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CARBON CONTRACTS FOR AN ACCELERATED INDUSTRIAL TRANSFORMATION

Position paper by IN4climate.NRW

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Bibliographic information

Publisher:	IN4climate.NRW GmbH
Published:	May 2021
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Please reference as:	IN4climate.NRW (Ed.) 2021: Carbon contracts for an accelerated industrial transformation. Position paper by IN4climate.NRW. Gelsenkirchen.

This paper was finalised by the working group on policy frameworks in March 2021.

OUR KEY MESSAGES

- As a **key component of the mix of mechanisms for industrial transformation,** carbon contracts (or carbon contracts for difference) can enable companies to invest in climate neutrality technologies early on. Carbon contracts can especially hedge long-term added costs related to transformation (OPEX and CAPEX) and cost risks of such technologies over their lifetime. These contracts can be introduced quickly, have a very targeted effect and thus accelerate the transformation. They will be needed until there is product cost parity between new and old technology or an international level playing field for climate-neutral industrial production. **Carbon contract testing and development should be a priority.**

- A carbon contract should be designed to **compensate the additional costs of low-carbon breakthrough technologies (LCBT) in comparison to an economic reference technology.** This will take into account the promotional effect of other mechanisms.

- In principle, carbon contracts should be offered for climate protection technologies in all sectors, provided they meet the relevant **selection criteria.** These criteria include, in particular, a high and long-term **CO_2 prevention potential and compatibility with climate neutrality,** a high **transformation potential** that extends beyond the individual project, high investment or transformation costs and a high **degree of technology development.**

- Carbon contracts must be **supplemented by other mechanisms.** In particular, possible negative competitive effects should be avoided for plants or companies that do not benefit from carbon contract programmes but produce potentially competing materials or products in a climate-friendly way. Measures that directly promote the production of renewable electricity or green hydrogen and reduce their costs for all users are also necessary and can reduce the amount of carbon contract support. In addition to promoting carbon contracts, creating **markets for climate-friendly materials and products** should be promoted in parallel.

- The **design of the carbon contracts should be coordinated with the development of the regulations for free allocation in European emissions trading.**

- The carbon contract premium **should be regularly evaluated and adjusted** in order to take into account fluctuating prices of key input factors and to avoid under- and over-subsidisation in equal measure.

CARBON CONTRACTS AS A POLICY TOOL FOR INDUSTRIAL TRANSFORMATION

Industry faces the great challenge of transitioning to climate neutrality. The remaining potential for efficiency improvements is not enough; new technologies are needed to achieve greenhouse gas neutrality. The degree of novelty or innovation of these technologies refers not only to the technology itself (technology readiness level, TRL), but also to the type, location and field of application. There is a great need for reinvestment in the raw materials industry in the coming years. Due to the long lifespan of plants, investments must already be compatible with the long-term climate protection goal, i.e. climate neutrality.

Key technologies for climate-friendly production in raw material industries (low-carbon breakthrough technologies, LCBT) are available for many processes, but are associated with high levels of investment and operating costs. Their costs to prevent CO_2 are in some cases significantly higher than the current CO_2 prices and those expected in the coming years (Agora Energiewende and Wuppertal Institute 2019). Additionally, the future development of the CO_2 price in the European Emissions Trading Scheme (EU ETS) and the future regulations on the free allocation of certificates are uncertain. For this reason, investments in these LCBT are not economically viable under current conditions.

