Tradable Permits for Greenhouse Gases

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Abstract

Reducing greenhouse gases emissions to address global warming implies high costs for all economic sectors. These costs can be reduced by introducing some compliance flexibility, allowing the trade of emission permits. However, the design of emission trading schemes is key to their effectiveness, i.e., their ability to reduce a pollution at a lower cost compared to traditional command and control policies.

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Definition

Tradable permits are incentive environmental policy instruments allowing concerned stakeholders a compliance choice when addressing environmental regulation and emission restrictions.

Introduction

Addressing climate change implies high costs for all economic sectors in shifting to low-carbon production and consumption patterns with little or no visible or immediate return on investment. Tradable permits may lead to reduced human-induced greenhouse gases (GHG) emissions at a lower marginal cost compared to traditional regulatory measures (command and control). They were developed in the United States in 1970s–1980s, for instance, to phase out lead in gasoline or allow coal-fueled power stations some flexibility in meeting strict air quality objectives.

Designing an effective emission trading scheme, actually resulting in emission reduction, is a delicate task for a regulator. Also called "flexibility instruments," tradable permits induce a behavior change by allowing the stakeholders to choose the way they will comply with a regulation: either reducing their own emissions or buying additional permits from other stakeholders.

Tradable Permits in the Climate Change Context

Theoretical Background

The Earth is surrounded by a single atmosphere. From an environmental point of view, every emission, or removal, of a unit of GHGs impacts the global atmospheric system no matter where this emission, or removal, takes place. However, from an economic point of view, the marginal abatement cost of reducing one unit of GHG varies greatly from one country, or one company, to another. Tradable permits enable decreasing the cost of GHG emission reduction by allowing the reduction to take place where it is cheaper.

Free access to the atmosphere, considered a common good, leads to overuse and damage. Allocating "property" rights over the atmosphere contributes to limiting free pollution and the resulting environmental damages (Coase 1960; Dales 1968). Allowing to trade these rights, or permits, creates a value for the atmosphere, hence an economic interest in its preservation. Often miscalled "rights to pollute," tradable permits create the right to release a limited amount of GHGs into the

atmosphere. They do not entitle permit holders to ownership over the atmosphere itself. Tradable permits have recourse to market principles, yet they do not address a need for an exchange of goods or services. Indeed, their existence is only due to a regulator limiting pollution, or emissions of GHGs, allocating permits to cover the authorized emissions and allowing these permits to be exchanged. Therefore, the design of the emission trading scheme is the key to its effectiveness, i.e., its capacity of enabling GHG emission reduction at a lower cost compared to command and control policies.

How Does It Work?

Tradable permit mechanisms have two forms, based on the same rationale: "Cap and Trade" and "Baseline and Credit."

The "Cap and Trade" system is called International Emission Trading in Article 17 of the Kyoto Protocol. In this system, the regulator sets a limit, a "cap," to GHGs emissions. It then allocates a number of tradable permits, up to the cap, to emitters taking part in the market. These permits are valid during a given commitment period, usually between one and five years, after which they must be surrendered. Emitters have a choice: to either keep emitting GHGs or cover their emissions with part or all of their allocated permits, thus avoiding the GHG emission reduction costs, but losing the price of selling a permit. They may have to buy additional permits if their emissions exceed their cap. Alternatively, emitters can decide to reduce part or all of their GHGs and sell the permits they are not using for their own emissions. They will bear the GHG emission reduction costs, but they will gain the price of selling permits. In both cases, emitters bear emission abatement costs, either reducing their own emissions or buying additional permits on the market.

Also referred to as "carbon offsets," the Baseline and Credit system consists in developing GHG emission reduction projects. Each project defines its own specific "baseline," i.e., normal emissions rates, and estimates how much emission reduction can be achieved, thanks to the project. Tradable credits are issued according to the difference of emission levels between the situation without the project and the situation once the project is implemented. Indeed, calculating the baseline consists in assessing a level of emissions that will never occur.

In the Kyoto Protocol, the "Baseline and Credit" system is twofold, depending on where the offsetting projects take place: "Joint Implementation" (JI, Article 6) for projects in countries with a binding emission reduction commitment and "Clean Development Mechanism" (CDM, Article 12) in countries with no binding commitment, mostly emerging and developing economies. In both JI and CDM, a sponsor country or company invests in an emission offset project. The sponsor will receive the corresponding credits while the host will benefit from the project. JI and CDM projects can deal with energy-efficient technologies, reforestation, or waste management, for instance. They have to go through a complex validation (JI) and certification (CDM) process. In addition to reducing greenhouse gases, CDM projects should contribute to sustainable development.

Emission Trading Market Structure

Emission trading schemes can only achieve their environmental purpose if the regulator clearly defines the rules of the game, including market participants, geographical boundaries, gases covered, and transaction and compliance rules.

