The Evaluation of Carbon Reduction Commitment

Energy Efficiency Scheme (2010-2013):

the current situation and the ways ahead

by

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Submitted to:

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In partial fulfilment of the requirements for the degree of Master of Sciences

Budapest, Hungary July 2013

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Marianna BUDARAGINA

Acknowledgements

First of all I would like to thank all CEU professors, staff and my fellow students for the great input in my education during this academic year. It was full of discoveries, challenging tasks, exciting achievements and a lot of fun.

I am also very grateful to my supervisor Professor Ruben Mnatsakanian (CEU) for helpful discussions and valuable advice not only in the course of writing this thesis, but throughout the whole academic year.

Many thanks to the Environment and Sustainability team of Schneider Electric, which introduced me to the UK climate change regulations and provided me with all needed advice to produce a meaningful academic paper. I wish to express my enormous gratitude to Ekaterina Tsvetkova for her huge contribution to this research. Thanks a lot to Nic Seuren, Idris Abubakar, Jana Kovandzic, Emese Fulop and all other Schneider guys who in this or another way participated in my research.

Special thanks to Mat Newton and Neil Kilner from Heidelberg Cement Group, who are the most friendly and helpful people one can meet in the UK. Without their priceless comments this thesis would never be what it is.

I would also like to thank all other CRC participants who contributed their time to share their thought and ideas with me.

And last but not lease, I am very much grateful to my parents and Gergely for always being near and supporting me whenever I needed it.

Central European University

ABSTRACT OF THE THESIS submitted by:

Marianna BUDARAGINA for the degree of Master of Sciences and entitled: The Evaluation of Carbon Reduction Commitment Energy Efficiency Scheme (2010-2013): the current situation and the ways ahead.

July 2013

Aiming at an 80% GHG emissions reduction by 2050, the UK has implemented a high number of climate change mitigation policies, among which the Carbon Reduction Commitment Energy Efficiency Scheme (CRC) has become an issue of wide discussion and criticism. Having been implemented in 2010 to incentivise energy efficiency and carbon management improvement in the UK non energy-intensive organisations of the public and private sectors, CRC has already gone through serious changes. This research provides an evaluation of the CRC performance in the first three years of its implementation (2010-2013), aiming to examine its success in terms of energy efficiency improvement. The interviews of the CRC participants and experts, online survey of the participating organisations, analysis of the Schneider Electric statistical data as well as literature review of the latest CRC-related publication have been carried out in the course of this research. Together these methods allowed to demonstrate the functional and instrumental overlap with the other UK climate policies (CCL, Mandatory Carbon Reporting), resulting in redundancy of CRC, and outline scheme's main achievements and drawbacks. The key achievements include increasing the importance of the energy efficiency discussion among participating organisations and further encouraging signing the Climate Change Agreements. The main flaws were defined as high cost and complexity, instrumental problems, misleading incentives with regards to the used fuels and political instability of the scheme implementation. No serious energy efficiency improvement took place as a result of CRC compliance. The concluding part provides brief recommendations for further CRC development, showing the need for a greater accent on the environmental implications of the scheme and merging CRC with the other climate change policies in order to address the problem of complexity and high administrative cost.

Keywords: Carbon Reduction Commitment scheme, climate change mitigation, UK, energy efficiency, carbon management, carbon taxation

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CCA	Climate Change Agreement
ССС	Climate Change Committee
CO ₂ e	CO ₂ -equivalent
CRC EES	Carbon Reduction Commitment Energy Efficiency Scheme
CTS	Carbon Trust Standard
DECC	Department on Energy and Climate Change
DEFRA	Department on Environment, Food and Rural Affairs
EA	Environment Agency
EU	European Union
EU ETS	European Union Emissions Trading Scheme
EUA	European Union Allowance
FIT	Feed-in Tariff
GHG	Greenhouse gas
нн	Half-hourly
MCR	Mandatory Carbon Reporting
NHH	Non-half-hourly
IPPC	Integrated Pollution Prevention and Control
PLT	Performance League Table
ROC	Renewable Obligation Certificate
UK	United Kingdom

1.1. Background and motivation

Every day climate change is becoming a more alarming issue, making governments, NGOs, and the private sector all over the world take steps to address this problem. From the global perspective, the European Union is known to be the most successful and radical in terms of its environmental programmes, including those of climate change mitigation (Eckersley 2004). Even among those, the United Kingdom persistently intends to be a leader (DECC n.d.), implementing numerous climate change mitigation policies and programmes, targeting to achieve a minimum of 80% GHG emissions reduction by 2050 compared to the level of 1990 (AEA 2011).

One of the recently introduced UK policies, the Carbon Reduction Commitment Energy Efficiency Scheme (CRC), which was implemented in 2010, became an issue of wide interest and heavy criticism. Aimed at addressing energy efficiency and carbon management of the UK non energy-intensive organisations on the public and private sectors, it was met with strong opposition from the participants due to its complexity and high administrative cost. As a result, in the first three years of the implementation, CRC has already gone through multiple changes (EA 2013).

