

DEFINITION, DEVELOPMENT, AND DEPLOYMENT OF TRADABLE PERMITS

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Summary

The term emission permit trading (EPT) covers a variety of market-based economic instruments—as opposed to instrument-based fiscal measures (such as carbon or energy taxes) or other regulatory interventions—used in the context of emission abatement efforts. The aim of introducing such trading systems is usually to achieve a particular emission limitation in an economically efficient manner, in other words, at a reduced overall cost. The purpose of this article is to give a general characterization of the main components of EPT programs.

1. The “Production” of Permits: Allowance Trading and Credit Trading

Emission permits are permits entitling the owner to emit specified quantities of gases into the atmosphere. Accordingly, they are denominated in specific amounts of the relevant gas(es) or components thereof, for instance 50 Gigagrams of carbon dioxide (50 Gg CO₂) or 20 Megatons of carbon (20 Gg C). Historical EPT programs have generally had single-gas character; they were used in controlling the environmental effects of the emission of a single gas (such as sulfur dioxide in the US Acid Rain Program). However, there are situations where the environmental effects of concern are caused by different gases in a quantitatively comparable manner. Global warming, for example, is caused by a variety of gases, chief of which being carbon dioxide (CO₂) and

methane (CH₄), and it is assumed that (over a period of 100 y), the emission of 21 units of CH₄ will have the same effect as the emission of one unit of CO₂. Given these quantitative equivalencies, it is possible to introduce a multigas EPT program that allows for intergas trading, carried out in environmental equivalence units, such as Ggagrams “carbon dioxide equivalent” (Gg CO₂e).

Traditionally, two types of EPT systems have been distinguished: allowance trading and credit trading. In order to discuss both within a unified conceptual scheme, it is useful to interpret the acquisition of an emission permit as acquiring the right to emit a specified amount either of a particular gas (single-gas programs), or certain combinations of gases (multi-gas programs), over and above source-specific debit thresholds. These thresholds, in other words, specify the emission level that, when surpassed, will incur a permit debit for the sources in question. A source with a zero debit threshold has to cover all its emissions by permits. If the threshold is positive, then the source is permitted to emit up to the threshold level without having to acquire covering permits.

The main difference between the two types of trading derives from the manner in which the permits are generated, or “produced.” In the case of allowance trading, an allocation of permits for the relevant time periods (“commitment periods”) is carried out by an issuing authority. The permits are generated “exogenously” in the sense that their total number is independent of decisions made by the sources of emissions. The “supply side” in an allowance-trading program is thus determined by this issuing authority. Usually, but not necessarily, allowance trading will be coupled with zero debit thresholds.

The second type, credit trading, involves the sale of permits generated by sources through emitting less than certain source-specific credit baseline levels. Historically, credit baselines have been equated with debit thresholds and the levels in question have been referred to simply as “baselines.” It is, however, important to keep in mind that the two concepts are quite independent and that the only thing one can assume (on pragmatic grounds) about the relation between the two levels is that the credit baseline ought not to be higher than the debit threshold.

Credit-trading systems are usually based on credit generation through emission reductions: sources are allocated positive credit baselines, that, if undercut, generate emission permits (“abatement credits”) for the source in question. The number of credits generated equal the difference between the actual emissions and the credit baseline, implying a limit to how many abatement credits can be generated, given by the sum total of credit baselines. In other words, while the actual supply of abatement credits is determined by the market, the potential overall size of the market is set exogenously by the agency determining the source-specific credit baselines. Yet credit trading is not necessarily tied to positive credit baselines, provided the system allows for the possibility of creating credits through absorption of the relevant gases and is consequently designed in terms of net emissions. In this case, the baseline-setting authority’s control over the potential size of the permit market is essentially replaced by physical constraints. For the sake of simplicity, however, the focus of this general exposition will be on credits generated through emission abatement.

2. The “Consumption” of Permits

To “consume” an emissions permit is to use it to legitimize emissions over and above a debit threshold. By contrast to permit producers, who can be issuing authorities, emission sources, or even emission sinks (the term source–sink in this context refers not so much to physical sources and sinks as to legal entities such as people, firms, and nations that can be held responsible for emissions), permits are only consumed by emission sources, and, to be more precise, by emission sources constrained by an underlying environmental regime. The relation between producers and consumers varies according to the type of trading system: In allowance trading, permits are issued by an authority that generally will not be a permit consumer, at least not within the trading system for which it issues allowances. In (abatement) credit-trading systems, all producers are necessarily emission sources. However, they need not be potential consumers (i.e., they need not be constrained by the environmental regime in question).

A distinction regularly used in this context is that between international and domestic EPT systems. Amongst the possible interpretations of these concepts, the most useful is in terms of the legal status of the permit consumers involved. If, on the one hand, all permit consumers are emission sources subject to a single national legislature—or rather to an environmental regime enacted by this legislature—then the EPS system is domestic. If the permit consumers are nation states (entities governed by international law), then EPT trading is international. To be noted is that domestic EPT systems thus conceived can involve transactions with nondomestic actors (in particular the acquisition of credits generated abroad) while international EPT systems do not preclude the transactions of subnational entities, even across international borders.

3. Environmental Integrity and Allocative Equity

3.1. Environmental Caps and Trading Allocations

EPT programs are established in the context of an environmental regime. The aim of such a regime—for example, keeping air concentrations at specified levels—is typically translated into maximum aggregate emissions levels, or environmental caps, concerning certain emissions sources for specified commitment periods. In practice, any such regime will cover more than one emission source and the imposed environmental caps will constitute a genuine constraint on the aggregate emissions of these sources. Accordingly, all such regimes face a distribution problem, whether they involve an EPT scheme or not: a decision has to be made how to translate these environmental caps into limits for the individual sources covered by the regime.

Given that EPT systems themselves require source-specific trading allocations—allocations of debit thresholds, allowances, and/or credit baselines—it will not be surprising that the question of how to make these trading allocations is often identified as the distribution problem of the underlying regime. In the case of allowance-trading schemes (with zero debit thresholds), for example, the sum totals of allowances issued for the commitment periods in question are usually equated with the relevant environmental caps. In a pure credit-trading system, the analogous equation is between the environmental caps and the total of the corresponding credit baseline emissions.

Notwithstanding this practice, it has to be kept in mind that there are no conceptual reasons against trade allocations being below (or above) the environmental caps stipulated by the environmental regime, although there may be other reasons, concerning environmental integrity and economic efficiency, that could be put forward against such deviations.

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Biographical Sketch

Dr Benito Müller joined the Oxford Institute for Energy Studies in February 1996. He has a PhD in philosophy from Oxford University specializing in philosophy of science, and was formerly a research fellow at Wolfson College and a lecturer in logic at the Queen's College, Oxford, UK. He has a diploma in mathematics from the Eidgenössische Technische Hochschule (ETH) in Zürich, Switzerland. His work in the field of climate change has focused on socioeconomic and political issues, in particular issues of equity in allocating emission targets and in burden sharing. His publications in this field include *Justice in Global Warming Negotiations: How to Achieve a Procedurally Fair Compromise* (Oxford Institute for Energy Studies, 1999) and *Fossil Fuels in a Changing Climate: Impacts of the Kyoto Protocol and Developing Country Participation* (Oxford University Press, 2000, coauthored with Ulrich Bartsch).