

Social Market Economy and Sustainability



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Foreword

Social Market Economy and Sustainability

Combating climate change and maintaining resource security are two of the most pressing global challenges of our time – and will remain so after the COVID-19-crisis. Addressing global warming amid a growing world population and ever scarcer resources requires more sustainable economic activity and development. But what does sustainability entail – and how can we realise it?

In 2015, the UN passed 17 Sustainable Development Goals (SDGs), also known as the 2030 Agenda. They constitute “the blueprint to achieve a better and more sustainable future for all”. The SDGs apply to all UN member states, but also to its citizens. Yet in order to find a compromise between democratic and autocratic states, the UN Sustainable Development Goals are not committed to democracy. Democratic and market-based systems increasingly face competition with autocratic and centrally planned systems that claim superiority. In addition, some claim that the only way to a sustainable future is to prioritise ecological aspects at the expense of economic and/or social ones.

This book aims to show that sustainable economic development can only be realised by considering economic, ecological and social factors simultaneously and with equal value. For Konrad-Adenauer-Stiftung, democracy and the values and principles of the Social Market Economy are necessary to implement the Sustainable Development Goals. As both strive for economic development and technological progress that take ecological capacity and social justice or viability into account, the Social Market Economy and the UN Sustainable Development Goals complement each other.

Contributions to this book

Sustainability and democracy

In her contribution to this book, Sabina Wölkner explains Konrad-Adenauer-Stiftung’s perspective of sustainability and derives policy recommendations for the EU, Germany and other member states. The contributions of Ralf Fücks as well as Wolfgang Bretschneider and Sebastian Spiegel are a plea for a solution of climate change that is based on freedom, competition, innovation and technological progress. Contrary to claims that autocratic systems are better able to address climate change, Ottmar Edenhofer and Linus Mattauch show that democracies can afford ambitious climate policies: a reform of fiscal policy that includes carbon pricing and a tax on land could decarbonise the economy, reduce inequality and thus promote economic growth and democratic institutions.

The Social Market Economy: the right model to combat climate change and ensure resource security

For Konrad-Adenauer-Stiftung, the Social Market Economy and democracy belong together and are two sides of the same coin. It is and remains the most successful as well as the most sustainable economic and social model. In contrast to a centrally planned economy, the Social Market Economy is based on a free market economy where demand, supply and competition ensure good quality for low prices. Yet the state has a more active role than simply being a “night-watchman”: it sets the regulative framework that protects freedom and competition, leading to economic growth, prosperity and social progress for all.

Yet in light of new challenges, the Social Market Economy faces calls for renewal. For Germany in particular, the *Energiewende* – the transition from fossil fuels to renewable energies – is a test and potential example for others to follow, yet its implication is difficult. The contributions of Arnd Küppers, Martin Schebesta and Hildegard Müller respectively show that the Social Market Economy, its values and principles are still relevant, if not even more relevant than ever. Küppers

and Schebesta respectively explore the socio-ethical, historic and economic foundations of the Social Market Economy and how its application can address climate change, whilst Hildegard Müller applies the values and principles to the *Energiewende* and derives policy recommendations to increase acceptance of the *Energiewende*.

The bottom line of these three contributions is that as an evolving economic and social order, the Social Market Economy can and must constantly be adapted to current challenges. Even though this economic and social model could not account for climate change at the time of its initiation, it is possible to derive policy recommendations from its values and principles. A renewal of the Social Market Economy in the sense of adapting the freedom-based regulatory framework is necessary. Carbon pricing to internalise the social costs of climate change into the price mechanism is the main tool to address climate change and ensure resource security. Even though states with a different political and economic model cannot and should not simply “copy” the Social Market Economy, carbon pricing is a promising policy tool that states of all type can implement.

Carbon pricing as the main policy tool

Yet the implementation of carbon pricing faces difficulties. As Anja Berretta, Daniela Diegelmann, Christian Hübner and Nicole Stopfer show in their overview over the state of carbon pricing across all regions but Europe, the level of implementation and popularity of carbon pricing clearly differs between developed and developing countries. They emphasize that carbon pricing always has a unique national character and that subsidies and low popularity impede the prospect of carbon pricing in developing countries. The latter require information on the benefits and challenges of using carbon pricing and institutional support.

In addition, there are different ways to implement carbon pricing. Jasper Eitze and Martin Schebesta provide an overview over the advantages and disadvantages of the most common ones – i. e. raising a car-

bon tax and introducing an emissions trading system (“cap and trade”). Both have their merits and are preferable to the status quo of a complex and partially incoherent policy mix – yet a comprehensive Emissions Trading System (ETS) is preferable, not least because it seems to offer better prospects for climate policy integration. Luca Taschini explores the benefits and barriers to linking ETSs and how to overcome them, whilst Christian Hübner explores the potential of blockchain technology for setting up a global ETS.

Global climate policy: prospects and challenges

In general, global, multilateral solutions and approaches are necessary to combat climate change. This also applies to global carbon pricing: Ultimately, a global carbon pricing regime would be an ideal or “first-best” approach, but faces many hurdles. Beyond carbon pricing, increasing the sustainability of global supply chains is also crucial. Tanja Gönner argues that a global institutional framework is necessary to implement common social and environmental standards across global supply chains. Veronika Ertl and Martin Schebesta explore the prospects, advantages and disadvantages of statutory regulation of corporate due diligence.

Yet across the board, multilateral initiatives such as the Paris Agreement seem to struggle. Louis Mourier examines the prospects of minilateralism in global climate policy and emphasizes the need for a “second generation of climate minilateralism”: a minilateral climate regime that is closely aligned with the Paris Agreement, creates significant benefits for its members and involves relevant actors that control sufficient resources to make club-membership increasingly attractive. The EU should lead the way to such a regime.

Sectors up close

In order to increase the sustainability of economic activity and development, it is also crucial to look at key sectors and consider sectoral approaches. For developed countries, the industrial sector plays a more prominent role in reducing carbon emissions and increase sus-

tainability. In his contribution, Joachim Lang argues for a market-based and technology-open approach in line with the principles of the Social Market Economy. He presents a proposal of the Federation of German Industries on how industrial carbon emissions can be cut by at least 80 percent until 2050. Germany and other G7 countries can lead by example when it comes to decoupling economic growth from greenhouse gas emissions, as Jasper Eitze and Maximilian Pretzel show in their contribution. Given that ecological standards in the G7 states are high, industrial goods should also continue to be produced in these countries on a large scale after the COVID-19-pandemic. Another way for industrialised countries to become more sustainable after the pandemic is expanding the circular economy. Joachim von Braun introduces the concept of bioeconomics and explores its relation to the vision of a circular economy. Although both are promising and complementary approaches, economic regulation is necessary to make both sustainable.

The agricultural sector is also significant to build more sustainable economies, particularly in developing countries. Christian Hübner, Nicole Stopfer and Anja Berretta provide an overview over the state of the agricultural sector in Asia, Latin America and Africa. They show that climate change undermines food security and requires investment, the inclusion of the broader population, fair trade agreements and education. Julia Klöckner argues that sustainable agriculture is an inherent duty of Christian Democracy and requires not only considering economic and social factors jointly, but also taking the interests of farmers as well as consumers into account. Franz-Theo Gottwald argues that sustainable agriculture must ensure at least three aspects: food security of a growing population, climate protection and protecting biodiversity. Using the benefits of digitalisation and 5G would also make the agricultural sector more sustainable.

Where to go from here? Synthesis of recommendations

Given the vast array of factors and sectors to consider, policy-makers face a huge challenge. Yet as Kai Whittaker, himself a Member of German Parliament, argues, policy-makers need to just start acting. The perspective of sustainability has to become a reference point for policy-makers across the board. Especially Western countries need to prove that liberal democracy and the Social Market Economy constitute a functioning system for others to follow in order to combat climate change and successfully realise sustainable development.

Although the contributions to this book differ in terms of authors, content and original date of publication, they all agree on at least three messages:

1. All three aspects of sustainability – economic, ecological and social – are equally important and should be considered simultaneously.
2. Liberal democracies and the values and principles of the Social Market Economy still constitute a successful – if not the most successful – path to sustainable economic activity and development.
3. Carbon pricing is key to sustainability, ideally implemented on a global scale. Yet other policy approaches might also be necessary, also depending on the sector in question. Reconciling the local, national and international or global levels is also key to more sustainable economic development.

Although we cannot claim to have found a one-size-fits-all solution, we hope that this volume encourages thought and ideas on how to get closer to a more sustainable world.

Berlin, December 2020

Sustainability and democracy



Beyond climate policy: The perspective of sustainability¹

Sabina Woelkner (2019)

Introduction

Since the 2019 European elections, the spotlight has been on climate protection. This is partly linked to the rise of Green parties throughout France, the Netherlands and, in particular, Germany. At the same time, there has been increased pressure to act due to the proliferation of heatwaves and extreme weather, even in the far north of Europe. These weather events are making the phenomenon of climate change tangible for EU citizens, and this explains why the President of the European Commission Ursula von der Leyen has called for a European Green Deal to make the EU climate-neutral by 2050.² It is beyond doubt that this approach is the right one, but high transition costs should be avoided in favour of smart regulations and market economy-based instruments. As signatories to the Paris Agreement, the EU, together with its member states, has committed to limiting global warming. Europeans must therefore deliver! That said, the strict focus on climate protection is obscuring our view of the real issue: sustainability! Taking this into consideration, it is worth taking a look at the UN 2030 Agenda for Sustainable Development³ (UN 2015), which refers to sustainability in three respects. *Transforming Our World* focuses on creating a globally efficient economy with technological progress that works in harmony with the environment and is socially compatible. This triad of the economy, environment and society has distinguished the politics of the European People's Party (EPP) since day one. The EPP is therefore predestined to take the lead in the debate about a sustainable EU.

This article argues that the time is ripe to unfold this potential. A broader definition of sustainability offers opportunities for the setting of a new political agenda that goes hand in hand with the EPP's holistic views on politics and society, which stem from its status as a people's party. In Germany, a renewed positioning around this topic among the Christian Democrats has recently begun. However, to walk the talk implies not only further integration of the various dimensions of sustainability into European and national policies, but also stirring a public debate on the local, regional and national levels about the complex realities of implementation. Furthermore, given the economic and demographic rise of Asia, the use of renewable energy technologies, the creation of international partnerships and the introduction of smart regulations to level the playing field for sustainable investments on a European and global scale will be indispensable to make the new narrative work.

Sustainability reloaded

First of all, it is worth noting that the threefold principle of sustainability is not an entirely new concept. The Brundtland Commission first coined the term in 1987.⁴ However, we are now faced with a different political environment compared to that of the 1980s. Whereas at that time the discussion about sustainability was largely restricted to multilateral forums and expert conferences, the topic has now become far more salient for many EU citizens as a result of advancing global warming.⁵ At the same time, our hyper-connected societies are undergoing dramatic changes as a result of growing connectivity and economic globalisation. The issue of global value chains provides one example of this. On the one hand, many developing and industrialised countries have benefited economically from the increased trade. On the other, the interconnected global economy is exerting high levels of competitive pressure on the affected multinational companies and producers.⁶ It is true that consumers throughout Europe can make social and ecological criteria conditions for purchase. However, that is

not enough to eliminate the social divide within societies or the abuses carried out at local production sites. It was against this backdrop that Germany adopted the National Action Plan on Business and Human Rights in 2016, and called on all actors in the supply chain to apply the UN guidelines for business and human rights.⁷ Although implementing the plan is proving to be anything but simple for a manufacturing process that involves a plethora of actors, such multi-stakeholder approaches are the only way to forge a path towards greater sustainability in globally interconnected value chains.

It is clear that the international dimension of sustainability is nowadays more essential to the realisation of a sustainable future than ever. Thus, the recent UN Sustainable Development Summit represented a milestone for moving towards global sustainability. Here, the aim above all else was to maintain the political momentum, particularly at a time when multilateralism has come under severe pressure. That is why the situation does not look promising at the moment. This impression has been reinforced by the mixed UN assessment on the implementation of the global Sustainable Development Goals (SDGs).⁸ Despite this, European countries once again achieved top marks thanks to the Nordic states, whose populations traditionally place a high value on sustainability. Germany ranked in sixth place, Austria in fifth and France, fourth. Nonetheless, both European countries and other G20 states (the US ranked thirty-fifth) need to show more commitment.⁹ The consumption behaviour of rich industrial countries is a particular target of criticism. The UN warns that unless we see improved performance from the G20, whose members account for two-thirds of the world's population and are responsible for 75 percent of global CO₂ emissions, the agenda will be doomed to failure.¹⁰

The politics of sustainability

Since the 2019 European elections, discourse on sustainability policy in Germany has been subject to change. While to date the topic has mainly found expression among the political Greens, who limit the principle of sustainability to climate protection, the Union parties (the Christian Democratic Union and the Christian Social Union) are once again taking an increased interest in it, too. In the Christian Democratic tradition, the topic of sustainability is firmly anchored under the motto 'Bewahrung der Schöpfung' (Protecting Creation). The *Energie-wende*, as heralded by German Chancellor Angela Merkel in 2011, is the most recent example of an extensive sustainability policy. After the Fukushima catastrophe, Merkel announced an energy policy turnaround including, amongst others, the phasing out of nuclear energy and an increased share of renewables in energy consumption.¹¹ It was the global financial and economic crisis that temporarily pushed the issue into the background. The tide has now turned. Leading Christian Democrats are seizing the opportunity to cast sustainability in a new light and to reconcile it with the economy, society and the environment. Hence, in addition to the 'black zero policy', which aims to ensure a balanced state budget, the chair of the Christian Democratic Union (Christlich Demokratische Union Deutschlands, CDU), Annegret Kramp-Karrenbauer, and Andreas Jung, deputy parliamentary group leader of the CDU and climate expert, have also called for a 'green zero policy' in order to prevent future generations from being faced with mountains of rubbish as well as debt.¹² To convince the broader population, a fine balance needs to be struck between an additional financial burden and opportunities for innovation and economic modernisation. It comes as little surprise that the Greens, in particular, are critical of the concept. They have been the main beneficiaries of a sustainability debate which focuses solely on climate protection and fails to take social and economic aspects into account.¹³ However, given that the three dimensions are considered of equal value, it is essential that they are all realised without cherry-picking. Instead, what is required is holistic action and a forward-looking perspective that includes the

honest assessment that we need to readjust our harmful patterns of production and consumption. This complies with the idea expressed by Kramp-Karrenbauer that the principle of sustainability should be included in the constitution by amending the German basic law. The idea is to create a strong obligation to deliver the social dimension, since the constitution already covers the environmental (art. 20a) and fiscal aspects (art. 115(2)). According to former President of the Federal Constitution Hans-Jürgen Papier, provisions for the long-term satisfaction of community interests adopted within a parliamentary democracy fall short of expectations due to the nature of the system itself.¹⁴ Hence, social compensation needs to take place not only within a generation but inter-generationally as well.¹⁵ However, this initiative will only create commitment if sustainability also becomes a guiding principle of the budget. In other words, for this to be effective, sustainability will need to be taken into account when the draft budget is being drawn up, and there will also have to be effective parliamentary sustainability checks in place. Although approaches already exist, this development is still in its infancy in Germany and the other EU member states.¹⁶

However, Germany does have a comprehensive national sustainability strategy. The strategy was revised in 2016 to reflect the 2030 Agenda and updated in 2018.¹⁷ As a cross-cutting issue, it is now present in all departments and is the main tool when it comes to implementing sustainability. Yet despite the strategy's importance, progress and challenges on the path towards greater sustainability are scarcely discussed beyond the circle of usual suspects. The German Council for Sustainable Development, an independent advisory body, thus recommends involving civil society to a greater extent. This primarily involves networking between local and regional actors.¹⁸ Thus, the consent of the federal states in June 2019 to adopt the federal government's sustainability principles represents a vital step towards meeting this intention. Since there is no one way of implementing sustainability, it is also necessary to create more space for discussion around the topic and, in particular, to promote political debate. The parliaments, whether at

the national, regional or local level, are the ideal places to answer concrete questions. The political foundations can also make substantial contributions to the discussion on sustainability thanks to their broad network in Germany as well as worldwide.

Sustainability as a driver of innovation

Sustainability is also the driver behind modernisation and innovation. This implies placing increased emphasis on sustainability principles in agriculture and transport, as well as in trade policy and when managing the internal market. A common European framework is essential for this. To date, however, the EU's development policy has merely been adjusted with the introduction of the New European Consensus on Development Policy in 2017. The hope is now that the new European Commission will quickly address the issue. That said, the most important prerequisite would be to include the sustainability principles in the Multiannual Financial Framework for 2021–7, and primarily to enshrine expenditure that fulfils SDG priorities in the EU cohesion and competition policy. A further suggestion, which has a similar goal, is to incorporate sustainability goals in the monitoring of the European Semester.¹⁹ Comparison at the EU level is needed to better display and integrate the results of sustainable policies across Europe. Despite the fact that all member states take note of the SDGs in their national strategy documents, the scope of these documents varies greatly and the range of results achieved is accordingly large.²⁰

Furthermore, sustainability is also about the question of who has the upper hand when it comes to future technologies: renewable energies are imperative here. German companies, in particular, have gained valuable experience thanks to the *Energiewende*, although it has turned Germany's energy – at least for the moment – into the EU's most expensive. However, the faster cutting-edge 'green' technologies are disseminated globally through market-based incentives, the sooner prices will be normalised. For the moment, China is leading the

way with the expansion of renewable energy capacities. Between 2010 and the first half of 2019 the country invested \$758 billion in renewable capacity, followed by the US in second place, with a mere \$356 billion of investment, and Japan in third, with \$202 billion. The EU comes after these three, with overall \$698 billion of investment, with Germany contributing the most, at \$179 billion.²¹ However, we should also extend our view beyond China, to include the other growth centres in Asia: India could overtake China as the most populous country in the world as early as 2027. Forecasts predict that over 60 percent of the global middle class will live in Asia by 2030; in 2015 it was 46 percent.²² There can be no doubt that Asia's economic rise will result in higher energy demands and more consumption and production. This phenomenon could thwart our progress in climate protection on a global scale. The World Energy Outlook assumes that global energy demand will experience major changes in the coming years. Whereas in the year 2000 more than 40 percent of global energy demand came from Europe and North America and approximately 20 percent came from developing and emerging countries in East Asia, this ratio will have reversed by 2040.²³ Thus it is clear that innovative concepts in mobility, climate-friendly fuels and greater energy efficiency are not only needed in the West, but are even more necessary in the new growth regions beyond Europe. Hence, in order to really save the climate and our planet, the EU, Germany and the other member states must boost their economies and position themselves more visibly in the global competition for climate and resource-saving technological solutions.²⁴

Sustainability needs capital

According to the European Commission, the transformation of the European economy into an environmentally friendly and circular system will not only result in reducing our ecological footprint, but will also increase competitiveness, as production processes will be designed more efficiently and the cost of accessing and managing resources will be reduced.²⁵ This transition requires capital, however.

To date, only a fraction of investments have been made in sustainable projects. The Commission estimates that there is an annual backlog in the investment needed to achieve the EU climate and energy targets of €180 billion.²⁶ Additional environmental and social considerations are rarely taken into account. In the same vein, it is unclear which companies really produce in a sustainable way. This is why the EU has recently adopted legislation in the framework of an action plan, which is currently being discussed by the Parliament and Council. The primary focus of the action plan is to develop a taxonomy that, as a uniform classification system, will ensure clarity about which activities can be considered 'sustainable' in order to help inform investors and to increase economic investment in sustainable projects.²⁷ Again, the emphasis is placed on climate protection and measures to adapt to global warming. Whether an agreement will be achieved in brief, remains unclear. Even though many EU member states have identified 'sustainable finance' as being relevant, opinions about the criteria continue to differ.²⁸ Nevertheless, the European discussion is a reflection of the global trend.²⁹ The UN also believes that the time has come for sustainable finance. Despite it still being in the embryonic stages, some sectors have already experienced high growth rates. The principles of responsible investment adopted in 2017 on the initiative of the UN committed shareholders and investors, who represent a value of some \$90 billion, to fully comply with environmental, social and governance criteria. The Global Impact Investing Network also takes the view that interest in 'impact investing' is on the rise.³⁰ This is driven by hard-hitting self-interest. Banks and insurance companies need to calculate the growing risks triggered by climate change and environmental degradation differently, and hence take sustainability into account when making their decisions. However, we need to be aware that the global market is diverse. Since there is 'still no uniform standard for measuring or proving whether and to what extent a company supports sustainable development and the SDGs', the risk of 'greenwashing' persists.³¹ Furthermore, the question of how increased amounts of private capital could be directed to those countries that most need it remains unresolved. Von der Leyen therefore intends to put forward

a strategy for green financing and a sustainable European Investment Plan.³² Money often fails to materialise, especially in fragile countries, where the risks for investors remain incalculable.³³ To date, expectations to mobilise private capital with the help of state subsidies in the form of 'blending' or by providing guarantee loan coverage, especially in the poorer developing countries, have not been fulfilled.³⁴ More effort is needed. Therefore, innovative financial instruments need to be refined to attract private equity to sustainable projects even in difficult circumstances.

Conclusion

It is beyond doubt that 'business as usual' achieves nothing when it comes to paving the way towards a sustainable world by 2030. The latest UN SDG report makes it clear that present and future generations will have to pay a high price if we fail. To prevent the realisation of such a negative scenario, the new complex reality of sustainability has to be taken into account by policymakers. That said, the apocalyptic global warming rhetoric of a self-fulfilling prophecy must stop and be changed into a sound vision that unites ecological sustainability, economic performance and social justice. This requires taking vital steps to create more space for political debate in order to build a broader consensus. To set the course, innovative concepts and ideas in areas such as mobility, climate-friendly fuels and higher energy efficiency need to circulate beyond national boundaries while forging partnerships with multiple actors, particularly in the new growth centres outside Europe. It is therefore imperative to strongly boost Europe's economies through increased investment, particularly in cutting-edge green technologies, and to continue the EU's pioneering role in the advancement of sustainable finance. At the same time, to ensure that sustainability actions are widely accepted, political measures are needed to avoid the high social costs affecting the most vulnerable within our societies. It is now high time to widen the scope of public discourse on sustainability and to promote political debate on

the different choices of transformative pathways. While the discourse in Germany on sustainability has long been hijacked by the political Greens and their sole focus on climate issues, the tide has now turned. New ideas, generated by the Christian Democrats, are evolving and are giving sustainability a more forward-looking approach and holistic perspective. Given Germany's size and role in the EU, this is good news for making real progress on sustainability within the country, but also in and outside Europe.

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Eco-friendliness and freedom³⁵ Balancing climate action, democracy and a market economy

Ralf Fücks (2019)

The climate change discussion has entered a new phase, with hundreds of thousands of young people becoming pioneers of a new 'Climate APO' (APO standing for Extra-Parliamentary Opposition in German). It is the young leading the old. Climate was already a critical factor at the most recent EU elections and has the potential to shake up the political landscape well beyond Germany's borders. The pressure for action is growing, not just for environmental reasons: If the gap between climate-policy impatience by the extra-parliamentary movement and climate-policy inertia by policymakers and business grows, this can rapidly trigger a legitimization crisis in the market economy and liberal democracy. Anyone wanting to future-proof both must face up to the environmental challenge.

The climate discussion also has the capacity to spark a culture war. The more obvious the threat to the environmental bases of our existence becomes, the louder the call of 'you must change your life!' The age of 'higher, faster, further' is coming to an end, they say; it now is all about self-limitation. For advocates of a new eco-puritanism, climate change is the result of the lifestyles of billions of wealthy earth-dwellers, who enjoy all the blessings of modernity with no regard for the consequences. Their love of driving, air travel, large homes, permanent online communication, annually changing fashions, non-season-dependent availability of food from all over the world and high

meat consumption are considered the original environmental sin. Our ongoing quest for 'more' is ruining the planet, they claim. 'Repent and change your ways!' is thus the new categorical imperative.

And it is true: Industrial modernity, with its motto of extroverted self-fulfilment, has so far been based on the seemingly unlimited availability of fossil fuels. These were the driving force behind an enormous increase in production and consumption, and increasingly expansive mobility. Now that burning coal, oil and gas has been proven to upset the earth's climate, modern hedonism is also coming under fire. Freedom that is enjoyed at the expense of others ends up being sheer egoism. It destroys the freedom of future generations to live in a half-intact environment. Instead of constantly pushing the limits of what is possible, we now need to practise self-limitation. The ethics of restriction require humility, slowing down and 'being' rather than 'having'.

No to privatising the climate issue

But the impact of all this preaching has so far been very limited. While there are new vegan burgers being sold at discount shops, and the young and educated are reducing both their meat consumption and the need to have their own car, the number of SUV registrations and power consumption associated with digital communication are on the rise, and there is no sign of any slump in the tourism industry. The number of those who have radically reduced their personal CO₂ balance barely registers. This is due to more than just the mighty force of old habits and individual convenience. Our personal climate balance depends heavily on *structures* that have very limited capacity for change at an individual level: From power-generation methods, the buildings we live in and the available alternatives to the cars we drive and the jobs we do.

Take the example of air travel: It is not an inalienable human right to jet off to London for a shopping trip or to Mallorca for a weekend holiday.

But these sorts of escapades are only a fraction of the rapidly growing global air-travel industry. Flying is part of a worldwide economic system and an increasing globalisation of all aspects of life. Families are scattered across countries and continents; young people are studying abroad; science, culture and sport are international. Politics would not be possible without air travel; digital communication cannot replace personal human interaction. Key figures of the 'global civil society' are also among the frequent flyers, meeting at international conferences and co-operating with partners all over the world. The more people rise into the middle class globally, the more air travel will continue to grow. China has now overtaken Germany as the 'travel world champions' in air tourism. In this sort of a world, making the renunciation of air travel a requirement of ecological virtue is simply naive.

Anyone wanting to reduce air travel's harmful impacts on the climate needs to set the course for climate-neutral flying. The solution lies in innovation, not in rejecting modernity. Synthetic hydrogen instead of kerosene, algal fuels, electric drives for ground transportation, and lightweight but robust materials have all long been in development. Incorporating air travel into the emissions trading system would help more than any anti-flying preachers, as would developing a fast, attractive rail network in Europe.

To a large extent, the majority of people even in rich societies like Germany are far from living in abundance; they're only just getting by. The call for 'us' to limit ourselves generally comes from the higher echelons of society, yet we are yet to hear anything about a mass movement by the higher income earners to reduce wages and increase taxes.

Let me be clear: There is no freedom without personal responsibility. It is great to ride a bike or take the train and not buy products whose manufacturing processes involve human exploitation or animal cruelty. Everyone is free to seek a 'good life' in the form of more free time and social relationships rather than higher income and consumption. But an objective look at the scale of the environmental challenge

shows that it will not be overcome simply by calling for a simpler lifestyle. Unless there is a green industrial revolution, we will not win the race against climate change. This will essentially involve decoupling wealth production from the consumption of natural resources. That is ambitious, but doable.

The authoritarian temptation of environmental action

When the appeal for renunciation falls on deaf ears, the call for bans is never far away. Bans limit the freedom of the individual in order to protect the lives of future generations. This *logic of restriction* appears imperative and morally unassailable. What good is individual convenience, what good are 'luxury needs' like holidays abroad, spacious homes and fancy cars, when we face an impending climate catastrophe? Shouldn't we accept a noticeable decline in welfare if it meant this would prevent growing instability in the ecosystem? But calling for restrictions and renunciation is the wrong response to climate change and species extinction. Environmentally, it falls short, socially, it is highly polarising, and politically, it heads down the slippery slope of authoritarianism in the name of saving the world.

Philosopher Peter Sloterdijk predicted the new culture war several years ago:

The ethics of the future inimical to expression and emissions focuses unequivocally on inverting the direction in which civilisation has moved hitherto. It calls for a decrease where the agenda to date has been to increase, it calls for minimisation where thus far all that counted was maximisation, it urges restraint where until now explosion was in order, it decrees thriftiness where to date extravagance was felt to be the greatest excitement, it admonishes us to restrict ourselves where otherwise self-liberation was celebrated. If one thinks these reversals through then in the course of the meteorological Reformation one reaches a kind of ecological Calvinism.⁸⁶

The rancour with which speed limits and driving bans are currently disputed provides a foretaste of this new culture war between supporters of a morally charged policy of restrictions and those who see this policy as an attack on their lifestyle. One side cites climate action as an absolute necessity, while the other considers it conspiracy by green tree-huggers who are out of touch with reality. This conflict involves a social bias, because it is primarily privileged children in affluent societies who spread the 'shift towards austerity' narrative. And when the most vocal advocates of bans on diesel cars turn out to be frequent flyers, it is a field day for all anti-greens and defenders of the status quo. Privatising the climate issue leaves its children as fair game.

Climate change and democracy

Criticism of the slowness of democracy, with its eternal compromises, goes back a long way. It is no coincidence that prominent climate activists like Norwegian Jorgen Randers are sympathetic to the Chinese model. If eco-friendliness is primarily equated with restricting production and consumption, this makes sense. Authoritarian regimes are then more able to enforce the necessary renunciations. Democracy becomes a luxury we can no longer afford; freedom shrinks as awareness of the need for eco-friendliness grows.

Arguing against the authoritarian temptation of environmental action does not amount to playing down the environmental crisis. If global warming gets out of control and sea levels rise dramatically, it will cause huge upheaval, from economic slumps to worldwide migratory movement. As such, the environmental crisis also poses a threat to democracy, which is why we need to do everything possible to push ahead with the environmental transformation of industrialised society, so as to prevent the climate crisis from destroying liberal democracy.

Supporters of restrictive environmental policy like to invoke the maxim of 'you cannot negotiate with the climate.' This harbours an anti-

political, if not anti-democratic, call for eco-driven practical constraints that go higher than politics itself. Politics is consequently reduced to the implementation of requirements based on climate-research forecast models to keep global warming below two degrees. 'Science' stipulates the targets and pace; politics can, at best, establish the methods by which the annual carbon emissions reduction targets are to be achieved. But no government anywhere in the world (not even an authoritarian power) can implement climate targets without taking into account economic, social and regional needs. Environmental policy is not above the political principle of weighing up different objectives and conflicting interests. And studying specific economic sectors in isolation is just as misleading as a view limited to national boundaries.

To put it bluntly, it makes no difference to the earth's climate if the last coal-fired power plant in Germany is switched off in 2038 or 2035. It is much more important that the shift in energy policy become a success model with international appeal. This includes ensuring it is supported by the majority of the population, rather than being a source of social division. It also includes making sure the switch to a climate-friendly energy system is economically successful, i. e. boosts competition, employment and income. Only then will it become a pilot project for other nations where growth and wealth continue to be a top priority.

Zero growth or a green industrial revolution?

Voluntary or forced renunciation will, at best, slow climate change, but will not stop it. This is particularly true given the billions of people on our planet who crave nothing more than to enjoy the pleasures of modern life: Well-equipped homes, education and professional health-care, the ability to travel, and abundant food. For the vast majority of the world's population, 'zero growth' is not an alternative. For them, increased economic output (a. k. a. growth) continues to be the key to higher income, better education and health care as well as greater material comforts.

On closer consideration, this is also true for the wealthy nations of the Global North. A stagnating or even shrinking economy means a decrease in investments and therefore the rate of innovation. And in an age where time is of the essence in the face of climate change, we actually need the switch to renewable energy, eco-friendly agriculture and climate-neutral mobility to occur faster. Making industry, our cities and public infrastructure eco-friendlier requires increased investment in alternative energy systems and new production plants, in developing public transport, and in the ecological modernisation of existing buildings. If we get it right, the result will be a new economic drive and a prolonged wave of environmentally friendly growth in the global economy.

Objectively speaking, it is not even about *whether* the global economy will continue to grow. In view of a world population approaching ten billion, the progressive industrialisation of the Global South, and ongoing urban growth, the all-important question is whether we will be able to *break the link between added value and environmental impact*. With an annual growth rate of three percent, global economic output will roughly double over the next twenty years. In that same time frame, greenhouse-gas emissions need to dramatically decrease to contain the rise in temperature. This will require nothing less than a *green industrial revolution* with a sweeping impact akin to that of the invention of the steam engine, electricity, or the automobile. It is essentially a case of transforming the old industrialised society threefold: Firstly from fossil energy sources to renewable energy, secondly by continuously increasing resource efficiency (using fewer natural resources and less energy to produce more wealth), and thirdly by transitioning to a modern circular economy in which all residual materials are fed back into the biological or industrial production process.

Like other European countries, Germany meets all the criteria for playing a leading role in environmentally reforming industrialised society. Instead of spreading crippling panic, the climate-action narrative should be one of great innovation and breakthrough, of a new, green economic miracle.

Eco-liberal regulatory policy

Anyone wanting to align freedom with eco-friendliness must, above all, focus on *innovation* and encourage competitive approaches to finding the best solutions. While even a liberal regulatory policy will be unable to succeed without limits and bans, these are not the silver bullet when it comes to solving the environmental problem. It is instead more constructive to incorporate environmental costs into pricing. A market economy can only function if prices tell the ecological truth. An environmental tax reform that incrementally taxes greenhouse-gas emissions and the consumption of scarce natural resources would have a much greater impact than constantly introducing new requirements and bans. The extra charges resulting from environmental taxes can be refunded in the form of a flat eco-bonus for all citizens. This sort of per-capita amount would even bring about a social shift, because low-income earners generally have a smaller carbon footprint than the wealthy.

The old question of ‘how much state involvement does the market need?’ has once again been raised in view of the speed and magnitude of the changing climate. The task ahead entails nothing less than fundamentally reorganising industrial society within the space of a few decades. A challenge of this scale – at best comparable with rebuilding a destroyed Europe after World War II – requires a non-partisan discussion of strategies and instruments. From a market-economy perspective, a shift to sustainability revolves around incorporating environmental costs into pricing. Only then can markets fulfil their role of innovators and allocators, including in terms of protecting the natural bases of our existence.

Introducing a successively increasing carbon price is the most cost-effective way of protecting the climate, unlocking CO₂-reduction measures that facilitate an optimum cost-benefit ratio. The second major advantage compared to state-led micromanagement of production and

consumption is the fact that it steers company and consumer initiative in a sustainable direction, without setting them rules as to what exactly they have to do or refrain from. The carbon price is a way of informing people what needs to be avoided in the interests of a stable climate on earth. It also provides incentives for environmentally friendly investments and purchase decisions by producers and consumers.

But it is not a fix-all solution that replaces every other regulatory and structural-policy measure, particularly given that an appropriate carbon price reflecting the costs of climate change is so high that, for economic and social reasons, it can only be achieved gradually. Climate economists envisage effective initial prices being around 60 euros per tonne, and then rising well into the three-figure region. In Sweden, which introduced a national carbon tax in the early 1990s, the price is currently 110 euros per tonne. It is charged for economic activities not covered by the EU’s emissions trading scheme. Businesses operating internationally pay lower rates.

State and market

Whenever the state controls investment and consumption, there is the dilemma of incomplete information – politics and administration are never able to keep track of all the possible impacts and side effects, and they never know for sure what the ‘right’ action is when it comes to solving certain environmental problems with a view to future developments. As such, every state-led industrial policy runs the risk of backing the wrong horse – in other words, spending billions of euros today promoting technologies that could be outdated by tomorrow. This is clear to see using the example of battery technology. Should the federal government subsidise the construction of local lithium-ion battery factories when research is already being conducted into the next generation of batteries that operate on a completely different technical basis? And should it make a political decision favouring battery-pow-

ered electric vehicles even though Japan is pushing fuel-cell technology and synthetic hydrogen could become the key link between the power and heating sector, transport and industrial production processes?

The answer to this question is less clear than it may first appear. None of the ground-breaking technical innovations of the industrial age, from the railway to the Internet, has established itself purely 'through the market' alone. They all had considerable political backing: In the form of legal framework conditions, state research policy, public contracts, infrastructural investments, or direct subsidies. This is also true of Silicon Valley's Internet economy. It would be naïve to focus solely on market-based innovations. This is only the case when the 'upscaling' of new technologies is dependent on infrastructures that cannot be provided by industry alone. A dense network of public charging stations, for example, is a pre-requisite for switching to electric cars. State grants for purchasing electric vehicles, exclusive parking facilities in inner-city areas, and priority lanes on heavily frequented roads are moving in a similar direction. A higher carbon price here would once again be the most effective way of advancing the transition to eco-friendly mobility.

There consequently needs to be a smart policy mix that allows maximum scope for responsibility and competitive innovation and makes readjustments when market-economy instruments are found not to be effective (or are taking too long to be effective). Eco-friendly regulatory policy must combine resolute objectives with flexibility in terms of methods, ability to learn and openness to innovation. It must provide a long-term framework for businesses and citizens without imposing strict regulations on them. The mission statement of '*As much market as possible, as much state as necessary*' is timeless. How the perfect balance is to be struck in this fraught situation, however, is something that needs to be determined based on specific challenges. Yet failing to introduce a cross-sectoral carbon tax leads to precisely the strict micro-regulations for individual sectors, technologies and products that conflict with market-economy principles.

It is therefore misleading to play an expansion of the emissions trading scheme off against an incrementally increased carbon tax. On the one hand, these are subject to different regulatory conditions: The emissions trading scheme is negotiated at an EU level, while a carbon tax can be charged nationally or (even better) as part of a European 'coalition of the willing'. On the other, they impact different areas: Agriculture, transport and the building sector are not affected by emissions trading. While the scheme oversees a reasonable number of larger emitters, it hardly applies to many small businesses, homeowners etc., and only influences a small percentage of demand. While deciding how to co-ordinate between two regulations, and which border adjustment mechanisms are necessary for a carbon tax, is a complex task, but not rocket science.

Climate action and the social aspect

The 'social aspect' has once again come more sharply into focus. The polarisation between the winners and losers of globalisation, the increasing imbalance in wealth distribution, the establishment of a new class of 'working poor' who can barely make a living despite working hard, and ongoing inequality in opportunities for education as well as the displacement of average-earners out of urban residential areas have all reignited the issue of social justice. If environmental policy wants to be successful for the long haul, it needs to face up to the social aspect; it needs to consider its impacts on employment, as well as the distribution-related effects of certain measures and their impacts on people's everyday lives. This is as true of expanding environmental taxes and levies as it is of intervention in private transport, which primarily hits commuters and small-business owners.

It is thus of no help to simply commit to giving climate action priority; if an ambitious climate policy wants to gain adequate social support, it needs to keep track of the environmental, economic and social dimensions. Otherwise, it will provide new fodder for antiliberal counter-

movements. We are already seeing populist parties and movements trying to secure themselves a second recruiting ground in addition to refugee and migration policy. They air themselves as advocates of the 'ordinary people', combating the patronising the 'environmental elites', and rail against rising energy prices and the loss of industrial jobs, which they attribute to the 'eco-loonies'. Donald Trump has demonstrated that anti-environmental populism can indeed have short-term success, even though his actions are directed against the long-term interests of precisely the poorer classes.

Faced with the threat of intensified environmental crises, we have three foreseeable options: The first is a radicalised reversal that seeks salvation in the voluntary or forced reprogramming of people towards renunciation and prohibition. The antithesis of this is the defiant 'keep going as is'. Sloterdijk calls this a 'complementary wave of resignation, defeatism and a cynical "après moi le deluge" mindset.' There is a high probability of this gaining the upper hand. The third option is a new synthesis between nature and technology, combining the untapped potential of evolution with the inventive talents of the human mind. Given the limits of the earth's system, we have two remaining sources of progress that are not expected to run out: Solar radiation onto the earth, and human creativity. A liberal *and* sustainable society must build on a combination of the two.

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The market economy and eco-friendly transformation³⁷

Wolfgang Bretschneider & Sebastian Spiegel (2019)

Transforming the economy into an eco-friendlier approach is rightly considered one of the greatest challenges of the 21st century.³⁸ Tackling problems such as climate change, polluted seas and oceans, or over-use of resources requires efforts from society as a whole. This is true in both the Global North and the Global South, and particularly for modern economies like that of Germany. Given all this, it is pleasing to note the broad social consensus in Germany that decisive political action is needed in order to protect the environment. There is less agreement, however, when it comes to the question of how this transformation is to occur, and the extent to which it should be targeted at systemic change.

In the face of ecological challenges, vocal, fundamental criticism of the market-economy system of 'capitalism' is sometimes also levelled at conventional economics, which are accused of clinging to the concept of humans being *Homo oeconomicus* and accepting the motive of making profits. It is claimed the market economy is defined by greed, exploitation of humans and nature, and the 'growth paradigm'. It is thus not difficult to see the moral vulnerability of such a system.³⁹

These fundamental critics also include institutions of the social 'establishment', such as large sections of the Christian churches. Concepts like 'sufficiency' or the 'less is more' philosophy are – presumably driven by morally plausible motives – pitted against 'economic greed' and 'boundless growth', and critics believe that once economics start 'eating into' the environment, they need to be stopped. But how this should be done is a question that cannot be answered in simple terms.

There is no doubt that economic activity needs to be programmed towards sustainability. The aforementioned fundamental criticism, however, is based on a vague diagnosis. Yet it is particularly in times of transformation and radical change that precise diagnosis is called for. When it comes to the debate on ecological transformation, this requirement can mean asking a question in two different ways: What needs to change in the current economy? And what needs to be retained?

