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Summary of the Position Paper

Pricing Carbon, Reforming Energy Prices

Pathways to a Cross-sectoral Market Design

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How should the **market be designed** to enable efficient climate protection in Germany and drive sector coupling forward? A comprehensive carbon pricing scheme and a reform of taxes, duties and surcharges are key components. This position paper categorises the decisions from the Climate Action Plan 2030 and sets out options for how revenue from carbon pricing can be put to use to achieve a **double dividend** for climate protection. The following points are crucial:

- A **uniform and comprehensive carbon price in Europe** is the cornerstone of an efficient and effective market design. One obvious approach is to extend the European Emissions Trading System (EU ETS) if possible to all sectors **by 2030**.
- Germany should persuade other Member States to join it in its national carbon pricing scheme in the transport and heating sectors, which the Federal government decided in the Climate Action Plan 2030. Together, they will be able to form a strategic carbon alliance which would ideally lead to an expansion of the EU ETS.
- The revenue from carbon pricing can be used **to reform the system of taxes, duties and surcharges** with the objective of relieving the tax burden on excessively severely taxed energy carriers. In this way, a **double dividend** can be achieved and sector coupling fostered. Replacing the EEG surcharge and reducing electricity tax is of particular assistance.
- Emissions in the **transport sector** are today at the same level as in 1990. A better market design could make a decisive contribution to solving these climate policy challenges in the transport sector in a targeted and efficient way. The Federal government should initiate a process to develop suitable solutions.

Sector coupling requires undistorted competition between different energy carriers

The Federal government's **Climate Action Plan 2030** has added new impetus to the country's climate and energy policy. By extending carbon pricing, policy makers are acceding to a long-standing recommendation by leading climate researchers and economists. However, the approach is still in many respects fragmentary and it is disputed whether the decided measures will be enough to achieve the 2030 climate objectives. This position paper investigates how Germany can efficiently achieve agreed European objectives and drive climate protection forward internationally. The results are set against the decisions of the Climate Action Plan and used as the basis for formulating policy options for the next steps.

A central question is how the climate-damaging emissions from the heating and transport sectors can be significantly reduced. Low-emission and renewable energy carriers will have to replace fossil fuels. A range of technical options is available: renewably generated electricity from wind and PV systems can be used in electric cars, heat pumps and industrial applications. Biomass, being a material, easily stored energy carrier, can also be put to greater use in the transport sector and industrial processes. And hydrogen, the use of which is under discussion in various fields, may in future also help to reduce emissions. Energy carriers which at present are primarily used for individual applications should thus in future be available for flexible use across different sectors. Such "**sector coupling**" is a central plank of a low-emission energy supply.

If **sector coupling** is to increase, the energy carriers must be in undistorted competition. This means that all energy carriers are traded under identical terms and equal account is taken of the environmental harm arising from extracting and using them. This is not the case in the present system essentially for two reasons:

- **Firstly**, price setting does not include environmental harm sufficiently, in particular due to emissions of climate-damaging greenhouse gases. This should be achieved by means of a **cross-sectoral carbon price appropriate to the environmental harm**.
- **Secondly**, taxes, duties and surcharges on energy carriers are not optimally designed: while, among others, the electricity tax, EEG surcharge and KWKG surcharge are levied on electricity, only very little energy tax is imposed on heating oil, for example. Energy taxation on diesel and petrol, on the other hand, is comparatively high. At the same time, the KWKG surcharge, EEG surcharge and electricity tax do not differentiate how the electricity was generated and so apply equally to renewable and fossil-generated electricity. **Existing duties, surcharges and taxes must be reformed** in order to drive sector coupling forward efficiently. Only once the unequal levels of taxation have been eliminated will carbon pricing become fully effective.

Carbon price as the basis for efficient and effective climate policy

Two fundamental decisions must be taken in relation to the introduction of a carbon price: which emissions should be recorded? How should the price be determined?