Taking into consideration that the scheme came into force only in 2010, there is a very limited number of academic and professional publications with relation to it. These publications are mostly produced by the UK government (Environment Agency, Climate Change Committee, Department on Energy and Climate Change, etc.) and a few other organisations either commissioned by the government (KPMG, AEA, Carbon Trust, etc.) or not (Carbon Masters, Carbon Retirement, etc.). Yet, most of them do not provide an overall critical assessment of the scheme and are usually concentrated on the particular aspect of the CRC compliance. In addition to this, as the scheme is constantly changing, no up-to-date assessment of the simplification process is currently available.

1.2. Aim and objectives

In order to fill the abovementioned gap, this research was designed to provide an assessment of the Carbon Reduction Commitment scheme, the changes it went through, its regulatory function in the scope of the UK climate change action, its achievements and flaws as well as consider certain ways to improve the scheme.

The aim of this research is:

To evaluate Carbon Reduction Commitment Energy Efficiency Scheme as a climate change mitigation policy and to see if it has caused improvement of the energy efficiency during the first three years of implementation.

To reach this aim, the following objectives have been outlined:

- to analyse the policy instruments used by CRC EES as climate change mitigation tools;
- to evaluate the modifications which CRC faced in the first three years of its implementation;
- to compare the CRC scheme in its present form to the one it had upon its implementation;
- to examine the interface of CRC with the other climate change policies and regulation applicable to the UK industrial and non-residential sector;
- to identify the main achievements and drawbacks of the CRC scheme;
- to analyse the opinion of CRC participants and experts on the CRC compliance procedure and scheme modifications;
- to examine the change of the CRC reported emissions and the implementation of the energy efficiency measures among the CRC participants in the period of CRC compliance;
- to evaluate the main options of CRC development and give recommendation on how to improve the CRC scheme.

1.3. Methodology

An internship with the Environment and Sustainability Services Department of Schneider Electric was undertaken as a part of the research process. Working at the position of CRC Analyst Intern became vital for the in-depth understanding of the CRC compliance process. This internship has also provided daily communication with the CRC participants and experts.

Multiple methods were used in this research, namely:

1) Literature review. The analysis of the CRC related publications mentioned in the 1.1. Background and Motivation subsection, UK climate change related legislation, climate change related academic literature took place. Available statistical data of the UK government was collected from the relevant websites.

2) Interviews. Four personal interviews with CRC experts from Schneider Electric Sustainability team were held. The email and Skype communication with the Head of Sustainable Strategy & Consulting also took place (see Table 1.1.). The outline of the main interview questions can be found in Appendix 2, yet the follow-up questions turned out to be more useful for the purposes of this research.

Interviewee	Position	Communication	Place	Date
		type		
Ekaterina Tsvetkova	Business Manager,	Formal Interview	Budapest	July 3, 2013
	Environment and			
	Sustainability Department			
Nicola Seuren	Head of Sustainable	Email	-	June 5, 2013
	Strategy & Consulting	communication		
	(EMEA)			
Idris Abubakar	CRC Analyst	Formal Interview	Budapest	June 3, 2013
Emese Fulop	CRC Analyst	Formal Interview	Budapest	May 27, 2013
Jana Kovandzic	CRC Analyst	Formal Interview	Budapest	June 20, 2013

Table. 1.1. Interviewed experts from Schneider Electric

Two personal interviews with the participants were also conducted. One of the interviewed participants represented a large cement-producing holding (Heidelberg Cement Group – Hanson UK). The other participating organisation which decided to remain unnamed represented a large UK bank. Further in this research this participant will be referred to as Anonymous Participant.

3) Survey. An online survey of the CRC participants which are clients of Schneider Electric Environmental Services, was carried out in June 2013. The questions of the survey were developed with help of Schneider Electric experts. Out of 202 sent requests, 47 (23,2%) got responses with detailed explanations in the comment box provided after each question (see Appendix 1). The sectorial breakdown is not visible in the results of the survey, as it was aimed at analysing the generalised opinion of CRC participants. Still the comments revealed numerous industry-specific differences.

4) Sample group of CRC participants. In order to evaluate the change of the CRC reportable emissions in the third CRC year (2012/2013), a sample group of the participants was selected from the internal database of Schneider Electric. The reports for the reporting year 2012-2013 already submitted to the Environment Agency have been used for the projection. This analysis appears to be valuable, as after the abolishment of the Performance League Tables the detailed information on the CRC emissions will no longer be easily accessible.

The sample group included 108 CRC participants and accounted for about 4% of the overall CRC emissions (1.25 GtCO₂ in the footprint year). The sectorial proportion of the sample group was preserved as can be seen in Fig 1.1.



Fig. 1.1. The CRC-covered emissions in the qualification year by sub-sector Data source: CCC (2010)

In 2011/2012 the emissions of all CRC participants, according to the Performance League Tables, have decreased by 7.8% compared to the footprint year, dropping from 61.1 to 56.2 GtCO₂. The relative emissions reduction in the sample group was equal to 7.7%, showing just a 0.1% difference with the total population. This allows to assume that the selected CRC participants can be considered as a representative sample group for the analysis of the changes and patterns that took place in the third CRC year. A higher number of the companies would be beneficial for the analysis and projections, yet for the purpose of this research it was limited to the information kindly provided by Schneider Electric.

