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THE EU ETS and Lessons for China

Has the European Union's Emission Trading Scheme failed and what can
China learn from it?

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1. Introduction

“ETS, RIP – The failure to reform Europe’s carbon market will reverberate round the world”

- The Economist, 2013

When the European Union established its Emission Trading Scheme (EU ETS), the expectations were high. It was, and still is, the “the first – and still by far the biggest – international system for trading greenhouse gas emissions allowances” (European Commission, 2014). As The Economist titles in 2003, these expectations seem to not have been met. A major consensus is that due to the financial crisis, the production and therefore greenhouse emission have been reduced, creating an oversupply of CO2 emission allowances (Schiller, 2011) (Spiegel Online, 2013a) (The Economist, 2013) (Walsh, 2013). This oversupply of permits is said to have caused the dramatic decrease in prices of emission allowances. The price of one ton of carbon dioxide fell from over \$25 in June 2008 to about \$3 in May 2013 (Morris, 2013). Very few individual voices contradict this simple explanation and show how the EU ETS has succeeded in capping greenhouse gas emissions and making firms include social damage in their production decision (Morris, 2013) (Worstell, 2012).

The UN states that

“By the 20th century, it was becoming clear that human action had significantly increased the production of these [greenhouse] gases, and the process of ‘global warming’ was accelerating. Today, nearly all scientists agree that we must stop and reverse this process now – or face a devastating cascade of natural disasters that will change life on earth as we know it.” (United Nations, 2014)

This makes trading schemes, such as the EU ETS so very important to reduce greenhouse gas emission. The EU ETS in its unique international character is therefore a milestone for future greenhouse reduction mechanisms and lessons can be drawn for other emission trading schemes. Currently, China is piloting such a trading scheme in five cities and two provinces. Learning from previously implemented schemes is vital for the Chinese trading scheme, as it is potentially the largest greenhouse trading market in the world. The success of the Chinese trading scheme will have a major influence on the future of greenhouse gas trading schemes and the impact they will have on sustainability and environmental protection. The question to be answered in this paper is therefore:

Has the European Union's Emission Trading Scheme failed and what can China learn from it?

In order to attempt a holistic evaluation of the EU ETS and possible lessons for the Chinese trading scheme, this paper will first introduce the EU ETS, then deal with the criticism towards it and explain the problems economically, and finally draw lessons for the Chinese trading scheme.

2. European Trading Scheme

2.1. General Introduction

The EU ETS was established by the European Parliament and the European Council's Directive *establishing a scheme for greenhouse gas emission allowance trading within the Community* (2003). This directive created a "cap-and-trade" system, which covers 45% of total EU emissions (European Commission, 2013). Specifically, it covers emission of carbon dioxide, nitrous oxide and perfluorocarbons and spans over the 28 EU countries plus Iceland, Liechtenstein and Norway.

The purpose of the EU ETS is “to promote reductions of greenhouse gas emissions in a cost-effective and economically efficient manner” (The European Parliament and the Council, 2003).

The EU ETS is divided into four phases. The first phase from 2005 to 2007 focused on the implementation of the basics and was used for “learning by doing” (European Commission, 2013).

The second phase from 2008 to 2012 introduced the EU ETS to three non-EU countries Iceland, Norway, and Liechtenstein and reduced the number of allowances by 6.5 percent. The third phase from 2013 to 2020 brings two major changes. Firstly, it shifts the EU ETS from free allowance allocation to auction. Secondly, it introduces an EU wide cap on emissions, which is reduced by 1.74 percent each year.

A few particular problems of emission permit trading are dealt with explicitly. One of the biggest issues is carbon leakage. It occurs, where firms relocate greenhouse gas emitting processes to locations outside of EU ETS jurisdiction. The EU ETS therefore grants firms in certain industries, which have a high risk of relocation, allowances for free, if they have greenhouse gas emissions below a certain benchmark. The second approach is cooperation with other emission trading schemes. The European Commission and the Australian Government have agreed on such a cooperation, partially linking their emission trading schemes by 2015 and fully integrating their schemes by 2018. Similar negotiations are currently done with the Swiss trading scheme.