While fundamental criticism is inherently focused on change, little attention is given to the issue of what is to be retained. This is likely due in part to the fact that what needs to be retained lies hidden in the supposedly self-evident. In his book *Sapiens: A Brief History of Humankind*, Israeli historian Yuval Harari presents the effect of being accustomed to an achieved level of wealth as an 'iron law of history'.⁴⁰ In times of radical change and transformation, identifying the self-evident and seemingly obvious becomes even more important. If these are overlooked, the result is often solutions that end up being worse than the original problem itself.

To be retained: Competitive markets

It is a common view that democracy, basic rights, and a free, open, tolerant society are among the great achievements of the modern world. But when it comes to the economy, there is the crucial question of 'What do you think of competitive markets?' Is competition one of the social foundations that need to be retained? The answer can only be a resounding 'Yes'. Only with competitive markets can we even begin to conceive of our everyday blessings, which many people take for granted these days.

The ability to create innovations that have been tested on the relative scarcity of resources (effectively on reality) is an essential function of competitive markets. It is only on this basis that we can use things like smartphones and reliable outdoor clothing today. Ecological innovations such as the organic food sector are also the product of competi-

tion. In justified cases – namely market failure –, it is the responsibility of the state to intervene in the economy's spontaneous developments. But even in deeply state-regulated areas like network mobility (rail), health and culture, it is impossible to imagine being able to achieve the supplies and services we have today without competition, particularly in the upstream markets of the value chain.

The motive of making a profit, the justification of which is regularly cast into doubt, does indeed play a key role in competition. But when it comes to assessing the morality of markets, this needs to be more indirect, because competition uses this profit-driven approach to serve society.⁴¹ Anyone wanting to be economically successful in the long run needs to offer their customers added value.

The fruits of competition are hard earned; they do not just fall into anyone's lap. Markets excite their players; they test suppliers' productivity and consumers' urge to consume. Their players are indeed sometimes subject to unreasonable demands that need to be met by social policy, taking into account the principle of subsidiarity.

In addition to this, public institutions also play a key role in economic activity, as had become clear by the time Walter Eucken founded Germany's ordoliberal movement. Problems associated with ecological overuse are a form of market failure and include external effects. These can only be effectively addressed by legal institutions. Leaving this matter to the markets themselves can destroy the foundations of the market economy.⁴²

For the rest, competitive markets are the fundamental drivers of the phenomenon that can macroeconomically be regarded as economic growth. But growth is definitely not what markets aim for. Their aforementioned functional logic and social justification are microeconomic, meaning they relate to productivity in a specific market. Growth is instead an unintentional side effect thereof at the level of an economy. Hence anyone wanting to do away with growth also needs to do away with markets.

An eco-friendly lifestyle: A way out or the wrong approach?

What ideas do the fundamental critics have for ecologically transforming the economy and society? These are not easy to distil, because we often only tend to hear negation ('anti-capitalism'), rather than what the future *should* look like. Two considerations regularly come into play here: An ecologically oriented change to individual lifestyles, and stronger economic activity by the state.

Despite our best intentions, we will not be able to save the planet by hoping for individuals to change their lifestyle in the vein of the 'less is more' philosophy. And this is particularly due to the following reasons:

- › Firstly, there is no empirical correlation between eco-friendly attitudes and individual consumption of natural resources; at least not in the manner required. A study commissioned by the German Environment Agency underlines what we already know: That individual consumption of natural resources is particularly high in social milieus where positive attitudes towards the environment are prevalent.⁴³ In environmental psychology, this phenomenon is known as the discrepancy between environmental awareness and environmental action, and has been discussed for years.⁴⁴

It is not so much attitudes, but rather real income, that determines the consumption of environmental resources: The higher income, the higher consumption. On average, this also means that usage of environmental resources increases with education level. The counterintuitive outcome is, for example, that Greens' voters will be particularly critical of air travel, yet will also fly more frequently than others.⁴⁵ It is not a 'culture of consumerism' that causes high consumption of natural resources; rather, it is the social groups inwardly distancing themselves from consumption, and who are indeed even critical of it, that are particularly heavy consumers. Consumption is thus different to 'consumerism'. But it is not 'consumerism' that affects the environment, but rather actual consumption.

These findings show that we must be under no illusions about consumer behaviour, and that it must be viewed through the lens of an individual's everyday needs, which constantly see an interest in ecological sustainability pitted against competing interests. It then becomes clear that everyday instances where time, money and effort become too important take precedence over the 'eco-friendlier alternative', even though people may still be sympathetic to this.

- › Secondly, ecological transformation relies on actual behavioural changes bringing about effective conservation of resources. The complexity of value chains means intrinsically driven behavioural changes soon reach their cognitive limits. It cannot, for example, be about simply stopping flying altogether, but rather about deciding not to fly certain distances, insofar as this decision is freely up to the individual. International exchange is a fundamental part of many professions, and doing away with short-haul flights would require a high-performance rail system. It is similarly impossible to make generalisations about the environmental impacts of replacing air travel with other activities.

Considering all this, effective protection of the environment at an individual level can at best be achieved through a *waiver of income*, i. e. asking for a wage reduction. No information is available regarding whether this approach would have been widely adopted.

The state economy as a dead-end street

Looking beyond individual lifestyle changes to non-market-economy concepts, we find an old solution: Having the state control economic decisions. This approach trades under the name of 'compulsory sufficiency'.⁴⁶ But this risks extensive losses of both efficiency and freedom. This is incompatible with the free, open society that capitalism critics generally want to see protected.

And what about environmental sustainability? A state-controlled economy can of course restrict growth. But this does not necessarily imply less impact on the environment. Here, too, an effective environmental sustainability policy first needs to be implemented – and this is something competitive economies can do just as well, if not better. Indeed, nations with a state-dominated/state-controlled economy have been, and continue to be, among the world's highest environmental consumers. It is worth remembering that East Germany had lower growth *and* more environmental destruction than West Germany. One reason for this may be the fact that a division of power of sorts between the private economy and state regulators has a positive impact on effective environmental policy. Coupled with this is the fact that modern environmental technologies, such as electric engines, more efficient wind turbines or water-treatment plants require technical progress and innovation, and therefore structural change – phenomena that are disproportionately more evident in a competitive economy.

Finally, this context gives rise to a historic argument against a state economy, which can be formulated as a question: Is it possible to have a structure in which democracy coexists alongside a state economy? China is occasionally used in attempts to prove that there is no strict correlation between democracy and a market economy. But this is deceptive, for it only proves that a dictatorship can still be maintained even after the economy has been partially opened. This example says nothing about the reverse case scenario; that of democracy without a market economy. There is no clear evidence of independence between a state system and economic system.

In other words: Throughout history, there have been no examples of a liberal democracy existing without a market economy. Conversely, there is a whole host of countries, including England and the Netherlands, where dynamic markets and trade have driven democratisation forwards. So anyone who thinks a competitive economy is dispensable is jeopardising a free and democratic society.

Changes needed: Enforcing environmentally transparent prices

Protecting natural resources of course requires maximum social and political effort. The critical question, however, is where this should be applied in order to direct social and political energies into this. The main aim of environmental transformation efforts should be: *Prices must tell the environmental truth*, i. e. environmentally transparent prices. Environmental crises are different aspects of market failure. These include external effects that need to be addressed by the state. The fundamental problem is that, without environmental taxes, these works of nature do not figure on any company balance sheet and are thus neglected at a business level.

This is where the state needs to step in as an *organising authority*; not as a controller of economic decisions. It provides the environmental framework, and thus the planetary boundaries, for competition. As an environmental trustee, it charges companies tax on their use of the environment, thereby increasing their costs for each unit of use, with usage being limited. For end users, environmental taxes appear as a pricing component, initially making a whole range of goods more expensive for consumers. But innovation and structural change ensure the new, increasingly apparent shortages are handled creatively and productively.

Environmentally transparent prices do indeed result in lifestyle changes. But not through a 'change in awareness', i. e. intrinsically. The changes happen extrinsically – through the costs consumers start noticing when using environmental resources. Conversely, these sorts of prices enable consumption, insofar as this is ecologically justifiable in cases where consumers are willing to pay. Things like flying behaviour will naturally change if prices are increased. But this does not mean people have to stop flying entirely; they would instead simply adjust their actions to an environmentally friendly level. Green drive technology and fuels would also be encouraged.

Environmentally transparent prices are an effective way of protecting resources. It is a different story for another known concept of environmental transformation, which revolves around increasing resource efficiency. The potential rebound effect here means effective protection of resources is not guaranteed; the price reduction resulting from greater technological efficiency leads to more usage, which then negates the positive environmental impact. The supposed allure of the concept of resource efficiency lies in the fact that an eco-friendly lifestyle can be maintained through price reductions, i. e. a 'rebound adjustment' which may give consumers the impression they could live in an eco-friendlier, and incidentally also more comfortable, life if only 'the economy' could have more sustainable production processes. Things unfortunately are not as easy as that, at least not at the start.

The process of achieving an eco-friendly, resource-friendly economy needs to be one of *'tension adjustment'*, in which the social economy is initially shown the environmental boundaries (in terms of price): An adjustment involving in-principle price increases for natural resources, and consequently decreasing prices for environmentally relevant consumables. Real income will drop due to rising prices, consequently reducing resource consumption. This may lead to less growth owing to (not for) the protection of natural resources. But this is only true for the first phase of environmental transformation. In the long term, more efficient technologies will make up for any deficits in wealth. Replacing fossil fuels and environmentally harmful technologies and products also requires a whole wave of innovations and investments, which in turn boost growth. In this respect, resource efficiency must be regarded as a consequence of environmentally transparent prices.

But one problem in terms of the public debate remains: its marketing. Its solutions seem boring and bureaucratic compared to the scandalous fundamental criticism. But marketing will not help; objective debates and solutions need to prepare for a long slog.

Conclusion

The environmental transformation required does not mean inventing new, game-changing economic systems. It is instead about taking appropriate political action based on environmental economic findings, indeed in conjunction with environmental economics: Usage of natural resources needs to be fully factored in.

This is not an easy road because, on the one hand, it involves vastly different industries and fields of politics, such as taxes on pesticides and water withdrawal, on kerosene and diesel. On the other hand, resistance is likely from the relevant industry lobby, which will oppose the associated laws and regulations since environmental taxes mean additional business-management costs. It would be helpful if these associations were able to gain a better understanding. In any case, it would actually be in their interests, so as not to lose legitimacy and social acceptance. But we cannot rely on them adopting this view.

Which is why we are even more dependent on another group in society: the citizens. If we want to achieve environmental sustainability, our most pressing task must be to not only introduce environmental taxes (which will impact us as end consumers to a certain extent), but to vehemently demand these. The associated price increases and economic structural changes should be offset as much as possible through other financial relief and a supportive structural policy to ensure social acceptance. We know that those profiting from the less sustainable status quo will try and stoke fears in these areas. We thus need to be steadfast in our approach – which is why it is all the more encouraging to see the rising awareness of the need for environmental sustainability. That is the capital that needs to be deployed for eco-friendly transformation.⁴⁷

Can liberal democracies afford an ambitious climate policy?⁴⁸

Ottmar Edenhofer & Linus Mattauch (2019)

- 37 This article originally appeared in: R. Fücks & T. Köhler (ed.) (2019). Soziale Marktwirtschaft ökologisch erneuern: Ökologische Innovationen, wirtschaftliche Chancen und soziale Teilhabe in Zeiten des Klimawandels (Berlin: Konrad-Adenauer-Stiftung e. V.): 153–163.
- 38 This is a revised version of an article for the 'Orientierungen zur Wirtschafts- und Gesellschaftspolitik' ('Guidelines for economic and social policy'), published by the Ludwig Erhard Foundation, May 2018.
- 39 Current examples of these widespread views can be found in Wolfgang George's anthology (ed.). Laudato Si. Wissenschaftler antworten auf die Enzyklika von Papst Franziskus (Gießen: Psychosozial-Verlag). The articles by Hans Peter Klein, Dietmar Kress and Martina Eick, for example, appear to only focus on degrading terms such as Market Efficiency, 'Profit interest' and 'Consumerism'.
- 40 'Once people get used to a certain luxury, they take it for granted'. Quoted in Harari, Y. (2014). Sapiens. A Brief History of Humankind (Harper Collins): 98.
- 41 Cf. Pies, I. (2017). 'Unternehmen handeln im öffentlichen Interesse', Diskussionspapier des Lehrstuhls für Wirtschaftsethik an der Martin-Luther-Universität Halle-Wittenberg, 2017-17: 2 f.
- 42 Which is why there is any work for economists at all.
- 43 Cf. Kleinhüchelkotten, S. et al. (2016). 'Repräsentative Erhebung von Pro-Kopf-Verbräuchen natürlicher Ressourcen in Deutschland (nach Bevölkerungsgruppen)', UBA-Texte 39/2016 (Dessau-Roßlau). For information on the issue with further proof, see also Ulrich Smeddinck (2011). 'Regulieren durch Anstoßen. Nachhaltiger Konsum durch gemeinwohlverträgliche Gestaltung von Entscheidungssituationen?', Die Verwaltung, 44 (3): 375–395, 379.
- 44 Already in, for example, Neugebauer, B. (2004). 'Die Erfassung von Umweltbewusstsein und Umweltverhalten', ZUMA-Methodenbericht, 2004/07.
- 45 Cf. Heinrich Böll Foundation and Airbus Group (2016). 'Oben. Ihr Flugbegleiter', Berlin: 15.
- 46 Cf. for example Linz, M. (2016). 'Wie Suffizienzpolitiken gelingen. Eine Handreichung', Wuppertal Spezial, 52.
- 47 We thank Prof Andreas Freytag, Dr. Alexandra Purkus and Ralf Fücks for their valuable input here.

The scope for action on climate policy in liberal democracies is limited by rising inequality. For many politicians, France's 'yellow vest' movement was a portent of the explosive socio-political force that can be generated when climate policy neglects social aspects. At the same time, a new youth movement at the 'Fridays for Future' demonstrations is calling for ambitious climate action. This requires broadening political scope. Liberal democracies are facing the challenge of tackling long-term future tasks, all while rising inequality in income and wealth, globalisation and an upswing in right-wing populist movements are severely limiting the availability of the necessary political means. We believe a bold *reform of the tax system and financial policy* can overcome a triple challenge: Decarbonising the economy, encouraging growth, reducing inequality, and thus strengthening democratic institutions. Though income inequality in Germany is relatively low compared to other countries, environmental policy reforms are being delayed, citing social upheaval. At the same time, there is a definite need in Germany to invest in infrastructure, e. g. the transport sector. Making climate-friendly investments could also boost economic growth.

This contribution explains why rising inequality in income and wealth poses a threat to democratic institutions. Based on this assumption, it demonstrates how national climate-action programmes can be designed to reduce economic inequality. Financial policy reforms need to be efficient and fair, which also requires appropriate communication to bolster trust between the state and its citizens.

In section 1 we analyse the causes of elevated inequality in wealth distribution in Western countries and highlight the potential risks they pose to democracy. Section 2 describes how national climate policy can be successful without increasing inequality and thus jeopardising democracy. On the one hand, this requires sound carbon pricing, and on the other, investments in the infrastructure that unlocks new growth potential. In section 3, we address the conditions needed for a successful sustainable tax and finance policy, before backing the narrative of defending liberal democracies as we look to the future.

The causes of increased inequality and how it impacts scope for action in democracies

Financial inequality within many major economies has risen considerably in recent decades, particularly in terms of the distribution of wealth. The richest percentile has risen by around five per cent since 1980 while the bottom 75 per cent has remained constant at around ten per cent.⁴⁹ If we look at the distribution of wealth in Germany, the bottom third of the population own no assets or have debts; the country's wealth inequality is also high when compared internationally.⁵⁰ It is a similar story for income inequality: The income of the top earners (both the top one per cent and the top ten per cent of income-earners) has risen in China, India, Europe, Russia and the United States since 1980 (in some cases dramatically), while the income earned by the bottom 50 per cent during the same period dropped.⁵¹ In Germany, income inequality measured in gross wages, i. e. before redistribution, has risen over the last few decades, though it has stagnated since 2005.⁵²

The constant lowering of the top tax rate on income and wealth has exacerbated this inequality. The once high rate, which was introduced in many Western countries in the early 1920s, significantly reduced economic inequality. But Germany, where the top income tax rate had been above 50 per cent for decades, gradually began dropping it in

2000 to its current level of 42 per cent (or 45 per cent for very high incomes⁵³). The wealth tax that had for decades been set at between 0.5 and 1 per cent in West Germany stopped being charged in 1997.⁵⁴

Sections of the middle class in Western industrialised nations have recently become globalisation's losers. The last 30 years have seen dramatic income increases for both the world's richest and poor, but this is not necessarily true for poorer people in rich countries.⁵⁵ In industrialised nations, it was primarily highly qualified workers who were experiencing disproportionate increases in their income. This so-called 'skill premium' has been rising sharply in industrialised nations since the 1990s.⁵⁶

We can argue about whether *inequality* also means *inequity*, and at what point this happens. Liberal democracies and market economies have always allowed a certain degree of inequality on two fundamental conditions. Firstly, the inequality in the distribution of wealth and income should reflect different performance contributions ('performance should pay off'). Secondly, fundamental political equality ('every vote has the same weighting in democratic elections') should not be undermined by financial inequality on goods markets, capital markets and job markets. Willingness and ability to pay on markets should have little to no bearing on political decisions. The risks of rising economic inequality for democratic institutions are explained below.

Leading inequality researchers such as Emmanuel Saez and Gabriel Zucman⁵⁷ believe wealth taxes and high top tax rates for income primarily serve to secure democracy, rather than finance state expenses. It is high top tax rates that prevent the formation of economic oligarchies, which otherwise dominate political decisions and thus erode the social contract.⁵⁸ This social contract is critically based on the notion that economic inequality can only be justified if fundamental political equality, capable of ensuring adequate social intra- and intergenerational social mobility, is assured. There is considerable historic evidence to support this. A century ago, the United States charged high

top tax rates to contain economic inequality.⁵⁹ That is to say, the USA's sense of identity revolved around presenting an alternative to the aristocratic, unequal societies of Europe. In war-torn Japan of 1945, US occupying forces introduced a top income tax rate of 85 per cent – just like the one applicable in the USA itself.⁶⁰ Although this top tax rate remained constant for decades after World War II, Japan experienced an unparalleled economic rise, with economic growth that, to this day, very few other countries have managed to achieve.⁶¹ Post-Soviet Russia, on the other hand, introduced a top tax rate of just 30 per cent in 1991 (again using the American model), which was later replaced by a 13 per cent flat-rate tax.⁶² These tax-policy decisions were driven by the Russian oligarchy that existed at the time, and likely significantly helped consolidate Russia's present-day oligarchy.⁶³

Through their research on the United States of the last thirty years, political scientists Martin Gilens and Benjamin I. Page have highlighted that economic elites and lobby groups representing corporate interests have a considerable influence on US government policy, while the average population and broad social interest groups hardly figure at all.⁶⁴ The findings are similar for Germany.⁶⁵ It is clear that many citizens thus feel overlooked, ignored or even muzzled by the elites. Rising economic inequality could have a further negative impact on the average population's already meagre influence on political decisions.⁶⁶

Climate policy as sustainable tax reform

The 2015 Paris Agreement, which is binding under international law, establishes that global warming must be limited to well below 2°C above pre-industrial levels. Yet the international community of states continues to be on a path that will see the average global temperature rise to between 3 and 4°C throughout the 21st century.⁶⁷ Failure to act on climate change poses a tremendous safety risk. Countries could become uninhabitable as a result of droughts, extreme heat or flood-

ing.⁶⁸ Rising sea levels, the associated risk of cities being destroyed⁶⁹ and increasing water shortages are driving up migration pressure in Africa, and this is having a particular impact in Europe. Forced migration, ethnic conflicts and loss of national territory can all lead to failed states, which is why rampant climate change is already regarded as a safety risk for the 21st century.⁷⁰

The community of states is reliant on international co-operation in order to achieve the objectives established in the 2015 Paris Agreement regarding decarbonisation of the global economy – because the agreement focuses on voluntary commitments by national governments, which must be co-ordinated as part of the United Nations Framework Convention on Climate Change.⁷¹ Implementing climate policy at a national level also poses its own set of new challenges; decarbonisation often needs to occur against the backdrop of rising economic inequality in rich countries, and in a context of drastic existing inequalities in poorer nations.

In Germany, greenhouse-gas emissions had dropped by 30.6 per cent by 2018 (compared to the reference year of 1990). The federal government has set itself the goal of reducing national greenhouse-gas emissions by 55 per cent (relative to 1990) by 2030, and by 80 to 95 per cent by 2050.⁷² Meeting the requirements of the Paris Agreement will only be the bare minimum, which is why further climate action will need to be taken in Germany over the next few years.

Discussions about future climate policy intensified in Germany in 2019: The resolutions made by the 'Coal Commission' to phase out coal, a draft act on climate protection, EU obligations for Germany to fulfil in the transport, construction and agricultural sectors, and, finally, a new 'climate cabinet' all attest to the pressure being placed on the federal government to take action – pressure that is being further increased by the 'Fridays for Future' movement. The crux of these discussions revolves around introducing a comprehensive carbon pricing scheme.

Economists agree that carbon prices lower emissions at minimal cost because they are reduced in sectors where it is cheapest to do so. Carbon pricing also sparks innovations that would otherwise have little chance of being successful on markets, such as the storage technologies necessary to develop renewable energy. Yet they have only ever played a secondary role in policy legislation.

Political decision-makers essentially have two arguments against carbon pricing: On the one hand, they claim the prices need to be comparatively high in order to achieve a noticeable decline in emissions, and, as this is not politically feasible for social and economic reasons, environmental and climate policy must rely on technological standards and administrative law. But there is evidence to suggest that carbon prices absolutely do not need to be prohibitively high. Increasing the carbon price from 20 to 35 euros per tonne on the European emissions market would be enough to achieve the national climate targets in the electricity sector by 2030, assuming prices for fuels and technologies continue to follow current trends.⁷³ Conversely, technological standards and bans are not capable of permanently lowering emissions: although it may be possible to stipulate, for example, a road-traffic rule that cars are allowed to use less petrol or diesel per kilometre, emissions will still rise if the number of cars sold increases and/or these cars get ever heavier. If transport emissions are to be permanently lowered, petrol and diesel pricing will be necessary. There are, however, many arguments in favour of combining technological standards with pricing. Most car buyers are not in a position to properly assess mileage over the car's economic lifetime. Technological standards protect customers from losing lots of money when purchasing vehicles.⁷⁴

The state can also order for coal-fired power stations to be decommissioned, but it has long relinquished control over whether the remaining coal-fired power stations increase their capacities in response to rising electricity prices. The plant operators will give preference to administrative law since they can be compensated for their legally enforced market exit. Although it would be fairer to have the plant operators

pay for their emissions based on the 'polluter pays' principle, the existing system of ownership and the distribution of social power urge society to compensate for polluters so that these polluters stop polluting. This is presumably only feasible at a policy level if the distribution-related impacts of administrative law, which favour the polluters, are not visible to citizens. In case of carbon prices, however, these impacts are seen and felt instantly.

Are carbon prices antisocial?

On the other hand, political decision-makers are quick to argue that carbon pricing is antisocial because it hits poorer households harder, i. e. has a regressive effect. This statement is essentially true (cf. Figure 1).⁷⁵ Higher carbon prices do indeed have a harder impact on lower-income households than they do on higher-income households, and are thus regressive. This is due to the fact that, measured on their income, poor households consume more CO₂ than wealthy households: For every euro spent, poor households' consumption is more carbon-intensive, making them more affected by carbon pricing. But it is not just carbon prices that can be regressive; technological standards for cars and buildings also have potentially negative effects on low-income households. The reasons for this become clear when we consider that high-income earners generate more emissions in road traffic than medium-income earners. But both income groups need to pay the same higher car costs resulting from technological standards.⁷⁶

The supposed negative impacts on low-income households are often used shield against any climate policy, when, in fact, a socio-politically blind climate policy increases the divide between income groups. Thus it is no surprise that it is regarded as a project of the urban elites that further burdens the poor – without the elites themselves playing their own appropriate part. In these cases, an ambitious climate policy is doomed to fail. If, however, it is socio-politically fair and effective, it absolutely can be successful.

The state can progressively *redistribute* income from carbon pricing – a design option not offered by technological standards or administrative law. Tax breaks (viz. increased social welfare benefits) or even a flat redistribution of tax revenue can put poorer households in a better position than before the introduction of higher carbon prices.⁷⁷ In other words, it is possible to use the revenue from carbon pricing for tax relief of low-income citizens who would thus end up financially better off as a result of climate-policy reforms.

Household expenditures in carbon-intensive sectors

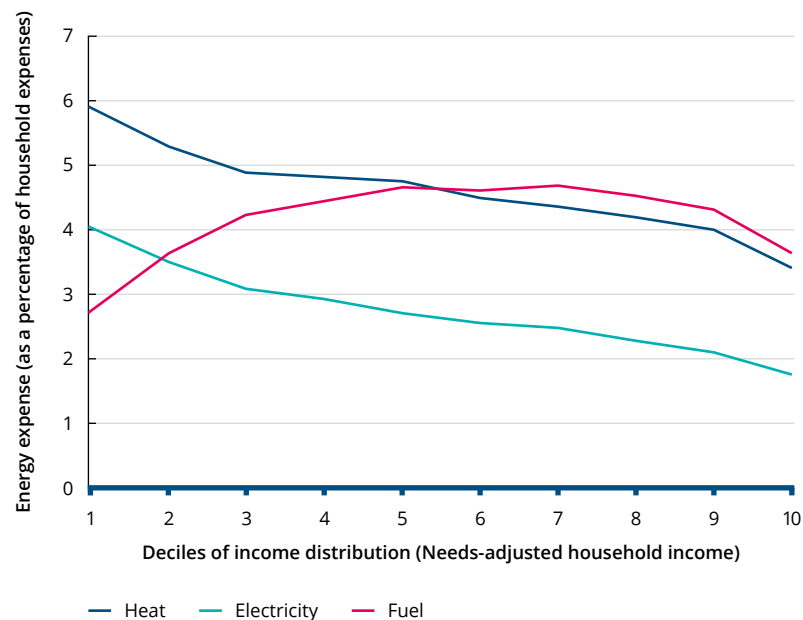


Figure 1: Expenses of German households in selected CO₂-intensive sectors. The households are ordered by income group, from the poorest 10 per cent of households (decile 1, left) to the richest 10 per cent of households (decile 10, right). Own graph based on HBS (2010) Household Budget Survey, Eurostat.

How does one set a cross-sectoral carbon price in Germany? While some of the country's greenhouse-gas emissions are covered by the EU Emissions Trading System (EU ETS), this does not apply to the transport sector, construction sector or agriculture. The current EU climate policy is already threatening to impose fines on other EU member states because Germany is going to fall short of its climate targets in sectors not forming part of the emissions trading system. Germany's finance ministry has already provided the funds for this.⁷⁸ It is expected that higher prices will be paid for the tonnes of CO₂ in the bilateral negotiations between the states than in the EU ETS. But there are doubts as to whether these price differences will hold up over the medium term. It is conceivable that emission allowances from the EU ETS will be credited in the other sectors – something that is already happening in some EU states, but not Germany. This would mean more obstacles for the electricity sector to have to get around, but less for the transport, construction and agricultural sectors. Adjusting prices would not only be imperative for economic efficiency, but also for political legitimacy.

The draft Climate Change Act issued by the German Federal Ministry for the Environment in spring 2019 stipulates specific reduction targets for various economic sectors in order to achieve an overall reduction of Germany's carbon emissions by 2030. This would see the inconsistent prices arising at a European level similarly applied at a national level. As achieving the different sector targets would require varying carbon price levels or unequally expensive technological standards and regulations (higher costs in the heating and transport industry than in the electricity sector), inflexible sector targets could result in potentially explosive socio-political forces (see Figure 1). This is particularly true if, due to the sector-specific targets, carbon prices on the heating market are much higher than on the electricity market. This is why we are advocating more flexible sector targets for 2030 – the emission targets for Germany should be achieved as a whole, not necessarily in a sector-specific manner – and a uniform, cross-sectoral carbon price for the medium term. Various combinations of emissions-trading

and CO₂-management solutions are possible at an institutional level. Though these will not be discussed in detail here⁷⁹, they can also produce the same economic outcome.

Adjusting the sector prices in this way must, however, involve distribution-policy measures in order to prevent the regressive effect of carbon pricing: Lowering the regressive electricity tax is an advisable move, as is providing tax breaks for the rural population. Developing local public transport and electric-vehicle infrastructure right across the country is also necessary: It is the rural population who, in all income groups, are likely to be most affected by carbon prices on fuels in the transport sector (see Figure 1), as they are particularly dependent on car use, and have so far not been able to rely much on public transport. A comprehensive change in transport policy also requires measures to be taken to combat traffic jams and local air pollution. These negative externalities must be internalised using targeted instruments, particularly urban toll systems.⁸⁰

Investments in public infrastructure

In order to achieve an environmentally friendly financial reform, there needs to be a carbon price. But that is not enough as successfully decarbonising the German economy requires considerable infrastructural investments, e.g. in local public transport, public housing and restoration programmes as well as e-mobility charging stations. The framework conditions for long-term investments in the energy, transport and building sector need to change.⁸¹ Power grids thus need to include a high percentage of renewable energies, and land-use planning and building codes need to be adjusted. For example, it is virtually impossible to bring Germany's latest Federal Transport Infrastructure Plan in line with the necessary greenhouse-gas reductions in the transport sector since the drastic reduction in transport emissions cannot be achieved with the current high volumes of private motorised transport. If we use appropriate discount rates and carbon prices as a basis,

Germany has not invested enough in public infrastructure to date. This is particularly true when it comes to the need to renovate the transport infrastructure,⁸² where the German government invests less than the OECD average. The number of gross investments in the national product consequently dropped from 2.5 to 2.1 per cent between 1996 and 2016.⁸³

But how should these infrastructural expenses be financed? Revenue from carbon pricing and energy taxes will not suffice, particularly as the former declines significantly once emissions decrease.

Land tax will be an important source in the tax system of the future. If, for example, someone owns municipal land, they will receive what is classified economically as a 'return' – simply because municipal land is effectively a finite commodity, meaning its value goes up when the city is enhanced with improved infrastructure or other public assets such as theatres or parks. This increases the value of the land without the owner putting in any work to achieve it. Taxing land value leverages this 'effort-free income', which can then be used to finance renovations of the municipal infrastructure. The annual ground rent for German residential properties is already around 85 billion euros, which is double the sum of current public investments.⁸⁴ In the long term, 80 per cent of the increase in property values in the cities of rich countries can be traced back the rise in municipal land values.⁸⁵ Furthermore, for the wealthiest 20 per cent, property makes up more than 60 per cent of their total assets.⁸⁶ Taxing land value would thus have a progressive effect, and reduce inequality in the distribution of wealth.

The limited amount of land in cities means landowners themselves need to pay the taxes, and cannot pass it on to tenants, even if they have claimed these as tenant running costs. If property owners saddled tenants with the tax, this would push housing costs above market-clearing levels: The tenants would then switch to smaller dwellings when their tenancies come up for renewal, and demand would

fall, resulting in some owners no longer being able to lease out their properties. Passing the taxes on to tenants would thus lower net rents (excluding heating) by exactly the additional tax amount to ensure the tenants' housing costs remain the same and the available living space is fully utilised. Empirical studies for the USA confirm that land taxes are borne almost entirely by the owner, and cannot be passed on to the tenants.⁸⁷ This requires an adequately competitive housing market, and rents that are not already below the market-clearing level as a result of regulation. While this is largely the case for new leases, existing leases are heavily regulated and sometimes fall below the market-clearing rent. In this case, the existing leases would not decrease by the amount of the land tax – the landlord can instead pass the tax burden on to the tenant as a running cost. But a change to the running-cost rules can prevent this from happening. Sellers of properties would similarly not be able to saddle buyers with the taxes, because the buyers will factor in the land-value tax and pay suitably less for the property. This also explains why prices drop when property values are taxed.⁸⁸

Although this tax is not part of the agreement by the federal and state finance ministers regarding the land-tax reform, it should be an essential component of modern environmentally friendly financial reform in future. If the return from properties drops as a result of a tax on land values, investments in productive capital will become more profitable, thereby increasing economic growth.⁸⁹ This also applies to carbon prices, as these leverage the return earned on fossil resource ownership. Carbon prices then lead to higher economic growth, insofar as society adequately invests in productive capital.⁹⁰

Beyond this *tax on land*, the financial industry is divided on whether *taxing capital income* can be a good idea. In any case, the industry has traditionally been of the view that taxing return on capital is particularly inefficient and does not reduce inequality, as the wealthy can pass the tax burden on to poorer households.⁹¹ The debate over taxing capital income has gained traction in the public sphere, as many fear

that digitisation could see the wage-income component of macroeconomic added value continue its downward trend, while the capital-income component keeps rising.⁹²

So should capital-income earners not be more involved in financing productive infrastructural measures? Recent financial research has found that the classic objections to taxing capital income can be disproven.⁹³ Capital-income taxes are required when households (as is the case in real life) have limited borrowing ability and cannot insure themselves against unforeseeable risks.⁹⁴ Capital-income taxes can also be used to reduce inequality when savings behaviour varies among social groups.⁹⁵ For example, working households primarily put money aside for their own retirement: They save during their working life, so as to consume in old age. Rich asset-owners, meanwhile, invest in building their wealth across generations. The workers can increase their share in the macroeconomic productive assets if the asset-owners play a greater role in financing public infrastructure. This not only reduces wealth inequality, but also encourages economic growth. On the other hand, using VAT or wage tax to finance state investments does not reduce inequality.⁹⁶ Setting up a *sovereign wealth fund*, which pays out an annual social dividend to workers, could also help workers build their wealth.⁹⁷ The federal government could incur debt on the capital market at relatively favourable interest rates, and the assets could be broadly invested on the share market. As returns on the share market are higher over the medium term, the result is a profit that could be paid out to citizens as a social dividend.⁹⁸

Mature liberal democracies based on a market economy are at risk of degenerating into 'rentier economies' where effort-free income yields high return. Inequality rises and innovation slackens. But rentier economies are not just an economic risk; they are also harmful to democratic institutions. Unstable democracies in turn have a negative impact on innovative capacity and investment security. This could trigger a downward spiral that would turn the politico-economic fear of inequality causing a loss of efficiency on its head.

Communicating an environmentally friendly financial reform

How an environmentally friendly financial reform is communicated is crucial to its prospects of success.⁹⁹ Political decision-makers will have to shift away from the illusion that climate policy is only possible if it is not noticed by the public.

Empirical research on the acceptance of politico-economic instruments has found that there is a high sense of intuitive scepticism amongst citizens when it comes to new taxes, as they do not trust governments to use the funds 'properly'. Reforms that use tax revenue for a specific purpose are thus more popular politically. The revenue from carbon pricing should not be used to cover government debt, but rather to finance tax breaks for citizens. Proposed reforms are also easier to implement if they avoid the term 'tax': Terms such as 'carbon levy' or 'climate dividend' (if the revenue is refunded to citizens at a flat rate) can increase acceptance. Slogans like 'pollutant pricing' or 'polluters need to pay their fair share for climate damage' would be a good way of drumming up more support.¹⁰⁰ The term 'tax' appears to have too many connotations of 'dictating', 'squeezing money out of people' and 'cashing in on people'. It is a matter of conveying that carbon pricing increases wealth because it helps protect against incalculable climate risks. Particularly in times where governments are seen to be losing control, it would appear important to link climate protection with the notion of security and a regaining of control.

Carbon prices also become more popular when the resulting revenue is spent on protecting the environment. This is due to the fact that there is little faith in carbon prices being able to steer the public debate, as consumption of fuels or heating is seen as inelastic – i. e. not very responsive to price changes. The public thus primarily understands carbon pricing as a means of financing climate-friendly investment projects.¹⁰¹ It will be crucial for the public discussion to both emphasise the pricing's strong steering effect and create transparency

over revenue use. It will also be easier to introduce a city toll if the funds are used to develop the local public transport network.

A key factor in these considerations is the fact that political scope for action expands when citizens' trust in political institutions is strengthened. If citizens mistrust politicians and see state institutions as corrupt, it is virtually impossible for climate action to be taken, which in turn leads to higher greenhouse-gas emissions (see Figure 2).¹⁰² Trust is a social capital that enables policymakers to involve various social groups in political decisions, thereby smoothing out political and social tensions.¹⁰³ This capital stock must also be invested in.

Public trust in politicians and carbon prices

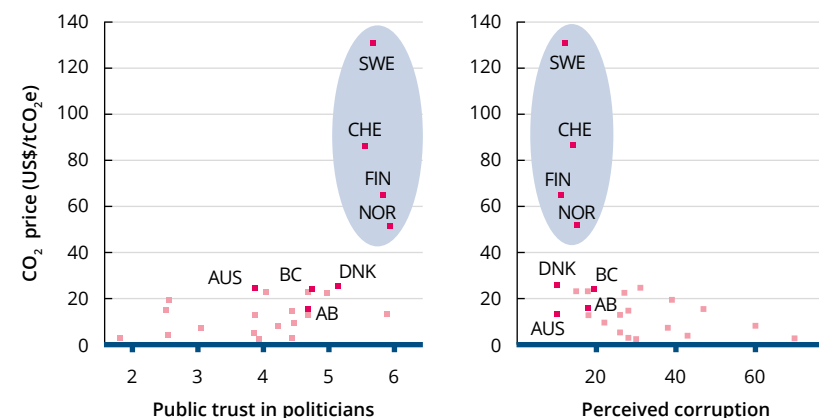


Figure 2: CO₂ prices in selected countries compared against public trust in politicians and perceived corruption (each increasing from left to right). Based on Klenert et al. (2018a). ISO country codes, except for the Canadian provinces: AB, Alberta; BC, British Columbia. Blue ovals denote countries with a CO₂ price above \$40/tCO₂e.

Outlook

Can liberal democracies afford an ambitious climate policy? Many political decision-makers would answer this question with a resounding 'No', claiming democracies need to worry about their survival in the face of populism. It therefore seems less politically attractive to promote international co-operation, focus on pricing external effects, and reduce inequality by taxing effort-free income. Citizens, the explanation continues, would reject this kind of financial and climate policy as too much of an interference with their individual civil rights and liberties.

But our contribution shows that the title question is the wrong one: It is precisely rampant climate change that would jeopardise individual freedom and thus undermine trust in democratic institutions, because it will lead to further loss of state control. We therefore propose reforming financial and tax policy: An environmentally friendly financial reform can secure freedom and wealth, while simultaneously reducing inequality and emissions. With well-designed carbon prices, land-value taxes and capital-income taxes, this is an achievable goal. Building wealth broadly across society can ensure acceptance of the market-economy system.

A new sustainability narrative needs to show that social actions, international co-operation, and deliberation are possible, even in a polarising society. Affirming national, ethnic and religious identities does not have to come at the expense of social co-operation and integration. Eco-friendly modernisation of the Social Market Economy is an alternative to an illiberal democracy that places solidarity and international co-operation under the general ideological suspicion of enabling elites to assert policy against the interests of the majority. This must be countered with a narrative that advocates ambitious climate action in liberal democracies, which will in turn emphasise the fact that, without sustainable climate action, liberal democracies will not be able to fulfil their responsibility to future generations, and will further lose support and acceptance.

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The Social Market Economy – the right model to combat climate change and ensure resource security



Renewing the Social Market Economy ecologically The socio-ethical perspective¹⁰⁴

Arnd Küppers (2020)

By its core the Social Market Economy is not just a pragmatic *Ordnungs-
theorie* but also a socio-ethical concept. The classical fundamental idea
of the Social Market Economy is, by Alfred Müller-Armacks much cited
statement, 'to combine the principle of freedom on the market with
that of social balance'.¹⁰⁵ Today we are facing the challenge of imple-
menting ecological sustainability as a third element into this successful
economic concept.

As much as in the historical beginnings of Social Market Economy, the
key challenge for its ecological renewal is to establish the socio-ethical
imperative with the necessary regulatory political acumen. For what
Erich Kästner wrote about morals is equally valid in the area of political
action: 'There is nothing good/unless: one does it.'¹⁰⁶ Albeit putting this
principle into effect is incomparably more difficult in politics than it is
for the morally acting individual. Since politics is about setting rules
and frameworks, about regulating and governing a multitude of singu-
lar cases and individual choices of action. Hence not just the immedi-
ate consequences, but also the indirect, unintended side-effects have
to be taken into consideration for each political decision. And not least,
political decisions in a democracy require the consent of the largest
possible majority of citizens. The Social Market Economy with its regu-
latory ethical and regulatory political conception provides proper pre-
requisites to meet these challenges, even in the light of the ecological
transformation as task of the century.

