

# BUSINESS FOR CLIMATE PLATFORM

## EMISSIONS TRADING SYSTEM SIMULATION

### EPC ETS

Final Report: March-November 2014

An Initiative of:



In Partnership with:



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## **MASTHEAD**

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## Introduction

The Center for Sustainability Studies (*Centro de Estudos em Sustentabilidade-GVces*) of the Business Management School at the Getulio Vargas Foundation (EAESP/FGV), as part of its Business for Climate Platform initiative (EPC), has, since 2013, promoted a simulation of the Emission Trading System (EPC ETS). The objective of this initiative is to offer the Brazilian business sector the opportunity to test a market instrument for carbon pricing and to enable it to contribute to the debate on this topic in Brazil and internationally.

This report presents the challenges, results, analysis and evaluation of the 1st operational cycle of the EPC ETS, carried out from March to November 2014. The key data is presented in the following table (1).

**Table 1- Key data from the EPC Emissions Trading System (EPC ETS), 2014**

<b>Number of participants</b>	20 companies
<b>Represented Sectors</b>	Energy, mining, financial, manufacturing, logistics, services, communication, agroforestry, construction, and waste management.
<b>Cap</b>	23.486.332 tCO <sub>2</sub> e
<b>Volume of bonds traded</b>	12.437.607 tCO <sub>2</sub> e
<b>Volume of funds traded (Ec\$)<sup>1</sup></b>	Ec\$ 25.541.400
<b>Maximum and average price of emission permit</b>	Ec\$ 35,00; Ec\$ 27,38
<b>Maximum and average price of offset type 1</b>	Ec\$ 28,00; EC\$ 24,47
<b>Maximum and average price of offset type 2</b>	Ec\$ 28,00; Ec\$ 19,11

<sup>1</sup> Fictitious Currency circulated in the EPC ETS on a par with the Real (Ec\$1,00 = R\$ 1,00).

Companies operated on the trading platform with the aim of attaining the best possible combination of financial and operational results. Their objective was to balance the reduction of greenhouse gas emissions (GHG) via the acquisition of emission allowance bonds and offsets (carbon credits), taking into account the penalties set forth by the EPC ETS in the case of non-coverage of the totality of GHG emissions for 2014.

Only once the emission data used in the simulation is real is it then possible to obtain the results and final analysis of the first cycle of the initiative. This is due to the publication date of emission inventories by the Brazilian GHG Protocol Program being set for August 2015.

This report is organised as follows: firstly, the context of existing carbon pricing mechanisms is presented. Subsequently, information and features of the first cycle of the EPC ETS operation are presented. The third chapter addresses the challenges encountered during the process. The fourth chapter presents the results and analysis of the 2014 cycle of the EPC ETS. Finally, the fifth chapter makes an evaluation of the cycle's activities.

## 1- Context

Carbon pricing<sup>2</sup> has been applied in a growing number of countries, jurisdictions, and organizations around the world as an instrument for transitioning to a low carbon economy. According to a report by the CDP (Carbon Disclosure Project) – an environmental organization that gathers information of interest to investors, large corporations such as the Dow Chemical Company, Goldman Sachs, and ExxonMobil claim to incorporate internal carbon pricing (CDP, 2014). Around 40 countries and over 20 states, regions, or cities in the world have already fixed a price for carbon emissions, or plan to do so, either through taxation or the implementation of systems that allow for their commercialization (World Bank, 2015).

The European Union has pioneered carbon pricing via a system of emission trading. California and Canada have successful systems, such that in 2014 their span was extended to cover transport emissions. Furthermore, in 2014, two emission trading pilot schemes were implemented in China, in Hubei and Chongqing, with another 5 pilot schemes already in operation since 2013.

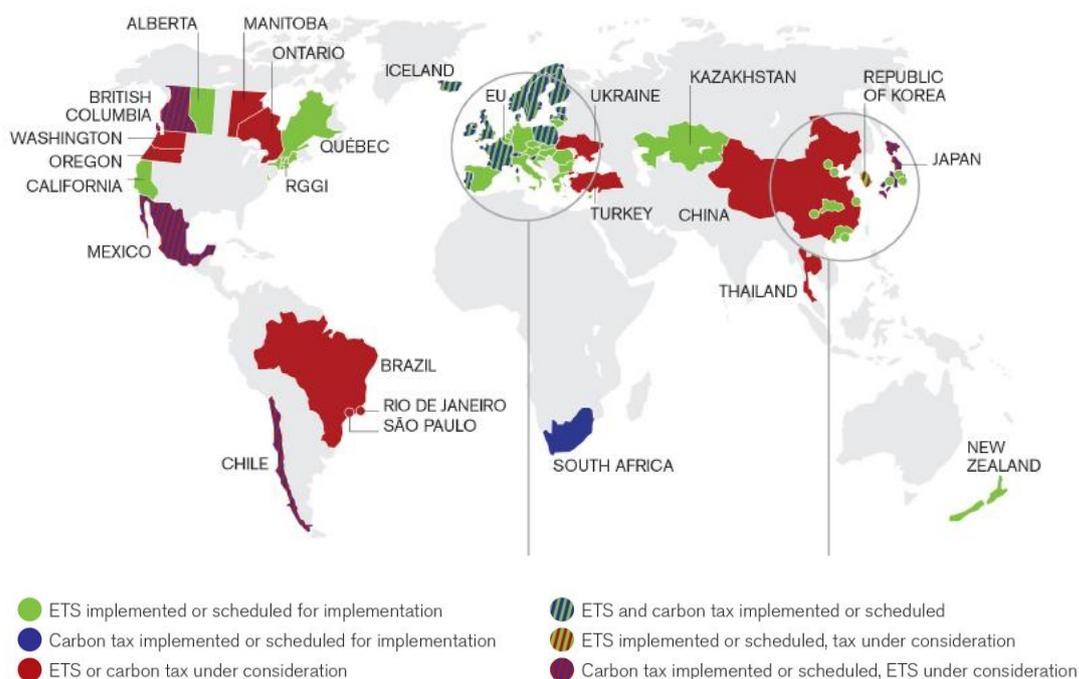
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<sup>2</sup> Carbon pricing can occur in two forms: taxation or emission trading (emission allowances are negotiated via a limit established by a regulatory body).

The EPC ETS is a pioneering initiative in Latin America, given that there is no other trading system between Latin American countries. Chile, Mexico, and Costa Rica have adopted taxation systems.

Domestically, the Ministry of Finance has coordinated a series of seminars and sectoral studies on carbon pricing in Brazil, due to a change in the country's emissions profile. Emissions from deforestation have decreased, however, emissions from other sectors are increasing, such as the energy sector, which has made necessary the study and implementation of new national mitigation policies.

**Figure 1- Carbon pricing initiatives around the world, 2014**



Source: Adapted from the World Bank, 2014.