Another issue with emission trading schemes is that it might not be socially optimal to spend resources on improving local emissions, as production in developed countries is generally relatively advanced, which makes reducing emissions relatively expensive, assuming a rising marginal cost curve of pollution abatement (Gruber, 2011). To make up for this shortcoming, the

EU ETS allows up to half of all credits to come from such emission reduction projects, as recognized by the Kyoto Protocol's Clean Development Mechanism or Joint Implementation mechanism.

2.2. Economic Rationale

By internalizing the social costs, in this case the right to emit greenhouse gases, the European Union hopes to reduce the total amount of greenhouse gasses emitted, as emission now costs the firms money. They sought a Coasean solution for multiple reasons. Firstly, Social Damage is difficult to measure, which makes a mandated pollution abatement or a tax less accepted by the public. In general, taxes are rarely ever seen positively by society, which forces politicians to make popular decisions instead of informed decisions. Secondly, as it was popular in the nineties, free market solutions were highly favored, which became more disputable with the Financial Crisis of 2008. Thirdly and most importantly, the Kyoto Protocol required the European countries to reduce greenhouse gas emission by a certain amount. This is why the European Union chose a cap-and-trade system. Getting the quantity right was the most important aspect and therefore quantity regulation was the preferred choice (Gruber, 2011). This takes into account the possibility of a bigger deadweight loss, if the mandated pollution abatement is missed. But it is because of priorities and social acceptability that the European Union implemented a trading scheme.

3. Previous Literature

Although some academic literature acknowledges the impact of the Global Economic Crisis and the subsequent oversupply of carbon allowances (Declercq, et al., 2011) (Maydybura & Andrew, 2011), more academics examine other exogenous factors such as weather, fuel prices, and

Marginal Cost curves (Bredin & Muckley, 2010) (Chesney & Taschini, 2008) (Maydybura & Andrew, 2011). This is mainly because they do not see oversupply as a problem. It is an intentional feature of the EU ETS that actors are able to bank emission allowances and even convert Phase II allowances into Phase III allowances. Neuhoff, Schopp, Boyd, Stelmakh and Vasa (2012) show in their discussion paper, how banking of allowances is necessary to reduce speculation and decrease uncertainty about future emission allowance prices and volumes.

Basic economic theory also supports the benefit of inter-temporal consumption of emission allowances. It can be cheaper to wait for the future to implement pollution abatement or save emission allowances in the present for future times, when the volume of allowances is being reduced or the price is expected to rise significantly.

After all, other factors such as temperature and price of fossil fuels (Maydybura & Andrew, 2011) (Chevallier, 2012) are more important in the academic literature than the failure of the EU to limit the market supply of emission allowances.

4. Criticism to the ETS

4.1. Administrative Criticism

There have been several technical difficulties with the EU ETS. Administrating such a novel and multinational trading scheme makes administrative difficulties very likely. Firstly, there have been cases of stolen allowances. One particular case involved a fake bomb threat in order to gain access to computers and then stealing carbon allowances worth seven million euros at the time (Mason, 2011). The second administrative issue concerns the evaluation of carbon offset programs and carbon emissions. Certified assessors are paid for by the corporation under

scrutiny. The dilemma is similar to rating agencies in the financial sectors. If an assessor is paid by the assessed, it is likely to receive a favorable assessment in order to keep the business.

4.2. Oversupply of Emission Allowances

The bigger problem seems to be economic. As mentioned in the introduction, popular media has said the EU ETS to have failed. The main criticism is the incapability to deal with an oversupply of emission allowances. While the volume of emission allowances in the first phase was similar to historic performance of each industry, it was only reduced by 6.25 percent in phase two, after the Economic Crisis hit and the use of energy fell significantly (see Appendix 1).