The regulatory ethics of the Social Market Economy

The specifically German version of the Social Market Economy as an economic order has its roots in the lessons drawn from the failure of the first German democracy, the Weimar Republic, and the dismay caused by the Nazi terror-regime. The leading idea providers and pioneers of the Social Market Economy stood in opposition to Hitler's regime, above all Walter Eucken (1891–1950). As early as in 1933, by then economics professor at the Freiburg university, he led the opposition against Martin Heidegger, who, as the new rector, intended to bring the university into line in the spirit of National Socialism. Until today, the term 'Freiburg School' is standing synonymous with the theoretical foundation of the Social Market Economy, drafted by Eucken: the concept of *ordo-liberalism*. What is less known is that Eucken was one of the leading members of the 'Freiburg Circle' – a Christian resistance group. In response to the request of Dietrich Bonhoeffer in 1943, he and some fellow members of the circle wrote a memorandum which was meant to be presented at an ecumenic world church conference planned for the post-war period as a roadmap for the political and societal reorganisation of Germany. The passage about the economic and social order, primarily written by Eucken, already offers a concise summary of the *ordo-liberal* concept of the Social Market Economy. According to their own statement, the authors aim 'to give a Christian justification for the foundations of the socio-economic ethics.'¹⁰⁷

The concept of regulatory politics as an originary central component of the Social Market Economy thus is based on a genuinely ethical ambition. And this socio-ethical foundation cannot merely be accounted to the specific background of the paper's emergence in 1943 but runs through Eucken's entire oeuvre until the end of his life. As he writes in his posthumously published 'The Principles of Economic Policy', a sort of agenda for the Social Market Economy: 'The order should be of a kind to allow the people a life according to ethical principles.'¹⁰⁸ And elsewhere it says: 'It must not be demanded from the people, what only the economic order can provide: to create a harmonic balance

between individual interest and common interest.'¹⁰⁹ Hereby Eucken phrases an ethical principle which in social ethics is reflected as the Principle of the Common Good.

Laudato si': Ecological transformation as a precept of the (global) common good

Considering the climate change, if any, the ecological renewal of our economic system is one of the most pressing demands of the common good. Which is also the general thrust of Pope Francis' encyclical 'Laudato si'', published in 2015 and celebrated even by the two world's most important scientific magazines: 'Hope from the Pope' was the headline of *Nature's* editorial from June 25, 2015. And, one week later, Marcia McNutt, editor in chief of the magazine *Science*, called Pope Francis 'currently our most visible champion for mitigating climate change.'

In *Laudato si'* Pope Francis is promoting an integral approach and finds 'the need for an 'economic ecology' capable of appealing to a broader vision of reality.' (*Laudato si'* 141). And he stresses, that 'an integral ecology is inseparable from the notion of the common good' (*Laudato si'* 156). At this point he refers to the classical definition of the common good from *Gaudium et spes*, as 'the sum of those conditions of social life which allow social groups and their individual members relatively thorough and ready access to their own fulfillment' (*Gaudium et spes* 26).

From *Laudato si'* Peter Cardinal Turkson, prefect of the Dicastery for Promoting Integral Human Development, draws three concretions of this abstract ethical principle.¹¹⁰ First: climate change is threatening the livelihoods of the entire mankind, particularly those of future generations. Therefore, it is particularly this challenge, which makes us aware that the 'notion of the common good also extends to future generations.' (*Laudato si'* 159). Second: 'In the present condition of global society, where injustices abound and growing numbers of people are

deprived of basic human rights and considered expendable, the principle of the common good immediately becomes, logically and inevitably, a summons to solidarity and a preferential option for the poorest of our brothers and sisters.' (Laudato si' 158). Third: climate change is caused by worldwide emissions and is threatening the entire mankind. Hence, when it comes to ecological transformation, it is not sufficient, to only focus on the own national economy and the national common good, as it is the 'global common good' (Laudato si' 169), which has to be looked at.

It is probably this imperative, to think and act beyond the national economy and in a global scale, which differs most clearly from the challenge the pioneers of the Social Market Economy were facing after the Second World War. Two consequences result from this: Firstly, overcoming climate change requires multilateral action. Even if Germany managed to transform its own national economy into climate neutrality in the shortest time period, it wouldn't affect climate change at all, if it wasn't for the other countries undertaking considerable efforts as well. Certainly, a strong national economy can and should take a pioneering role in the transformation process, and Germany does so. Yet one has to be aware, that the German example is receiving significant international attention, which leads to a second consequence: Success or failure of the German transformation process will make a decisive contribution to other countries intensifying their endeavors – or not.

This means: if – and only if – the change towards a sustainable energy supply succeeds, with Germany remaining a competitive economic site with a strong industrial core, and furthermore the German social model of overall prosperity remaining in force, the Ecological and Social Market Economy can become a role model for other countries, as the 'old' Social Market Economy was and still is. The Council of the Protestant Church in Germany and the German Bishops Conference emphasize on this in their Ecumenic Social Initiative of 2014: 'It takes a worldwide effective and fundamental transformation of business- and lifestyles, to maintain a high quality of life also for future generations.

This demanding transformation process will only succeed, if the new objective of ecological responsibility is being combined with the traditional principles of market freedom and social balance. This is the necessary and quite conflictual plurality of goals of the Ecological and Social Market Economy'.¹¹¹

Ecological Regulatory Politics for the Renewal of the Social Market Economy

As shown above, the Social Market Economy has a socio-ethical basis and is oriented to the common good. This fundamentally distinguishes it from laissez-faire-capitalism. The second essential characteristic of the Social Market Economy is the pursuit of common good objectives not through state interventions and governance, but regulatory politics. The aim of regulatory politics is to shape an economic environment that provides incentives for the market actors to refrain from behaviours detrimental to the common good objectives and instead to behave in ways which contribute to their achievement. Beyond this regulatory political framework, direct state interventions into the market should preferably be omitted in order not to disturb the price mechanism.

Therefore, the Social Market Economy relies on 'competition as a discovery procedure'.¹¹² In regard of the ecological renewal of our national economy this means that policies should set clear targets, such as reduction quotas for certain emissions – but without unilaterally determining specific methods and technologies to achieve them: this would amount to a 'pretence of knowledge'¹¹³ which ignores the historical lesson that in a competitive market, suppliers usually find more efficient solutions than the government and administration.

Hence regulatory policy based on the ecological renewal of the Social Market Economy relies on competition to achieve its goals. For market competition to function properly, a functioning price mechanism is required above all. Eucken calls it 'the basic principle of economic

constitutional law'.¹¹⁴ Consequently, the regulatory political means of choice is to implement the ecological objectives into the price system. This does not at all imply a manipulation of prices – quite the contrary. Eucken already discussed this under the heading '*Wirtschaftsrechnung*' (economic accounting), a term he uses to denote that a functioning price system coordinates the economic calculations and interactions of individual producers and consumers, 'lead[ing] to a meaningful account of the overall economy and to a sufficient management of the overall process. This is the basic idea of the competition regime'. Even though Eucken was convinced that this mechanism is functioning very well, he also already realised that it 'does not take into account the repercussions, which microeconomic planning and conduct have on macroeconomic data – if these repercussions are not to be perceived in the own planning area of the individual management'. As an example, he cited the 'destruction of forests in America, which deteriorated soil and climate of large areas'.¹¹⁵

Modern economics calls this 'external effects'. One current regulating principle is for market prices to reflect the macroeconomic costs or benefits which occur as external effects so that individual market actors consider them in their decision making.¹¹⁶ Regarding the Catholic Church's social doctrine, Pope Benedict XVI. included the regulatory principle of the 'internalisation of external effects' in his encyclical '*Caritas in veritate*', published in 2009, as a socio-ethical precept: 'It is likewise incumbent upon the competent authorities to make every effort to ensure that the economic and social costs of using up shared environmental resources are recognized with transparency and fully borne by those who incur them, not by other peoples or future generations' (*Caritas in veritate*: 50). His successor, Pope Francis, expressly reaffirms the demand in *Laudato si'* (see *Laudato si'* 195). Applied to climate policy, this means to charge a price on carbon emissions either by taxes or an emissions trading system. 'These instruments translate the scarcity of the common good atmosphere into the 'hard' language of the markets oriented on profit maximisation and provide them with the necessary ethical framework'.¹¹⁷

Conclusion: The Social Market Economy's Power of Renewal

Climate change is felt worldwide, and its pace of its progression undoubtedly gives cause for serious concern. Some react with fatalism, others talk about a 'state of ecological emergency' and – necessity knows no law – call for rebellion and radical system change. This is not a promising alternative indeed, but fortunately the history of the Social Market Economy shows yet another way. After the Second World War, Germany was in ruins, morally as much as economically. The rapid reconstruction and recovery of economic power and prosperity was soon celebrated as the German '*Wirtschaftswunder*' (economic miracle). Yet this was no miracle, but the success of the Social Market Economy, with its clear regulatory ethical compass and its regulatory political instruments. Apart from economic efficiency, the regulatory ethics of the Social Market Economy also includes social justice and, going along with it, social consensus as decisive criteria for regulatory policies. This is precisely what Alfred Müller-Armack meant when he named the Social Market Economy an 'irenic formula'.¹¹⁸ Applied to climate policy, politicians need to consider not only the "steering function" of measures such as carbon pricing, but also normative and distributive impacts, such as a socially viable distribution of their costs. In combination with the aim for compromise and consensus, the Social Market Economy can make its contribution to curbing the populist hysterics and agitators in our midst.

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Climate Change, Digitisation and Globalisation – does the Social Market Economy need Renewal?¹¹⁹

Martin Schebesta (2020)

Introduction

The Social Market Economy has proven to be a stable and successful economic and social order. In light of current challenges, however, there are increasing calls for a renewal of the Social Market Economy. This has come out most clearly in discussions on climate change: some claim that the Social Market Economy would need to be refined to a "Eco(logical)-Social" Market Economy to be able to address climate change.

Whether climate change, digitisation, globalisation and addressing a pandemic – the key debate is whether the Social Market Economy is up to date viz. in a position to address economic and social challenges of our time. This paper argues that the instruments of the Social Market Economy must be adapted to current challenges – yet the values and principles of the Social Market Economy are timeless. The exact policy design is up to societal negotiating processes.

Part I: Foundations of our economic and social order: Social Market Economy as a free, evolving order

The conceptualisation of the Social Market Economy as an economic and social order mainly took place in the 1940s to 1960s. At the time, many of the present-day challenges such as climate change, digitisation and globalisation were not yet foreseeable in their current magnitude. Yet a closer look at our economic and social order shows that the Social Market Economy is timeless and adaptable.

The Social Market Economy is not merely a free market economy with a “social appendix”, but rather a normative model where human beings and their freedom take centre stage. The purpose of this economic and social order is to “link the principle of freedom on the market with that of social balance”.¹²⁰ Human beings are regarded as God’s creation and thus entitled to freedom and responsibility. Human dignity constitutes and limits human freedom: the state should trust its citizens to develop their freedom and empower them to do so, but at the same time prevent them from harming others. This requires the state to set rules and ensure compliance. The state is, so to speak, both rule-maker and referee. A democratic state is most capable of this task.

At the economic level, the model outlined above is best realised in a market economy in which a strong state ensures and protects competition. Competition satisfies the (material) needs of consumers most efficiently and creates “prosperity for all”: competition between suppliers ensures good quality at reasonable prices and rising wealth for everyone. In the long term, competition leads to innovation, quality improvements and falling prices. The luxury of today becomes the standard of tomorrow. A good example of this is the development of the mobile phone: whilst the first phones were rather big, unaffordable and not very mobile, the smartphone of today has become an affordable mass product. Competition played a major role in this evolution as producers developed ever better, more functional and more affordable models to please their customers.

By contrast, concentrations of market power and lack of competition tend to hamper progress and cause higher prices. The state has to set a regulatory framework for competition within which economic actors can act freely – it sets the rules and ensures their compliance as a neutral “referee”. Walter Eucken’s constituent principles of competitive order are the corner stone for a functioning competitive order that creates wealth; his regulatory principles define occasions and rules for state interventions in case of market failure or distortions of competition.¹²¹

The regulatory principles – i. e. the tasks of the state – include the preservation of competition via monopoly control and the internalisation of external effects. External effects are third party effects that are not included in the price. The state should internalise these effects – i. e. integrate them into the price mechanism. Further tasks of the state include empowering people to freedom and responsibility – e. g. via education – so that individuals can assert themselves on the labour market and make a living.

Those who are not able to make a living – e. g. due to age or illness – should be able to lead a dignified life through social benefits (solidarity principle). The state or the community provides educational and social benefits for those in need via redistribution of tax revenue. A progressive, fair tax system based on merit is essential: strong shoulders should also bear a comparatively higher tax burden and thereby support the community; those who merit more should, however, still have more disposable income. This form of solidarity is however strictly limited to those who cannot provide for themselves and their families (subsidiarity principle). Freedom, responsibility, subsidiarity, solidarity and orientation towards the common good represent timeless values of the Social Market Economy; Eucken’s principles of competitive order lay the foundation for the economic order.

Despite these values and principles, the Social Market Economy is not a “closed”, set-in-stone concept that can be applied mechanically. Alfred Müller-Armack, who coined the term Social Market Economy,

regarded this economic and social model as “a progressive style, an idea waiting to be given shape”:¹²²

“According to its conception, the Social Market Economy is not complete; it is not a patent medicine that, once it has been prescribed, can be used in the same way for all time. It is an evolving order in which, besides the firm principle that everything has to take place within the framework of a free system, it is continually necessary to emphasise different things, in accordance with the requirements of a changing time.”¹²³

The Social Market Economy must therefore be constantly adapted to new challenges. In other words, the state has to adapt the regulatory framework to current challenges on the basis of the fundamental values and principles of the Social Market Economy.

The Social Market Economy is hence explicitly able to address social problems which go beyond economic issues. Alfred Müller-Armack spoke of a “second phase” of the Social Market Economy, in which economic policy is a means to reaching societal goals beyond satisfying people’s material needs. Among these goals he numbered – back in the 1960s – environmental policy, European integration and development assistance.

A further aspect of this “second phase” of the Social Market Economy is, according to Alfred Müller-Armack, “social irenics” – i. e. the reconciliation of capital and labour, e. g. on the basis of partnership in collective bargaining. Ludwig Erhard, too, aimed to reconcile the interests of interest groups in a concept he called “formed society” – and to prevent politics from being captured by single interest groups. According to him, (economic) policy should be based on the interests of society as a whole as opposed to satisfying contradictory particular group interests. He saw the “formed society” as consisting no longer of classes or groups with contradictory goals, but rather as consisting

of common interests and cooperation agreements. Yet “only on the foundation of a healthy economy can society fulfil its actual and ultimate goals”.¹²⁴ Economic aspects of the Social Market Economy must be taken into account when striving for societal goals and overcoming current challenges.

Part II: The adaption of the Social Market Economy in view of ecological, digital and global challenges

1. Ecological challenges

The evolving character of the Social Market Economy puts it in an ideal position to address present challenges without neglecting its values and principles. The challenge of climate change illustrates this point. Experts largely agree that pricing greenhouse gas emissions is necessary for reaching climate targets. This approach conforms to the Social Market Economy: Walter Eucken’s regulatory principle of “economic calculation” prescribes internalising external effects into the price mechanism. Greenhouse gas emissions constitute external effects as they pollute the environment, cause climate change and thereby impact on third parties. Yet these social costs are not included in the market price. Accordingly, the state should give greenhouse gas emissions a price tag by integrating them into the price mechanism, making environmental impacts of economic activities visible.

Which carbon pricing model is most suitable, however, cannot be derived from this principle. It is still questionable whether carbon pricing on its own is sufficient to cope with climate change or whether other policies such as state research policy must be added. Regardless, these objections do not undermine the appropriateness of our economic and social order, but rather illustrate the need for a societal negotiating process in accordance with the “second phase” of the Social Market Economy that takes economic, ecological and social aspects into account.

Ludwig Erhard's reminder that social goals like a sustainable and greenhouse gas-neutral economy can only be realised on the basis of a healthy economy illustrate the necessity of considering economic aspects when fleshing out the regulatory framework. Equal consideration must be given to economic, ecological and social aspects. Furthermore, it is necessary to remember the reconciling [irenic] character of the Social Market Economy – the Social Market Economy can reconcile the “economic” and the “ecological”, something that appears particularly important in the current polarised debate. The Social Market Economy is thus *per se* sustainable through involving and reconciling economic, ecological and social aspects – and does not need to be conceptually extended to an “Ecological and Social Market Economy”.

2. Digital policy challenges

The case of digital platform monopolies also illustrates that the Social Market Economy is still up to date and is able to give guidelines for addressing current challenges. The market power of large digital platforms (which is sometimes abused) confronts economic policy with new challenges. Although platforms – particularly comparison shopping websites – can intensify price competition between providers or innovative competitors, digital platform markets tend towards enormous concentration of market power and have “winner takes it all” characteristics – to the point where single platforms obtain monopoly status or comprise the entire market.¹²⁵

The fundamental values and principles of the Social Market Economy still exist in digital platform markets. Big platforms only increase prosperity as long as they have to compete with other players. As soon as they abuse their market power, set up entry barriers and “swallow up” smaller competitors in order to prevent competitive and innovative pressure, state interventions in digital markets become necessary. In particular, regulators need to stop market dominating platforms from taking over innovative competitors and to adapt competition law accordingly – e. g. through broadening the assessment basis by

access to data. The current amendment of the Act against Restraints of Competition (“*GWB-Novelle*”) has already implemented this step at the national level. The disclosure of anonymised user data to create a level playing field would likewise lower digital barriers to entry and foster digital competition.

Walter Eucken considered it “necessary to prevent the formation of powerful players, not only to combat individual abuses of market power”.¹²⁶ This seems to apply particularly to platform markets. Current research suggests that the predominance of powerful platforms in “winner takes it all” markets is practically irreversible. Regulators thus need to check whether *ex ante* regulation on top of the *ex post* regulation is necessary – in other words, whether competition authorities should regulate platforms *before* they reach a position of market dominance. An adaptation of the regulatory framework along these lines would be in line with the Social Market Economy.

3. Global challenges

The cases of climate policy and the regulation of digital platform monopolies show that the national level alone is no longer sufficient to meet international and global challenges. Global challenges call for global solutions. According to the subsidiarity principle, competences should remain as close to the individual as possible – yet if a problem cannot be resolved at the individual, family, municipal, regional or national level, the global community comes into play. Phenomena like climate change require European and global solutions.

At the same time, we observe a weakening of multilateralism: protectionism and economic nationalism are gaining ground, global organisations are undermined or by-passed. In particular, the blocking of the Appellate Body as part of the Dispute Settlement System of the World Trade Organisation (WTO) undermines a key pillar in the international trade system.¹²⁷ This also seems to constitute a challenge for the Social Market Economy: protectionism undermines open markets and fair

competition as principles of a functioning competitive order. A “strong state” is necessary for legislation and law enforcement as pillars of the rule of law, but it is lacking at the global level.

Regardless, the principles of the Social Market Economy serve as guidelines. Even without a strong “global state”, commitment to multi-lateral, rule-based trade is indispensable for prosperity. It is necessary to strengthen international organisations in order to achieve a better enforcement of law and, as second best, to implement the rule of law at the global level. More precisely, Germany and other states could form a “coalition of the willing” to initiate the necessary reforms of the WTO and, if necessary, seek plurilateral solutions.¹²⁸ European integration or coordination as part of the “second phase” of the Social Market Economy also offers a possible regulatory solution: only a strong EU can appropriately represent German and European interests in a globalised world. The fundamental values and principles of the Social Market Economy thus remain valid in the context of globalisation and offer solutions to resolving global problems.

Conclusion and outlook

In conclusion, the Social Market Economy still lives up to current challenges. It offers solutions to issues of our time – be it climate change, digital platform monopolies or growing protectionism.¹²⁹ As far as the Social Market Economy’s need for renewal is concerned, it is true that an adaptation of the regulatory framework is necessary. Yet the principles of the Social Market Economy set out an economic, ecological and socially acceptable course. Its actual implementation – e. g. whether greenhouse gas pricing will be by a tax or emissions trading – is subject to societal and democratic negotiation processes. There is hence no need for a new economic and social order – the regulatory framework merely requires adaption that is based on the values and principles of the Social Market Economy. The Social Market Economy is more relevant than ever.

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The Social Market Economy: An outdated model or a blueprint for transformation processes?¹³⁰

An analysis using the example of
Germany's change in energy policy
(*Energiewende*)

Hildegard Müller (2019)

With demographic changes, digitisation, climate change, and a shift in the world's political power structures, a number of profound political, economic and social changes are currently afoot. This causes a sense of uncertainty in many people, and consequently puts traditional notions of social order – and thus also the Social Market Economy – to the test. Election victories by populist parties are a reflection of this, as is a general mistrust of decision-makers from the fields of politics, business or even science. For a political system such as ours, which is geared around a notion of being representative, this can lead to weakness, and, in the worst-case scenario, compromise the capacity for political action. Similar fears can be projected onto key social projects like the *Energiewende*, Germany's change in energy policy, which, between its overriding mission and its partly divergent local acceptance conditions, threatens to lose traction and drive.

Yet, in my view, the Social Market Economy is not an outdated concept in times of radical social change, nor in relation to projects like the *Energiewende*. On the contrary: It is precisely its capacity as an eco-

nomical system seeking to 'combine the principle of freedom on the market with that of social balance'¹³¹ that makes it inherently highly dynamic and adaptable, as this balance requires constant social discourse. On this basis, social conflicts can be less of a crisis and more of a stabilising factor of a liberal system.

The value of battles in the Social Market Economy

The Social Market Economy is, by nature, a system open to a variety of social movements and arguments, and is therefore constantly changing. This will be demonstrated below using several foundations of the 'economics of order' on which the Social Market Economy is based. *Institutions*, i. e. formal or informal rules, play a significant role in this context. The guiding principle of control systems in a Social Market Economy is that of the individual freedom manifested in the ability to have free election decisions. But the Social Market Economy also needs to guarantee individual freedom when it comes to choosing the control systems. This is a notion emphasised by the founder of the theory of justice, John Rawls, who also applies the mutual advantageousness of market processes to the choice of rules.¹³²

Although I believe the principles of the Social Market Economy are set in stone, their development can and must be subject to social change processes. Long-time director of the Walter Eucken Institute, Viktor Vanberg, makes the comment here that reforming the Social Market Economy depends on distinguishing between matters of principle, i. e. the normative paradigm of the Social Market Economy, and matters of prudence, i. e. the institutional arrangements appropriate to this. As such, the normative paradigm of 'individual freedom' requires 'that the affected individual be seen as [...] the source of judgements.'¹³³ This illustrates that great importance is placed on the voluntariness, and thus legitimacy of social transactions or arrangements.

Reflecting on the will of the individual is essential, not only in the Social Market Economy, but also in representative democracies in general. This was a view shared by the recently deceased constitutional law scholar, Ernst-Wolfgang Böckenförde, who said that, while there only needs to be a few representative entities, their actions must prompt reactions by many others. It is in this question-and-answer logic that representatives must keep ensuring their legitimacy.¹³⁴

This clearly demonstrates the fact that the Social Market Economy is in substantial need of maintenance. Bringing its productive drive to bear takes more than just the political will to continually safeguard its conditions. It is also about society constantly battling for answers to the flip side of individual freedom and competition: The supposed lack of market morality, the uncertainty associated with competition and change, or the dissatisfaction with market results deemed to be unfair.¹³⁵ The element of perpetual questioning, criticising and challenging in the Social Market Economy can thus certainly pose a risk, and erode its underlying principles. As Böckenförde's paradox goes: 'The liberal, secularised state lives off requirements that it itself cannot guarantee.'

Nevertheless, individual freedom as the core element of the Social Market Economy remains a highly attractive concept. Ultimately, I believe it is liberal and discursive state and economic systems that have the best chances of finding sound answers to new social and economic challenges like the *Energiewende*.

Global and local acceptance of the *Energiewende*

If we look at acceptance of the Social Market Economy and acceptance of the *Energiewende*, a similar observation can be made: Comparatively high approval at an abstract level that erodes as its effects become more concrete and localised. Here, too, the Social Market Economy is generally recognised as a productive, and comparatively the best, model, though it is also attributed with social shortcomings, particu-

larly social injustice and associated breaches of conceptions of justice. This is focal point of many academic papers examining acceptance of the Social Market Economy.¹³⁶

A similar phenomenon, albeit on a different scale, is apparent in relation to the overarching objectives of the *Energiewende* on the one hand, and its local conditions on the other. For example, approval to develop renewable energy sources has remained at an unchanged high level overall for several years. The latest TNS Infratest studies conducted on behalf of Germany's Renewable Energy Agency have found that 92 per cent of Germans consider the use and development of renewable energy sources at least important. Similar figures were recorded back in 2011 or 2013. 78 per cent of interviewees rate grid expansion as important or very important.¹³⁷ The current engagement by young people as part of the 'Fridays for Future'-movement further underlines the population's widespread support for climate-policy targets.

The *Energiewende* objectives are equally ambitious at a federal political level, namely in the latest coalition agreement. The percentage of renewable energies in total power supply is to be increased from approximately 50 to 65 per cent by 2030, and the expansion and smart usage of transmission grids and distribution networks advanced. At the same time, the expansion into renewables needs to be controlled regionally, and thus better co-ordinated with network capacities. Acceptance should also increase, e.g. by involving municipalities in the added value offered by renewable energy. There is also the prospect of adapting framework conditions for integrated energy, which has been recognised as a key element.¹³⁸

While a coalition agreement is not an actual bill, it is not unreasonable to assume these actions will ensure a high likelihood of the *Energiewende* being implemented or even achieving success. But there is indeed friction at various levels of implementation, which reduces, if not jeopardises, this high likelihood. This will be illustrated below using a few examples:

Conflicts resulting from renewable energy

Given that the costs of expanding renewable energy sources have long been the focus of acceptance-related matters, dramatic cost reductions, among other things, have shifted the debate onto the topic of interference into the landscape. Having to limit one's own living environment as a result of energy-related interventions such as the construction of wind power plants or power lines is discomfiting.

This is most evident in the case of wind energy across the country. Despite higher expansion targets, many wind parks cannot currently be built because they are being complained about or are not even getting approved in the first place. Consequently, various German states are trying – contrary to the federal policy objectives – to enforce a minimum distance between wind turbines and certain areas that well exceed the legal regulations for noise protection. If a distance of 2,000 metres – as is the case in Bavaria – were to apply across all of Germany, the available area would be reduced by up to 97 per cent.¹³⁹ Expansion of the wind-energy industry in Germany would practically come to a standstill. Nearly a third of the onshore capacities tendered in the most recent round have already been impossible to fill due to a lack of supply.

Area is also increasingly becoming a bottleneck for solar power plants. Concerned by the potential for conflict with conservation activities, agriculture or other land usage, legislators significantly limited the areas eligible for larger solar plants, e. g. to sealed-off areas or areas bordering transport routes, from the outset. The rules have not been adjusted for nearly ten years for the same reasons. While the competition is more intense than in the onshore wind industry, it still remains questionable as to whether this can be maintained with an expected tripling of tendering volumes. At a political level, it is a question of focusing more on open-air plants in addition to roof systems, and making eligible areas more flexible. This could reduce the cumulative funding costs for photovoltaic-system expansions by up to 3.5 billion euros by 2030.¹⁴⁰

Grid development

High-performance grids are a prerequisite for developing renewable energy sources, yet even here, acceptance issues have been resulting in delays for some time. This is particularly the case for the expansion of the transmission grid: Of the lines stipulated in the German Act on the Federal Requirements Plan (*Bundesbedarfsplangesetz*), only four per cent had been created, and a further ten per cent approved, by the end of 2018. In 2017, the costs for the resulting measures necessary to stabilise the grid rose to 1.4 billion euros – much to the chagrin of power customers.¹⁴¹

From an economic perspective, there also needs to be a mechanism that minimises the total costs associated with expanding renewable energy sources and the grid. Such a mechanism could efficiently control where systems are built or grids are expanded. It has so far been impossible to reach an agreement on a single efficient instrument, as specific local/regional preferences often take precedence. This 'regulatory inaction' in relation to power grids is a serious problem, in part due to the fact that technical and digital developments are occurring much faster and are thus often not being taken into account.

Focusing on transmission grids also frequently creates a blind spot around another key factor of the *Energiewende*: the distribution network. More than 95 per cent of all renewable-energy plants are connected to this; it is where e-mobility develops, where energy is stored and integrated energy occurs. Substantial efforts are thus needed in order to condition the distribution networks for the sharp rise in volatility in terms of production and consumption. A stronger political focus is needed here so that distribution-network operators can continue to invest, innovations can be incentivised, and opportunities for flexible procurement can be maintained.

Integrated energy

Integrated energy is now considered the key to applying the decarbonisation successes achieved in the electricity sector to the transport and heating sector – because these are where half the energy-based emissions occur. One aim is to increasingly use renewably produced electricity directly, or by converting it to synthetic fuels, to provide heating and transport services. So far, however, this has tended to be done rather mildly: Electricity makes up around 20 per cent of Germany's total final energy consumption. But in terms of heating in individuals' homes, it only makes up eight per cent, and plays a similarly marginal role in transportation at just one per cent. Achieving a 95 per cent reduction in emissions by 2050 will require a clear increase in direct electrification. EURELECTRIC, for example, expects an increase of up to 61 per cent.¹⁴² Indirect electrification – the conversion into fuels – will, however, also have to play a key role.

The large number of affected structures and the complexity of the situation mean the obstacles here are various. One important – causally political – obstacle needs to be mentioned here: Consumption taxes or levies are among the most critical instruments a state can use to set incentives. This particularly applies to energy taxes, which have been pursuing a clear objective of controlling consumption since at least the eco-tax reform. Fundamentally reforming the energy-tax system – e. g. using CO₂ content as the basis of measurement – would constitute a central lever for facilitating integrated energy. Electricity is hit much harder by things like the electricity tax or even the EEG (German Renewable Energy Sources Act) surcharge compared to, for example, fuel oil – and this prevents fair competition between energy sources when it comes to heating. Although this finding is well known, adjustments are yet to be made – not least because they would undoubtedly result in a redistribution of charges for various consumers, which could trigger a pushback and thus be less attractive politically. The 'yellow-vest' protests, which are in part a response to rising fuel prices in France, feed these concerns.

Many other aspects, however, are not causatively political; they are the result of a complex interplay of political, economic and social dynamics. Electromobility – as an integrated-energy technology – is a good example of this. It illustrates that it is not just about relevant signals from policymakers and the automotive industry, but rather also about consumer acceptance of a technology.

The examples show that, while the overarching objectives of the *Energiewende* are generally acceptable, the frictions reduce the speed or likelihood of success. As the *Energiewende* sparks transformation processes at a political, economic and social level, the frictions impeding these also occur on all these levels. In many cases, the general insights and intelligence gained are greater than the capacity for implementation.

Conditions of local acceptance

Work to date has shown that the issue of *acceptance* is a central condition for *Energiewende* success at all levels – be it in the development, implementation or outcome of a measure. It thus is no surprise that this issue is coming increasingly under the spotlight. The following conditions of acceptance are often cited in relation to the *Energiewende*¹⁴³:

Institutional fairness: This particularly refers to the perceived fairness in decision-making, depending on whether it is transparent and open to opportunities for participation. Many consider the *Energiewende* to fall short here, with people increasingly feeling their own lifestyles being hemmed in by political plans or expert opinions.

Allocative fairness: The individual risk distribution, and thus the weighing up of cost and benefit, plays an equally important role. It increasingly refers to the consternation caused by interference with the landscape. In the past, the focus was frequently on distributing the costs of the *Energiewende*. This aspect has gained further prominence in light of the discussion on stronger pricing of carbon emissions.

Experience and awareness: Awareness of the risks of climate change, as well as experience with renewable energy, increases acceptance.¹⁴⁴ It is in this dimension that general patterns of attitude towards environmental aspects also become apparent.

Trust: Trust in institutional and non-institutional arrangements and players is an interdisciplinary condition that influences all aforementioned conditions of acceptance – and is conversely also influenced by these. Little trust is placed in the political system when it comes to *Energiewende* implementation. Expert opinions are often mistrusted here, as even specialists are not always clear on the planning objectives.

The conditions of institutional fairness, as well as trust in decision-makers, especially correspond with the aforementioned comments on the role of regulations and the acceptance thereof in the Social Market Economy. Comparable conditions of acceptance have also been put forward for the Social Market Economy itself.¹⁴⁵ It can be assumed that the shortfalls in acceptance of the Social Market Economy in general terms are similar to those of the *Energiewende* in specific terms.

The *Energiewende* in the systems competition

Among the aforementioned conditions of acceptance, it is this lack of trust in decision-makers that poses a key problem for a political system seeking to be representative, because it creates an area of conflict between a greater need for individual participation on the one hand, and a resulting reduced scope for political decision-makers on the other. This influences the effectiveness of the political system, and thus on the likelihood of implementation (or at least the speed of implementation) of major projects like the *Energiewende*.

These findings of ineffectiveness put the Social Market Economy into a new type of systems competition.¹⁴⁶ A market-based, constitutional, liberal democracy has, to date, proven to be the superior system from

an economic perspective. Yet dynamic economies like China, where fundamental conditions for individual freedom are lacking, are now calling this into question. Centralist systems are increasingly rating positively in terms of their capacity to implement large-scale projects. When it comes to restructuring the economy environmentally, China is increasingly deemed a prime example. Even within Europe, however, the Social Market Economy is already finding itself in intense competition with more authoritarian systems.

Unlike the top-down mechanism of authoritarian systems, the much more participative elements existing in Germany are challenged by *Energiewende* implementation as a result of shortfalls in acceptance. There is frequently even talk of the need for completely different governance approaches and a ‘democratisation’ of the *Energiewende*.¹⁴⁷

Neither this nor any other paradigm should, in its pure form, serve as a model for implementing the *Energiewende*. Instead, consistent reinforcement of the principles of the Social Market Economy should carve out a middle road. While this will involve a spirited and maybe even protracted process to agree on the right objectives, approaches and rules, it will ultimately also ensure acceptance of the final outcome.

Market-based principles: Pleading for a return

A return to market-based principles of control can make the *Energiewende* more successful and strengthen its legitimacy. Both are interdependent. I believe the following principles are particularly essential for a successful *Energiewende*, and should be applied more consistently in policy-making.

Competition and technology-neutrality

Competition is more than just an expression of the possibility of individual electoral decisions; it also facilitates efficient allocation of resources. It is where previously unknown solutions are developed.

The policy approach for an *Energiewende* that is both efficient and innovative must thus be one that formulates only a handful of clear targets, but which enables competition at every turn. This may mean, for instance, not focusing too blindly on certain technologies or discounting other options too prematurely, as has been done repeatedly in the area of power generation since 2011. It is also important to be mindful of non-discriminatory market access; disproportionately privileging civic-energy companies can be just as harmful here as classic cases for market power.

Particularly when it comes to integrated energy, it is clear that an ideal energy system 30 to 40 years from now cannot be designed on the drawing board; it is impossible to predict today what future technology mix will establish itself in view of consumer preferences and cost trends, and it is equally impossible to know what the transformation process to get there will actually look like. The relationships between energy-consumption patterns, transportation and storage infrastructure and energy provision are also extremely complex and dynamic. Technical and digital innovations – as a key factor of the *Energiewende's* success – must be incentivised on the market, but then developed and quality-checked in competition.

The product of a fair competition run in accordance with eco-friendly criteria, and therefore of voluntary individual exchanges, is also less vulnerable than centrally 'prescribed' technologies.

Price transparency

One principle of the market economy is that of disclosing the costs and benefits of specific goods through prices. Environmental economics have found that this principle of efficiently allocating scarce goods also works for environmental common goods (e. g. by pricing carbon emissions). Yet it is precisely energy policy that distances itself so much from it. Despite well-functioning trading of emissions allowances in industry and the energy sector at a European level, policymakers have often interfered – in some cases in an ad-hoc manner – with local

production structures, be it through technology-specific support for renewable energy sources or the flagged phase-out of coal-powered electricity. Though there is no point in further questioning all these decisions at present, the ever more complex energy industry of the future will require even more trust in the allocation function of prices.

The electricity price is a central starting point: State-based components now make up 53 per cent of the end-customer price. These often do not have any incentive effect in terms of energy, but instead skew efficient electricity use, e. g. in the heating or transport sector. This could be remedied by reducing electricity taxes, while simultaneously gearing other energy sources outside the European emissions-trading scheme around their carbon content, so as to factor in their environmental impact. But other qualities also need to be taken into account through markets and incentives, e. g. permanent availabilities or short-term flexibility, which will be increasingly required both by market players and grid operators. In this context, the compromise established as part of the Commission on Growth, Structural Change and Employment should ensure that it does not further encumber electricity pricing components.

Consistency in economic policy

Incentives and the resulting potential for doing away with excessive individual objectives serve to take into account another mission of the Social Market Economy: consistent economic policy. Particularly for long-term investment and consumption decisions, such as those concerning the *Energiewende*, it is crucial that these can be made efficiently and with foresight. This is currently not the case in conventional or renewable power-plant construction, nor when it comes to investment in smart grids. Other decisions would also be made at the consumers' end if a carbon tax were to slowly but steadily rise over the next ten to twenty years on the heating market. Energy-policy and ad-hoc interventions, and the resulting constant need for improvements, on the other hand, come at the cost of trust among consumers and the energy sector.

Pinpointing normative elements

A return to market principles for the purpose of economic allocation in the energy industry does not, in any way, discount normative elements such as environmental targets or concepts of justice. The environmental aspect is itself integrated into market-based rules through the pricing of environmental commons. This also minimises the macro-economic costs of the *Energiewende*, and thus the financial cost to citizens – a fact which in turn involves an aspect of justice and acceptance.

The remaining costs of the *Energiewende* can similarly be distributed more fairly: This is particularly true of the EEG (German Renewable Energy Sources Act) surcharge, which affects low-income households more heavily since these do not exactly purchase less electricity than affluent households. Financing the EEG surcharge, at least proportionately, from the national budget could make for fairer distribution. Concerns surrounding distribution of a carbon tax on the heating market can also be assuaged: If, despite electricity-tax relief, a carbon tax on the heating market puts a greater strain on certain groups of consumers, this can be compensated by direct transfers. Private or commercial customer groups can be defined *ex post* based on factors such as economic productivity or international competitiveness.

In general, normative notions should be systematically pinpointed wherever they least influence market efficiency.

Open markets in an open Europe

All these principles need to be considered within a European context – especially when it comes to the overarching guidelines and objectives. Europe's domestic energy market, which will be further strengthened by the so-called 'winter package', provides an opportunity for effective climate action, which can only be achieved when taken collectively. Focusing on market mechanisms instead of strict regulations would take into account the common fear that countries following the energy policy are subject to *EU dirigisme*. A larger market also provides an opportunity to efficiently allocate the countries' climate-protection

efforts – whether through a common carbon price on the heating market, efficiently controlling the addition of renewable energies/other climate-friendly technologies, or an electricity market connected on the grid side – which not only enables the most cost-effective use of production technologies, but can also boost security of supply. Germany's approach to energy policy has also been a national solo attempt on far too many occasions. The aim should instead be to seek solidarity and reinforce climate-policy alliances – not only for a successful *Energiewende*, but also for a strong Europe.

Conclusion

The Social Market Economy is not an outdated concept – especially not in times of profound social change. It is, by nature, a perpetual social discourse that can and must question not its principles, but rather institutional regulatory arrangements. In this sense, even in times of conflict, we can hope for an ultimately stabilising solution – including in terms of the current dislocation in EU politics. I firmly believe that consistently applying market-based principles can significantly help here, as it is precisely the neglect thereof that causes friction.

The mission to achieve environmental targets fits perfectly with the concept of the Social Market Economy. The major *Energiewende* project is a prime example demonstrating that its objectives can, in many cases, be translated into prices, and that innovative solutions are best developed in a competitive setting. More competitive and thus also localised control elements could considerably contribute to the success of the *Energiewende* – both in terms of efficiency and of ensuring acceptance.

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Carbon pricing as the main policy tool

Carbon pricing: an international overview¹⁴⁸

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Despite the difficult political environment for carbon pricing, especially in emerging and developing countries, the instrument is gaining ground. Numerous international organisations are promoting this development by providing institutional and technical assistance. The extent to which this will be sufficient to bring about effective carbon pricing approaches throughout the world in the medium term remains open, however. Equally unforeseeable are the consequences of the COVID-19 pandemic on future carbon pricing worldwide. While proponents of transformative, green economic stimulus packages would like to internalise the costs of climate-damaging emissions more than before, the COVID-19-related economic losses are an argument for others to question further carbon pricing.

For the partly dogmatic discussion in industrialised countries about “carbon tax vs. emissions trading”, the experience of the European countries and the climate policy framework of the European Union played an important role. This discussion showed that carbon pricing always has a unique national character and that a simple transfer is difficult due to differing economic, social and political conditions. Germany's climate cabinet, which was set up specifically for determining which carbon pricing model to follow, has proposed a correspondingly unique carbon pricing system. According to this, a national fixed-price

system for greenhouse gas emissions in the transport and heating sectors – the energy sector is already covered by the European Emissions Trading System (ETS) – is to be introduced initially, along with other measures, and converted into an ETS via upper and lower price limits. The proceeds from this are to be used, among other things, to reduce the Renewable Energy Sources Act levy (EEG levy) and hence electricity prices.

The discourse on the German carbon pricing approach shows that the outside perspective – beyond the EU – has rarely been included in German and European debates. However, the global perspective is important. Above all, countries in Asia and the Pacific, Latin America and Africa suffer disproportionately from the effects of climate change and/or are among the largest carbon emitters of all and therefore must be given special attention. The following analysis provides an overview.

Asia and Pacific

Despite climate change, the associated increase in weather extremes and numerous carbon pricing policies, carbon pricing has not yet attracted broad public attention in the Asia and Pacific region. The main reasons are the economic development and social heterogeneity that characterise the region. In recent years, for example, strong economic growth and a concomitant increase in energy consumption has led to an increase in fossil energy supply, particularly coal, to meet increased energy demand. This increase in supply has outweighed the expansion of renewable energies in the entire region.

