Climate Protection without Borders
The future of the global energy supply and the future of the world’s climate: two problem areas that not only demand technical innovations, but also require far-reaching regulation at the political level. **Carl Christian von Weizsäcker**, Senior Research Fellow at the **Max Planck Institute for Research on Collective Goods**, proposes a solution to this problem in the form of a treaty under international law – a world climate agreement that would allocate tradable CO₂ emissions rights to individual states.*

*This text is an extract from the article “International Energetik”, published in the anthology Die Zukunft der Energie [Only published in German].
If the global climate is to be stabilized to ensure that the average temperature on Earth does not increase by more than 2 degrees Celsius, emissions of CO$_2$ and other greenhouse gases must be reduced by at least half their current levels by the middle of this century. In order to achieve this, all major emitters of CO$_2$ must be bound by an international treaty. The partners of such a world climate agreement would include the Kyoto countries as an entity, along with the US, Brazil, Russia, India and China. The individual member states would then be allocated CO$_2$ emissions rights that would also be tradable. This trade would be served by a fund that could sell and buy the CO$_2$ rights and, in this way, stabilize the world market price for CO$_2$, initially at around 40 euros per metric ton of CO$_2$.

This idea of globally tradable emissions rights is based on the economic theory that holds that a market of this kind for a homogeneous good ensures that the scarce resource is used with optimum efficiency. The practical problem of agreeing on the emission volumes for individual countries will constitute a key issue in the negotiations leading to the future world climate agreement. In any case, the target path must lead to a situation in which the per capita CO$_2$ emissions of the populations in all countries are the same by around the middle of this century.

We know from the structure of the global climate problem that the precise time at which CO$_2$ is emitted is not of crucial importance. All that needs to be ensured is that CO$_2$ emissions decline cumulatively and permanently. It could absolutely make sense to accept higher CO$_2$ emissions initially if this makes their reduction easier to achieve in the long run. This idea can be illustrated based on the example of China (and similar considerations also apply to India and Brazil).
Until recently, China was a very poor country. However, as a result of its shift to a market economy, China now finds itself in the throes of a turbulent catching-up process in terms of economic growth. The standard of living of the Chinese population is doubling in cycles of less than ten years. If this growth trend continues through the middle of this century, China will reach the same per capita wealth level as the one currently enjoyed by the population of Europe.

Environmental pollution is usually accompanied by a negative impact on health. Initially, people think of their local environment; filters are fitted in power stations to retain the coal dust, sulfur dioxide and other harmful substances. If living standards continue to increase, the question of climate problems gains in significance for the population.

Consequently, the paradoxical situation arises in which, despite the fact that economic growth is harmful to the stabilization of the global climate, it is also the subjective, psychological precondition for focusing a population’s interest in stabilizing the climate. Therefore, as it is absolutely essential that China participate in a world climate agreement, the Chinese population should initially be granted significant CO₂ rights so that economic growth there is not halted. However, this should be attached to the condition that China commit itself now to reduce its CO₂ emissions in subsequent decades in accordance with the agreement.

Such an approach would have the advantage, first, of inducing China to enter into such an agreement and, second, of immediately increasing the price of CO₂ emissions in China to the world market level. The opportunity costs of CO₂ emission would then also increase for a country like China: although it will have been allocated more emissions rights than the country currently needs, it would be able to sell to the fund the emissions rights it does not require.

This would create an incentive for the Chinese government to set the CO₂ price on the domestic market at this world market level and establish an efficient allocation mechanism for CO₂. This could take place immediately following the establishment of the world climate agreement. Such an approach would not stunt the growth process in China in any way, as the increase in the price of electricity arising from the establishment of this CO₂ scheme would be countered by the additional yields from the sale of CO₂ rights to the fund, which, in turn, would constitute financial resources available for use in the investment process for economic growth.

Wind and Solar Energy Have no Priority

When the need for a world climate agreement as outlined above is considered in the light of the energy forecasts of the International Energy Agency (IEA), also presented above, it is very clear that the global climate problem can be resolved only if we succeed in technically mastering the capture and sequestration (storage) of carbon during the combustion of coal, oil, and gas in large power plants, and in implementing this ap-
approach at an economically palatable cost. No number of wind turbines, solar systems or nuclear power plants can replace clean coal. Therefore, from a technical perspective, the most important contribution a country such as Germany can make to resolving the climate problem is to show the world how clean coal works. This would be far more important than promoting wind or solar energy.

