

Carbon-denominated weather swaps

Jeremy Weinstein sees a potential role for weather derivatives with payouts in environmental 'commodities', such as emissions credits, rather than cash

Potential limits on emissions of carbon dioxide (CO₂) and other pollutants significantly increase the environmental risks borne by energy companies. Whether and when there will be strict limits remains uncertain, especially in the US, whose administration is opposed to the Kyoto Protocol. Current arguments over terms in the treaty itself are vastly overshadowed by the brewing war in the Middle East although this could also affect long-term climate change economics.

Despite this uncertainty, energy companies should be taking steps to manage the environmental risks presented by potential limits on their CO₂ emissions. Emissions trading is likely to be an important tool for compliance, but companies trading in CO₂ credits before an emissions trading regime is established risk buying credits that end up being worthless because they do not qualify under the regime. Many companies are therefore reluctant to hedge their CO₂ emissions risk through trading, because they do not want to pay cash, which is real, for CO₂ credits, which only become real if and when there is an emissions trading regime that recognises them.

One way to address this problem would be with transactions that do not trade real-for-unreal, but rather like-for-like, such as a temperature-based weather swap in which the pay-outs are denominated in CO₂ credits. If the local weather is particularly hot or cold, the increased power demand for cooling or heating would lead to increased generation to serve the local load and hence to greater emissions, and a need for more CO₂ credits to offset them. An example of this occurred in the Regional Clean Air Incentives Market in

the Los Angeles basin where prices of nitrogen oxide (NOx) emissions credits rose so high by the end of 2000, due to tightness in generation supply, that the entire programme was temporarily bifurcated to uncap the supply of credits for power utilities.

To illustrate this idea, consider a utility and a bank that enter into a swap based on a temperature index for the summer months. The utility agrees to pay the bank when temperatures are below a certain level, and the bank agrees to pay the utility when temperatures are above a certain level. By providing that the payments are to be made in CO₂ credits rather than in cash, each party takes the same risk as to the eventual 'reality' of the CO₂ credits, and both parties gain experience in managing CO₂ emissions risk without necessarily having to part with cash.

Another regulatory approach to reducing air pollution is renewable portfolio standards (RPS) requiring electricity utilities to deliver a mandatory minimum of power derived from renewable sources, or give retail customers a choice of buying 'green power' from a renewable resource mix. The UK's RPS starts next January and the concept is gathering momentum in the US.

Utilities subject to such programmes are often permitted to generate from 'brown' power sources, like coal, and buy the 'greenness' of power generated elsewhere by renewable resources, like wind, through what are

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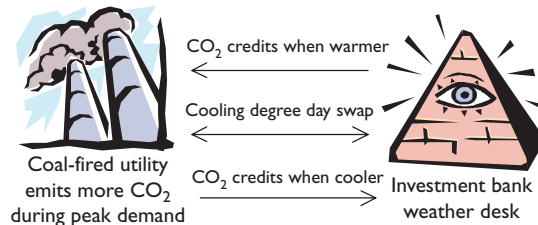
called 'green tags'. In the US, there have been calls for standardised green tags markets and the development of a wider, fungible market in green tags would help mitigate RPS risk. Developers or utilities might be able to use weather derivatives to hedge their 'green' generation risk. For example, a windmill developer that is selling green tags to a utility might be able to protect itself from a failure to deliver the tags due to low wind conditions reducing its renewable resource generation with a weather swap that pays out in green tags in the event of persistent low wind-speed conditions.

Structuring weather derivatives that settle with pay-outs in environmental commodities also requires consideration of the effects of weather on the price of that commodity. These instruments offer a way to quantitatively tie together several important aspects of environmental finance. E

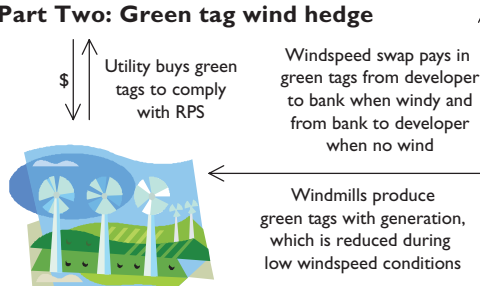
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Part One: Carbon-denominated temperature swap



Part Two: Green tag wind hedge



The Emissions Marketing Association consists of more than 270 members from 190 companies worldwide. Its aim is to promote market-based trading solutions for environmental control