Against this background, carbon pricing mechanisms could be a useful supplement to counteract the increasing greenhouse gas emissions caused by the expansion of fossil fuels. In particular, the Paris Climate Change Agreement of 2015 ensured that many countries in the region included corresponding programs in their National Determined Contributions (NDCs). Australia, for example, has an Emission Reduction

Fund, whose volume was recently expanded. It buys Australia Carbon Credit Units from entrepreneurs, landowners or indigenous people, who can earn them through carbon-saving projects. In China, a national emissions trading system is to be imposed, building on the experience of numerous provincial policies. Its volume could exceed the European ETS.

In Japan, there is a provincially linked ETS between the Tokyo Metropolitan Government and Saitama Prefecture. In Kazakhstan – with interruptions –, South Korea and New Zealand, ETS have been in use for several years and are increasing or have already entered into further trading phases. In the new trading phases, ETS will be more flexible, broader – in New Zealand, even the forest sector is to be included – but also more binding. Singapore introduced the only direct carbon tax in the region and aims to expand it from 2023. In addition, Thailand, Vietnam and Indonesia are currently preparing or investigating the implementation of national carbon pricing.

The carbon pricing mechanisms introduced in the region differ in their concrete design and cover many greenhouse gas emitting sectors. However, they do not slow down, let alone reduce, the overall increase in greenhouse gas emissions in the region. In addition to direct carbon pricing measures, there are numerous other taxes and levies that indirectly increase the price of greenhouse gases in most Asian and Pacific energy sectors, particularly the transport and electricity sectors. However, these taxes are marginal in relation to subsidies for fossil energy sources.

The high political relevance of subsidies for fossil fuels such as coal goes back to the persisting energy poverty in the region. Significant parts of the population lack access to electricity, leaving them cut off from essential every day and increasingly digital services. In 2014, 421 million people in the region had no access to electricity. Subsidies and tax breaks for fossil fuels are widespread as they provide electricity and jobs quickly and cheaply. Their success in reducing energy poverty in recent years legitimises these subsidies and tax breaks politically.

Subsidies for oil and gas have, however, decreased amid price collapses on world markets. But multilateral commitments are also having an impact. The Asian G20 countries in particular have been successful in reducing their energy subsidies. In Indonesia, the combination of a 2013 reform of the subsidy system in the transport sector and low global oil prices led to a significant reduction in subsidies. At that time, Indonesia significantly increased the prices of petrol and diesel within a short period of time in order to reduce the gap to actual market prices. In order to compensate for these price increases, over 15 million households received grants from the state and other benefits in the areas of education and health. The low oil prices led to a reduction in subsidies. In the electricity sector, Indonesia even managed to completely abolish subsidies by cleverly distributing the burden based on income.

Despite these encouraging developments, the level of subsidies in Asia is the highest in the world. In India and China, among others, subsidies in the coal sector have even increased. Subsidies for renewable energies have also increased massively. Almost all countries in the region now have targets for renewable energies, their expansion and/or energy efficiency. The ASEAN regional group of states, for example, wants to increase its energy efficiency by 20 percent by 2020 compared to 2005. However, the share of renewable energies in the overall mix in the Asia and Pacific region remains low and is not expected to significantly increase by 2030.

Although numerous carbon pricing policies have been implemented, carbon pricing is having a hard time gaining a generally positive public perception in the Asia and Pacific region. Growing energy demand and access to energy are the more politically dominant issues. It is therefore not surprising that climate policy did not play a major role in the recent elections in India, Thailand, Kazakhstan or Indonesia. This creates a difficult starting position for politicians.

Unpopular energy price increases due to carbon pricing are hard to convey. However, other political challenges could lead to a rethink.

For example, air pollution has become a pressing public concern, as it poses significant health risks in many Asian and Pacific countries. Identifying the links between air pollution and greenhouse gas emissions could be one approach. Another approach could be the strong expansion of renewable energies in the region, which is perceived primarily as a diversification of energy supply and thus an improvement in energy security. However, the strongest signal for carbon pricing in the region could come from the planned Chinese ETS. Demonstrating opportunities of participation or promoting regional networking could effectively price greenhouse gas emissions. Another important approach is reducing subsidies for fossil fuels which would make renewable energies even more competitive and simultaneously increase regional energy security.

Latin America

Although almost two-thirds of Latin American countries mention carbon pricing instruments in their NDCs, most of them have no *de facto* price for greenhouse gas emissions or even impose negative prices such as subsidies for fossil fuels. This encourages the use of fossil fuels, especially by major oil producers. Tax reforms that reduce fossil fuel subsidies and impose positive carbon prices would not only help to mitigate climate change but also constitute an additional source of public revenue. There are concerns, however, about their distributional effects and impact on various social groups. In addition, the region suffers from informality, inequality, unemployment, bad air quality and often lack of national industries that could invest in renewable energy projects.

Nevertheless, some Latin American countries have taken the first steps towards carbon taxing. In June 2017, the countries of the Pacific Alliance – Chile, Colombia, Mexico and Peru – pledged to step up their efforts to measure, report and verify emissions to identify potential voluntary market mechanisms. In December of the same year, several Latin American governments signed the “Paris Declaration on carbon

prices in the Americas". In this declaration, the signatory states agreed to introduce carbon pricing as a key policy to combat climate change while promoting a common market.

Carbon taxes constitute the main model of carbon pricing in Latin America. Argentina introduced a tax on the greenhouse gas content of liquid fuels and mineral carbon in 2017. The special feature of this tax was that, given the complex macroeconomic context, it aimed to have no short-term impact on the final price of energy products – existing taxes were abolished and new ones added. In 2019, this tax was introduced at the full rate on most liquid fuels; by 2028, it is expected to increase by ten percent per year to 100 percent. While the new carbon tax in Argentina replaced previous taxes on fuels, the introduction in Colombia, Chile and Mexico is designed to increase government revenues.

As part of a comprehensive tax reform package, Colombia has decided to use part of the carbon tax revenue to support peace-building and to protect ecosystems and coastal erosion. This proposal seems to be popular among voters. The inclusion of the carbon tax in a structural tax reform seems to have made it easier to discuss and approve taxes. Costa Rica, on the other hand, has been developing a carbon pricing policy that focuses on reducing air pollution. The proposed carbon tax would cover other air pollutants such as carbon monoxide, nitrogen oxides and particulate matter to promote cleaner and more efficient technologies. Chile is the first country in the region to have introduced a so-called "green" tax in 2017. As in Colombia, this tax was also adopted as part of a comprehensive tax reform and regulates the greenhouse gas emissions of major emitters in the energy and industry sector.

There are also attempts to introduce ETS in the region. In Brazil and Mexico, companies have been participating in voluntary carbon market simulations since 2013 and 2016, respectively. The simulation offers all elements of a regulated emissions trading system and demonstrates

participating companies how such an instrument works. The aim is to provide appropriate inputs for future policy proposals. In Mexico, the pilot phase of an ETS will start in a few months. The regional or even international linkage of ETS initiatives is already being considered, but for now remain dreams of the future.

Nevertheless, the increasing carbon pricing mechanisms in the region offer useful opportunities for cooperation. One example of a more in-depth regional exchange is the Carbon Pricing in the Americas platform. This initiative launched in December 2017 and aims to strengthen Monitoring, Reporting and Verification (MRV) systems, develop common standards, exchange best practices, build capacity, and involve stakeholders. At the same time, it emphasizes the key role of carbon pricing instruments within climate policy.

In most Latin American countries, carbon pricing initiatives have become part of the climate policy mix since 2017 and will likely remain so in the future. While some countries – including Argentina, Chile, Colombia and Mexico – have begun to implement rather far-reaching tax reforms to tax greenhouse gas emissions, other countries are actively exploring how a consumer price index can best be integrated into their climate policy. The question is not IF, but WHEN carbon pricing will cover all greenhouse gas emissions in the region. Therefore, companies and government agencies should prepare themselves accordingly.

At the same time, countries are approaching carbon pricing merely gradually. A strong need for information on the benefits and challenges of using pricing models as policy instruments remains. Existing initiatives have the potential to be expanded in scope, whether in terms of sources or fuels. A transition to an emissions trading scheme, as planned in Mexico and considered in Chile and Argentina, could provide additional market linkages, foster regional integration, and help countries meet their Paris targets.

Middle East and North Africa

In the states of the Near and Middle East, no national carbon pricing policies exist to date. Although the states in the southern and eastern Mediterranean are disproportionately affected by climate change, there is no uniform commitment to mitigate or adapt to the consequences of climate change. Energy subsidies are even widespread in the region. Turkey has been taking a special path of voluntary emissions markets for the past 15 years. The NDC Register of the UNFCCC Secretariat demonstrates diverging priorities in the MENA region. Although the MENA states have joined the Paris Convention in 2016, only 14 governments have ratified it so far, the most recent being the Sultanate of Oman in May 2019.

The NDCs of Gulf states such as Saudi Arabia or Qatar and the North African country Algeria rather emphasise the opportunities of renewable energies for economic diversification. Nevertheless, their economies and thus the prevailing rentier system as foundations of their societies face the threat of declining demand for fossil fuels amid a global commitment to tackle climate change. Morocco and Tunisia, on the other hand, see their commitment under the Paris Climate Agreement as an opportunity for more sustainable development and, above all, independence from energy imports via expanding renewable energies and increasing energy efficiency. Morocco in particular emphasises the gradual reduction of energy subsidies as a control instrument. However, they explicitly point to the need for international financing to cover investment costs. Both Morocco and Tunisia regard integration into international carbon markets in particular and market-based mechanisms in general as a way to access climate investment funds.

In Tunisia, for example, the German Federal Ministry for the Environment supports the National Agency for Energy Management (ANME) in a corresponding project. Morocco has been working on the conditions for introducing market-based climate instruments such as emissions data management and monitoring, reporting and verification of data (MRV) within the World Bank's Partnership for Market Readiness

(PMR) initiative alongside Tunisia, Jordan and Turkey since 2016. The Moroccan government has been insisting on international support for implementation for some time now and is also observing the impact of these instruments on the local economy, particularly on small and medium-sized enterprises. The preliminary findings of the PMR study recommend a "hybrid model", i. e. a combination of a carbon tax and an ETS. The implementation of a carbon tax in the first phase reduces emissions – particularly in the electricity, phosphate and cement production sectors – and builds the basic infrastructure for the gradual transition to an ETS as the second phase of this hybrid model.

Egypt also emphasises the necessity to reduce subsidies in the energy sector, but is the only country in the region to explicitly mention an ETS as a possible instrument to achieve climate targets. In its NDC, Egypt also considers an expansion to a regional ETS, which illustrates Egypt's claim to regional leadership. The NDCs of Middle Eastern countries dependent on energy imports, such as Jordan, also emphasize their high dependence on international funds to achieve their national climate targets. In the Mashrek, the Palestinian Territories are the only ones to mention the potential of market-based mechanisms to finance their climate policies, which are probably difficult to implement amid the political situation in the Middle East.

Turkey is one of the few countries in the world that has not ratified the Paris Climate Convention. Although its INDCs (today's NDCs) set a greenhouse gas emission reduction target of up to 21 percent below *business as usual* (BAU) by 2030, this target represents a 90 percent increase in emissions compared to 2017, or a 348 percent increase compared to 1990. Regarding international climate negotiations, Turkey repeatedly refers to its special status as an "advanced developing country". This special status allowed Turkey to be exempted from obligations to reduce emissions under the Kyoto Protocol. Despite the government's reluctance to commit itself to binding international targets, Turkey is one of the world's prominent recipients of climate financing. For example, it tops the list of recipients of EU climate funding and ranks fifth in terms of international funding. However, Turkey

lacks access to the *Green Climate Fund* so far due to the blockade by G7 countries and China in particular, yet Turkey lists access as one condition for ratifying the Paris Convention.

This contrasts with Turkey's commitment to voluntary carbon markets since 2005. Between 2007 and 2015, the country sold around 35 million tons of certificates worth more than 200 million US dollars, making it the largest supplier in Europe. In 2015 alone, half of all European transactions were conducted with Turkey, a total of 3.1 million tons. Worldwide, Turkey ranks fourth behind the USA, India and Indonesia as a provider of voluntary emissions offset certificates, roughly on par with Kenya and Brazil. Due to falling certificate prices, however, sales had fallen considerably. Most of the certificates originate from wind or hydro-power projects and from methane savings at landfills. In addition to this commitment to voluntary emissions markets, Turkey is working on the conditions for a formal link to the European ETS. However, it remains to be seen to what extent this can become reality.

Sub-Saharan Africa

Countries in sub-Saharan Africa discuss whether they should introduce carbon pricing at the national level. After South Africa introduced a carbon tax in summer 2019, Burkina Faso, Ivory Coast, Rwanda, Senegal and Nigeria are also considering carbon pricing.

There are signs that countries in sub-Saharan Africa are preparing for carbon pricing policies in the medium and long term. However, most African countries' NDCs (35 in total) stated that they would need help from international markets to finance climate protection activities, e. g. via the market mechanisms in Article 6 of the Paris Convention. At that time, the position in the declarations of intent was that countries with low emissions could sell carbon credits on the international market. South Africa is the only sub-Saharan African country to declare intentions to introduce a national carbon tax (which was implemented on June 1, 2019).

Since then, several African countries such as Burkina Faso, Ivory Coast, Rwanda and Nigeria have agreed to implement carbon pricing at their national level. Kenya is working on a platform for emissions trading, but few other African countries are showing interest in introducing a carbon tax or an emissions trading system. Ten countries in sub-Saharan Africa mention carbon pricing in their NDCs. But they do so mainly by selling credits and offsets on the international market.

The NDCs of Kenya, Zambia and Lesotho indicated that these countries do not exclude the possibility of using the international market to achieve climate change targets. Yet only South Africa mentioned a carbon tax and no country mentioned an ETS. Countries such as Madagascar, Angola, Malawi, the Democratic Republic of Congo and Zambia refer to the REDD+ (United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries) concept and list the extent to which different projects in the respective countries are relevant to meeting their climate targets. This underlines the potential for Results-Based Climate Finance (RBCF) and the role of unconventional mechanisms for carbon pricing. Although there was no widespread interest in national carbon taxes or ETS when they wrote their NDCs, they recognised the value of projects e. g. under REDD+ as an important source of finance to realise climate targets.

In summary, where NDCs mention carbon pricing, there is no specific mention of a tax or ETS. Furthermore, the wording regarding carbon pricing is largely imprecise and preliminary. How an official carbon pricing system can be developed at national level remains open. Many declarations of intent are limited to Kyoto-derived, project-based actions, where the domestic value of greenhouse gas emissions is determined by traditional market dynamics. This approach assumes far-reaching international carbon pricing in the future. This strategy is not surprising, as many sub-Saharan countries have only been exposed to traditional strategies to carbon pricing, such as the Clean Development Mechanism (CDM). Research and analysis as to what a more holistic perspective on carbon pricing, especially in Africa, could

include (e. g. RBCF is also missing). There thus is no information that could serve NDCs as a reference for carbon pricing.

Since 2015 when the INDCs were written, discussions about conventional approaches to carbon pricing (carbon taxes and ETS) have increased, but still are missing from official statements – they merely appear in declarations of intent of regional bodies and forums. The *African Climate Week 2019* in Ghana showed that mitigation is not a political priority, as Africa is responsible for only three percent of global emissions. Instead, the event concluded that the focus should be on providing financial resources that benefit the broad mass of the African population and promote sustainable development. Nevertheless, two alliances have recently been formed on carbon markets and climate finance in the region: The *West African Alliance on Carbon Markets and Climate Finance* (WAA) and the *East African Alliance on Carbon Markets and Climate Finance* (EAA). The WAA consists of 16 member states and aims to provide the *West African Economic Area* (ECOWAS) with early access to carbon markets and climate finance through cooperation and support for self-help.

In addition, African representatives of the *Vulnerable Twenty* (V20) Group (the Comoros, Democratic Republic of Congo, Kenya, Madagascar, Malawi, Rwanda and Tanzania) also expressed an intention to introduce regional carbon pricing. Among other things, they call for the abolition of fossil fuel subsidies by 2020 by using appropriate instruments, introducing carbon pricing mechanisms by 2025 and joint efforts to introduce carbon pricing for all emissions. Even in the V20 group, however, it is unclear what carbon pricing actually means. Regarding the NDCs of these countries, it is reasonable to assume that these are projects like the Clean Development Mechanism.

Carbon pricing policies on the regional level – especially in West Africa – as well as initiatives to reduce fossil fuel subsidies seem on the rise, particularly amid the COVID-19 crisis: For example, subsidies on petrol were abolished in Nigeria in April 2020 after the country's oil price had fallen by around 40 percent. The prices are now below

the minimum price previously guaranteed by the government, but it remains open whether the government will renounce subsidies once fossil fuel prices rise again. However, intense analysis of the effects of carbon pricing mechanisms remain necessary before any carbon pricing mechanisms can be introduced at national level. It is questionable whether countries in sub-Saharan Africa would be able to bear the economic costs. Moreover, considerable institutional support is necessary to implement carbon pricing and adapt it to national conditions. Alternative forms of carbon pricing, such as RBCF and the reduction of subsidies for fossil fuels, need to be considered where carbon tax or an ETS is out of the question.

Conclusion

Many countries in Asia, the Pacific, Latin America and Africa use carbon pricing or at least test and develop plans for its implementation, although carbon pricing is neither a popular nor publicly known instrument. The NDCs of the voluntary Paris Climate Convention almost always constitute a starting point.

However, there is a clear difference between developed countries, some of which have already implemented complex carbon pricing regimes such as ETS at national or federal level, and emerging economies, which are gaining experience with voluntary pilot programs that predominantly rely on carbon taxing. In developing countries, however, hardly any carbon pricing approaches have been implemented. Yet some intensely discuss carbon pricing as well as alternative carbon pricing instruments beyond taxes and ETS.

Emerging countries are particularly important for global climate protection efforts. Taken together, they emit the majority of greenhouse gases. Yet they often subsidise fossil fuels on a large scale to provide their population with cheap access to energy. However, the effects of climate change, which have long been part of everyday life in some regions of these countries, do not lead to a political rethink. Secur-

ing energy supply for economic growth as a guarantor of prosperity has absolute priority. The dismantling of subsidies for fossil energy sources is hence difficult to implement, creating a difficult environment for effective carbon pricing approaches. Even the massive expansion of renewable energies in Asia and the Pacific, Latin America and Africa as an alternative to fossil fuels does not seem to penetrate the energy market through competition, although renewable energies are now competitive.

Despite the difficult political environment for carbon pricing, especially in emerging and developing countries, it is gaining ground. Numerous international organisations are promoting this development by providing institutional and technical assistance. At the same time, there are more and more initiatives for regional and supra-regional linking of ETS. The extent to which this will be sufficient to bring about effective carbon pricing throughout the world in the medium term remains open, however. Even in Germany, the federal government faces accusations of not being able to achieve its own targets with the new carbon pricing approach. In the fight against climate change, it is particularly important to take even stronger action against subsidies for fossil fuels and simultaneously create room for energy technology innovation without bans on thinking. At the same time, it is necessary to adapt to the ever-increasing and no longer preventable effects of climate change. Climate disaster prevention is likely to become a central global issue of the coming decade.

148 This article originally appeared under the title "CO₂-Bepreisung: Internationale Impulse für die deutsche Debatte" ("CO₂ pricing: International impetus for the German debate") in the *Auslandsinformationen* (Foreign Countries Information) online, No. 16 (October 2019) and was slightly adapted for this anthology.

Comparing Carbon Pricing Models¹⁴⁹

How can Germany achieve its climate targets sustainably?

Jasper Eitze & Martin Schebesta (2019)

In the discussion on how the German climate targets can be achieved, calls for a more comprehensive carbon pricing are getting louder.¹⁵⁰ Although the European Union Emissions Trading Scheme (EU ETS) already constitutes a carbon pricing system for the electrical and industrial sectors and for intra-European aviation, it only covers about 40 percent of all emissions. The 2009 EU Effort Sharing Decision commits Germany to lowering its emissions in sectors not covered by the EU ETS (Non-ETS area: transport, buildings, agriculture) by 14 percent until 2020 and by 38 percent until 2030 (compared to 2005 levels).¹⁵¹ Germany however might not fully achieve its 2020 targets and could get sanctioned. The Federal budget already assigns 300 million euros to the payment of fines for the period from 2018 to 2020.¹⁵² If Germany also fails to meet its 2030 targets, the fines could go as high as 30 to 60 billion euros.¹⁵³ Two market-based pricing models dominate the discussion on how to avoid this scenario: introducing a carbon tax and expanding emissions trading.

Carbon Tax

Introducing a carbon tax is the most prominent pricing model discussed in Germany and would entail the state setting a price per tonne of carbon emissions that applies to all sectors. As long as avoiding emissions is cheaper than paying the tax, the carbon tax is effective since polluters have incentives to use low-emission alternatives to avoid the tax.

Social viability is however crucial for the tax to work (as the yellow vest protests in France showed). Policy-makers need to be aware that the tax affects lower income groups disproportionately since expenditures on energy, heating and mobility are particularly high relative to income. Thus (partial) compensation of the population seems reasonable. Alternatively, existing taxes or the overall tax burden could also be reduced. Sweden provides a good example: When the local government introduced a carbon tax, it simultaneously reduced asset, capital and income taxes. In addition, companies facing international competition pay up to 60 percent less per tonne.

Switzerland which has also been imposing a carbon tax since 2008 tries to ensure social viability by means of transparency and repaying two thirds of the revenue via health insurance reimbursements. The remaining third is spent on emission reduction policies for buildings and research into climate-friendly innovations. Emissions-intensive companies can also be exempted from the tax by committing to reduce emissions.¹⁵⁴ About 4,000 industrial companies have thereby been reducing their CO₂ emissions by 30 percent since 2001.¹⁵⁵

From an ecological point of view, the biggest shortfall of a carbon tax is that it merely indirectly limits the level of emissions (via incentives). If consumers are willing to pay a higher price, for example due to a lack of alternatives, these incentives could be too weak to adjust behaviour. This is particularly true in the transport sector, where the tax burden in Germany is already high and the existing “eco-tax” barely shows

any steering effects.¹⁵⁶ Some experts thus call for a German carbon tax of 20 euros per tonne to be gradually increased over time (as in Sweden, Switzerland or France). Others claim that a tax would only be effective if set above 50 euros per tonne.¹⁵⁷

A carbon tax should hence meet several objectives: It should establish an appropriate level of taxation that promises the desired ecological effect, be socially viable and maintain international competitiveness. The latter in particular is intended to prevent companies from shifting their emissions, factories and jobs abroad (carbon leakage). A carbon tax should also avoid any additional administrative burden and at best even reduce bureaucracy. Two measures would be crucial to achieve these objectives:

1. Reforming or abolishing other levies and duties, compensating the population in a transparent way and granting exemptions for companies or sectors competing internationally;
2. Setting a taxation level and adjusting it regularly in order to ensure emissions reduction, adequate compensation and achieving climate targets.

Emissions Trading Systems

In contrast to a carbon tax, emissions trading systems (ETS) are designed to cap emissions over a certain scope and period of time. Governmental authorities release allowances that give recipients the right to emit one tonne of carbon dioxide (or equivalent). These allowances are either given out for free, are sold or auctioned. Certificate auctions generate additional public revenue mostly spent on special climate protection schemes (promoting energy efficiency, renewable energies etc.). At the end of the trading period, market participants must hold sufficient certificates to cover their emissions – otherwise sanctions such as fines may be imposed.

An ETS also involves setting up a market for these allowances where demand and supply (rather than the government) determine the carbon price. During a trading period, market participants can buy or sell certificates according to their needs. Over the trading period, the legislator can influence the price by reducing the number of certificates, by determining a minimum price or price corridor, or by changing regulations, e. g. by giving credit for emissions savings realised outside the ETS area. Such interventions should, however, be considered carefully as they potentially increase uncertainty for businesses. Apart from this, the same conditions as for introducing a carbon tax apply.

Among emissions trading systems, there are two main allowance systems that potentially complement one another:

1. **Upstream:** Production companies and fossil fuel importers have to acquire allowances. By passing costs onto subsequent trading stages and eventually consumers, this approach has a similar effect to a carbon tax, the difference being the legislator not setting the price. The advantages of upstream ETS are low administrative and monitoring costs due to the comparatively small number of market participants,
2. **Downstream:** Consumers like power plant operators or car drivers are required to acquire allowances. Compared to an upstream system, this system can be introduced gradually in different sub-markets. In addition, plant-specific or sector-specific exemptions are easier to implement. The main disadvantage of a downstream ETS is the large number of market participants and the resulting administrative costs.

The EU ETS resembles a downstream system. It is the EU's central climate protection instrument for meeting its Kyoto Protocol climate targets between 2005 and 2020 and its Paris Climate Change Agreement targets from 2021 onwards. Critics often argue that the EU ETS prices carbon emissions too low, providing hardly any incentives to reduce

emissions. However, the price for allowances is less a reflection of the EU ETS's functionality rather than the ambitiousness of the emissions cap set. After gradually removing surplus certificates from the market, the price for allowances has been increasing from seven euro at the beginning of 2018 to its current price of 25 euros. Due to the incremental certificate reduction, further price increases should be expected in the fourth trading phase starting in 2021.

Comparison and Outlook: Taxation or Emissions Trading?

Since an ETS "cap and trade"-system limits emissions in line with climate targets, it is considered as an "accurate" instrument from an ecological perspective. From an economic point of view, an ETS will reduce emissions wherever it is most cost-effective. In addition, existing ETS can be integrated relatively easily. The International Carbon Action Partnership (ICAP) shows that the willingness for states to cooperate is greater on emissions trading systems than on taxes. Hence an ETS fosters international trade – an important factor in times of increasing protectionist tendencies. In terms of social viability, allowances auctions generate public revenue that enables regular reimbursements of the population.

Designing a National Emissions Trading System

Given different attitudes among member states, expanding the EU ETS appears to be feasible only in the medium to long term, i. e. not in time for Germany to achieve its 2030 climate targets. Thus a national ETS in Germany (DE ETS) seems more feasible.¹⁵⁸ An DE ETS should be confined to the transport and buildings sectors and initiated as a closed system, i. e. separate from the EU ETS. Although increasing electrification (e-mobility and heat pumps) already leads to incremental integration of the transport and building sectors into the EU ETS, the intentional full integration would hardly reduce emissions in the fore-

seeable future: since costs for reducing emissions are particularly high in the transport sector, transport firms will rather buy up surplus certificates than reduce their emissions. In the medium to long-run, however, the corrective measures adopted in 2018 will remove this surplus. Germany would nevertheless still fail to meet its climate targets in the non-EU ETS sectors. The agricultural sector in particular would also require close coordination in terms of EU agricultural policy.

It would be possible to initially confine a DE ETS to electricity and heat generation not covered by the EU ETS (i. e. small installations in residential buildings etc.). This DE ETS would cover 40 percent of German greenhouse gas emissions in the non-EU ETS-sectors. If the transport sector was also included, this share would rise to 80 percent. In order to make the inclusion of the transport and building sectors feasible, an upstream system should be imposed¹⁵⁹ as industrial sites and refineries are already familiar with the EU ETS.

A downstream ETS would be very hard to implement due to administrative costs for both government agencies and private households. A DE ETS should be compatible with the EU ETS and potentially other EU member states' national ETS. Germany could also become an example for other states to follow. However, a DE ETS based on ambitious climate targets (such as the 2050 climate protection plan) would result in strong price increases, undermining public support unless adequate compensation was put in place. To avoid social distress, public revenue from auctioning allowances should be invested into a special fund (like the Energy and Climate Fund) to fund compensation measures.¹⁶⁰

In conclusion, expanding the EU ETS to transport, building and agricultural sectors – initially in the form of a DE ETS as a transitional solution – seems a better approach than introducing a carbon tax. Both pricing schemes however can be effective market-based instruments, depending on policy design. Given the abolition and/or reform of existing regulations, subsidies, levies and contributions, both models are likely to be superior to the status quo as far as climate policy is concerned.

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- 149 This article was originally published as Eitze, J. & Schebesta, M. (2019) "Comparing Carbon Pricing Models: How can Germany achieve its climate targets sustainably?", Konrad-Adenauer-Stiftung, Facts & Findings, 361 (November 2019).
- 150 "CO₂" refers to other greenhouse gases (GHGs) in addition to carbon dioxide, which are converted to CO₂ equivalents (abbreviated CO₂e) for comparability reasons.
- 151 Moreover, in its 2050 climate protection plan, Germany sets itself the goal of becoming largely greenhouse gas-neutral by 2050. The interim target of reducing greenhouse gas emissions by at least 40 percent by 2020 compared with 1990 levels has clearly been missed; in contrast to the European targets, however, this purely national climate target is neither legally binding nor associated with sanctions.
- 152 Cf. Schlandt, J. (2019). "300 Millionen Euro: Deutschland verfehlt Klimaziele – und muss Strafe zahlen" (300 Million Euro: Germany misses climate targets – and has to pay a fine), Tagesspiegel. <https://www.tagesspiegel.de/politik/300-millionen-euro-deutschland-verfehlt-klimaziele-und-muss-strafe-zahlen/24118596.html> (accessed on 04 June 2019).
- 153 Cf. Agora Energiewende/Agora Verkehrswende (2018) "Die Kosten von unterlassenem Klimaschutz für den Bundeshaushalt: Die Klimaschutzverpflichtungen Deutschlands bei Verkehr, Gebäuden und Landwirtschaft nach der EU-Effort-Sharing-Entscheidung und der EU-Climate-Action-Verordnung." (The costs of failure to protect the climate for the federal budget: Germany's climate protection obligations for transport, buildings and agriculture following the EU Effort-Sharing Decision and the EU Climate Action Regulation.) https://www.agora-energiewende.de/fileadmin2/Projekte/2018/Non-ETS/142_Nicht-ETS-Papier_WEB.pdf (accessed on 04 June 2019).
- 154 The 40 most energy-intensive companies are subject to their own ETS and are in any case exempt from the tax. All other companies can receive refunds by achieving individually agreed targets.
- 155 Cf. Minsch, R. (2019). "Wieso die Schweizer Wirtschaft so viel CO₂ einspart" (Why the Swiss economy is saving so much CO₂), Neue Zürcher Zeitung. <https://www.nzz.ch/meinung/wieso-die-schweizer-wirtschaft-so-viel-co2-einspart-id.1470516> (accessed on 04 June 2019).
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- 159 The Federal Association for Emissions Trading and Climate Protection represents this proposal. A similar upstream integration of transport, households and small industrial emitters (less than 25,000 t CO₂ emissions per year) is used in California, for example.
- 160 Possible compensatory measures would be, for example, generalized reimbursement, an increase in the heating subsidy, a strong tax incentive to renovate buildings (especially for landlords), and obligations to renovate apartment buildings to save energy.

Linking Emissions Trading Systems: Understanding the Barriers to Linking

Luca Taschini (2020)

Carbon pricing plays a central role in delivering broad-based and cost-effective abatement. Worldwide, markets for emission permits, also known as emission trading systems (ETSs), continue to be an important policy instrument in regulating greenhouse gas (GHG) emissions. A patchwork of ETSs, covering almost a quarter of global emissions, are now operational in jurisdictions including the EU, South Korea, New Zealand, China as well as several US states and Canadian provinces. Many more countries have ETSs in the pipeline, including Mexico and Turkey.¹⁶¹

Due to the unequal global distribution of carbon sinks, achieving carbon neutrality in isolation by 2050 will likely remain unfeasible. Integration of these programmes will be crucial in continuing to build the global climate change policy framework.¹⁶² Article 6 of the Paris Agreement encourages the voluntary exchange of emission reduction efforts, opening a new era for international climate action and providing support for the integration of ETSs. Consequently, linkages between jurisdictional ETSs can potentially generate substantial economic benefits by sharing the cost of abatement efforts more efficiently among the participating systems, ultimately generating a uniform linking price. Currently, some jurisdictions are already linked (California and Québec, Europe and Switzerland), will link in the near future after having completed the required negotiations (New Jersey

and Virginia plan to link to the Regional Greenhouse Gas Initiative [RGGI]), or are contemplating a link with an existing system (Pennsylvania plans to link to RGGI in 2022). Linkages can also be made with other types of carbon pricing instruments, such as carbon taxes or regulatory instruments.¹⁶³

Despite the growing amount of literature that presents the sizable economic and environmental benefits that linking ETSs could generate,¹⁶⁴ linking is not a foregone conclusion, as eloquently explained in Doda¹⁶⁵ and rigorously examined in Doda & Quemin & Taschini.¹⁶⁶ Considerable barriers exist that may slow down or even stop the process of ETS integration through linking, and efforts to overcome such barriers can be economically and politically costly.

This chapter reviews the benefits of linking and the costs that may hinder integration of carbon policies. Notably, as neither the benefits nor the costs of linking are distributed evenly across jurisdictions¹⁶⁷, it remains essential that policy makers understand the barriers and carefully consider alternative policy and design options well in advance.

Benefits of linking Emission Trading Systems

The central argument for linking ETSs is maximising overall economic benefits. As linking ETSs increases the quantity and type of abatement options, mitigation takes place where it is cheapest, ultimately achieving lowest-cost emissions reductions across the set of linked ETSs as a result of increased efficiency and market size. In a hypothetical bilateral link, emission permits (hereafter permits) in the low-price ETS are sold to entities in the high-price ETS until permit prices are equalised. Buyers in the high-price ETS benefit from purchasing permits at a lower cost; sellers in the low-price ETS benefit from selling permits at a higher price. Both the costs for individual jurisdictions as well as the overall costs of meeting the collective cap are minimised, assuming both caps remain unaltered. As such, linking facilitates cost-effective-

ness.¹⁶⁸ Also, to the extent that linking reduces permit price differentials across jurisdictions, linking ETSs alleviates competitiveness concerns caused by leakage by discouraging the shift of emissions-generating activities to jurisdictions with less stringent climate policies. Furthermore, linking can provide an opportunity for jurisdictions to increase their level of ambition by taking future linking into consideration when choosing their domestic emissions caps.

The larger markets created by linking ETSs can potentially increase the number of permits, buyers and sellers, raising market liquidity and reducing overall transaction costs.¹⁶⁹ This argument is particularly relevant for those ETSs that alone might not have a sufficient number of active participants and thus may experience a greater risk of sudden price variations. By expanding the size of the market, linking can mitigate the emission permits price variations caused by unexpected shocks¹⁷⁰, and thereby reduce price volatility, although in the process, linking ETSs also can transmit price volatility from one jurisdiction to another.¹⁷¹

On the international stage, linking ETSs can be used to demonstrate climate change leadership and encourage international action. The prospect of linking may allow some countries to exert greater diplomatic influence on those unlinked ETSs – countries – encouraging them to take more ambitious action on climate change. On the domestic stage, linking ETSs shows a cross-border commitment that can create sufficient domestic political support for the selected policy instrument, as well as demonstrating political momentum on carbon pricing more broadly. Once the link is established, so the argument goes, the policy is locked in under future administrations, ultimately reducing the risk of regulatory capture against the ETS.¹⁷² However, for the ETSs that are in early stage of implementation, the lock-in effect might be insubstantial. For instance, neither the upcoming link with the EU ETS nor the participation in the linked WCI carbon market were enough to prevent Australia and Ontario respectively from dismantling their recently launched emissions trading systems.¹⁷³

Barriers to linking Emission Trading Systems

For a given amount of total emissions under the (sum of separate) caps, differences in ETSs permits prices present an opportunity for a linked market to reduce emissions at a lower total cost. Once the ETSs are linked, the reallocation of abatement efforts will eventually eliminate price differentials. In principle, the larger the difference in the price of permits are, the greater the gains from the cost savings for the linked ETSs as a whole will be. Nonetheless, these mutually beneficial cross-border transactions of permits imply substantial financial transfers from the higher pre-linking permit price country to the lower pre-linking permit price country, which can face domestic political resistance in the buying country.

Moreover, countries where permit prices decline tend to see domestic abatement efforts decrease. This may have significant consequences: incentives to invest in domestic low carbon activities and technologies are weakened; emissions of local co-pollutants are increased; potential effects on companion domestic policies designed to tackle climate change can be magnified. In other words, the relocation of abatement efforts across borders implies the redistribution of the potential co-benefits associated with abatement, such as reduced local pollution and greater learning-by-doing in abatement technologies and activities.¹⁷⁴

Linking ETSs also generates distributional issues within each linked country. Buyers in the low-price systems will end up paying more than the price they would have faced pre-linking; equally, sellers in the high-price systems will end up receiving a lower price post-linking. A more level playing field between the linked countries is created at the cost of generating winners and losers in each linked country. A carefully designed mechanism of appropriate transfers is necessary so that those who gain can compensate those who lose. However, the design of these compensation schemes is a complex and deeply political issue.¹⁷⁵ As participants in both systems adjust their behavior to

benefit from the least cost design features of the linkage, each jurisdiction loses some control over the operation of its ETS. Additionally, it should be recognised that, if permits are auctioned, the equalisation of the permit prices can affect the expected fiscal revenue in the pre-link high-price systems.

Post-linking, countries may have an incentive to inflate the number of permits they will issue in the future in order to increase the flow of permits and, consequently, their gains. This could imply greater total emissions when the ETSs are linked relative to the case when the ETSs are separated. Even when the post-link caps can be shielded from such manipulation, there may be post-linking incentives to relax monitoring and enforcement, especially in the countries that expect to be permits sellers.¹⁷⁶

Another barrier to linking arises if the design of the respective ETSs differs substantially. As national ETSs typically reflect their specific domestic circumstances and political objectives, they may have different levels of climate ambition or expectations of the role of the carbon price as a domestic climate policy instrument. Countries can have different preferences with respect to temporal provisions, whether banking and borrowing of permits is permitted; supply control mechanisms that automatically adjust the cap stringency; and cost containment mechanisms such as price ceiling and price floors of the combined price corridors.

Take the example of two ETSs, in which banking is prohibited in one system but permitted in the second. Banking would flow on to the linked system in the same manner as if it were allowed in both systems, as permits become fungible between linked ETSs. Alternatively, imagine the case of two ETSs that both have price collars to prevent permit prices falling below or exceeding given price thresholds. For the sake of argument, assume one country is more comfortable with a relatively low and high permit price, reflected in a broader range for the price collar that contains the partner country's entire price col-

lar range. In this simple but extreme case, the unrestricted linking of the two ETSs implies that the broader price collar becomes irrelevant. Such design contagion may not be welcome in the country that prefers a larger range of possible permit prices.

A final consideration lies in the eligibility and use of offsets. These can pose an additional barrier for linking if they are not harmonised between systems. If both ETSs do not have the same degree of stringency for offsets, the one with the more ambitious design may have its environmental integrity undermined.¹⁷⁷

Overcoming Linkage Barriers

The recent experience with linking ETSs suggests that the potential barriers discussed earlier should be anticipated well in advance. Mutual trust and understanding must be established during the design process, as seen in existing initiatives. The RGGI has a virtually identical ETS design in all participating states. Officials in California and Quebec have worked to harmonise the designs of the two systems under the Western Climate Initiative. Switzerland and the EU signed a linking agreement in 2017, after several years of negotiations regarding the cap and the design of the Swiss system. The link was ratified in 2019 and entered into force in 2020.

Key policy parameters that could pose a significant barrier for linking in political terms should be discussed well in advance of a link being operational. For example, differences in cap stringency that are reflected in permit prices differentials and different coverage of emission-intensive industries could preclude linking of ETSs due to political concerns about financial transfers and competitiveness, respectively. Key ETS design elements that could pose a significant barrier for linking in economic and environmental terms should be negotiated and harmonised during the linkage process. For instance, it would be eas-

ier to link ETSs that have a price floor and price ceiling, or that have neither, than to link an ETS with cost containment measures with an ETS that has no measures.

It is worth noting that a link can be implemented gradually. For example, a price difference can be narrowed by implementing in the lower-price system a floor price that rises over time. When the lower-price system approaches the price in the higher-price system, the link can be implemented. Alternatively, a link where one jurisdiction has constraints on the use of imported compliance instruments can implement a gradual agreement to relax these constraints.¹⁷⁸

Robust Monitoring Reporting and Verification (MRV) systems, registries, and compliance enforcement are essential in maintaining function and reducing potential counting errors in any ETS. These elements are relatively simple to align and do not have to be identical between different systems, as long as measures are comparable and sufficiently stringent.¹⁷⁹

Finally, the success of an established link crucially depends on maintaining the agreed level of compatibility over time in the face of technological, economic and political changes.¹⁸⁰

Concluding remarks

A decision to link ETSs requires a political decision be made by each jurisdiction that the benefits are greater than the linking costs and that the resulting changes to the balance of environmental changes and distribution of costs are acceptable. Given the likelihood of economic, political, and technological shifts, further actions may need to be taken to ensure compatibility and consistency of both ETSs even after a link is established.

While linking ETSs offers significant economic and environmental benefits, economic and political barriers imply that it is not a foregone conclusion. The ability to harmonise various provisions in linked schemes varies, and political preferences rather than economic realities may influence design elements and decision-making policy in the linking process.

Still, the growing potential for ETS linkage reflects a desire for international cooperation as a tool to enhance mitigation ambition and serve as a key policy instrument to deliver the ambition of the Paris Agreement.

