

CARBON CONUNDRUM

Governments struggle to find best path to cut greenhouse gases, limit **CLIMATE-CHANGE IMPACTS**

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AS THE EFFECTS of human-induced climate change become more evident and damaging, a growing number of nations are struggling to figure out how to reduce their anthropogenic greenhouse gas emissions without destroying their economies.

Governments around the world are looking at various options to force greenhouse gas producers to reduce their emissions. The two primary ways being used to rein in such emissions are a carbon tax and a market-based system that caps greenhouse gas emissions and requires credits or allowances to be obtained for every metric ton of carbon emitted. The latter is commonly called cap and trade or carbon trading. The overall patchwork of policies is slowly growing but faces challenges that threaten to derail efforts.

Underscoring the need for nations to act are several recent U.S. government reports. These reports stress that the rapid pace of greenhouse gas impacts is making projections and mitigation efforts increasingly difficult in the face of a drastic transformation of Earth's environment.

Rising seas, heat waves, erratic and intense rainfall, storm surges, and droughts are among the accelerating effects of climate change now under way, says a report by the National Climate Assessment & Development Advisory Committee, a 60-member federal advisory body.

Also, analyses by the National Aeronautics & Space Administration and the National Oceanic & Atmospheric Administration show that 2012 was one of the 10 hottest years on record, on the basis of global average temperature.

"What matters is that this decade is warmer than the last decade, and that decade was warmer than the decade before it," explains Gavin A. Schmidt, climatologist at NASA's Goddard Institute for Space

Studies. "The planet is warming. The reason it's warming is because we are pumping increasing amounts of carbon dioxide into the atmosphere."

Yvo de Boer, former executive secretary for the United Nations Framework Convention on Climate Change, warns that it has become an "almost impossible challenge" to keep the long-term temperature increase below 2 °C, a measure considered by experts to be necessary to avoid

severe climate extremes. The world, he notes, does not have climate change under control.

"The choice we face is to spend massive amounts of money on adapting to the impacts of climate change or spending significantly smaller amounts to reduce greenhouse gas emissions now," says de Boer, who now is a special global adviser for climate change and sustainability for KPMG, a global auditing and advisory firm.

Most anthropogenic CO₂ and other greenhouse gas emissions are generated by electric utilities, vehicles, refineries, and other industrial sources. To cut their greenhouse gas emissions, nations have turned to penalties or taxes on carbon emissions, or to schemes to cap emissions over time.

MANY ECONOMISTS ARGUE that a carbon tax is the simplest and most direct way to reduce greenhouse gas emissions. A study by the Environmental & Energy Study Institute (EESI), a Washington, D.C.-based think tank, finds that carbon tax programs are in place in 13 countries and the Canadian provinces of Alberta, British Columbia, and Quebec, as well as in a few U.S. cities. The report notes the oldest program began in 1990 in Finland.

But taxing carbon carries a stigma, particularly in the U.S., which is the world's second-largest greenhouse gas emitter. President Barack Obama has said he would not support a policy that implements carbon taxes.

Meanwhile, momentum around the world is building behind the adoption of emissions trading schemes.

"There is lots of interest in schemes to reduce greenhouse gas emissions around the world," says Kevin Kennedy, director of the U.S. climate initiative at the World

GLOSSARY

Key terms to understand when looking at emissions control policies

Allowance: A single allowance represents 1 metric ton of carbon dioxide or CO₂ equivalent emitted.

Backloading: Delaying the introduction of emissions allowances.

Carbon leakage: The relocation of a manufacturing facility from a country that puts a cost on carbon emissions to a country that does not place a price on carbon.

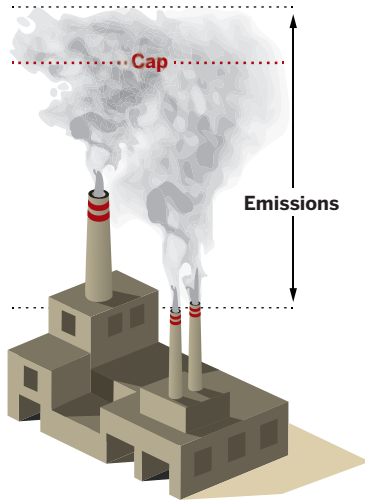
Carbon trading or cap-and-trade scheme: A market approach to reduce greenhouse gas emissions in which an annual emissions cap is set by a government in charge of the program, and each year that cap is lowered. Firms covered by the program must record and report their emissions, and they must purchase or obtain in various ways allowances to cover their emissions.

Offset: A credit for reducing emissions at another pollution source.

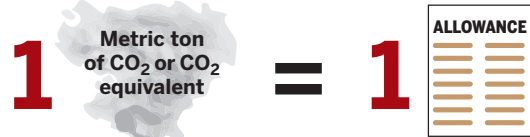
“What matters is that this decade is warmer than the last decade, and that decade was warmer than the decade before it.”

