May 2013

THE CLIMATE GROUP

CARBON PRICING

Insight Briefing | Analyzing the issues that matter to the Clean Revolution

This is part of THE CLEAN REVOLUTION

ABOUT

In light of the recent setbacks in the EU ETS, this briefing provides an overview of the state of carbon pricing policies around the world - including Australia, China, Europe, India, and the United States. It concludes that, while the EU ETS is in need of reforms, investors and policymakers should not give up on carbon pricing.

SUMMARY

Economists have long argued that putting a price on carbon, either through a carbon market or a carbon tax, is the most economically efficient way to reduce emissions.

But setbacks in the EU ETS – including the recent rejection of the European Commission's "backloading" proposal and the subsequent price crash – have caused some to question the effectiveness of carbon pricing in practice.

While the EU ETS is indeed in need of fundamental reform, the world's largest carbon market is likely to recover in the long term. And emerging carbon markets in major economies such as Australia and California have adopted safeguards against the price volatility and fraud that has beset the EU ETS to date, making them less likely to experience the same problems.

Broadening the perspective beyond the EU ETS, the story of carbon pricing over the past decade has been one of growth. More than 20 new carbon pricing policies have been adopted around the world and many more are under consideration, which suggests that the coming years will teach us more about the viability of carbon pricing than the past has.

"CLIMATE CHANGE IS A RESULT OF THE GREATEST MARKET FAILURE THAT THE WORLD HAS SEEN."

Lord Nicholas Stern,
British Economist

WHY PRICE CARBON?

As British economist Lord Nicholas Stern explains: "Climate change is a result of the greatest market failure that the world has seen."[1] Specifically, it is a negative externality, a market failure, in which prices do not reflect the full costs of producing a product or service. The price of energy does not reflect the climate change related costs of producing it.

To fix negative externalities, Cambridge economist Arthur Pigou argued that the government should tax the producer of the externality at a rate equal to its social cost. A carbon tax is thus a form of Pigovian tax.

On the other hand, University of Chicago economist Ronald Coase and others have argued that creating a market for the externality, by assigning tradable property rights, could solve the problem more efficiently.[3] Carbon markets were born from this concept.

Yale University economist William Nordhaus goes a step further to explain how a carbon price reduces emissions in an economy:

[1]http://www.guardian.co.uk/environment/2007/nov/29/climatechange.carbonemissions

[2]http://www.econlib.org/library/Enc/bios/Pigou.html

[3]http://www.econlib.org/Enc/bios/Coase.html

"WITHOUT A STRONG PRICE SIGNAL, THERE IS SIMPLY NO HOPE FOR MAKING THE VAST NUMBER OF DECISIONS IN A REMOTELY EFFICIENT MANNER."

William Nordhaus,
Economist, Yale University

"Raising the market price of carbon provides strong incentives to reduce carbon emissions through four mechanisms. First, it provides signals to consumers about what goods and services produce high carbon emissions and should therefore be used more sparingly. Second, it provides signals to producers about which inputs (such as electricity from coal) use more carbon, and which inputs (such as electricity from wind) use less or none. It thereby induces producers to move to low carbon technologies. Third, high carbon prices provide market signals and financial incentives to inventors and innovators to develop and introduce low carbon products and processes, which can eventually replace the current generation of carbon-intensive technologies. Finally, and most subtle of all, the use of carbon pricing economizes on the information requirements that market participants need to undertake each of these three tasks. Without a strong price signal, there is simply no hope for making the vast number of decisions in a remotely efficient manner."[4]

Finally, as opposed to traditional command and control regulations, carbon pricing lets the market decide where emission reductions will come from. As Harvard University economist Robert Stavins puts it: "By pricing carbon, governments wisely defer to private firms and individuals to find and exploit the lowest cost ways to reduce emissions."[5]

CARBON TAX VS. CARBON MARKET

The fundamental difference between a carbon tax and a carbon market is which market variable it fixes – price or quantity. A carbon tax fixes the price of carbon emissions and lets the quantity fluctuate. While a carbon market fixes the quantity of carbon emissions and lets the price fluctuate. Because policymakers cannot accurately predict the effect a given price will have on quantity, and vice-versa, they must accept an amount of uncertainty around one or the other variable from the outset.

