International Emissions Trading. The Future Capabilities of a Flexible Environmental Regulation as a Global Tool For Combating Climate Change

Filippos KOLEONIDIS*, Georgia SKREKA**
Aristotle University of Thessaloniki, Greece

Abstract

Upon approaching the twentieth anniversary since the signing of the Kyoto Protocol in December 1997, there is no doubt that the economics of greenhouse gas (GHG) emissions are facing a paradigm shift. There are currently seventeen emissions trading systems operating globally, covering more than thirty countries, thirteen states and seven cities. However, at the moment there exists only a collection of disparate programs that lack the uniformity required to transform into an international agency. This paper will provide an examination of the state of emissions trading today and expand into the future capabilities of establishing a truly international emissions trading scheme in order to successfully combat and reverse the economically and socially catastrophic consequences of climate change.

Keywords: emissions trading, environmental economics, climate change
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1. Introduction

Almost twenty years after the adoption of the Kyoto Protocol in December 1997 the global community still faces the adverse effects of increasing greenhouse gas (GHG) emissions. Though huge leaps have been made in the fields of market – driven solutions and technological innovation in an effort to mitigate climate change, there is undoubtedly still a long way to go. Following the implementation of the Protocol on February 16, 2005 a vast number of emissions trading schemes (ETSs) developed around the globe. There are currently seventeen ETSs operating globally, covering more than thirty countries, thirteen states and seven cities, functioning however with little to no interaction.

This paper will provide a thorough examination of the largest emissions trading scheme in the world – European Union's ETS – combined with an analysis of its most innovative counterpart – California's Cap – and – Trade Program. These schemes

Corresponding addresses:
* Filippos KOLEONIDIS, Aristotle University, Faculty of Economics, Thessaloniki, Greece.
Email: koleonidis.filippos@gmail.com
** Georgia SKREKA, Aristotle University, Faculty of Economics, Thessaloniki, Greece.
Email: georgiask5@gmail.com,

serve as the backbone for the paper's proposition, which is the establishment of a truly Global ETS. The authors intend to outline the steps that will lead to a truly international emissions trading scheme, which in turn will assist the global community's efforts of combating climate change. In accordance with the Summer School's theme, a brief historical background of the subject is presented, so as to paint a more vivid picture of the events that contributed to the rise of this market mechanism. The examination of these future capabilities will be done based on a dual axis, namely **simplification** and **cooperation**. More specifically, in order to achieve a functional Global ETS a certain degree of operational simplification, meaning bureaucratic facilitation and reporting user-friendliness, is deemed necessary. In the same vein, a successful Global ETS cannot exist without the utmost level of international cooperation via mutual decision – making and knowledge sharing.

The basic principle in the field of cap – and – trade is rather straightforward: the cap functions as an allowed upper limit on emissions levels, thus generating scarcity and subsequently price incentives that create value in environmental investments. By inserting market mechanisms, cap – and – trade ultimately transforms into a financially and environmentally profitable trading system. Buying and selling of emissions permits became the norm as member states capitalized on this new found scheme to generate revenue and simultaneously contribute to the global efforts. However, the most important event of the decade regarding climate change and the direction that the global community intends to follow is the Paris Conference, held in December 2015. Though the plan's timeline is expected to commence on 2020 and although the targets discussed revolve mainly around limiting global warming and temperature increase, the parameters of transgressing to an international emissions trading scheme were discussed. Article 6 refers to the "voluntary cooperation in the implementation of (...) nationally determined contributions" which may include "internationally transferred mitigation outcomes".

The Paris Agreement failed to determine the nature and outlook of the new international market and it is this paper's goal to substantially fill in the void and offer a guide going forward.

2. Environmental Regulations in Retrospect

2.1 Clean Development Mechanism – CDM

On 11 December 1997, at the third session of the Conference of the Parties ("COP3"), the Kyoto Protocol was ratified, with its full implementation having taken place on 16 February 2005. The most prominent factor of the Kyoto Protocol was the ground-breaking introduction of three innovative market-based mechanisms, in order to expedite the commitments made by the participating countries regarding the reduction of GHG emissions.