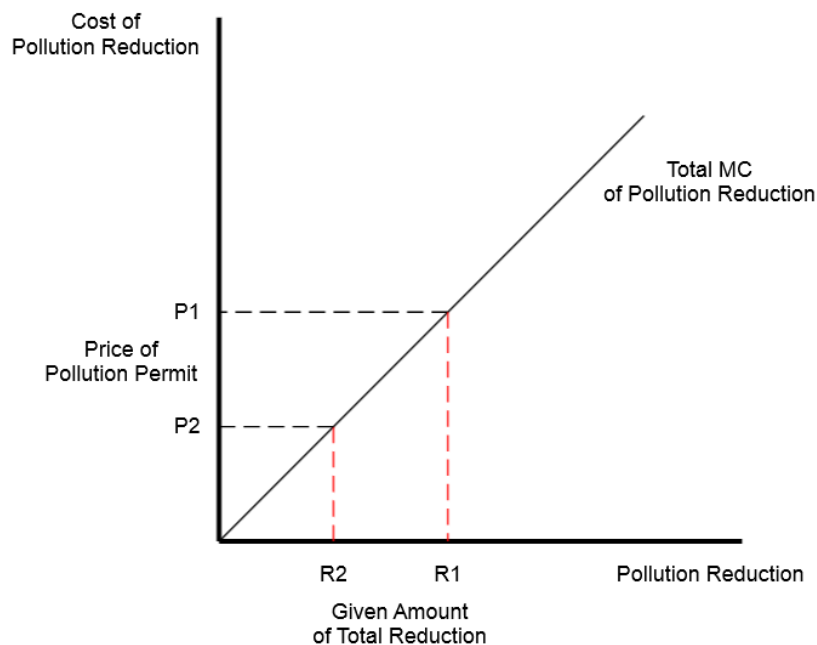


Figure 1 Oversupply of Allowances: R2

As a simple demand supply analysis with perfectly inelastic supply shows, when demand decreases, so do prices. In December of 2013, the EU parliament overcame this deficiency by withholding emission allowances from the market, a technique called ‘back loading’ (Spiegel

Online, 2013b). By reducing the supply of emission allowances, the European Parliament hopes to increase its price.

A problem in evaluating the claim of oversupply in the Allowance market is that it is a political project with the goal to reduce greenhouse gas emissions, as mentioned in the introduction. Emission of greenhouse gasses has actually fallen in the European Union from 5.1 billion CO₂ equivalent in 2005 to 4.5 billion CO₂ equivalent in 2011 (OECD, 2014). In this sense, it is highly debatable to claim that the EU ETS has failed. It might not have had the expected effect, as the circumstances had changed, but it did not have an adverse effect.

Another problem to evaluate the price of emission allowances concerns discounting. As emission allowances can be bought for future use, they will be bought at a discounted present value. This not only incorporates expected inflation, but also uncertainty about the EU ETS' future and the value of future emission allowances. This leaves the nominal price of emission allowances lower than it actually is.

The failure to react and adjust the price of carbon emission allowances might even lead to higher emissions than without trading scheme. A Thomson Reuter's study showed that firms take carbon prices into account (Schiller, 2011). Very low carbon prices therefore encourage firms to pollute more instead of reducing pollution.

Opposing this popular criticism, Tim Worstall (2012) argues that the price of a carbon emission permit does not represent the price of emitting one unit of carbon, but instead represents the price of abating one unit of carbon emission. The price plunge of carbon allowances just shows how cheap it has become to abate one unit of carbon emission. It is not the volume of carbon allowances allocated, but the overestimated or changed Marginal Cost curve of pollution abatement, which causes low prices for carbon allowances.

