Global Power/North America
Special Report

Emission Trading

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Related Research
- Status of Environmental Regulation, Special Report Oct. 12, 2004.

Rating Implications
Fitch anticipates more stringent pollution-control requirements leading to increased operating and capital costs. A well-structured emission-trading program can assist companies in managing and reducing capital expenditures for compliance with environmental regulations.

Key Observations
- Current financial effect from emissions is modest.
- NOx and SO_2 trading has generally worked as intended.
- Investing in emission credits does, nonetheless, involve risks, albeit generally modest at the enterprise level.
- International cooperation and standardization will be very important for trading in carbon and less so for NOx and SO_2.

A glossary of terms appears on page 7.

■ Overview

The commencement of carbon dioxide (CO_2) trading in Europe and the recent run-up in prices in the United States for sulfur dioxide (SO_2) emission credits have contributed greatly to renewed attention to the value and effectiveness of the use of emission credits. Fitch Ratings believes that a well-structured emission-trading program can assist companies in managing and reducing capital expenditure requirements to comply with legal requirements to reduce harmful emissions, while at the same time not hampering the achievement of environmental goals. Fitch also recognizes that a trading program that does not foster the overall reduction in pollutants would ultimately fail. Historically, the use of allowances alone has not been the most cost-effective way of dealing with environmental problems, and this is likely to remain the case. The purchase of emission credits is one part of a solution that includes installation of pollution-control devises, fuel-switching, conservation or demand management and improved efficiency.

There have been six major emission-trading programs in the United States based on regulated reduction schemes. Additionally, there is voluntary carbon emission trading, most notably over the Chicago Climate Exchange (CCX). This report will focus on the trading of SO_2 and nitrogen oxide (NOx) under the Clean Air Act (CAA), as these programs apply to the widest group of companies covered by Fitch's global power group in the United States. Additionally, there will be some discussion of the trading of CO_2, as Fitch believes that the United States will eventually have a federal law limiting the emissions of CO_2 and possibly other greenhouse gases (GHGs).

An emission-trading program is primarily valuable because it puts a market price on the cost on emissions, thus allowing a company to make an informed choice among compliance options. However, it should be noted that a dysfunctional trading system can result in market prices that could lead to economically suboptimal decision-making.

For an emission-trading market to be efficient, allocation of emission allowances or credits must be assigned in a consistent and coordinated fashion. Emission output and compliance must be auditable, and compliance must be certifiable to support the value of the emission allowance. This will be particularly challenging as the market for carbon develops. With SO_2, there is one overarching regulatory body, the Environmental Protection Agency (EPA), that allocates the allowances and monitors the compliance process. However, with carbon, there will be a number of countries setting their own procedures with varying degrees of rigor.

Emissions Trading — In Theory

The most common types of emission trading programs are "reduction credits" and "cap and trade." In a reduction credit program the polluter has a limit on emissions, usually defined in tons of a given substance. If the generator emits less than the permitted amount, it receives a tradable credit that can be sold to others that are exceeding the limit. Reduction credits are granted by a regulatory body (e.g., the EPA) upon the actual reduction of emission. The actual certification process is done either on a case-by-case and sometimes plant-by-plant basis or through a predetermined formula. An example of credits that are automatically certified are those offered under "averaging" programs where an average emission rate is set for a company's plants on a portfolio basis and emissions below a predetermined figure are certified.

The certification allows for a more effective trading program in that the allocation of credits is more timely and the terms of the credit are more uniform. In a case-by-case method, the regulator conducts a review after the fact. This usually takes time. Additionally, the regulator may grant credits as it sees fit, resulting in the terms of credits, in some cases, being different than those given to others. In the case of the predetermined formula, the emitter at the end of the period is entitled to credits based on a formula. Usually the emitter can trade those credits immediately. Perhaps more importantly, the terms of the credits are based on a formula applicable to all emitters and, therefore, are consistent.

The other major trading scheme is a cap-and-trade policy in which the regulator establishes the amount of emissions permissible per generating plant, as under the Acid Rain Program for SO_2. The generator is given a number of allowances that are denominated in tons of emissions for a given year. There is no certification process, as the allowances are immediately tradable upon allocation. The company, in the case of SO_2 emissions, however, will need to verify at the end of the year that it has sufficient allowances to offset the emissions that it must report to the EPA.

