

Executive summary

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Ursula von der Leyen has made climate change a top priority, promising to propose a European Green Deal that would make Europe climate neutral by 2050. The European Green Deal should be conceived as a reallocation mechanism, fostering investment shifts and labour substitution in key economic sectors, while supporting the most vulnerable segments of society throughout the decarbonisation process. The deal's four pillars would be carbon pricing, sustainable investment, industrial policy and a just transition.

A carbon price should be established for all sectors, by strengthening the EU emissions trading system (ETS) and by pushing EU countries to increase the price for emissions not covered by the ETS. To ensure a robust mechanism against carbon leakage, a carbon border tax should be prepared. However, such a measure will be extremely politically challenging, and the EU's future climate policy should not rely on its successful implementa-

1 The contours of the European Green Deal

The European Union has stated repeatedly its aim to be at the forefront of global action against climate change. The EU has adopted policies to reduce its greenhouse gas emissions and support energy from clean sources, while being active in international climate negotiations. However, the EU has not managed to reduce its greenhouse gas emissions convincingly, and has not done enough to tackle emissions in some sectors. In transport, greenhouse gas emissions are rising, while in electricity systems coal continues to play a persistent role. Energy efficiency improvements in buildings have been unsatisfactory and the decarbonisation of industry has proved difficult. Meanwhile, climate policy has become one of the most divisive EU topics. The FridaysForFuture movement has mobilised mainly young people to demand stronger climate policies. In contrast, there has been a backlash against fossil-fuel price increases perceived as unfair, as seen with the *gilets jaunes* movement in France and beyond.

In this context, European Commission president-designate Ursula von der Leyen has promised to broaden and strengthen EU climate policy (von der Leyen, 2019). She intends to propose a European Climate Law that would require the EU to become climate neutral by 2050 ... likely making Europe the first continent to do so. To reach this ambitious goal, a comprehensive policy framework is required encompassing the climate, energy, environmental, industrial, economic and social aspects of this unprecedented process. This is what the European Green Deal is all about.

Von der Leyen has put forward a broad concept of the European Green Deal, sketching out about 20 different proposals. They include an increase in the EU's 2030 emissions reduction target from 40 to 55 percent, the introduction of a carbon border tax, the drafting of a Sustainable Europe Investment Plan, the partial transformation of the European Investment Bank (EIB) into a climate bank, the extension of the EU emissions trading system (ETS) and the development of a new industrial policy for Europe (von der Leyen, 2019). These proposals are preliminary and, at the time of writing, are still in the form of general policy guidelines. Von der Leyen has said she will come up with a detailed policy plan within the next 100 days of her mandate. So, while we have some general contours, the European Green Deal remains to be structured.

This Policy Contribution seeks to contribute to the design of the European Green Deal by outlining a realisable plan focused on what can be considered its four foundational pillars: carbon pricing, sustainable investment, industrial policy and a just transition.

2 How to price greenhouse gas emissions well

Putting a price on all emissions is essential because it incentivises all relevant parties to reduce their greenhouse gas footprints. Without such a price, other climate policy measures ... such as subsidies or standards ... cannot effectively reduce emissions. The new Commission is therefore right to strive for a sensible price on all greenhouse gas emissions. A major reform of emission pricing in Europe will have to address three questions of principle:

1 Without a carbon price, falling fossil-fuel prices might make it attractive to use fossil fuels in unregulated sectors, while greater efficiency of devices might encourage increased usage (rebound effect).

A single price or differentiation between sectors/countries?

A key question when pricing greenhouse gas emissions is whether each unit of emissions (typically expressed as the greenhouse gas equivalent of one tonne of carbon dioxide) should have the same price, or whether prices in different sectors and/or different countries should be allowed to vary. Currently, Europe has a hybrid system. Greenhouse gas emissions from large industrial emitters (including power generators) that fall under the EU ETS have a single price throughout Europe, while other emissions, such as from heating or road transport, are not explicitly priced.

Textbook economics would suggest putting the same price on all emissions. This would incentivise economic actors to reduce all emissions that can be mitigated at a cost below this emission price and would avoid inefficient circumvention (such as consumers preferring to use natural gas that is not covered by the current emission pricing system, instead of electricity which is). Consequently, harmonising emission prices across sectors reduces the total cost of emissions reduction.