There are also a number of additional trade-offs between the two policies related to administrative complexity, transparency, vulnerability to manipulation, international linkage, and political feasibility, suggesting that countries will continue to choose the option and design that best fits their domestic preferences.[6]

POLICY	PRICE CERTAINTY	EMISSIONS CERTAINTY	SIMPLICITY	TRANSPARENCY	SECURITY	INTERNATIONAL LINKAGE
CARBON MARKET		X				X
CARBON TAX	X		X	X	X	

Note: X denotes a relative advantage

IN 2005, THE EUROPEAN UNION LAUNCHED THE "CORNERSTONE" OF ITS CLIMATE CHANGE POLICY: THE EU EMISSIONS TRADING SCHEME (ETS) – THE WORLD'S FIRST MAJOR CARBON MARKET AND STILL ITS LARGEST.

EXPERIENCE TO DATE: EU ETS

In 2005, the European Union launched the "cornerstone" of its climate change policy: the EU Emissions Trading Scheme (ETS) – the world's first major carbon market and still its largest.[7] The ETS covers more than 11,000 factories, power stations and other installations, across all 27 EU member states (plus Croatia, Iceland, Norway and Liechtenstein), accounting for close to half of the EU's carbon emissions.

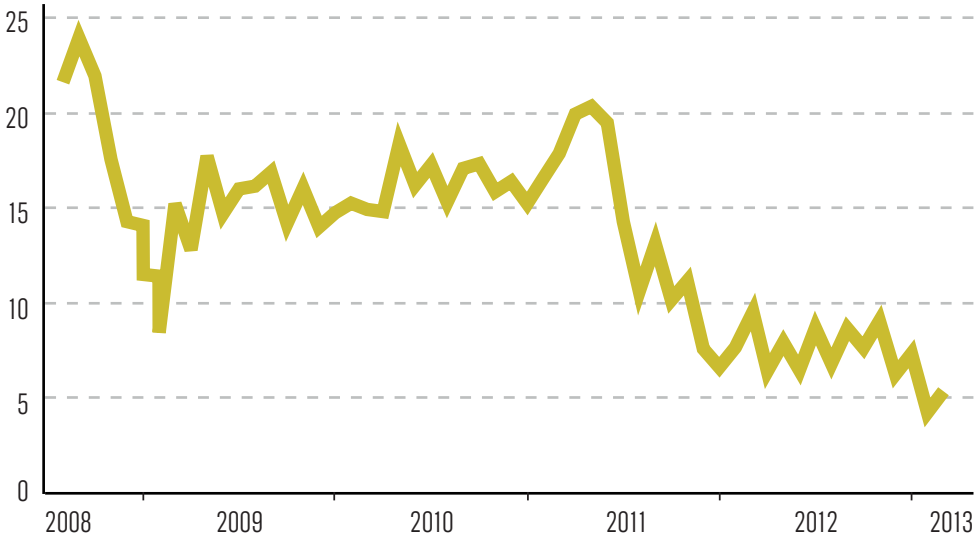
The first of its kind, policymakers expected the ETS to involve a certain amount of "learning by doing." And after almost a decade of operation, the ETS has experienced its share of challenges.

Over-allocation of emission allowances in the first phase (2005-2007) led to prices falling from a peak of about €30 per ton in April 2005 to a rock-bottom €0.10 in September 2007, as market participants became aware that actual EU emissions were well below the number of allowances issued. The over-allocation was caused by EU member states overestimating their emissions, in the absence of accurate emissions data and under pressure from industry lobby groups.

[4]http://www.marketplace.org/topics/your-money/my-two-cents/economics-global-climate-change
[5]http://www.robertstavinsblog.org/2011/10/30/the-promise-and-problems-of-pricing-carbon
[6]http://e360.yale.edu/feature/putting_a_price_on_carbon_an_emissions_cap_or_a_tax/2148
[7]http://ec.europa.eu/clima/policies/ets/index_en.htm

After recovering to over €20 at the start of the second phase (2008-2012), prices again fell below €10 in 2012, where they remain to this day. This time, the price collapse was caused primarily by a combination of economic recession, over-allocation and an abundance of cheap international offsets.