Limitations of the research

One of the limitations of this research is that the opinion of participants might be overemphasised in the overall scheme analysis, as the government's position is out of the scope of this research. Unfortunately, neither the representatives of the Environment Agency, nor the Department of Energy and Climate Change agreed to participate in this research, explaining it by the information available on their websites. Still the number of the governmental publications on various aspects of CRC scheme could partly compensate for this.

1.4. Thesis structure

This thesis consists of five chapters, which are aimed at providing a consistent analysis of the CRC scheme. They will be presented as follows.

Chapter 1. Introduction

 provides introduction to the research; explains motivation and background, aims and objectives, methodology and structure of this thesis.

Chapter 2. Carbon Reduction Commitment scheme overview

- includes a brief overview of the CRC scheme, the history of its implementation and development;
- analyses of each policy tool used by CRC during the first three years.

Chapter 3. CRC as a part of the UK climate change action

- presents CRC in the scope of other climate change policies applicable to the UK nondomestic sector;
- demonstrates the regulatory gap which CRC was supposed to fill as well as sectorial and instrumental overlap.

Chapter 4. Achievements and drawbacks of the Carbon Reduction Commitment scheme

- examines the key achievements of the CRC scheme as well as the main problems of its design and implementation, based on the opinion of the CRC participants and experts;
- briefly analyses the CRC reported emissions change and demonstrates sectorial differences.

Chapter 5. Recommendations and conclusions

- offers recommendations on how to increase the acceptability of the scheme by the participants through emphasising the environmental aspects of the scheme;
- evaluates the ways of the future CRC development;
- provides brief conclusions to the research.

Chapter 2. Carbon Reduction Commitment scheme overview

2.1. Carbon Reduction Commitment Energy Efficiency Scheme in brief

2.1.1. CRC policy design and compliance procedure

The Carbon Reduction Commitment Energy Efficiency Scheme (CRC EES or CRC for short) is one of the UK-wide policies aimed at reduction of the CO₂e emissions and mitigation of climate change. The first consultations on the introduction of this scheme began in 2007, whereas it became a fully functioning mandatory scheme in 2010, announced by the CRC Energy Efficiency Scheme Order (Court at Buckingham Palace 2010). The CRC scheme is required under Climate Change Act 2008, which was approved to ensure meeting the UK target of an 80% GHG emissions reduction by 2050 compared to 1990 level (AEA 2011). CRC is currently in its first Phase, which takes place from 2010 to 2014.

CRC covers large non-energy intensive companies, both public and private. Together these organisations account for about 10% of the total UK CO₂e emissions, which equals 55MtCO₂ (EA 2013). The key principle of the scheme is to price carbon through the requirement to buy and surrender government allowances according to the amount of emitted CO₂. This scheme aims to address the energy efficiency of the companies not yet covered by other climate change policies such as Climate Change Agreements (CCAs) or European Union Emissions Trading Scheme (EU ETS). The interface of CRC with the other climate change regulations applicable to the UK non-domestic sector will be scrutinized in the next chapter.

CRC policy is determined by the Coalition Government led by the Department on Energy and Climate Change (DECC). Currently the CRC scheme is administrated by the UK Environment Agency, which is responsible for registration of the participants and selling the allowances, while the audit and enforcement actions are the responsibility of the Regulators: the Environment Agency (for England), Natural Resources Wales, the Scottish Environment Protection Agency and Northern Ireland Environment Agency (EA 2013). The model of CRC administration is demonstrated in Fig. 2.1.



Fig. 2.1. CRC administration Data source: EA (2012)

CRC is delivered in phases with the compliance years starting on the 1st of April and ending on the 31st of March. Overall CRC is supposed to be implemented in three phases. The first phase, which is called Introductory Phase (2010-2014), is of 4 years and is the shortest. The next two phases will have a two years' overlap with the preceding phase. During this overlap, qualification (one year) and registration (one year) procedures for the upcoming phase should be held (EA 2010). For a better understanding of the CRC implementation timeline, see Fig. 2.2.



Fig. 2.2. CRC timeline (first two phases) Data source: EA (2010)

The basic steps to be taken in the course of CRC compliance include qualification, registration, reporting, allowances purchase and their surrendering. Emissions reporting, allowances purchase and surrendering should occur on the annual basis.

Qualification and registration

The qualification begins two years prior to the CRC Phase and lasts for one year. During the qualification year of the Introductory Phase, UK companies had to check if they needed to participate in CRC based on both of the following criteria:

1) if they have at least one half-hourly (HH) electricity meter or non-half-hourly (NHH) meter with installed Automatic Meter Reading (AMR)¹ system;

2) if their yearly consumption through all HH meters and NHH ones with installed AMRs is ≥6000 MW.

