

# How the Emission Trade Works

## Potential Effects on the Agricultural and Nutritional Sector

*On 1st January 2005, the EU emission trade system started as a consequence of the development in environmental policy in the past decade. The goal of this system is to achieve an 8% reduction of the greenhouse gas emissions (GGE) of the EU by 2012. This puts an additional financial burden on the plant operators involved in emission trade. In comparison with other possible instruments for the reduction of GGE, however, the costs are lower. Besides the greater expenses, emission trade can also open up new economic chances under certain conditions, which will be illustrated using the agricultural and food industry as an example.*

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### Keywords

Kyoto-Protocol, emission trade, Joint Implementation, Clean Development Mechanism

The foundation of international climate policy is the Convention on Climate Change from the year 1992. Its core content is a general agreement on the goal of climate protection, which is intended to slow down worldwide climate change and to mitigate its consequences [1].

### Legal Conditions

Concrete instruments which allow this goal to be reached were developed at the world climate summit in Tokyo in the year 1997, which ended with the adoption of the Kyoto Protocol (KP). In this protocol, the industrial countries involved obliged themselves to limit their annual emissions of greenhouse gases (GGE) by 5% in relation to the historical emissions of the basis year 1990 by the year 2012. However, the implementation of the KP was bound to the condition that the protocol is ratified by at least 55 contracting states, among them so many industrialized countries that their cumulated emissions account for at least 55% of the greenhouse gases emitted worldwide in 1990 [2]. After recent ratification by Russia, these conditions have been fulfilled so that the KP will go into effect.

### Emission Trade

Emission trade enables a defined group of participants to achieve the reduction goals set by the government in a cost-efficient manner. The idea is to limit GGE and to allow GGE rights to be traded freely among those who cause them. This principle gives every emitter the possibility to choose the option which minimizes his expenses. The emitter can effect investments in order to avoid GGE in his own plants if his specific costs of avoidance are below the market price of emission rights. If he sells surplus emission rights to a company obliged to reduce emissions whose specific costs of avoidance are above the market price, this provides an economic advantage for both. In contrast to other climate-political instruments, such as taxes or levies, the instrument

of emission trade generates macroeconomic advantages [3].

### The EU Emission Trade System

After years of uncertainty about the realization of the KP, the EU decided to introduce a GGE trade system in order to fulfill its 8% reduction obligation accepted in Kyoto by the year 2012. Until 2012, this system is divided into two obligation periods characterized by different conditions. In the first obligation period (2005 until 2007), only the greenhouse gas CO<sub>2</sub> is traded, and the group of participants is limited to energy-intensive plants of energy generation and industry. In the second obligation period (2008 until 2012), both the number of greenhouse gases and the group of participants can be extended [4]. Within the European member states, the common reduction obligation is distributed according to a certain key. This key is based on country-specific emission volumes and also takes economic and structural differences between the individual economies into account. By 2012, countries such as Luxembourg and Germany must reduce their GGE level by 28% and 21% respectively in comparison with the basis year 1990, while Greece and Portugal may increase their GGE by 25% and 27% respectively. Based on this distribution of obligations, each country has an upper limit of emissions which it may produce within a certain period. In a so-called national allocation plan, each state sets an upper limit and decides how its GGE rights are distributed among the plants involved. These rights are then given to the plant operators free of charge. One emission right allows exactly one tonne of CO<sub>2</sub> to be emitted. The rights can be traded freely within the EU.

### Project-Related Mechanisms

In addition to trading, the EU system includes two project-related mechanisms embodied in the KP: Joint Implementation (JI) and the Clean Development Mechanism (CDM). These mechanisms allow the market

participants to realize emission reduction projects even outside the EU and to have resulting reductions counted as additional emission rights. The most significant differences between the two instruments JI and CDM lie in the target group and the expenditures for the project. JI exclusively refers to projects which are realized by two industrialized countries, whereas the CDM is required for projects to be carried out by an industrialized state and a developing country. In contrast to CDM, the project expenditures which lead to additional emission rights are comparatively small in the case of JI. This is due to the fact that the industrialized countries are bound by a reduction obligation and a transfer of emission rights automatically leads to an alteration in the upper limit of the emissions permitted for a country. Therefore, the industrialized country where the measures of avoidance are carried out has a vested interest in recognizing only the emission reductions which have really been achieved and transferring them in the form of emission rights. In the simplest case, the amount of emission rights is simply negotiated between the project partners. Developing countries, which have not accepted any reduction obligation according to the KP and thus do not have to observe any upper emission limit, could have an interest in granting more emission rights than those which have really been created as a result of the measures of avoidance. This would increase their attractiveness for potential investors substantially. Since this procedure does not serve the purpose of climate protection, the demands of the CDM project cycle are far greater than those of comparable JI projects. CDM projects must undergo detailed examination by specialized institutions and the public. As a result, the time requirements and the expenses for the transaction grow considerably. However, this can possibly be compensated for by the generally higher avoidance potential and the lower costs of avoidance of such projects [5].

### **Emission Trade in the Agricultural and Food Industry**

Since only plants having a thermal output of >20 MW are eligible for EU emission trading at the beginning of the first obligation period [4], only parts of the food industry will be involved at first. In Germany, this mainly applies to plants of beer-, milk-, and sugar production [6]. For the plant operators, this means that they will likely have to reduce their emissions in the order of 2.91% by 2008 [7]. Depending on the individual marginal costs of avoidance and the future market price of emission rights, this can lead to considerable additional expenses in some

cases besides the greater administrative requirements. At present, it cannot be predicted whether these expenditures will ultimately affect pricing within the food industry. The actual number of emission rights allocated to the individual companies was still unknown when this contribution was published. The agricultural sector is exempt from emission trade at the beginning. In the second obligation period, however, it could be included. At present, it is totally unclear to what extent this may happen and what the consequences might be. A partial solution which includes biogas plants, for example, would be conceivable. These plants generate energy from biomass and thus only produce emissions which are bound again immediately during biomass production. When manure is converted in biogas plants, additional emissions are avoided which would otherwise have been produced during direct spreading on the fields. Given these considerations, it is interesting that along with other gases methane is emitted, whose greenhouse potential is 21 times higher than that of CO<sub>2</sub>. For each tonne of methane which is avoided 21 emission rights could be obtained. Calculations by the authors have shown that in some cases the inclusion of biogas plants in the emission trade allows significant additional proceeds to be achieved depending on the plant concept and the substrates used. It is problematic, however, that this would lead to double subsidizing in combination with the Renewable Energy Act. In addition, the proceeds from the emission trade would not be sufficient to compensate for the complete discontinuation of the subsidies granted under the Renewable Energy Act. However, the stepwise substitution of the proceeds from emission trade for the compensation rates provided under the Renewable Energy Act would be conceivable. This, however, requires further studies on the balancing of emissions from biogas plants.

### **Conclusions**

Emission trade provides the possibility of reaching a GGE reduction goal stipulated by the relevant agreement in a cost-effective manner. It remains to be seen to what extent the welfare returns obtainable in theory can really be attained in practice. For the food industry, emission trade only causes additional expenses at the beginning, which, however, will most likely be lower than those required by other instruments of environmental policy. For the agricultural sector, however, emission trade provides considerable chances for additional proceeds, whose realizability and potential remain to be examined in further scientific studies.

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