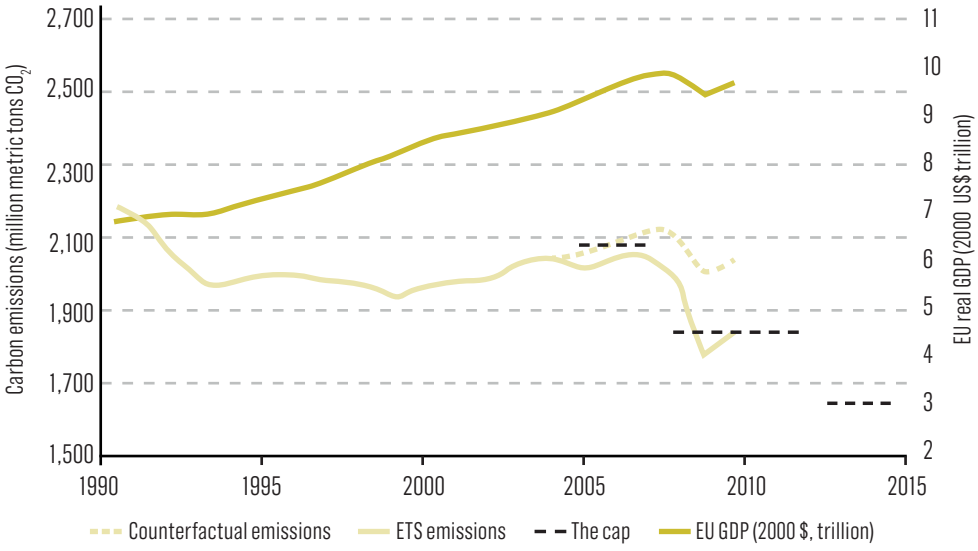
FIGURE 1 EU ETS carbon spot price, € per ton



Source: Thomson Reuters Point Carbon

On the one hand, this price volatility has not prevented the EU from meeting its emissions goals – and EU emissions have fallen since the ETS came into existence.[8]

FIGURE 2 EU ETS sector emissions (million metric tons CO_2) emissions caps, and EU GDP, 1990-2015



Source: Washington Post

On the other hand, observers have rightly argued that such a low carbon price is not sufficient to encourage firms to shift investments towards lower-carbon technologies – a key goal of the ETS. For example, according to the International Energy Agency, the carbon price would need to be at least US$65 per ton before power plants would switch from coal to natural gas.[9] Johannes Teyssen, CEO of power utility E.ON, put it bluntly: "I don't know a single person in the world that would invest a dime based on ETS signals."[10]

[8]http://www.washingtonpost.com/blogs/wonkblog/wp/2013/04/20/europes-cap-and-trade-program-is-in-trouble-can-it-be-fixed/

[9]Ibid

[10]http://www.ft.com/intl/cms/s/0/135e1172-5636-11e1-8dfa-00144feabdc0/html#axzz2Mbityhr8

"THE REALITY IS EU ENERGY POLICY IS AT A CROSSROADS. A DRAMATIC RETHINK IS REQUIRED TO PREVENT CONTINUED DE-INDUSTRIALIZATION AND THE BLOC FROM BECOMING THE GLOBAL DUMPING GROUND FOR CHEAP COAL."

Matthew Gray,
Carbon Market Analyst, Jefferies

Earlier this month, the European Parliament voted down a plan to withhold 900 million emission allowances from the ETS until 2020, in order to boost short-term prices. The price fix, known as "backloading", was rejected 334 to 315, with over 60 abstentions. Following the vote, prices fell to a new low of €2.63 and are expected to remain there for the duration of the third phase (2013-2020), in absence of any further regulatory interventions.

This has shed some doubt on the future of the program. Stig Schjølset, Head of EU Carbon Analysis at Thomson Reuters Point Carbon, said: "This vote makes the EU ETS irrelevant as an emissions reduction tool for many years to come."[11]

But the longer-term prospects for the ETS are more hopeful. In an interview with The Climate Group, Matthew Gray, a carbon market analyst at Jefferies, said:

"Over the long-term, this outcome is not as morbid as it appears. The reality is EU energy policy is at a crossroads. A dramatic rethink is required to prevent continued de-industrialization and the Bloc from becoming the global dumping ground for cheap coal. These reforms will take time, because they will likely define Europe's future. And climate policy, specifically structural reforms and the 2030 debate, will be coalesced into this strategy. [As a result], our long-term outlook for domestic policy remains resolutely optimistic."