- Fundamentally, **the more emissions are recorded, the more efficient can pricing be**. This firstly means that as many sectors as possible should be covered. Secondly, as many countries as possible should participate, so reducing the risk of companies relocating their manufacturing operations to countries with lower carbon prices (“carbon leakage”). A global pricing scheme should be the long-term objective.
- There are two different approaches to setting prices: charging a direct **carbon price** or using an **emissions trading system**. A direct carbon price, for example by carbon-based taxation¹, facilitates planning for market actors but on the other hand does not necessarily achieve a possible volume target. In contrast, the situation is reversed in **emissions trading**, where the entire volume of emissions is fixed and the price is established accordingly, making it uncertain in advance. In practice, due to the different advantages and drawbacks, a **hybrid system** is often proposed: emissions trading with a price floor or a price corridor. The effect of a carbon pricing scheme is, however, similar in the two systems. What is crucial is for a carbon pricing system to introduce prices which are high and commensurate with the climate damage so that the Federal government’s objectives can be achieved.

This gives rise to a series of different options for a national pricing scheme. What is important is that a national pricing scheme should serve as **a first step towards an international solution**. In the medium term (2030 target horizon), the Federal government should endeavour to extend European emissions trading to all sectors. Until that point, Germany should coordinate with partner countries and attempt to introduce a common system. Ideally, it should also include agriculture.

Making targeted use of carbon pricing revenue and achieving a double dividend

A **double dividend for climate protection** can be achieved if the revenue from a carbon pricing scheme is used to reduce taxes, duties and surcharges levied on low-emission energy carriers: **Firstly**, carbon pricing increases the cost of emissions of climate-damaging greenhouse gases. This also encourages climate-friendly technologies. **Secondly**, revenue is generated which is available for instance for relieving the tax burden on companies which compete internationally and on private households. In addition, low-emission technologies can also be directly promoted with a proportion of the revenue, for instance by means of replacement premiums. An essential element for achieving a double dividend is to bring about a reform of taxes, duties and surcharges which boosts welfare by eliminating existing distortion. This is discussed below.

¹ A direct carbon tax is considered inadmissible under Germany’s current fiscal legislation. Existing energy taxes may, however, be geared towards carbon content.

Efficient sector coupling by reforming taxes, duties and surcharges

Taxes, duties and surcharges are levied for two reasons: Firstly to generate revenue for the public budget and secondly to reduce unwanted effects, such as environmental harm (incentive effect). The present system, however, no longer corresponds to current aims and insights. For example, the incentive effect in climate protection has not resulted in the political aims of emission reduction being achieved. Instead, the system has developed over the course of time and has had numerous piecemeal items of legislation added over the years. Relatively recent examples are Germany's introduction of the electricity tax and the increase in mineral oil tax in the course of environmental tax reform, and the introduction of the EU ETS² and the EEG surcharge.

As a result, numerous government price components are imposed on electricity. At the same time, the EU ETS had already introduced a carbon price into power generation, whereas natural gas and heating oil are subject to only low taxation (see figure 1).