Thus, among the economic instruments adopted for carbon pricing, the most prominent, in particular due to its cost-effectiveness<sup>3</sup> and for offering a less uncertain environmental outcome, is the “cap and trade” type emission trading system. This type of carbon market seeks to restrict the GHG emissions of a sector, an economy of a region or country, to a pre-established limit.

<sup>3</sup> Cost effectiveness: Property of an instrument of public policy to obtain a determined objective at the lowest possible cost (Kolstad, 2000).

A limit for emissions is established (cap) for sources covered and converted into emission allowances that can be distributed and/or sold to the regulated companies, who can negotiate between themselves. The logic is that companies with the lowest marginal costs of abatement (the cost of reducing a ton of carbon equivalent – tCO<sub>2</sub>e) invest in technology and good practice for reducing their emissions, and negotiate surplus emission allowances with companies with higher abatement costs. Companies thus trade allowances according to their opportunities for reduction, which is why this system of emissions trading is a pricing instrument that confers flexibility to the companies being regulated, and leads to improved cost-effectiveness.

The EPC ETS was developed within this context, its general features and information about its first cycle of operations are described in the following chapter. Table 2 offers a comparison between key data of the initiative and that of the emissions trade in California and the European Union.

**Table 2- Key data for EPC ETS 2014 and emission trading systems of California (2013-2014) and the European Union (2008-2012).**

	<b>EPC ETS 2014 (simulation – voluntary)</b>	<b>California (2013- 2014) (regulated)</b>	<b>European Union (2008-2012) (regulated)</b>
<b>Coverage</b>	20 companies	360 companies	12.000 industrial installations
<b>Represented Sectors</b>	Energy, mining, finance, manufacturing, logistics, services, communication, agroforestry, construction, and waste management.	Producers and importers of electricity, large industrial sources (> 25.000 tCO <sub>2</sub> e)	Power plants and production facilities.
<b>Cap</b>	23.486.332 tCO <sub>2</sub> e	162.800.000 tCO <sub>2</sub> e	2.084.301.856 tCO <sub>2</sub> e

Source: European Commission and C2ES (Center for Climate and Energy Solutions), 2015

## 2- The EPC ETS and the 2014 Cycle

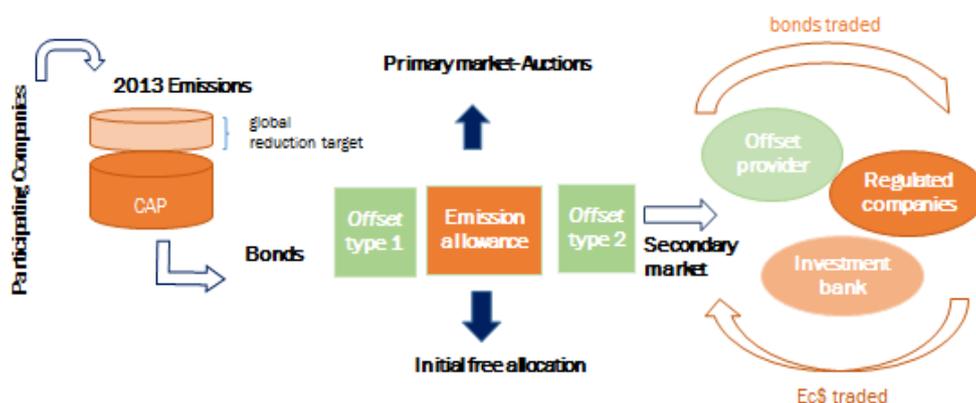
GVces and the participating companies aim to contribute to the debate on carbon pricing, a topic that is increasingly on the agenda of international negotiations and the media. 2015 will see the 2nd year of EPC ETS operations, and, by the end of 2016, the 3rd cycle. On the basis of this experience, proposals will be co-created and put forth for a possible emissions trading system in Brazil.

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The planning and structuring of the EPC ETS happened in 2013, in a collaborative process with the participating companies, and taking as its starting point the experience of carbon markets both existent and under construction, such as those of the EU and California. Generally speaking, the rules set for the 1st cycle (2014) were: 2013 as the base year, adoption of an absolute cap with annual emissions reduction target, coverage of Scope 1 and Scope 2 emissions, functioning of a primary (auction) and secondary (spot) markets and transaction of emission allowances and offsets of type 1 and 2. These rules and parameters confer upon the EPC ETS the following operational layout represented in Figure 2, below. For more information, [click here](#) or access [Rules and Parameters of the EPC ETS 2014](#).

**Figure 2- Operational logic of the EPC ETS**



As illustrated in Figure 1, according to the definition of *cap*, a determined volume of emission allowances is distributed to companies via an initial free allocation and auction (primary market). The percentage of allowances a company receives via the free initial allocation is defined according to a benchmarking study of the carbon intensity indicator. The company with the best indicator receives 60% of the volume of allowances necessary for settling its base year emissions, the company with the worst indicator receives 40%. For sectors in which a benchmarking study was not possible, due to the absence of data on behalf of the companies of the same productive activity, the percentage transferred is 50%.

Once they have received their free allocation or bought allowances through auctions, companies may then trade these allowances on the secondary market, open 24 hours a day. Offsets are also tradable on the secondary market.

As a financial resource for operation in the EPC ETS, companies use a made-up currency, set forth in the Rules and Parameters, called EPCents (Ec\$), that is on a par with the real (Ec\$ 1,00= R\$ 1,00). A financial allocation is made at the beginning of the operational cycle for 150% of the quantity of allowances that would need to be acquired by the company, taking into account base year emissions.

There is a table (3), annexed, with a summary of the main rules and parameters for the functioning of EPC ETS 2014.

In 2014, the 20 companies shown in Figure 3, below, took part in the EPC ETS. Another 2 companies didn't complete the full cycle, so their data and results have been used for didactical purposes, and in case they should return to the initiative.

**Figure 3- Companies participating in the EPC ETS 2014**



The cap established by the EPC ETS in 2014 was of 23.486.332 tCO<sub>2</sub>, taking into account emissions for 2013 of Scopes 1 and 2 of the 22 companies that initiated participation in the EPC ETS. In line with the rules and parameters of the EPC ETS 2014, the calculation of Scope 2 emissions was made taking the emission factor of the national grid (Sistema Interligado Nacional - SIN) for the year 2012 (initially adopted as base year) into account, disregarding emission factor variations, as companies have no control over the emissions of the Brazilian energy matrix.

EPC ETS operations took place on an online negotiating platform developed in partnership with [Rio de Janeiro Green Stock Exchange \(BVRio\), a BVTrade](#), where, in 2014, 12.437.607 tCO<sub>2</sub>e in allowances and offsets were traded, shifting Ec\$ 25.541.400.

### 3- Challenges and Lessons Learned

- **Business Engagement**

The solutions found by the majority of companies for the reduction of emissions were elaborating inventories, investing in low carbon technology, good practices, and the consumption of renewables, which indicates progress in the field of mitigation.

