): Salience of carbon taxes in the gasoline market, Journal of Environmental Economics and Management.

[32] Fremstad, A. and Paul, M. (2018): Disrupting the Dirty Economy: A Progressive Case for a Carbon Dividend, People's Policy Project.

[33] https://co2.myclimate.org/en/flight_calculators/new calculation: 205€ x 0,195 t CO_2 = 40€

Why so? Let us swiftly dive into fiscal policy. A carbon tax, as mapped out above, has a regressive character. This means that everyone regardless of earnings pays the same tax rate on a product or service. So in general, the poorer strata of the population are the most strongly affected by such a tax, when considering the relative burden on the different income groups of the population.[34] An example of the problems arising from a regressive implementation of an environmental tax policy is the recent initiative to increase taxes on the necessities diesel and gas in France. The potential price hike sparked the "gilets jaunes" protest movement, which led to civil unrest and low popularity for the Macron government, especially from less privileged citizens. Therefore, to reassert equity, CARE addresses the problem of the regressive nature of the carbon tax proposed. Let's elaborate: "Few things are distributed equally in our society, and pollution is no different".[35] Every citizen emits carbon, but not every citizen emits the same amount. While carbon emissions of a particular citizen are highly individual, generally income and carbon emissions are significantly positively correlated. In the U.S.[36] for example, the average person in the top 10% of the income distribution pollutes 5.5 times more than what the average person in the bottom 10% does. So in absolute terms the higher income tiers would take the large share of the burden of carbon taxes.[37] This is where the equal per capita carbon dividend transforms the carbon tax system to work like a progressive tax. This means that tax liability rises with increased income, similar to the way most EU countries income tax schemes work. As the richer citizens on average pay a higher amount of the carbon tax than the poorer, the former ends up with a net loss, while the latter part leaves with a net benefit. This social aspect is central for CARE.

In contrast to the proposals of the aforementioned studies, CARE would redistribute 100% of the revenues collected, increasing the effect of reallocation.

In addition to a carbon dividend, the study proposals usually foresee financial investments in climate protection projects or the reduction of taxes and levies. While some of these strategies could potentially also result in a progressive carbon taxation, we oppose them decisively. Our rationale here is that the carbon dividend can both achieve the objective of progressive taxation, while at the same time being easily communicable to the general public. The latter cannot be achieved with a muddle of politics.

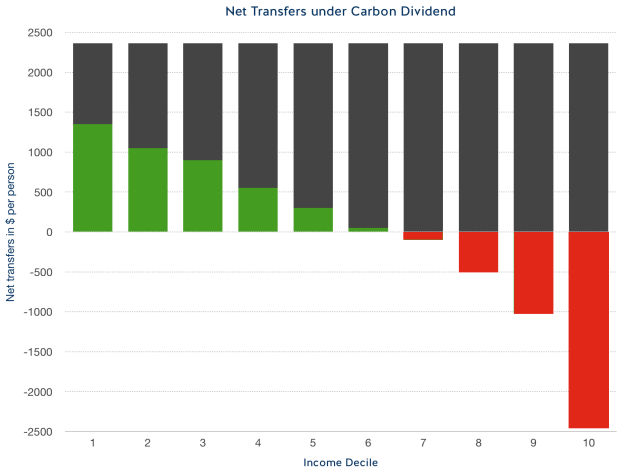

Figure 4. Net transfers under a carbon dividend based on a carbon price of $230 per ton emitted.[38]

We propose that the carbon tax and dividend would be both collected and distributed on a national level. One reason for this is that an EU-wide redistribution would prevent most of the positive effects of reallocation on the national level. So while the carbon price would need to be harmonized on the EU level to sustain a level playing field for competing industries, the carbon tax and dividend should work on a national level. Both the French and German citizens would pay 205€ per ton, but the French citizens' tax liability would increase the French tax revenue and thereby the French carbon dividend, while the German citizens' liability would do the same for the German tax revenue and dividend.

