

Carbon markets—buying and selling the right to pollute

Carbon-pollution markets, where governments give companies the right to pollute and allow them to buy and sell such rights (a “cap and trade” system), are being widely adopted as one of the largest—and most controversial—tools for limiting climate change.

In the basic “cap-and-trade” system, the government annually grants to each business a certain number of pollution allowances, each worth one metric ton of carbon dioxide. The allowances are handed out free of charge. The number of allowances is capped for the entire trading system, and decreases each year. If a business pollutes less than its allotment, it can sell extra credits to other companies. If a business pollutes more than its number of allowances, then it must buy extra allowances from other companies that reduced their pollution. Companies that don’t comply face steep fines.

Businesses are supposed to respond to market pressure by finding cost-effective ways to lower emissions. A business that requires expensive retrofits or replacement of factories will find it cheaper to buy allowances, paying another business that can reduce its emissions at less cost. A pollution market is supposed to be more efficient than government mandates that might not be sensitive to costs and benefits. Theoretical analysis of supply and demand curves predicts that carbon markets will lead to a least-cost reduction in carbon pollution. Since market participants don’t always make ethical or even rational choices, though, it’s an open question whether they will obey mathematical equations.

Cap-and-trade systems do have potential problems. They give little incentive to reduce carbon faster than the declining caps, since that leads to a surplus of allowances and falling carbon prices. Participants may also face unpredictable prices, which will depend on decisions by government regulators, economic cycles, and even the weather. Prices can also be influenced by speculation; under the European Climate Exchange, a secondary market has developed in derivatives, such as carbon futures and carbon options. Buying a carbon option would give someone a right to buy or sell a pollution allowance at a future date at a preset price. In theory that is supposed to be a way to control price risk, but in practice it can lead to higher risk.

The basic “cap and trade” approach is subject to several major criticisms:

- it allows many businesses to buy their way out of reducing emissions;
- it provides an incentive to limit total pollution to the cap, but not to do better than that;
- it provides no revenue for government programs that reduce carbon emissions;
- it violates the ethical principle that the “polluter pays”.

Another complication in a carbon market is the “offset”, where businesses can pay for carbon reductions outside the trading system (see article below). Many critics consider offsets to be “leaks” that remove the market pressure of the gradually tightening caps and that thus can undermine the market system.

In response to such problems, policymakers are moving toward an auction system, where polluters have to bid for all allowances. To make sure that revenues are generated

beyond the cost of holding the auction, government may set a minimum bid price. President Obama has recently stated that he favors an auction to create an effective program for reducing carbon emissions, and to limit gaming of the system.

Others, however, believe it may be more efficient to impose a carbon fee or tax, as was recently recommended by Rex Tillerson, the CEO of ExxonMobil, a company that for years denied that climate change exists. A tax eliminates the price uncertainty of a pollution market, and lowers transaction costs. While cap-and-trade is usually limited to large industrial polluters, a tax can be distributed across the whole economy. A given amount of revenue is generated at a lower cost per ton of carbon, which reduces the burden on businesses.

There has been speculation about how high a carbon cost (whether through cap-and-trade, auction, or a tax) would motivate businesses or consumers to change their habits. There may, however, be significantly less expensive ways to transform our energy system. A \$25 per ton tax on the nation's six billion tons of carbon dioxide would generate \$150 billion of revenue per year. That could pay for efficiency programs, subsidies for renewable energy, conversion to cleaner transportation, and redesigning our infrastructure. It is unlikely that the equivalent tax of 28 cents per gallon of gas could achieve a similar transformation through a penalty effect.

Real carbon markets

The European Union created the first major carbon market, the European Climate Exchange, in 2005. At first, the EU issued too many allowances. Most companies could easily meet the cap, and the price of carbon plummeted. This resulted in little incentive to cut emissions. In spite of challenges, the market has grown dramatically. In 2005, 94 million tons of carbon permits traded hands; in 2008 the trading volume was 20 times larger, equivalent to about half of all the carbon emissions in the EU. Prices have ranged from 10 to 30 euros per metric ton (about \$15 to \$45 per English ton), with 2007 sales of \$64 billion and the value more than doubling every year.

Despite years of stonewalling by the U.S. government and the oil industry, discussion and action on climate protection are rapidly moving ahead in this country. The Regional Greenhouse Gas Initiative (RGGI) is a group of 10 states that created a "northeastern climate confederacy" with Kyoto-style regulations. Nearly all carbon allowances under the system are auctioned, and offsets are minimized; currently only power plants are covered.

The three auctions held since the market began in September 2008 have raised a hefty \$260 million—to be spent by states for efficiency, renewables, and other climate-protection programs. The caps are designed to reduce regional emissions 10% by 2018.

The next region to bolt from under the Bush regime of climate inaction was the West. In 2007 five states (California, Oregon, New Mexico, Arizona, and Washington) formed the Western Climate Initiative (WCI). Two more states and four Canadian provinces have since joined, and a few Mexican states sit in as observers. While still in the planning stage, WCI will cover nearly all sectors including transportation, residential, commercial, and industrial carbon pollution. It aims for a 15% reduction in carbon emissions by 2020.

