

University of Dayton eCommons

Mechanical and Aerospace Engineering Faculty
Publications

Department of Mechanical and Aerospace
Engineering

2008

Carbon Permits

Jun-Ki Choi

University of Dayton, jchoi1@udayton.edu

Bhavik R. Bakshi

Ohio State University - Main Campus

Follow this and additional works at: https://ecommons.udayton.edu/mee_fac_pub

 Part of the [Environmental Sciences Commons](#), and the [Mechanical Engineering Commons](#)

eCommons Citation

Choi, Jun-Ki and Bakshi, Bhavik R., "Carbon Permits" (2008). *Mechanical and Aerospace Engineering Faculty Publications*. 241.
https://ecommons.udayton.edu/mee_fac_pub/241

This Encyclopedia Entry is brought to you for free and open access by the Department of Mechanical and Aerospace Engineering at eCommons. It has been accepted for inclusion in Mechanical and Aerospace Engineering Faculty Publications by an authorized administrator of eCommons. For more information, please contact frice1@udayton.edu, mschlangen1@udayton.edu.

CARBON PERMITS MAY be issued to companies through governmental agencies, and allow companies to emit up to a specified level of CO₂. The total number of issued permits from governmental agencies equals the national limit on emissions. CO₂-generating companies may reduce emissions by using lower-carbon coals, or increasing the use of cleaner-generating plants. Generators that reduce emissions below their allotted levels can sell excess emissions permits to other generators. Other generators who exceed the limit of the permit may purchase permits at the market price, instead of reducing emissions, if it is more cost effective. Thus, companies that can easily reduce emissions will do so, and those for which it is harder will buy credits that reduce greenhouse gases at the lowest possible cost to society. Emissions permits can also be banked for future use.

Emission Trading Systems

The European Union Emission Trading Scheme (ETS) is an example of a carbon permits trading system. The test phase of ETS operated from 2005–07, and is slated for operation in the European Union (EU) during the Kyoto commitment period 2008–12. In the system, the aggregate cap on emissions is set by each EU government agency, and the total number of emissions allowances is defined to provide the owner the right to emit units of emissions. The amount of emissions is capped, whereas the permit prices are uncertain.

These permit prices are determined by economic conditions, generally, stronger economic growth means a higher permit price. Critics claim that the ETS has done more for power-generating companies, than it has curbed pollution. First, power generators emit a tremendous amount of pollution and monopolize the carbon market. Also, permit holders find they have unexpectedly valuable property rights because carbon permits are usually handed out for free, rather than auctioned. Second, there are no signals that the carbon permit is helpful in switching to cleaner fuel. That is not just because gas has been so much more expensive than coal, but because the first phase of the ETS lasts only three years. Because investments to reduce emissions have payback periods of five or more years, investors are wary.

The ETS was originally designed to meet the targets set by the Kyoto Protocol. The Kyoto Protocol was an international treaty negotiated in Kyoto, Japan, in December 1997 that took effect on February 16, 2005. As of December 2006, a total of 169 countries and other governmental entities had ratified the agreement. Its objective is to stabilize the greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. In the Kyoto Protocol, mechanisms such as International Emissions Trading (IET), Joint Implementation (JI) and the Clean Development Mechanism (CDM) provide options for members to fulfill their targets. IET provides the trading of assigned amount units (AAUs) between Annex I Parties in the Kyoto Protocol, JI enables Annex I parties to get credits for joint projects to reduce emissions, CDM enables Annex I parties to get credit for projects resulting in emissions reductions in non-Annex I parties.

In the United States, the example of a successful emission trading system to date is the SO₂ trading system under the framework of the Clean Air Act (CAA). Under this program, SO₂ emissions are expected to fall by 50 percent 1980–2010. Compared to the proven success of the SO₂ trading program in the United States, carbon trading has some specific features that make it more complicated.

Carbon emissions are an international issue, rather than a domestic one. Complexities may arise in setting up baseline projections against which to monitor and verify net emissions reductions, particularly with regard to the CDM. Usually, large amounts of SO₂ come from coal-burning generation plants, making it relatively easy to monitor a plants fuel use and emissions, rather than to construct and maintain a trading system to ensure compliance. On the other hand, carbon emissions come from many different sources, such as households, commercial and industrial facilities, transportation systems, and fossil-fired generating plants. Therefore, the development and operation of a monitoring and trading system for carbon emissions would be complicated.

Carbon Permits vs. Carbon Taxes

There has been debate on the relative merits of carbon permits versus carbon taxes to achieve emission reductions. Carbon permit systems fix the overall carbon emission level, while prices vary. On the other hand, carbon taxes fix the price, while the emission level quantity is allowed to vary according to economic activity. Therefore, carbon permits and carbon taxes are called quantity and price instruments, respectively. There are major drawbacks for each system. Carbon permits create uncertainty about the cost of compliance for firms, because the price of a permit is unknown; carbon taxes cannot guarantee the amount of emissions reduction.

Recently, a third option known as a safety valve has been suggested. It is a hybrid of the price and quantity instruments. The system is similar to a carbon permit system, but the maximum permit price is limited. Permits can be either purchased from the carbon market, or government, at a specified price. This system is designed to overcome the fundamental disadvantages of both systems, while providing flexibility.

- carbon permits
- emissions
- carbon tax
- kyoto protocol
- emissions trading
- carbon trading
- pricing

Jun-Ki Choi Bhavik R.BakshiOhio State University

<http://dx.doi.org/10.4135/9781412963893.n106>

SEE ALSO:

- [Carbon Cycle](#)
- [Carbon Emissions](#)
- [Carbon Footprint](#)
- [Clean Air Act, U.S](#)
- [Economics, Cost of Affecting Climate Change](#)
- [Emissions, Trading](#)
- [Kyoto Protocol](#)

Bibliography

P.Cramton, & S.Kerr, Tradeable Carbon Permit Auctions: How and Why to Auction Not

Grandfather (University of Maryland, 1999)

R.Green, Carbon Tax or Carbon Permits: The Impact on Generators' Risks (University of Birmingham, 2007)

Organisation for Economic Cooperation and Development (OECD), Tradeable Permits: Policy Evaluation, Design and Reform (OECD Publication, 1998)

United Nations Framework Convention on Climate Change, An Introduction to the Kyoto Protocol Compliance Mechanism (United Nations Framework Convention on Climate Change, 2006)

U.S. Energy Information Administration, Impact of the Kyoto Protocol on U.S. Energy Markets and Economic Activity (U.S. Department of Energy, 1998)