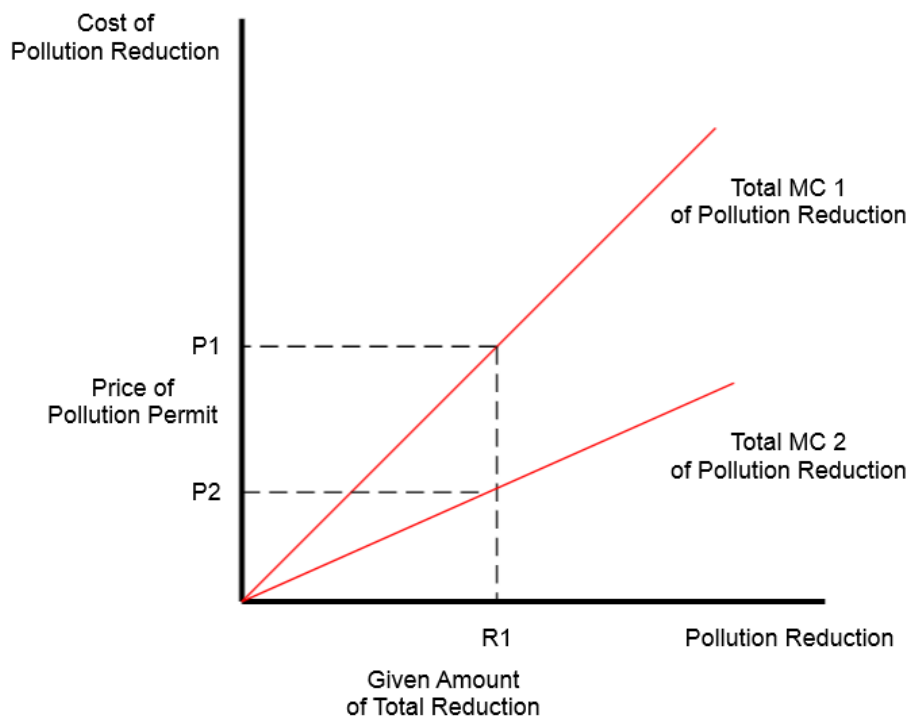


Figure 2 Overestimation of Marginal Cost of Abatement

Looking at the market price of EU's emission allowances can show the market's assessment of the current surplus of allowances.



Figure 3 Price of European Emission Allowances (source: www.eex.com)

On April 16, 2013, the European Parliament rejected a law to withhold 900 million emission allowances. The price of emission allowances consequentially dropped significantly. This could lead us to conclude that the market believes oversupply to be a major problem and the rejection of the EU parliament was a horrible mistake. Later on June 19, 2013, the European Environment, Public Health and Food Safety Committee voted in favor of withholding 900 million emission allowances, which was confirmed by the European parliament in December 2013. The latter two actions do not seem to have any impact on the price of emission allowances. Thus, the market reaction to the European Parliament's rejection appears to have been an overreaction. One could argue that the 900 million emission allowances are just not enough to have a significant impact on the current oversupply. Assuming an accumulated surplus of emission allowances of about 2.8 billion (Neuhoff, et al., 2012), taking 900 million allowances out of the market should be significant enough to have an impact on prices, if volume was the big decisive factor.

5. Discussion

The question remains if the EU ETS is a failure to an extent that popular media makes it out to be. As stated above, a basic problem is how this is to be evaluated. If the EU follows their original plan and keeps reducing the allocation of emission allowances according to plan, it will eventually achieve the significant lower levels of greenhouse gas emission. The discussion on the administrative and organizational issues is economically informative, but insignificant to the results, which will be achieved eventually. When discussing the potential of pollution abatement projects, it is safe to assume that the EU ETS' potential is not fully utilized. The reduction of GDP and subsequent reduction in greenhouse gas emissions imply that the greenhouse emission cap could have been set lower than actually set, since a certain amount of pollution abatement came for free in terms of reduction of GDP.

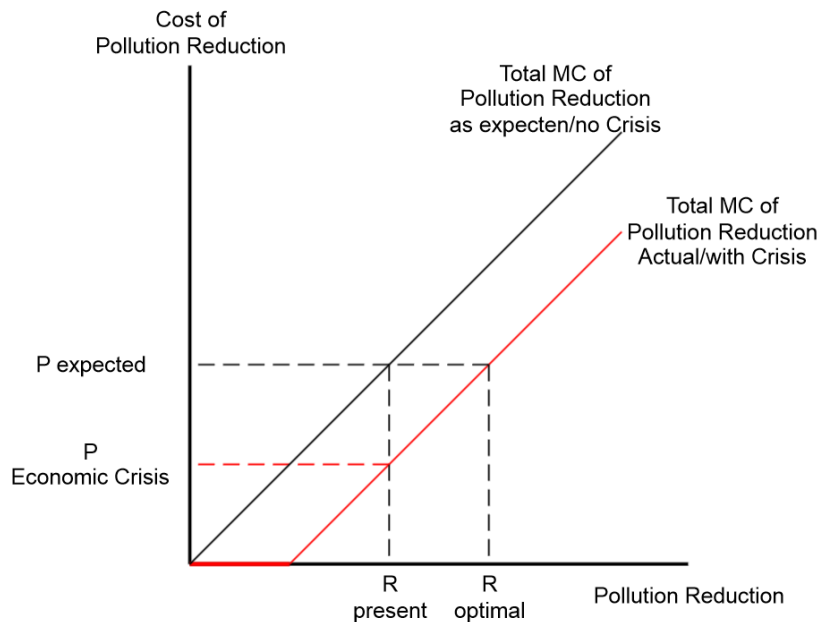


Figure 4 Impact of Economic Crisis on Marginal Cost of Abatement

The purpose of each phases of the EU ETS is often ignored. The first phase of the EU ETS was no more than a test of administrative processes and acceptability of carbon trading. It is therefore