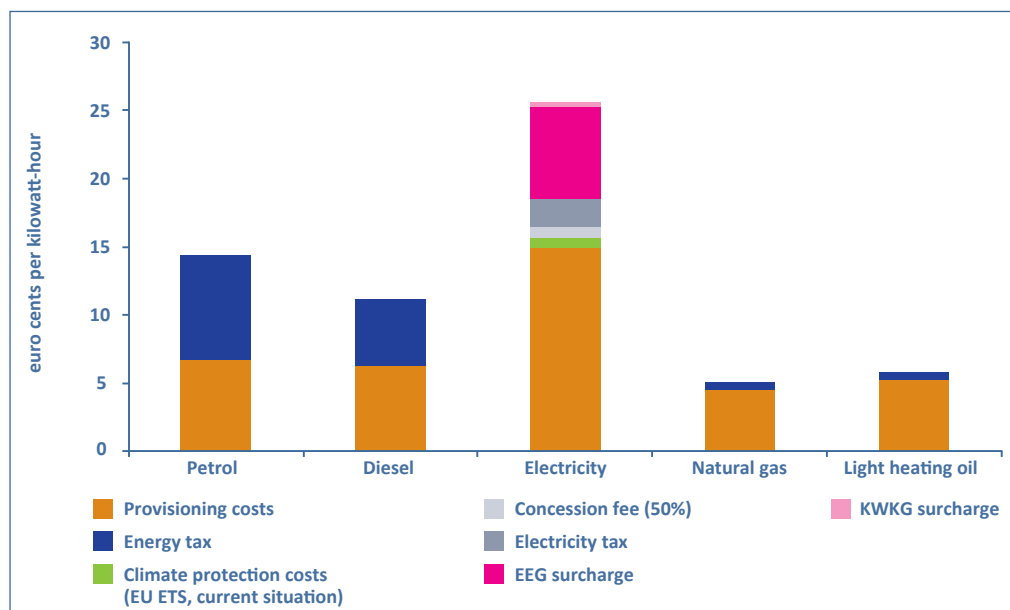


Figure 1: Average final consumer prices for selected energy carriers, broken down into provisioning costs³ and taxes, duties and surcharges (as at 2018, excluding value-added tax). The figure relates to final consumer prices for private households, no account being taken of exemptions for companies. Sources: own calculations based on BMWi 2019, BDEW 2019, BNetzA/BKartA 2018, Energi Data Service 2019, MWV 2019.

The box below outlines the need for reform of the most important price components. A prerequisite is that a reasonable carbon price is charged in all sectors. But what would an effective reform of the existing system look like? The following options may be considered in order to achieve a **double dividend** with the revenue from the carbon pricing scheme:

² EU Emission Trading System.

³ The concession fee in part reflects infrastructure costs for power lines and in part is a public sector (local authority) funding instrument. For simplicity, 50 per cent is therefore reported as a duty and 50 per cent is included in the provisioning costs.

At a glance: where is there a need for reform?

EEG and KWKG surcharges

- **Double taxation:** These two surcharges make up around one fifth of the final customer price for private households. They were introduced to fund the development of renewable energy plants (RE plants) and combined heat and power plants (CHP plants) and so cut greenhouse gas emissions. GHG emissions are, however, already factored into power generation prices by the EU ETS (for all plants >29 MW combustion capacity).
- **No differentiation by type of generation:** Both surcharges are levied on the final customer price and generally do not differentiate in terms of how the electricity was generated. They are thus imposed equally on renewably generated electricity and on that generated with fossil combustion fuels and so cannot have any climate policy effect.
- **Social task:** The development of RE plants and CHP plants only incompletely addresses market failures in power generation. These are therefore at least in part social tasks which cannot be shaped by one-sided taxation of the electricity price.

Electricity tax

- The electricity tax is intended on the one hand to encourage **power-saving behaviour** while on the other hand it is a reliable **source of revenue** for the Federal budget.
- However, from an economic standpoint, there is no need for additional instruments for **reducing consumption** if reasonable account of the harm arising from use of the energy carriers has already been taken in the market design. This can be ensured for climate protection by setting a sufficiently high carbon price. With regard to other environmental harm (e.g. fine particulate emissions), the electricity tax has the drawback that it also does not generally differentiate between renewable and fossil generation and thus does not optimally address the causes.
- As a **source of revenue** for the public sector, it distorts consumption signals in the energy sector and considerably complicates sector coupling.

Energy tax on natural gas and heating oil

- **Infrastructure costs must be secured in the long term:** The level of energy tax on natural gas and heating oil roughly corresponds to the (environmental) harm arising from burning these energy carriers, apart from emissions of climate-damaging greenhouse gases, for instance fine particulate pollution. Abolition would in any event have only a slight effect on the final customer price (see figure 1).

Energy tax on petrol and diesel

- **Infrastructure costs must be secured in the long term:** Energy tax makes up around half the final customer price of petrol and diesel, a proportion which is explained by the road infrastructure costs to which much of the revenue is allocated. Looking ahead, it must be borne in mind that the proportion of vehicles with internal combustion engines will probably fall, while the proportion of vehicles with alternative drive systems will rise. If it is to be possible to cover road infrastructure costs in the long term, all vehicles should contribute to funding road costs.
- **Transport policy challenges** such as noise, road congestion and pollution in cities and differences between rural and urban areas could be addressed more effectively and efficiently by traffic policy instruments. A **usage- and location-dependent toll** could, for example, be considered. Revenue from carbon pricing need not be used for this purpose.

