Putting a Price on Carbon with an ETS

Summary of Key Findings:

- An ETS is an explicit carbon pricing instrument that limits or caps the allowed amount of GHG emissions and lets market forces disclose the carbon price through emitters trading emissions allowances.
- 35 countries (incl. 28 in the EU) and 20 subnational jurisdictions have adopted emissions trading programs.

Defining Emissions Trading Schemes (ETS)

An ETS – or cap-and-trade program – is managed by a governing jurisdiction that sets a limit or a cap on the total level of covered GHG emissions – including CO_2. The allowances to emit are distributed to liable entities (direct emission sources or others) that must redeem allowances for every emitted ton of CO_2, with the possibility to buy additional allowances or sell unused ones.

As liable entities consider the cost of their emissions within their production processes and the possibility to buy or sell allowances, a market for CO_2 emerges, setting a price on CO_2 that acts as a reduction incentive for all liable entities. This price influences decisions both in the short-term management of existing assets and in the longer-term direction of investments. [1]

An ETS – as opposed to a tax – is a quantity-based policy, i.e., it offers certainty over the environmental outcome (i.e., "cap") but leaves it to the market (i.e., "trade") to set the price of carbon.

ETS around the World

Emissions trading was first experimented in the United States, through an amendment to the U.S Clean Air Act (1990) that introduced a market-based regulation to control sulfur dioxide emissions from coal-burning electric utility plants – the primary cause of acid rain. ETS has since been widely developed, notably for the control of GHG emissions in climate change mitigation policies.

An ETS can set a carbon price uniformly across a number of different sectors of the economy. Regulation occurs either at the point where GHGs are released into the atmosphere (e.g., coal-fired power

[1] Definition combined and adapted from OECD, 2013. "*Climate and carbon - Aligning prices and policies*". OECD Environment Policy paper n°01, and Trotignon, Raphaël, 2012. "In search of the carbon price: "*The European CO2 emission trading scheme: from ex ante and ex post analysis to the protection in 2020*" Economic Thesis from University Paris Dauphine.

generators under the EU ETS or RGGI), or further downstream with the distribution or use of a product (e.g., distributors of petroleum products for transport and heating, such as in California's ETS).

Figure 1 – ETS in operation around the world as of December 2014

Jurisdiction	Start date	Power & heat	Industry	Liquid fuels	Building	Transport	Waste	Forest	Cov. (%)	Cov. (Mt CO_2e)
EU ETS (28+3)	2005	■	■						45%	2,000
New Zealand	2008	■	■	■			■	■	50%	37
Kazakhstan	2013	■	■						55%	153
Switzerland	2013	■	■						7%	3.5
Republic of Korea	2015	■	■		■	■	■		≈ 60%	400
RGGI (9)	2009	■							22%	104
California[2]	2013	■	■	■					85%	395
Alberta	2007		■						45%	108
Quebec	2013	■	■	■					85%	61
China's Pilots (7)	2013	■	■	■	■	■			70%	1,000
Tokyo	2013		■		■		■		20%	13
									TOTAL	**4,275**

Source: own compilation from various sources.

ETS feature different designs, mostly related to the way the allowances are distributed to compliance entities (e.g., free versus auctioned) or to the way the price is stabilized and contained (e.g., price ceiling and floor, use of offsets etc.). This diversity reflects countries' specific concerns over domestic competitiveness in the sectors regulated by the ETS. It is exemplified in the seven pilot ETS in China where a range of approaches were encouraged by the Chinese National Development and Reform Commission (NDRC) in order to inform the development of China's national ETS expected to start as early as 2016.[3]

[2] California's cap and trade program covers about 35% of the state's GHG emissions but will expand to 85% from 2015 with the inclusion of the fuels sector.

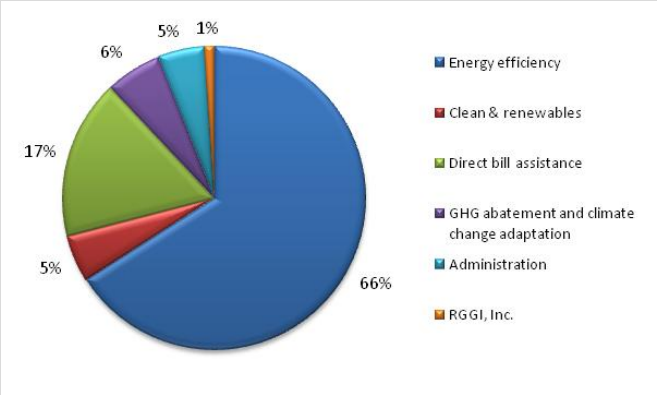
[3] Pilots are in the municipalities of Beijing, Chongqing, Tianjin, Shanghai, Shenzhen, and provinces of Hubei and Guangdong.

Economic Effectiveness

Beyond the certainty of meeting environmental objective (i.e., the cap), an ETS is also a cost-effective way to use available resources to promote GHG reductions and comply with environmental objectives – as explained above. In addition, auctions generate government revenue that can be used to lower financing costs of GHG abatement investments and facilitate low-carbon transformation. Beyond environmental issues, auctions proceeds can be earmarked to balance the general budget or to address equity issues such as through paying for reductions in users' electricity bills or some distortionary taxes.

Use of Auction Proceeds in RGGI States

Figure 2 - RGGI investments by category (2009-2011)



Source: adapted from RGGI, Inc.

From the start of the regional ETS in 2008, RGGI states[4] chose to distribute approximately 90% of the emissions allowances to the regulated electricity producers through quarterly auctions. Under the first compliance period (2008-2011) auctions raised about US$826 million in public revenue. US$617 million were invested by RGGI states in climate related programs,[5] such as energy efficiency measures in residential and commercial facilities (US$1.2 billion of electricity bill savings generated over 2009-2011), direct electricity bill assistance, support to renewable power generation, various other environment related programs and outreach activities, and ETS administration (see Figure 2).[6]

Emerging ETS Initiatives

Several other countries or sub-national jurisdictions are advancing preparations for introduction of an ETS. These include China, which seeks to establish a national ETS as early as 2016, Mexico, Turkey, Russia, Ukraine, and the municipality of Rio de Janeiro in Brazil.

[4] RGGI covers emissions from power plants in the Northeast and Mid-Atlantic U.S. States, namely: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont.
[5] US$93.1 were transferred to states' general budgets, and US$114,5 were set aside for future programs.
[6] RGGI, Inc., (2012). *Regional Investment of RGGI CO2 Allowance Proceeds, 2011*.