California has developed its own climate agenda through AB 32 (Nuñez and Pavley), the Global Warming Solutions Act of 2006. California has focused strongly on programs,

planning, and regulations to achieve greenhouse-gas reductions. These include requirements to increase renewable energy to 33% of the state's electricity supply (see article, page 12), to reduce the carbon content of transportation fuel, to reduce methane emissions from waste, and to improve local planning and land use. A pollution market will account for 21% of the reductions. The trading scheme will probably involve auctions, after a phase-in when initial allowances may be handed out for free. This is a contentious issue, with environmentalists wanting to minimize, or ideally to eliminate, free allowances.

It is too early to judge the effectiveness of carbon pollution markets. The market systems that have achieved significant reductions in other pollutants, such as sulfur dioxide and nitrogen oxides, have been mixed with regulatory structure, and have operated largely through retrofitting existing facilities. In contrast, controlling carbon emissions will require replacement of entire power plants, factories, transportation systems, and other infrastructure. Clearly, the economic incentive required to rebuild infrastructure will need to be much higher than for adding equipment to existing facilities.

It is almost certain that pollution markets will not be able to achieve all the necessary reductions in greenhouse gases. Much of our infrastructure—such as roads, planned urban environments, transit systems, passenger rail, airports, electric utilities, and vast portions of the nation's real estate—is immune to market incentives because it is owned or heavily regulated by government. Government plays a key role in research and development of new technologies and controls about 40% of the U.S. economy through the power of taxation. Governments also set laws and regulations, and can design climate policies, programs, and plans. These are things that few people expect or want the “free market” to do. Government and markets both have critical roles to play in protecting the world's climate; the challenge will be to integrate them into effective and timely solutions to the major crisis of our age.

Robert Freehling, Energy and Climate Committee, Sierra Club California

Cutting emissions, not “offsetting” them

If a polluter pays someone else to reduce greenhouse-gas emissions, should the polluter get credit? Such “offset” projects may include emission reductions in a different local industry, planting trees in a deforested region, or paying a factory in China to stop producing chlorofluorocarbons (CFCs). The logic behind offsets is that carbon reductions anywhere in the world are equally effective at controlling global climate change.

Unfortunately, carbon offsets can be a dicey proposition when it comes to cleaning up our air. They have been compared to the indulgences sold by medieval clerics—by paying some money (which ostensibly will go toward reducing or sequestering emissions somewhere) a polluter is considered to be compensating for its discharges into our atmosphere.

Minimally, offsets need strong safeguards to ensure that the promised emission reductions are real, additional, verifiable, permanent, and enforceable. It may be difficult, though, to oversee offsets, especially in distant places, to ensure that the benefits are real. And of course, it would be far better to reduce *both* the carbon discharges in Los Angeles *and* the CFCs in China, *and* to save the rainforests, rather than create offsets that allow businesses to choose one or the other.

Further, offsets may interfere with reductions in other forms of pollution. When a facility is modified to lower carbon emissions, typically other pollution is reduced in the process. It may not matter where in the world carbon reductions happen, but to the neighbors of a polluting facility, the location of other kinds of pollution matters greatly. Since unhealthy air is concentrated in some of California's most impoverished communities, some offsets could harm the cause of environmental justice.

Excessive reliance on offsets could open up huge loopholes that undermine the very purposes of a law like California's AB 32 cap on emissions. The Air Resources Board's (ARB) AB 32 Scoping Plan would allow up to 49% of emission reductions to come from offsets anywhere in the world. Sierra Club California believes that offsets should be much more strictly limited.

Curbing global warming will require a fundamental transformation of our energy economy, a task that cannot be outsourced to other countries. Requiring California's largest polluters to reduce their *own* emissions will spur technological advances that can be exported to the rest of the world, bringing green jobs to the Golden State. If polluters are allowed to outsource their emission reductions to other sectors and jurisdictions, the clean-energy revolution will be delayed. If big oil and utilities can comply with the law by paying for tree planting in Canada, then they will not have to develop clean technologies to green their own operations and products.

In addition, according to a new study from UC Berkeley, allowing out-of-state offsets would increase emissions of harmful smog-forming and toxic pollutants here in California. AB 32 requires the ARB to ensure that its implementation rules "complement, and do not interfere with, efforts to achieve and maintain federal and state ambient air quality standards and to reduce toxic air contaminant emissions." The study found that by limiting offsets to in-state emission-reduction projects, we could slash emissions of six out of eight air pollutants.

A new bill, AB 1404 authored by Assemblymembers Kevin de León and Manuel Perez, would improve environmental justice and air quality in California communities by setting some sensible limits on offsets. The bill would limit the use of compliance offsets to no more than 10% of the emission reductions needed, establish requirements for verifying and tracking compliance offsets to ensure that they are real and do not cause harm to the environment or public health, and require the ARB to prioritize offsets that provide air-quality benefits to communities already suffering from disproportionate air pollution—particularly in the same air basin as the offset purchaser, and that provide environmental and public-health benefits to California. Sierra Club California supports AB 1404 as a balanced approach to compliance offsets.

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