- The EEG and KWKG surcharges could be reduced or abolished and the corresponding schemes they support funded in another way.
- The electricity tax could likewise be reduced while observing the minimum rate set at the European level.

If the revenue is insufficient to completely replace the price components, the EEG and KWKG surcharges in particular could initially be reduced insofar as is financially affordable.

Implementation in the Climate Action Plan 2030

The German Federal government has decided to introduce a carbon price in the heating and transport sectors via a separate emissions trading scheme from 2021. Until 2025, the certificates will have a fixed price which is set annually, after which the price is to be determined by the market. This is a **combination** of the options discussed above (taxation or emissions trading) since emissions trading will have the effect of a tax in the initial years. It is disputed whether this approach is legally admissible because a direct tax on carbon emissions is considered inadmissible under fiscal legislation. The starting price is set to be € 25 per tonne of CO₂ in 2021 and to rise incrementally to € 55 per tonne by 2025. The Federal government furthermore aims to extend the EU ETS to the heating and transport sectors by 2030.

Some of the **revenue from carbon pricing** is to be used to reduce the EEG surcharge. Specifically, it is set to fall by 1.75 ct/kWh in 2021 and by 2.9 ct/kWh by 2025. This corresponds to around forty per cent of today's EEG surcharge. A large proportion of the revenue, however, will be used to fund the many individual measures provided in the Climate Action Plan. These include for example an increase in the commuter's tax allowance and various technology-specific support schemes. Efficient and effective climate protection could be more usefully achieved by focusing on the carbon price as the most important instrument and eliminating existing distortion, in particular by making a greater reduction to the EEG and KWKG surcharges.

Possible next steps

The Federal government has initiated some important measures in the Climate Action Plan. It is, however, disputed whether Germany will achieve agreed European targets with the adopted measures. The following proposals could help to achieve the targets, keep costs as low as possible and drive climate protection forward internationally:

1. Germany should emphatically support a **global carbon pricing scheme**. Only in this way can carbon emissions be reduced globally and, ultimately, the risk of carbon leakage⁴ minimised.
2. The Federal government should accelerate negotiations for a reform of European emissions trading: **extending the EU ETS to all sectors** – including agriculture – should be the primary objective of European climate policy. A minimum price in the EU ETS could additionally create planning certainty and help to bring about a further reduction in emissions from power generation throughout Europe.
3. Germany should win over **partner nations** for the introduction of carbon pricing. This would diminish the competitive disadvantage of German companies within Europe and could add further impetus to an expansion of the EU ETS.
4. **Revenue** from additional climate protection should primarily be used to cut the EEG and KWKG surcharges and possibly also the electricity tax. This would firstly reduce the electricity price and make electricity from renewable energy carriers more competitive in sector coupling. Secondly, some of the revenue would return to citizens.
5. To ensure **efficient climate protection**, the Federal government could furthermore review whether it can provide further resources to reduce the tax burden on the **electricity price**.
6. The Federal government could support the EU Commission's efforts to implement meaningful **reforms to European fiscal directives** since they are not entirely designed for efficient climate protection. For instance, minimum tax rates for the energy tax could be abolished.
7. In the **transport sector**, new technologies (GPS, communication, digitalisation) offer wide-ranging options for addressing not only climate-damaging emissions, but also noise, road congestion and pollution in cities and the differences between rural and urban areas in a more targeted manner. A better market design could make a decisive contribution to solving these challenges purposefully and efficiently. The Federal government should initiate a process to develop suitable solutions.

⁴ "Carbon leakage" refers to companies which, due to carbon pricing-related costs, relocate their manufacturing activities to countries with less stringent emission requirements.

The Academies' Project "Energy Systems of the Future"

The Position Paper *Pricing Carbon, Reforming Energy Prices. Pathways to a Cross-sectoral Market Design* evolved within the framework of the Academies' Project "Energy Systems of the Future". In interdisciplinary working groups, about 100 experts are working on different courses of action for the pathway to an environmentally sustainable, safe and affordable energy supply.

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