This assertion is further corroborated by the ideas economist Hans-Werner Sinn presented in relation to the climate problem. Sinn points out that the countries that export fossil energy feedstock – coal, oil and natural gas – are interested in selling their goods, and will remain reliant on this for some time to come. The world market price for these goods is determined by supply and demand.

In the author’s opinion, we will not be able to do without a fossil fuel such as coal in the future. However, in order to reduce emissions, we need innovative technologies, such as clean-coal power plants. If the demand for coal and gas declines as a result of constructing additional systems and plants for renewable energies and nuclear power, or as a result of implementing energy-saving measures, and if the demand for oil declines because drivers are forced to also use biofuels, this will lead, above all, to a reduction in the cost of these fuels in the short to medium term – that is, a lower oil price, lower gas price and, probably, a lower coal price as well.

It would also result in even more coal, gas, and oil being used in other parts of the world until a balance has been re-established between supply and demand. In other words, based on an extreme variant of the “Sinn effect,” promoting renewable energies and building additional nuclear power plants will not reduce CO₂ emissions at all. It will merely relocate them. Having relied on fossil fuels for centuries – and even more so in recent decades – and thus fostered supply through technological progress and high investment, we will not be able to get rid of this supply that quickly.

Garzweiler brown coal mine in Germany (above).
The desire of the suppliers – so for instance the Persian Gulf states and other oil-exporting countries – to line their coffers through the sale of these exports can be made compatible with successful climate policy only if we ensure, with the help of carbon capture and sequestration, that this supply does not cause CO₂ emissions, or at least produces fewer CO₂ emissions.

The question as to how strong this “Sinn effect” is can only be answered empirically. What proportion of a cubic meter of natural gas or ton of coal that is saved by constructing wind power plants is in a particular part of the world disappears from the world market because the reduced price of this fuel renders its extraction uneconomical? How much of this saved fossil fuel is used additionally elsewhere in the world because the reduced price now makes its use there cost effective?

If it is assumed in the context of a sample calculation that the long-term demand curve for fossil fuels has the same (negative) slope as the long-term (positive) supply curve, then any technical saving of fossil fuels through the use of renewable energies, through additional nuclear power, through energy-saving measures and through foregoing economic growth will cause half of the fossil energy saved in this way to be burned additionally elsewhere due to the reduction in its price. As a result, based on the “Sinn effect,” the net saving effect is only half of what it would be in the absence of this effect.

By comparison, in accordance with the “Sinn effect,” the net effect of the CO₂ savings achieved through the use of clean coal is even greater than the initial technical savings, as the sequestration of CO₂ at coal-fired power plants costs additional energy. So using clean coal requires more coal per kilowatt hour than is the case without sequestration. Although CO₂ emissions decline with clean coal, this method triggers an increase in the demand for coal. Consequently, in contrast to the other types of emissions saving, this approach has the effect of increasing the price of fossil fuels, with the result that demand declines in applications that do not involve sequestration.

Thus, for every metric ton of sequestered CO₂, overall CO₂ savings exceed one ton. The climate effect of a ton of CO₂ saved technically through sequestration is therefore considerably greater than the climate effect of a ton of CO₂ saved technically through the use of renewable energies or nuclear power.

**Kyoto Protocol Had no Significant Effect**

Finally, a few comments on climate policy as implemented at the European and national levels. The Kyoto Protocol, which was concluded in 1997, concerns 30 percent of global CO₂ emissions – based on the states that actually undertook to implement reduction obligations. These reduction obligations are on the order of 10 percent as compared with the initial value of emissions levels in 1990. The countries involved in this agreement are, for the most part, countries with slow economic growth. This means that, without the Kyoto Protocol, their CO₂ emissions would have increased by around 10 percent between 1990 and 2012.

So the result of the Kyoto Protocol is that CO₂ emissions within the countries that undertook to reduce their emissions are 20 percent lower on average than they would have been without the agreement. This 20 percent relates to 30 percent of global emissions, so accounted for just 6 percent of global emissions in the base year, 1990. In view of the fact that global CO₂ emissions are currently still increasing by 1.8 percent per year (despite the Kyoto Protocol), this one-time savings of 6 percent of global emissions merely delayed the increase of CO₂ emissions by around three years. This is all the Kyoto Protocol has achieved. Its direct impact on the climate is thus negligible.