Article 6 of the Paris Agreement sets out general principles regarding the voluntary use of internationally transferred mitigation outcomes (ITMOs) toward the implementation of the Parties' nationally determined contributions. Linking ETSs is one form ITMOs can take; others include investment in emission reduction products, technological transfers, and credits from avoided deforestation schemes.

International cooperation through Article 6 has the potential to generate significant benefits. Modelling has demonstrated a cost savings of US \$250 billion by 2030 for NDC implementation, and an additional 50 percent in global GHG emissions reduction of compared to countries acting alone.¹⁶¹

While the implementation and rules have not yet been finalised, Article 6 initiatives and pilots projects have emerged in various countries. A recent example can be found in the bilateral agreement between Switzerland and Peru to operationalise the provisions of Article 6.2 by means of the creation and transfer of ITMOs.

The negotiations about Article 6 are likely to provide a valuable forum for knowledge exchange between those who have established carbon market linkages and those who are aiming for them in the future. Additional initiatives exist that seek to enhance national and jurisdic-

tional capacities and encourage international cooperation in carbon markets in the upcoming decade.

The future of linking ETSs will be shaped by political will and developments in national and subnational climate policy, along with the ongoing conversation at the international multilateral level. Given the potential benefits, it remains an invaluable tool to deepen mitigation ambitions and meet global climate commitments.

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Emissions trading and blockchain

Christian Hübner (2020)

Over the past decades, trading in carbon emission allowances has developed into a practical regulatory instrument used around the world. Today, the individual emissions trading markets in many countries provide a framework for setting incentives to reduce carbon emissions and/or buying emission allowances. A very heterogeneous landscape has developed with a wide variety of emissions trading schemes (ETS). Simple transfer of emission allowances between those markets is usually not possible. Different standards in monitoring, reporting and verification (MRV) are sometimes insurmountable barriers. The last UNFCCC climate negotiations in Madrid in 2019 showed very impressively that a quick solution cannot be expected: it was not possible to hammer out a multilateral agreement on a common emissions trading framework.

Data collection of carbon emissions is a complex process. While it is still relatively easy to quantify energy-related carbon emissions in the large-scale industry, identifying emissions in forestry and agriculture clearly is a more difficult task. There, however, exact quantification and certification is particularly important in order to avoid double counting, for example. The complexity increases even more if, voluntary carbon markets are emerging on top of mandatory regulations like European emissions trading which covers primarily large industrial plants and energy companies. In those markets, companies voluntarily

submit their CO₂ balance sheets and apply appropriate compensation. The respective standards are mainly based on the companies' own obligations, which in turn can be externally specified, e. g. in the form of the Verified Carbon Standard (VCS) or the Gold Standard.

In the meantime, the challenges of carbon emission regulation have also become the subject of digitisation. In particular, blockchain technology has many features that could make carbon emission markets more efficient and put them on a broader footing. The special feature of blockchain and the numerous innovations that have emerged from it primarily is the way it stores and organises data. Basically, it is a digital register where data may be entered. These data cannot be altered or duplicated due to a cryptographic procedure and are traceable and transparent because of its blockwise storage (this is why the method is called block chain). In contrast to conventional databases, the register's storage is decentralised rather than centrally stored, i. e. on several computers or servers of the corresponding DLT network, which can be publicly accessible or restricted to certain users. There is no central authority that checks or verifies the entries in the register. This is done by the network subscribers, who rely on a confidence-building consensus mechanism or protocol (code), which provides security by being independent from central authorities.

A blockchain can therefore map all relevant MRV information of carbon emissions for an ETS in a traceable and unalterable way. In addition, this information can be mapped by means of tradable digital tokens and represent an alternative to non-transparent paper allowances that are prone to manipulation. Companies obliged to purchase allowances, regulators and non-governmental organisations can permanently monitor the blockchain to ensure that all relevant criteria are met. Those transparent carbon tokens could also be traded much more easily on a supra-regional basis. On top of that, carbon tokens could also be distributed to a wider audience. As a matter of fact, every smartphone user could buy carbon tokens and thus make a contribution to climate protection.

A classic business model that has developed around the blockchain-based "tokenisation" of carbon emissions in the voluntary ETS market starts with one single provider of emission allowances. This may be, for example, a forest owner who commits to growing a certain amount of plants or to refrain from clearing a forest, or a renewable energy plant operator. This process of carbon emission avoidance is recorded in a blockchain and issued as a token. The corresponding quantities are offered on a carbon token marketplace and can be purchased by companies which have to prove that they meet their respective obligations. Many companies are already working on the basis of such business models and similar ones, including Climate Trade¹⁸², ECO2¹⁸³, Solar Coin¹⁸⁴ or Carbon X¹⁸⁵.

While numerous startups have discovered the voluntary use of carbon markets as a potential business area, the use of blockchain technology has not yet made it to the mandatory ETS. In principle, the advantages of block chain technology could also be used there, even though the challenges of technical implementation are greater due to the centralised registration of carbon emissions as opposed to the decentralised nature of blockchain technology. A promising development is emerging in this context, at least at the technical level.

Within the framework of the Paris Climate Convention, achieving the nationally *determined contributions* (NDCs) should be possible in the medium-term through intergovernmental cooperation in the form of *Internationally Transferred Mitigation Outcomes* (ITMOs). The World Bank¹⁸⁶ is currently developing a worldwide register based on blockchain technology that could record the ITMOs and enable their exchange or trade by means of ITMO tokens. Hence, the advantages of blockchain technology in terms of interoperability, increased efficiency through automated processes, greater transparency, tracking and verifiability could perhaps provide for the necessary push to global emissions trading.

Although the negotiations on Article 6 of the Paris Climate Change Convention are currently stalled and the use of ITMO tokens is still a long way off, the development of a multilateral ETS on a block-chain basis could serve as a model for mandatory ETS at national level. This way, perhaps voluntary carbon emissions trading could also find its way into the mandatory ETS, thereby reducing existing barriers in the form of missing common standards or lack of transparency.

Overall, blockchain technology has already overcome initial technical obstacles to playing a permanent role in carbon emissions trading. If international climate policy succeeds in establishing binding rules for carbon emissions trading under the Paris Climate Convention, it could also become a decisive technology for global climate protection.

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Global climate policy – prospects and challenges



A social and eco-friendly market economy in a global economy¹⁸⁷

Tanja Gönner (2019)

The Social Market Economy model has been pursued in Germany since the post-war era to control economic growth to ensure the broadest, most sustainable possible social wealth. This approach is based on the principles of ordoliberalism, coined by the Freiburg school of thought. One of its core philosophies is that efficient market mechanisms require a regulatory framework to, for example, counteract concentrations of power and ensure competition. The social and environmental market-economy approach combines ordoliberalism with a system of social security and social balance, as well as with rules and incentives for environmentally sustainable business activities. But the idea of taking environmental aspects into account is more recent than Ludwig Erhard's original model of the Social Market Economy. In times of global markets and global value chains, social and environmental challenges extend well beyond national borders.

As part of the discussions on environmentally reforming the Social Market Economy, this contribution primarily focuses on the question of: Is the institutional framework for national regulatory policy still suitable for largely global markets? And is it possible to further think out the social and environmental market-economy approach to tackle global future-related issues in an environmentally sustainable manner?

National regulatory policy in a globalised economy?

The basic regulatory-policy principles of a social and eco-friendly economy are based on the idea that the state sets a framework within which the market can function freely. This occurs, for example, through competition policy and cartel law, which prevents market distortion caused by monopolies. The social and eco-friendly market economy supplements this framework with minimum social and ecological standards and a social-security system designed to ensure social cohesion and a sustainability-oriented economy. The self-structuring of market players may be utilised here to help the environment, e. g. through free collective wage bargaining or regulatory incentives to internalise external costs. The state can also establish positive incentives for innovating towards more sustainable business models. Ideally, the state-set framework will make it easier for pioneering companies to develop long-term, sustainable business models and become more innovative. But to what extent is a model founded on national regulatory policy and solidarity within a social state suitable in a global economy?

Ordoliberalism assumes that the state can effectively establish a framework for the market at a national level. However, this market is becoming increasingly global, as globalisation involves interlinking national economies through trade and investment relations. Not only does this include trading in finished products, but also globally fragmenting production into individual production stages, which are each performed in different countries with different regulations. In recent decades, we have seen the emergence of these sorts of global value chains, where multinational companies play a key role as 'lead firms'. This raises the question of the extent to which states can influence the actions of globally operating companies through national regulatory policy. How wise is it, for example, to regulate minimum standards for eco-friendly industrial production at a national level if this can only cover a fraction of the production stages because production is spread over various countries around the world with different environmental regulations? There are also fears of a 'race to the bottom' in terms of

social and environmental standards if certain countries try to make a site more attractive to foreign investors by lowering requirements for such standards.

Global frameworks for an eco-oriented economy?

The social and eco-friendly market economy is founded on the assumption that economic players can act freely in accordance with market principles, and that they do this within a set framework of regulatory policy. Based on this logic, the ideal approach would be to define a global framework for the social and eco-friendly market economy, insofar as globalisation limits the effectiveness of national regulatory policy to regulate economic players.

There is an obvious need for a global regulatory framework when it comes to global commons such as biodiversity and climate action. The sole actions of a single state will be ineffective here if, for example, the climate impact of a regulation to reduce greenhouse-gas emissions in one place is nullified elsewhere, through lack of coordination, by higher emissions. Conversely, measures to protect biodiversity in certain countries may be in global interests if these help preserve biodiversity. Solutions to challenges relating to global commons thus require co-operation at a global level. But what might a global regulatory framework look like here? And should it be limited to using and protecting global commons, or should it also include other aspects of social and environmental sustainability in a global economy?

Global agreements to protect global environmental commons already exist, such as the Convention on Biological Diversity, the Antarctic Treaty, the Montreal Protocol on Substances that Deplete the Ozone Layer, and the Paris Climate Agreement. But these agreements do not stipulate any specific guidelines for corporate activity. This requires a national regulatory policy to translate global agreements into concrete regulations for economic players. One example here is that of

the climate targets established in the United Nations Framework Convention on Climate Change (UNFCCC), where the global objective of limiting the global climate's temperature rise to 2 or 1.5 degrees Celsius is to be achieved through national contributions to reduce greenhouse-gas emissions. Implementing this, which includes refocusing the economy in a climate-friendly manner, is thus within the scope of national regulatory policy. This scope for action was broadened in the Paris Agreement compared to the previous Kyoto Protocol, as the countries now make NDCs (Nationally Determined Contributions) to reduce greenhouse gases. National governments are also free to decide which measures are used to achieve the savings, and thus the extent to which this involves ordoliberal market mechanisms or other regulations and incentives for economic players. Climate action is consequently an approach in which global agreements on the protection of global commons provide guidelines for national regulatory policy.

In addition to protecting 'classic' global commons, a globalised economy also results in global responsibility for states and businesses alike. Businesses use resources worldwide, both through transnational investments and through global supply chains. This needs to be sustainable – not just so that a resource continues to be preserved for humanity as a whole (such as in the idea of global commons), but also to prevent local shortages (e. g. a shortage of drinking water). Although local environmental pollution is not directly about protecting a global commons, there is a need for global action when environmental damage occurs within global value chains as a result of consumer behaviour in other countries. Here, too, there are already approaches in place for global policy guidelines, such as the United Nations Guiding Principles on Business and Human Rights and the OECD Guidelines for Multinational Enterprises, as well as initiatives like the UN Global Compact. But more progress has been made in the area of social sustainability than it has in relation to environmental aspects. On the other hand, it still remains to be seen how the maxim that businesses also have global responsibility in a global economy impacts the necessary regulatory-policy framework for a social and eco-friendly market economy.

What might global agreements that set 'guardrails' for environmentally sustainable corporate activity, and which thus prevent a 'race to the bottom' both by businesses and national governments in terms of environmental standards, look like? When it comes to social standards, the core labour standards established by the International Labour Organization (ILO) provide a global framework of reference which a number of countries have committed to implementing through national law, and to which individual businesses or private standard organisations can also refer. Although we are currently still a long way from global implementation, it does act as a set of largely recognised policy guidelines.

In the sphere of environmental sustainability, no such global framework of reference exists for factory-level activities, such as for the handling of hazardous chemicals or for emission limits. While an ILO convention on chemicals management at the workplace was established in 1990, this was only ratified by twenty-one countries, and hardly provides an effective point of reference for national legislation or the private sector in practice. Instead, private initiatives by businesses and civil society have given rise to a series of voluntary environmental standards aimed at defining rules for environmental sustainability in production through different national regulations. But these standards do not contain any uniform requirements for businesses; and they often also only relate to submarkets, such as the 'organic certification' or are restricted to specific sectors, such as the Zero Discharge of Hazardous Chemicals (ZDHC) for limit values in the textile industry.

These different private initiatives are a step in the right direction, but will not suffice on their own to prevent a downward spiral in environmental standards. What is necessary here is a recognised, global framework of reference to which both private standards and state regulation can refer. This could be achieved, for example, through agreements at a UN level, similar to the ILO core labour standards or the Paris Climate Agreement. But even having a global framework of reference will be far from adequate if we want to ensure environmen-

tally sustainable business activities worldwide. The next step rather involves the question of how such a framework can be implemented and monitored, similar to the way we have seen this happen with the core labour standards or the climate agreements.

The role of the social and eco-friendly market economy in achieving global targets

So how could we effectively implement a global framework of reference for an eco-friendly refocusing of the economy? Can the model of the social and eco-friendly market economy help here, or is it long outdated in an age of globalisation?

Global agreements can be implemented through a national regulatory policy that provides a framework for economic players' activities and the market developments in individual countries. In this respect, the social and eco-friendly market economy remains at a national level, but geared around global agreements and minimum standards within which the market operates. In a globalised economy, this sort of international framework can prevent the competitiveness of a country's companies from being negatively impacted by high local environmental standards. Climate targets, for instance, may be achieved through the emissions-trading mechanism. Alternatively, the state can play a more active role and provide positive incentives for reducing emissions, such as through temporary subsidies for renewable energy or climate-friendly technologies. In this case, the model of the social and environmental market economy is used at a national (or European) level to implement global agreements to protect global commons. Global agreements (regulations) and national policy guidelines complement one another.

How can we further develop the social and eco-friendly market economy to cope with globalisation? One option would be to see a global framework of reference as an instrument of global regulatory pol-

icy within which the global market functions. This would be akin to a social and eco-friendly market economy at a global level. For example, private standard initiatives and voluntary commitments by individual businesses could be geared around globally defined minimum standards instead of the many different private standard initiatives we currently have. Voluntary sustainability initiatives in the private sector, consumer demand, and producers being orientated towards sustainable business models can also help with transforming the economy environmentally and implementing global sustainability targets. National regulatory policy would barely play any role in this scenario.

Or is there a potential middle way in which national regulatory policy proactively helps regulate and shape global markets? In the academic literature on global value chains and global production networks, discussions are currently underway on a 'return of the state' in the global economy, i. e. governments having a greater influence nationally on the global activities of market players. For example, the interactions between state and private regulation in global value chains have been the subject of studies and analyses for some time now.¹⁸⁸ This can involve private sustainability standards referring to national labour and environmental laws so as to ensure multinational companies require their suppliers in various countries to comply with local laws, or states accepting private sustainability standards as proof of compliance with legal requirements, as in the case of the EU regulation on renewable energy. This comes close to the idea of a regulatory-policy framework, but fails to take into account the transnational activities of economy players.

It is also conceivable for the state to play an active role in shaping the market, thereby providing positive incentives. Horner¹⁸⁹ argues here that the role of the state in global value chains is increasingly extending beyond regulation, and instead also including aspects such as subsidies and public procurement. Though active state intervention in market mechanisms can run the risk of inefficiency, it can also stimu-

late the economy's own initiatives, for instance by supporting innovative ideas for sustainable business models. Besides temporary subsidies for the use of environmentally friendly technologies, these sorts of state incentives can also include helping establish networks for sustainability initiatives, providing consumer information on product and business sustainability, and taking sustainability aspects into account in public procurement.

The notion of exploring a new interplay between the market and state in a global economy is also evident in the increasingly proactive role being played by some governments, which are trying to use regulation to gain influence over more sustainability in global supply chains.

The example of corporate due diligence

One example of how approaches to social and environmental sustainability can be implemented in global markets is that of establishing national legal regulations for corporate due diligence. These obligate businesses to identify risks in their global supply chains and take appropriate countermeasures. Such approaches are currently attracting increased attention internationally and in Germany. The Modern Slavery Act in Great Britain and the *Loi Vigilance* in France, for instance, require major companies to prove how they tackle social and/or environmental risks in their global supply chains. Since 2015, businesses in Britain have had to provide an annual statement on how they avoid forced labour and human trafficking in their supply chain. And in France, companies not only need to present a plan on identifying and minimising environmental and human-rights risks in their supply chain, but, since 2019, have also had to implement relevant countermeasures based on this plan. Even in Germany, implementation of the National Action Plan for Business and Human Rights has sparked fierce debate over the extent to which a similar legal regulation is required for corporate due diligence.

This example shows the concrete nature of the issue surrounding the role of, and need for, national regulatory policy in a global economy. Global points of reference exist for corporate due diligence in global supply chains, such as the UN Guiding Principles on Business and Human Rights and the OECD Guidelines for Multinational Enterprises, including sector-based guidelines on how to implement these. There are also discussions regarding the prospect of making these guidelines a legal requirement for global market operations at a national level. This would mean that the national regulatory framework for a social and eco-friendly market economy would no longer be limited to just corporate activities within Germany. It would fundamentally redefine the scope of a social and eco-friendly market economy, which uses both global frameworks and national regulatory policy to provide a system within which market mechanisms can function and (global) market players can structure themselves.

It is also becoming clear how important the basic idea of self-structuring and initiative among economic players is in a social and eco-friendly market economy. On the one hand, critics of the UK Modern Slavery Act bemoan the lack of binding character and concrete provisions regarding implementation by businesses. On the other, there are growing fears that excessively rigid state regulations will be impossible to implement, or that sanctions could discourage businesses from complying with due diligence out of intrinsic conviction or an understanding of the business case.

Regulation on corporate due diligence could thus constitute a further development of the concept of a social and eco-friendly market economy. But it is also important to ensure these are devised in such a way that they consider the basic principles of this model. This means finding a balance between state requirements and corporate initiative. Open questions here could include how businesses should prove their compliance with due diligence, and what role membership of voluntary sustainability initiatives and the use of private sustainability standards can play.

Conclusion: A social and eco-friendly market economy in a globalised world?

Although globalisation does bring new challenges, a social and eco-friendly market economy continues to be possible and necessary. But in a globalised world, a national regulatory framework will not suffice to achieve this. There are two main reasons for this: On the one hand, the use of global environmental commons cannot, by definition, be regulated by one country alone. On the other, markets and businesses act globally, meaning a national regulatory framework will fall short. While national regulatory policy continues to be necessary, it must coexist alongside global approaches.

This is why the original model of a social and eco-friendly market economy must be adapted to current requirements. On the one hand, a globalised world needs global (or at least multilateral) co-operation to establish joint targets for social and environmental sustainability. National regulatory policy can then play a role in implementing and further developing this; national regulation can be effective in global markets by being co-ordinated between states.

This ordoliberal interplay between state and market also shifts to the global stage. While states should be involved in preparing global frameworks of reference, the personal responsibility of private players can be utilised to implement these directly at a global level. For example, we are seeing increasing interactions between state and private regulation and joint initiatives to promote sustainable business models within global production networks and value chains. This interplay can help effectively achieve global objectives for a social and eco-friendly market economy in a globalised market.

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Sustainability in Global Supply Chains¹⁹⁰

Arguments For and Against a Legal Obligation for Compliance with Human Rights and Environmental Standards

Veronika Ertl & Martin Schebesta (2020)

Introduction and Background

Global value chains are a fundamental pillar of globalisation, without which value creation would be inconceivable in most countries. They provide opportunities for increasing productivity and wealth, but also present a number of challenges when it comes to compliance with human rights and environmental standards.¹⁹¹ Humane working conditions, child labour, accidents on manufacturing sites and long-term environmental damage have confronted us with these challenges for years. What is more, the current pandemic is making the issue of resilient supply chains more relevant than ever before.

How supply chains can be made more sustainable, and which actors are responsible for this, is increasingly the subject of debate – both at the European and international level as well as in Germany, too. The UN Guiding Principles for Business and Human Rights adopted by the United Nations Human Rights Council in 2011, which have been

included in the OECD Guidelines on Multinational Enterprises, provide a global framework. They define clear responsibilities for states and companies based on three pillars:

1. **Protection:** The duty of the state to protect human rights;
2. **Caution:** The responsibility of companies to observe human rights; and
3. **Redress:** The necessity of enabling victims of human rights violations caused by companies to access complaints mechanisms.

The EU Commission has called on all EU Member States to implement the UN Guiding Principles in national action plans. In December 2016, the German Federal Government adopted the National Action Plan for Business and Human Rights (NAP), which expects German companies to implement human rights due diligence on a voluntary basis. Monitoring is used to examine how many companies from 500 employees have introduced human rights due diligence processes.¹⁹² Following an initial round of surveys in 2019, merely 17 to 19 per cent of companies had fulfilled the conditions. Nine to twelve per cent were “companies on the right track”, two to three per cent were “companies with an implementation plan”.¹⁹³ The second and decisive round of the survey has been running since March 2020. If it transpires that less than 50 per cent of responding companies comply with their due diligence obligations, the NAP and the coalition agreement provide for a legal obligation to be promoted in Germany and at EU level.

Some European states have already adopted statutory regulations, but these vary in terms of scope and design. The French *Loi de Vigilance* goes furthest by obligating companies to monitor human rights and environmental due diligence, as well as clear sanctions in case of non-compliance. The *UK Modern Slavery Act* and the Dutch law against child labour are limited to human rights due diligence. The *UK Modern*

Slavery Act merely stipulates reporting requirements, whereas companies in France and in the Netherlands are obliged to compliance with due diligence obligations in their supply chains. Statutory regulations are being discussed in Switzerland, Austria and the Scandinavian countries. Due diligence regulations already exist at EU level, which refer to specific sectors and/or types of companies¹⁹⁴

Statutory Regulation of Global Supply Chains – Pro and Contra

Against the background of the German and international debate, how is a statutory regulation of supply chains to be assessed in the potential trade-off between political responsibility, corporate due diligence and economic competitiveness?

What Factors Speak in Favour of a Supply Chain Law?

Embedding in the Christian Democratic Foundation of Values and the Social Market Economy

The obligations associated with a supply chain law are based on the Christian concept of humans and its basic principles. The principle of personality, according to which every human is a creature and image of God, justifies human dignity, their rights and duties. Humans are empowered to be free and autonomous, but at the same time bear responsibility for themselves and the common good. They must not be degraded to an object of economic interests. Two obligations are derived in the context of global supply chains: The protection of human rights and compliance with ecological minimum standards to preserve creation as a natural basis of life for coming generations (intergenerational justice). The “Irenic Formula” of the social market economy, “of bringing the ideals of justice, freedom and economic growth into a reasonable harmony”¹⁹⁵, provides the framework for action.

In a social market economy, a state regulatory framework ensures rule-governed competition and creates incentives for achieving goals in the common interest. Economic actors should freely operate within this framework. The internalisation of external effects, e. g. via pricing in social and ecological costs, forms part of the regulatory framework. It corrects competitive disadvantages that arise for sustainably operating companies owing to higher costs for compliance with human rights and environmental standards. In order to ensure compliance with regulatory principles (and the UN Guiding Principles) in global supply chains – in the absence of a “global state” – the national regulatory framework needs to be expanded and adapted to cross-border activities of market actors.¹⁹⁶ The work of international institutions (e. g. investment and trade agreements and multilateral organisations), which set and monitor the key framework conditions for international economic relations, should usefully supplement the above-mentioned measures.

Opportunities and Economic Benefits of a Supply Chain Law

An increasing number of companies also seem to advocate for a statutory regulation of corporate due diligence in global supply chains.¹⁹⁷ This is not only rooted in their value-based vision of themselves, they also expect economic benefits.

A law that clearly defines corporate responsibilities and creates legal certainty through a reliable framework, enables companies to adjust their processes in a more targeted way. Legally regulated proof of having fulfilled due diligence obligations may protect companies against criticism and the associated legal damage as well as that to their reputation. A law also provides companies with a “legal lever” for enforcing minimum standards in their supply chains and generates critical mass by expanding the circle of companies that requires its suppliers to comply with standards. This could make it possible particularly for small and medium-sized enterprises (SME), whose market power is often limited, to implement minimum standards.¹⁹⁸

Origin and production methods of products are more and more important for the consumer, which is what they base their purchasing decisions on.¹⁹⁹ A legal obligation for consistent risk assessment, measures for preventing human rights violations or the breach of environmental standards, and last but not least transparent reporting, strengthen the consumer's trust in companies. Reputational risks decrease, and the image of German brands is protected. In the competition for qualified staff, too, a company's reputation gains importance since sustainability is an important criterion when choosing an employer, especially for younger target groups.²⁰⁰

A legal commitment to human rights and environmental due diligence may also strengthen the resilience of global supply chains by urging companies to carry out more in-depth risk management. It would increase the transparency of supply chains and enable a better assessment of risks pertaining to interruptions and failures. What is more, companies would be more motivated to determine different supply options so as to prevent supply failures owing to violations against the supply chain. This could also help to mitigate risks of failure in the wake of unforeseeable events such as extreme weather or pandemics. The COVID-19 pandemic clearly illustrates the necessity of this.

Compliance with human rights and environmental standards also opens up new financing opportunities. In addition to the classic risk-yield relationship, investment decisions are increasingly taken based on the so-called ESG criteria: *environmental, social, governance*. Regulatory efforts for sustainable finance indicate that ESG criteria will become increasingly important for access to finance in future. Even today, many investors are incorporating the sustainability factor into their decisions. For many investors, corporate due diligence is an important part of risk management, and an indicator for the robustness and profitability of an investment. A statutory regulation and the appropriate reporting could enable companies to prove ESG criteria, increase their attractiveness and expand their financing options.

What Factors Speak Against a Supply Chain Law?

Disadvantages with Competition and in Development Cooperation

Opponents of a supply chain law consider the competitiveness of German companies to be under threat, unless such a law were introduced on the European level at the very least. In order to comply with prescribed due diligence when observing human rights and environmental standards, companies would have to take cost-intensive measures such as risk analysis, prevention measures and the fulfilment of documentation and reporting duties.

As a consequence, price increases are to be expected, which put German companies at a disadvantage in international price competition. We can expect evasive reactions from customers: Particularly for price-elastic products, whose demand reacts particularly strongly to price changes, consumers could switch to cheaper goods from non-compliant, foreign companies. The more extensive the statutory regulation, the higher the costs, prices and potential competitive disadvantages – unless it were introduced throughout the EU or internationally. However, a European or plurilateral regulation could also entail competitive disadvantages for German companies: The German economic structure is shaped by SMEs, who find it harder to bear the cost-intensive measures described above than is the case with large companies.

The dynamic described above could result in long-term damage to the human rights and environmental situation – as paradoxical as it may seem. Companies could avoid potential sanctions under the supply chain law by withdrawing from “risk areas” or shortening their supply chains. In developing countries, that would be accompanied with a loss of jobs, an increase in poverty and a decline in knowledge transfer.²⁰¹ Although foreign companies not subject to the supply chain law could fill the “gap” – this would not improve the human rights situation in developing countries, nor the competitiveness of German companies.

The reference to UN and OECD guidelines as international initiatives for a supply chain law presents weaknesses for two reasons: On the one hand, the UN Guiding Principles refer to human rights aspects, which the individual company can directly and immediately influence or control.²⁰² The UN Guidelines do not therefore directly indicate whether they apply to the entire supply chain. While the OECD guidelines are based on a voluntary approach.²⁰³ The more a German supply chain law exceeds the UN and OECD guidelines, the greater the competitive disadvantage for local companies; unless an accordingly strictly regulated law is introduced in other countries. International coordination and joint legislative measures are thus required in order to compensate for possible competitive disadvantages. It is still too early to assess the national go-it alone initiatives, such as the French supply chain law, since there are still no court rulings from France to assess the repercussions on the competitiveness of French companies.²⁰⁴

Difficulties with Implementation and Responsibility Issues

Yet, even if there were a comparable supply chain law in many countries, there would be justified doubts about the feasibility of such a law: How can companies ensure compliance with human rights and environmental standards along the entire, to some extent strongly fragmented, supply chain?

A complete monitoring of supply chains – for example through constant on-site inspection or meticulous tracing of each individual component – hardly seems practical. That applies to SMEs in particular. Even the state “flagship seal” *Der Grüne Knopf (The Green Button)* does not yet cover all production steps.²⁰⁵ In the pharmaceutical industry, which is already documenting supply chains, the composition of drugs is verified, but not necessarily the conformity with human rights and environmental standards that is eventually difficult to prove. Companies claiming to already comply with due diligence often only check their direct suppliers, which in turn have their own supply chains.²⁰⁶ At present, it still seems very difficult to control all stages of the supply chain.

Moreover, the responsibility for compliance with human rights and environmental standards does not lie with companies alone: Consumers, too, contribute towards improving production conditions with their purchasing decisions – by consciously buying products whose production demonstrably complies with human rights and environmental standards. Given that companies fear damage to their reputation, the purchasing decisions of consumers are an important lever. Against this background, a transparency and disclosure obligation would be useful and could already make an important contribution. States, above all, have a central responsibility since they are responsible for compliance with and enforcement of human rights and environmental standards in their countries. Consistent national legislation and enforcement is the only way to ensure that all employees benefit from better working conditions, and not only those who work for exports to Germany. Furthermore, states can increase transparency by introducing official seals, although the seal needs to be optimised, harmonised and controlled. Another instrument for establishing human rights and environmental standards are trade agreements. Hence in addition to companies, consumers and states also need to fulfil their role.

Outlook and Summary

From a Christian democratic perspective, a statutory regulation for compliance with human rights and environmental protection standards would definitely be a conceivable measure, which could have positive effects for companies. Criticism regarding the competitiveness and feasibility of such a law, as well as the reference to the responsibility of consumers and states are also justified, however.

Therefore, a statutory regulation would at least have to fulfil the following criteria:

- › **Determination of the due diligence and liability obligations to be fulfilled which are in line with and proportionate to corporate conditions.** SMEs in particular must not suffer any competitive disadvantages. Proportionate rules, differentiated between size, capacity and sector, would facilitate fair competition and better implementation.
- › **Incorporating the statutory regulation into a Smart Mix system** that comprises state and corporate due diligence obligations and combines voluntary and mandatory elements. A Smart Mix system ensures that the responsibilities for implementing human rights and environmental protection standards are divided appropriately between states and companies, and obligations are only applied where they are not implemented voluntarily in any case.
- › **Continuation of existing voluntary corporate alliances and multi-stakeholder initiatives** in order to build on experience and support companies in implementing due diligence obligations. This avoids unnecessary costs and bureaucracy. Where these measures fail to achieve their objectives or to comply with human rights and environmental protection standards, legal obligations must be reviewed.
- › **Support for capacity building of governments in developing countries** for monitoring and enforcing international human rights and environmental standards. The main focus is on empowering developing countries to fulfil their obligations when complying with human rights and environmental protection standards. This requires support from the International Labour Organisation (ILO) as well as bilateral and multilateral development policy instruments.

- › **Consistent advancement of international solutions** at EU and UN levels to prevent competitive disadvantages for German companies and to create a level playing field through uniform regulation. That is the basic prerequisite for sustainably and extensively improving human rights and environmental protection standards. The German EU Council Presidency this year affords the opportunity to play a central role in shaping these matters.
- › **Increase in transparency for consumers** through clearly designed reporting obligations and a consistent link with trustworthy seals. The influence of the consumer as an important lever for sustainable growth is strengthened as a result.
- › **Increased investments in and use of innovation**, making it easier to comprehensively track supply chains. In particular, blockchain technology appears to be promising.
- › **Coordination with measures for strengthening the resilience of supply chains due to the COVID-19 crisis.** The COVID-19 crisis has exposed the vulnerability of global supply chains. It is likely that companies will increasingly diversify or shorten their supply chains accordingly. If human rights and environmental protection criteria are taken into account in this process, it will be possible to strengthen the resilience of supply chains and “kill two birds with one stone”.

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The Second Generation of Climate Minilateralism²⁰⁷

Building a New Mitigation Alliance

Louis Mourier (2020)

Introduction

Praised as one of the major achievements of the multilateral climate regime, the 2015 Paris Agreement (PA) broke new ground in international climate politics, bringing to an end almost two decades of controversial UN negotiations. However, given that the Agreement is based on voluntary Nationally Determined Contributions (NDCs), which are neither legally-binding nor necessarily in line with the Agreement's temperature targets, it remains far from clear whether the PA can actually deliver on its ambitious objective of limiting global warming to well below two degrees Celsius.²⁰⁸ Indeed, current NDCs would lead to significant temperature increases of more than three degrees Celsius at the end of the century;²⁰⁹ the share of renewables in global energy demand remains limited to just 10.4 per cent (2018);²¹⁰ and last year, as a result of higher energy consumption, global CO₂ emissions rose by 1.7 per cent, hitting new record levels.²¹¹ Put differently, more than four years after the adoption of the PA, the Agreement seems to have created little incentives to transform the global economy and set the world on a more sustainable development path, an issue which highlights the weaknesses of the current multilateral climate system.²¹²

With progress on the multilateral level lagging behind, it is hardly surprising that the "top down grand deal approach" of the UNFCCC has produced frustration among more ambitious UN member states, trig-

gering a range of alternative proposals on how smaller groupings of states can accelerate global climate action.²¹³

In this context, so-called "minilateral alliances" or "climate clubs" have attracted a substantial degree of attention among policy-makers: typically comprising a small set of pioneer actors that seek to go beyond the multilateral climate regime, climate clubs are widely perceived as an effective way to increase the collective level of ambition and complement the consensus-based setting of the UNFCCC.²¹⁴ Accordingly, numerous minilateral initiatives for climate action have emerged over the past decade. Among others, these include the Clean Energy Ministerial, an international forum that encourages exchange among 25 major emitters, the Climate & Clean Air Coalition, a network of over 120 states and non-state actors that aims to reduce short-lived climate pollutants, or the G20 Energy Transitions Working Group, an intergovernmental working group that was added to the G20 agenda in 2018 in order to promote sustainable energy systems.

However, despite the establishment of a multitude of minilateral climate regimes, mitigation efforts continue to be off-track, raising fundamental questions on the effectiveness and usefulness of existing climate clubs: To what extent can minilateralism actually contribute to the combat against climate change? Do climate clubs have a real impact on the ground or are they mere "talking shops" where dialogue prevails action? Is there a need for more action-oriented alliances to provide new impetus to climate change mitigation? This article argues that while climate minilateralism can be a strong complementary force to the PA, the impact of existing clubs has been strikingly limited. Too often, climate alliances have promoted incremental, rather than transformative change, falling short to accelerate climate action at the scale required to reach the temperature targets of the PA.²¹⁵ As such, there is a need for a "second generation" of climate minilateralism – a new Mitigation Alliance that draws lessons from the shortcomings of existing clubs and thereby initiates ambitious mitigation efforts.

A New Impetus for Global Climate Action? The Rationale Behind Minilateralism

While the Paris Agreement has been interpreted as an outstanding victory for the multilateral climate regime, a range of analysts and policy-makers have called for supplementary mechanisms of cooperation to the PA.²¹⁶ Indeed, the uncertainty surrounding the implementation of the PA – namely the potential misalignment between NDCs and the PA's temperature target – shows that the Agreement can only serve as a broad framework for global climate action, a framework that needs to be underpinned and supported by complementary tools of implementation, including climate clubs.²¹⁷ In fact, the PA itself highlights the importance of coalitions of the willing, noting in Article 6 that those parties who are willing to do so may “pursue voluntary cooperation in the implementation of their NDCs to allow for higher ambition in their mitigation [...] actions”.²¹⁸

In line with that, climate clubs may offer great potential to accelerate the implementation of the PA. First, minilateralism shifts climate change initiatives from a multilateral, consensus-based forum to a smaller, more flexible regime, bypassing the veto risk by parties that do not wish to go beyond the lowest-common-denominator solution of the PA's COP-process.²¹⁹ As such, minilateralism enables climate leaders to raise the international level of ambition without waiting for laggards to agree to the collective effort. Second, by providing significant, exclusive benefits to club-members only (e. g. linking Emission Trading Schemes (ETS)), climate alliances can set strong incentives to abide by a club's mitigation targets.²²⁰ This, in turn, allows to send a clear message to the world that non-compliance will come at a cost (i. e. losing access to benefits), reducing the risk of free-riding in climate change mitigation. Finally, while moving ahead in parallel to the UNFCCC, minilateral regimes can increase the level of ambition of the PA over time, for example through the Agreement's “ratchet mechanism” – a mechanism according to which the PA's parties are supposed to submit increasingly ambitious climate action plans every five

years.²²¹ Indeed, climate clubs can develop collective climate action plans, thereby taking a leadership role in multilateral climate policy and setting a benchmark for the implementation of the PA.

As a result, minilateralism can be a strong, complementary force to the PA, pushing international climate politics beyond the UNFCCC “towards a more decentralized game of ratcheting up mitigation efforts”.²²² This, of course, should not mask the fact that climate alliances do harbour a range of risks, which may put the multilateral climate process at stake. Some commentators, for instance, have highlighted that the establishment of a multiplicity of climate clubs may lead to an increasingly fragmented institutional landscape, potentially undermining the coherence and effectiveness of the global climate governance architecture.²²³ Others have cautioned that any minilateral regime is likely to lack legitimacy in the eyes of excluded actors, possibly prompting strong counter-reactions from non-members and further destabilizing an international order that is already characterized by a high degree of polarization. However, if based on a formal link to the multilateral climate regime, climate clubs may disperse at least some of the risks mentioned above, in particular the potential lack of international legitimacy as any minilateral regime aligned with the provisions of the PA remains within the “legal orbit” of the UNFCCC. As such, rather than undermining or even replacing the PA's COP-process, climate clubs may augment and support the multilateral climate efforts – assuming that they are well-coordinated with the provisions and targets of the PA.²²⁴

Theory Meets Practice: Climate Clubs in the Real World

While in theory climate clubs may provide key benefits to accelerate international mitigation efforts, their practical impact has proven to be strikingly limited. Although numerous initiatives have been launched, there is scant evidence that minilateral groups are more effective in advancing climate cooperation than the UNFCCC has been in the past.²²⁵

Indeed, an analysis of the existing institutional landscape of climate clubs shows that current clubs enable incremental, rather than transformative change.²²⁶ A first set of minilateral climate alliances, such as the Clean Energy Ministerial or the G20 Energy Transitions Working Group, can be best described as “political dialogue forums”, whose central purpose is the exchange of information and the sharing of best-practices on climate change mitigation, often resulting in joint statements. A second category of climate clubs, including the Climate & Clean Air Coalition and the Global Green Growth Institute, may be defined as “implementation clubs”, which primarily focus on the promotion of specific, rather limited, climate projects. Both of these kinds of minilateral regimes serve useful and important functions, such as providing a “safe space” for diplomatic initiatives on climate change and supporting a slow progress towards a decarbonized global economy – non-trivial achievements in a world where climate politics continues to be a controversial issue.²²⁷ However, almost none of the existing minilateral arrangements comprise an explicitly stated objective of enabling and encouraging significantly increased ambition among its members.²²⁸ In fact, most clubs are open to any actor that wishes to join, regardless of the actual level of ambition to reduce emissions. Moreover, many alliances have failed to provide exclusive, tangible benefits for their members, thereby lacking one of the most crucial aspects to incentivize mitigation efforts and reduce the risk of free-riding.²²⁹ Accordingly, the mandates and configurations of most minilateral climate regimes are inadequate to achieve substantial emission reductions, falling short to trigger ambitious action at the scale required to reach the temperature targets of the Paris Agreement.²³⁰

Rather than contributing decisively to global mitigation efforts, the sheer quantity of existing climate clubs has actually added to an increasing degree of fragmentation in international climate politics, in line with the concerns raised by critics of minilateralism. In many cases, minilateral alliances seem to have been formed out of political opportunity instead of a systematic analysis of the needs and gaps in the current institutional landscape, with “little overarching consideration

either of how clubs fit together or how they could methodically drive forward the goal of [climate change mitigation]”.²³¹ As such, it becomes clear that forming climate clubs does not necessarily reinforce global climate action. Quite to the contrary, in some circumstances minilateral alliances may even be detrimental to the combat against climate change, undermining the coherence of global climate governance.

Nonetheless, despite the shortcomings of existing clubs, the concept of climate minilateralism should not be rejected as a whole. When constructed in a straightforward manner, closely aligned with the provisions of the Paris Agreement, climate clubs can be conducive to the multilateral climate regime. What is needed is a “second generation” of climate minilateralism – a minilateral regime that draws lessons from the shortcomings of existing climate clubs and sets clear incentives for ambitious mitigation efforts.

“Second Generation” Minilateralism: The Architecture of a New Mitigation Alliance

How could a more effective mitigation alliance look like? On which architecture could it be based? And through which specific measures could it avoid the associated risks with minilateralism, namely the potential lack of legitimacy and the undermining of the Paris Agreement? In order to turn into transformative pioneer alliances, climate clubs need to meet three key conditions: first, significant benefits need to be created that are accessible to club-members only; second, the “right” size of a club needs to be determined, with a range of enthusiastic actors involved; and finally, legitimacy vis-à-vis the UN-led climate process needs to be ensured, linking the club to the PA.