dangerous to point out the non-existence of results after this phase. On the contrary, the EU ETS has seen a massive increase in acceptability since 2005 (Delegation of the European Union to Australia and New Zealand, 2010) (Schiller, 2011). This is a success, which should not be underestimated. It is only in the third stage that the majority of pollution permits is allocated via auction instead of free give-away. In combination with the decision to withhold 900 million emission allowances, the major impact is yet to be seen and the expectations might have just been too high or the original plan not ambitious enough. Additionally, the California emission trading scheme went through similar struggle with low emission allowance prices followed by a solid recovery (Marcacci, 2013). It implies that the EU ETS is still too young to deliver solid results. In the end, it is hard to deny that the global economic crisis of 2008 had an impact on the price of emission allowances. Although it might be possible that the EU has overestimated the marginal cost of pollution abatement, comparison with emission trading schemes around the world suggest that the European price for carbon emissions is too low to be realistic. The California Carbon Allowances generally trade above \$10 per ton of CO₂. A temporary oversupply of emission allowances does not mean a failure of the whole project, though.

6. Lessons for China

6.1. Chinese ETS

The Chinese government implemented carbon trading pilot projects in three cities and one province during 2013. The similarities to the EU ETS are in many ways striking. Firstly, there is still a lot of uncertainty in the market. The price for a carbon allowance is not only volatile over time, but also differs considerably between cities (Gray, 2013). As investors are not yet sure of what future development to expect, the prices vary immensely. Secondly, free allocation of emission

allowances is based on historical performance. Beijing's coal-fired power plants receive "free permits for 2013 equal to 99.9 percent of their average emissions over 2009 to 2012" (Gray, 2013). Thirdly, Chinese Certified Emissions Reductions can be used to offset carbon emission. When the price of emission allowances is too high or limited, a firm can just invest in a project which reduces emission and receive a certificate issued by the central government.

Eventually, the Chinese emission trading scheme will grow to become the biggest of its kind. It will span over a vast area and include a more and more diverse industrial landscape.

6.2. Lessons from the EU ETS

The most important lesson from EU ETS for China is that the Chinese government should keep some kind of flexibility. Limiting the supply of emission permits is a powerful tool for reducing greenhouse gas emissions, but it involves the risk of getting the volume wrong. In economically volatile times, this can be fatal to an emission trading scheme. Especially taking into account the long-run nature of greenhouse gas emission trading projects, one has to be prepared for economic downturns, crisis, and catastrophes on top of more common factors, such as temperature and fuel prices. There should not be a day-to-day flexibility, which might even be subject for industrial pressures, but a limited and controlled amount of adjustment will help the Chinese emission trading scheme to survive and be effective. The Chinese form of government has the advantage of being somewhat authoritarian, which makes adjustments to existing policy easier than adjustments on existing EU policy, where 27 governments have to agree on a decision. This flexibility can make the Chinese emission trading scheme very effective in achieving its goals, although, the Chinese government also has to create a degree of stability. Policy adjustment

should be limited in order to not create uncertainty about future value and availability of emission allowances.

Secondly, free allocation of emission allowances might be politically feasible, but lacks efficiency. When using market forces to deal with emission reduction, why not use market forces in allocating emission allowances. Just because a firm has had high pollution in the past, does not mean, that it needs many emission allowances. It might just be, that even the cheapest pollution abatement was not needed, just because there was absolutely no reason to do so. By auctioning off emission allowances, they are allocated to the firms who will use them most efficiently. Additionally, this helps new industries and firms to receive their fair amount of emission allowances, which would be more difficult under free allocation, because of a lacking historical data.

The third lesson should be to establish a reliable assessment mechanism. The amount each firm historically polluted, presently pollutes, and offsets with some kind of pollution reduction certificate is not easy to assess with scientific clarity. Some kind of safety barrier should exist between assessors and assessed to avoid the rating agency dilemma from the financial industry. Possible solutions to this problem could be a national rating agency or organizing the assessor market in a way where the assessed does not have a say in which assessor it is assessed by.