[34] cf. Fremstad and Paul, 2018
[35] ibid.
[36] The situation is comparable in Europe (cf. Gore, T. (2015): Extreme Carbon Inequality: Why the Paris climate deal must put the poorest, lowest emitting and most vulnerable people first, Oxfam.).
[37] cf. Fremstad and Paul, 2018
[38] ibid.

As discussed in the public debate, the effects of a carbon tax on people can also differ within an income decile.[39] Commuters and the rural population would in some cases be worse off due to their higher CO2 emissions. This is the issue of vertical and horizontal inequality.[40] While the carbon tax and dividend system attenuate problems on vertical inequality, as shown above, it cannot solve the issues regarding horizontal inequality. In order to solve the issues regarding horizontal inequality, other distributional measures would need to be implemented.[41] With regard to the bigger issue at stake here, this seems like a minor challenge.

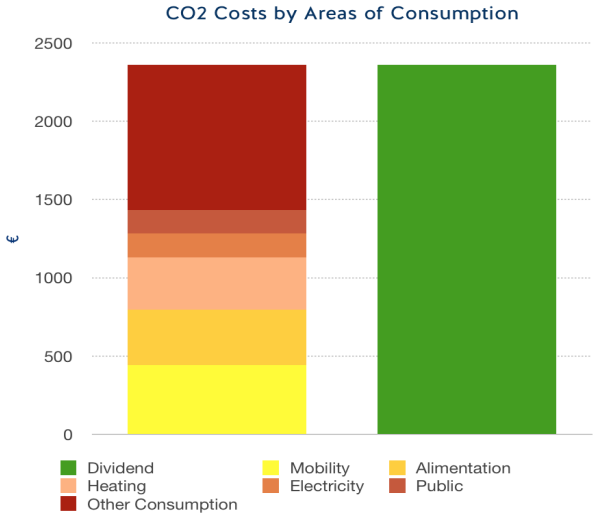

Figure 5. Average rounded annual CO_2-costs for different areas of consumption for a German citizen and the corresponding dividend based on a price of 205€ per ton (Nordhaus, 2017) using data from the Umweltbundesamt (2019).

How to implement the reimbursement? As described above, the dividend is calculated by dividing all the revenues collected within one year by the number of citizens in a country. We suggest that the reimbursement takes place in monthly intervals in the following way: First, the upcoming year's dividend would be estimated according to the last years one, starting with an estimated amount in the first year. 10% of this estimate would be held back by the state as a "security margin". The remaining 90% would then be divided by 12 and paid out on a monthly basis. At the end of the year, the leftover amount from the margin would be reimbursed to the population. This approach has two advantages: First, it would minimize the short-time financial burden caused by the CO_2-tax, in particular for lower income citizens. Second, the constant monthly payback amount would allow for reliable financial planning. With regard to the practical execution of the monthly payback, the IMK study, mentioned in chapter 1, shows that the Bundeszentralamt für Steuern, the German Federal Central Tax Office, is equipped with the necessary data and competences to pay out the climate dividend. This can be implemented with comparatively little effort.

CARE – EUROPEAN IMPLEMENTATION

There are at least three possibilities to consider to implement CARE on the European level. We follow Weishaar[42] in our assessment. (1) Under the premise that CARE is considered either as environmental and/or energy policy, "the ordinary legislative procedure" (Article 289 TFEU) is applicable, which only needs a qualified majority. (2) If CARE is foremost considered as being "primarily of fiscal nature" (Article 192(2)(a)), the measure can only be adopted using "a special legislative procedure." This requires a unanimous decision in the Council. As it is rather

[39] e.g. https://www.zeit.de/news/2019-07/05/co2-steuer-auf-sprit-und-heizen-was-bedeutet-das-fuer-wen-190705-99-941183

[40] **Vertical inequality:** The cross-group inequality. This is the general difference of the impact of the policy for the average person in the different deciles, such as the top 10% and the bottom 10%.
Horizontal inequality: The within-group inequality. This is the difference of the impact of the policy for the different persons in a particular decile, such as one rural person in the bottom 10% who would be worse off, by far, than a city dweller of the same group. To give an example, the rural person would be worse off as their only mobility option is a car, while the city dweller can easily substitute a car with public transport. As a result the two individuals will pay vastly different amounts of carbon tax on their mobility needs.