Carbon contracts are intended to make it possible to switch to LCBT early on, i.e. during the short- and medium-term reinvestments in the raw materials industry. This is done by offsetting the high abatement costs of these technologies and mitigating risks associated with the transition in the long term. A carbon contract is a project-related contract between the state (or a state institution) and a company that sets a fixed or variable premium per tonne of prevented CO_2 emissions for a specified period of time. The premium will be designed to compensate for the costs of CO_2 prevention, i.e. the additional costs (OPEX and CAPEX) of LCBT compared to an economic reference technology combined with other mechanisms. The free allocation for LCBT will generally be much lower than for conventional technologies so that the additional costs of LCBT will largely be independent of the CO_2 price in the ETS. In this case, carbon contracts should cover all additional costs – minus already existing subsidies. Additional costs already partly covered by the CO_2 price in the EU ETS, for example through free allocation to LCBT or the introduction of an effective border adjustment mechanism, will be taken into account when calculating the premium (carbon contract for difference). If the regulations for free allocation change throughout the duration of the carbon contract, the contract will be adjusted accordingly. The carbon contract thus safeguards planning for investments in climate-friendly processes and products. In addition, the guaranteed revenue streams also reduce financing costs for investors.

The German government is currently working on a pilot programme for carbon contracts within the National Hydrogen Strategy. This is intended to facilitate initial investments in LCBT and to further develop the mechanism itself. Subsequently, the mechanism could be introduced at the European level and coordinated with the EU ETS. Funding through carbon contracts will generally become less important to the extent that LCBT becomes competitive in Germany, the EU and internationally or a market for climate-neutral products emerges. A successful climate policy that maintains industrial competitiveness can thus reduce costs for carbon contracts.

IN4climate.NRW welcomes the development of carbon contracts at the national and European level. From IN4climate.NRW's point of view, carbon contracts are a vital part in our toolbox for industrial transformation. They are necessary to enable early and timely investments in transformative climate protection technologies while keeping upcoming investment decisions in mind. Testing and developing them should be a priority. However, they need to be complemented and coordinated with other measures (see below).

Objectives and tasks of carbon contracts

The purpose of carbon contracts is to support investments in industrial LCBT that can enable long-term climate-neutral industrial production, but which are not yet competitive. The purpose of carbon contracts, either alone or in combination with other tools, is to close the cost gap between conventional production methods and LCBT. This is achieved by compensating the additional costs of LCBT production compared to economic CO_2-intensive production. The premium is calculated based on the CO_2 abatement costs. This takes into account the operating costs associated with key input factors such as renewable electricity or green hydrogen, which the LCBT uses as opposed to the reference technology. However, the mechanism is not intended to mitigate all market risks, and it is not intended to absolve the investing companies from the need to act in a market economy.

Funding is needed until production cost parity between LCBT and the conventional reference technology is achieved. Long contract terms should help achieve sufficient funding periods and reliable risk minimisation.

Carbon contracts initially promote individual projects. However, they also have a broader impact by reducing the costs of the corresponding LCBT for subsequent investors, creating markets for plant construction and project development and, for example, supporting the demand for green hydrogen. By enabling its use in industry, carbon contracts can promote the market ramp-up of electrolysis technologies and thus contribute to cost reductions that also benefit other green hydrogen applications.

Technologies to be promoted and allocations

Carbon contracts can initially be developed for individual central technology fields in order to stimulate the transformation of processes that are difficult to defossilise at an early stage. In the pilot programme of the German government, carbon offset agreements are initially being developed for hydrogen technologies in the steel and chemical industries; the cement industry is also being considered in current discussions (Agora Energiewende 2021). From IN4climate.NRW's point of view, carbon contracts should be offered in the long term for climate protection technologies in all industrial applications, provided they meet the relevant selection criteria (see below). Carbon contracts should not be awarded through competitive tendering, at least in the short term, but rather on a project-by-project basis to avoid competition distortions across sectors. In this way, carbon contracts can ensure that different LCBTs needed in the long term enter the market, even if they differ greatly in their current CO_2 abatement costs.

Carbon contracts can also take into account project-specific differences in location conditions, regulatory conditions and willingness to pay for green products. For example, the availability of infrastructure and the geographical location of a plant can have an impact on the operating costs of the technology. Transformation may also be appropriate and necessary in locations with particular challenges.