However, the adoption of an internal carbon price as an element for decision making is still underexplored by the Brazilian business sector. Due to being a relatively new and complex economic instrument dependent on public policy, it is still resisted in the business sector.

In this context, one of the great challenges faced by the EPC ETS was to mobilise and engage the companies taking part in the initiative. Thus lessons were learnt about how to make companies aware of the importance of discussing and experiencing an emission trading system in a real and practical manner, and in combination with other climate agendas. One of the project's main objectives is to prepare companies for the debate on a possible market instrument in Brazil.

- **The complexity of structuring an emission trading system for a diverse group of sectors and productive activities**

In 2013, after the companies had joined, the process of building the SPC EPC rules and guidelines was started, and the complexity of structuring an emission trading system, especially with a group of companies with diverse activities, became apparent. This involves technical and economic variables, which are still being studied and tested, and should be applied according to the reality the system is covering, for example: global reduction target, form of allowance distribution, among other variables. Thus, taking

as a starting point the experiences of other emission trade systems both existent and under construction, such as those in California, the EU, and China, the rules and parameters most applicable to the reality of Brazilian companies were studied and discussed.

One of the rules set forth is about the adoption of benchmarking for indicators of carbon intensity<sup>4</sup> as a basis for the free distribution of a part of the emission allowances required for companies to settle their emissions for the year 2014 (fiscal year of the 1st operational cycle of the EPC ETS). To this extent, the first challenge was about sectorial classification and determination of the denominator, such that it be transversal and representative of the companies in each sector, once intrasectoral indicators<sup>5</sup>, have been adopted, and taking into account that one same player may develop different economic activities.

The generation and release of denominator data, especially on behalf of the companies, was also one of the bottlenecks in the process. This data is linked to economic or production aspects of the companies and are treated as confidential by most of them. It was therefore necessary to seek a denominator that, as well as transversal and representative, could be public.

- **To involve and prepare high leadership**

Once up and running, the main challenge of the EPC ETS was to engage the high leadership of the companies, involving executives in the debate and analysis of results. Long term company planning, on the whole, doesn't yet incorporate the costs of externalities caused by the emissions of GHG, which becomes a barrier for linking the participation of companies in the EPC ETS to a mitigation strategy. Given this, a more effective communication with leadership is sought within the context of the EPC ETS, in order that the working logic of an emission trading system can be incorporated into strategies and opportunity and risk management.

In this sense it is fundamental that the relationship between carbon pricing and the competitiveness of the business be made clear: the investment in less carbon intensive processes and technologies prepare a company for possible regulation, making it more

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<sup>4</sup> Carbon intensity indicator: emissions/economic or production aspect

<sup>5</sup> That which can be applied to various companies belonging to a same sector. The intrasectoral indicator is rarely useful for another sector, as it is based on denominators specific to the sector analysed and allows for comparability between companies of a same sector (FGV, 2014).

resilient to changes in the environment and better able to serve a market of consumers who are increasingly demanding in regards to socio-environmental criteria.

Other opportunities directly linked to taking part in a ETS are also relevant, such as: reduction of emissions for the lowest global cost, the possibility of obtaining financial gain from operating in the market, either by reducing emissions beyond the target and trading the surplus allowances, or through speculative activity<sup>6</sup>.

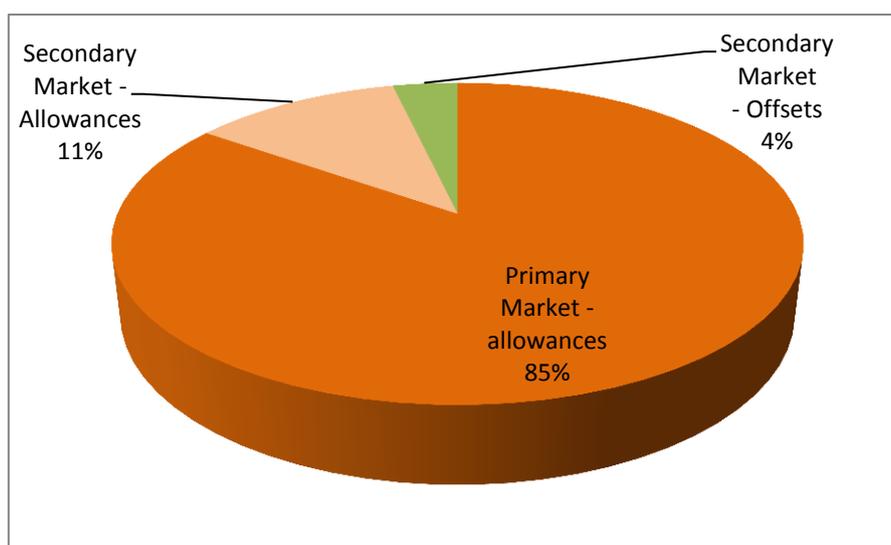
To this extent, a fundamental lesson from the 2014 cycle of the EPC ETS is the understanding of how an emission trade system can bring opportunities to the business sector, and how this instrument can connect and contribute to company climate policies. The next step is for those lessons to be taken to high management.

## 4. Results and Analysis

### 4.1 General Results

During the first operational cycle of the EPC ETS, 12.437.607 tCO<sub>2</sub>e of allowances were traded by participating companies in the primary (auction) and secondary markets. The primary market shifted 85% of traded allowances (Graph 1).

**Graph 1- Percentage of allowances traded in the EPC ETS 2014, by market type (primary and secondary).**

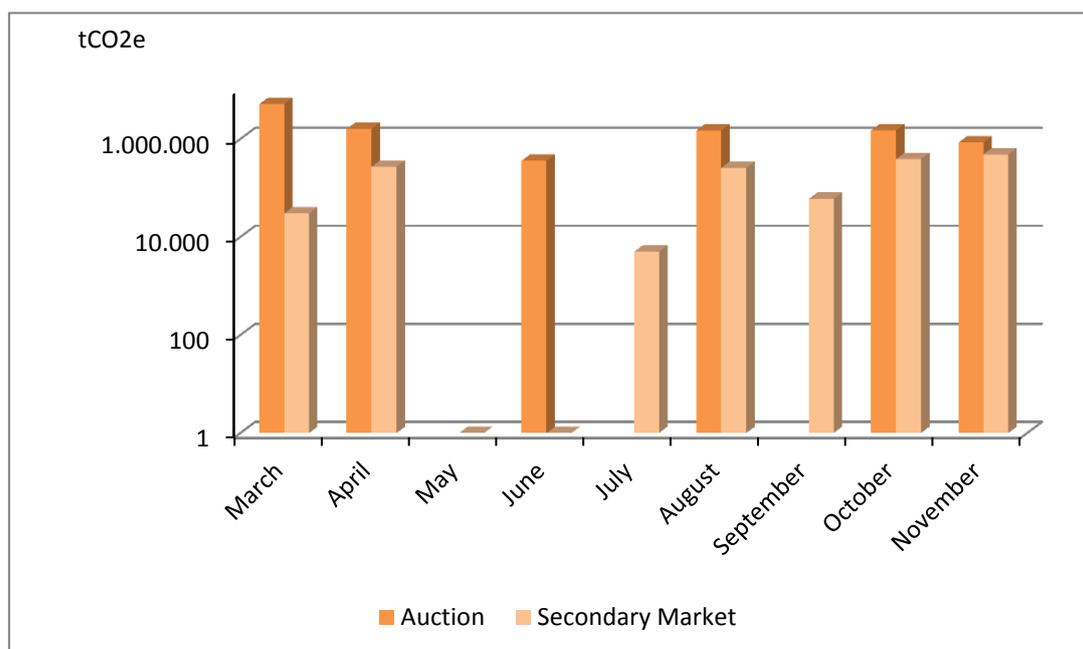


<sup>6</sup> Financial speculation refers to, in this context, the sale of surplus allowances, for gain, without compromising the meeting of emission targets.