Structural reforms needed to revive the ETS include tightening the existing EU-wide carbon cap, making steeper annual cuts in allowances, bringing more economic sectors into the program, limiting access to international offsets and introducing a carbon price floor.[12]

Above all, a longer-term commitment to an increasing price on carbon is needed; and there is no reason to believe that the EU has lost that fundamental understanding.

ADDRESSING FRAUD IN THE EU ETS

In addition to price volatility, the ETS has also experienced other high-profile setbacks. These include power companies receiving windfall profits during the first phase and instances of fraud during the second phase, such as value-added tax fraud and the cyber-theft of allowances. While neither of the incidents had an impact on the environmental integrity of the system, they have led to significant financial losses and decreased public confidence in the market.

To date, the European Commission has taken several steps to prevent these issues from reoccurring. This year, 40% of allowances will be auctioned as opposed to being allocated for free, which is in part to prevent companies from reaping windfall profits.[13] All allowances are expected to be auctioned by 2020.

In addition, the ETS will use a single allowance registry in place of the previous system of 27 national registries, in order to improve security and prevent future instances of fraud.

EMERGING CARBON MARKETS: AUSTRALIA AND CALIFORNIA

AUSTRALIA

After Australia's previous Prime Minister, Kevin Rudd, tried and failed to pass carbon market legislation three separate times, current Prime Minister Julia Gillard was able to pass a carbon tax into law in 2011. Although Gillard did not have control of either parliamentary chamber, she successfully negotiated with key independents and the Greens to pass the legislation.

The AU$23 per ton tax took effect on July 1, 2012 and will rise 2.5% each year, reaching AU$24.15 in the next fiscal year and AU$25.40 the following year. It is imposed on Australia's 500 largest emitters, each of whom emits more than 25,000 tons of carbon each year.[14]

In July 2015, the tax will switch to a carbon market with a price ceiling of AU$20 above the expected international price (rising by 5% in real terms each year).[15] Emitters will be able to meet up to 50% of their liability using international credits, including up to 12.5% from Kyoto Clean Development Mechanism credits. There are also plans to link the Australian market with the EU ETS, beginning in 2015.[16]

To date, implementation of the carbon tax has gone as planned. Carbon emissions from the electricity sector fell 8.6% in the six months following its enactment, caused by a combination of the carbon price and existing renewable energy targets and reduced electricity demand.[17]

A spokesman for Australian Climate Change Minister Greg Combet told The Australian in February: "The Government's clean energy policies have been implemented smoothly and are working as intended to cut carbon pollution."

Opposition to Australia's carbon tax remains, with the federal opposition leader Tony Abbott swearing a "blood oath" to repeal it. But repeal would face several barriers. While current polling indicates that Abbott's Coalition party will win the federal election on September 14, it is uncertain whether

[11] http://www.businessgreen.com/bg/analysis/2261753/eu-ets-carbon-backloading-vote-the-reaction

[12] http://www.reuters.com/article/2013/04/16/column-wynn-ets-reform-idUSL5N0D323I20130416

[13] http://ec.europa.eu/clima/policies/ets/index_en.htm

[14] http://www.theclimategroup.org/what-we-do/publications/Australias-Clean-Energy-Plan-Policy-Briefing-Paper

[15] Ibid

[16] http://ec.europa.eu/clima/policies/ets/linking/index_en.htm

[17] http://www.theaustralian.com.au/national-affairs/climate/emissions-drop-signals-fall-in-carbon-tax-take/story-e6frg6xf-1226559632995

"ONCE YOU'VE PUT AUS$1,000 IN A BUNCH OF PEOPLE'S POCKETS TO HELP THEM WITH HIGHER ENERGY PRICES, BOY, IT'S HARD TO TAKE THAT OUT."

**Steve Sargent,
President and CEO, GE Australia**

the party will gain control of both houses of parliament. Further barriers to repealing the carbon tax include the risk of legal challenges, as well as public backlash from rescinding the compensation packages distributed along with the tax.

As Steve Sargent, President and CEO of GE Australia put it: "Once you've put AUS$1,000 in a bunch of people's pockets to help them with higher energy prices, boy, it's hard to take that out."[18]

CALIFORNIA (UNITED STATES)

After six years of development (and overcoming several legal challenges), California launched its economy-wide carbon market, with the first allowance auction in November 2012. The program is part of a broader state policy (AB 32) with the goal of reducing California's carbon emissions to 1990 levels by 2020; and is already the second largest carbon market in the world after the EU ETS.

