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Corona perspectives

# Climate Performance of the G7 States and the Corona Crisis

## How can we reconcile Climate Protection and the Economy?

*Jasper Eitze, Maximilian Pretzel*

- Especially during the Corona crisis, the question about how we can reconcile economic and ecological objectives is becoming ever more important. Climate change, after all, as a predominantly long-term challenge, is in competition with the short-term goal of economic revival.
- The common G7 evaluation of climate performance – primarily based on $CO_2$ emissions – falls short of the mark. Rather, a new benchmark should be applied which measures both emissions and economic development simultaneously.
- Until industrial processes can be made $CO_2$-neutral in a cost-efficient way, reductions in emissions owing to declining industrial production in the G7 states will be to the detriment of climate protection. 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.
- Changes to the electricity mix of the G7 states highlight both the effective and efficient steering effect of $CO_2$ prices. For this reason, it is important to further strengthen $CO_2$ pricing as a guiding tool for the market economy.

## Contents



## 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 $CO_2$ 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 $CO_2$ emissions by the end of 2020. We can, however, expect a dramatic increase in $CO_2$ 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!)[1] include the economic perspective, it is therefore advised to jointly consider $CO_2$ emissions and the gross domestic product (GDP) as the common economic indicator. In fact, benchmarks such as $CO_2$ intensity (amount of $CO_2$ emitted per US Dollar of GDP), or $CO_2$ productivity (GDP produced per tonne of $CO_2$) 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 $CO_2$ 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 $CO_2$ productivity as a benchmark.

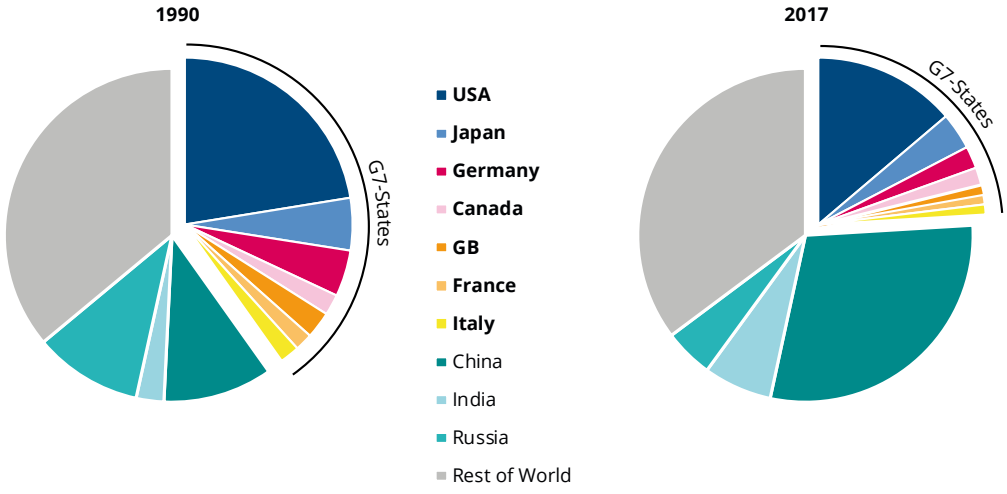
If a more holistic evaluation of global climate performance is the first argument in favour of using $CO_2$ productivity as a benchmark then here is another: it is well-known that the voluntary commitments and targets adopted by the G7 states under the Paris Climate Agreement are more extensive (this 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.

One argument for giving greater consideration to $CO_2$ productivity arises from the logic of international climate policy.

Yet how can a western industrial nation set a global example if it only evaluates its own climate performance based on absolute $CO_2$ 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 $CO_2$ 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 $CO_2$ 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.