Furthermore, 10.978.784 tCO<sub>2</sub>e in allowances were distributed through the initial free allocation. Approximately 93% of the cap was inserted to the market through six auctions carried out throughout the cycle and the initial free allocation. As such, part of the available titles (equivalent to the cap amount) were not acquired by the companies; demand only surpassed supply by the 5th auction.

As for demand, this showed to 'heat up' in the final two months of the operation, mainly in the secondary market, which in November and December registered the highest volumes of allowance trade, 389.450 tCO<sub>2</sub>e and 485.621 tCO<sub>2</sub>e respectively. During the other months, the greatest traded volume was of 271.500, in April. This shows that most companies left their positioning<sup>7</sup> for the last months of the operation (Graph 2).

**Graph 2- Volume of traded allowances (tCO<sub>2</sub>e) by market, during the months of EPC ETS operation, 2014**



The high demand for allowances during the final months caused an increase in prices, although the highest allowance price in the secondary market, Ec\$ 35,00, was registered at the beginning of operations (mid-March), as the result of a single transaction. After the first month of operation, allowance prices dropped, registering

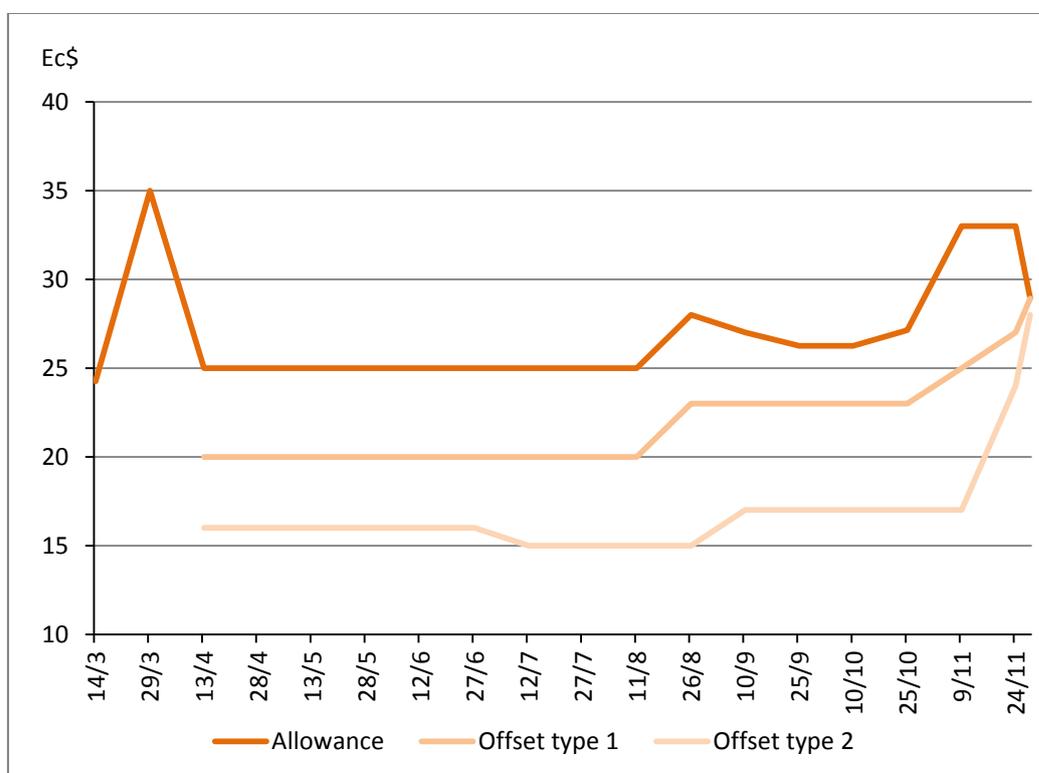
<sup>7</sup> In reference to the activity of acquiring allowances in order to settle emission for the current year's operational cycle.

Ec\$ 25,00 and keeping stable until August. From this month, the allowance price began to oscillate, trading for up to Ec\$ 33,00 in November, and closing the operational cycle at Ec\$ 28,00.

The prices of offsets type 1 and 2 also remained virtually stable until the three final months of the EPC ETS 2014, being traded solely on the secondary market. In the final months, offsets appreciated significantly, as a result of a move by companies to diversify their portfolios with bonds costing less than an allowance. Furthermore, in November, a simulation of the verification of offset type 2<sup>8</sup> was carried out. Following this process, the bond was found not to present any performance risk and appreciated in value.

This increase in demand for offsets in combination with the offer from some participants, in the final days of operation, of emission allowances at a below average market price, equalized the offset and allowance price at Ec\$ 28,00, as reflected in Graph 3.