Benefits: As has been noted before, any effective climate club needs to have the ability to guarantee to its members a set of significant, exclusive benefits that stimulate participation.²³² As cutting emissions is costly and economically disruptive – especially when it comes to

transitioning towards renewable energies and clean industries – the benefits of joining the club need to be large enough to outweigh the costs of climate change mitigation, thereby reducing the temptation to free-ride by remaining a non-member.²³³ This is most likely to be achieved by a strategy of “carrots and sticks”, whereby “carrots” represent the benefits of membership and “sticks” comprise some form of penalty for non-compliance with the club’s norms, such as withholding benefits or even excluding non-compliant members. Analysts have identified numerous incentives which climate clubs could provide, including the harmonization of sustainability standards in a broad range of sectors, the exemption from Carbon Border Adjustment (a policy tool which effectively puts an import tax on carbon-intensive industries that are not covered adequately by national or regional carbon pricing), preferential trade agreements in the renewable energies sector and, perhaps most ambitious, the linkage of different ETS, turning climate alliances into a “club of carbon markets”.²³⁴

Size and membership: While climate minilateralism has attracted a significant degree of attention in policy circles, it remains far from obvious how the size and membership of climate clubs should be determined. Existing proposals have ranged from 20 member states,²³⁵ covering the major emitters that are responsible for up to 80 per cent of global emissions, to just seven or eight “climate great powers”,²³⁶ i. e. those key countries whose efforts are vital to mitigate climate change. In line with these proposals, many observers tend to agree that any effective minilateral climate regime should be built around a critical mass of central players, essentially consisting of those major emitters that possess sufficient economic weight to implement substantial emissions reductions.²³⁷ However, such an approach, focussed exclusively on major emitters, seems to be misguided in two particular ways: not only does it pose the risk of replicating the gridlocked climate talks of other forums – such as the G7/G20 – that have achieved very little in actual emissions reductions; it would also exclude several actors that have contributed decisively to the UNFCCC in the past, such as the Alliance of Small Island States (AOSIS) which is responsible for

less than one per cent of global emissions but has been a driver of change in international climate politics throughout the past decades.²³⁸

In fact, instead of incorporating all major emitters right from the start, it seems more appropriate that, initially, a climate club is composed of a few enthusiastic actors which control a sufficiently large share of global income. Based on these financial resources, the club can generate significant economic benefits that make membership worthwhile for reluctant actors.²³⁹ Put differently: the key for climate minilateralism is to provide an attractive model of cooperation, thereby enticing participation of major emitters over time. As such, a climate club can start small and grow gradually, assuming that it pursues an open-membership policy and is able to provide increasingly large benefits. A fully-fledged climate alliance may also expand its membership to ambitious sub-national actors (e. g. cities, regions, and businesses), circumventing national governments that are unwilling to intensify their mitigation efforts – something which, at the moment, may be particularly interesting for US States that pursue progressive climate policies, such as California or Massachusetts.²⁴⁰ Indeed, this approach would allow to tap the significant mitigation actions which more than 7,000 cities, 245 regions, and 6,000 businesses across the world have promised since 2015, paving the way to bridge the global emissions reductions gap.²⁴¹

Legitimacy: Finally, linking climate clubs to the Paris Agreement is of pivotal importance to respect the foundations of the multilateral climate regime – a key factor to strengthen the international legitimacy of minilateral climate alliances.²⁴² For this, a climate club should engage pro-actively with the COP-process, in particular by supporting the PA’s “ratchet mechanism”. Moreover, in order to remain within the legal provisions of the PA, close attention needs to be paid to Article 6 of the Agreement, one of the most comprehensive Articles whose “rule-book” is still under negotiation. Article 6 sets specific obligations for the formation of minilateral climate regimes, especially when it comes to international carbon pricing, effective measures for monitoring, reporting and verification (MRV) as well as shared efforts on NDCs. As

such, complementarity with the multilateral climate regime depends on a thorough understanding of Article 6, making it an important norm of future climate minilateralism.

Based on these three conditions – significant benefits, dynamic membership policies and international legitimacy – ambitious actors can construct a more effective minilateral regime, with club members developing a joint vision for climate change mitigation. Such a joint vision could be transformed into a climate club’s founding document which

1. determines collective targets for emission reductions and climate neutrality,
2. establishes specific rules of cooperation among members,
3. and acts as a basis for the set-up of concrete, exclusive club-benefits.

Conclusions and Recommendations for the EU

Given that the Paris Agreement is primarily based on voluntary NDCs, which are neither legally-binding nor necessarily in line with Agreement’s overall temperature targets, minilateralism constitutes an indispensable complement to the multilateral climate regime. In fact, as Robert Falkner from the London School of Economics puts it, any expectation that the PA alone “could provide the breakthrough solution for [climate change], was always illusory”.²⁴³ The Agreement needs to be supported and underpinned by more effective forms of climate cooperation, including climate clubs which allow to raise the level of ambition, reduce the risk of free-riding and bypass the lowest-common denominator logic of the UNFCCC. While existing climate clubs have fallen short to achieve these objectives, climate minilateralism can be made “fit for purpose”: what is needed is a second generation of minilateralism – a minilateral climate regime that is closely aligned with the Paris

Agreement, creates significant benefits for its members and involves relevant actors that control sufficient resources to make club-membership increasingly attractive. Without any doubt, the establishment of such an ambitious climate club is likely to face substantive challenges, not least against the background that in the past years several influential players have dropped their leadership role in international climate politics, including the US and Brazil.²⁴⁴ However, during the UN Climate Action Summit in September 2019, international climate politics gained new momentum: more than 60 UN member states committed to climate neutrality by 2050 and 59 member states launched the “Climate Ambition Alliance” – a group of countries that aims to increase the collective level of ambition at this year’s COP26 where the parties to the PA are supposed to submit enhanced climate action plans.²⁴⁵

The EU should seize these positive dynamics and support the set-up of a new climate club, leading the way towards a minilateral climate regime that is based on the three key pillars outlined in this paper: significant benefits, dynamic membership policies, and international legitimacy. In fact, recent research suggests that with its huge single market, its well-established ETS and its substantial financial resources, the EU could even single-handedly launch a climate club that creates sufficient incentives to attract non-EU members, including China and India.²⁴⁶ Accordingly, it lies within the EU’s reach to initiate substantive global climate action through the formation of a new minilateral climate regime. As a starting point, this paper proposes the following immediate measures:

1. Launch EU-internal, cross-sector discussions on the set-up of an action-oriented climate club, culminating in a common EU position for this year’s COP26. The position should set out time-bound targets for the club, illustrate exclusive benefits for abiding by the club’s norms and present potential disadvantages in case of non-compliance. The discussions should go beyond negotiations among EU member states and ensure close coordination between relevant EU member states and ensure close coordination between relevant players, in particular DG Climate Action, DG Environment,

the EEAS as well as DG Trade (traditionally, the latter has not been involved in climate negotiations, but is likely to play an instrumental role when it comes to providing benefits, such as a Sustainable Energy Trade Agreement).

2. Identify a number of key policy areas where the EU may provide particularly attractive benefits for non-club-members, making use of the Union's international market power. Among others, this may include preferential trade agreements in the renewable energies sector, the linkage of the EU-ETS with other carbon markets across the world, and the exemption from Carbon Border Adjustment (which, controversially, the new European Commission is planning to introduce – to the dismay of some actors in the Global South who fear to face yet another EU trade barrier).
3. Reach out to successful climate initiatives of sub-national-actors, unleashing the potential of urban and regional climate action, especially in the fields of public transport, housing and air pollution. Partners for closer cooperation may include a range of ambitious sub-national groupings that have been set up in the past, including the C40 and the International Council for Local Environmental Initiatives (ICLEI).

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Sectors up close



For a market-based energy and climate policy²⁴⁷

Joachim Lang (2019)

The Social Market Economy in Germany has for decades proven to be a successful economic and social model ensuring wealth, growth and technological progress. Its strength particularly lies in the fact that it is not a collection of established instruments and measures, but rather a general approach for politics, economics and society.

With its unique principle of open competition, it creates an incentive system to encourage the best solutions, thereby ensuring efficient allocation of resources. Combining environmental protection with economic growth and continued improvement in living standards for broad sections of the population should also be a guiding theme for future-oriented climate policy in Germany as an industrialised nation.

Policy should also utilise the strengths of the Social Market Economy when it comes to climate action. Balancing market and state can deeply entrench the principle of sustainability in the economy.

A market economy gives rise to externalities that are yet to be (fully) internalised – a phenomenon that affects public commons in particular. Climate change is a good example of this. Local emitters all over the world emit greenhouse gases (GHG), which build up in the atmosphere. An increased concentration of GHG in the atmosphere causes

the temperature on earth to slowly rise. The atmosphere serves as a repository for GHG emissions. For years, however, we have been seeing this mechanism reaching its limits because of resulting and continuous warming: a negative external effect. We have no means of internalisation. There is still no global market that incorporates atmospheric usage and sets a price for GHG to make them a tradeable commodity. External effects are generally recognised as market failure in economic theory, authorising the state to counter this development through special requirements, pricing instruments or volume instruments.

Limiting these GHG-induced externalities with a reduction target must be accompanied by legal and fiscal instruments. Effective accompaniment should be based on market-driven, technology-agnostic tools and measures. One such example is the EU Emissions Trading System (EU-ETS) with its volume system that sets a market-based price for GHG, enabling emissions to be limited efficiently and in a technology-agnostic manner.

Bans or pure technology-specific aid does not guarantee that the desired objective will be achieved. Uncoordinated regulations between climate and energy policy, such as those enacted in recent years, set false incentives and caused market distortion. The wide variety of political instruments aimed at reaching a reduction target always requires extensive knowledge on the state's behalf. For example, the state needs to be fully aware of the costs incurred as a result of avoiding greenhouse gas, and the sectors in which these costs are incurred. This requires reliable, long-term forecasts and information about possible leakage effects. As private households and businesses would have no incentive to provide the state with information such as the individual willingness to pay for certain goods, this pushes public authorities to the limits of political control.

The federal government's announcement regarding its intention to reduce Germany's 1990 levels of greenhouse-gas emissions by 80–95 per cent by 2050 defined a concrete climate-policy target.

This text offers a conceptual proposal from the Federation of German Industries (BDI) as to how, based on the successful model of the Social Market Economy, an economically feasible reduction in greenhouse-gas emissions of 80+ per cent can be achieved by 2050.

This proposal is based on the target of an 80 per cent reduction in GHG by 2050. Achieving this target, however, is contingent on certain assumptions. For example, the right political decisions need to be made at the right time, long-term shortages in the power grid must be avoided, and industry must be protected against competition-distorting measures resulting from increased carbon-induced costs. Higher reductions are also possible if additional technological breakthroughs emerge and are applied. These may include renewable synthetic energy sources and the expansive use thereof, or the usage and storage of CO₂. The cheaper method of reducing GHG emissions through offsets also provides an opportunity to take globally efficient climate action and fulfil national specifications beyond the 80 per cent mark.

This ambitious goal requires clever interlinking of climate and industrial policy to ensure economic opportunities can be seized, and challenges countered:

A strong economic hub like Germany generates both growth and employment, meaning it can also achieve widespread social acceptance of fundamental changes to public and private life. Achieving the climate targets will involve inconveniences, so it is all the most important for policymakers to develop functional concepts that provide opportunities and accept the economic and social challenges.

Feasibility of an economically tolerable reduction scenario of 80+ per cent by 2050

In its study *Klimapfade für Deutschland*²⁴⁸ ('Climate Pathways for Germany'), the BDI showed that reducing Germany's greenhouse-gas emissions by 80 per cent by 2050 is both technically possible and economically tolerable under certain framework conditions.

To better understand this, let us first look at the *reference scenario* and basic assumptions of the study. The reference scenario serves as the starting point. It is based on today's climate-policy framework conditions and describes the reductions in greenhouse-gas emissions these will already achieve by 2050. At the same time, it assumes comprehensive and effective protection against 'carbon leakage'.²⁴⁹ That the current laws and regulations will be established and updated are further assumptions.²⁵⁰ It is similarly assumed that policymakers will make the right decisions at the right time.²⁵¹

The reference scenario highlights the gap between developments under current framework conditions and the government's climate-action targets. Building on this, two *target scenarios* have been devised, revolving around the question of 'What are the assumed social and political framework conditions?'

Scenario 1: National solo efforts

The 'National solo efforts' target scenario assumes a world without a standard global UN climate process. Ambitious climate action is only pursued in 'core Europe', and sporadically in other countries. A key element in this scenario is the assumption of comprehensive, effective carbon-leakage protection.

This is necessitated by a lack of international ambition for climate action since, without a 'level playing field', industrial production will largely be outsourced, often to places with lower standards.

Scenario 2: Global climate action

In the 'Global climate action' target scenario, the global community commits to achieving the two-degree target, and coordinates global instruments to reduce emissions. Despite a strong ambition for climate action, there still is an almost level playing field for industry.

The target scenarios essentially differ in terms of their local and international ambitions to reduce GHG, and in terms of the resulting price level for carbon and fossil energy sources.

A carbon price path was assumed for the reference scenario and the 'National solo efforts' target scenario. In the long term, it lies somewhere between the 'Current Policies' and 'New Policies' scenarios of the 2016 World Energy Outlook (WEO) published by the International Energy Agency (IEA), though rises more slowly over the short and medium term. The model assumed that the carbon price would rise to 45 euros per tonne by 2050. In view of the ever growing demand, particularly in internationally expanding economies, it is assumed the prices for fossil energy sources will rise. In the reference scenario, for example, the oil price is assumed as being USD 115 per barrel in 2050.

The 'Global climate action' scenario worked on the basis that the carbon price would be as per the WEO's scenario of 450 ppm (parts per million), i. e. for every million air particles in the earth's atmosphere, 450 are carbon dioxide. This price rises to 55 euros per tonne in 2030, and to 124 euros in 2050. The oil price in this scenario remains at around USD 50 per barrel due to stagnating/declining global demand for fossil fuels.

Key results of the Climate Pathways study: Mind The Gap!

If the current efforts are continued in the form of existing measures, political and regulatory framework conditions, and foreseeable technological developments ('reference path'), 1990 levels of GHG emissions will be reduced by approx. 61 per cent by 2050, leaving a shortfall of 19 per cent to Germany's 80 per cent climate target.

How can we close this gap? The 80 per cent climate path highlights the opportunities and challenges associated with such a massive transformation process for the economy and society. Through a present-day lens, achieving the 80 per cent climate path cost-effectively would, overall, require additional investments of 1.5 billion euros by 2050 compared to a scenario without any intensified climate action²⁵². This would include some 530 billion euros to adjust efforts already being made as part of the reference path. The additional investments need to be made by business, the public authorities, and the citizens themselves, and would include investments in lower-emission systems, energy-efficient renovations on residential and commercial buildings, and establishing a storage and charging infrastructure. According to the BDI's calculations, the direct additional costs to the economy would be around 470 billion euros by 2050, as each investment also involves savings. But this cost-effective fulfilment of the climate paths does not mean the technical measures will pay off for the individual decision-maker from a business perspective.

Around 80 percent of the necessary technical measures thus need specific incentives. It is consequently the task of policymakers to close the gap to profitability, so that businesses and private individuals can make the necessary investments. One example is energy-efficient renovation of residential and commercial buildings. Withheld investments may be linked to personal financial situations or current phase of life. Successful climate action would be associated with extensive reforms in all sectors of the German economy – and could

unlock further opportunities for German exporters in growing climate-protection markets. Studies expect that the global market volume of the most important climate technologies will grow to one to two billion euros per year by 2030. This would particularly benefit the German economy, which has a foreign-trade quota of 86.9 per cent (2017). As German industry's strength lies in developing and selling emission-reducing technologies, it is highly likely that there will be positive impacts for German businesses.

The fundamental opportunity and simultaneously also challenge primarily consists in tying climate-policy objectives in with other socially important policy objectives, such as stable economic growth and employment, the international competitiveness of German businesses, and affordable security for energy and utilities.

Achieving climate action using the principles of the Social Market Economy

In order to achieve climate-policy objectives, the Social Market Economy must operate on the principle of being technology-agnostic. Two economic instruments are thus generally conceivable here: On the one hand a quantity-based instrument, such as the EU-ETS, and on the other, a price-based instrument such as a tax or levy.

The quantity-based instrument establishes a quantity, in this case GHG emissions, exogenously and *ex ante*. The available quantity can then in turn be traded among market participants. In the case of the EU-ETS, these are emission allowances traded by companies on the European Energy Exchange in Leipzig. The price is made up of supply and demand. A quantity-based instrument provides security in terms of quantity development, but poses a certain degree of uncertainty in pricing.

A price-based instrument sets an exogenously established *ex ante* price X for a commodity. This price X would then be applied to every

GHG emission. The consumer can decide the quantities in which it purchases the product, despite the X per cent increase in price. As such, a price-based instrument creates price security, though the resulting volume of GHG is unclear.

Current EU regulations stipulate an EU-ETS-based quantity system for the energy and industry sectors. What we do already know is that its clear reduction path for annually emitted GHG means less than ten per cent of 1990-level GHG emissions will be produced by 2050.

The EU-ETS, however, is only a second-best solution, as trade is limited to the European Union. A first-best solution for the energy and industry sectors would be a global scheme. In other words, the ideal scenario would be for such an approach to be pursued internationally, as the GHG-emitting plants and processes in Germany are very efficient when compared to the rest of the world. Every GHG saving is thus inevitably going to be more expensive than in developing and emerging nations.

This is also why the Paris Climate Agreement expressly stipulates the use of market-based instruments. In December 2019, the negotiation teams of the Paris Agreement signatories will grapple with a solution here (Article 6 of the Paris Climate Agreement) that will make the international scheme and transnational co-operations easier and capable of being integrated into the Paris Agreement. Parties are yet to come to an agreement on the aforementioned Article 6.

A one-size-fits-all solution across all sectors does not satisfy the principles of the Social Market Economy. The building and transport sectors are particularly essential parts of people's lives, and changes to these have an impact on every individual.

As such, climate action must, in both cases, be inextricably linked with profitability and social justice. A quantity structure is less effective for consumers whose demand is inelastic.

Here are two extreme examples of this:

1. In the building sector, the vast majority of emissions are generated by refrigeration and heating processes. Strictly limiting volumes of GHG emissions in this sector would ultimately amount to a ban on heating using conventional energy sources or fully switching heat supplies to renewable energy sources.
2. The transport sector generates emissions by burning fuel. In extreme cases, limiting quantities here can result in driving bans if the permitted volume of GHG emissions is reached. It would then no longer be possible to drive to the supermarket or to work using these fuels.

The aim of a political instrument should be to achieve an economically effective and socially acceptable steering effect. Price signals are one option here. A price-based instrument, meanwhile, offers up various alternatives for pricing. A price can make a commodity more expensive by being added on as an extra component, or it can replace an existing pricing component. From the perspective of competitive and socially acceptable pricing, the last two variants must be given preference over the first.

But a price-based instrument or quantity-based instrument cannot be the only means of choice. They each make up part of a coherent energy and climate policy.

There also needs to be an *innovation policy* that sets the framework conditions for researching, developing and testing future technologies. Germany will need research, funding and innovations in order to go beyond the 80 per cent mark and achieve the +X. Technologies of the future will not, however, be able to cope without a suitable infrastructure. The charging infrastructure for electric mobility, a complete expansion of 5G networks and much more all play a key role here. This is where the state can lay the foundations for future

developments and technological advances by establishing clever, market-based framework conditions.

It is true that technological decisions will not be made on the German domestic market or within the European Union. Over the long term, the critical question is whether the international community of states can agree on comparable framework conditions for an environmentally sustainable economy and lifestyle. In keeping with the Paris Climate Agreement, the states have, in any case, signed their intention to limit GHG emissions in their economies, though there are yet to be any joint or comparable framework conditions conducive to an international 'level playing field'.

Yet this field is essential for avoiding conflict between competitiveness and climate-action ambitions. It can help prevent duplicate regulations or 'carbon leakage'. Insofar as no such conditions exist at a global, or at least at a G20 level, it needs German industry to be protected against competitive disadvantages so that security of supply and competitiveness are not left by the wayside. It would not be doing any favours for climate action either. The task of international politics in the coming years remains that of establishing greater congruence and agreement between states.

Conclusion

In general, market-based principles should be reinforced in heavily regulated areas of energy and climate policy. While market interventions are economically tenable for public commons, the chosen instruments should in turn take into account the principles of the Social Market Economy. When internalising externalities relevant to climate policy, these should therefore go hand in hand with a reduction in contrary regulations, such as various taxes, levies or cost allocations. And it is important to ensure here that state intervention addresses the external costs as precisely as possible, and that clear target and instrument

hierarchies are followed. A market-based energy and climate policy must make sure the policy governing externality reduction does not adopt technology-specific regulations or give preference to individual applications.

Policymakers have a difficult task ahead of them. On the one hand, there is mounting public pressure on the Parliament and government to act now, if necessary even just at a purely national level. On the other hand, measures and associated costs would become increasingly felt by the individual (e. g. in the transport and building sectors), which could again undermine acceptance of climate action during implementation.

National gesture politics increases the costs to the economy. Returning to a state of technological neutrality instead of bans, to clever competitive and industrial policy, and to the targeted reduction of taxes and levies for greater (social) acceptance can help make the enormous process to transform climate policy across the whole of society a social and market-based one for the population and the economy.

247 This article originally appeared in: R. Fücks & T. Köhler (ed.) (2019). Soziale Marktwirtschaft ökologisch erneuern: Ökologische Innovationen, wirtschaftliche Chancen und soziale Teilhabe in Zeiten des Klimawandels (Berlin: Konrad-Adenauer-Stiftung e. V.): 73–84.

248 The Boston Consulting Group & Prognos AG (2018). Klimapfade für Deutschland, study conducted on behalf of the BDI.

249 This limits the direct and indirect CO₂-induced additional costs to present-day levels.

250 Examples here particularly include the Energieeinsparverordnung (German Energy Saving Ordinance, EnEV), the Erneuerbare-Energien-Gesetz (German Renewable Energy Sources Act, EEG) until 2050, and the increase in the percentage of renewable energy sources in total power supply to 80 per cent by 2050.

251 This relates to, for example, grid expansion, which needs to be intensified in order to reduce grid bottlenecks.

252 This corresponds to average annual additional investments of approximately 1.2 to 1.8 per cent of the German gross domestic product (GDP) by 2050.

Climate Performance of the G7 States and the COVID-19 Crisis²⁵³

How can we reconcile climate protection and the economy?

Jasper Eitze & Maximilian Pretzel (2020)

Introduction

One issue will dominate the USA's presidency of the G7 in 2020: the corona crisis. In addition to fighting the pandemic, the question of how to swiftly overcome the deepest recession since the 1930s and how to relaunch the economy is taking centre stage. That the economic recovery needs to take place under sustainable conditions, in other words by striking a balance between economic, social and ecological criteria, should be beyond dispute; especially since climate change, as a long-term risk, remains a virulent threat despite having temporarily faded into the background of public debate as a result of the corona crisis. Having said this, it is easier to call for a sustainable balance than it is to implement it in practice, especially during times of crisis, when various social and economic interests come to the fore.

In principle, the G7 states, with their democratic race for the best political solutions, their political processes oriented towards reconciling interests, participative structures and free media, are well-placed to balance the different aspects underpinning sustainability. And in fact – at least in the European G7 states – discussions on the appropriate consideration of climate change during economic recovery are well underway. This reflects the assumption that CO₂ emissions will indeed decline during the corona crisis, and thus Germany, contrary to all previous expectations, can still achieve its self-imposed objective of a 40 per cent reduction in CO₂ emissions by the end of 2020. We can, however, expect a dramatic increase in CO₂ emissions in the course of the economic recovery.

What do we mean by Sustainable Climate Performance?

Which value(s) can help us to evaluate sustainable climate performance appropriately? At least since Agenda 2030, it has been clear that sustainability means more than just environmental and climate protection, and requires economic and social concerns to be taken into account, too. In order to extend the ecological aspect of climate performance to (at least!)²⁵⁴ include the economic perspective, it is therefore advised to jointly consider CO₂ emissions and the gross domestic product (GDP) as the common economic indicator. In fact, benchmarks such as CO₂ intensity (amount of CO₂ emitted per US Dollar of GDP), or CO₂ productivity (GDP produced per tonne of CO₂) have been around for some time, but have so far been largely overlooked in the climate policy debates of Western industrialised nations. Developing and emerging countries, on the other hand, naturally view their CO₂ emissions as being dependent on their economic development. Given that both the UN's Agenda 2030 with its 17 sustainability goals and the Paris Climate Agreement place joint responsibility on developing, emerging and industrialised countries, it is important (in the sense

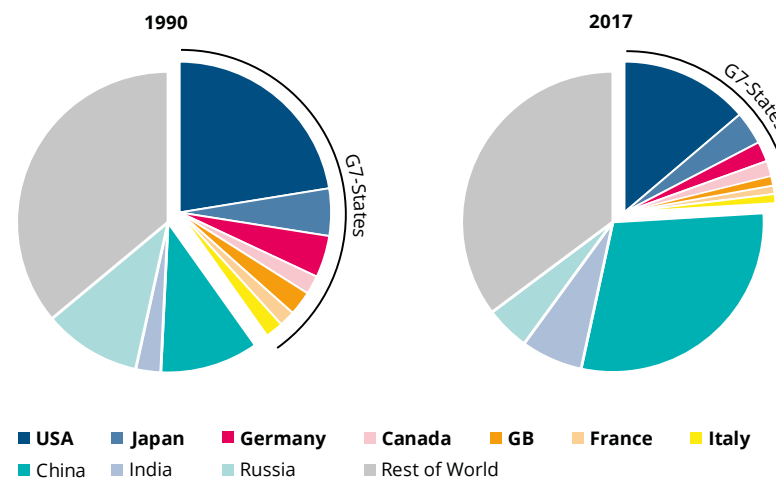
of holistically evaluating global climate performance) to pay greater attention to CO₂ productivity as a benchmark.

If a more holistic evaluation of global climate performance is the first argument in favour of using CO₂ productivity as a benchmark then here is another: it is well-known that the voluntary commitments and targets adopted by the G7 states under the Paris Climate Agreement are more extensive (this point does not apply to the USA owing to their imminent withdrawal from the agreement at least prior to the presidential elections on 4 November 2020), taking into account climate justice, in other words, the historical responsibility of western industrial states for climate change. This does not, however, mean that G7 states are simply obliged to act as a role model for emissions reduction. As leading economic nations, they instead adopt the role of illustrating to all countries developmental trajectories that reconcile climate protection with economic growth.

Yet how can a western industrial nation set a global example if it only evaluates its own climate performance based on absolute CO₂ emissions and consequently fails to consider essential aspects underpinning a sustainable approach? With a view to climate change, on the one hand, it is true that only absolute emissions values count. At the same time, this approach is too simplistic in light of emerging and developing countries' economic catch-up, and the steadily declining share of global CO₂ emissions from Western industrial nations as a result.

As shown in the following diagram, the global share of emissions from the G7 constitutes "only" around one quarter and is thus about as large as China's. By contrast, 30 years ago, the G7 were responsible for around 40 per cent of global CO₂ emissions. Considering a global order subject to economic transformation in particular, a benchmark of climate performance which expresses both economic and ecological output for the purpose of comparing sustainable development on a global scale is both appropriate and overdue.

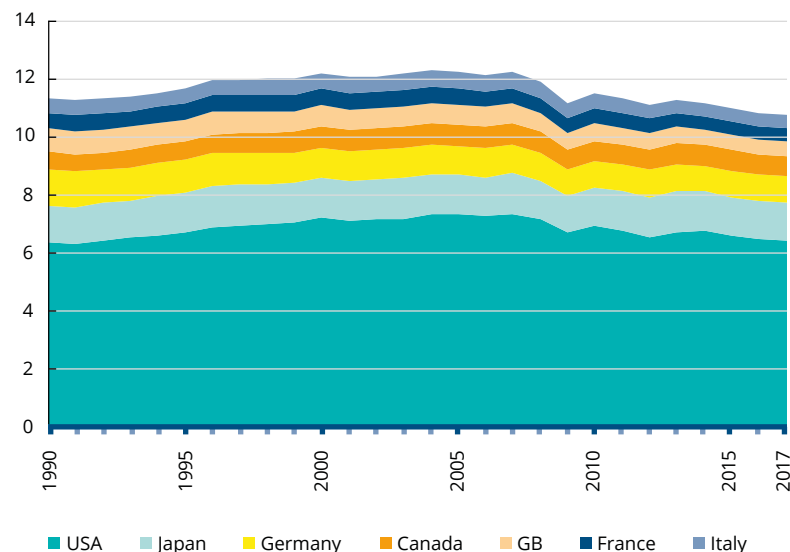
Share of global CO₂ emissions of the G7 and other major emitters in per cent



Source: Fossil CO₂ emissions of all world countries – 2018 Report
 "DOI: 10.2760/30158 (online)", Publications Office of the European Union <https://ec.europa.eu/jrc/en/publication/fossil-co2-emissions-all-world-countries-2018-report> Taken from: https://en.wikipedia.org/wiki/List_of_countries_by_carbon_dioxide_emissions

But there is another reason why G7 states should pay more attention to the relationship between GDP and CO₂ emissions: the one-sided focus on absolute CO₂ figures suggests that greenhouse gas (GHG) emissions in industrialised nations are already largely de-coupled from economic development. The fact that this is not true, is made clear by the corona crisis and its resulting economic upheaval. Since the current fall in CO₂ emissions is equally dramatic as the economic collapse itself, the so-called climate protection community, which primarily consists of non-governmental environmental organisations, is refraining from portraying decreased CO₂ emissions as a success story in the present crisis. However, in the case of Germany, this same community largely ignored the unexpectedly positive economic development over the

G7 greenhouse gas emissions in million tonnes of CO₂ equivalent

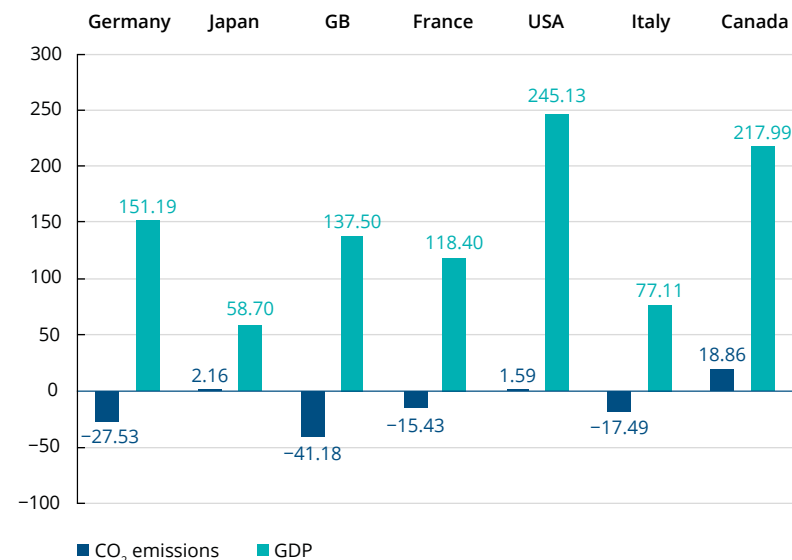


Source: OECD 2020 https://stats.oecd.org/Index.aspx?DataSetCode=AIR_GHG

last decade, which ultimately represents at least a relative decoupling of economic growth from CO₂ emissions. Instead, the looming failure to meet the national 2020 climate goals came under sharp criticism, whereby only absolute CO₂ emissions were recognised as a criterion of German climate performance. The following graphs illustrate how different the evaluation of climate performance can be when economic factors are also taken into consideration. The first graph initially shows G7 greenhouse gas emissions since 1990 in absolute figures.

When considered as a block, the G7 states have reduced their emissions by just over five per cent in almost three decades. A closer look at the underlying figures, however, shows that European G7 states record

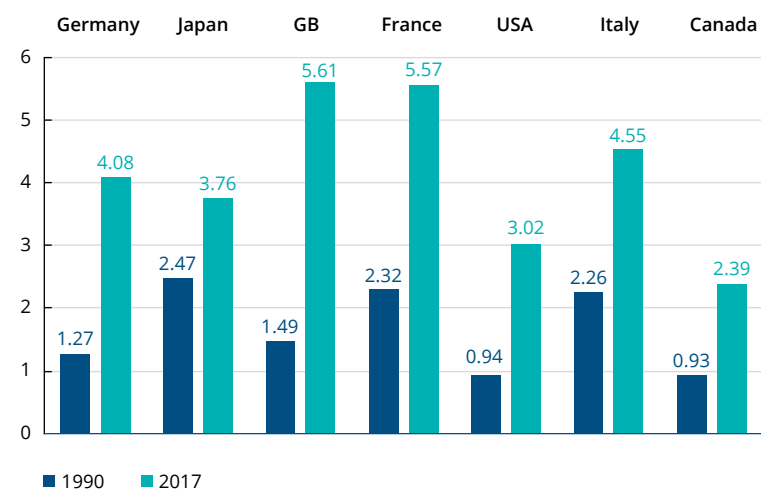
Development of GDP compared with CO₂ emissions 1990 to 2018 in per cent



Sources: GDP: World Bank 2020, <https://data.worldbank.org/indicator/NY.GDP.MKTP.CD>; THG: OECD 2020, https://stats.oecd.org/Index.aspx?DataSetCode=AIR_GHG

significant reductions in emissions, whereas GHG emissions in Japan, Canada and the USA even increased slightly. In turn, among the European G7 states, it was Great Britain that recorded the strongest decline, followed by Germany. In contrast to Japan, Canada and the USA, the visible decline in CO₂ emissions recorded in European states largely explains why Germany, France, Great Britain and Italy achieve far better rankings than those non-European G7 states in studies such as Climate Change Performance Index by Germanwatch. To what extent does this evaluation now change if economic development is also taken into consideration? The following graph compares the emission trends of G7 states with the growth in economic output during the same period.

CO₂ productivity measured in GDP (in USD)/kg CO₂



Sources: GDP: World Bank 2020, <https://data.worldbank.org/indicator/NY.GDP.MKTP.CD>; THG: OECD 2020, https://stats.oecd.org/Index.aspx?DataSetCode=AIR_GHG

It is striking that both the USA and Canada, whose emissions are higher in 2018 than in 1990, also recorded by far the highest growth in GDP. Japan also achieved notable growth in GDP during this period, without markedly increasing its GHG emissions. Between 1990 and 2018, all G7 states therefore succeeded in decoupling GDP growth from emissions growth, in relative terms at least. In other words: The levels of CO₂ emissions produced for every US Dollar of GDP created have significantly decreased in all G7 states. CO₂ productivity has thus improved, as the following graph shows.

As regards absolute CO₂ productivity values for 2017, Great Britain and France are in the lead, followed by Italy, Germany and Japan – while the USA and Canada come in last place. However, if we calculate the growth rates of CO₂ productivity for individual states between 1990 and 2017, a different picture emerges: Although Great Britain continues to be in the

lead with a growth factor of 3.77, second place is now shared by Germany and the USA (both 3.21). Canada comes next (2.57), followed by France (2.4) and Italy (2.01). The poorest performer is now Japan (1.52). The USA and Canada in particular are thus in a far better position when climate performance is also evaluated based on the increase in CO₂ productivity. Germany also fares better here, whereas the climate performance of France, Italy and Japan appears less favourable.

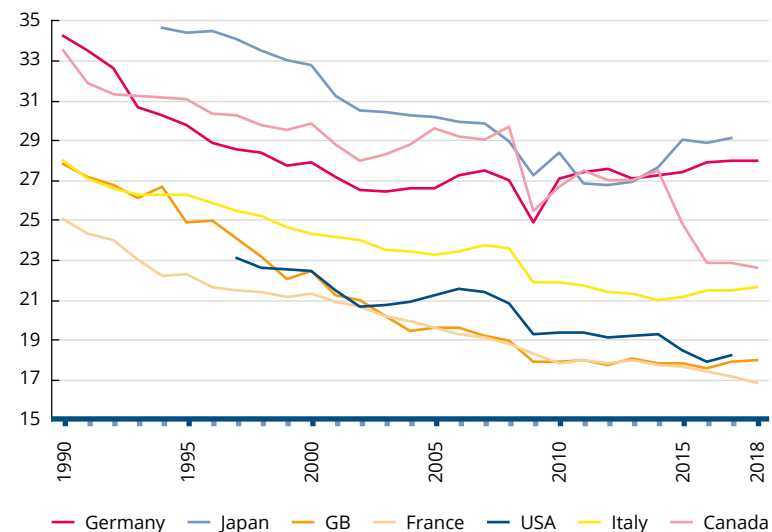
Influencing factor industrial production

In Germany, the industrial sector accounts for more than one quarter of total value added and thus represents a mainstay of the economy. One in three jobs depend directly or indirectly on industry – more than 90 per cent of research and development investments are made in this sector. It is the industrial strength that has earned Germany the rank of the most innovative nation in the world according to the latest Bloomberg Innovation Index. At the same time, however, industrial production is very CO₂-intensive due to its high energy demand. It can therefore be expected that a high industrial share of GDP compared to other economic sectors negatively impacts on a country's CO₂ productivity. As the following graph shows, the industrial share of GDP has developed differently among the G7 states since 1990.

The figures confirm: Only in Germany do we see an industrial share of a similarly high level to that at the turn of the millennium: in contrast, this dropped sharply in other G7 states during the same period. Particularly noteworthy is the dramatic decline of the industrial share in Great Britain, especially since the financial crisis of 2008/2009. We can assume that the industrial share which has been falling in all G7 states since 1990 has resulted in a reduction of CO₂ emissions – this effect has been far more pronounced in Great Britain than in Germany for example. At first glance, reducing industrial production in Germany in line with Britain seems to make sense in climate policy terms. Yet the opposite is the case: due to the global demand for industrial goods,

Industrial share of GDP

in per cent



Sources: World Bank 2020, <https://data.worldbank.org/indicator/NV.IND.TOTL.ZS?>; Canada: Statistics Canada, Industry total (average over twelve months): <https://www150.statcan.gc.ca/t1/tb1/en/cv.action?pid=3610043401#timeframe>

both at present and in the future, lower production in Germany would most likely be compensated in other parts of the world. Ultimately, this would merely entail transferring CO₂ emissions elsewhere. From a global perspective, the lower environmental standards in developing and emerging countries would result in lower CO₂ productivity in the industrial sector altogether. Accordingly, with regard to Great Britain, it is also important to note that bearing the industrial sector's development in mind, puts the positive evaluation of the country's climate performance based on the trajectory of absolute CO₂ emissions and CO₂ productivity into perspective. This observation is significant insofar as Great Britain is often portrayed as the climate protection role model that other industrial nations should follow.

Influencing factor electricity generation

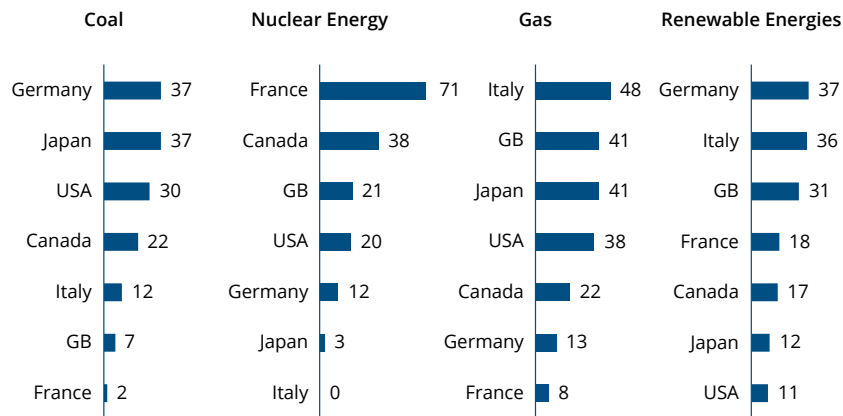
Based on the knowledge that a strong industrial sector also represents a desirable climate policy objective for the G7 states thanks to their high ecological standards, it is worth taking a closer look at the electricity mix. After all, the need for CO₂-neutral electricity will dramatically increase as part of an accelerated defossilisation of industrial production if electricity-intensive alternatives, particularly hydrogen, are used. Therefore, we should initially regard the fact that coal-based electricity generation has recently dwindled in importance in all G7 countries a positive development. For instance, in Germany, the electricity sector was almost entirely responsible for the marked decline in CO₂ emissions in 2019. While the share of electricity production from lignite and hard coal decreased by 31 and 22 per cent respectively, the share of renewable energies increased by five per cent to just under 43 per cent. The main reason behind this was the increased price of CO₂ certificates in EU emissions trading, from which in addition to renewable energies the gas power plants (plus eleven per cent share), benefited most of all. In Great Britain, too, coal-based electricity still occupied a share of about one third five years ago, while only accounting for one per cent in 2019. This rapid fall stems from the fact that the British government had already introduced a national CO₂ minimum price in 2013, which increased to some 20 euros per tonne in 2015, whereas the certificate price in European emissions trading did not achieve a similar price level until late 2018. But it was also in the USA where the share of coal shrank by about 13 per cent in 2019, since domestic shale gas proved to be a cheaper way of generating electricity.

