Journal of Cleaner Production 148 (2017) 857–865

Contents lists available at ScienceDirect

Journal of Cleaner Production

journal homepage: www.elsevier.com/locate/jclepro

Carbon prices: Were they an obstacle to the launching of emission abatement projects in Spain in the Kyoto Protocol period?

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ARTICLE INFO

Article history:
Received 27 July 2016
Received in revised form
20 January 2017
Accepted 30 January 2017
Available online 31 January 2017

Keywords:
Carbon price
Carbon cost carbon markets
Kyoto Protocol
European Union Emission Trading Scheme (EU ETS)
International Emission Trading (IET)

ABSTRACT

The future of the Carbon Market Approach under the United Nations Framework Convention on Climate Change (UNFCCC) is uncertain. However, further development of Carbon Markets is expected. This paper estimates the average carbon price of the carbon emission permits (COP-approved units) acquired by the Spanish government and also a more realistic figure for the average carbon cost of the aforesaid emission permits. This is very useful for evaluating and comparing different carbon prices and markets. In addition, the paper contributes to the existing literature by providing a deeper understanding of the flow of emission permits between the European Union Emission Trading Scheme (EU ETS) and the Emission Trading Scheme (ETS) under the Kyoto Protocol. The main conclusions are that the estimated carbon price and cost are both lower than other reported prices and costs. This may go some way towards explaining why the government preferred to use the Flexibility Mechanisms and acquire an especially large number of COP-approved units (mainly Assigned Amount Units (AAUs)) through bilateral transactions with other Annex B countries, instead of launching actual greenhouse gas (GHG) abatement projects in the country. Moreover, more transparency is needed in regard to bilateral transactions of AAUs between the Spanish government and other Annex B seller countries.

1. Introduction

The main objective of the COP21 (21st assembly of the Conference of Parties) of the United Nations Framework Convention on Climate Change (UNFCCC) held in Paris in 2015 was to commit to holding "the increase in the global average temperature to well below 2 °C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5 °C above pre-industrial levels" (UNFCCC, 2015a). Under the European Union (EU)'s Intended Nationally Determined Contribution (INDC) scheme (which indicates the EU's joint climate policy objective), Member States endorsed a joint binding target of at least a 40% domestic reduction in greenhouse gas (GHG) emissions by 2030 compared to 1990 (UNFCCC, 2016). In order to reach this commitment, by 2018 Member States must adopt National Energy and Climate Plans for the period 2021–2030 (European Commission, 2015a), in which the state of their respective national energy systems and national climate policies must be shown. However each Member State has broad leeway to choose its own energy mix, including its policy planning and objectives on climate and energy.

In regard to the Emission Trading Scheme (ETS) under the Kyoto Protocol, the COP21 assembly did not address the Carbon Market Approach explicitly (Marcu, 2016), so its future is uncertain. However, Article 6 of the Paris Agreement allows for voluntary cooperation, including both market and non-market provisions. The seven paragraphs related to market provisions refer to international transfers and the creation of reductions/mitigation outcomes under the Carbon Market Approach (referred to as Internationally Transferred Mitigation Outcome (ITMO)). The text does not contain details about how mitigation outcomes are to be achieved (which suggests that any cooperative approach could be considered), but it does allow the use of transfers to meet the Nationally Determined Contributions (NDCs). This is understood as a possibility of creating an international carbon market if any Parties so desire. Nor does the

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http://dx.doi.org/10.1016/j.jclepro.2017.01.154
0959-6526/

article establish any international price for carbon, but it provides the means to create a process that could end up with the convergence of domestic carbon prices in the future (Marcu, 2016). Moreover, it must be taken into account that Article 6 also establishes a mechanism for contributing to GHG mitigation (Emissions Mitigation Mechanism (EMM)) and supporting sustainable development. Some authors (Walker and Swartz, 2016) hold that the internationally transferred mitigation outcome will enable those countries with a price on carbon and new participants to increase their climate ambition and drive down emissions at a lower cost. They also see a chance to create a fungible, international price on carbon within transparent, high-integrity carbon markets.

The Paris Agreement took effect on November 4, 2016, once it had been signed and ratified by at least 55 countries representing at least 55 percent of global GHG. The Intended Nationally Determined Contributions of these countries have since become Nationally Determined Contributions, i.e. they have lost their intentionality and have become each country's official climate plans (Erbach, 2016; UNFCCC, 2016).

As explained by Martínez de Alegría et al. (2015), trading in emission permits is a relatively recent instrument for dealing with environmental problems. Each emission permit or carbon unit corresponds to the right to emit GHG into the atmosphere, generally in the amount of one metric ton of CO_{2eq}. As pointed out by the cited authors, the theory underlying these emission permits was first stated by Coase in 1960 (Brohé and Howarth, 2009; Ellerman, 2005; Coase, 1960) and a decade later they were applied specifically to environmental problems (Ellerman, 2005). Emission permit trading or carbon markets started to be applied on a large scale from 1974 in the United States of America and by the end of 1997 six types of emission trading initiative had been implemented there (Ellerman, 2005; Solomon, 1999; Tietemberg et al., 1999). Currently there are various initiatives generating emission permits or carbon units. The most common mechanisms are the following (Kossoy and Guigon, 2012; Brohé and Howarth, 2009; Gupta et al., 2007; Farrell, 2004; Solomon, 1999):