**Graph 3- Average price of bonds traded on the secondary market of the EPC ETS 2014, over a fortnightly period.**

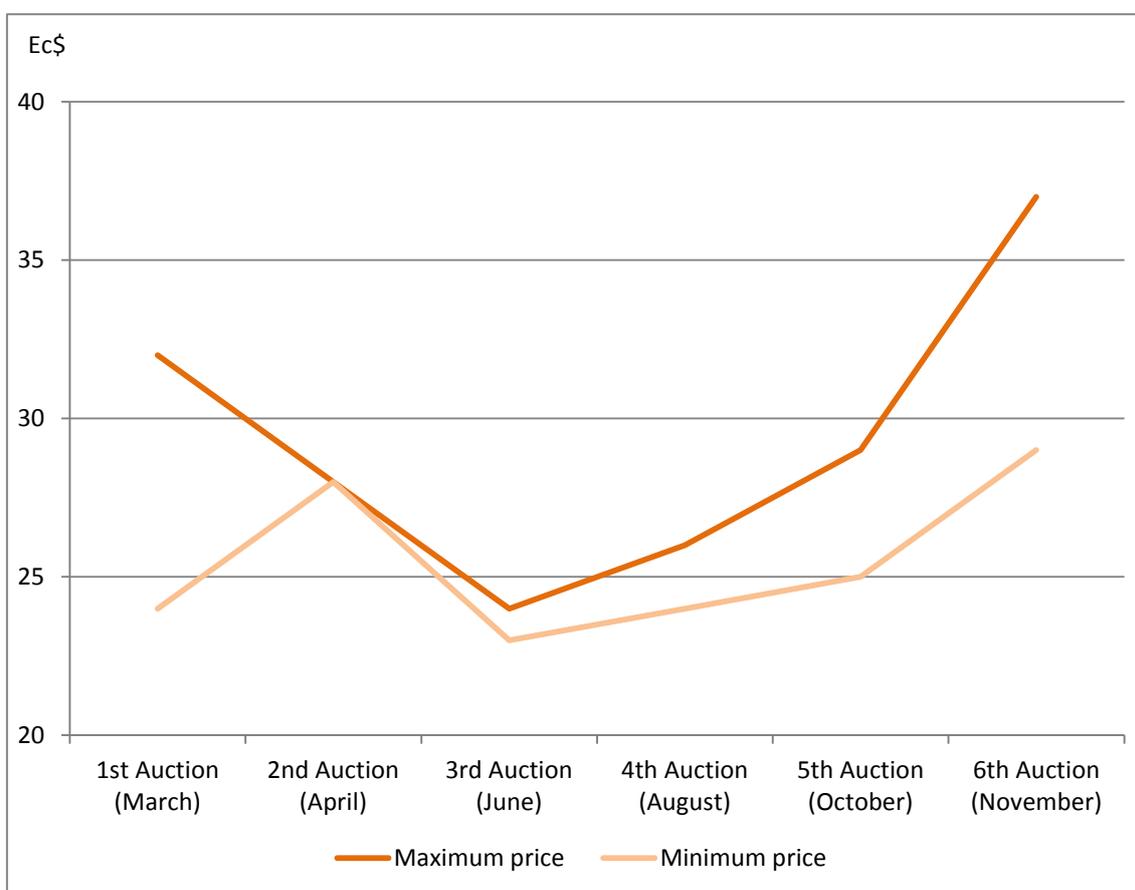


<sup>8</sup> For more information about the simulation of verification of type 2 offsets, see Offsets Normative Ruling (02/2014).

\*Offsets only entered the market during the second half of April.

In the primary market, allowances also underwent significant appreciation in the last two months. The two last auctions, carried out in October and November, registered the highest maximum and lowest minimum prices. The highest maximum traded price was of Ec\$ 37,00, in the final auction. It is worth noting that the lowest minimum price traded was of Ec\$ 24,00, in the 3rd auction, in June. The first auction, being the first opportunity for operation on behalf of the companies, also registered the highest price difference<sup>9</sup>: Ec\$ 8 (Graph 4).

**Graph 4- Maximum and minimum emission allowance price traded on the primary market (auction) of the EPC ETS 2014.**



#### 4.2 Financial Analysis

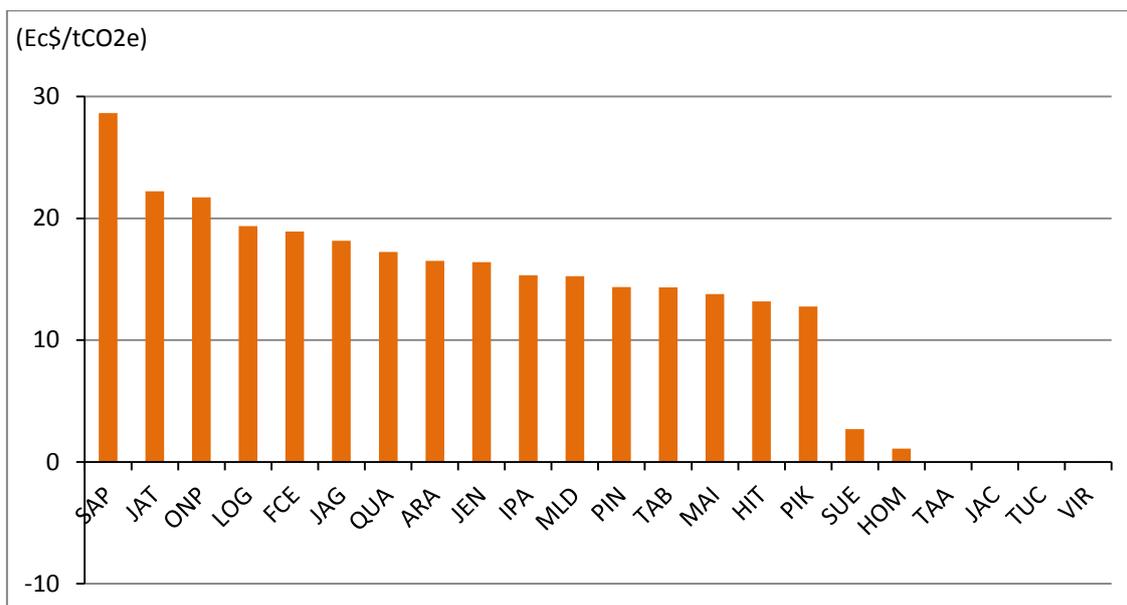
Companies waiting until after October to buy bonds paid a high price, as bonds registered the following appreciation in the secondary market: 16% for emission allowance, 7,5% for offset type 1, and 28% for offset type 2. During this same period, allowances appreciated, in the primary market, by 22% and 14% in relation to

<sup>9</sup> Price difference between opening and closure.

maximum and minimum prices respectively. This compromised the result of these companies in the indicator cost per tCO<sub>2</sub>e settled with EPC ETS bonds.

The greatest cost obtained by tCO<sub>2</sub>e bond was almost Ec\$ 30,00. Three companies had a cost of over Ec\$ 20,00, while the average was Ec\$ 14,12. Three companies did not operate on the market, and as such presented zero cost. Emphasis should be given to Vitória Régia, who only carried out a single allowance sale transaction, therefore obtaining only profit (Graph 5).

**Graph 5- Financial indicator: final cost for tCO<sub>2</sub>e in bonds acquired by companies in the EPC ETS 2014**



Acronyms and their respective pseudonyms: ARA = Arara Azul; FCE = FCE; Hiteco = HIT; HOM = HOM; IPA = Ipê Amarelo; JAC = Jacarandá; JAT = Jacutinga; JEN = Jenipapo; LOG = Lobo Guará; MAI = Mailu; MLD = Mico Leão Dourado; ONP = Onça Pintada; PIN = Pinheiro; PIK = Pink; QUA = Quaresmeira; SAP = Sapphire; SUE = Sustainable Energy; TAA = Tamanduá; TAB = Tatu Bola; TUC = Tucano; VIR = Vitória Régia.

\*Two companies did not participate in the entire cycle of the EPC ETS 2014, however, their data has been considered in the results and analysis.

No company adopted a strategy of financial speculation, obtaining significant earnings through market operations. To diminish final costs, it would be possible to sell excess bonds. In addition, companies seeking to buy could sell bonds in the short term, with the expectation of positioning at a lower price in future, just as they could position themselves in the short term and continue operating in an attempt to generate revenue from an eventual high price trend, which is to say, to buy surplus bonds at lower prices and sell them at a higher price.