**Fig. 1**
**Share of global $CO_2$ emissions of the G7 and other major emitters**
in per cent

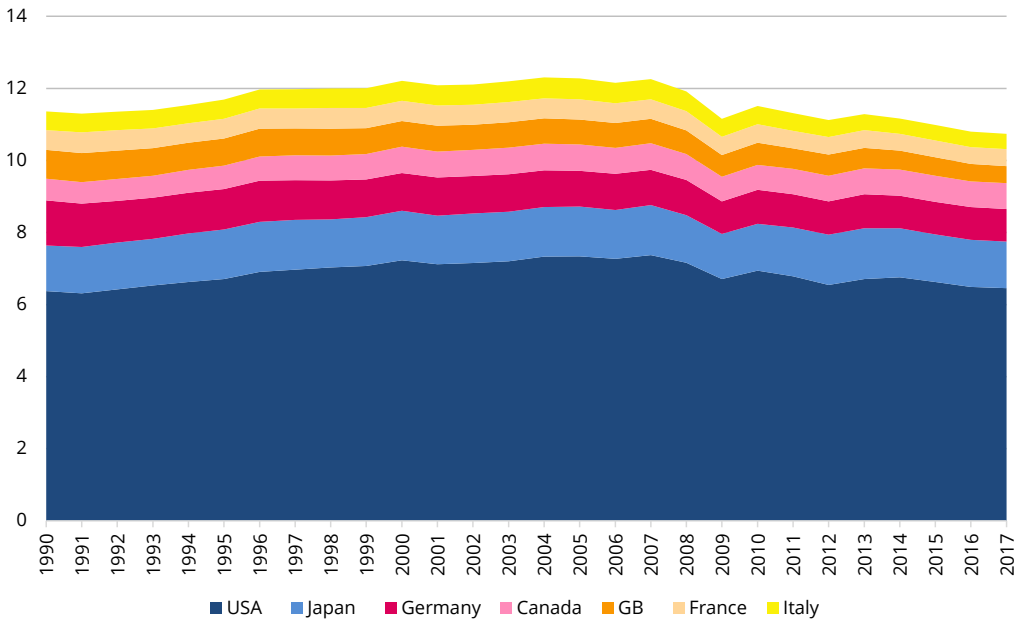



Source: Fossil $CO_2$ emissions of all world countries – 2018 Report "DOI: 10.2760/30158 (online)", Publications Office of the European Union https://ec.europa.eu/jrc/en/publication/fossil-co2-emissions-all-world-countries-2018-report Taken from: https://en.wikipedia.org/wiki/List_of_countries_by_carbon_dioxide_emissions

But there is another reason why G7 states should pay more attention to the relationship between GDP and $CO_2$ emissions: the one-sided focus on absolute $CO_2$ 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 $CO_2$ 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 $CO_2$ 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 last decade, which ultimately represents at least a relative decoupling of economic growth from $CO_2$ emissions. Instead, the looming failure to meet the national 2020 climate goals came under sharp criticism, whereby only absolute $CO_2$ 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.

The one-sided focus on absolute $CO_2$ figures suggests that the Western industrial nations have already largely decoupled their greenhouse gas emissions from economic development.