The Kyoto Protocol can be considered worthwhile only if it is assumed that the good example, the exemplary behavior of a model pupil as presented here, will prompt other countries in the global community to participate in a true world climate agreement. There is some evidence to support the fact that this behavioral assumption is valid. For example, the willingness to pursue an active climate policy has increased significantly in the United States in recent years. The Chinese leadership may also have been influenced by Kyoto.

Nevertheless, it is far from inconceivable that a world climate agreement involving all of the OECD countries, China, India, Brazil and Russia will fail. Europe needs a plan B for this eventuality. Should this approach fail, there is something to be said for abandoning climate policy, also in the Kyoto states. As long as industrial operations in these states must compete with companies in the US and China, which are not subject to the disadvantages of such an agreement, competition distortions will arise and negatively affect employment and prosperity in the Kyoto countries – and, moreover, assuming that Kyoto fails, without any positive effect on the world’s climate.
Furthermore, the migration of the energy-intensive sectors of industry to non-Kyoto states means that emissions are not actually reduced, but merely transferred. This makes no sense whatsoever. It would also be a bit of dishonest politics to pat ourselves on the back for preventing CO₂ emissions in the area under the jurisdiction of the Kyoto Protocol if this measure remains largely ineffective because it has prompted an increase in CO₂ emissions in other parts of the world.

Another relevant point here is that the measures currently being taken to reduce CO₂ emissions are extremely dirigiste. This even makes them counterproductive to a certain extent. This is clearly demonstrated by the example of biofuel. If crop prices increase as a result of the obligation to mix biofuel with diesel, this poses a serious disadvantage for the poorer segments of the world’s population, for whom food becomes more expensive. Secondly, it means that more artificial fertilizer will be used as the rise in crop prices triggers an increase in the profit-maximizing volume of artificial fertilizer employed. As Paul J. Crutzen and his co-authors have shown, the use of artificial fertilizer is extremely harmful to the climate due to the resulting production of the trace gas nitrous oxide. Thus, in terms of greenhouse gas emissions, all in all, mixing biofuel with diesel increases emissions rather than decreasing them.

Governments are not the best managers of scarce resources in other respects, either. This is evidenced by the miserable results of the various attempts in human history to establish centrally planned economies as compared with market economy systems. A shift to price mechanisms thus also makes sense in the area of climate policy, and the above-outlined world climate agreement could provide a model for more efficient climate policy at the national level. If, for example, solar energy is being promoted today in the form of feeding solar electricity into the national grid at a price of almost 0.5 euros per kilowatt hour, this approach to climate policy is clearly too expensive compared with the above estimated price of 40 euros per ton of saved CO₂ emissions. It promotes systems whose contribution to reducing emissions costs maybe 300 to 400 euros per ton of CO₂.

A wealthy country can, of course, afford such extravagance in its climate policy. The electricity customers simply pay a bit more for their electricity to compensate. But the resources used in this way could be used far more efficiently in the interest of climate protection, and an eight to ten times greater effect could, perhaps, be achieved at the same cost.

**Magical Limit of 40 Euros per Ton**

The estimated 40 euros per ton of CO₂ equivalent as fair in terms of climate policy can already serve as a guideline for a pioneer policy in the national and European context. Promotional measures and dirigiste dictates should be verified according to whether they save CO₂ at a cost of less than 40 euros per ton. Many of today’s climate policy instruments would struggle to pass this test.

An efficient policy design also serves the interest of sustainable climate policy. In view of the pressing policy problems arising in other areas, inefficient, over-expensive climate instruments will ultimately discredit climate policy itself. If, for instance, the construction of new coal-fired power stations in Germany meets with resistance that is, in part, based on climate policy, then the shortfall in the electricity supply to the population that may be expected as a result of both this and the withdrawal from nuclear power will prompt a change in mood that will also negatively impact climate policy.

Thus, in conclusion, it may be stated that the only solution that makes sense is a world climate agreement that obliges at least the OECD countries and China, India and Russia to realize massive reductions in CO₂ emissions. These cannot be achieved through energy saving, the promotion of renewable energies and nuclear power alone; clean coal is indispensable. The most important technological-economic contribution that Germany can make here is to demonstrate workable systems for clean coal. Certain forms of promotion of renewable energies, on the other hand, such as the mandatory mixing of biofuel, are actually counterproductive in climate-policy terms.

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