i) Emission Trading Schemes (ETS), which are "Cap and Trade" systems where participating agents are given a limited number of emission permits (known as emission allowances) depending on the emission reduction targets or cap set for a certain period. The allowances are very often allocated via grandfathering —i.e. for free— according to the agents' historical emissions. After that period, the emitter must have obtained an amount of emission permits (including those free allowances) equivalent to the amount of GHG that it has emitted. If the emitter has an excess of allowances it can sell that excess in the carbon market. However if it is below its cap it can acquire allowances in the carbon market or by other mechanisms. The Emission Trading Scheme under the Kyoto Protocol and the European Union Emission Trading Scheme (EU ETS) are both "Cap and Trade" systems. In the Emission Trading Scheme under the Kyoto Protocol, allowances were assigned via grandfathering to the affected countries according to their respective objectives during the first commitment period, i.e. 2008–2012. These free allowances are called Assigned Amount Units (AAUs). The Emission allowances generated within the EU ETS are called European Union Allowances (EUAs), and at least 90% of EUAs were allocated by grandfathering in the 2008–2012 period (European Commission, 2016; European Commission, 2003).
ii) "Baseline and Credit" schemes, also known as "project-based mechanisms", which make it possible to offset emissions by implementing different projects (or programs) aimed at preventing, reducing or capturing an amount of GHG from the atmosphere. These systems rely on permanent reductions in emissions from specific sources compared to a baseline. Those reductions can generate emission permits, usually known as carbon credits, which can also be traded. Clear examples of such systems include the Clean Development Mechanism (CDM) and the Joint Implementation Mechanism (JIM), which give rise to Certified Emission Reductions (CERs) and Emission Reduction Units (ERUs), respectively.

Scientific literature has paid great attention to the behavior of carbon prices in current carbon markets, very often focusing on the analysis of European Union Allowances or EUAs (Zhu and Wei, 2013; Blyth and Bunn, 2011; den Elzen et al., 2011; Chevallier, 2011). As explained by Isacs et al. (2016), there is a societal need to use monetary estimates of social impacts of GHG emissions in different assessment tools. According to the Intergovernmental Panel on Climate Change (IPCC), modeling studies consistent with GHG stabilization at around 550 ppm of CO_{2eq} by 2100 show carbon prices rising to US$20–80/$tCO_{2eq}$ by 2030 and US$30–155/$tCO_{2eq}$ by 2050. For the same stabilization level, studies taking into account induced technological change find lower price ranges of US$5–65/$tCO_{2eq}$ by 2030 and US$15–130/$tCO_{2eq}$ by 2050 (IPCC, 2007). With 550 ppm and 450 ppm of CO_{2eq} the temperature increase is likely to be between 1.9 and 4.4 C^o and 1.4–3.1C^o respectively (Solomon et al., 2007). As explained by Isacs et al., two main economics-based approaches for monetizing the impacts of these emissions can be found: the marginal cost approach (MAC) and the social cost of carbon (SCC). The MAC estimate is "derived from the marginal cost to reach a certain emission reduction target" (Isacs et al., 2016). An example of a marginal cost approach value estimate is the price of EUAs, which fell from more than €23/tCO2eq in August 2008 to €7/tCO2-eq in May 2012 during the Kyoto period (Martínez de Alegría et al., 2015). The social cost of carbon "is defined as the value of the damage from climate change impacts associated with an additional ton of CO_2 emitted into the atmosphere". A social cost of carbon is estimated that varies from €6.1/tCO_{2eq} to €1214/tCO_{2eq} (Isacs et al., 2016).

However, scientific literature has paid little attention to country-specific ex-post analysis of the real price paid for COP-approved units (also known as International Mitigation Units (IMUs), International Compliance Unit (ICUs), Kyoto Protocol Units, etc.). These COP-approved units are different emission permits created under the Kyoto Protocol's Flexibility Mechanisms (which include the aforesaid Emission Trading Scheme under the Kyoto Protocol, the Clean Development Mechanism and the Joint Implementation Mechanism). Each of these types of COP-approved unit has its own functioning and acquisition cost. Kossoy and Guigon (2012) offer a "reported" average figure of €5.1/tCO_{2eq} in 2011 and in the range of €5–7/tCO_{2eq} at the end of 2010 for AAUs, while the spot market price for CERs fell considerably by the end of the first commitment period, from more than €18/tCO_{2eq} in August 2008 to €3.5/tCO_{2eq} in May 2012 (European Energy Exchange, 2012).

This paper sets out to estimate the average price paid (€/tCO_{2eq}) for the total COP-approved units acquired by the Spanish government in the Kyoto commitment period. A more realistic figure for the average cost of these COP-approved units is also estimated when considering the country's Kyoto Protocol specific commitment. The case of Spain is chosen because, in the words of the European Environment Agency (2012), by the end of 2011 almost every European country was on track to meet its Kyoto targets for 2008–2012 with the exception of Italy and Spain. Moreover, Spain planned to acquire a large quantity of COP units through the Flexibility Mechanisms to meet its commitment (European Commission, 2011).

The rest of the article is organized as follows: Section 2