**Fig. 2**
**G7 greenhouse gas emissions**
in million tonnes of $CO_2$ equivalent

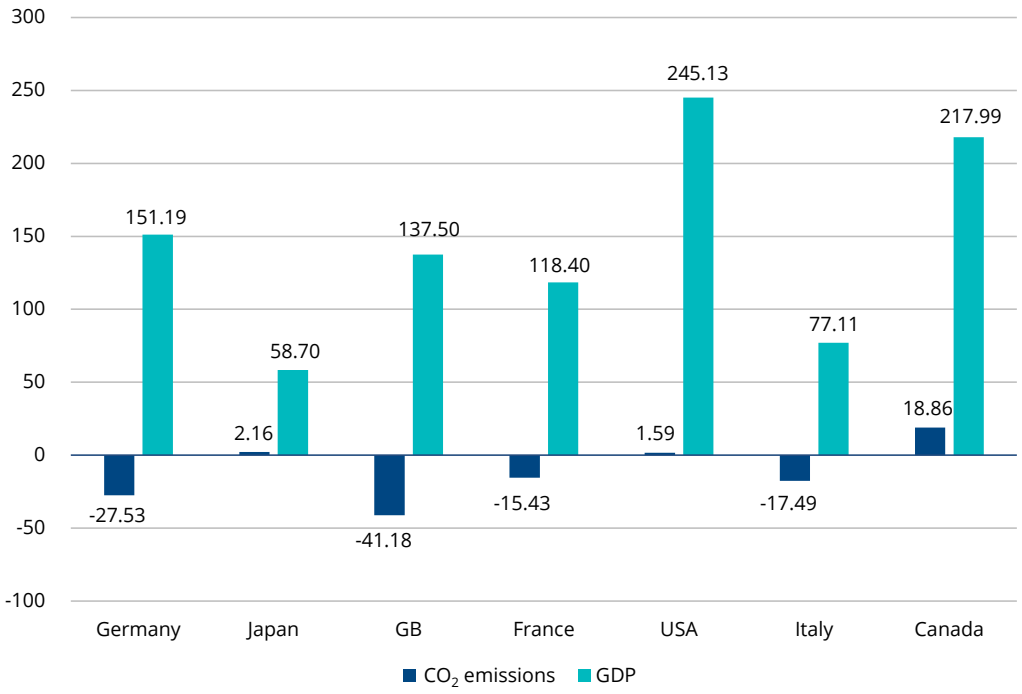



Source: OECD 2020 https://stats.oecd.org/Index.aspx?DataSetCode=AIR_GHG

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 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 $CO_2$ 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.

**Fig. 3**
**Development of GDP compared with $CO_2$ emissions 1990 to 2018**
in per cent

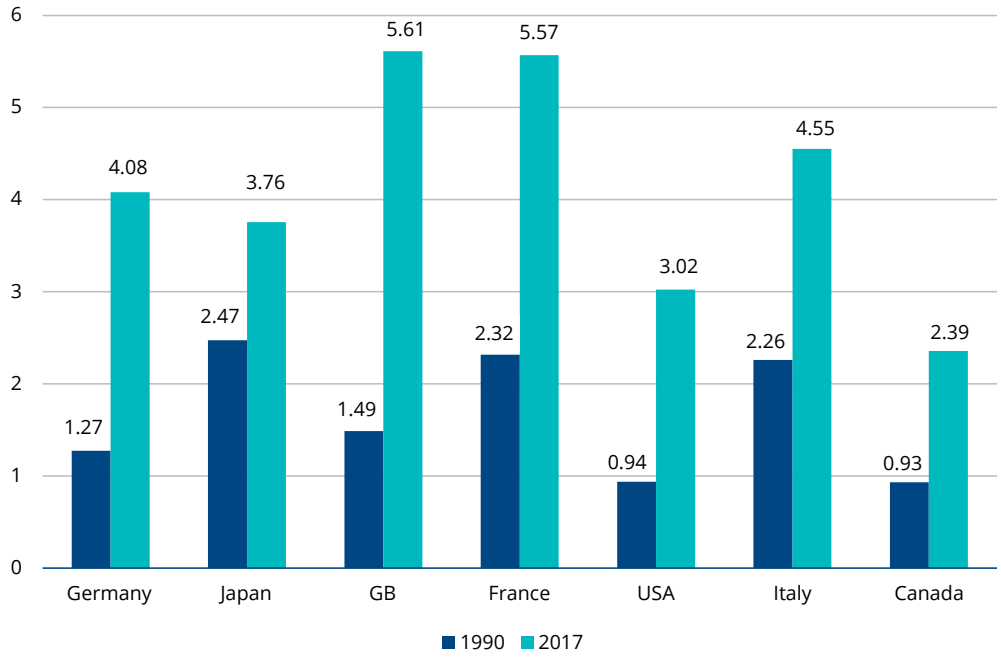



Sources: GDP: World Bank 2020, https://data.worldbank.org/indicator/NY.GDP.MKTP.CD;
THG: OECD 2020, https://stats.oecd.org/Index.aspx?DataSetCode=AIR_GHG

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 $CO_2$ emissions produced for every US Dollar of GDP created have significantly decreased in all G7 states. $CO_2$ productivity has thus improved, as the following graph shows.