### 4.3 Operational Analysis

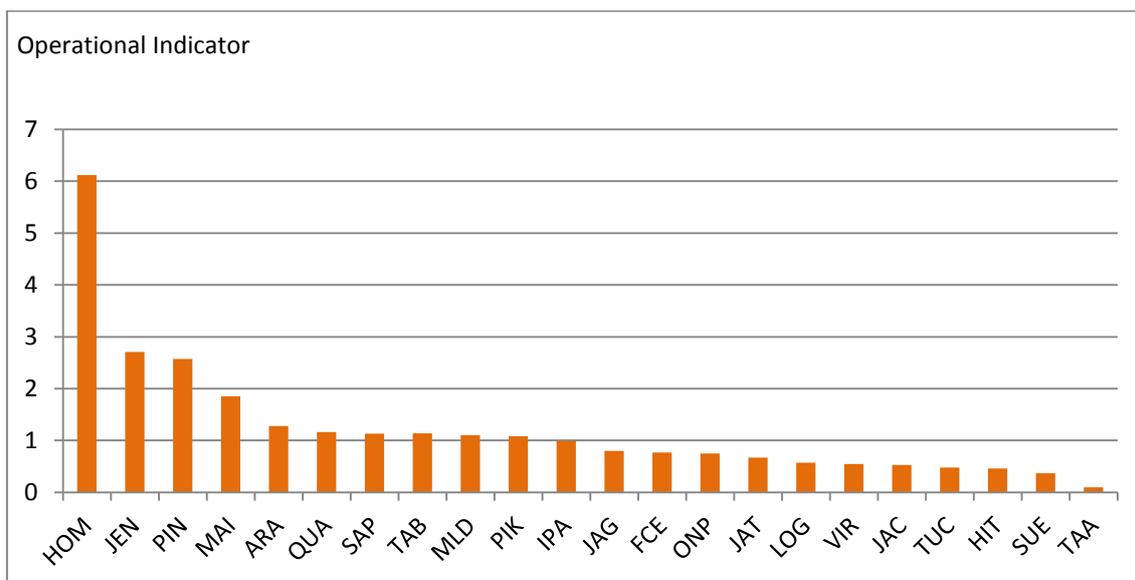
In addition to the financial indicator, paid cost for tCO<sub>2</sub>e acquired in bonds, the operational indicator should also be considered, which refers to the meeting of total emission targets (Scopes 1 and 2) of 2014 with market traded bonds, in the same year. For the calculation of Scope 2 emissions for 2014, a fixed emission factor (Fixed EF) from 2012 was considered, in line with the Rules and Parameters of the EPC ETS 2014.

Of the 22 participating companies (2 companies gave up during the cycle, although their data and results have been analysed), 11 companies were able to settle their emissions for 2014 with the available bonds in their portfolios by the end of the operational cycle. Of this group of 11 companies, three acquired a volume of bonds close to the value of their volumes of emission, reflecting a strategy of participation within the simulation closer to the companies' emission management. Those companies were: Pink, Ipê Amarelo, and Mico Leão Dourado.

Eight companies (HOM, Jenipapo, Pinheiro, Mailu, Arara Azul, Quaresmeira, Tatu Bola and Sapphire) acquired bonds beyond emission target requirements, and within the cycle in question excess bonds are non-transferrable to the next operational year. Thus, these companies missed the opportunity for making a financial gain, as they could have sold their excess bonds and improved the financial indicator.

On the other hand, 11 companies did not settle their emissions, with 4 companies reaching less than 50% of the required volume of bonds, and 7 companies reaching the end of the cycle with between 50% and 80% (Graph 6)

**Graph 6 – Operational indicator (bond balance (tCO<sub>2</sub>e)/total emissions (tCO<sub>2</sub>e) of companies participating in EPC ETS, in 2014.**



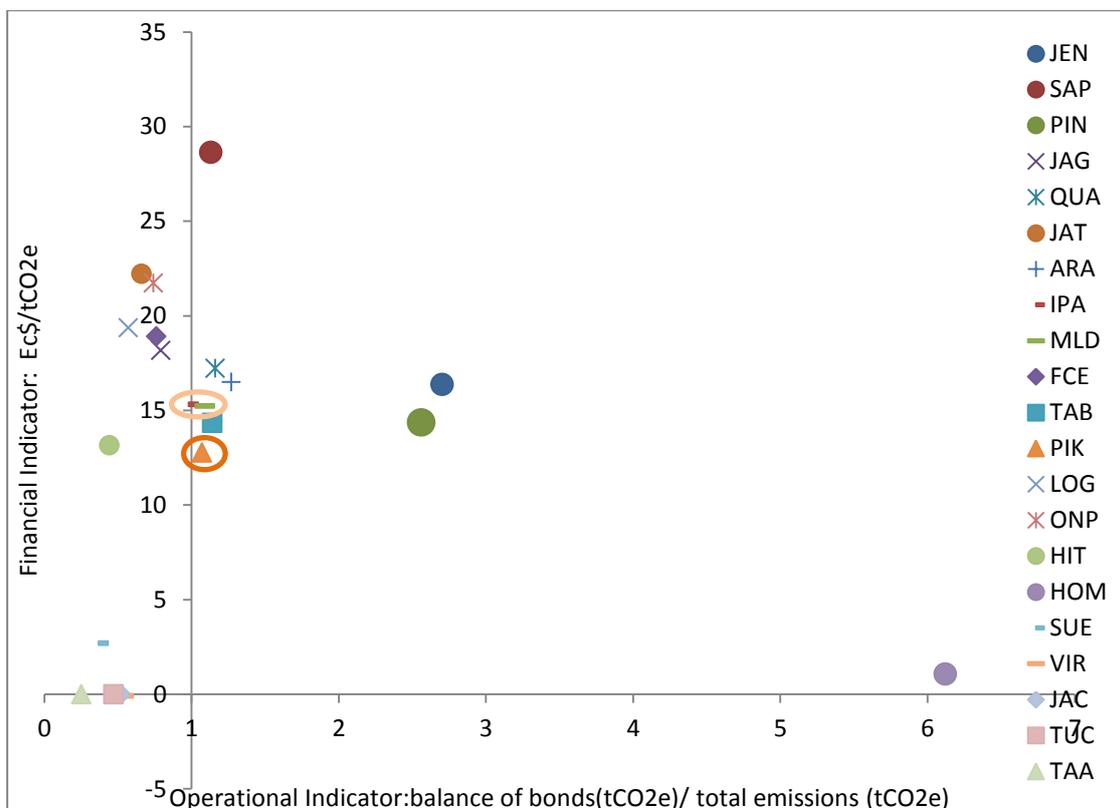
It is worth noting that had the 2012 emission factor not been used for the calculation of Scope 2 emissions of 2014, only 5 companies would have settled their emissions.