The fourth lesson concerns emission reduction certificates. It is economically safe to say, that money spent abating pollution in developed regions could be better spent in less developed regions. Therefore investing money in pollution abatement projects in other places instead of one's own factory should be continued. The amount should be restricted though. As these

projects increase the total amount of pollution allowed by a trading scheme, it is counterproductive to a cap-and-trade system. The second issue regarding emission reduction certificates is the geographical and administrative distance to the trading area. This leads to a loss in oversight. By only allowing emission reduction certificates from within China, this problem could be diminished, especially since the Chinese carbon trading schemes are planned to grow to one single Chinese carbon trading scheme over time. Having the same framework in terms of administration and control will decrease the organizational distance between emission abatement projects and the trading area.

Lesson five is that the administrative foundations should be sound. Allocation of emission allowances have to be corruption free and impossible to manipulate. They have to be protected against criminal activity and counterfeiting, just like any other currency.

Lastly, the implementation speed of any project decides what people should expect from it. In the EU ETS, there has been a quick adaptation to the new emission trading scheme. Firms quickly learned to take emission into account and trade according to their needs. The reduction of available permits on the other hand, occurred rather slowly. This led to unfulfilled expectations and even the proclamation of the EU ETS' end. The Chinese government should learn from this and do not be too hesitant in reducing available emission certificates (taking in account current growth). Once the administrative foundation is set, the Chinese government should use its authoritarian power to make a real difference and dictate a challenging greenhouse emission cap. It is always possible to inject emission allowances into the market, while reducing them is by far more expensive and politically more difficult.

7. Conclusion

The EU ETS just was not ambitious enough. One cannot say that it has failed, though. It has achieved the goals, which were set during the design phase of the trading scheme. Additional flexibility would have ensured an even bigger impact on pollution abatement, but assessing the relatively short period, which the EU ETS has been working, first positive results can be seen.

The Chinese government should not be afraid of implementing a comprehensive greenhouse emission trading scheme. Pollution abatement is a long-run project and lessons from previous projects are not yet complete. The Chinese authoritarian form of government will help this form of trading scheme adjust for exogenous events. With a sound administrative foundation, adjustable allocation of emission allowances, auction of allowances, reliable assessment processes, reasonable inclusion of pollution reduction certificates, and challenging goals, it will help to reduce greenhouse gas emissions in the future. China's economic future is still to be seen, but the Chinese emission trading scheme is a first step into the right direction.

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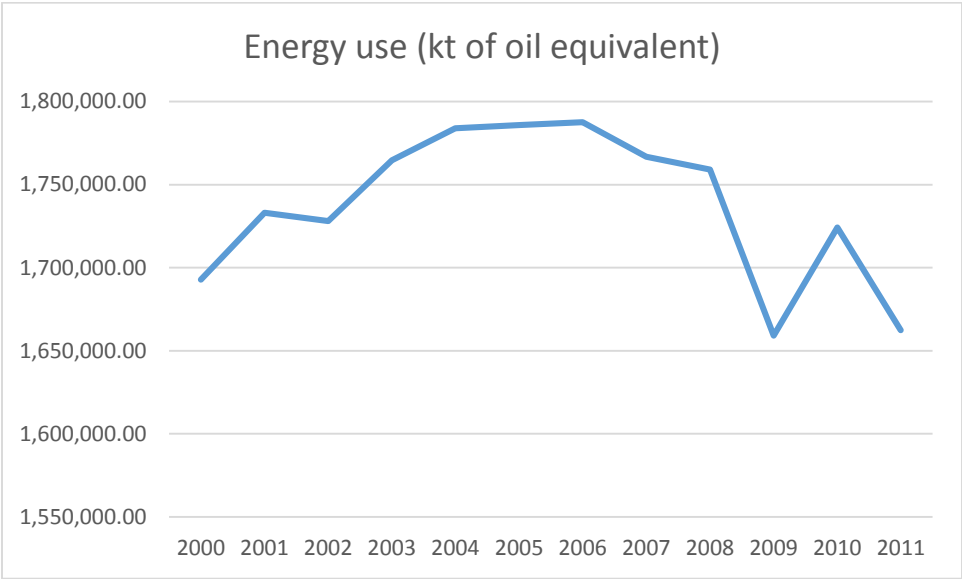
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Appendix

Appendix 1



Source: The World Bank – World Databank (www.databank.worldbank.org)