Enron Capital + Trade Resources
Memo Re: SO2 Trading
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ARTHUR ANDERSEN & CO, SC

To: The Files

From: Vladimir Gorny, Houston VG
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Date: May 22, 1997 (update to October 18, 1996 memo)

Subject: SO2 Trading

Overview

The 1990 Clean Air Act Amendments (CAAA) created an organized market for sulfur dioxide (SO2) emission allowances (EAs). Allowances are granted to utilities by the Environmental Protection Agency (EPA) in an effort to control acid precipitation and encourage utilities to convert to clean burning fuels. The Act allowed market players to sell, buy, trade and/or exchange allowances. Phase I of the program (1995-1999) covers 110 large power plants with 265 generating units. Phase II (starting in the year 2000) will include a total of 800 power plants with 2200 generating facilities across the United States.

CAAA mandates all utilities to install emission monitors on each smokestack. Utilities that do not hold enough EAs to cover SO2 emissions during a year face heavy fines. Each tradeable SO2 emission allowance allows its holder to emit one ton of sulfur dioxide in a designated year. Additionally, the vintage year of an allowance (the year in which it can be used) can be extended to the future years. Such extension will occur automatically if the allowance is not utilized.

Enron Power Marketing, Inc. (EPMI) began trading emissions in late 1993. In the past three years the Company has executed approximately 320 transactions and traded over a million allowances. This memorandum summarizes EPMI's management of market and price risks, curve generation methodology, and description and assessment of controls over these processes.

Description of the SO2 Market

Despite recent legislation, SO2 market remains substantially illiquid. Major players in the market are utilities, brokers and a few coal companies. The CAAA organizes annual auctions (run by the Chicago Board of Trade) of allowances to be used in the current or future years. Additionally, market activity picks-up during the 1st and 4th Quarters, closer to the reporting deadline. Trading of SO2 allowances is not a physical process and does not require physical delivery of the allowances. Emission allowances exist only as entries in EPA computer file, and transfers are recorded in the book entry accounts in the system. However, liquidity of SO2 allowances market varies significantly by state, depending on the degree of regulation by the Public Utility Commissions.

VG

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Pricing of SO2 Allowances

At the birth of the SO2 market, allowance prices were set based on the cost of clean up and EPA penalties. However, as the market evolved, emission allowance prices lowered significantly. SO2 price volatility is affected by the following factors: weather conditions, power plant outages (dirty/clean plants), volume of purchases of wholesale electricity, ratio of higher/lower-sulfur coal used (due to price, shipping quality, etc.), deviations in scrubber system performance, technological improvements in emission abatement equipment.

Curve Generation Procedures

EPMI values SO2 allowances transactions by comparing the contract price negotiated with customers to the forward price curve. The SO2 allowance curve is generated by SO2 trader as follows:

- the trader derives spot price for the emission allowances based on the available broker quotes (Cantor Fitzgerald, Tradition, NRG, Mission Exchange), publications (Clean Air Products Review, Utility Strategy), historical information, market surveys, and individual knowledge and perception of the market
- future prices are derived by inflating spot prices using ECT's interest rate curve
- the trader steps-up the curve approximately 6.5% beyond the year 2000 in anticipation of higher demand for SO2 credits, when more utilities will be subject to emission controls as Phase II of the Act becomes effective

The curve is updated as often as dictated by the market (from daily to bi-weekly). Bid/Ask curves are not utilized by EPMI. Currently, there are no procedures in place for review, authorization or validation of the emission allowances curve (see report finding).

Types of Transactions/Hedging

The SO2 allowance transactions executed by EPMI are "physical" trades. EPMI offers swaps, exchanges, options and prepays of emission allowance vintages. Vintage is the year in which an allowance can be used. EPMI does not hedge its SO2 allowance positions, as financial transactions are not common due to market illiquidity. As a compensating control ECT established an overall position limit for number of allowances (300,000 credits). The limit is monitored by EPMI's Management and the Controls group daily.

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Prudency

EPMI does not generate a prudency curve for emission allowances. The SO2 trader and the Head trader reserve for prudency for certain transactions which are considered risky. However, there are no procedures in place for prudency reserve for SO2 allowance transactions (see report finding).