CAP AND TRADE 101 Carbon trading schemes around the world operate under the same fundamental principles.

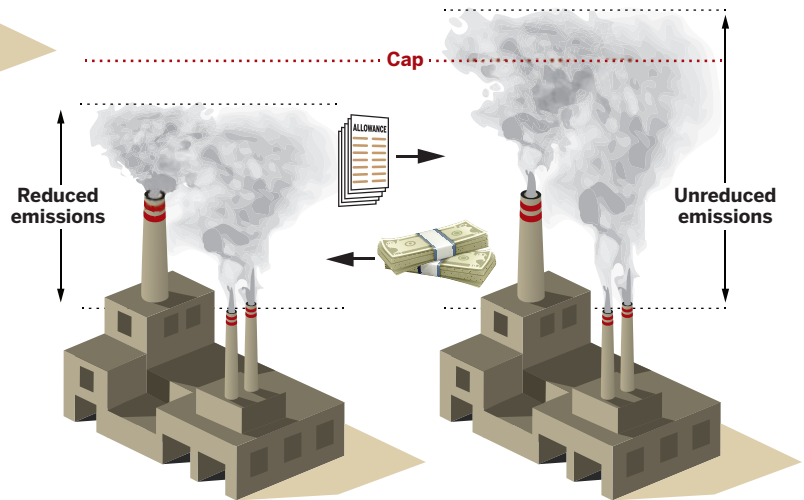
1. A limit, or cap, on emissions is established for each covered company or facility. By design, that cap will be lowered over time and thereby greenhouse gas emissions will be reduced and emissions targets will be reached.



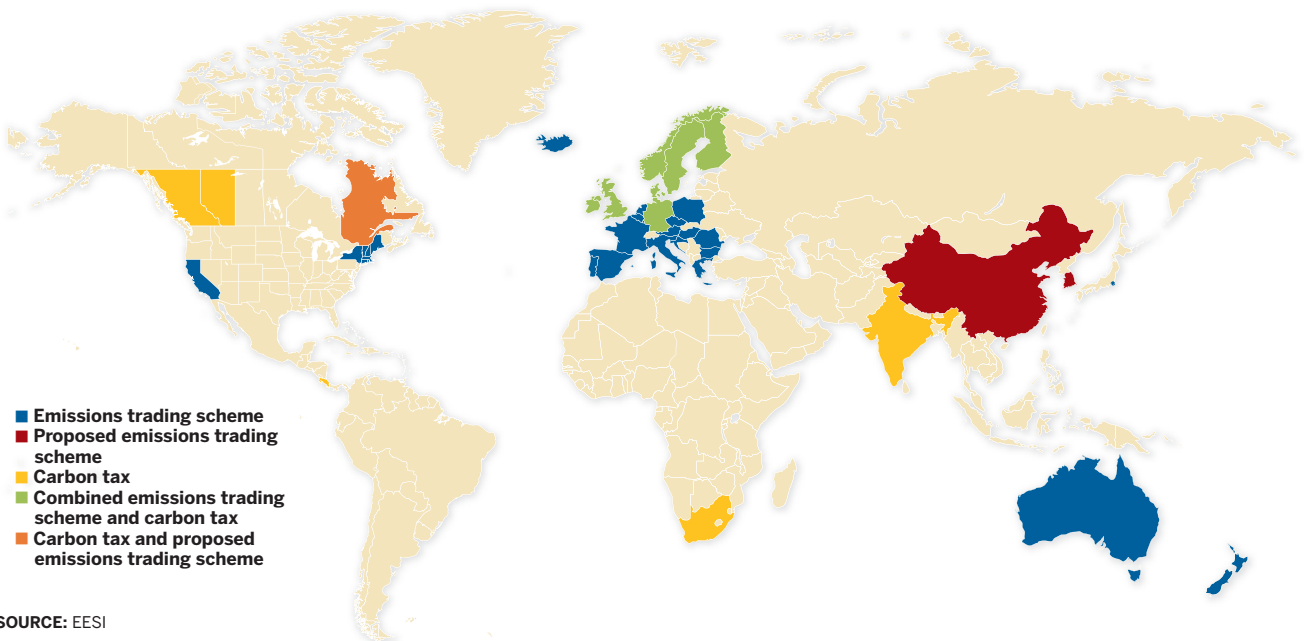
2. A company must obtain permits, or allowances, for each ton of pollution its facilities emit. Allowances are the currency of emissions trading schemes. One metric ton of carbon dioxide or its equivalent is equal to one allowance, and companies obtain allowances for every metric ton of CO₂ their facilities emit. To obtain allowances, companies may be given some for free or buy them either from other companies or at an auction, which is held at least once annually. The auction will raise funds that can be used to spur development of clean energy products to lower emissions as well as to aid electricity ratepayers facing higher bills.