¹ Automatic Meter Reading System (AMR) - technology which allows to measure power supply automatically and send the consumption and meter status data to the supplier for analysis and billing purposes. (Sheikh and Sharma 2011)

Now, however, these criteria apply to HH supplied electricity only. Having HH meters, which are more accurate and reliable than non half hourly ones since they measure electricity consumption every 30 minutes and can be read remotely, was chosen as the main qualification criterion. The key argument for this was the difference in consumption associated with the energy meter measurement types (half-hourly and non-half-hourly). HH profile class is mandatory for the meter points with the peak load of more than 100 kWh and, therefore, are used by businesses with high energy consumption (Elexon 2008). The requirement of mandatory HH metering was introduced in 2006 to provide an accurate measurement of the electricity consumption for large energy consumers and encourage more responsible energy measurement as well as more accurate energy billing. Taking this into consideration, choosing HH profile class as the main criterion intends to avoid unnecessary expenses associated with qualification assessment for smaller energy consumers.

Nevertheless, having a HH meter alone does not make an organization a CRC participant. If an organisation has consumed less than 6000 MW of half hourly measured electricity in the qualification year, it does not have to get registered with the CRC scheme. Still, information disclosure after the qualification year was required from these organisations in the Introductory Phase (EA 2010). Now, however, the need to disclose this data is cancelled. In addition to the qualified companies, all UK Government departments as well as Devolved Administrations are obliged to participate regardless of their energy consumption.

Any organisation that qualified for the CRC scheme is obliged to participate and will be fined in case it fails to do so.

Further participation and simplifications

The first year of the First Phase was a footprint year. During this year CRC participants were obliged to measure their emissions, but purchasing allowances was not required. Footprint energy consumption formed a baseline for the assessment of the energy efficiency efforts during the phase (EA 2010). Nevertheless, during the simplification process, the footprinting

was cancelled from the second phase as the energy efficiency and carbon management improvement will not be measured in the framework of the CRC scheme anymore.

When CRC was introduced, emissions originating from 29 fuels had to be accounted for. Since it resulted in a complicated procedure of information gathering and reporting, participants could apply the so-called 90% rule. It suggested that all participants had to report on their total consumption in the footprint year, but to purchase allowances only to cover the selected 90% of their energy supplies. From the second year onwards participants could report only on the selected supplies (EA 2010). This enabled participating organisations to ease the burden of reporting on the hardest 10%.

However, it did not make the scheme easy enough. After its implementation, CRC faced heavy criticism, as it still was very expensive to administrate and comply with. As a result, the UK Environment Agency introduced a number of simplifications related to CRC administration. Most of them will apply only to Phase II, while certain simplifications took effect during the last two years of the first phase (2012/2013 and 2013/2014).

As a part of the simplifications, which came into effect from 2012-2013, reporting on 29 fuels was changed to only two (electricity and natural gas). Together with this change, the 90% rule was abolished, which means that now reporting and allowances purchase should cover 100% of the consumption through these two fuels. The financial implications of this change for the compliant companies as well as the Environment Agency will be discussed in Chapter 4. In addition to that, only natural gas used for heating is now reportable under CRC and only from significant meter points (≥72300 kWh of yearly consumption). If natural gas consumption is less than 2% of the electricity consumption, it should be excluded from the CRC reporting obligations.

Further CRC participation requires annual purchase of the government allowances for each emitted tonne of CO_2e according to the submitted report. Purchased emissions have to be surrendered to the government.

In order to ensure the proper compliance level among CRC participants, their reports are being audited. Each participant has to go through the audit procedure only once per phase (EA 2013).

2.1.2. CRC instruments

Even though now the mechanism seems to be very simple, initially it included more policy instruments, which were abolished in 2011 and 2012 during the simplification processes. These instruments included allowances trading, revenue recycling and Performance League Table publishing.

Allowances trading

According to the first CRC Guidance (EA 2010), the mechanism of allowances purchase was supposed to be the following. At the beginning of each reporting year (except the footprint year) CRC participants would have been able to purchase allowances from the government. At the end of the year, when reporting on the emissions, these allowances would have been surrendered to cover the amount of the reported CO₂. In case of the lack of previously bought allowances, organisations would have been able to purchase them from the other participants, which had them in excess. If it was not possible, the allowances could have been purchased through a "safety valve" mechanism. This means that the CRC Administrator would have needed to buy them from the EU ETS Registry and convert them into CRC emissions allowances. In this case the cost would have been higher than the initial government price as the allowances would have been bought at the EU ETS market price and would have also included broker and handling fees. The requirement to purchase allowances at the beginning of the reporting year was aimed to encourage more accurate forecasting of the energy use (EA 2010).

In addition to this, the price of CRC allowances had to become subject to carbon market price fluctuations starting from the second phase through a link to the EU ETS.

CEU eTD Collection

During the simplification of the scheme, however, allowances trading was cancelled. Currently, according to the new rules, participants only have to purchase allowances for the reported emissions at the end of the year at the fixed priced without any restrictions or caps set by the government. The price of one tCO_2e in the first phase is £12 (EA 2013). The need to forecast the energy consumption has disappeared as well.

Revenue Recycling

The revenue raised from the allowances sale was designed to be redistributed among the participants. The planned normal CRC turnover of funds and allowances is demonstrated in Fig. 2.3.