But while a single carbon price for all sectors and countries is economically efficient, it implies substantial distributional effects. Two examples:

1. To decarbonise transport ... which is essential to achieve a carbon-neutral continent ... much higher carbon prices would be needed than the carbon price required to decarbonise most electricity production. Electricity prices will be determined by the most expensive unit that is needed to meet the demand ... which will still often be a fossil-fuelled power plant (even though the bulk of electricity is produced carbon-free) ... and might thus drastically increase without much impact on power-sector emissions. This will have massive distributional consequences as all electricity consumers will have to pay these higher prices.
2. A single carbon price will affect more poorer EU countries, which typically have higher emissions per unit of GDP. Therefore, in sectors with emissions that are not very sensitive to expected carbon prices, keeping carbon prices lower might reduce undesirable distributional effects little impact on emissions.

For efficiency reasons, the European Commission should strive to converge towards a single carbon price over time. Heating and transport emissions should be priced to provide economic actors with incentives to change their consumption behaviour and/or invest in cleaner technologies. And emissions in sectors with high levels of trade across EU country borders (eg electricity and industry) should have the same price in each country to avoid distorting the single market. But giving EU countries some flexibility to set prices for emissions that are price insensitive but have significant distributional consequences might have limited cost in terms of efficiency but high political value. The right tool would be a significant and rising European minimum tax rate on emissions, which those countries that want to cut emissions faster can exceed if they want.

Tax or trading permits?

There are two main instruments for putting a price on emissions. Either the government sets a price ... a tax ... or the government issues a fixed volume of emission allowances and leaves

But in practice, policymakers try to guide both the price and the volume by adjusting either if the system does not provide the expected results. Consequently, mixed systems (where some emissions are covered by carbon trading and others by taxes) and/or hybrid systems (where prices in trading systems are managed) are the norm rather than the exception.

The EU has a mixed system with half of the emissions falling under the EU ETS, and the other half being only partially covered by national taxes. The EU ETS is also a hybrid system because the system is regularly adjusted to deliver sensible prices.

The European Green Deal can retain the current mixed and hybrid system. But it should include proposals to push EU countries to put the right prices on emissions in some of the areas not covered by EU ETS: transport, heating and maybe agriculture. A right approach would be to revise the 2003 Energy Taxation Directive (2003/96/EC), which sets minimum tax rates for fuels. A European agreement on minimum carbon prices in the non-ETS sectors would allow national governments to establish national carbon-pricing rules within their national fiscal systems, while reducing concerns about intra-EU carbon leakage. It will still be difficult to define a minimum tax rate that is equally acceptable to the poorest and richest countries. But as the fiscal revenues accrue at the national level, these revenues in principle allow each country to target compensation at the most affected national consumers.

The EU ETS can also be strengthened by providing investors with some clearer guidance on future prices. Our suggestion would be to give the European Investment Bank a mandate to sell guarantees that protect investors against low carbon prices in the future. This would create a liability for future governments in case of carbon prices that are too low.

What to do with the revenues

Emissions pricing in the EU can bring substantial revenues. Putting a price of 40/tonne on all EU emissions (around 4.5 billion tonnes annually) would lead to 180 billion in revenues ... significantly more than the current revenues from the EU ETS (around 25 billion).

The first issue is how much of this money would accrue at the European level and how much at national level. This is a largely political question. While it might be more efficient to have more revenues available in the centre to enable compromises in difficult issues, EU countries in the past only allowed the European Commission to set up two relatively small centralised funds (see section 4). The second question is what to use these revenues for: they can be used for the general budget, returned to consumers to mitigate distributional effects (see section 5), used to support the development of low-carbon alternatives, public investment in low-carbon infrastructure, or given to companies to compensate them for competitive disadvantage arising from stronger climate policies. Getting this balance right will be

6 There is a complex national patchwork of explicit or implicit taxation of fossil fuel use in transport and heating (Kettner-Marx and Klefsen-Slamanig, 2018).

7 A surplus of emission allowances has built up in the ETS since 2009, as a consequence of the economic crisis and high imports of international credits. This led to low carbon prices. This problem was addressed by introducing in January 2019 a market stability reserve: a system under which 900 million allowances are transferred into a reserve rather than auctioned. As a consequence of this intervention, the price of emission allowances quickly increased from below 10 in early 2018 to about 25 per tonne of CO₂ at the time of writing.