Both credit reduction and allowance usually allow the company a grace period for compliance after the end of the measurement period. In the case of SO_2, a company has 60 days after year-end to acquire additional allowances in the event that it failed to estimate its needs accurately. Failure to have sufficient emission allowances, or credits as the case may be, will result in a fine. For SO_2, the fine is currently $2,727 per ton. Few companies have actually failed to comply and pay fines. In 2003, only one company failed to meet SO_2 emission standards and was fined $40,000.

Effective programs are characterized by regulation that permits allowances/credits to be tradable and bankable. For the credits/allowances to be tradable, the allowance should be clearly and consistently defined in terms of size and the applicable period of time. Additionally, the allowances need to be properly allocated. Failure to allocate the proper amount of allowances could be the result of error on the part of the regulator or the lack of coordination among regulators in a trading scheme that includes multiple jurisdictions or even countries (i.e., CO_2). In the event the too many or too few allowances are allocated to meet a given emission reduction goal, the market price of the allowance may be giving off an incorrect indicator of the ultimate cost of compliance. The failure to reach national or international reduction goals will more than likely lead to a revision of the allowance program(s). These types of changes are disruptive to any market and could lead the owner of an existing allowance to be holding an asset with a value materially different than the original purchase price.

Bankable credits/allowances are those that are generated in the early years of an emission-reduction period that can be used for compliance in later years. This is important for programs that have an emission-reductions program where permissible emission levels are reduced over time. The generator is provided an incentive to reduce emissions more rapidly than required. Additionally, it allows the generators more flexibility in its capital expenditure program.

Today's Market

The most active market in the United States for emissions is that for SO_2 under the CAA, which commenced in 1995. The market is primarily an over-the-counter (OTC) market. However, some trades are cleared on the Chicago Board of Trade. The nature of the allowance contracts are standardized in terms of size, in tons of emissions per million British thermal units (mmBtu), and tenor (annual), making them suitable to be exchange traded. However, the market is rather small with estimated dollar value to date at $6 billion.

Additionally, it is not unusual for a day or even longer to elapse without a trade in SO_2. Thus, the lack of volume at this time makes trading emissions unattractive to most exchanges. CCX, which has recently been made a "designated contract market" (DCM) by the Commodity Futures Trading Commission, plans to commence trading of sulfur futures contracts in December 2004. CCX will have a committee that will set prices for the products on days when there are no trades.

Factors that have led to the modest size of the market include the economically viable alternatives to the use of allowance for emission reductions and the regional nature of the market. Companies to date have complied with SO_2 emission-reduction rules in large part by fuel-switching and the application of commercially feasible emission-control technology. Additionally, the SO_2 program falls under U.S. law and mostly applies to acid rain conditions caused by generators on the East Coast and in the Midwest. Thus, the number of companies that would be in this market is limited.

The market for trading of NOx is thinner than that for SO_2. This is in large part due to the more nascent nature of the market, as trading commenced only in 1999. Additionally, the market for NOx is limited to the areas under the state-by-state Standard Implementation Plan (SIP) Calls programs, which include specified states on the East Coast and the Midwest (see appendix on page 5 for a description of the SIP Calls). Also, the NOx compliance period is for a shorter period of time. SO_2 emissions are measured annually, NOx emissions are only measured from May through September (the months with extended sunlight) when ground-level ozone is most prevalent. NOx and certain particulate matter combine in sunlight to make ground-level ozone.

Participants in the SO_2 and NOx markets, for the most part, are utilities and wholesale generators. For SO_2, the larger coal-fired producers that use Eastern coal, which has a higher sulfur content, are the net buyers of allowances. However, it is not unusual to see the larger companies, such as Cinergy Corp. and American Electric Power Co., Inc. (AEP), selling allowances given market conditions. Companies that converted early to low sulfur coal, such as Ameren Corp., are the typical sellers. Some financial institutions, such as Morgan Stanley and Goldman Sachs Group, Inc., are now trading emissions, as they are a natural complement to the institutions' sizable presence in the electric and natural gas markets. Additionally, there are a few brokers that have found a niche in this market and include Amerex Futures Ltd., Cantor Fitzgerald, Evolution Markets LLC, United Power Inc. and Natsource LLC.