Fig. 2.3 CRC initially planned cycle Source: EA 2010

At the end of the CRC financial cycle, companies performing better were supposed to receive bonuses, while those that performed worse had to face financial losses. Therefore, originally CRC was introduced as a fiscally neutral climate change instrument (EA 2010), but the planned revenue recycling never took place. After having received the revenue from the first selling of allowances, DECC (2010) announced that these funds will be used "to support the public finances (including spending on the environment), rather than recycled to participants". Revenue recycling had to be based on participants' ranking in the Performance League Table.

Performance League Table (PLT)

According to the initial design, the government was supposed to publish a Performance League Table (PLT) at the end of each reporting year to show the results of the companies' efforts to reduce their emissions. However, it happened only twice: after the footprint and the first compliance year. As revenue recycling did not occur, PLT had only reputational influence and did not affect the CRC related cost for participating organisations. PLT appeared in the form of the list, ranking participants according to their energy efficiency and carbon management improvement.

In the effort to make the comparison of CRC performance objective, a number of factors were considered. As EA (n.d.) explains, the PLT raking was calculated based on the following criteria:

1) Early Action Metric

This criterion includes the percentage of the participants' emissions that comes from the meter points with voluntary-installed automatic metering and the percentage of the CRC emissions covered by one of the seven carbon management scheme approved by the EA, with Carbon Trust Standard (STD)² being the most popular.

2) Absolute Metric

The second criterion compares the annual emissions against the preceding 5-year average and therefore measures the absolute emissions change.

3) Growth Metric

In many cases the increase/reduction of the company's emissions depends not on the carbon management of the company, but rather on its economic activities. To take this into consideration, the Growth Metric criterion assesses the energy efficiency per unit of turnover. This means that even with growing absolute emissions a company can be rewarded according to this method, if its turnover is growing at a faster pace.

² Carbon Trust Standards is an evaluation method developed by the Carbon Trust organisation to certify the reduction of emissions by UK companies. It evaluates the absolute emission reduction compared to the footprint year and the quality of the company's carbon management. It is based on the GHG Protocol methodology and government-calculated emissions factors. It has only reputational influence (Carbon Trust n.d. (a)).

The influence of each of these metrics on the final ranking was unequal with Early Action Metric fully defining the PLT position in the first year, but not influencing ranking from year 3 onwards.

Nevertheless, PLT was abolished due to the simplifications after the 2011-2012 compliance year (EA 2013). The purpose of PLT was to demonstrate the achievements of the CRC participants in implementation of the energy efficiency measures and emission reduction compared to the footprint year. The greater was the emission abatement, the higher line the organisation was given in the PLT. PLT was based on the reports submitted by the participants. This information was supposed to be useful not only for the responsible choices of investors, but also for further "revenue recycling" (EA 2010).

In a nutshell, the CRC EES has been changed significantly from its original design to the current state with more changes expected in the upcoming phases. During these transformations CRC lost a number of policy instruments that had to create additional incentives for the participants to reduce emissions, but on the other hand, numerous changes are designed to have positive implications for the participating organisations as they facilitate CRC compliance.

2.2. The CRC as a climate change mitigation instrument

The CRC in the form which it had upon its implementation was designed as a complex climate change mitigation policy. It incorporated a number of instruments creating direct and indirect incentives for emissions reduction. These instruments are discussed below.

2.2.1. Charging carbon emissions

The key instrument used by the CRC scheme is charging carbon emission through assigning a price to the CO₂ emissions unit. According to the guidance issued by the Environment Agency (EA 2013), it is supposed to create a direct incentive for the participating organisations to reduce their emissions originating from energy use.

By making the companies pay a fixed fee (£12 in the first Phase) for every emitted tCO₂, the government creates an economic mechanism which is similar to carbon taxation. It is designed to encourage further improvements of energy efficiency and switching to less polluting sources of energy, based on a simple logic with regards to higher energy cost. Even though CRC is called "a scheme" and the carbon price is not included in the energy bill, its principle is very alike to that of carbon taxation.

General efficiency of carbon taxation policies is questionable. On one hand, carbon and energy taxation may be attractive since it provides incentives for investments in cleaner sources of energy, and is less vulnerable to regulatory capture compared to command regulation (Richardson and Chanwai 2003). Moreover, it generates revenue which can be recycled for environmental purposes. In addition to this, if the introduction of environmental tax is followed by the social and labour taxes, it may provoke job growth and higher investment levels.

These advantages, however, might be largely outweighed by the limitations of these economic instruments such as uncertain effect (as opposed to the environmental regulations), need for constant revision of the tax rates or disproportional effect on the different social groups (Richardson and Chanwai 2003). Disproportional effect implies that carbon taxation may escalate the equity problem in the society since the carbon taxation is regressive (IRL 2009). Therefore, carbon tax can be beneficial only if it is a part of a consistent policy package that includes increase of the social benefits combined with reduction of the income taxes.

The major concern, however, is their effect on the international competitiveness. While numerous countries included carbon pricing either in the form of taxes or tradable permits in their climate change mitigation policies encouraged by the Stern report (Stern 2006), the

practice of its implementation does not demonstrate serious results. In fact, the considerations of international competitiveness play a much greater role in climate change policy making, which results in numerous exemptions after the introduction of the tax. This is often mentioned as a main obstacle for proper carbon taxation (Metz 2009; Hoel 2010; Richardson and Charwai 2003).