First was the introduction of the *Clean Development Mechanism* - "CDM" as defined in Article 12 of the Protocol with the main motive being the financial assistance from the more developed countries towards the less developed ones. In more detail, CDM allowed a country with an emission – limitation target to put into

effect an emission – reduction project in a developing country. This resulted in earned and salable *certified emission reduction* (CER) credits with each credit being equivalent to one ton of CO2. CERs levels skyrocketed in the second (2008 – 2012) and third phases (2012 – 2015). More importantly, from February 2005 until February 2017, a full-twelve year period of implementation of CDM, most of the CERs (57.6%) have been issued to projects in one single country, China. *Figure 1* represents the accumulated issuance of CERs over time, while *Figure 2* illustrates the biggest contributing countries to the issued CERs. Just eight countries contribute to 96% of all globally issued CERs (China, India, South Korea, Brazil, Mexico, Chile, Argentina, Vietnam).

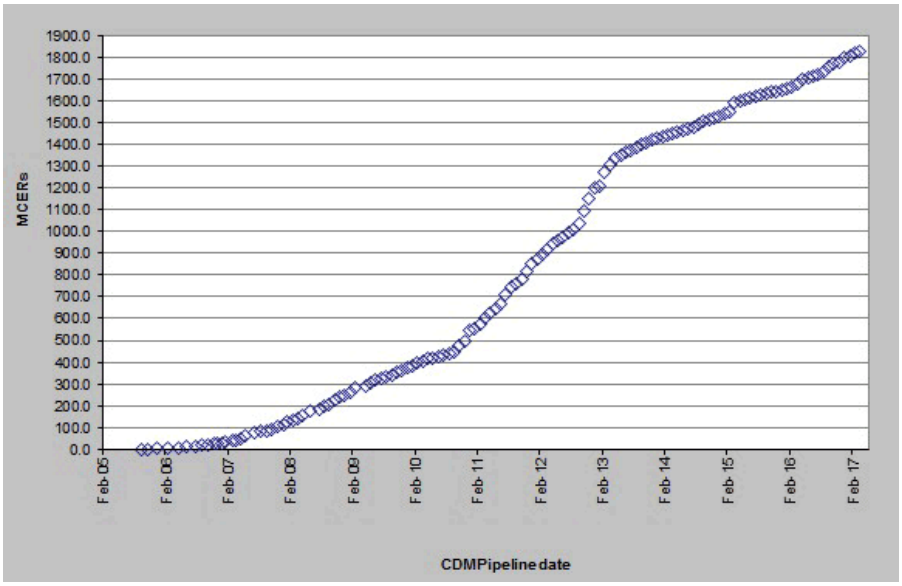

Figure 1: Accumulated issuance of CERs over time, taken from cdm.unfccc.int/index.html

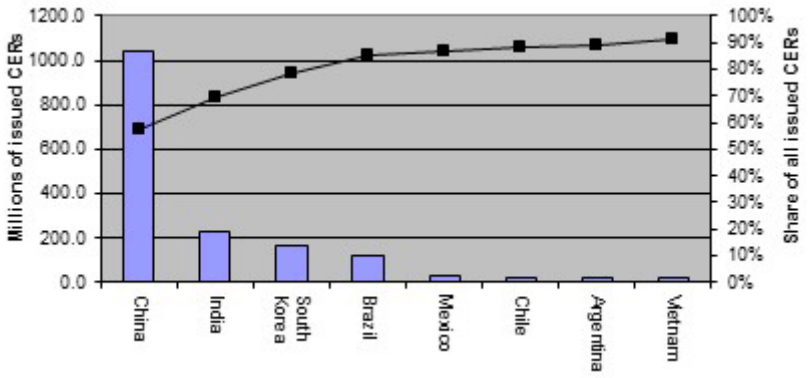

Figure 2: Top Countries by issued CERs, taken from cdm.unfccc.int/index.html

Regarding the buyer countries, the most common practice is a unilateral and coordinated approach to the acquisitions. More specifically, the dispersion of each country's buying levels is illustrated below, namely *Figure 3*.