Since 1990, the $CO_2$ productivity of all G7 states has significantly improved.

**Fig. 4**
**$CO_2$ productivity measured in GDP (in USD)/kg $CO_2$**




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

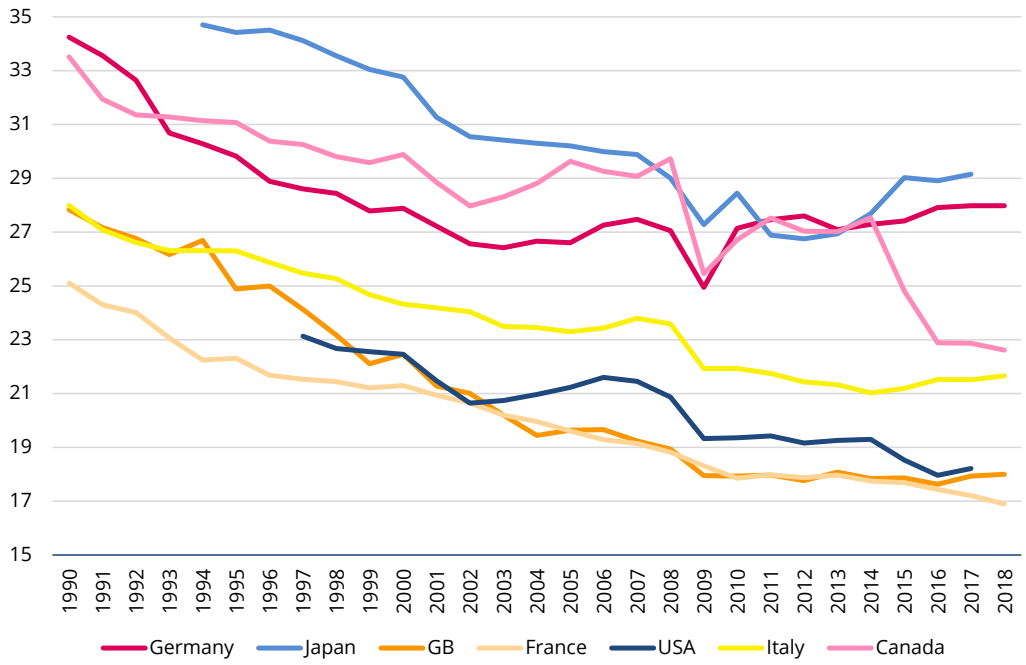
As regards absolute $CO_2$ productivity values for 2017, Great Britain and France are in the lead, followed by Italy, Germany and Japan – while the USA and Canada come in last place. However, if we calculate the growth rates of $CO_2$ productivity for individual states between 1990 and 2017, a different 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 $CO_2$ 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 $CO_2$-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 $CO_2$ productivity. As the following graph shows, the industrial share of GDP has developed differently among the G7 states since 1990.

The industrial share of GDP has an influence on $CO_2$ productivity.

**Fig. 5**
**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/tbl1/en/cv.action?pid=3610043401#timeframe

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 $CO_2$ 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

A decrease in industrial production in Germany in line with Britain would be detrimental to climate protection.

case: due to the global demand for industrial goods, 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 $CO_2$ emissions elsewhere. From a global perspective, the lower environmental standards in developing and emerging countries would result in lower $CO_2$ 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 $CO_2$ emissions and $CO_2$ 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.