Another problem is related to the inability of governments to keep up the tax up with the optimal carbon tax path, which is rising due to the increasing discounted value of the future marginal costs of today's emissions (Hoel and Kverndokk 1996). The point about the rising tax is, however, debatable. While many authors claim that the tax should rise over time (Greaker and Pade 2009; Hoel 2010), others argue that as the carbon tax is able to influence R&D development, there is more sense in postponing abatement for the future, when the technological development allows doing it at a lower cost (Glouder and Mathai 2000). In addition to the criticism of rising carbon taxes, if carbon price is rising fast enough, it may provoke an effect called "green paradox" meaning that in the short run emissions will increase at an even faster pace because fossil fuels owners might fear to have to pay more if they delay the extraction (Hoel 2010).

As a result, carbon taxation might seem to be quite efficient theoretically, while in real life there are a number of obstacles preventing this instrument from proper functioning.

2.2.2. Accurate energy consumption measurement and reporting

The way in which CRC charges energy use is tightly related to the requirement of the accurate energy use measurement and reporting which is designed to make the companies aware of their energy consumption. Over a number of years this reporting can help companies to understand the dynamics of their energy consumption (EA 2013). Moreover, the requirement to report on financial turnover of the organisation and emissions per unit of turnover was giving a more reasonable measure of the energy efficiency than a simple trend of the CO₂ emissions reduction/increase. However, after cancelation of the PLTs, disclosure of turnover and emissions per unit of turnover became optional and therefore disappeared from the reports of many companies.

In addition to this, research performed for Home Energy Rating systems in the US (Stein and Meier 2000) revealed, that the energy used for heating can be forecasted and estimated with lower accuracy in the mild climate zones than in those with hard winters. As the UK is characterized predominantly by mild climatic conditions, this assumption suggests relatively low precision of the energy use estimations for heating purposes (the most considerable part of the CRC energy use [EA 2013]). In light of this, the accurate energy consumption measurement through installing AMRs and reporting consumer reads³ to the energy supplier turns out to be highly important for the UK companies.

2.2.3. Carbon pricing and allowances trading

An important part of the CRC original design was allowances trading, an instrumental continuation of the carbon pricing discussed above.

Trading of the emissions allowances has recently become a popular and controversial climate change policy tool. The underlying logic of this approach is that the whole problem of the climate change occurred because of market failure (Stern 2006; Das and Das 2012). The fact that carbon was not priced at its "real value" resulted in the wrong decisionmaking. Creating a carbon market is supposed to solve this problem, as the solution should be where the problem comes from. This logic leads to assigning a value to the "carbon unit", which is a similar to carbon taxation mechanism. However, in this case this unit can later be traded as any other commodity. This approach allowed to consider the problem of the anthropogenic caused climate change from the perspective of the neoliberal economics and provoked a wave of enthusiasm in many countries since a market appears to be a much

³ For the energy meter points which do not send the consumption figures automatically, the reads can be manually taken either by the consumer, or the supplier. These reads will be considered as 'actual' consumption measurement. If the read was not taken, supplier or consumer estimates the supply/consumption and in this case it is referred to as 'estimated'. CRC is encouraging participants to take manual reads and report them to the supplier by using a 10% uplift for the energy supply, if more that 183 days of the year is estimated (EA 2013).

more acceptable social concept than simple GHG emissions restriction or carbon taxation policies (Bond 2013).

The international carbon trade is more widely discussed in the academic literature than the domestic one, yet its main principles are applicable to the smaller-scale carbon markets.

One of the most commonly mentioned effects of the international carbon trade introduction is that it gave participating countries certain freedom. Allowing countries to decide if they are willing to reduce GHG emissions domestically or trade them for an equivalent reduction in other countries was aimed at achieving the global balance rather than a number of domestic goals (Gilbertson and Reyes 2009). However, this idea does not always work as it is supposed to, since the existing carbon trading mechanisms also create numerous loopholes.

Some of these loopholes appear occasionally due to the fluctuations of the carbon market and its dependence on the economic performance, which does not go in line with relatively stable carbon caps. An example of such "occasional" breaches in the carbon market control can be the situation that arose in post-Soviet countries, where the breakup of the Soviet Union led to an industrial collapse. Due to the decline of the industrial sector, their emissions went much lower than the 1990-level that was a baseline for the Kyoto protocol⁴ to which they were parties. This created the so-called "hot air" emissions units that eased the pressure on the other Kyoto protocol countries with growing GHG emissions (Gilbertson and Reyes 2009).

These situations cause an uncertainty of price signals, which represents another serious problem of the carbon market. The volatility of carbon price is inherent because carbon does not exist as a commodity in nature (Gilbertson and Reyes 2009). For this reason predicting a price for carbon is merely guesswork, yet analysing energy prices or future

⁴ The Kyoto Protocol is an international agreement, which is a part to the United Nations Framework Convention on Climate Change (UNFCCC). Its parties are committed to decrease emissions according to the binding emissions targets. First commitment period: 2008-2012. Second commitment period: 2013-2020 (UNFCCC n.d.).

political decisions might give some results. Still, only if the price signals are stable, can they influence long-term decision-making.