Market Participants

Whether at national or international levels, the following stakeholders are essential to an emission trading system. First, a regulator is needed to set emission limits and transaction and compliance rules. The regulator decides on participation in the market: either compulsory (like in the European Union Emission Trading Scheme, EU ETS). Directive 2003/87/EC or voluntary (Kyoto Protocol). It also decides on the scheme's geographical boundaries: Does it include facilities of a company covered by the scheme but located outside of it? What are the linkages with other national or regional emission trading schemes, including fungibility of permits? Can it be limited to certain industries (EU ETS 2005–2012) or opened to broader economic sectors (California Cap-and-Trade Program) and civil society? (See Fig. 62.1).

Since the tradable permit market objective is to reduce polluting emissions, a compliance authority is needed to check that the environmental goals and transaction rules are met. Finally, national registries hold countries' accounts to be used for compliance purposes (retirement account) as well as the accounts of the national entities allowed to have one. Permits can be removed from the system when placed in cancellation accounts, indeed reducing the overall emission cap. Registries are electronic databases keeping record of emissions, permit transactions, and validity. National registries are interconnected and are all linked to the International Transaction Log managed by the UNFCCC Secretariat.

Permit Transaction Rules

Initial allocation of permits is done by the regulator, either for free (e.g., based on historical emission, "grandfathering") or sold, for instance, through auction sale (e.g., third phase of the EU ETS). Transaction rules may allow flexibility over time through the possibility of banking or borrowing permits for the next commitment period.

Different types of permits coexist in international carbon trading, all setting up different "carbon currencies" (Table 62.1). One permit of any kind equals one metric ton of CO_2 equivalent (tCO_2e).

Tradable permits exist under different legal national regimes. The 2003 European Union Directive leaves it to Member States to decide on whether

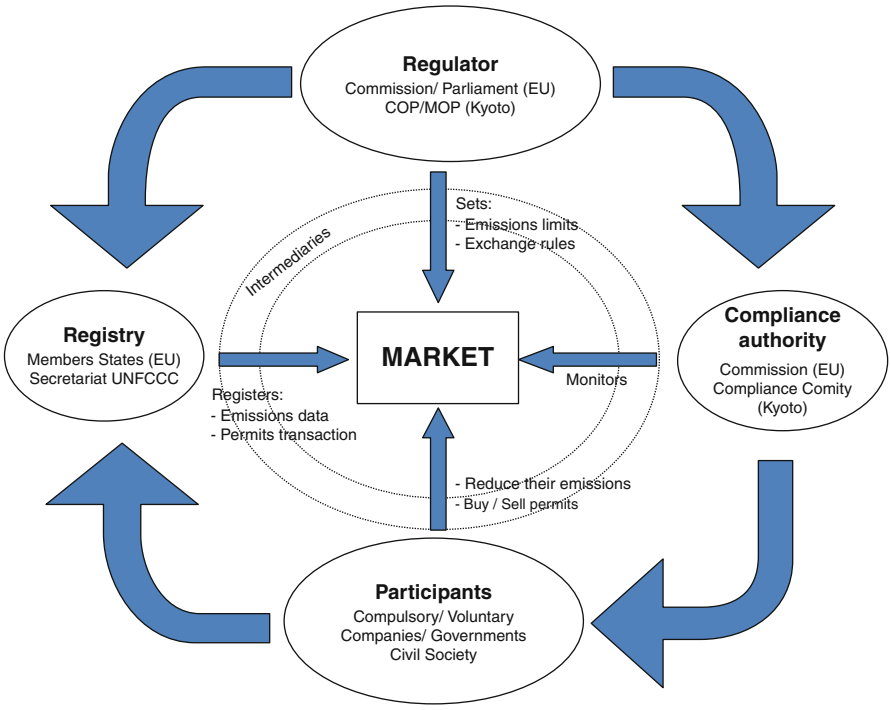

Fig. 62.1 Emission trading market institutions, examples of the EU ETS and Kyoto Protocol (Adapted from Ferrier 2008)

Table 62.1 Variety of tradable permits

AAUs	Assigned Amount Units	Tradable permits allocated to countries under Article 17 of Kyoto Protocol
RMUs	Removal Units	Cover carbon sinks, i.e., carbon absorption by land use, land-use change, and forestry activities
ERUs	Emission Reduction Units	Permits issued under JI projects
CERs	Certified Emission Reductions	Credits issued under CDM projects
EUAs	European Union Allowances	Permits allocated to industries in the EU ETS
VCRs	Voluntary Carbon Reductions	Voluntary carbon reduction or offsetting project

a carbon tradable permit is a financial instrument or a commodity; what domestic tax, VAT rate, and accounting system apply; if they are accounted for as tangible or intangible assets; and what happens in case of insolvency or bankruptcy of the emitter (Ferrier 2008; Wemaere et al. 2009).

Compliance

To ensure compliance with the environmental objective, access to accurate and comparable data on emissions is essential. In the climate change context, emission monitoring is based on country or company inventories. Countries communicate their yearly inventories to the UNFCCC Secretariat, which reviews them. These inventories include information on emissions and removals of GHGs as well as policies and measures taken to meet the goals of the Convention.