Those companies are: HOM, Jenipapo, Mico Leão Dourado, Mailu and Arara Azul. A further two companies came close to settling, with almost 90% of required bonds (Tatu Bola and Ipê Amarelo), and six companies would have had less than 50% of the required volume of bonds necessary to settle emissions. The other eight companies would have remained with a percentage between 70% and 50%.

#### 4.4 Performance and Strategies

For the final analysis of company performance, a combination of financial and operational results should be considered, given that the objective is to balance the reduction of GHG emissions through the acquisition of bonds in the EPC ETS 2014. Of the group of three companies that achieved the best operational position and came close to an exact balance, the one that presented the lowest cost per acquired tCO<sub>2</sub>e in bonds was Pink with Ec\$ 12,76/tCO<sub>2</sub>e, Mico Leão Dourado with Ec\$ 15,23 and Ipê Amarelo with Ec\$ 15,31. HOM registered the lowest cost of target attainment (Ec\$ 1,08), however, it ended up with more bonds than necessary, which reflects a gap between the operation strategy in the simulation and the company's emission management (Graph 6).

**Graph 7- Performance of participating companies in financial and operational indicators of the EPC ETS 2014**



Acronyms and their respective pseudonyms: ARA = Arara Azul; FCE = FCE; Hiteco = HIT; HOM = HOM; IPA = Ipê Amarelo; JAC = Jacarandá; JAT = Jacutinga; JEN = Jenipapo; LOG = Lobo Guará; MAI = Mailu; MLD = Mico Leão Dourado; ONP = Onça Pintada; PIN = Pinheiro; PIK = Pink; QUA = Quaresmeira; SAP = Sapphire; SUE = Sustainable Energy; TAA = Tamanduá; TAB = Tatu Bola; TUC = Tucano; VIR = Vitória Régia .

\*Two companies did not participate in the entire cycle of the EPC ETS 2014, however, their data has been considered in the results and analysis.

Performances are a reflection of the strategies adopted by the companies. Mico Leão Dourado and Ipê Amarelo reduced their emissions, planned to settle their emissions with bonds, and took into account, for market operations, the cost of opportunity<sup>10</sup>, which is to say they traded their bonds at the beginning of operations, considering the tendency for increase in demand and, consequently, appreciation of bonds. Moreover, they diversified their portfolios, composing them of allowances and offsets, which improved financial indicator performance, since offsets were traded mostly at a lower price than allowances.

Early on Pink adopted a strategy of emission reduction, foregoing the need for major trading on the market. HOM should be mentioned for achieving the best financial performance, as they presented their own offset credits, which were turned into bonds by the CG and credited to them, thus diluting their costs.

## 5. Conclusion

The EPC ETS is a unique opportunity for learning about emission trade systems, and its first cycle yielded positive results, mainly the lessons learned throughout the process. As such, one of its main objectives was attained: to capacitate Brazilian companies for the debate on finding a comprehensive and robust market approach in order to reduce national GHG emissions.

In what pertains to the final objective of an emission trading system, the global target of emission reduction of the simulation was not reflected in the reality of management in the majority of the companies. In 2013, the total volume of emissions (Scopes 1 and 2) of the participating companies came to 26.504.347 tCO<sub>2</sub>e, in 2014 this figure reached 24.607.653 tCO<sub>2</sub>, therefore resulting in a global reduction in emissions of 8%, slightly below the 2014 cycle target of 10%. Of the group of 22 participating companies, 13 companies reduced their emissions. If we compare the volume of emissions in 2014 with the number of bonds held by the companies (21.425.981 tCO<sub>2</sub>e), it can be concluded that approximately 13% of emissions were not covered by bonds.

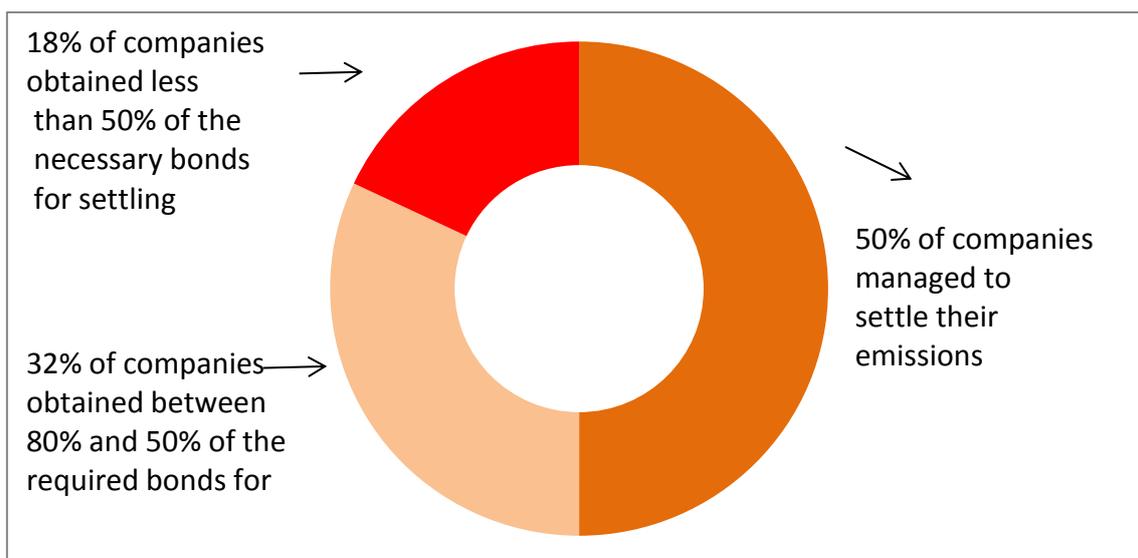
It is worth mentioning that the cited reduction could have occurred not only because of the mitigation efforts made by the companies, but also due to the current slowdown of the Brazilian economy. Yet at the core of factors influencing GHG mitigation should lie the consideration that fossil fuel composition has increased in the Brazilian energy matrix.

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<sup>10</sup> The cost of opportunity is the value of the benefit foregone when in a decision making process one path is chosen to the detriment of another (Leone, 1992).

In this respect, combining reductions with trading of bonds on the market, 50% of companies managed to settle their emissions with bonds available in the EPC ETS, with 8 companies within this group remaining with excess bonds for settling of emissions. Among the remaining companies, 32% managed to get close to their target, with 80% to 50% of the required bonds, and 18% ending the operational cycle with less than 50% of the required bonds for settling their emissions. (Graph 6)

**Graph 6- Percentage of position of companies in relation to emission targets (S1 and S2) with EPC ETS 2014 bonds.**



The main lessons learned, operationally speaking, in this simulation, are: operating on a trading platform with auctions and a secondary market, diversification of bond portfolio, analysis of cost of opportunity, and balancing the volume of bonds required with the volume of emissions to be settled. As well as operational lessons there are strategic ones which should be highlighted: to link the operational logic of a system of emission trading with the mitigation policy of the company and to assemble a market participation strategy based on emission management.