In addition to this, the international carbon trading system is mainly oriented at creating equivalences of the emitted carbon across the world and allowing developed countries to trade allowances instead of directly reducing the emissions. This, in fact, creates no real encouragement to make a shift from the unsustainable production and consumption models based on the fossil fuels economy. For this reason this scheme is very attractive to most governments, since it creates the image of addressing a climate change problem, but does not require an immediate structural change. Consequently, it allows politicians to satisfy the growing demand for climate change mitigation actions without challenging the status quo (Bond 2013).

Obviously, in case of domestic emissions trading, such as planned CRC allowances trading, global conflicts do not arise, yet the key point of the abovementioned criticism is still applicable. The flexibility, which the participants of the trading scheme gain, results in picking up the 'low hanging fruit' that allows postponing any measures by most of the companies (Gilbertson and Reyes 2009). Moreover, the consideration of international competitiveness already discussed in the carbon taxation sub-section also becomes an important policy restriction.

2.2.4. Revenue recycling

Revenue recycling is not a standard climate change instrument. However, it can still be classified in the framework of the more widely used instruments such as those described by UNEP and CEU (2007). The revenue recycling mechanism may be included in the category 'tax reduction', since the participants could receive back their payments. On the other hand, it can also be considered a financial incentives tool, as a number of participants were supposed to receive certain revenue from CRC participation.

Being a kind of financial incentives as opposed to extra charges, these instruments are much better accepted by the regulated companies (Metz 2009). Generally their efficiency is high (UNEP and CEU 2007), still they are not always desirable for the government since they involve reduction of the public revenue and/or additional expenditures. In time of recession it might not be the easiest way in terms of public finance, which made the UK government abolish recycling the CRC revenue to the participants.

2.2.5. Performance League Table

Performance League Table (PLT), which ranked the CRC participants according to their performance, had only reputational effect and did not influence the cost of the CRC allowances for the participants. However, in many cases, the reputational factors play an important role in business performance (CCC 2010).

The basic principle of the PLT is the so-called *naming and shaming*. This approach is based on the peer pressure that appears when the better performing participants are named as benchmarks, while those who performed worse are considered to be laggards (Cabus and Witte 2012). This principle is very popular among supranational organisations, such as the United Nations or European Union, and is mostly applied to countries' performance, however other units (cities, universities, schools, etc.) may also be a subject to this policy. Naming and shaming is often used in human rights (Meerink 2012), economics (Green and Boehm 2012), education (Elstad 2009), etc. Generally this policy is considered to be efficient, even though Cabus and Witte (2012) note that the wrong methodology is used for many league tables. The main problem is that judges often focus too much on the output of a certain process, neglecting the input made by the participants. Another important issue pointed out by Pawson (2002) is that the naming and shaming policies need to give the participants an opportunity to restore their image; otherwise they will not have incentives to improve their performance once they are at the bottom of the ranking list. Pawson (2002) also notices that 'unambiguous' remedies need to be available to the performance league laggards to improve their positions.

Even though the CRC PLT took into consideration all of the points mentioned above, it was also met with criticism, which will be analysed in Chapter 4. This situation shows, that

except the general problems of the naming and shaming method, each ranking faces numerous challenges related to the specific field or subject of comparison.

2.2.6. Instrumental comparison

In order to make an overall estimation of the CRC instruments, the study conducted by the UNEP together with CEU (2007), which examined various instruments applied to decrease the GHG emissions from non-industrial buildings, was used. A brief comparison of the major policy tools relevant to CRC, are demonstrated in the Table 2.1.

CRC instrument	Generic instrument	Emission Reduction	Cost
	group	Effectiveness	Effectiveness
Charging carbon	Carbon taxation	Low	Low
emissions			
Revenue recycling	Tax exemptions/	High	High
	reductions		
	Capital subsidies,	High	Low
	grants		
PLT	Disclosure	Medium	Medium
	programmes		

Table 2.1. Comparison of relevant climate change instruments

Source: adapted from UNEP and CEU (2007)

As Table 2.1 shows, revenue recycling could have been the most effective instrument, both in terms of emission reduction effectiveness and cost effectiveness. PLT was estimated as medium on both scales, while carbon taxation, which is the only tool left after simplification, has the lowest effectiveness level. This assumes that CRC has lost a significant part of its potential for climate change mitigation after the changes. In a nutshell, at the beginning CRC EES included numerous instruments, which could become an impulse for the participants to improve their energy efficiency and carbon management. From the theoretic point of view, the efficiency of each of them is debatable to a certain extent. However, the main criticism that they faced was based not on the theoretical implications of policy efficiency, but, as it usually happens in real life, rather on the drawbacks of their implementation. As in the case of any new policy, these instruments could have been adjusted and modified taking into consideration feedback from stakeholders. In turn, the UK government decided to abolish all of them leaving only carbon charging, thus making the CRC scheme very similar to a simple carbon tax.