The market for SO_2, in particular, has become very tight in the past year, as companies with available credits have opted to hold onto the allowances. This is due to the belief in the industry that even more stringent requirements will be forthcoming. Additionally, the high price of gas has caused the industry to increase the dispatch of coal-fired capacity, thus requiring companies to hold onto more allowances. In 2003, uncertainty in how the state-by-state SIP Calls affect the NOx market led to an unstable market with insufficient liquidity, as companies were holding on to allowances. This caused prices to be very high in early 2003 at $5,000/ton, spiking to $8,000/ton during the early summer months of that year. As the dynamics of the market became more transparent, the market stabilized, and prices have been in the $2,000–$3,000/ton range since August 2003.

■ Carbon?

The United States does not have any federal rules controlling the emission of CO_2 or other GHGs. However, in anticipation of future regulation the CCX was founded and currently has 65 members. The baseline of the carbon emissions of the members on aggregate is greater than the baseline for the U.K. All members have agreed to reduce emissions by 1% per annum from 2000 levels. Currently, AEP and TECO Energy, Inc. are the only U.S. utilities among the members. AEP has been the largest buyer on the CCX. Prices are, for the most part, in the range of $1 per ton. The price is deemed to be unrealistically low due to the uncertainty of the terms of any future U.S. carbon law. The CCX assumes that allowances are bankable, which is necessary if these are to have value when a carbon law is enacted. It should be noted that there have been a number of sizable OTC transactions in CO_2 also.

The European Union (EU), which has signed the Kyoto Protocol (KP), is to commence trading of physical allowances, the Emissions Trading Scheme (ETS) in January 2005. Currently, there is a market in the EU for financial-only CO_2 allowances. Each country in the EU is to allocate allowances within its boundaries. There is concern at this time that the allocation methods in all countries are not transparent. Additionally, some countries appear to

be too generous in the permitting of allowances, thus making it difficult to reach KP's requirements down the road. Both of these factors already have had a dampening effect on the price of ETS. Even in the UK, where the government is viewed as having voluntarily allocated less allowances in aggregate than it would have been able to under the ETS, allowances are trading at approximately GBP3.50 (US$6) per ton of CO_2. This is well-below the figure initially anticipated at $15–$20 per ton of CO_2.

It is expected that the EU market over time will become more transparent, and the allowance-allocation mechanisms will come more in line with what is required under KP. As CO_2 emissions in any place in the world affect the global environment, Fitch anticipates that CO_2 trading will have a global scope. The eventual market size has been estimated by the Council on Foreign Policy at $2.5 trillion–$3.0 trillion. This volume should allow for CO_2 to be traded on exchanges, such as the New York Mercantile Exchange and Chicago Mercantile Exchange, which already trade energy and weather derivatives. The advantage of clearing trades through an exchange is that it increases price transparency, as prices are posted on a real-time basis. Additionally, it reduces counterparty risk, as the exchange steps in between the market participants.

Summary of Emissions Trading Programs

Program	Agency	Type	Emissions	Source	Scope	Year
EPA Emissions Trading Program	U.S. EPA	Reduction Credit, Averaging	Various	Stationary	United States	1979–Present
Lead-In-Gasoline	U.S. EPA	Averaging	Lead	Gasoline	United States	1982–1987
Acid Rain Trading	U.S. EPA	Cap-and-Trade, Reduction Credit	SO_2	Electricity Generation	United States	1995–Present
RECLAIM	South Coast Air, Quality Management District	Cap-and-Trade	NOx, SO_2	Stationary	Los Angeles Basin	1994–Present
Averaging, Banking and Trading	U.S. EPA	Averaging	Various	Mobile	United States	1991–Present
Northeast NOx Budget Trading	U.S. EPA, 12 states and Washington, D.C.	Cap-and-Trade	NOx	Stationary	Northeastern United States	1999–Present

EPA – Environmental Protection Agency. NOx – Nitrogen oxide. SO_2 – Sulfur dioxide. Source: *Emissions Trading in the U.S.: Experience, Lessons, and Considerations for Greenhouse Gases*, A. Denny Ellerman, Paul L. Joskow and David Harrison Jr. Pew Center on Global Climate Change, Arlington, Va., May, 2003.

Appendix

Sulfur Dioxide (SO_2)

Acid Rain Program (ARP)

The EPA, under the CAA, regulates the emission of SO_2, a cause of acid rain, through the ARP. ARP aims to reduce the SO_2 emissions by 10 million tons from 1980 levels (or approximately one-half the amount emitted in 1980), and the rules affect generating units greater than 25 megawatts (mw) in capacity. The ARP has been conducted in two stages. Phase I (1995–1999) targeted the largest emitters and required 110 coal-burning electric power facilities in 21 Eastern and Midwestern states to reduce SO_2 emission rates to 2.5 pounds (lbs)/mmBtu. Phase II (2000–present) requires essentially all fossil-fueled electricity generating facilities to reduce their emission rate to 1.2 lbs/mmBtu.