The price in the initial auction settled at US$10 per ton of carbon emissions. In a subsequent auction in February 2013, the price settled at US$13.62 per ton; more than a dollar above analysts' expectations. Lenny Hochschild, head of global carbon trading for Evolution Markets, said: "It looks clearly like a very healthy auction result, at least on the surface."[19]

Learning from the experience of price volatility and fraud in the EU ETS, the California market will include both a price ceiling (US$40/ton) and a price floor (US$10/ton), as well as a number of oversight mechanisms to protect the market from gaming and fraud.[20]

Earlier this month, Governor Jerry Brown also approved a proposal to link California's carbon market with Quebec's emerging carbon market, beginning in 2014.[21]

While it is still too early to assess results, the success or failure of the carbon market in California, the world's ninth largest economy, will have a significant impact on US perceptions of carbon markets in general. As Mary Nichols, Chairman of the California Air Resources Board (CARB) said: "If it can work in California, it can work in the U.S."[22]

"SETTING UP CARBON EXCHANGE CENTERS IS THE WAY WE MUST GO [IN THE FUTURE]."

Xie Zhenhua, Vice Chairman, China's National Development and Reform Commission

MAJOR ECONOMIES ON THE FENCE: CHINA, INDIA, UNITED STATES

CHINA

Indications of carbon pricing in China date back to at least August 2009, when, after experiencing some challenges implementing command and control energy policies in the 11th Five Year Plan (i.e. shutting down low-efficiency factories and power plants), Xie Zhenhua, Vice Chairman of China's National Development and Reform Commission, said publically: "Setting up carbon exchange centers is the way we must go [in the future]."

Since then, seven Chinese provinces have established emissions trading programs as part of a suite of policies aimed at meeting the environmental goals laid out in China's 12th Five Year Plan (2011-2015). The pilot programs will operate in Guangdong, Hubei, Beijing, Tianjin, Shanghai, Chongqing and Shenzhen over the next five years.

Key energy and climate policy goals and indicators in China 2006–2020

	11TH FYP (2006-2010) (TARGET)	11TH FYP (ACTUAL)	**12TH FYP (2011-2015) (TARGET)**	13TH FYP (2016-2020) (TARGET)
INDICATORS				
ENERGY INTENSITY (% REDUCTION IN FIVE YEARS)	20%	19.1%	16%	NOT SET
CARBON INTENSITY (% REDUCTION IN FIVE YEARS)	NOT SET		17%	40-45% VS 2005
NEW ENERGY (% OF PRIMARY ENERGY)	10%	9.6%	11.4%	15%

[18]http://www.reuters.com/article/2011/11/08/us-australia-carbon-view-idUSTRE7A70IV20111108

[19]http://www.bloomberg.com/news/2013-02-22/california-sells-carbon-allowances-for-13-62-each-in-auction.html

[20]http://www.arb.ca.gov/cc/capandtrade/capandtrade.htm

[21]http://www.bloomberg.com/news/2013-04-09/california-governor-clears-way-for-carbon-market-link-to-quebec.html

[22]http://science.time.com/2013/01/29/obama-talk0s-climate-change-california-is-acting-on-it

It has been suggested that these pilots could pave the way for a national carbon market in China. Indeed, each of the seven pilot regions was selected to reflect different levels of economic development, allowing the government to observe how carbon pricing would affect different parts of the country. However it is still too early to tell exactly how this will play out at the national level, as China continues to experiment with a number of different policy options for dealing with its growing emissions.[23]

Indeed, after air pollution in Beijing reached record high levels in January, the government quickly responded by announcing that it would introduce a set of new taxation policies designed to preserve the environment, including a carbon tax of 5 to 10 yuan (80 cents to US$1.61) per ton. The government did not specify when the tax would take effect, and does not view it as incompatible with existing carbon markets.[24] [25]

"MARKET BASED APPROACHES TO CONTROL ENVIRONMENTAL QUALITY HAVE THE POTENTIAL TO DELIVER DESIRED ENVIRONMENTAL OUTCOMES AT THE LOWEST SOCIAL COST."