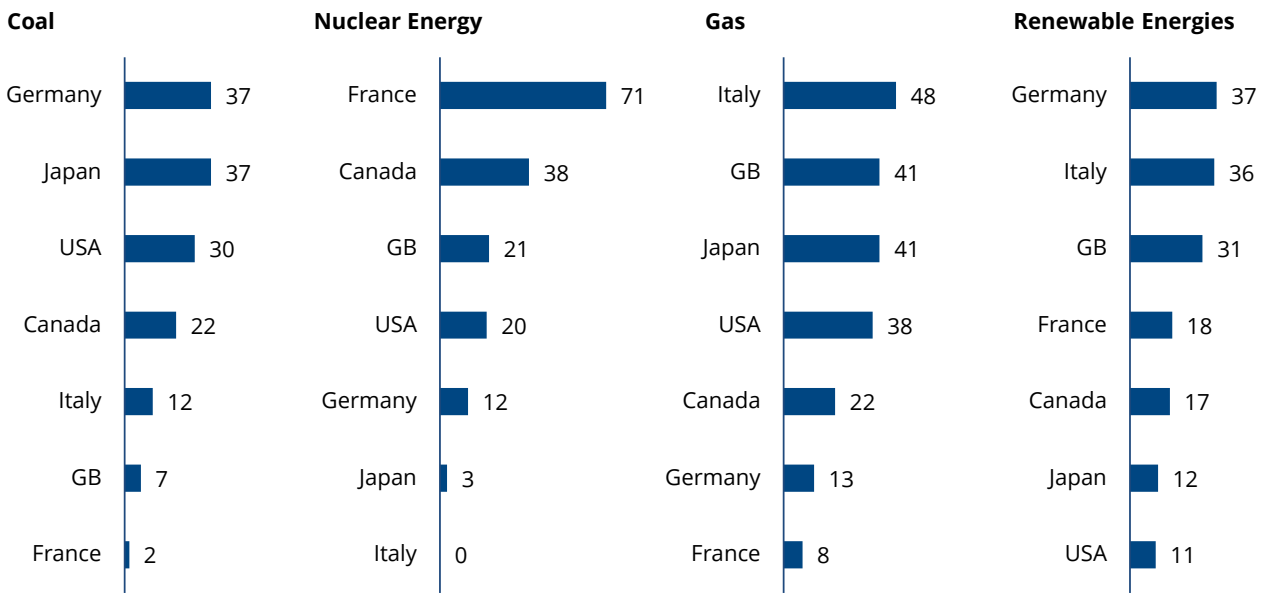
## Influencing Factor Electricity Generation

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 $CO_2$-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 $CO_2$ 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 $CO_2$ 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 $CO_2$ 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.

Among the G7 states, Germany boasts the largest share not only of renewable energies, but coal-based electricity as well.

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.

**Fig. 6**
**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 $CO_2$ 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 $CO_2$ 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, $CO_2$ productivity should play a key role as an assessment criterion for climate performance. This is because neither strong growth in GDP combined with soaring $CO_2$ emissions, nor a decline in GHG emissions owing to an absent economic recovery constitute the right approach. $CO_2$ 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.

Solely focusing on $CO_2$ productivity would not be sensible, but should certainly be an obvious consideration.

All the same, we can expect calls for greater consideration of $CO_2$ productivity to meet with resistance. This is understandable insofar as the focus on $CO_2$ 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 $CO_2$ productivity even if no significant progress is recorded with reducing emissions.

That's why it would make little sense to solely focus on $CO_2$ productivity, even though this benchmark should be an obvious consideration in light of the aforementioned arguments. If G7 states change their perception of $CO_2$ 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.

Enormous amounts of investment are required in the G7 states in order to switch to climate-friendly industrial production.

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 $CO_2$ 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 $CO_2$ price signal provides the right incentives for this (see decline in share of coal-based electricity).

National emissions trading agreed in Germany should also be adhered to in times of economic crisis.

Against this backdrop, the necessity of $CO_2$ 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.

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

## Imprint

### The Authors

Jasper Eitze is Policy Advisor for Energy and Resources in the department Agenda 2030 at the Konrad-Adenauer-Stiftung.

Maximilian Pretzel is a Research Associate in the department Agenda 2030 at the Konrad-Adenauer-Stiftung.

**Konrad-Adenauer-Stiftung e. V.**

**Jasper Eitze**
Policy Advisor Energy and Resources
Department Agenda 2030
Division Analysis and Consulting
T: +49 30 / 26 996-3635
jasper.eitze@kas.de

Postal address: Konrad-Adenauer-Stiftung e. V., 10907 Berlin

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