8 For more details on such guarantees, see Zachmann (2013).

9 There is no European Commission modelling on what carbon price would be needed to achieve 50-55 percent decarbonisation by 209. It would compensate them ETS [(capensaast96.8(t)).7(e them2n)8.9n2he cur.1698ee(r)17.9(o)-.1(pean Co

crucial for the political viability

introduce a unilateral carbon price on intercontinental flights)¹³. The ongoing fierce debate between proponents and opponents of such a tax shows that achieving a meaningful border tax will require the expenditure of a great deal of political capital in Brussels and the national capitals. There is a risk that discussing a complex solution to a potential problem will distract attention from more urgent issues and result in a weak compromise.

Any CBT proposal will be extremely politically challenging, and the EU's future climate policy should not rely on its successful implementation. This is particularly because the scale of the carbon leakage problem remains unknown.

Therefore, the EU should follow a trial-and-error approach, with the first priority being to do what is necessary to ensure an appropriate price on all greenhouse gas emissions in Europe. As far as the leakage risk is concerned, the EU should help domestic producers of steel, cement and chemicals (eg the products most affected by higher carbon prices) to become cleaner ... as it did in the past with renewable energy subsidies for the electricity sector. Companies that produce internationally traded goods with significantly lower emissions than the average could be granted subsidies linked to the reduced emissions. The value of these subsidies per tonne of mitigated emissions might be significantly higher than the carbon price as long as the new technologies are not mature. This could help to build the competitive advantage of European industry for the global low-carbon economy (see section 5). In addition, carbon rebates for exports (ie companies can reclaim the carbon price embedded in export products) can be applied, combined with a support scheme for low-carbon production of otherwise emissions-intensive products.

As far as the second aim of pushing other countries across the world towards decarbonisation is concerned, the EU should make better use of environmental standards. Requiring compliance with strict environmental regulations a condition of access to the EU market of 500 million people should be a strong incentive to all other countries to adapt and change their production processes.

In parallel, the European Commission should work on a WTO-compatible and acceptable CBT, but should hold off from implementing it¹⁵. The Commission should closely monitor the evolution of carbon leakage risks in Europe, and ultimately implement a CBT if the risks start to materialise.

3 Mobilising investment for the transition

How large is the green investment gap?

Most estimates of the yearly average additional investment (public and private) necessary to achieve the EU's current 2030 climate and energy targets are in the range of 175 billion to 290 billion¹⁶. The European Commission's most recent estimate (European Commission, 2019a) of this green investment gap, taking into account the currently agreed target, is 260 billion per year. According to this estimate, the investment needs per sector would be: 125

13 In 2012 the EU tried to make intercontinental flights leaving from or arriving in the EU buy emission allowances for the whole emissions of each flight. It was seen as a relatively simple case. Nevertheless, WTO compliance of the scheme was challenged and fierce opposition from the US and China (which threatened to retaliate by no longer buying Airbuses) killed the project politically.

14 See, for example, Horn and Sapir (2019) and Wolf (2019).

15 Our proposals would actually give time to the European Commission to prepare a ready-made solution for a CBT if it is needed in the future.

16 See for instance European Commission (2018a).

17 However, this estimate corresponds to a -40 percent emission reduction target, not to the more ambitious -55 percent proposed by Ursula von der Leyen. As abatement costs are typically non-linear, the green investment gap to reach that target could even be larger.

billion for the residential sector, 71 billion for the service sector, 21 billion for the transport sector, 21 billion for power generation, 13 billion for the power grid, 4 billion for the industry sector, and 2 billion for boilers.

Whatever the exact aggregate number for the green investment gaps it is important to note that the models used in these estimations tend to underestimate investment that will be needed for the low-carbon transition¹⁸. In addition, the success of technologies in the long run is highly uncertain. As a result, it might be preferable to over-invest in green R&D in the short-term to insure against potentially catastrophic events in the future. Also, scenarios involving less behavioural change on the part of citizens are generally the most expensive in terms of investment. This means that if Europeans want to preserve their current way of life as much as possible they need to invest even more today. All in all, despite the high uncertainty surrounding these estimates, the desirable number for additional investment is probably nearer to the 250-300 billion per year range. In this context, the Sustainable Europe Investment Plan mentioned by Ursula von der Leyen in her political guidelines and in her first speech (16 July 2019) to the European Parliament only envisages a 100 billion per year target.