Ministry of Environment and Forests, India

INDIA

In 2010, India made its foray into carbon pricing by introducing a small coal tax of 50 rupees (US$1) on each ton of coal produced in and imported to India, along with other market-based climate policies such as an energy efficiency trading program for major Indian industries (i.e. Perform, Achieve, and Trade (PAT) program).[26]

In April 2012, the Ministry of Environment and Forests went a step further to introduce a pilot carbon market in Gujarat, Tamil Nadu and Maharashtra, in order to help the regions reduce high concentrations of particulate matter. Referring to the program in its 2011-2012 annual report, the Ministry said that, "market based approaches to control environmental quality have the potential to deliver desired environmental outcomes at the lowest social cost," adding that the proposed carbon market "will set a new model for environmental regulation in India."[27]

Similar to China, the Indian Government appears poised to experiment with different forms of carbon pricing before committing to a large-scale policy at the national level.

UNITED STATES

The US was the first country to put an emissions trading market into place. Under the Clean Air Act Amendments of 1990, it created a market for sulfur dioxide (SO2) and nitrogen oxide (NOx) emissions, which are the primary causes of acid rain. After more than two decades of operation, the Acid Rain Program is considered to be a success, with SO2 emissions falling by 64% and NOx emissions falling by 67%, far exceeding the emission caps set by the program.[28] In addition, the cost of complying with the program is estimated at US$3 billion a year, which is a fraction of the initial estimates.[29]

"GIVEN THE CURRENT POLITICAL CLIMATE, IT WOULD BE DIFFICULT TO PASS A CARBON TAX AS A STAND-ALONE PIECE OF LEGISLATION. BUT THERE ARE ENOUGH MEMBERS THAT COULD VOTE FOR IT IF IT IS PACKAGED WITH OTHER POLICIES THEY SUPPORT."

Jim McDermott, Congressman, Washington State

Following this model, a number of state governments in the US have adopted carbon markets at the regional level. In addition to California, nine Northeast and Mid-Atlantic states, including Connecticut, Delaware, Massachusetts, Maryland, Maine, New Hampshire, New York, Rhode Island and Vermont, joined together to adopt a carbon market for the region's power sector in 2009. The Regional Greenhouse Gas Initiative (a.k.a. RGGI) has thus far succeeded in reducing power sector emissions by 12 million tons, while providing significant government revenues from the auctioning of emission allowances, much of which has been reinvested in the region's energy sector. Earlier this year, the group recommended reducing the overall cap on emissions by an additional 45% in 2014.

The success of these programs, combined with the support they received from Republican policymakers, encouraged Democrats in Congress to pursue a similar program for carbon emissions beginning in 2007. The well-publicized effort culminated in the passing of carbon market legislation in the House of Representatives in 2009, but ended with the failure of similar legislation in the Senate in 2010. During this process, the concept of carbon markets in general was rejected by the current Republican Party, suggesting that any new carbon market proposals would fail in the current Congress.

[23] http://www.sandbag.org.uk/blog/2012/apr/24/chinas-emissions-trading-pilots-are-starting-take-

[24] http://news.xinhuanet.com/english/china/2013-02/19/c_132178898.htm

[25] http://www.bloomberg.com/news/2013-03-06/china-backing-away-from-carbon-tax-start-in-2013-official-says.html

[26] http://www.bloomberg.com/news/2011-03-03/india-lagging-on-channeling-coal-tax-for-clean-energy-solar-lobby-says.html

[27] http://www.indianexpress.com/news/carbon-trading-moef-launches-pilot-scheme-in-3-states/937313/1

[28] http://www.epa.gov/airmarkets/progress/ARP09_4.html

[29] http://www.whitehouse.gov/blog/2012/01/19/acid-rain-program-benefiting-environment-human-health

REGIONS CONSIDERING CARBON MARKETS

- Brazil
- British Columbia
- Chile
- China
- Hangzhou
- India
- Japan
- Manitoba
- Mexico
- Ontario
- Rio de Janeiro
- Sao Paulo
- Turkey
- Ukraine

Source: ICAP, The Climate Group

Aside from the "death of cap and trade," an opportunity for the adoption of a national carbon tax has emerged in the form of comprehensive tax reform, which Congress may take up in the current session. In this context, a carbon tax (supported by Democrats) could be included in a tax reform package alongside reductions in existing taxes and/or deficit reduction (supported by Republicans).