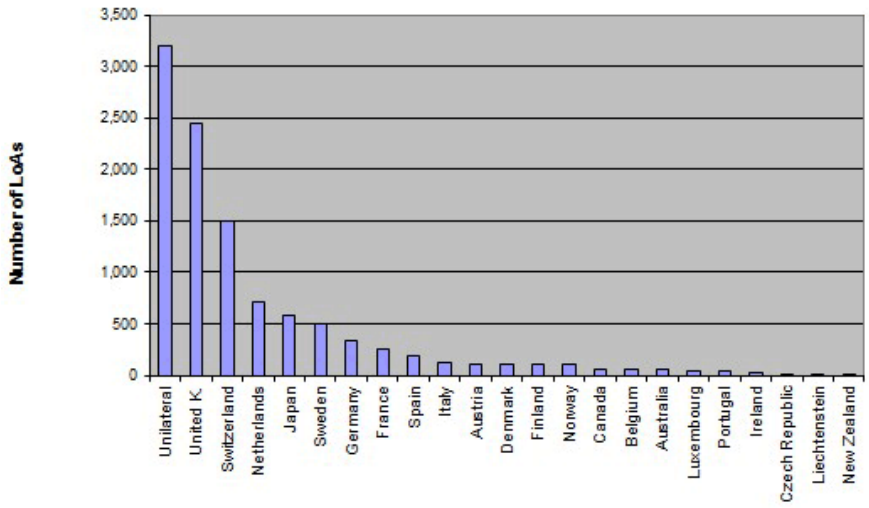

Figure 3: Dispersion of Buyer Countries contributions, taken from cdm.unfccc.int/index.html

The CDM's gravitas is best realized when taking into consideration the fact that CDM is the main line of income for the UNFCCC *Adaptation Fund*, a fund which was established in 2001 as a means of financial support to projects and programs in developing countries that are especially exposed to the detrimental effects of climate change.

2.2 Joint Implementation

Second was the Joint Implementation initiative that introduced the concept of *emission reduction units* (ERUs). An ERU represents a reduction of GHG under the JI mechanism, with each ERU amounting to one ton of CO2 equivalent. What this mechanism does is, it allows a party included in Annex I with a commitment inscribed in Annex B to transfer and/or acquire ERUs in accordance with the proportionate provisions. It should be noted that the aforementioned practice targets mainly carbon sinks.

2.3. Emissions Trading

The third, and the backbone of this paper, mechanism is the notion of *emissions trading*. As noted in Article 17 of the Protocol, the participating countries were given the permission to "participate in emissions trading in order to fulfill their GHG emissions". This method resulted in the division of allowed emissions into *assigned amount units*, or AAUs for short. AAUs could now be stored – e.g. emissions permitted but not "used" – and subsequently traded to countries that had exceeded their corresponding emissions limit. Carbon is therefore now traded like any other commodity ("carbon market").

Consequently this resulted in the first signs of a global carbon market, as a means of assisting participating countries in reaching their mandatory assigned emissions units for the first commitment period under the Kyoto Protocol (2008 – 2012). The European Union Emissions Trading System (EU ETS) was the first and till this day the largest GHG emissions trading scheme in the world. Launched in 2005 as a means

of combating climate change and contributing to EU's climate policy, EU ETS covers more than 11,000 factories in 31 countries – all 28 EU member states in addition to Iceland, Norway and Liechtenstein. The scheme was initiated using a division of several trading periods. More specifically, the first introductory period was spawned on January 2005 and lasted until December 2007, with the second trading period following immediately after from January 2008 to December 2012, coinciding with the end of the first commitment period. The second period is expected to expire on December 2020, however the momentum gained since the launch of the protocol holds a considerable amount of climate change mitigation potential going forward.

3. Function of the European Union's Emissions Trading Scheme

As mentioned in the introduction, the EU ETS and its corresponding practices will be used as the backbone of this paper's position for a truly global emissions trading scheme. *Figure 4* illustrates the functions of the scheme.