What would be the macro consequences of the Green Deal? Despite the potentially significant size of the plan (and despite being a good selling point for the European Green Deal), the possibility of obtaining a so-called double dividend ... both a positive environmental effect and a positive macroeconomic effect ... seems to be overstated. Even if the potential crowding-out effect of the investment pillar of the European Green Deal appears to be very low, especially in today's low interest rate environment, the aggregate macroeconomic effect of the transition, and of the investment plan to support it, is overall expected to be relatively modest (around +0.1 percent of annual GDP growth according to the literature review conducted by Guerret et al, 2019)¹⁹. Besides, the overarching objective of the Green Deal should not be to boost growth²⁰ but to facilitate the necessary reallocation of capital in and across sectors in order to decarbonise, and to mitigate the resulting reallocation in employment (which is discussed in more detail in section 5).

The overarching objective of the Green Deal should not be to boost growth but to facilitate the reallocation of capital in and across sectors in order to decarbonise

Having said that, even if the overall impact on growth is expected to be small over the whole period, a potential co-benefit from a macro perspective of having a 10-year investment plan ready would be to have a list of concrete off-the-shelf investment projects that can be rolled out more quickly if they are needed from a countercyclical perspective (which might come in handy quickly given the slowdown currently experienced by the European economy). This would boost the total macroeconomic effect of the plan, given that multipliers have been higher during recessions.

In terms of timing, political economy considerations dictate clear sequencing: green investments need to be made as soon as possible, before carbon prices rise to a high level, so households and companies can switch smoothly to green alternatives when this happens. The green investment push thus needs to start now. The temptation to procrastinate and to leave the burden of reaching the 2030 targets to the 2024-2029 Commission should be avoided.

18 For instance, the PRIMES model used by the European Commission does not include investment in roads, railways, ports and airports infrastructure and in systems facilitating sharing of vehicles etc., as these are out of the scope of the model. Investment or hidden costs related to behavioural or organisational structural changes or in sectors outside energy are not part of the calculation of investment expenditures either. Generally, the model does not include the full investment expenditure of industrial plants and buildings, but only the parts that relate to energy and efficiency and to a certain extent to the additional investment expenditure to change process technology in the industry²¹ (European Commission, 2018b, p330).

19 This number increases further if the international climate finance promises of developed countries from the 2015 Paris Agreement are added (\$100 billion per year).

20 This is probably the case because the models used assume a low multiplier on average over the next decade.

21 This does not take into account, however, that averting climate change soon enough would lead to the avoidance of (hardly quantifiable) costs related to health care, climate-related damage, the loss of value of stranded assets, migration, and to compensation for distributional effects.

22 Actually, boosting growth significantly could make the climate targets harder to achieve, unless a full decoupling of economic growth and greenhouse gas emissions is achieved thanks to technological progress.

The EU has very limited resources to conduct its own investments. Its main role in plugging the green investment gap will thus be to design an investment plan that will: 1) mobilise public funds through the EU budget and member states' national budgets and through the European Investment Bank in order to take advantage of the historically low interest rates from which European governments and institutions currently benefit, and 2) incentivise the private sector to invest in the transition.

How can the Commission boost public investment for the transition?

Public investment will be needed because of the public-good nature of some the investments.

This will be particularly the case for deployment of a sustainable transportation system, which will involve, first, helping owners of old polluting vehicles to replace them by more environmental-friendly vehicles, and, more importantly, developing alternatives to car ownership.

This implies renovating the railway network or building bicycle facilities. Another important role for the public sector will be to renovate public buildings and social housing to make them energy efficient. Finally, public authorities will also have to invest in R&D in new technologies, especially carbon capture and storage. More generally, direct public investment is also important for increasing the long-term credibility of other climate-mitigation instruments and to reduce the potential regulatory risk perceived by private investors. From an incentive perspective, it is important also that governments should bear some of the losses in case of failure resulting from a change in environmental regulation to convince investors the regulation is definitive.

The role of the Commission will be twofold: greening the EU's own investments, and encouraging EU countries green their public investments.

Greening the EU's own investments

At the European level, the main tool to invest directly will remain the EU budget. The European Commission (2018c) has already proposed to increase the share of EU spending that contributes to the EU's climate objectives from 20 percent in the 2014-20 Multiannual Financial Framework (MFF) to at least 25 percent in the next MFF (ie from about 30 billion to about 45 billion per year over 7 years). This is a good first step, but there are two important caveats.

to them are in the hands of national governments and not under the control of the EU. If the European Commission wants to foster investment to accelerate the transition, it must find a way to encourage public investment in member states and then use indirect measures to steer

How can the Commission encourage private investment in the transition?