[41] cf. Boyce, J. K. (2018): Carbon pricing: effectiveness and equity. Ecological Economics, 150, 52-61. Bundeszentrale für politische Bildung (2016): Duden Wirtschaft von A bis Z: Grundlagenwissen für Schule und Studium, Beruf und Alltag, Mannheim.

[42] Weishaar, S. (2018): Carbon taxes at EU level: Introduction issues and barriers, WIFO Working Papers.

difficult to achieve unanimous decisions, there is a backup plan laid out for such problems in the Lisbon Treaty, which, while unfavorable, could make an implementation possible, even against opposition by particular countries. This procedure mandates that it is only to be used if the first two alternatives fail to pass the Council. (3) One can use the "enhanced cooperation" (Article 20 TEU and Articles 326 to 334 TFEU) to build a coalition of the willing, where at least nine EU countries can use the EU structures to implement CARE. While this procedure appears far from optimal, implementing CARE using the EU structures would facilitate the later integration of further Member States into the system.[43] Overall, to make the implementation possible, a constellation of supporting firms, non-profit organizations and initiatives from different EU countries is necessary to generate an EU-wide social embedding of CARE and lobby for the initiation of the described EU legal procedures.

CARE FOR THE ENTIRE GLOBE – OUTLOOK

The CARE Program would be particularly effective if implemented in as many countries as possible. Likewise, a widespread implementation is the only way to fulfill the objectives of the Paris Agreement. For this to become reality, Europe must lead the way by setting an example. Correspondingly, Europe can use its economic strength to put pressure on its trading partners to introduce a carbon tax. The above-mentioned import-export regulation makes this possible, as countries with comparable CO_2-taxation would not have to submit to a bureaucratic emission assessment procedure when importing from and exporting products to the EU. Countries that have not introduced a carbon tax, on the contrary, would have a competitive disadvantage, as the necessary emission assessment would make trade more cumbersome. In addition, countries would be forced to offer products with the smallest possible CO_2-footprint, as otherwise, they would fall behind in competition with European producers. Unquestionably, this would incentivize EU partners to swiftly introduce CO_2-taxation.[44]

CONCLUSION AND RECOMMENDATIONS – CARE FOR OUR FUTURE!

For the Paris Agreement's 2°C objective to be achieved, an enormous global effort is needed. To be realistic, we need holistic, globally supported solutions to reduce greenhouse gases. It is time to CARE now! If we don't act together, we will fail to meet our economic and environmental goals. Europe must show courage, ambition and vision to become the protagonist for a future worth living. CARE proposes a way forward to save the climate, while reasserting social equity and the individual freedom of action. Touching on the freedom of action, CARE cannot and would not exonerate individuals from their personal obligations and responsibilities to solve the climate crisis. On this note a central issue remains: Humans tend to favor their generation by "refusing to make any sacrifices at all for their successor[s]" as John Rawls put it.[45] To achieve intergenerational equity, every one of us has to reflect on their own actions to abate carbon emissions. With CARE, we want to stir up the public debate, give concrete recommendations to decision-makers – to implement a 205€ carbon tax on all CO2-emissions redistributed by an equal per capita carbon dividend – and show how policy recommendations by relevant players lack ambition.

With CARE, we choose to go on as a civilization. To end with Greta: "We already have all the facts and solutions [to solve the climate crisis]. All we need to do is to wake up and change." – Let Europe lead the way!

[43] To read a detailed review on issues and barriers to the introduction of carbon taxes at the EU level consider Weishaar (2018).

[44] cf. Nordhaus, 2013

[45] Rawls, J. (2009): A theory of justice, Cambridge.

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