Despite comparable trends in reducing the share of coal-fired electricity in the G7 countries, the graph below illustrates that the relevance of energy sources for electricity generation continues to differ substantially between those countries. While Italy has comparatively high shares of renewable energies as well as gas, the importance of coal and nuclear energy is correspondingly low. France's enormous share of nuclear power, however, enables the country to largely

abstain from gas and coal. Great Britain, the USA and Canada have more balanced electricity mixes at their disposal. It is worth noting that the European states are ahead of non-European states when it comes to the share of renewable energies. The opposite is the case with regard to coal-based electricity – with one exception: among the G7 states, Germany has the largest share not only of renewable energies, but coal-based electricity, too. The reason behind this is the strong position of domestically mineable lignite as a cheap source of energy independent of imports (compared to hard coal and gas). No other European G7 country has a significant amount of lignite deposits that can be mined. On the other hand, the European G7 states usually import hard coal for reasons of cost.

Electricity generation by main sources of energy 2018

in per cent



Source: Federal Environment Agency 2018

<https://www.umweltbundesamt.de/daten/energie/stromerzeugung-erneuerbar-konventionell#-textpart-3>; EU Commission 2019: EU energy statistical pocketbook and country datasheets, <https://ec.europa.eu/energy/en/data-analysis/energy-statistical-pocketbook>; BP 2019: BP Statistical Review of World Energy June 2019, <https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html>

Recommendations

The graphs highlight that Germany's climate performance – if CO₂ productivity, the high share of industry and renewable energies in the G7 comparison are taken into account – can serve as a model for both Western industrialised states and emerging economies. To ensure that this position remains guaranteed, political priority must be ascribed to a) achieving significant economic growth with marked reduction in CO₂ at low economic costs, b) at least maintaining the industrial share at the current level and c) shaping the regulatory environment for the further expansion of renewable energies in such a way that potential areas are used efficiently and the necessary social support is available. The following three recommendations can be derived from this:

1. CO₂ Productivity as a key benchmark of climate performance

Especially in the light of the necessary economic revival in the after the Corona crisis, CO₂ productivity should play a key role as an assessment criterion for climate performance. This is because neither strong growth in GDP combined with soaring CO₂ emissions, nor a decline in GHG emissions owing to an absent economic recovery constitute the right approach. CO₂ productivity provides a binding reference value for constructive dialogue between actors primarily concerned with climate change on the one hand and actors with a stronger focus on the economy on the other.

All the same, we can expect calls for greater consideration of CO₂ productivity to meet with resistance. This is understandable insofar as the focus on CO₂ productivity would attest to a more positive climate performance in some states than would have previously been the case. Here we can certainly mention the USA, which – particularly due to the Trump administration's climate policy stance – many observers see as a prime example of deficient climate performance. In fact, with a correspondingly high growth in GDP, it is still possible to achieve a reasonable level of CO₂ productivity even if no significant progress is recorded with reducing emissions.

That's why it would make little sense to solely focus on CO₂ productivity, even though this benchmark should be an obvious consideration in light of the aforementioned arguments. If G7 states change their perception of CO₂ productivity, it would be easier to address supposed or actual conflicting goals between climate protection and economic growth. Debates on climate change would have a more realistic and constructive frame of reference, and thus ultimately lead to more global climate protection than has hitherto been the case.

2. Keeping an eye on the industrial sector while monitoring climate performance

Due to its systemically relevant economic importance, industry will be the focus of political debate in the course of economic revival to overcome the corona crisis. Given that the global demand for industrial products is set to continue over the next few decades, the G7 states need to respond to the enormous need for investments in climate-friendly production processes to avoid carbon leakage. For Germany alone, calculations estimate investments of up to 230 billion euros being required to accomplish the goal of making the industrial sector carbon-neutral by 2050.

The energy-intensive industry seems clearly committed to switching to climate-neutral production processes. Huge quantities of low-priced renewable energy (primarily electricity) are needed to make this transition. In the case of Germany, for the chemical industry alone, carbon neutrality by 2050 would mean that the demand for electricity would rapidly increase from mid-2030, and, at 628 terawatt hours, would ultimately reach today's level of total electricity production. When compared with other G7 states, Germany's peak share of renewable energies in electricity production and national expansion targets mean that it is on course to achieve the defossilisation of its industry over the coming decades.

3. Further strengthening CO₂ Pricing as a guiding tool

The overwhelmingly positive summary drawn here in view of Germany's climate performance is, however, no reason to become complacent in efforts to protect the climate. Rather, Germany is called upon to achieve far more climate protection than in the past using much less detailed energy and climate policy regulations (see for example the Renewable Energies Law with its number of subsidies) and the economic costs resulting from this. The agreed national emissions trading, in conjunction with the European scheme, is an important element in this context, which should also be adhered to in times of economic crisis. This is the only way to secure the trust in this market-based instrument that is necessary for mitigating climate change. The high amount of state funds directed towards economic revival will only lead to promising investments over the longer-term in terms of climate change, if a clear, preferably technologically neutral CO₂ price signal provides the right incentives for this (see decline in share of coal-based electricity).

Against this backdrop, the necessity of CO₂ pricing, in combination with the inherent advantages of certificate trading (quantity-controlled pinpointing, cost efficiency and openness to technology), has proven to be a key instrument in climate policy. Provided that the certificate price in emissions trading is not permanently too low as a result of unambitious EU climate goals, we can assume that the climate performance of the European G7 states (including Great Britain, which is interested in continued participation in European emissions trading), will improve over the coming years. This effect is likely to be particularly pronounced for Germany with its comparatively large share of coal-based electricity today.

253 This contribution was originally published as Eitze, J. & Pretzel, M. (2020) "Climate Performance of the G7 States and the COVID-19 Crisis: How can we reconcile climate protection and the economy?", Konrad-Adenauer-Stiftung, Facts & Findings, 393 (July 2020).

254 For reasons of clarity, the social aspect is not considered here.

How the bioeconomy is boosting innovation and sustainability in the Anthropocene²⁵⁵

Joachim von Braun (2019)

The Social Market Economy is facing new and growing environmental, social and economic challenges that are all intricately linked. These include, for one, the long-term need to increasingly integrate human economic activity of the Anthropocene era into natural cycles. But this is appearing to be more and more of a utopian notion in a world that will soon be home to nine billion people, amid rising consumption. Secondly comes the challenge of decoupling economic growth from the excessive use of finite resources (which also has intense negative external impacts), while shaping the future of employment in a digitised, networked world. Thirdly, there is vast income inequality between and within countries, coupled with increased awareness of disadvantages. International trade and investment policy is part of the market-based solution to promote a sustainable global economy geared around division of labour. Nevertheless, its underlying regulations are increasingly also being viewed as part of the social, environmental and economic problems. These critical processes and challenges create a loss of trust in the Social Market Economy, putting the economy and its institutions under pressure.

The bioeconomy as part of the solution

These roughly outlined challenges cannot be appropriately tackled with conventional, separate economic, social and environmental policies. The Anthropocene – the age in which humans have become an important influencing factor on the earth's biosphere, geosphere and atmosphere – requires a combination and integration of far-reaching initiatives for more social and technological *innovations* and a new *regulatory policy*. Regulatory policy needs to create framework conditions for the Social Market Economy, so that justice, responsibility and economic and political freedom can be cultivated and positioned for the long-term future. Policies supporting innovations for sustainability also need to consider which innovations are to be strategically targeted, and which instruments and incentives can be used to achieve this.

Evolving to a more bio-based economy, a *bioeconomy*, is an important part of the solution. The bioeconomy concept will be presented here as a central, strategic component capable of serving the three dimensions of environmental, social and economic sustainability. The bioeconomy is the 'knowledge-based production and use of biological resources, processes and principles in order to provide products and services in all economic sectors as part of a sustainable economic system.'²⁵⁶ The bioeconomy is not the brainchild of science or politics. It is driven by three fundamental forces: New technological opportunities, the phase-out of fossil energy sources, and consumer behaviour that is increasingly geared around sustainability.²⁵⁷

The circular economy and bioeconomy are sometimes compared against one another, which is inappropriate. These are rather complementary approaches. Both are part of the Social Market Economy's necessary evolution towards sustainability. But a circular economy alone would hardly be able to bring about the transformation to a post-fossil age. Like the bioeconomy, the circular economy, which focuses on material flows and their usage routes, is not *per se* sus-

tainable. It always needs to reflect on the resource costs and external effects actually caused by the 'circulation' (including recycling). The bioeconomy extends well beyond the circular economy by placing the focus on social, environmental and economic sustainability.²⁵⁸

The evolution of the 'sustainable bioeconomy' concept

Nature and the natural resources that have formed over millennia are the bases of human existence. They have been visibly used and, in some cases, irreversibly damaged or destroyed. Extensive declines have become apparent in vital resources, particularly soil fertility, drinking-water supplies, flora and fauna, forests and biodiversity. Many raw materials used by urban companies, such as coal, crude oil, natural gas and sand for cement, have become scarce in the sense that increasingly complex and often environmentally harmful measures need to be taken in order to extract them. Given the current production methods and consumption patterns of industrialised nations, these challenges are only set to further impact the environment, at the cost of supply security for future generations. The ongoing degradation of the world's soils is a key example.²⁵⁹

Ever since the 1970s, there have been economic theories linking the Social Market Economy and a liberal-democratic social order with environmental sustainability. Today's bioeconomy continues this tradition. It must be seen as one of the comprehensive concepts providing solutions and new approaches to the aforementioned major challenges. The bioeconomy is modelled on the cycles of nature and the particular skills of organisms and entire ecosystems. They can multiply, fix each other and adapt to environmental changes. Georgescu-Roegen can be considered the founder of the term 'bioeconomics', and a pioneer of environmentally oriented economic theory. He applied the laws of thermodynamics to economic issues, deriving far-reaching consequences for economical use of non-renewable resources.²⁶⁰

In industrial production and agriculture, large volumes of energy and resources go unused for physical reasons, and get 'lost' in an economic sense, e. g. in the form of waste heat, frictional losses or waste. Even with recycling – i. e. in the circular economy –, only some used raw materials can be recovered, and only with further use of energy and materials. Georgescu-Roegen called for an end to resource wastage, as well as a refocusing of social values towards what we now refer to as sustainability.²⁶¹

Today's bioeconomy concept was developed in politics and science in the 2000s. It is geared around the fundamental ideas of bioeconomics from the 1970s but sees more opportunities in technological and social innovations. In recent years, rapid progress has been achieved in many areas of biomedical and life sciences, particularly genomics, and, coupled with digitisation and IT, this now facilitates innovations for sustainability. The life sciences encompass various fields of research, such as biology, biochemistry, bioinformatics, biomedicine, biophysics, bio and gene technology, nutritional sciences, agricultural sciences, food technology, medicine, medical technology, pharmacy and pharmacology, environmental management and environmental engineering. New findings in these fields are the starting point and sources of hope for new inventions and shift towards a more sustainable society.²⁶²

The evolution of bioeconomy policy

While the first bioeconomy policy strategies of the 2000s focused on transitioning from an economy based on fossil fuels to an economy based on renewable commodities, more recent strategies are more clearly oriented towards the Sustainable Development Goals.²⁶³ The core elements of such a 'transformative' bioeconomy policy were established in a communiqué by the second Global Bioeconomy Summit.²⁶⁴

They emphasise

- a. A focus on sustainability goals, particularly the United Nations' 2030 Agenda;
- b. Protecting and regenerating ecosystems and natural resources as the basis of human existence, particularly agriculture, forestry, fishing and bioenergy sectors;
- c. The strong importance of research, knowledge and innovation for sustainable bioeconomics;
- d. The importance of good governance for sustainable production and use of renewable resources.

Intangible resources in the form of intellectual and cultural capital are also vital to developing a sustainable bioeconomy. The demand aspect of the bioeconomy is also a factor, as bioeconomic products need to prove their worth on the market. Modified consumer behaviour is part of a bioeconomy, except that the 'bio-based' element is not clearly defined and has so far been subject to varying interpretations by consumers.²⁶⁵

The economic importance of the bioeconomy today

The bioeconomy is, on the one hand, a very old and traditional concept (bread-baking, beer-brewing, food preservation, charcoal production, animal husbandry, natural medicine and cosmetics), and, on the other hand, new and innovative (biopharmaceuticals, bio-based plastics and compounds, environmental biotechnology).

Bioeconomics play an important role in practically all economies – in the form of agriculture, forestry and fishing, as well as the food industry and bioenergy. In the EU, the bioeconomy contributed to a total

annual turnover of around 2,259 billion Euros in 2015, and it employed more than 18 million workers. This amounts to 8.2 per cent of total employment. The innovative bioeconomy (bio-based chemicals, pharmaceuticals and plastics) generates 177 billion in revenue.²⁶⁶

Germany is Europe's largest bioeconomy, both in the classic food industry and in the innovative field of bio-based chemistry. The bioeconomy is growing particularly rapidly in the Americas and Asia; China's bioindustry had already generated a turnover of approximately USD 500 billion in 2018. More than 40 countries have now subscribed to bioeconomic strategies. Based on the aforementioned driving forces, it can be assumed that increasing biologisation will see the bioeconomy present across all economic sectors.²⁶⁷ The bioeconomy is thus not to be seen as a special economic sector, but rather – like digitisation – something that penetrates and alters the economy.

Critical challenges for the bioeconomy

Like any strategic innovation, the bioeconomy has also faced criticism.²⁶⁸ In view of established process technologies, it has, for one, been rejected by several traditional industries, such as parts of the chemicals industry which want to keep focusing on fossil fuels and which give little priority to negative external impacts on the environment or climate. Others, meanwhile, reject it for eco-philosophical reasons, for fear of 'marketising' nature, and because they see no future in 'biologising' economics. The bioeconomy is claimed to be dependent on biotechnological innovations, which many simply reject.

But this criticism neglects to mention that the bioeconomy involves innovative processes that also occur in nature. Finally, many see the bioeconomy as primarily being a form of using biomass at the expense of forests and in competition with scarce agricultural products, particularly food. All these concerns need to be taken seriously, because a bioeconomy is not *per se* sustainable, it needs to be made sustaina-

ble. Its environmental sustainability only becomes apparent when the economy's resource efficiency improves, whereby all external effects as well as the so-called rebound effects of modified usage and consumption behaviour need to be incorporated. This requires clear concepts for measuring the bioeconomic aspect.²⁶⁹

A bioeconomy must first serve to secure food supply. It must not, as was the case in the misplaced euphoria of the early 2000s, be seen as a far-reaching alternative to oil but rather as part of the renewable-energy portfolio. A bioeconomy must brace for limited biomass availability and must not be misconstrued as a 'biomass strategy'. We owe life on earth to a unique cycle in which solar energy is stored in all kinds of plants through photosynthesis.

In the specialist literature, plants are often referred to as biomass in terms of their universal function as renewable, energy-rich sources of carbon. When biomass decomposes, it produces CO₂ and water which are required for photosynthesis. Some 60 billion tonnes of biomass (measured as dry matter) in rural areas such as forests, meadows, steppes and fields are generated annually and a quarter of this growing biomass is already being used by humans.²⁷⁰ Most plants serve as food, particularly for animal feed. But fuels, construction materials and raw materials for chemistry and industry also play a key role.²⁷¹ Climate policy is placing a great and increasing emphasis on binding CO₂ from the atmosphere in woodlands, agroforests, wetlands, grasslands and topsoils. These all constitute potential investment focuses for internationally transferred mitigation of German greenhouse gases as per Article 6 of the Paris Climate Agreement.

To meet the growing demand for food and bio-based raw materials, estimates have shown that agricultural production, for example, needs to virtually double by 2050.²⁷² Expanding farmland beyond the recultivation of soils, however, is not advisable given carbon sequestration in forests, climate change, and the protection of species and

resources.²⁷³ Under no circumstances can or should bioeconomy policy thus focus on substituting fossil-based resources one-for-one with bio-based resources while continuing previous subsistence strategies, production methods and consumption behaviours. This would be virtually impossible for quantitative reasons alone and would have far-reaching negative consequences for the environment and society.

Experience with an expansive, non-sustainable bioenergy policy has shown that the increased demand for biological resources can intensify the competition for farmland and thus result in unwanted changes to land use (e.g. forest clearances, monocultures) as well as price increases for staple foods.²⁷⁴ Bioeconomic strategies with a local value-added focus have recently been developed – partly as a counterpoint to globalised biomass trading with undesirable impacts in distant countries.²⁷⁵

Bioeconomic solutions in practice

Creating a sustainable bioeconomy requires social engagement, extensive innovations and improvements in all areas of business and life. Technological, social and institutional innovations are all called for. Below are some examples in various relevant areas of life:

- **Food:** When it comes to food, incentives and product modifications can be used to reduce food wastage.²⁷⁶ Social innovations, such as personal shopping lists on Smartphones, food-sharing networks and cooking classes using leftover food, show that a lot can be done at the consumers' end to combat food wastage. Some bioeconomic startups are working on alternatives to animal protein. High-protein milk, dairy and egg substitutes are already on the market, and startups are in the trial phase of bringing synthetic (biotechnical) manufacturing of meat from the laboratory into production.

- › **Agriculture:** In agriculture, rapid success can be achieved when it comes to curbing water consumption and tackling soil degradation.²⁷⁷ Technological solutions exist in improved cultivation of high-yield, resistant, undemanding plants. This will be highly important given climate change and increasingly scarce resources. Precision agriculture can use automatic data collection to generate new knowledge and provide farmers all over the world with information for optimum land management. Developers of mini field robots expect it will be possible to cultivate more biodiversity, protect soils, largely contain diseases, and do away with almost all pesticides and herbicides. ‘Urban farming’ is the catchphrase used to describe projects aimed at producing food in major cities, with a view to supplying the population with fresh vegetables, fruit and fish. We are also observing a number of new civic initiatives to use fallow land or vacant buildings to grow food or for bioeconomic projects.²⁷⁸
- › **Textiles:** When it comes to clothing, our lifestyles and the ‘fast fashion’ business model have resulted in incredible resource wastage. Bio-based innovations can help sustainably transform the clothing industry. Examples include environmentally friendly textiles which can be obtained efficiently from cellulose fibres which are biodegradable, treated with environmentally friendly tannins or pigments and are protected against wind and moisture through bio-based coatings.²⁷⁹
- › **Cities and living:** Extensive concepts for ‘biocities’ and sustainable living are also developed in a bioeconomy.²⁸⁰ Biocities are geared around the principles of natural cycles and aim for high quality of life as well as a health-promoting lifestyle for everyone. In addition to renewable and environmentally friendly construction materials which can even be used in modern high-rise,²⁸¹ these concepts also revolve around closing materials cycles in cities. This relates to reusing materials, obtaining bioenergy from organic waste and

sewage as well as biotechnologically recovering scarce resources from sewage (e. g. phosphorus) and residual materials (e. g. precious metals). Architecture utilises *in-situ* factors and biological knowledge to create natural shade, cooling or heating in buildings and even entire urban districts. Greenery is used strategically to provide shade, to purify the air, as places for people to relax and exercise, to protect biodiversity and as a water store and regulator.

- › The 17 Sustainable Development Goals (SDGs) enacted in 2015 (2030 Agenda) require all regions of the world to rethink and restructure the key aspects of modern societies. A sustainable bioeconomy is required in order to achieve most of the 17 SDGs, particularly in the case of worldwide food security and quality (goal 2), health (goal 3), access to water and sanitation (goal 6), affordable and clean energy (goal 7), sustainable innovation and industrialisation (goal 9), sustainable consumption and production (goal 12), sustainable and inclusive economic growth (goal 8), and climate action (goal 13). As such, a bioeconomy must be designed in such a way that it helps preserve natural resources, ecosystems and biodiversity, and contributes to regeneration processes (goals 14 and 15).

Political course for the bioeconomy

The road to a sustainable bioeconomy will be more of an evolution than a ‘transformation’. There is no foreseeable ‘end’ to the bioeconomic evolutionary process. Imagining an end state in a new, stable, sustainable ‘post-transformation era’ would not be realistic – not at a German, European or global level. We do not know how economic, social and environmental dynamics will develop in the Anthropocene. Policy should thus concentrate on navigating into the sustainable bioeconomic evolution, learning to use new information, experimenting, testing innovations and always extensively involving the population.

Below are a few points of reference for such a navigation:

1. Regulatory policy must enable and stimulate the evolutionary further development of the Social Market Economy. This includes *setting strong incentives for innovations promoting sustainability*. This may include combinations of tax incentives for established businesses, capital incentives for startups, state funding for research and implementation in the bioeconomy, or results-oriented transfer payments as well as rules involving requirements and bans.
2. The simultaneous challenges associated with the destruction of nature and the environment, along with the profound restructuring of the working world (caused by digitisation), must be addressed jointly when it comes to the future of the Social Market Economy. *The future of humans, nature and the working world need to be considered collectively and considered in coherent regulatory policy*. One implication is that taxing the employment factor should be reduced, and tax on capital and excessive resource usage should be increased.
3. The shift to a bioeconomy requires *respect and appreciation for nature* as a source of unique inspiration and the basis of human existence. This goes hand in hand with switching to much more efficient, sustainable use of natural resources. Organisational and technical innovations such as cascade use and biological cycle systems offer considerable options, reduce environmental damage and should also include non-market-oriented ecosystem services such as water purification.
4. The bioeconomy requires and enables innovations from life-science research to be used for better, more sustainable subsistence strategies. No one can see into the future, but there are examples of such transformative innovations. One of these could be artificial photosynthesis if it becomes possible to obtain high-quality carbon directly from sunlight, water and CO₂ in an energy-effi-

cient manner. Another example is the use of DNA as a data store, which would only require a fraction of the energy and space of previous electronic stores. These sorts of far-reaching innovations are usually only successful when combined with advancements in other fields of research, i. e. in an interdisciplinary and transdisciplinary setting. *Research policy remains necessary over the long term to implement the bioeconomy on a large scale.*

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Spotlights: Agriculture, continent by continent²⁸²

Reports from Latin America, Asia and Africa

Nicole Stopfer, Christian Hübner & Anja Berretta (2020)

Asia

Recent developments in the agricultural sector in Asia can be regarded in a positive light. The application of new agrotechnologies and cultivation methods and the use of genetically modified crops have increased production capacities substantially. As a result, chronic food shortages in poor communities and the associated health risks, particularly for newborns and infants, could be considerably reduced. Although rice is still the staple crop, fishing, livestock farming and fruit and vegetable growing are now increasingly contributing to the population's diet. Nevertheless, a high degree of social and agricultural heterogeneity continues to be a key characteristic of the region. Areas can still be found today where food is in short supply and malnutrition remains a widespread phenomenon. There is a clear regional divide in this respect, with the countries of South Asia lagging behind those of East and South East Asia. It is also worth noting that, in many Asian countries, a significant proportion of the population is engaged in agricultural work, making this sector as a whole very important economically.

In addition to the increasing demand for food, climate change is one of the greatest challenges facing farming in Asia. Droughts, floods, worsening weather extremes, melting glaciers and rising sea levels are already causing severe disruptions to the food supply. Rising sea levels are reducing the amount of land available for agricultural production and salinising the soil. Weather extremes are inhibiting plant growth and destroying entire harvests. The financial markets anticipate and amplify this trend by withholding investments in agriculture due to the increased risk, thereby triggering a vicious circle. According to recent studies, wheat production in South Asia is expected to drop by up to 50 per cent by 2050 compared with the year 2000. In the East Asia and Pacific regions, rice cultivation losses could be as high as 20 per cent. Climate change thus represents a threat to the recent advances in the agricultural sector.

Afghanistan, Bangladesh, Cambodia, Vietnam, India, Laos, Myanmar and Nepal are particularly affected by climate change. In addition to mountainous regions, the threat here is primarily focused on coastal areas, where most people live and where the main land used for agriculture is located. In Vietnam, the Mekong River flows into the South China Sea via a wide, winding river system. The region is densely populated and a principal area of rice cultivation, which serves the needs of several million people. Fruit and seafood are also harvested here. Even today, a rise in sea level can be observed in the region, reducing the amount of land available for agricultural cultivation. The salinisation of freshwater resources is greatly exacerbating the situation. On top of these issues, new animal diseases are emerging, as are infectious diseases that can affect humans. Forecasts indicate that Vietnam's economic growth may be impaired as a result. Against this background, an increase in migration to cities is already apparent today. The pressure of urbanisation is growing due to climate change.

The action taken by local authorities in response to this development includes encouraging the cultivation of more resistant varieties of cereals and fruit. In addition, there is a move towards a reduction in

monoculture practices overall. Another approach is to use rice-growing areas for shrimp farming on a rotational basis. However, as well as large quantities of fresh water, shrimp also need antibiotics to prevent disease. Both have negative side effects. The increased use of fresh water leads to land subsidence, which makes the rise in sea level caused by climate change even more pronounced. The extensive use of antibiotics results in considerable risks to health due to the development of resistance. A similar trend can also be observed in the densely populated Ganges Delta.

The changing climatic conditions are also very much in evidence in countries in the mountainous regions of Asia. Nepal, a country with various climate systems and a great diversity of plants and animals, is particularly affected. More extreme levels of rainfall in summer and increasing drought conditions in winter are causing major problems for the agricultural sector here. The intention is that new plant species, new technologies, improved agricultural management systems and varying growing cycles for cereal cultivation will mitigate the effects. For example, water-intensive rice plantations are to be replaced in certain areas by crops of millet, which require less water. The diversification strategy also affects maize growing, with plans to switch to bean farming. To combat soil erosion, coffee, lemon trees, grasses and cardamom plants will be incorporated into crop plans for terraced fields. Local farmers, who have been working the land in mountainous areas under extreme conditions for centuries, are under huge pressure to adapt. When combined with modern climate research, however, their cultural knowledge of traditional farming methods provides a good foundation for coping strategies.

The greatest danger to countries in mountainous areas is posed by flooding as a result of the annual monsoon rains, which can threaten not only the agricultural sector but also, without warning, people's lives. In particular, the catastrophic floods in India, Pakistan and Bangladesh in recent years are a cause for great concern. The organisa-

tion of early warning systems and protection mechanisms to prevent disasters in these regions is still in its infancy and in need of urgent expansion.

Climate change has a particularly dramatic impact on the agricultural sector in Asia. Recent progress in combatting malnutrition is in jeopardy, and the ability of farmers to adapt is being stretched to the limit. The onus is therefore on political decision makers to develop strategies for long-term mitigation. The establishment of management systems that combine cultural and traditional knowledge with the latest climate research and the creation of effective disaster prevention mechanisms will be of vital importance.

Latin America

Climate change has undoubtedly also begun to make its mark on agriculture in Latin America. It is not only extreme weather events such as droughts and heatwaves that are having a direct impact on crop production and livestock farming, so too are heavy rainfall and flooding. In the long term, this means declining yields, lower revenues and rising prices. While farmers try to adapt to new weather conditions, income and food security are the greatest threats climate change poses to Latin America's agricultural sector. At the same time, farmers are confronted with another problem: agriculture is one of the main producers of the greenhouse gases that are damaging the climate, and the sector is increasingly blamed for its role in climate change. The debate over climate protection is therefore in direct conflict with issues surrounding the very survival of Latin American farmers.

Latin America is a diverse continent. Nevertheless, many countries in the region have both climatic risks and socio-economic and cultural conditions in common, which influence their vulnerability to climate risks in similar ways. Agriculture in the Andean region – Bolivia,

Ecuador, Peru, Argentina and Chile – is characterised above all by small-scale farming structures where cultivation and production rely almost exclusively on the supply of water from glaciers. However, (tropical) glaciers have shrunk by up to 50 per cent in the last forty years. For a population that is for the most part very poor, the melting of glaciers signals a dramatic change and threatens to destroy traditional cultivation and production structures. As a result, the rate of migration to nearby cities is increasing, further intensifying the pressure of urbanisation on Latin America's megalopolises.

In Central America, a region that historically has few water sources of its own, farmers have nevertheless previously been able to rely on regular rainy seasons. However, prolonged periods of drought in the so-called "Dry Corridor", i. e. on the Pacific coasts of Guatemala, El Salvador, Honduras, Nicaragua and Costa Rica, are now leading to six-figure losses. Owing to a lack of alternative employment opportunities, a growing exodus of farmers is being reported in Central America too.

In the Amazon region in particular, the available water supply structures are plagued by more frequent droughts as well as extreme flooding. At the same time, there has been an (often uncontrolled) expansion of the land area used for agriculture – a trend that has already led to conflict between farmers, agricultural corporations and indigenous groups in the past. Climate change thus also has the potential to further increase pressure on land use and intensify existing points of friction. To make matters worse, the loss of forests caused by human activity is being accelerated by more frequent heatwaves with the result that the climate is progressively losing carbon regulators, such as the Amazon rainforest. In Brazil in particular, one of the largest Latin American producers of agricultural products such as soya, maize and beef, this change is associated with considerable economic risks.

The impacts of climate change on agriculture in Latin America are as complex as the reactions to it. In the region, adaptation to climate

change remains the agricultural sector's greatest challenge. At the same time, this adaptation process must be carried out in line with a risk management strategy.

For this reason, some countries have already invested in improved agricultural management and technological innovation. One of the steps taken in Central America has been to expand artificial irrigation systems. Disaster risk management is also being introduced in some regions. Some other governments have also implemented emergency measures. However, migration movements and the many potential sources of conflict indicate that there is still no long-term strategy for dealing with the altered climatic conditions that will actually strengthen the agricultural sector, especially in rural areas. State controls, community-level structures and expertise are required to make the definitive link between both mitigation and adaptation strategies and climate protection. This need is highlighted not least by the annual (uncontrolled) fires in the Amazon region.

It is also undeniable that agriculture is closely linked to food security and economic income. With this in mind, the agricultural sector faces a particularly challenging task when it comes to adapting to climate change while simultaneously protecting the climate. For large sections of the population, farming is the main source of income. At the same time, as an economic sector it has a considerable impact on the environment.

With Latin America now producing about 20 per cent of the world's food supply, the international significance of the issue must not be forgotten either. Any disruptions to agriculture in Latin America therefore entail direct risks to the global food market.

However, the consequences of climate change also open up opportunities. If these are to be exploited successfully in the long term, farmers must be able to avert the risks of climate change. Adapting to chang-

ing conditions will only be possible if local people are involved in decision-making processes through the offer of training programmes and motivated to develop their own strategies and contribute their own knowledge about how to deal with climate change – knowledge that, in some cases, has been handed down over centuries. Last but not least, the similar climatic risks across the region present an opportunity to create regional synergies. These may include not only long-term political strategies and institutional structures but also trade agreements that are economically fair. It is only by strengthening those regions whose economies are increasingly being weakened by climate change that Latin America's agricultural sector will be able to make a sustainable contribution to climate protection.

Sub-Saharan Africa

In sub-Saharan Africa (SSA), economic output is heavily dependent on agricultural production, with farming accounting for over 50 per cent of gross domestic product in some countries.

Given the sector's role in the region, it is important to understand the impact of climate change on agriculture on the continent of Africa. However, there is an absence of robust data for estimating how food production will change as temperatures rise. This is due partly to uncertainty about future temperature trends and partly to the poor quality of the available data. African governments could remedy this situation and make the systematic collection and analysis of data a priority in order to strengthen the adaptive capacity of individual countries.

Adaptation to the consequences of climate change in the agricultural sector is also hampered by the lack of financial resources. As in other sectors, there is a fundamental shortage of private investment and, compared at global level, very little money from international climate

funds is channelled into sub-Saharan Africa. In order to increase both private investment and international compensation payments, good governance and independent institutions are prerequisites, as called for by Goal 16 of the United Nations' Agenda for Sustainable Development.

Agricultural productivity is closely linked to establishing food security – a process that is being slowed down by climate change. Along with population growth in SSA, climate change is therefore the second major factor putting the achievement of Goal 2 of the UN Agenda for Sustainable Development at risk (“End hunger, achieve food security and improved nutrition and promote sustainable agriculture”).

The effects of climate change also extend beyond the direct impact on agricultural production methods. In the area surrounding Lake Chad, the desperate situation arising in the wake of increasingly extreme weather events has also prompted poor farmers and fishermen to join the Islamist terrorist organisation Boko Haram. The region bordering Nigeria, Niger, Chad and Cameroon has been destabilised by a decades-long Islamist uprising that has uprooted 2.5 million people in one of the poorest areas of the world. Extreme weather events have exacerbated the conflict by depriving many people of their livelihoods and creating food shortages.

Around forty million people living in the Chad Basin depend on the water it provides for cereal cultivation, livestock farming, fishing and trade. The rains that fall around the lake leave behind fertile agricultural land, but the amount and the timing of the rainfall have become so unpredictable that people no longer know what to grow or when to grow it. This is where governments have a responsibility to help their populations cope with changes in weather by providing them with better data on rainfall and supporting them in finding new ways of making a living.

For climate-change adaptations to be efficient and effective, the following courses of action are open to the governments of individual African countries:

- › To examine and evaluate data concerning climate change and its impacts on agriculture more systematically and to formulate appropriate recommended actions.
- › To create better conditions for investment, especially for private investment, in order to improve the agricultural sector's ability to adapt.
- › To propose policy measures, such as training programmes for farmers, in order to improve the adaptability of food production systems while simultaneously mitigating impacts on rural incomes and education. Indirect investments, such as in improved transport routes and energy supply, will also be necessary in order to increase agricultural production.
- › The indirect consequences of a lack of food security and the impacts of climate change must be kept in mind at all times.

282 This article originally appeared (in German) under the title 'Landwirtschaft kontinental' in Die Politische Meinung, 65/560 (January/February 2020).

More sustainability in agriculture and the food industry – but how?²⁸³

Julia Klöckner (2019)

Let me start with a proposition: We will only achieve more sustainability in agriculture and the food industry if we make agriculture a project for society as a whole – if we involve everyone: Agriculture, trade, service providers and consumers.

We will begin with us consumers: Most of us endeavour to eat healthily. It is a challenging undertaking in everyday life. We want to be fit and healthy and often must battle excess weight and too much sitting at work. And for good reason since we can prevent many illnesses by adopting a healthier lifestyle.

According to the Robert Koch Institute, half of women and over 60 per cent of men in Germany are overweight. Nearly a fifth of adults are obese, i. e. morbidly overweight. Even more than 15 per cent of our children and adolescents struggle with excess weight.

Let me be clear: This is not about finding 'Germany's Next Top Model', but rather about preventing young people from developing adult-onset diabetes or suffering from cardiovascular problems – diseases with are diet-related.

The paradox is that we often find it difficult to change our consumption when it comes to our most precious asset: Our own health and body. Yet we are infinitely more motivated when it comes to something more

abstract: quickly acting when the environment, climate and animal welfare are at stake. While we have two unerring witnesses to our body in the form of scales and waistline, our behaviour in sustainability matters is initially only reflected in a column of figures. A column of figures that, for most of us, is neither verifiable nor traceable. Unlike our own body weight, our environmental footprint can only ever be an estimate influenced by many different factors that are difficult to quantify.

When it comes to personal consumption, we ask questions such as: Do I really have the power to change anything? Is my individual purchase decision relevant in terms of achieving global sustainability targets? How can my eating habits affect biodiversity or the climate? Not to mention the conflict of objectives we then grapple with.

In many areas, it is not even that easy to assess what the better, more sustainable option would be – the organic cucumbers from Spain or the cucumbers grown locally but using conventional farming methods?

Let us consider the example of apples: Local apples have a much better climate footprint in autumn. But after a few months in cold storage, it is a different story. By spring, apples coming from Chile or New Zealand can indeed be an equally good option.²⁸⁴

Regarding our own mobility, a one-kilometre drive in a conventional middle-class vehicle produces the same amount of climate-harming gases as farming and trading a kilogram of fresh vegetables.²⁸⁵

Fortunately, we have now largely progressed beyond the trench warfare between organic and conventional farming and instead focus on facts: Yields of organically farmed grain are about a quarter less than its conventionally farmed counterpart. Researchers from the University of Göttingen have thus come to the conclusion that completely converting agriculture would take up substantially more space, destroying the habitats of animals and plants.²⁸⁶ As simple as the 'organic farming is the only form of sustainable agriculture' mantra may appear, it is not.

What do we need to do to be successful when it comes to sustainability in agriculture and the food industry? The first and most important point is: We need to shift from the abstract to the concrete. We need more knowledge and more transparency, good consumer information. We need to know where it is worth changing our personal behaviour to effectively protect the environment and climate. And what positive impact this can have.

Sustainability as the basis of Christian Democratic politics

Getting down to specifics, our first question is: What does the term 'sustainability' actually mean? Contrary to popular belief, sustainability is not something that has been invented by certain political groups. Interpretative sovereignty over the term, the essence of what sustainability is, cannot be attributed to a specific political movement. The principle of sustainability was founded over 300 years ago. Faced with the threat of a commodity crisis, German forestry scientist Hans Carl von Carlowitz was the first to declare, in 1713, that timber should only be logged in quantities capable of being regrown through planned reforestation, seed-sowing and planting.

The mission of achieving sustainable economic activity is a deeply Christian one. It is based on the understanding that humans, nature and the environment are created by God. God assigns humans the task of taking responsibility for sustainably nourishing, maintaining and caring for the earth, to 'work and keep' the earth, as stated in Genesis 2:15, to handle our earth and its resources with care.

That is why I am very serious about the responsibility to treat this world in a way that enables many future generations to lead a good life. Acting with these future generations in mind means taking joint responsibility for preserving God's creation. Working for a world in which we do not use up the resources in a manner that leaves nothing but disad-

vantages for subsequent generations. Sustainability is the opposite of egotism and self-interest. Sustainability is common welfare for today and tomorrow.

The notion of sustainability is often regarded as a modern phenomenon. But the principle of sustainability can be found as far back as the Old Testament. During their time as nomads, Israel's tribes had to live in harmony with their barren natural environment. This led them to develop a remarkable sense of bioethics and sensitivity to their surrounds. In warfare, for instance, it was forbidden to cut down the opponent's trees (Deuteronomy 20:19), because it takes years, even decades, before trees can bear fruit again. Another example can be found in Deuteronomy 22:6–7: Anyone who comes across a bird's nest, with the mother sitting on the eggs, may only take the eggs or the young, but must let the mother go.

The principle of thinking of tomorrow and not wanting to exhaust all benefits today is an integral part of Christian-Democratic politics: We want to leave behind a liveable world for our offspring.

A future-oriented policy must consider environmental protection, conservation and climate protection in all areas of economic activity while also acknowledging economic productivity and its macroeconomic importance. Biotopes are thus important for sustainable jobs; economy, ecology and social responsibility are inextricably linked. Because 'what is not social cannot truly be sustainable (...) and vice versa: what's not sustainable ultimately is not social either.'²⁸⁷

Qualitative growth

This notion also underlies the basic concept of the Social Market Economy – another key component of Christian Democratic politics. This concept also states that every market participant is liable for the consequences of their economic decisions.²⁸⁸ In this regard, the Social Market

Economy's task is not to leave behind a 'burnt earth', but to structure economic growth and development processes in a resource-friendly manner for future generations. Thinking about those who will come after us.

This guideline also applies to the future focus of our agricultural industry. It recognises that agriculture is business. And business needs opportunity to grow in order to ensure a living for families and workers. I firmly believe that qualitative, sustainable growth is crucial for economic development since it creates room and energy for innovation. Yet it would be wrong to define growth one-dimensionally. This is particularly true for an economic sector which requires us to treat animals – as our fellow creatures – responsibly and in which we affect the state of the water, air and soil.

If we irreversibly damage the foundations of our existence, we also destroy our future. There hence cannot be an economy without sustainability. Sustainability is a prerequisite for lasting wealth. Sustainability is the foundation of the intergenerational contract! Growth thus cannot be seen merely as a matter of 'more' or 'faster' at the expense of others. Having more and more animals per area, more wheat per hectare will not take us further. It is rather about being *better*; about qualitative growth.

German winegrowers are a good example of how the concept of 'quality over quantity' leads to long-term success. Following the crisis phase of the 1980s, they refocused, produced less wine and instead focused on quality, on better marketing of premium products. And they were successful. Winegrowers today are much better positioned than in times when many were concentrating primarily on quantity.

Our preferred idea of growth and therefore progress thus requires innovations. We need resource-friendly growth and a form of economic activity that does not overexploit the bases of its own success. We need new ideas and a greater focus on holistic aspects of sustainability, including measurability and reviewing of concrete factors. The

criteria for this need to be defined beyond just 'organic'. How can sustainability become a tangible, measurable variable?

Investments in new technologies play a key role. We need smart solutions for better stables and more sophisticated cultivation practices. These are also investments in sustainability. We have to be crystal clear: New technologies will only be successful if they are combined with more efficiency and value without destroying the bases of food production or literally 'leaching' them out. The state also plays an important part in this process. It can become the catalyst that drives innovations, initiates research, accelerates practical tests, and gains new findings through models and demonstrations or illustrates their added value.

Sustainable agriculture is digital

I have great expectations for an increasingly digitised agricultural industry. Germany currently has around 270,000 agricultural businesses. One in two farmers and subcontractors is already engaged in 'smart farming'. Six per cent are planning to go digital, and 24 per cent are at least discussing it. Thirty-nine per cent of farmers use agricultural machinery equipped with state-of-the-art digital technology. Fifty-one per cent of cattle-farming businesses have robotic feeders. Four per cent already use drones, whether to combat harmful organisms or to protect against wild animals in the field during grass harvesting. Digitisation is already an integral part of training. The cold, hard facts may be one thing, but what exactly do they mean?