If the contract price for carbon contracts is negotiated between the contracting parties on a projectspecific basis, appropriate pricing mechanisms must be found. A project cost review by independent experts is necessary to assess appropriate, technology-specific prices. In general, it can be assumed that sufficient information is already available on the technologies and processes in question to enable realistic cost ranges to be determined.

Role in the mechanism mix

Carbon contracts must be supplemented by and coordinated with other existing mechanisms. It is particularly important to avoid possible negative competitive effects for companies or processes that do not benefit from carbon contract programmes. Distortions could occur here, for example, if industrial hydrogen applications are promoted via carbon contracts and the increased operating costs due to the use of renewable energy sources are thereby absorbed, but the conversion from fossil to renewable energy is not supported accordingly in other cases. It should be taken into account that other measures that directly promote the production of renewable electricity or green hydrogen and reduce their costs (BBH 2021) can benefit all potential users in a competitive-neutral way, while also reducing the necessary amount of funding for carbon contracts.

The cost gap between LCBT and reference technology can be closed by a combination of several mechanisms, such as direct promotion of the renewable energy sources and raw materials required for production, investment promotion, and carbon contracts. The respective shares of these mechanisms can be designed differently and must be coordinated with each other in order to avoid double promotion or gaps in promotion. It is important to simultaneously promote the emergence of markets for climatefriendly materials and products, so that an increasing amount of the CO_2 abatement costs can be covered by higher revenues.

Carbon contracts are no substitute for existing carbon leakage protection measures. While they can level the playing field for individual transformative climate protection technologies, they cannot guarantee carbon leakage protection for the industry as a whole, as they are only awarded for LCBT and, at least initially, only for individual projects. Measures that effectively create an international level playing field in terms of CO_2 costs are therefore still needed.

Financing

Various options for financing carbon contracts are being discussed. These range from federal budget funds to proceeds from the EU ETS and national fuel emissions trading to a climate apportionment on end products (Agora Energiewende 2021, Neuhoff et al. 2019).

Criteria for selecting eligible projects

IN4climate.NRW proposes a number of criteria for the selection of eligible projects:

- **Production location:** Only plants that are operated at a German production site can be included in the funding (if the funding programme is designed on a national level).
- **High and long-term CO_2 prevention potential:** Only those technologies are promoted that are considered key technologies in the individual sectors, have a high CO_2 prevention potential and are compatible with a long-term climate-neutral industry.
- **High level of technology development:** Funding is provided for technologies that are already close to commercialisation in terms of their development status, but whose use is not yet economically viable due to the framework conditions compared to conventional reference technologies.

- **High transformation potential:** Funding is provided for technologies that can promote the transformation of infrastructures and industrial value chains and networks as a whole beyond the scope of individual projects.

- **Funding mechanisms working together:** Funding via other mechanisms (e.g. investment funding, OPEX funding via other mechanisms) is taken into account accordingly when calculating the contract price.

Dynamic contracts

In order for investments in LCBT to take place, it must be possible to cover the increased investment and operating costs compared to conventional methods. When designing the premium, it is therefore important for it to be variable in order to adequately take into account changing boundary conditions and minimise the risk of under- or over-subsidisation. The ability to adapt to fluctuating prices of input factors is of central importance. If the CO_2 price influences the additional costs, for example in the case of free allocation to LCBT or according to the effectiveness of a border adjustment mechanism, the premium will also be linked to the development of the CO_2 price.

Over the presumably long period of carbon contract lifetimes, the prices for key input factors may change (e.g. for hydrogen, green electricity or CO_2 transport), which may have a significant impact on operating costs. Furthermore, it should be noted that costs can arise that were not foreseeable at the planning stage, especially in the case of technologically innovative plant technology. In bilateral contract negotiations, entrepreneurial expectations regarding price developments are taken into account when determining the contract price. However, if the price developments over the term of the contract deviate greatly from the expectations at the time the contract is concluded, there is a risk of both over- and under-subsidisation. For this reason, measures that allow for an adjustment of the contract price should be included in the contracts depending on the contract term.

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