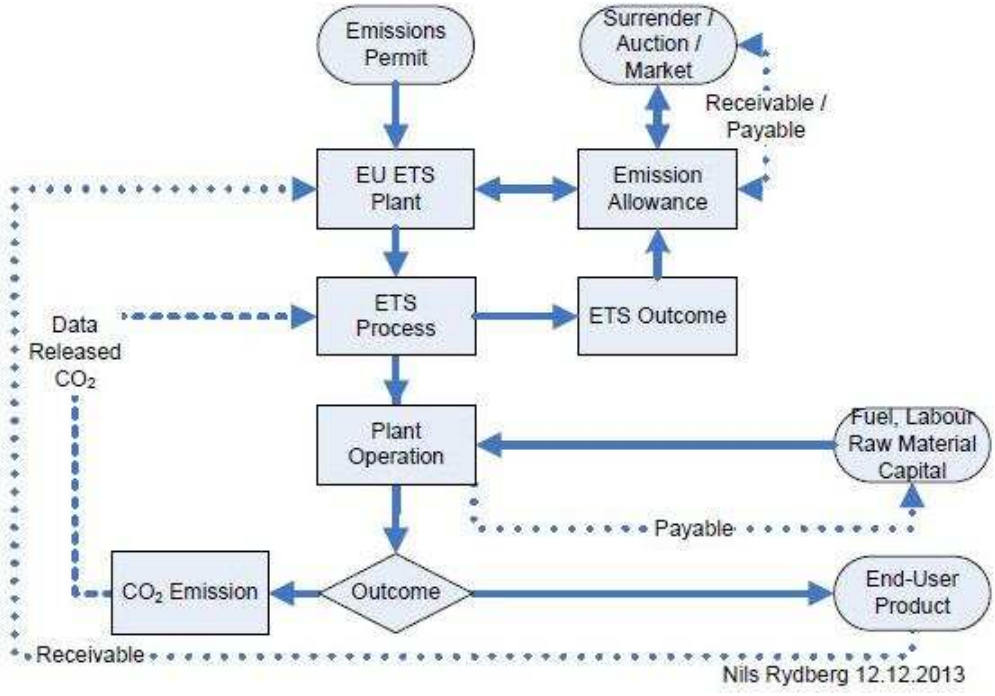

Figure 4: Functions of EU ETS, as depicted by Nils Rydberg, 2013

To put in perspective, the scheme implements a cap-and-trade principle, whereas each participating subject – plant or other production facility – receives an emissions permit with a maximum amount of allowed GHG emissions. It then proceeds to operate accordingly with the CO2 emissions being strictly monitored and any deviation from the allowed limits carefully examined. The main factor however that differentiates this scheme with its predecessors is the ability to auction and trade any "emission surplus" of unused CO2. What this means is that any subject that exceeds the possible emissions limit, is required to purchase *emissions allowances* (EUAs) from other installations.

4. Moving Forward: a Global ETS

Though EU ETS has evidently contributed positively to EU's climate policy, in recent years it suffers from a surplus of EUAs. This resulted in the downfall of publicly traded carbon prices as shown in *Figure 5*, which subsequently led to the discouragement of installations to reduce their GHG emissions and acted as a deterrent for a possible switch from coal to gas for electricity generation.