Tradable permit scheme compliance provisions include lenient to tough sanctions. In the EU ETS commitment period 2008–2012, those participants providing inaccurate reports or badly monitoring their emissions are forbidden to transfer permits. If they do not hand in enough permits to cover all their emissions at the end of the commitment period, then these emitters are not allowed to sell permits anymore and are fined 100€ per extra ton of CO_2. The missing permits are deduced from the following allocation period.

The Kyoto Protocol compliance mechanism is primarily based on openness and transparency – "name and shame" – since participants are sovereign States. At the end of the first commitment period, countries not meeting their binding emission reduction commitment are allowed an extra 100-day period to comply (i.e., by purchasing additional permits). Then, countries still not complying will have to reduce the additional emissions in the next commitment period, increased by 30 %. They will also have to present a compliance action plan. These sanctions are decided on a case-by-case basis by the UNFCCC Compliance Committee. Appeal is possible. The incentive for compliance vastly depends on the emission reduction objectives agreed on for the following commitment period, as well as on the market price of permits.

Assessing Tradable Permit Schemes in the Climate Change Context

If they are well designed, tradable permit schemes allow lower GHG emissions with increased flexibility and hence reduced costs compared to traditional command and control measures. Trading emissions encourage innovation. By investing more than needed to meet a reduction objective, a company can trade an increased number of permits and sell the surplus tradable permits resulting from this investment. Command and control approaches do not reward additional reduction efforts.

However, allocation of tradable permits is problematic. Granting tradable permits is a way to limiting pollution. Nonetheless, granting them for free may be an indirect subsidy to emitting greenhouse gases. On the other hand, auction sales of permits may be counterproductive because emitters can pass the cost on to consumers. Tradable permits raise an equity issue: Is it fair and equitable for

a country or a company to pay for the reduction efforts of somebody else instead of reducing their own emissions?

Finally, over-allocating permits creates loose caps and hence market distortion. In the first phase of the EU ETS (2005–2008), carbon prices crashed from around €30 per tCO_2e to a few cents when it became clear that an excessive number of permits had been allocated.

Conclusion

Designing an effective tradable permit scheme requires key structural and institutional components (Ferrier 2008). First of all, defining the overall emission cap is the key to the success of such a policy scheme. If tradable permits are allocated in excessive number (i.e., if the overall cap is too high), emissions will not be reduced. Second, uncertainties should be as low as possible to enable investments in emission reduction. This includes stable, long-term programs and market rules. Emission trading schemes should set an ambitious long-term goal and several intermediate short- or medium-term stages with decreasing caps. This would encourage advanced investment planning, reduce emission abatement costs, as well as allow meeting the ultimate emission reduction goal earlier than anticipated. When operating an emission trading scheme, uncertainties can be reduced with access to reliable emission data.

Finally, market elements should be clearly identified: gases, scheme participants, legal nature of permits, and tax and accountancy regimes. Clear institutional and administrative frameworks should be decided, with adequate means to implement them including clear emission limits, free transactions, compliance control, and sanctions in case of noncompliance. Sanctions can be a powerful incitation to comply provided the market is not flooded with permits.

Tradable permits have been successful from a market perspective. In spite of economic volatility and evidence of "long-term oversupply in the EU ETS" driving carbon prices down by 50–62 %, the value of the global market increased in 2011 by 11 % to US$ 176 billion with transaction volumes of 10.3 billion tCO_2e (Kossoy and Guigon 2012).

Have they contributed to reduce greenhouse gases emissions? The total aggregate GHG emissions have declined by 6 % between 1990 and 2008, excluding the emissions and removals from land and forests, and −10.7 %, including them. Large emission reductions were achieved in 1990–2000 in countries with economies in transition, as a result of their shift to a market economy, offsetting a good part of emissions from industrialized countries (UNFCCC 2011). Economic growth or recession deeply impacts emission levels as well as any country's energy policies and fuel switching. It is therefore difficult to sort out the reductions achieved through emission trading schemes from the ones obtained through traditional command and control policies, voluntary measures, or as a consequence of an economic recession.

Flexible market mechanisms are more and more perceived as an effective environmental policy tool judging from the increasing number of emission trading schemes established at subnational, national, and regional levels, including those in countries with no binding commitment under the Kyoto Protocol (e.g., in United States, the California Cap-and-Trade Program or the Regional Greenhouse Gas Initiative). Tradable permits have been used or could be used to address other environmental issues, including water (effluent trading), biodiversity resources, and forests (United Nations REDD Program). In the climate change context, they may partially compensate for the lack of a global binding agreement.

Cross-References

▶ Kyoto Protocol and Beyond
▶ Offset Systems and Greenhouse Gases

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Additional Recommended Reading: Articles and Books

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Additional Recommended Reading: Websites

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Point Carbon: http://www.pointcarbon.com/
Regional Greenhouse Gas Initiative http://www.rggi.org/
UNFCCC http://unfccc.int/2860.php
UN-REDD Programme http://www.un-redd.org/Home/tabid/565/Default.aspx
World Bank: Carbon Finance Unit www.carbonfinance.org