Corporations and households will be responsible for the vast majority of investment needed for the transition²⁶, as the sectoral distribution of investment needs also suggests. Private investment will drive the electrification and improved energy efficiency of the privately-owned segment of the residential sector, and of the service and industry sectors. Private investment will also represent most of the investment in the transport sector given that replacement of private vehicles will be covered by households. In the energy sector, investment in renewable power generation or electricity storage will mainly be financed by the private sector. The Commission thus needs to find a way to mobilise significant resources from the private sector and redirect financing from brown towards green activities to fill the green investment gap.

The role of the Commission will be twofold: to create a conducive regulatory framework, and to improve the financing conditions for green investment.

Creating a conducive regulatory framework

The most important tool to push companies and households away from brown activities will be a high carbon price (see section 2). Another important step will be to put in place as soon as possible an ambitious investment taxonomy that will make brown activities unattractive to investors.

But these tools will not be enough to encourage the efficient deployment of immature low-carbon technologies, which are confronted with several market failures. Private deployment of low-carbon technologies will help to bring down the cost of these technologies (as was the case for photovoltaic, wind, batteries and electric vehicles) and will therefore enable large-scale take-up in the EU and beyond.

Hence, public support instruments beyond carbon pricing will be crucial for an efficient decarbonisation pathway. Particularly important will be public support for private R&D investment, pilot projects and first deployment. Much of the monetary incentives will have to come from the member states. But the Commission must enable and encourage such incentives by allowing EU countries (especially in terms of state aid rules) to experiment with support programmes.

Improving the financing conditions for green private investment

Many green technologies are more capital intensive than brown technologies. Consequently, financing conditions play an important role in the technology choices of economic actors. In other words, there are many sectors in which, depending on the interest rate and on their access to finance, households and companies can choose either green (for example an electric vehicle with a high capital cost but lower fuel costs) or brown (for example a conventional car with a lower upfront cost but higher fuel costs²⁷).

Direct support for private investment is thus complementary to the price and regulatory incentives needed to solve market failures. In particular, it is crucial to provide assistance to valuable projects that face financing constraints because their social desirability arises from positive externalities that are not internalised by private investors or manifests itself beyond the maturity of traditional financial instruments ... scenarios that are particularly the case for green investment. The best instrument for this would be to use more actively public development banks ... the EIB and national public finance institutions ... to finance the transition.

On that front, the Commission's main tool to crowd-in private investment will remain

leverage the Commission's limited resources through private investment. e European Fund

countries ... to change how the EIB functions and the projects it invests in

If the Commission wants the EIB to contribute to filling the green investment gap, it must avoid duplication of investment already committed under national budgets or EU Structural Funds, or that could be financed by the private sector. Instead, to best use limited EU funds, the EIB should be refocused on financing investments that are strategic, in particular in the energy transition.

In addition, the EIB ... even without the EU budget guarantee for EFSI ... should be able to do more to finance the transition. Its volume of new lending disbursed has gone down every year since 2015, and its total outstanding amount of loans has fallen as well. EIB has clearly some margin of manoeuvre to act more forcefully: its capital ratio has gone up in recent years, its leverage has been going down since 2012, and according to its statutes (article 16.5), it can lend as much as two and a half times its level of subscribed capital, plus reserves and profits, which means its portfolio of loans could reach around 600 billion, compared to about 450 billion today. The EIB currently benefits from very favourable rates for its borrowing from capital markets⁹ and it would be a shame not to use this opportunity to finance



- € **Investing more** Europe's R&D spending in relation to GDP remains lower than in other major economies. In 2015, Europe's private and public sectors combined spent 2.04 per cent of GDP on R&D, compared to 2.07 percent in China, 2.79 percent in the US, 3.29 percent in Japan and 4.2 percent in South Korea (Eurostat, 2019). Europe will thus not meet the target it set itself in 2010 to spend 3 percent of GDP on R&D by 2020. EU business enterprise sector in particular needs to invest more. Its share of total R&D expenditure is much lower in Europe (64 percent) than in the US (72 percent), or China, Japan and South Korea (almost 80 percent) (Eurostat, 2019).
- € **Investing better** Europe is a global innovation leader in sectors such as automotive and biopharma, but is less present in the fast-growing technological, electronics and digital sectors that will increasingly underpin clean energy, clean mobility and smart buildings solutions. To turn decarbonisation into an industrial opportunity, the EU must push the business enterprise sector to scale-up its R&D investment also in these disruptive sectors.