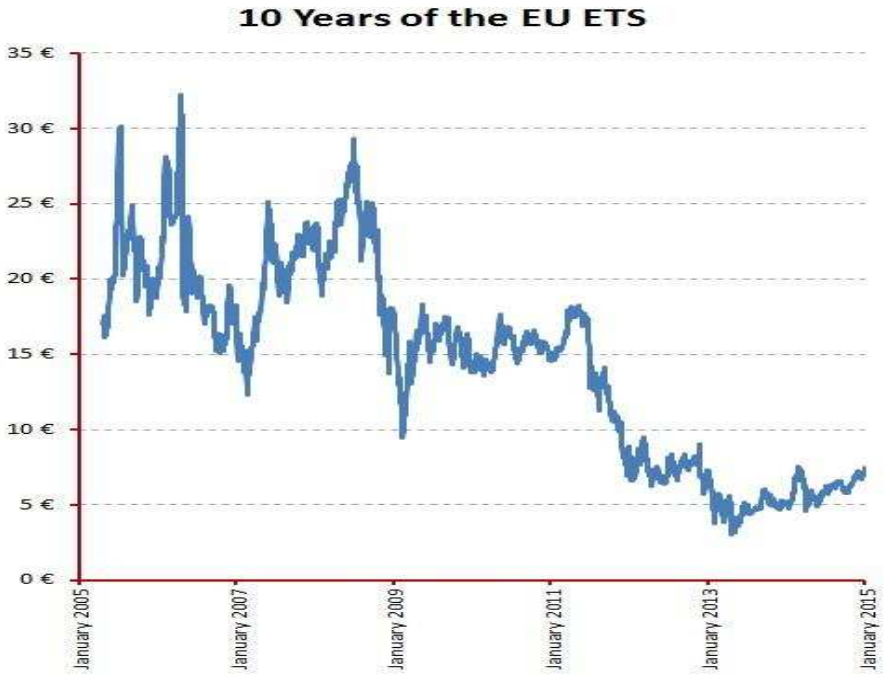

Figure 5: carbon spot prices per metric ton CO2

In order to combat the falling prices and to achieve the goals set, which included the reduction of emissions by 43% compared to 2005, European Union will decrease the available emissions allowances at an annual rate of 2.2% from 2021 onwards, marking a departure from the 1.74% set in the period 2013 to 2020.

However, the most prominent issue with EU ETS is its *operational complexity*. Since the goal of the global community is the mitigation of climate change risks, a global cooperative mechanism requires a certain level of bureaucratic entanglement which is deemed fundamentally unavoidable. Nevertheless, there is room for improvement. The act of increasing the complexity of participating in an emissions trading scheme further increases transaction costs and administrative expenses for the interested subject, especially in the case of small emitters. *Figure 6* illustrates the discrepancy in the transaction costs relative to the size of the emitter, with smaller ones carrying the burden in an evidently more adverse manner[1].

[1] Peter Heindl (2012) 'Transaction Costs and Tradable Permits: Empirical Evidence from the EU Emissions Trading Scheme', Centre for European Economic Research, <http://ftp.zew.de/pub/zew-docs/dp/dp12021.pdf>

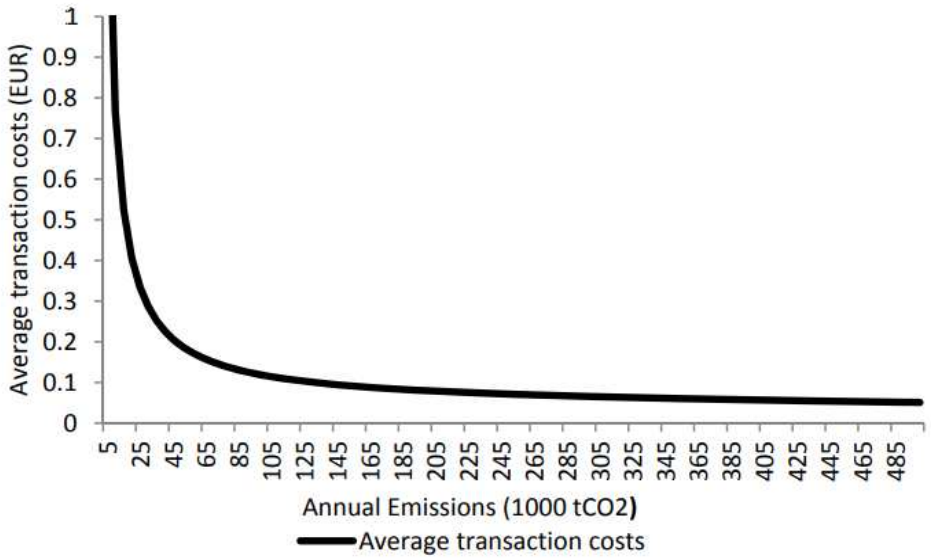

Figure 6: Average transaction costs (fitted values) of firms in the EU ETS

By decreasing the magnitude of the above-mentioned administrative burdens, a Global ETS will function as a definite cost-effective mechanism for the reduction of global emissions by promoting the participation of smaller emitters and simultaneously facilitating an increased presence of larger ones. This can be achieved by:

a) Changing the main determinants of a company's "emissions exposure", to be *actual emissions* instead of the predetermined *installed capacity*, as is the situation currently.

b) Allowing smaller entities to opt out of the mechanism during a trading period. At the moment, EU ETS forbids such actions and instead offers the ability to exit the scheme only once in a ten-year period, resulting in a fundamental market failure.

c) Adjusting operational rules so as to simplify and fairly balance the system. For example, rules that correspond to strictly monitor complex production facilities are essential, though they produce unnecessary complexities to small and medium sized enterprises (SMEs).

d) Amending the user-friendliness of the reporting mechanism. The main criticism by participating members[2] is the lack of clarity and inflexibility of EU ETS's system. Therefore, the mitigation of bureaucratic operations is vital to the sustainability of a Global ETS.

In essence a simpler Global ETS will be a fairer and more efficient ETS. As such, ***simplification*** is a critical component of an integrated global cooperative emissions trading scheme.

[2] Dutch Emissions Authority (2015) 'A simple and effective EU ETS', <https://www.emissieautoriteit.nl/documenten/publicatie/2015/06/23/dutch-report---a-simple-and-effective-eu-ets>

5. The California – Quebec Linkage

California acts as the second case in point, when it comes to modeling a truly Global ETS. The state also implements an expanded cap-and-trade program with the goal being the reversal of GHG emissions to pre-1990 levels by 2020. The state additionally serves as a bridge to the second pillar of this paper, ***cooperation***. California's climate plan entails an extensive set of cooperative policies. In order to achieve the state-wide target of promoting long-term investments in cleaner fuels, California combines its Carbon Fuel Program, Advanced Clean Car Program and Renewables Portfolio Standard in a consolidated effort to alleviate the dangers associated with global warming.

The outcome of the afore-mentioned measures becomes crystal clear by taking a look at some state statistics. More specifically, compared to 2000 California's GDP has risen 26% (2013 values), its population 13%, with GHG emissions following an exactly reverse trend, as shown in *Figure 7*.

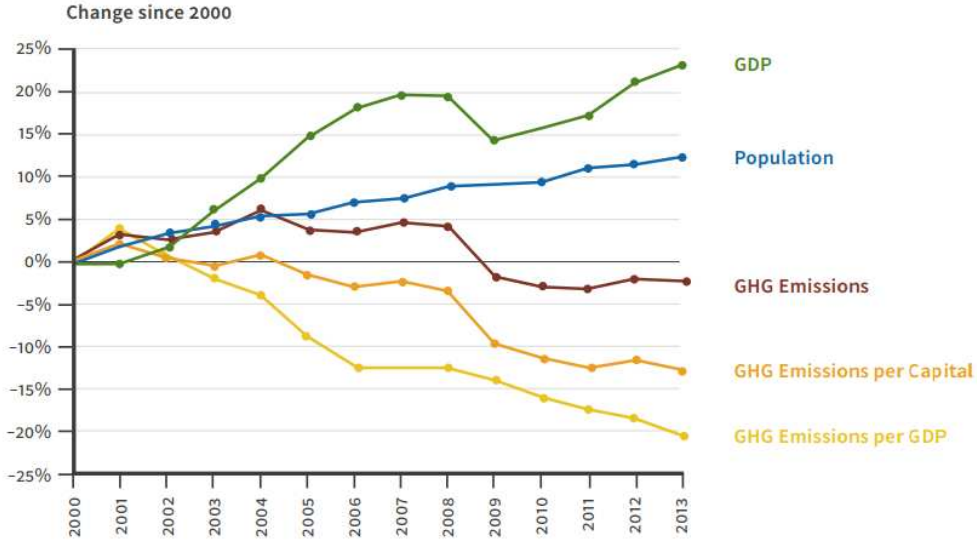

Figure 7: California's GDP, Population & GHG Emissions, % change since 2000. Data taken from: www.arb.ca.gov/cc/inventory/data/graph/graph.html