3. To meet the cap and reduce emissions, a company can improve operations and invest in clean technology, it can buy allowances from another company that doesn't need all of its allowances, or it can obtain allowance offsets by cleaning up pollution at another source.



GROWING TREND A scattering of cap-and-trade schemes and carbon tax programs are occurring around the world.



SOURCE: EESI

Resources Institute, another Washington-based think tank. “In Washington, D.C., there is a perception that cap and trade is dead,” he says. “It is an idea that people thought about, but it has gone nowhere. But internationally, and to some degree in California and other parts of the U.S., there is a lot of activity.”

The growing mix of national and re-

gional attempts to cut greenhouse gas emissions through trading schemes is laid out in the EESI study. It found emerging programs in many places around the globe.

FOR EXAMPLE, the European Union’s emissions trading scheme, which began in 2005, is the world’s largest carbon trading program. It includes 27 EU member coun-

tries as well as Croatia, Iceland, Norway, and Liechtenstein. Switzerland is likely to join this year. The program covers 40% of greenhouse gas emissions in the EU.

Another example is the Regional Greenhouse Gas Initiative, which was launched in 2009 and includes nine northeastern U.S. states. It has been moderately successful but limits power plant emissions only in the participating states. The actual emissions covered under the initiative are far below the set cap because of a shift by utilities to natural gas as a power plant fuel. As a result, in early February, the initiative announced it was lowering its greenhouse gas emission caps by 45%.

Also in the U.S., California began its own cap-and-trade program last month. It will eventually cover 85% of greenhouse gas emissions in the state. The program addresses emissions from power plants and industries and by 2015 will include transportation. Quebec just announced its intention to join California, and the two are developing a protocol to combine their programs.

Elsewhere, Australia began an emissions trading scheme in July 2012, according to EESI, in which companies can purchase fixed-price allowance permits. In 2015, the Australians plan to link their program with the EU trading program, with a goal of fully integrating the programs by 2018.

New Zealand also is exploring cap and trade and hoping to begin a full trading program by 2015. Tokyo began a cap-and-trade program in 2010 to reduce greenhouse gas emissions in the metropolitan area. South Korea is planning a carbon trading scheme, scheduled to start in 2015, with a goal of covering 60% of its greenhouse gas emissions.

And China, the world’s top greenhouse gas emitter, is preparing a pilot cap-and-trade program to involve five cities and two provinces. China’s pilot program addresses carbon emissions per unit of gross domestic product. It will not limit overall emissions. The country hopes to begin this pilot program this year and roll out a national program in 2015.

To understand the goals and challenges of cap-and-trade systems, two examples stand out: the EU’s system (see page 16) and California’s program (see page 22).

The EU program covers some 2 billion metric tons of emissions from 11,000 power stations and manufacturing facilities. The EU had considered including aviation emissions but has postponed the inclusion and now hopes for a global framework to tackle aviation emissions next fall. In all, the trad-

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ing scheme accounts for more than three-quarters of international carbon trading.

Participation is mandatory. Each year the emissions cap in the EU is reduced by 1.74%, meaning that by 2020, emissions from participating sectors should be 21% lower than when the scheme began in 2005.

As the main market for credits generated by emissions-saving projects around the world, the EU trading scheme is also a major source of investment in environmentally sustainable development in emerging countries.

Because of its scale and scope, Europe's system has become the blueprint for subsequent schemes now cropping up around the world.

However, the EU trading scheme is in crisis. The carbon price has tanked with the decline in demand for allowances that has resulted from the current economic recession and slowing manufacturing. To try to bump up the price of carbon, the EU is exploring postponing—or backloading—the release of allowances to the trading market. It is too early to know whether such measures will be successful.

The low price is causing uncertainty over long-term investment and is also cutting the market's potential to generate money earmarked for planned investments in cleantech projects. It is also threatening to derail the EU's path to targeted emissions reductions.

CALIFORNIA'S cap-and-trade program is just getting under way. California, with the world's eighth-largest economy and some of the most rigorous environmental regulations in the world, is often cited as an environmental and economic model for the U.S. and the world.

Its program is part of a large package of greenhouse gas reduction initiatives. The state's goal is to cut greenhouse gas emissions to 1990 levels by 2020, a 15% reduction in what would have been emitted without controls.

In all, about a half-million metric tons of annual emissions are affected and about 600 plants will be included in the program. The California cap-and-trade program is in a trial phase and is being modified as it is implemented.

The program is designed to be phased

out in 2020. However, state officials and environmental activists would like to see it modified and extended until 2050 to yield deeper greenhouse gas emissions cuts. If

California succeeds in meeting its 2020 goals and reducing emissions over the next seven years, the program will be seen as a model for how to cut emissions.

If the California scheme fails, and the fundamental problems being experienced by the EU scheme continue, a crisis of confidence in the use of emissions trading schemes will likely follow. ■

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