In the framework of the European Green Deal, two existing EU initiatives could be enhanced and used to stimulate more R&D investment by the business enterprise sector in clean disruptive technologies.

The first tool is the European Innovation Council (EIC), currently in pilot phase. It is inspired by the US Defense Advanced Research Projects Agency (DARPA), an agency of the US Department of Defense that has significantly contributed towards many technologies, including the internet and GPS. DARPA has a rather limited budget of about \$3 billion per year and focuses on the identification and recruitment of, and provision of support to, top innovators. Likewise, the EIC is designed to financially support ... through a combination of grants and equity ... innovators who are developing high-risk, disruptive innovations with the potential to create new markets. The EIC could become the core innovation tool of the European Green Deal, with a strong mandate in the areas of clean energy, clean mobility and smart buildings. To enable this, and to make the EIC truly comparable to DARPA, the EIC will have to be endowed with at least 15 billion from 2021 to 2027 under Horizon Europe.

The second tool is the Innovation Fund (IF). Established under the EU ETS for the period 2021-2030, the IF supports the demonstration of low-carbon technologies and processes in energy-intensive industries, carbon capture and utilisation and storage of carbon dioxide (CCU and CCS), innovative renewable energy and energy storage technologies. The IF has been endowed with at least 450 million carbon allowances, amounting at current carbon price levels to about 11 billion. A sensible way to further scale-up the IF would be to rapidly reduce the number of allowances allocated for free under the ETS, and to use the resulting revenues for the IF.

In general terms, it must be emphasised that fostering disruptive innovation will require a significant dose of risk-taking and an acceptance that there will be failures. New support models that provide numerous and still sizeable grants in a relatively non-bureaucratic way are crucial to enable disruptive ideas to emerge. Accepting that a significant proportion of these ideas will fail to develop -ve ideas

Circle 2: Create the conditions for innovative European companies to flourish in a receptive market

Public funding for disruptive technological innovation does not by itself guarantee industrial development. The success of DARPA strongly relates to the overall US economic ecosystem, which strongly favours innovation, and to its ability to turn disruptive innovations into marketable products. DARPA's limited budget shows that creating the conditions for making inno-

billion/year. A higher amount would give NDICI more leverage to stimulate recipient countries to implement the energy-market reforms that are necessary to attract international (and thus also European) private investors.

The second step would be to further consolidate and streamline EU development finance



Designing less-regressive climate policies

The first solution is to prioritise less-regressive policies and focus on less-regressive sectors first. Climate policies for different products/services have different distributional impacts. In order to reduce the regressive effects, climate policymakers might prioritise the least-regressive elements. For example, putting high prices on carbon in transport, and in particular on aviation, will have less dramatic distributional consequences than a similar price for heating or electricity.

Policymakers should also focus on less-regressive policy tools. Different instruments can be used to decarbonise a sector and some policy instruments are more regressive than others. Policy choices should therefore be concerned not only by effectiveness and efficiency considerations, but should also take distributional aspects into account. In the discussion on taxes versus technology standards, distributional concerns provide an additional argument for the former.

Most importantly, policy design should seek to minimise regressive effects. For example, giving free allowances to companies whose factor value is priced in for consumers is an unnecessarily regressive instrument.

Correcting regressive climate policies through compensation

Policies dealing with the social consequences of the transition and ensuring that no one is left behind will take two complementary forms.

First it will be important to use the revenues from climate policies (and in particular the increased revenues resulting from a more comprehensive carbon pricing system, as discussed in section 2) to compensate the citizens most affected by the rise in carbon prices.

To do this, money raised from taxing emissions could be returned to citizens in the form of a so-called dividend³³. This could take the form of lump sum transfers like in Switzerland, where two thirds of the revenues from carbon levies go back to the population through this means³⁴. Money can also be targeted at the lower deciles of the income distribution. This is the case, for example, in British Columbia in Canada, where revenues from the carbon tax have been used to reduce taxes for the lowest paid, plus provide an additional transfer conditional on low income levels.

In the light of the success of the increase in the French carbon tax in 2017-18, which resulted (in combination with a large increase in oil prices) in the emergence of the *gilets jaunes* movement, Bureau et al (2019) made a detailed proposal for France that could be used as a blueprint in many EU countries. They proposed to redistribute fully the French carbon tax revenues, through transfers based on income and geographical criteria, targeting the most affected locations such as rural and small urban areas with limited access to public transport. Using this combination of criteria would minimise the number of people negatively affected by the rise in carbon prices ... in the French case such a system of transfers would compensate fully the six lowest deciles of the income distribution.