However, some points must be improved upon for companies to obtain a better performance in the EPC ETS. The breakdown of emission data is a point that could contribute to a more precise operational strategy, as the company would have a greater power of management and more accurate analysis of its capacity for emission reduction, and thus taking more assertive decisions in relation to purchase and sale of allowances. The frequency of data monitoring should also be improved, as many companies both went over and fell short of the volume of purchased bonds required for settling their volume of emissions.

The involvement of the financial area is another point that can contribute to a better performance, mainly in relation to obtaining the lowest cost per tCO<sub>2</sub>e acquired in

bond. The financial team can use their experience with capital markets, which have high liquidity and are highly dynamic, to better exploit opportunity cost.

In terms of the systematization and structuring of the EPC ETS, some improvements are also necessary, which have already been included in the 2nd operational cycle (2015), as, for example, the exclusion of Scope 2 from the calculations of the simulation. No real carbon market includes indirect emissions (Scopes 2 and 3) in the calculation of the cap or for other accounting. Furthermore, most real emission trading systems base their operations on the future market, and as such this market type has been incorporated into the EPC ETS.

The reduction target was also increased by 2%, which is the equivalent of an emission reduction target of 12% on 2013 emissions. The definition of a reduction target is a challenge in all emission trading systems, as it involves economic analysis as well as political factors. Taking into account that the EPC ETS is a didactic exercise, an ambitious target can be adopted, without causing harm to company competitiveness.

Thus the first operational cycle of the EPC ETS was rich in operational and strategic lessons, in terms of company participation as well as the structuring of the initiative. To move forward in this process, the second cycle is in operation in 2015 exploring solutions to the bottlenecks identified in 2014 and improving the experience of participating companies. As well as disseminating the SCE within the companies, engaging other areas and high management, this cycle opens the possibility for a larger group to participate: it includes member companies of the Brazilian GHG Protocol Program with Scope 1 emissions of above 10.000 tCO<sub>2</sub>e.

## Bibliography

CDP, 2014. Carbon Disclosure Program: Global corporate use of carbon pricing.

Accessible at:

<https://www.cdp.net/CDPResults/global-price-on-carbon-report-2014.pdf>

C2ES (Center for Climate and Energy Solutions), 2015. California Cap and Trade.

Accessible at:

<http://www.c2es.org/us-states-regions/key-legislation/california-cap-trade#Details>

Europe Comission, 2015. Climate Action.

Accessible at:

[http://ec.europa.eu/clima/policies/ets/cap/index\\_en.htm](http://ec.europa.eu/clima/policies/ets/cap/index_en.htm)

Kolstad, Charles D. Environmental Economics. New York Oxford. Oxford University Press, 2000.

LEONE, George S.G. Custos: Planejamento, Implantação e Controle. São Paulo. Atlas. 1982.

EPC ETS, 2014. Rules and Parameters of the Emission Trade System of the Platform Companies for Climate. Accessible at:

[https://s3.amazonaws.com/arquivos2.gvces.com.br/epc/original/sce-epc\\_in-parametros-04\\_2015.pdf](https://s3.amazonaws.com/arquivos2.gvces.com.br/epc/original/sce-epc_in-parametros-04_2015.pdf)

EPC ETS, 2015. Rules and Parameters of the Emission Trade System of the Platform Companies for Climate. Accessible at:

[https://s3.amazonaws.com/arquivos2.gvces.com.br/epc/original/epc\\_regras-parametrossce\\_2015\\_final.pdf](https://s3.amazonaws.com/arquivos2.gvces.com.br/epc/original/epc_regras-parametrossce_2015_final.pdf)

World Bank, 2014. Carbon Pricing Watch, 2015.

Accessible at:

<http://documents.worldbank.org/curated/en/2015/05/24528977/carbon-pricing-watch-2015-advance-brief-state-trends-carbon-pricing-2015-report-released-late-2015>

## Annex 1

### Summary Table of the main rules and parameters of the EPC ETS 2014

<b>Objective of the participating companies</b>	To obtain the best possible combination between <b>financial and operational results</b> , balancing emission reduction with the acquisition of carbon bonds and the possible penalties set forth by the EPC ETS in the case of non-coverage of the totality of GHG emission in 2015.
<b>Goal of participating companies</b>	(1) to cover each tCO <sub>2</sub> e emitted in 2015 with bonds available from the EPC ETS and (2) to obtain the lowest cost per tCO <sub>2</sub> e delivered to the Management Committee <sup>11</sup>
<b>Regulated Market Operators (RMO)</b>	Companies participating in the EPC ETS and authorized to trade bonds on the market are the “regulated operators”, that is, their GHG emissions are regulated and must correspond to the market bonds at the end of each cycle.
<b>Base year</b>	2013
<b>Global cap</b>	Maximum emission limit for the participating group, which determines the corresponding volume of allowances to be emitted by the Management Committee, and which are distributed or sold to participants. Calculated on the basis of Scope 1 emissions of all participants, and therefore a global cap.
<b>Reduction target</b>	Target applied to the calculation of the cap. The reduction target was of 10% of emissions of 2013 (base year).

<sup>11</sup> Management Committee (MC): composed of the team at Gvces, responsible for the operation of the EPC ETS. Acts to avoid and correct market distortion, using the offer of bonds through auction, the purchase and sale of bonds on the secondary market, and the revision of parameters of price and limit of use of offset credits as instruments.

<p><b>Traded bonds</b></p>	<p>Allowance: Distributed among RMOs by the MC (auction and initial free allocation).</p> <p><i>Offset:</i> type 01- verified and validated; type 02- validated, but with verification pending.</p> <p>The use of up to 10% of offsets for emission compensation is permitted.</p>
<p><b>Free allowance allocation</b></p>	<p>Part (40 to 60%) of the required allowances for the settling of emissions are freely passed on to the RMOs based on a carbon efficiency ranking from their sectoral benchmark. RMOs from sectors for which there is no benchmark receive 50% of required allowances.</p>
<p><b>Financial resources</b></p>	<p>Fictitious Currency: EPCents (Ec\$). Initial allocation represents 150% of the quantity of allowances that would need to be acquired by the RMO.</p>
<p><b>Providers and purchasers of offset credits</b></p>	<p>Agents authorized to act in the EPC ETS as offset traders, not being authorized to trade emission allowances.</p>
<p><b>Investment bank</b></p>	<p>Agents authorized to act in the EPC ETS as traders. They trade directly with participants, being able to buy or sell any bonds available on the secondary market – they are not authorized to participate in auctions.</p>
<p><b>Management Committee (MC)</b></p>	<p>Management Committee (MC): composed of the team at Gvces, responsible for the operation of the EPC ETS. Acts to avoid and correct market distortion, using the offer of bonds through auction, the purchase and sale of bonds on the secondary market, and the revision of parameters of price and limit of use of offset credits as instruments.</p>