Where California's Program excels however is its linkage to a Canadian counterpart, namely Quebec's cap-and-trade system. This cooperation between sub-national jurisdictions offers the ground for close examination of possible intricacies and potential upside of such actions in a global scale. Numbers are evident: more emissions have been reduced and market liquidity has increased[3]. In order to achieve this in a global scale however, a series of actions ought to be taken into consideration:

a) *Careful large-scale planning* is a prerequisite for the success of similar future ventures. The first stage of the process includes extensive investigation into possible partnerships. Similarities regarding the size, output levels and sectors involved in

[3] California Environmental Protection Agency, Air Resources Board, <https://www.arb.ca.gov/cc/capandtrade/auction/auction.htm>

existing emissions schemes will be assessed. At the initial stage of the Global ETS, cooperation between sub-national jurisdictions with comparable qualities should be opted in favor of riskier, less secure options so as to safeguard the viability of the project.

b) Constant *consultation* and bidirectional *communication* between relevant authorities. As in the case of the California – Quebec connection, the linkage should be examined and the emissions targets reassessed in a frequent manner, in order to accomplish the highest level of efficiency.

c) *Knowledge sharing* in the form of *data dispersion* and *best practice* techniques. The creation of a global database as a tool for better decision – making will prove to be of utmost value in endeavors by future participating members.

d) *Inter – sectorial cooperation.* The final step is the introduction of carbon trading between sectors in a global scale. By achieving a truly international trading scheme the opportunity to expand allocation of emission permits beyond the strict boundaries of within – sector trading will offer a vast array of environmental and financial benefits.

6. Conclusion

The fact of the matter is that the turbulent times that the global economy is confronting in the dawn of the 21st century have resulted in economic models facing a paradigm shift. Environmental economics is no exception to this realization. Market – driven mechanisms, such as the ones outlined in this paper, have shown positive outcomes throughout the years, though their reevaluation is deemed a necessity. The framework analyzed above constitutes an effort to solidify the established progress made till this day and at the same time act as a base for a future – proof environmental regulation. The globalization of the world's economies should not halt at just financial integration, but instead ought to act as an incentive for the global community to collectively tackle a problem that affects all and a problem that none can overcome alone.

References

California GDP Statistics, Department of Numbers, <http://www.deptofnumbers.com/gdp/california/>

Centre on Energy, Climate and Sustainable Development, <http://cdmpipeline.org/cers.htm>

Clean Development Mechanism, United Nations Framework Convention on Climate Change, <http://http://unfccc.int/kyoto_protocol/mechanisms/clean_development_mechanism/items/2718.php>

Data from United Nations Framework Convention on Climate Change, <*cdm.unfccc.int/index.html*>

Data from California Environmental Protection Agency, <arb.ca.gov/cc/inventory/data/graph/graph.html>

Dutch Emissions Authority (2015) 'A simple and effective EU ETS', <http://www.emissieautoriteit.nl/documenten/publicatie/2015/06/23/dutch-report---asimple-and-effective-eu-ets>

International Emissions Trading, United Nations Framework Convention on Climate Change, <http://unfccc.int/kyoto_protocol/mechanisms/emissions_trading/items/2731.php>

Joint Implementation, United Nations Framework Convention on Climate Change, <http://ji.unfccc.int/index.html>

Nils Rydberg (2013), European Unions' Emissions Trading Scheme Functions

Peter Heindl (2012) 'Transaction Costs and Tradable Permits: Empirical Evidence from the EU Emissions Trading Scheme', Centre for European Economic Research, <http://ftp.zew.de/pub/zew-docs/dp/dp12021.pdf>