From a political perspective, it appears that well-designed compensation mechanisms are crucial if the population is to accept climate policies. This is what the Swiss, Canadian and

make recommendations in the context of the European Semester for such schemes that could be put in place at national level.

Second, given that the reallocation of capital resulting from the fight against climate change will also result in a reallocation of employment, it is crucial to put in place policies to facilitate the transition towards new jobs for those whose jobs are at risk. Even if overall the net effect on employment is neutral or even slightly positive, the transition will make some jobs disappear, while creating new ones.

The transitional issue related to climate change is not very different to the challenges from globalisation or technological change, so the solution could be the same: if a change in the demand for skills is rapid, there is a role for authorities to play to ensure that the workforce (and in particular displaced workers with low

already being done in the United States, and what was done in Europe during the coal-mining transformation of the 1950s.

In 2017, the European Parliament proposed the creation of a Just Transition Fund, which would use 2 percent of the revenues from the auctioning of emission allowances to support regions with a high share of workers in carbon-dependent sectors and where per capita GDP is well below the EU average. This proposal was rapidly dismissed, however, notably because of opposition from the European Commission. In 2018, the European Parliament put forward a new proposal to establish a Just Transition Fund, this time in the context of the MFF negotiations, and with a proposed endowment of 4.8 billion for 2021-2027.

But the EU does not need to establish a new Just Transition Fund to support the transition in coal-mining regions. It only needs to make a better use of the existing European Globalisation Adjustment Fund (EGF), which was established in 2006 and has a maximum annual budget of 150 million for 2014-2020 ... a budget that has so far not been fully employed, with on average 40 million disbursed from the EGF each year.

The EGF supports workers who lose their jobs because of major structural changes in world trade patterns arising from globalisation. It can be triggered when more than 500 workers are made redundant by a single company, or if a large number of workers are laid off in a particular sector in one or more neighbouring regions. The EGF provides up to 60 percent of the funding for projects, lasting up to two years, to help workers who have been made redundant find new employment or set up their own businesses. EU countries apply for finance from the EGF and national or regional authorities oversee the deployment of project funds.

The EGF has been transformed over time. In 2009, its scope was broadened to cover also people losing their jobs as a result of the global financial and economic crisis. In 2014, the categories of workers eligible for support were broadened to include young people not in employment, education or training (NEETs). In short, the EGF has been adapted to new economic and social challenges emerging in Europe. The EGF should now be extended to people losing their jobs in coal-mining regions as a result of the decarbonisation process.

This can be done quickly by amending the regulation governing the EGF, as was done in 2009 in response to the negative impact on employment of the global financial and economic crisis. The amendment could increase the use of the currently under-utilised EGF (Claeys and Sapir, 2018). The amendment should:

- € Broaden the scope of the EGF, to include support for EU coal-mining regions that commit to a timely coal phase-out;
- € Modify the redundancies requirements, to allow the EGF to be used not only once workers lose their jobs, but also before this happens. This would allow the planning of an orderly transition, limiting the socio-economic effects of the coal phase-out in these regions;
- € Extend the implementation period from 24 to 36 months, to allow for proper implementation in complex cases, such as the closure of coal mines.

36 The concept of a 'just transition' was developed by North American unions in the 1990s, with a focus on support for workers who lost their jobs as a result of environmental protection policies. Examples of US federal just transition initiatives include President Obama's Partnerships for Opportunity and Workforce and Economic Revitalisation and President Trump's Assistance to Coal Communities programme.

37 Europe's 1950s transition mechanism for coal-mining regions was the European Coal and Steel Community (ECSC) Fund for the Retraining and Resettlement of Workers. With the 1957 Treaty of Rome, this fund was transformed into the European Social Fund, which in its early stages was used to support workers who lost their jobs in sectors that were modernising, such as coal mining.

38 In 2017, a first coal-related project was

Under the 2021-2027 EU budget, the focus of the EGF on coal-mining regions could be further strengthened, transforming it into a European Globalisation and Climate Adjustment Fund (EGCF).

In order to ensure coal mining is phased out across the EU by the end of the 2021-2027 EU budget cycle, the EGCF would need to be endowed with adequate



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