GPS-based tractors that use satellite controls to work with utmost precision, to drive accurately over the fields, and thus to ensure optimum resource-efficiency have already been in use for years. Thanks to steering aids and tracking, a tractor with GPS receiver and correction signal can be controlled to an accuracy of within two centimetres. Coupled with suitable farming machinery, this enables equipment to be brought onto or into the ground precisely and without any overlap.

The same applies for pest-management measures. Situation-based section control, speed-dependent volume-flow regulation and software to optimise resource usage have long been standard technology when it comes to manure distributors and field sprayers.

Digital farm-management systems are also widespread these days. They make documentation easier, digitally recording and storing operational processes. Robotic milking machines have long ceased to be merely a future fantasy; they are now the option of choice at medium-sized establishments. Not only do they make farmers' everyday work easier, they also record the quality of the milk or the cows' vital signs, enabling better control to protect the animals. Automatic feeder systems are used particularly in cattle-farming. They are even capable of allocating individual rations to each animal, supporting animal health. Digital analytical methods are used to assess animal-health parameters, and farmers are able to detect diseases earlier. Efficiency and sustainability go hand in hand here.

Digitisation within stables is also aimed at helping farmers to be able to refocus on looking after animals. The robots can provide food and clear away dung. The coordination of feeding, ventilation and dung removal is beneficial for animals, humans and the environment. Animals are more than technical data sets in Agriculture 4.0. They are fellow creatures for which we are responsible. Farmers know that they work amongst and with nature, which is subject to many fluctuations with the sun, wind and weather. We experienced this during the drought of summer 2018. This is another reason farming families can never fully relinquish their responsibility to technology.

Yet the issue of digitisation is often associated with restraints. Consumers still prefer to maintain their romantic nostalgic idea of our agricultural industry. Farmers, meanwhile, wonder how these technologies will change farming. High-tech will be increasingly fused with nature. We will get used to driving past idyllic-looking fields where self-driving machines are at work. Driverless robots are already being

used in special applications, such as vegetable-growing. Apple-picking robots are already working on plantations in New Zealand. They have replaced the seasonal workers who were already lacking. But this also means that smaller-scale cultivation will once again become possible, replacing the monocultures we commonly see today. Automatic harvesting machines are being developed for fruit and vegetable-growing. Given that it is becoming more and more difficult for farming businesses to find harvest hands, this is an exciting prospect.

There is a long way to go before digitisation can unlock its full potential. Just because something is new, it is not necessarily good, nor is it bad *per se*. Digitisation enables precision farming, fewer losses, and fewer pesticides and fertilisers and thereby enables greater precision across the board.

Sustainable agriculture – but how?

The agricultural policy of the future will take both consumer and farmer interests seriously. It will advocate competitiveness, animal welfare, environmental protection and conservation and sustainable economic activity in attractive rural areas. It will take responsibility for humans, animals and the environment. It will be clear about the fact that agriculture is a unique sector. It involves our food, our means for living. Farming is a challenging occupation that produces these means for living. Agriculture is the economy of life.

Animal welfare is a particularly important topic, particularly from a Christian perspective. We bear a significant responsibility for animals. They are our fellow creatures. The First Book of Moses, Verse 28, states: 'Be fruitful, and multiply, and replenish the earth, and subdue it: and have dominion over the fish of the sea, and over the fowl of the air, and over every living thing that moveth upon the earth.' That we are 'executors of a trust' for nature – as Hans Jonas calls it in his prominent 1979 work *The Imperative of Responsibility*²⁸⁹ – is not a banality for us Christians.

In future discussions about sustainable agriculture, we will have to face further debates about conflicting objectives, e. g. international competitiveness and animal welfare, securing harvests and reducing pesticides, growing new plants resistant to climate stress and the widespread social rejection of new cultivation methods. There can also be conflicts between conservation and animal welfare since animal husbandry generates more emissions if animals are kept more outdoors and less in stables, where air can be filtered.

We are already having some of these discussions within our 'agricultural bubble'. I firmly believe these aspects will end up playing an even greater role in deep social discussions.

But we need to already recognise that, in the social discussion about what type of farming we want, we may first need to take a step back in many aspects. We need to ask ourselves: 'What sort of farming do we have?' And this is where self-criticism is absolutely necessary.

The dominant image of 'factory farming' and 'industrialisation' does not match the reality of most agricultural businesses. Our farmers need to get out into society and engage in the latest means of communication. Our farmers need to utilise the opportunity to self-market on social networks like Twitter and Instagram, enabling them to broadcast their own images and messages. They need to help shape the debate, refrain from taking up a defensive position, and gain trust authentically and transparently.

We also need to consider trade as the third player as we have grown accustomed – or have been made accustomed – to not having to spend much money on our groceries. We are a nation of meat-bargain-hunters, almost as if we were still processing traumas from times of scarcity. In 2017, each German household spent 306 euros per month on food, including alcoholic drinks – that is 12.2 per cent of income.²⁹⁰ This percentage is 13.8 for transport, and 35.6 for living, power and home maintenance. Trade plays a significant role here since it pushes

the wage-price spiral down – by ensuring we hunt for special offers for particularly coveted foods instead of setting the benchmark on placing more value on our purchase decisions.

We need to value our food more

More quality is not just about things tasting better; but about them being manufactured sustainably. This costs money. The crux will be that to make this quality increase visible. This relates to ingredients and increasingly also to process quality. The challenge is that meat produced with a focus on animal welfare looks no different to other meat; organic milk cannot be visually distinguished from conventional milk. Packaging needs to do what the product cannot, which is why labels such as the animal welfare label are so important. Everyone – agriculture, trade and consumers – sits in the same boat here.

Consumers want this added process quality in many areas. Most people in Germany want to do more for animal welfare. The latest consumer surveys show that the vast majority (90 per cent) are prepared to pay more for food if it means the animals are looked after better. But consumer behaviour is a different kettle of fish. Around 80 per cent demand state-run animal-welfare labelling. In other words, state-run labelling creates more sustainability. It enables consumers to recognise products that have been manufactured in accordance with standards higher than the legal minimum standards, and to factor this into their purchase decision because a government seal is credible. Animal-welfare labels are just one of many steps we need to take to fulfil our mission of showing due care for our fellow creatures.

Our aim must therefore be to highlight the added value of better products for consumers; that is the key. If I value something, I will look after it better and will not just get rid of it.

Saving food – not throwing it away

This brings me to another key issue: fundamentally valuing food. Achieving this is no mean feat since we are living not only in a bargain-driven society, but also in a society of plenty. Snacks and fast-food is at every corner, the supermarket is open virtually around the clock – and, at home, it's no longer a case of 'what do we have left in the fridge?' but rather 'what do we feel like today – Indian, sushi or pizza?' The consequences are fatal: Around eleven million tonnes of food end up in the rubbish in Germany every year.

Every piece of edible food that ends up in the rubbish is one too many. Every bit of food thrown away leaves a deep environmental and even social footprint. Our food contains precious resources: Water, energy and raw materials as well as labour, care, heart and soul. There are valuable resources inside every piece of food produced – for example, around 70 litres of water in any apple on the supermarket shelf and a whopping 5,000 litres in a kilogram of cheese.

There is lack of respect for food and their produces, not to mention our ethical responsibility. Over 800 million people around the world are starving. Given this knowledge, how can we throw away even a single slice of bread?

The good news is that awareness is growing. The media regularly report on startups and restaurants seeking to reduce food waste. Even at official dinners, guests are encouraged to take leftover food home with them. Saving food is 'in' and in many cases results in clever business models. The federal government is supporting these activities by introducing a strategy to reduce food wastage by half by 2030. In other words, we are seeing a trend reversal. There is a growing number of smart ideas that considerably help reduce the intolerable volumes of food waste and make our diets more sustainable.

It is not for me to judge, but I grew up in an environment where respecting food and the work of others was a given. It is therefore essential for me that this basic idea gains more traction in our throw-away culture. Recycling leftovers and passing things on for reuse may be easier in rural areas and intragenerational communities than in the city. Many people, for instance, do not know that you can still consume food even after its expiry date. We need to find solutions that move away from rigid regulations when it comes to non-perishable foods like pasta or rice. ‘Smell, try, enjoy’ is the motto, and this needs to be conveyed to even the youngest members of society. Hence education about food and nutrition is so important. Trusting one’s own senses, being familiar with food and its properties, and being able to prepare delicious meals using leftovers are all priceless aspects when it comes to reducing food waste.

The consumers decide

Consumers are indispensable. I sometimes think that they do not realise their influence. Their demand, their purchase determines what is sold in shops, what trade demands from farmers, what the retail market produces, and how.

Our task therefore is to include consumers in the journey to sustainability. This requires transparency. We need to define criteria for what is sustainable and what contribution everyone can make. At the same time, we also need to focus on innovative agriculture in which progress, sustainability and economic focus are contingent upon each other.

The chances seem promising. More and more people recognise their personal responsibility and are indeed willing to bear it. Their demands from manufacturers and retailers can provide a valuable boost to sustainability and quality of life worldwide. Their everyday behaviour plays a considerable part in determining whether resources are protected and whether food is handled responsibly.

it will, however, be important not to pursue one-dimensional, ideological concepts. It constantly irritates me to see agriculture relegated solely to the role of scapegoat when it comes to climate change. It rather is a major part of the solution because agricultural soils are natural carbon stores, just like our forests.

Our task is clear: We need to develop more sustainably as a society and involve all players rather than exclude them. We need to give equal priority to the economic dimension of sustainability. In a market economy, production interacts closely with consumers and follows their wants and wishes. Our economic reality also brings feasibility! Idealism alone will not suffice. Sustainable products and technologies ‘Made in Germany’ need to be sold for businesses and jobs to have a future. We need to aim for sustainable growth and economic activity that does not overexploit the foundations of its own success.

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- 283 The original and unedited version of this text appeared in: R. Fücks & T. Köhler (ed.) (2019). *Soziale Marktwirtschaft ökologisch erneuern: Ökologische Innovationen, wirtschaftliche Chancen und soziale Teilhabe in Zeiten des Klimawandels* (Berlin: Konrad-Adenauer-Stiftung e. V.): 253–267.
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Climate-positive, sustainable agriculture is possible!²⁹¹

Cornerstones for a welfare-oriented agricultural policy

Franz-Theo Gottwald (2019)

Sustainable agriculture needs to be measured on how it copes with three central challenges: Ensuring food for a growing global population, protecting the climate, and preserving biodiversity and the natural bases of our existence. If the world managed to consistently keep these three hitherto conflicting objectives within planetary limits²⁹² during the 21st century, initial production as the first sector of any economy would be transformed for the benefit of future generations.

Published in 2019, a Forsa survey asked farmers in Germany about the future focus of German and European agricultural policy. It found that 44 per cent of farmers surveyed would prefer the funding system started providing more money for environmental protection and conservation and for compliance with environmental requirements as of 2030, and instead abolished the current flat-rate area payment.²⁹³ This shows that the profession largely supports the call to receive public money for public services. It is a demand that has been made on party platforms for many years, as well as by vast alliances between civil players from the fields of climate protection, environmental protection and conservation as well as representatives of future-oriented agricultural interest groups such as the German Dairy Farmers Association (Bundesverband deutscher Milchviehhalter) and the German Small Farmers Association (Arbeitsgemeinschaft bäuerlicher Landwirtschaft).

Many interest groups would thus welcome a shift in agricultural policy to securing the future of the climate and genetic diversity in liveable landscapes, while simultaneously securing food supply. This shift thus is possible. Its main feature consists of shifting attitudes towards common welfare, which is understood in terms of the Sustainable Development Goals: an economically robust, agroecologically diverse and socially compatible agricultural industry that gradually but clearly reduces its impact on the climate. This is the model within which the current regulatory framework would need to be restructured in order for Germany and Europe to have a comprehensive welfare-oriented agricultural industry by around 2030.

Climate-positive agriculture is possible

When it comes to the first challenge – that of protecting the climate through agriculture –, there is justified hope for a path of transformation over the coming decades. 'In some parts of the world, there are already pioneering businesses providing substantiated proof that it is possible to have climate-positive agriculture with high economic added value. The Hof Wies farm in the central Swiss town of Neuheim combines its cattle farming activities (60 cattle) with local fodder cultivation, the building of new topsoil, and tall fruit trees; it has also begun producing biochar and set up a composting plant. Instead of the average 115 tonnes of CO₂ equivalents per agricultural establishment (the usual emissions figure for Switzerland), Hof Wies extracts 380 tonnes of CO₂ from the atmosphere every year, making it significantly climate-positive. With over 13 hectares, this thus compensates for the CO₂ emissions generated by 65 Swiss citizens.'²⁹⁴

This has the potential to transform the entire agricultural sector. Agriculture, together with forestry and other land use, is responsible for around a quarter of greenhouse-gas emissions worldwide.²⁹⁵ These include nitrous-oxide emissions from nitrogen-containing soil fertilisers; methane emissions produced as part of certain farm ani-

mals' metabolic processes; CO₂ emissions from fossil fuels, which are released by farm machinery and when running agricultural facilities; emissions resulting from storing farm fertilisers and transporting preliminary products required for farming (seeds, animal feed); and emissions that harm the climate during the transportation of agricultural products (e. g. milk).

These numerous negative impacts on the climate make it difficult to envisage the globally agreed climate targets being implemented given agriculture in Germany and large parts of Europe stays as it is. Yet closing the carbon cycle associated with agriculture and forestry is essential for climate-neutral economic activity. Even farming interest groups like the German Farmers' Association (Deutscher Bauernverband) have recognised this and have consequently prepared relevant climate strategies.²⁹⁶ Successful implementation, however, also requires regulatory policy to set the course. Solving the climate problem requires more regulatory policy and an even greater scale of ambition.

Over the long-run, regulatory policy should focus on creating framework conditions enabling agriculture, forestry, horticulture and the fishing industry to effectively remove carbon emissions from the atmosphere. On a global scale, trees, plants, algae and topsoil build-up are able to bind climate-relevant volumes of greenhouse gases if carbon is successfully stored in the soil and in new biomaterials (biochar or construction materials).²⁹⁷

A number of agroecological practices, such as agro-forest systems, symbiotic agriculture, permaculture, companion fruit-planting and organic farming appear to be favourable options in terms of their impacts on the climate – which is why even the 2008 World Agriculture Report established that there was a high enough number of regionally adapted climate-friendly practices worldwide, and that these were simultaneously capable of providing sufficient food for a growing global population.²⁹⁸ More recently, in 2018, the World Future Council and FAO demonstrated how many exemplary, copy-worthy agro-

ecological practices existed worldwide. There hence are many options in agriculture, forestry and the fishing industry to achieve the socially desirable objective of protecting the climate.²⁹⁹ At a political level, this is about broadly enforcing the practically feasible and socially desired via suitable regulatory policy, and thus serving the interests of common welfare.

A corresponding minimum political requirement is reviewing all protective and support measures regarding their impacts on climate-positive practices in agriculture and forestry. Only those measures that promise to bring about transformations towards climate-neutrality viz. climate-positivity should be publicly financed.

Various studies have shown that the investments needed for a pivot to climate-positive agriculture could be raised macroeconomically through carbon pricing.³⁰⁰ An appropriate carbon price and regulated certificates market could also generate additional income for the agricultural industry if climate-friendly investments were made at the farm or in the forest. Topsoil-building is an easy example to follow here as topsoil is known to bind CO₂.³⁰¹

The price per tonne of greenhouse gas emissions is crucial here. Given the currently differing calculations per tonne of CO₂, political willingness is necessary to come to an agreement. Taking climate action seriously across society as a whole, and enforcing it through politically consensual pricing and climate certificates, has already had initial success, as demonstrated by the EU Emissions Trading System. The innovation here, however, would be to identify a second level of mechanisms and enforce these in a legally robust manner, so that they can regulate how much of the price for compensation measures in the processing industry or food-service industry could ultimately benefit agricultural players achieving climate-neutrality or even climate-positivity.

In this context, regulatory policy would also need to specially focus on those businesses wanting to keep increasing their productivity, e. g.

for export, at the expense of the climate. The impact on the climate caused by the manufacturing of agricultural goods should, in short, constitute one of the key criteria for an eco-friendly reform of the agricultural sector.

Biodiversity and conservation

In addition to protecting the climate, it is also crucial for a welfare-oriented agricultural policy to ensure the biodiversity of flora and fauna is preserved, i. e. to ensure a reversal in the trend of biodiversity loss. Society is aware of the damage caused so far to nature and the environment (e. g. insect die-off, a decline of 300 million breeding pairs (57 percent) in bird populations in agricultural landscapes in the European Union between 1980 and 2010³⁰², water pollution, soil erosion etc.³⁰³) as a result of agricultural practices, and this must now be addressed and eliminated at a policy level. Some European countries have presented conservation and biodiversity strategies for this, aimed specifically at agricultural players.³⁰⁴

But a large part of the biodiversity loss and Europe's environmental impacts resulting from conventional agriculture also ties in with the dynamics of structural change in agriculture. This structural change has been sparked by concentration, specialisation, automation and intensification. The law of 'grow or give way' seems to apply here and has consequently led to ever larger business structures in primary production.

While, in previous decades, investment cycles in technological innovations, new framework conditions and funding programmes aided structural change, a mighty new player has recently emerged: Food retail. It demands and encourages a new structural change in agricultural production. In the competition with other bioeconomic sectors dependent on agricultural raw materials³⁰⁵, food retail also performs a broad-scale vertical-integration task and expects switches to be made in production to help the environment and prevent further biodiversity loss.

This includes, for example, various campaigns to protect insects³⁰⁶ and, in particular, to promote regional and organic production. This vertical integration and the occasionally associated regional polarisation into new biodiversity hotspots, such as in Germany's Schwäbisch Hall region, demonstrate the economy's ability to self-structure as soon as an issue of market-defining importance or with the potential to offer a competitive edge arises. It also does justice to the existing geobiological diversity in rural areas, from mountainous regions to fertile lowlands.

The national or regional strategic plans needed for a new, pro-transformation agricultural policy promoting biodiversity offer other options, beyond this market self-structuring, for addressing regional differentiation through suitable measures. This could include promoting cooperative processes to prepare regional strategic concepts for sustainable rural development, focusing particularly on increasing biodiversity. As bottom-up participatory processes involving relevant stakeholders, these concepts could also contribute to the city-country ties that have been increasingly forged in an ever urbanising world.³⁰⁷

To support and finance rural development in this direction, funds would particularly need to be provided to pay for environmental, biodiversity and climate-related work. In its statement 'for a welfare-oriented Joint EU Agricultural Policy post-2020', the Scientific Advisory Council for Agricultural Policy, Food and Health-based Consumer Protection at the German Federal Ministry of Food and Agriculture makes the following recommendations:

- › *Expand support for protecting biodiversity in open landscapes as part of the Natura 2000 nature-protection network;*
- › *Additionally stipulate to the member states that, as part of their national strategy plans, they need to provide at least the same amount of funding for targeted agro-environmental and climate-policy measures as they do for the greening bonus, i. e. 30 percent of the current direct payments;*

- › *Further develop existing agro-environmental and climate-protection measures as customised instruments for various types of living environments, and give these a larger budget. It is important to take into account the challenges associated with making measures goal-oriented while also ensuring non-excessive administrative costs, industry-wide networking, and designing extensively used biodiversity reserves and agricultural structural elements. In particular:*
 - › *Incentives for regionally managing the environment and conservation measures should become more prevalent, e. g. bonuses staggered based on soil quality, or for interlinking priority areas for biodiversity;*
 - › *Results-oriented fee models should be further developed;*
 - › *The development of collective approaches to conservation and climate protection should be expedited. The Dutch model of collectively organised and regionally co-ordinated contract-based conservation may serve as inspiration here.³⁰⁸*

In this context, it is also fitting to mention the social dimension of sustainable development: Partnership-based activities, such as biodiversity partnerships or fauna/flora cultivation communities, are a good way of bringing a municipality's industry-wide farmers together more intensively than before, while simultaneously involving other partners from conservation and environmental protection as well as the municipal administration. With the involvement of other regionally focused economic and trading partners, this could enable the economic utilisation of special local or municipal features to be organised in a network-like structure, and facilitate new value chains that would also create new social obligations, and would thus increase a region's social capital.

But this requires policymakers to establish structures for participative regional management, in which moderation, mediation and coaching expertise is also available at an institutional level. Without institution-

alising networks enabling joint learning processes and the exchanging of information, without participation, without networking both on site and between the municipalities, there will not be any pro-biodiversity, pro-conservation rural development at a local or regional level. Vibrant, resilient rural areas will, in future, be more reliant than ever before on farmers not only seeing them as producers of raw materials, but also recognising their service-providing skills in the fields of conservation and biodiversity protection, i. e. rewarding them for their services to cultivate and maintain cultural landscapes.

Food security in the digital age

The central concepts of climate protection and protection of the natural environment encompass two of the three welfare-oriented areas of an agricultural industry set to be transformed by 2030. In an environmentally reformed Social Market Economy, the sub-targets applicable in these areas must be achieved alongside food security, despite a growing global population.

But part of this third aspect has already been achieved. At a calorific level, the productivity of the world's farmers is already enough to produce adequate food for everyone, even allowing for the global population to grow to ten billion. What is still yet to be achieved, however, is the fair distribution of food or fair worldwide access to food, as well as a reduction in crop losses and the prevention of food wastage.³⁰⁹ If policy were able to tackle these sub-objectives for long-term food security, the pressure on soil, water, flora, fauna and humans that results from constant efforts to increase productivity would not increase. If policy promoted improvements in, rather than the destruction of, fairness, crop yield and food use, there would be less pressure on agriculture to keep focusing on volume growth for human food security by 2050.

The capital and labour resources this would free up could be used to help advance the agro-economic reform of the agricultural indus-

try. On the one hand, agro-economic farming practices must be further developed on a region-specific basis. Wherever technical elements (machinery, data technology, biochemical substances) are employed here, these must be tested out as a new stage of co-production of human labour, natural production conditions and scientifically assessed or culturally passed-down know-how, and adapted to the regional factors. This initial additional expense requires financial incentives. On the other hand, further investments are needed to implement the imminent digitisation across the board. Digitisation is seen as a key driver of a market-based overall development of agriculture, the environment and rural areas.³¹⁰ As such, all possible should be done at a political level to accelerate the digitisation of value chains associated with food production, processing and marketing. This includes access to fast Internet for all businesses considering themselves players on the food-economics market. But it also includes supporting technologies that facilitate sustainable precision farming with practical research and land-driven, cyclical, location-based agriculture, or which enable eco-friendly modernisation.

As is becoming increasingly apparent, digitisation in precision livestock farming offers clear advantages for more efficient production. It enables better management of ventilation systems, feeding machines, robotic milking machines, stable cleaners and other measures intended to improve animal welfare and increase environmental protection. Animal-specific data (e. g. movement patterns, feeding, drinking and activity patterns) can also be collected for the benefit of animal welfare using algorithms and sensors, and can help improve animal-handling and achieve animal-friendly husbandry.

When it comes to crop production, precision-farming measures are already helping optimise production processes, e. g. in relation to fertiliser use, soil monitoring and pest management.

In Germany, for example, more than 50 per cent of full-time farms are using digital solutions, 39 per cent use digital agricultural machin-

ery for soil-tending, sowing and harvesting, more than 51 per cent of farms use digital individual feeding equipment, and around 40 per cent use robot technology for milking or to clean stables.³¹¹

Increased digitisation worldwide will ensure the socially expected environmental and conservation targets can be implemented faster, along with improvements in animal welfare and climate protection. But this requires investment support from the public sector. And above all, it also requires business models for farmers, whose data can be used by manufacturers of agricultural machinery. If agriculture is increasingly becoming part of the digital economy, paying into the third sector of modern economies – the services industry – with its data, then this must pay off for farmers in future as a source of income.

However, digitisation, and its relevant information available to all market players, is also changing the type of food-security activities being conducted all over the world. It is the key to having truly networked global agricultural markets, as, over time and space, it creates a high degree of transparency regarding what quantities are available where and at what price. Internationally geared trade in agricultural raw materials is already utilising powerful information and communication tools, for purposes such as to structure feed flows.

There is also another, accelerating technology associated with transforming agriculture, particularly regarding the fifth generation of mobile communications. At the 27th Hülseberger Discussions in 2018, Gerhard P. Fettweis and Norman Franchi summarised the importance of the 5G network for digital agriculture as follows:

1. *The fifth generation of mobile communications, known as '5G', will enable us to connect everything to the Internet. The Internet of Things will allow us to monitor, digitise, manage and optimise the entire agricultural chain, producing considerably better results in terms of the use of pesticides and fertilisers, as well as yield, using less equipment and fewer materials.*

2. *5G will also mark the start of the Tactile Internet, which will expedite the automation of mobile devices in a way never seen before. This 'robotisation' of the world will enable significant advancements, particularly in agriculture.*
3. *The Tactile Internet will facilitate improvements in agriculture and enable particularly marked increases in terms of eco-friendliness and profitability.*
4. *The technology used in agriculture will change dramatically – through the development of completely new machinery, flexible cloud applications, further semi and fully-automation functions, and real-time teleoperation concepts. This needs to be recognised now, not only to advance the supply industry, but also to further develop farmers' understanding and expertise.*
5. *Farms will, with the help of a special local/private cloud installation, be able to systematically guarantee secure recording and storage of data. Based on this, and in symbiosis with access to mobile communications, they will run their own ad-hoc network on site and in the fields in order to cost-effectively maximise the possibilities of the Tactile Internet.*
6. *Agriculture needs its own ad-hoc radio-network solutions capable of meeting the functional requirements of latency, bandwidth, coverage and availability for specific geographic boundary conditions.*
7. *Through its strong expertise in agricultural-machinery engineering, agricultural processes, and the integration and application of information and communication technologies, Germany is in pole position to be an international leader in the Tactile Internet's rollout for the agricultural industry, and to deliver key components for this at a technical level.*

8. *Germany's window of opportunity for adopting pole position is opening now and will soon close again. Coordinated action between agriculture, the supply industry and the federal government can set the course for Germany's future here.⁶¹²*

These same discussions also highlighted the legal challenges of digitising agriculture, and the associated need for political action. Jose Martinez makes the following comment, using the example of data ownership and protection:

The legal risks relate to the following aspects: Protecting personal and – especially – company data, insofar as this is not classified as a trade secret. The protection of company data has so far only proven to be sporadic. The attribution of usage rights to data under civil law is also problematic, as 'ownership' of data does not exist under German civil law. The right to intellectual property only protects intellectually created works; not mere technical data or geodata from agricultural businesses. Considerable problems also exist in terms of allocating declarations of intent submitted by machines, and in terms of liability for errors in recording or analysing data. European and state legislators are currently unable to offer adequate solutions, as this area is still in development. The problems must instead be solved bilaterally at a contractual level.⁶¹³

Martinez thus rightly calls for European legislators to rectify any visible loopholes in liability law, in the protection of company data, and in contract law.⁶¹⁴

Scientific and technical solutions, from agroecological to digital and a combination thereof, will play a key role in the upcoming eco-friendly transformation of the agricultural sector as part of a Social Market Economy. Establishing legal and investment security through regulatory policy will be just as important as the notion of organising the global trade of agricultural raw materials and food in keeping with standards of fairness and sovereignty.⁶¹⁵

- 291 This article originally appeared in: R. Fücks & T. Köhler (ed.) (2019). Soziale Marktwirtschaft ökologisch erneuern: Ökologische Innovationen, wirtschaftliche Chancen und soziale Teilhabe in Zeiten des Klimawandels (Berlin: Konrad-Adenauer-Stiftung e. V.): 269–284.
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Where do we go from here?



Just do it – making sustainable policy pragmatic³¹⁶

Kai Whittaker (2019)

The discussion on *whether* we need to separate economic growth from resource consumption and greenhouse-gas emissions in order to protect the climate and ensure more sustainable development has now thankfully lapsed. It is now a question of *how*. The task of German policymakers is also clear after signing the Paris Climate Agreement and the understanding regarding the United Nations 17 Sustainable Development Goals (SDGs). The SDGs are a response to the findings of the international community of states that climate action to limit global warming to a maximum of two degrees can only be achieved through joint efforts. After all, our actions and their impacts on climate change do not stop at national borders.

No politician can deny that successful implementation in Germany has failed – it is still conceivable that we might fall short of our interim 2020 target to reduce greenhouse gases by 40 percent compared to 1990 figures (and even if we meet this interim target, we probably would have fallen short of it without the COVID-19 pandemic).³¹⁷

What is it all about?

The current discussion will not bring us closer to our goal of limiting global warming to a maximum of two degrees by 2050. Instead of wasting time and resources on this, complaining about failed numerical targets, or striving to phase-out coal by 2035 instead of 2038, the remaining time and existing advancements should be used to focus on developing and implementing further measures.

We need to keep forcing ourselves into even in the most heated of debates, pause, take a step back and ask ourselves: What is it actually all about?

It simply is about our future and that of our children in a world whose climate is changing faster than ever before due to human actions. Even climate researchers can merely predict its overall impact. But the effects that global warming of more than two degrees can have by the middle of the century – i. e. in the next 30 years – paint a concerning picture.

The changing climate and human interference are already pushing several flora and fauna species to the verge of extinction. Agricultural yields are declining in many parts of the world. Increased use of fertilisers and pesticides are further destabilising the ecosystems. The result is less biodiversity, as excessive use of these substances can harm other flora and fauna just as easily as greenhouse gas emissions and sewage from industry and settlement areas can.

Global warming is also changing maritime habitats. Elevated water temperatures cause water acidity to rise, posing new adaptation challenges for marine flora and fauna.

Scientists define the two-degree target as the critical boundary ('tipping point') before our ecosystem becomes at risk of 'tipping' – in other

words, reaching a state of irreversible damage. If we want to preserve creation for our children and claim to take the term 'inter-generation fairness' seriously, then we need to act now. Measures to protect our ecosystem need to be as profound and comprehensive as our ecosystem is complex.

Large sections of society have already acknowledged this – when else has an issue prompted so many school pupils and university students to take to the streets and protest, in ever increasing numbers, on a weekly basis? Even businesses and industry, which were often perceived being opposed to protecting the climate and environment, are decisively positioning themselves towards climate action and sustainability.

Clear framework conditions for sustainable policy

Policymakers are being called on, with increasing urgency, to provide clear answers to the pressing issues of climate action. Business-owners worry about potentially becoming overtaken in the international competition if there are no mandatory international regulations on climate action. Others push forward because they see the future of their businesses in climate-friendly business models. Young people are worried about their future. Media attention is focused on emotionalised debates that urge action before it is too late – climate action now and immediately or else 'that's it!' Some claims are stated as if there was no alternative or compromise – critical questions about economic and social feasibility are considered ignorant or even climate-change-denialism.

But anyone wanting to protect the climate effectively and over the long term needs to address and answer precisely these questions instead of hastily declaring measures that soon prove to be economically or socially untenable and thus will not help the climate either. The best example of failed climate action is the case of our neighbours in France,

where higher fuel taxes have been implemented with no regard for the social effects resulting in the yellow vests taken to the streets.

Although the concept of sustainability has now become so politically hackneyed that it can potentially be classified as anything but sustainable, the original basic idea remains a suitable framework for policy-making. Sustainability, which, by definition, goes hand in hand with inter-generation fairness, forms the starting point for effective climate action. Only by considering economic, environmental and social requirements equally can global development become sustainable and constructive.

Our scope for action is defined by our environment and the resources available to us – using these in such a way that they or suitable alternatives will continue to be available in future is our responsibility to intergenerational fairness. As such, successful economic activity needs to be focused on being both profitable and integrated into the environment and society within these limits. The social component of sustainable development only exists if both economic and environmental measures are accepted equally, and become a responsibility shared by society as a whole. This will only be the case if the individual can see how they benefit from these measures – or at least does not experience any disadvantage. In a completely sustainable system, the economy is considered as the driving force for social and environmental innovation. Business-owners are dependent on human capital and on available resources for creating added value.

Creating this sort of paradigm shift is the primary task of policymakers. A climate-change apocalyptic atmosphere does not help people see climate action as an opportunity to reform social structures and improve their own life. While scientists and experts repeatedly emphasise the opportunities offered by digitisation regarding a shift to a more resource-friendly world, society's fear of changing to the unknown still outweighs its curiosity and desire for creativity.

Analysing political decisions pragmatically

Policymakers need to combat these future-related fears with pragmatic, logically thought-out solutions, and communicate these clearly and comprehensibly. Anyone wanting to achieve the climate targets needs to be aware of necessary changes. Ambitious greenhouse-gas-saving goals of 80 to 95 per cent need to draw on all available options. This means that even less popular measures, such as carbon storage and utilisation (CCS/CCU), must be considered as bridging technologies.

This necessary examination of all options requires a comprehensive analysis before decisions are made. Technology-agnosticism is particularly important in view of a future that, due to climate change, requires a higher potential for adaptation – we only have limited ability to assess whether innovations currently deemed the most sustainable will remain so.

The aim of sustainable development is to strengthen the resilience of ecosystems and economies through innovation. Innovation starts by critically assessing what is already there. We need to question habits and move out of our comfort zone. The signs of climate change in Germany over the summer of 2018 gave us a glimpse of what lies ahead. The direct effects on nature and thus on our agriculture have intensified the urgency for change. Policymakers now need to utilise the momentum that has come with society's shift in values towards greater environmental awareness and use this for progressive measures that lead to more sustainability and climate action. We need to think in terms of solutions, not problems.

Embracing democracy – Protecting freedom for action

Our current culture of debate suggests that compromises are an abandonment of one's own view. Yet they are a core part of our democracy. Developments that fundamentally change our life need to be shaped in such a way that everyone can participate in them. The democratic process needs to be given the necessary space. Sustainable development requires social acceptance, which is greatest when efforts have been made to reach a consensus. Needless to say, this sort of process cannot be used as a pretext for inaction. But nor can a time-intensive weighing-up of options be called inaction either.

One of the strengths of a democracy is to respect the concerns expressed by various sides to create a consistent policy. This does not, in any way, mean that decisions made should not be disputable. Nor is it a question of presenting solutions dictating to people what they must do. Adaptability and an agnostic approach to technology require a certain freedom for action and decision-making. The policy should certainly not create a how-to guide for climate change, but rather set clear political framework conditions that support climate-action innovations instead of curbing them or decreeing them as government orders.

'Prosperity for all' – and its worth for us

The Social Market Economy as an economic and social structure of the Federal Republic of Germany is based on the basic idea of 'prosperity for all'. Policies should be formulated based on its principles.

But what does 'prosperity for all' mean today? These days, we can buy more things than people could on a 1960 salary³¹⁸ – does this imply more wealth, or does it show that the value of products we buy today does not reflect all costs?

Both answers are worthy of discussion – given current debates, hardly anyone would probably claim that perceived wealth these days really is a lot higher than was the case in 1960. But this is likely also due to an altered understanding of wealth among the population. Climate change is prompting us to question our modern-day lifestyle. Our social responsibility lies in defining our country's wealth not simply in terms of our purchasing power, but rather in terms of natural resources and sustainable production and consumption patterns.

We can only achieve this by putting a price on the environmental impact of the production and consumption of goods. For example, we can use carbon pricing to start internalising external costs. A shift in values towards a lower-emission society will only happen if there is also transparency enabling citizens to see where their consumption produces greenhouse gases, how high these emissions are, or where they can save on these. Obviously, this sort of pricing cannot come at the expense of lower-income earners. But if the costs of a product also reflect external environmental costs, such as those generated by the transportation of goods, it suddenly also becomes more profitable to procure raw materials locally instead of sending products halfway around the world. Raw materials that are still purchased from other parts of the world, e. g. for technical equipment, may be reused as a result of high-quality recycling systems, or simply be fitted in such a way that they can be repaired, rather than entire devices having to be replaced.

Adopting a central measure – carbon pricing – can thus trigger a chain reaction of changes.

Understanding options for action as a narrative

Politics needs new approaches that makes the impacts of policies on nature and society visible before implementation. While the technology impact assessment and cost assessment conducted by Germany's National Regulatory Control Council already serve as tools for analysing the potential (financial) impact of policies, there is currently no instrument for analysing benefit. In other words, we do not systematically weigh up potential benefits of a policy against the costs to the environment or society. Yet seriously examining costs and benefits, and the resulting conflicts of objectives, is essential for sustainable policymaking. We need to think policies through from start to finish – with all their potential consequences. We need to clearly name them, weight them up against each other, and identify the correlations between various decisions. Thinking this narrative through, and not just stopping where it sounds good, is crucial.

One example of this is the hotly disputed coal phase-out. Let us do it as quickly as possible, is the call, because that is better for the environment and soothes our conscience. But phasing out coal involves, for everyone, interfering with the way work has previously been defined in coal-mining regions, and how the regions themselves have defined their work to date. The sector that drove the German economy and created numerous jobs after World War II is being shut down. Regions are at risk of losing their identities. As important as it is to phase out coal, policymakers must ensure the transition is as smooth as possible by facilitating a structural change that enables citizens in the affected regions to be part of the changes to their local area. Anyone worried about their own future, and who sees politics destroying what is important to them, will be likely to shift to the political fringes. That is why it is so important to also consider the social and economic aspect when it comes to phasing out coal.

Complete supply security is another aspect that needs to be considered. A hasty phase-out could result in supply shortages. If, in such cases, electricity needs to be purchased from abroad, where it may also come from a coal-fired power plants, good intentions will be the only sustainable thing in the whole equation. Is it relevant to discuss whether we will shut down the last coal-fired power plant in 2035 or 2038? We are better off developing a sustainable strategy for the affected regions – and who knows; maybe this will unlock new opportunities for phasing out coal even earlier? To do this, however, we need to get to work to devise sustainable solutions in a technology-agnostic and innovative manner in cooperation with the affected regions.

Assessing benefits through sustainability goals

The 17 SDGs provide an internationally recognised agenda to promote sustainable innovation. They serve as a guide and provide a starting point for assessing measures in terms of sustainability aspects.

Germany's sustainability strategy is founded on these goals, and, through national sub-goals, highlights the areas of relevance to a more sustainable Germany. As such, we have access to a system through which we can assess the benefit of political measures through the lens of sustainability. To implement this successfully, and make progress measurable and comprehensible, assessments need to be transparent and mandatory.

One option being discussed for this is to establish sustainability in the German Constitution (the 'Basic Law'). Such an addition could cement, in all political decision-making processes, the notion of upholding principles of sustainable development. But changing the constitution does not guarantee more sustainable policy. The critical factor is to take sustainability aspects into account right from the time political measures, and bills on their implementation, are created, and to establish sustainable benefit assessments as a fixed element of political debates.

Germany's responsibility in the world

But Germany's responsibility does not just lie in sustainability policy and its implementation at a domestic level. In our globalised world, with international interdependencies and relations, the highly industrialised nations of the Northern Hemisphere bear particular responsibility for helping developing and emerging nations achieve sustainable growth in terms of climate action.

In a time when the ideal of liberal democracies is increasingly being questioned, it is in our own interest to prove that such a notion of society, with the concept of a Social Market Economy, is a functional system for successfully protecting the climate through sustainable development.

Given mistrust of confederations of states, such as NATO or the European Union, it is the responsibility of the member states to show that peaceful alliances are the best way to achieve joint goals.

Although every country needs to set different priorities for its own development, global solutions to reduce greenhouse gases must be the target. If Germany demonstrates that climate action and sustainable development serve as drivers of innovation and the economy, we are not only enabling ourselves to look toward a more secure future, but can also act as a role model for other countries. The international peer-review work on the German sustainability strategy raises the question of who, if not Germany, will be able to achieve the eco-friendly transformation to a more sustainable economic system?³¹⁹ We need to fulfil this responsibility.

Strategic approaches to internalising external costs, coupled with an improved sustainability assessment, are at least two fundamental steps towards changing direction. Sustainable development requires profoundly changing the way we think of policy, and who we consider responsible for making it. The proposed measures will not yet

be enough to achieve the climate goals; that will require a joint effort by everyone. But society is calling for a more sustainable future. It is up to policymakers to clearly state what needs to be done for this, to disclose the costs, to face up to conflicts, to try new things, and to view the opportunities provided by sustainable development as potential for a better future. Just do it – in any case, we have no other choice.

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- 316 The original, unedited version of this text appeared in: R. Fücks & T. Köhler (ed.) (2019). *Soziale Marktwirtschaft ökologisch erneuern: Ökologische Innovationen, wirtschaftliche Chancen und soziale Teilhabe in Zeiten des Klimawandels* (Berlin: Konrad-Adenauer-Stiftung e. V.): 303–314.
- 317 The original version of this article stated: “No politician can deny that totally successful implementation in Germany has failed – it is already conceivable that we will fall short of our interim 2020 target to reduce greenhouse gases by 40 percent compared to 1990 figures. The debate in Germany barely addresses the fact that we are, however, still heading for a nearly 32% reduction”. As this statement is based on the data and perspective available in Summer 2019, we have edited this statement to take the COVID-19-pandemic and its impact into account. Whether Germany has fulfilled its interim 2020 target will be announced in 2021.
- 318 Konrad-Adenauer-Stiftung e. V. (2019). *Wohlstand für alle*. <https://www.flickr.com/photos/134317886@N06/46661674504/in/album-72157689414119815> (accessed on 15 April 2019).
- 319 Rat für Nachhaltige Entwicklung (2018). *The 2018 Peer Review on the German Sustainability Strategy*. https://www.nachhaltigkeitsrat.de/wp-content/uploads/2018/05/2018_Peer_Review_of_German_Sustainability_Strategy_BITV.pdf (accessed on 14 April 2019).

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