As Congressman Jim McDermott (D-WA) explained in an interview with The Climate Group: "Given the current political climate, it would be difficult to pass a carbon tax as a stand-alone piece of legislation. But there are enough Members that could vote for it if it is packaged with other policies they support."

Indeed, a revenue-neutral carbon tax was recently rejected in the Senate by a vote of 41-58 – nearly 20 votes shy of the 60 needed to pass stand-alone legislation – demonstrating just how much additional support would need to be gained through a tax reform package.[30]

REVENUE-NEUTRAL CARBON TAX: A MODEL FOR FISCALLY CONSERVATIVE GOVERNMENTS?

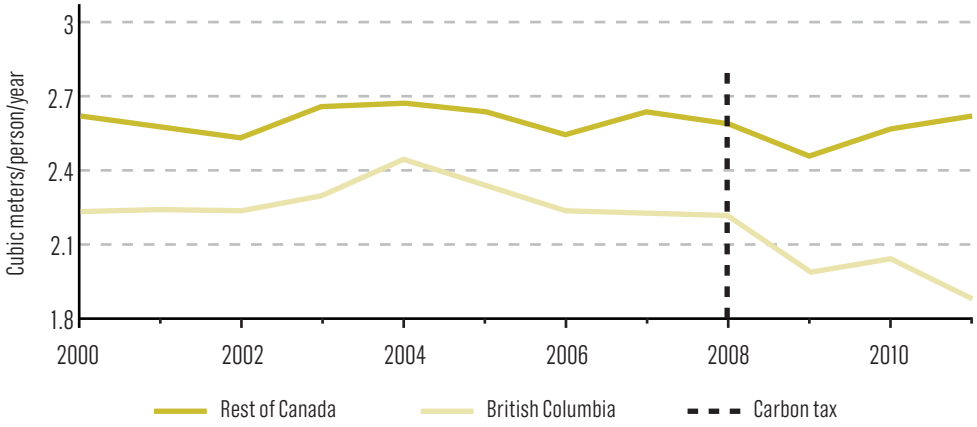
BRITISH COLUMBIA (CANADA)

In 2008, the Canadian province of British Columbia (BC) adopted a CAD$10 per ton carbon tax on fossil fuels. The tax has risen CAD$5 each year, reaching CAD$30 per ton in 2012, where it is currently capped.

BC's carbon tax is strictly revenue neutral, meaning that all revenues collected from it are used to reduce existing corporate and individual income tax, or returned to the public. As a result of the "tax shift", BC now has the lowest general corporate income tax rate in Canada, as well as the lowest personal income tax rate, for those earning up to CAD$119,000.[31]

In the five years since it was adopted, the tax is working as planned. Fossil fuel consumption in BC has decreased by 15%, while rising 1% throughout the rest of Canada. Greenhouse gas emissions from fossil fuels also decreased by 10% on a per capita basis, while BC's GDP outperformed the rest of the country.[32]

FIGURE 3 Sales of refined petroleum products subject to BC carbon tax, per capita



Source: Sustainable Prosperity, Statistics Canada

This result is consistent with the results seen in other countries that have adopted carbon taxes to date. According to a 2007 study, carbon taxes adopted in several European countries caused greenhouse gas emissions to fall from between 2%-6%, while the effect on GDP was neutral or slightly positive – suggesting that such taxes are not incompatible with economic growth, as some have suggested.[33]

The early success of BC's revenue-neutral carbon tax has caused it to be held up as a potential model for fiscally conservative governments, such as the US.[34]