Allowances

ARP prescribes a market-based cap and trade mechanism of reducing SO_2 emissions that has become the template for other programs for emission trading, both in the United States and abroad. Utilities are required to maintain an emissions cap determined by multiplying the allowed emission rate by the annual average quantity of mmBtus consumed in fuel between 1985–1987. The EPA allocates emission allowances to each electric generator at the emissions cap. Emission credits are issued in per ton of SO_2. These allowances are distributed free of charge and are fully marketable commodities that can be bought, sold or banked for future use. A small number (2.8%) of total annual allowances are withheld on a pro rata basis from each generating unit for an auction conducted by the EPA. The auction is intended to encourage trading and to ensure the availability of allowances for new units. Revenues ($334 million in 2004) from the EPA auction are returned on a pro rata basis to the owners of the units from whom the allowances were withheld.

Nitrogen Oxide (NOx)

SIP Calls

In 2003, the EPA established the NOx SIP Call, which includes 22 states and Washington, D.C., and requires each state to submit implementation plans for the decrease of the transport of ground-level ozone. The SIP Call program is to be implemented in two phases. Phase I, effective on May 1, 2003, applied mostly to generating facilities in Connecticut, Massachusetts, Rhode Island, New York, New Jersey, Pennsylvania, Maryland, Delaware and the District of Columbia. Phase II, commenced on May 31, 2004, includes the Phase I states as well as Virginia, West Virginia, North Carolina, South Carolina, Kentucky, Tennessee, Alabama, Illinois, Indiana, Michigan and Ohio. Georgia and Wisconsin are to be included in the program in 2005. Qualifying plants with nameplate capacity of at least 25 mw are required to reduce their NOx emissions to the target rate of 0.15 lbs/mmBtu through actual reductions by installing selective catalytic reduction devices (SCRs) or buying emission credits through the NOx budget trading system.

Allowances

Every participating state is allocated NOx allowances, its NOx budget, based on the higher of each state's heat input rate in 1995 or 1996 for units then in operation. These budgets will be used to allocate allowances through 2007 and will be adjusted for estimates of the growth in electricity demand. In April, before the ozone season, each state allocates among the emission sources allowances equal to 0.15lbs/mmBtu multiplied by the average of the two highest heat inputs in the past three ozone seasons. A portion of each state's allowance budget is reserved for new sources that have not operated for two full ozone seasons and/or for distribution after the ozone season to cleaner burning sources. Each participating state is required to report its allocations to the EPA. All allocations and subsequent allowance transactions are recorded in the EPA NOx Allowance Tracking System (NATS) to facilitate the reconciliation process at year-end. Unused NOx allowances can be banked for use in the future. However, banked allowances are subject to a "flow control" provision that limits banking to 10% of the total annual allocation for the region. If tonnage available for banking exceeds the regional 10%, each participant receives a discounted value for the allowance, such that the aggregate limit was not violated.

Accounting for Allowances

The accounting by generation companies of allowances is on an accrual basis. The allowances received from the government have zero basis, as there is no cost. Those allowances purchased in the marketplace are booked at the lower of cost or market. The company is assumed to have an inventory that comprises both the free and purchased allowances. Companies use an average cost basis for

the inventory. For example, Company A was allocated 90 allowances from the government and purchased 10 more for $100 dollars each. The company thus has 100 allowances with a total value of $1,000 and an average value of $10. If the company sells an allowance for $90, the assumed cost of the unit sold is $10. It should be noted that there has been papers presented to the Financial Accounting Standards Board recommending the use of fair-value accounting for these allowances. There appears to be no significant support, however, for fair-value accounting of these instruments at this time.

Glossary

Certification
The determination by a regulatory body that the company has emission credits that can be transferred to a third party.

Allowance
An allowance is issued, as in the case of SO_2, at the beginning of the year by the regulator, the EPA. The allowance permits a given company the right to emit a ton of SO_2 during that year.

Credit
A regulatory body issues or establishes the formula through which a company can earn an emission credit. The credit is earned by emitting less of a pollutant than is permissible. Unlike an allowance, the credit is issued after the fact and is only tradable at that time.