[30] http://www.govtrack.us/congress/votes/113-2013/s58

[31] http://www.sustainableprosperity.ca/article2864

[32] Ibid

[33] http://cordis.europa.eu/documents/documentlibrary/124729471EN6.pdf

[34] http://www.nytimes.com/2012/07/05/.../a-carbon-tax-sensible-for-all.html

CARBON PRICES AROUND THE WORLD

REGION	START DATE	PRICE/TON CO2E (2012) (US$)	STATUS
CARBON MARKETS			
European Union	2005	$7	In force
New Zealand	2008	$11	In force
Switzerland	2008	$43	In force
Northeast US States	2009	$2	In force
Tokyo	2010	$142	In force
California (US)	2012	$10	In force
Quebec (Canada)	2012	$10	In force
Kazakhstan	2013	N/A	Implementation scheduled
Chinese Provinces	2013	N/A	Implementation scheduled
South Korea	2015	N/A	Implementation scheduled
CARBON TAXES			
Finland	1990	$39-$78	In force
Netherlands	1990	$27-$615	In force
Norway	1991	$16-$67	In force
Sweden	1991	$130	In force
Denmark	1992	$17	In force
Alberta (Canada)	2007	$15	In force
Quebec (Canada)	2007	$3	In force
United Kingdom	2008	$19	In force
British Columbia (Canada)	2008	$30	In force
Switzerland	2008	$38	In force
Ireland	2010	$26	In force
Australia	2012	$24	In force
Japan	2012	$4	In force
South Africa	2015	$13	Implementation scheduled

Sources: Bloomberg, Reuters, ICAP, IETA, EESI, CRS, Government Websites

Note: Prices are rounded to the nearest US$. Exchange rates via XE Currency Converter as of April 8, 2013.

*In addition to the carbon taxes above, a number of governments also tax carbon-generating products, services, and activities. For example India has a tax on coal (US$1/ton of coal), Costa Rica a tax on fossil fuels (3.5%), and the UK, Boulder (Colorado, US) and the Bay Area (California, US) all have taxes on electricity production/consumption.

WHAT IT MEANS FOR THE CLEAN REVOLUTION

Speaking to an audience in Brussels earlier this year, Johannes Teyssen, CEO of the power company E.ON, gave voice to a sentiment that many investors had already been thinking.

"Ladies and gentlemen," he stated, "let's talk real: the EU ETS is bust. It's dead."

Indeed, the European Parliament's recent rejection of a short-term price-fix for the EU ETS has left many wondering about the future of the world's largest carbon market, and some questioning the viability of carbon pricing altogether.

But while there's no doubt that the EU ETS is in need of reform, investors and policymakers should not give up on carbon pricing.

For one thing, the setbacks experienced in the EU ETS are not inevitable for future carbon markets. Learning from Europe's experience, emerging carbon markets in Australia, California, and Quebec have all incorporated safeguards against the windfall profits, fraud, and price volatility that have beset the EU ETS to date. And Europe is also likely to adopt these reforms in time – suggesting that the carbon markets of the future will be much more stable than those of the past.

SINCE THE EU ETS BEGAN IN 2005, MORE THAN 20 ADDITIONAL CARBON PRICES HAVE BEEN ADOPTED WORLDWIDE.

Looking beyond the EU ETS, carbon-pricing around the world is actually growing. Since the EU ETS began in 2005, more than 20 additional carbon prices have been adopted worldwide. According to the Australian Climate Commission, carbon prices are currently in place in more than 33 countries and 18 sub-national jurisdictions, covering 30% of the world's economy and 20% of its emissions.[35] In addition, new carbon prices are also being considered in a number of major countries including Brazil, China, India, Mexico and Turkey – meaning that experience with carbon pricing in practice is about to grow exponentially.

Perhaps most importantly, as the urgency around addressing climate change increases, the need for low-cost tools to reduce emissions will also grow. The latest data from the International Energy Agency suggests that current government policies have the world on track for a 5.3 degree Celsius increase in global temperatures - far beyond the two-degree increase viewed by scientists as the threshold for avoiding dangerous climate change. And as this reality becomes increasingly hard for policymakers to ignore, the concerns about increased energy prices and competitive disadvantages that have slowed progress on carbon pricing to date are likely to be weighed more equally against the need for cost effective climate policies.

The EU ETS ride has been a bumpy one so far. But now is not the time to jump off the carbon pricing bandwagon. The road ahead looks more certain, and it's the only one that ultimately leads where we need to go.

°C

THECLIMATEGROUP.ORG I THECLEANREVOLUTION.ORG
TWITTER.COM/CLIMATEGROUP I #CLEANREVOLUTION
FOR MORE INFORMATION PLEASE CONTACT EVAN JUSKA AT EJUSKA@THECLIMATEGROUP.ORG

Australia I Melbourne I +61 (0)3 9668 5798
Europe I London I Brussels I +44 (0)20 7960 2970
China I Beijing I Hong Kong I +86 (0) 10 64403639
India I New Delhi I +91 11 30614612
North America I New York City I +1 (646) 233 0550

[35]http://rendezvous.blogs.nytimes.com/2012/10/15/norway-increases-carbon-tax-on-domestic-production