Chapter 3. Carbon Reduction Commitment scheme as a part of the UK climate change action

In order to analyse the efficiency of the CRC, it is necessary to understand what role it is designed to play in the UK climate change policy. The chapter will present a brief overview of the UK's major climate change regulations affecting the non-domestic sector and the regulation gap, which CRC is supposed to fill. Further, the interface of the CRC with the European Union Emission Trading Scheme will be examined in more detail.

3.1. The UK climate change regulations overview

Having an ambition to be the leaders in the climate change policy-making (DECC n.d.), the UK government has implemented numerous policy instruments to shift the UK energy use model towards more sustainable consumption. The first serious climate change measure was the introduction of the Climate Change Levy in 2001, followed by the Climate Change Agreements (2005). Joining the European Union Emission Trading Scheme (2005) became the next major step for the UK climate change legislative framework. These policies, together with the projected UK Mandatory Carbon Reporting (2013), will be discussed below.

Although the UK Carbon Emission Trading Scheme existed in the UK before launching the EU ETS, it will not be included in the analysis, as it was terminated prior to the introduction of CRC. Another regulatory measure omitted in this research is the Integrated Pollution Prevention and Control Directive (IPPC), which requires, where practicable, reduction of the emissions to the air, water and land as well as implementing certain measures regarding waste and energy efficiency (EA 2008). It fell out of the scope of the research, since all of the IPPC-covered sectors are parties to Climate Chang Agreements whose emission reduction targets are higher.

3.1.1. Climate Change Levy (CCL)

The CCL is a UK environmental tax on energy supplies to industry, commerce, agriculture, local administration and a number of other services, which does not apply to domestic energy supplies (EA 2012). CCL came into force in 2001 to encourage technical and behavioural changes aimed at increasing energy efficiency motivated by the higher energy price. The forms of energy covered by CCL are electricity, gas and other specified energy products for end-use rather than resale from a third party supplier (HMRC n.d.(a)). It adds approximately 15% to the normal energy bill.

As it often happens with additional charges, the UK energy intensive sector met CCL with strong opposition. To deal with this, the government introduced Climate Change Agreements, which allowed companies to get a certain discount on CCL and, therefore, ease the burden for the industrial sector as well as create special incentives for the emission reduction. This situation is a bright example of the carbon taxes immediately followed by numerous exemptions discussed in the previous chapter.

Nevertheless, a high fiscal burden is not the only point of criticism in case of CCL. The structure of the levy has been mentioned even more often, since taxing the downstream energy use does not discriminate between energy sources according to their carbon content. An alternative could be a "carbon tax" that would differentiate the types of energy and encourage the users to switch to less polluting energy sources (Richardson and Chanwai 2003; Varna 2003). During 12 years of discussion, the principle of CCL remained unchanged.

However, from April 2013, the Carbon Floor Price, which is an additional fee on fossil fuels will be incorporated in the CCL and will add about 3% to the average energy bill (HMRC n.d. (d); WSP Group 2013).

3.1.2. Climate Change Agreements (CCAs)

CCAs are agreements between the government and trade associations representing the production sectors to reduce emissions by certain percentage. Being a party to CCA and meeting emission reduction targets agreed with the government allow relevant facilities to

claim a reduction of CCL. This reduction was 80% for all eligible fuels until April 2011, when it fell to 65%. (World and Scott 2011). The discount for electricity, however, was lifted to 90% from April 2013 [DECC n.d.(a)].

CCA agreements are evaluated in periods. The target years were 2002, 2004, 2006, 2008, 2010 and 2013. In order to provide industry with more certainty to invest in energy efficiency, it was announced that CCAs agreed in 2012 would be extended until 2023 and the current participants would be eligible for the scheme and the CCL discount for the period of 10 years (EA 2011).

The eligible industries are aluminium, cement, ceramics, chemicals, food and drink, foundries, glass, non-ferrous metals, paper, steel, and around 20 smaller sectors. In the fifth evaluating period (2019-2010) 38 out of 54 sectors reporting met their targets outright (World and Scott 2011).

Even though CCAs saved UK industry from paying the full cost of CCL, they were also heavily criticised. The key argument was that eligibility for CCA was determined by undertakings to reduce emissions. As a result, those companies that had already implemented measures to promote energy efficiency were in a worse situation than those that had done little and could benefit more from basic steps towards energy efficiency.

3.1.3. European Union Emissions Trading Scheme (EU ETS)

As the UK is a member of the European Union, its industrial sector is also subject to the pan-European regulations and the European Union Emissions Trading Scheme in particular. EU ETS, which was launched in 2005, became the first international emissions trading scheme. It remains the biggest emission market covering more than 11,000 installations in 31 countries (27 EU member states and Croatia, Norway, Iceland, Lichtenstein). This scheme is based on the cap and trade principle, which means that there is an absolute cap for the emissions set by the EU. EU ETS allowances (European Union Allowance or EUA) are issued for the amount of the caped emissions with one allowance being equal to one ton of emitted CO₂. The trading mechanism is similar to the one described in the previous chapter: after the allocation those installations that performed better and emitted less can sell their
emissions to those who performed worse (DECC 2011). As a result, the climate change mitigation occurs where it is the cheapest.

EU ETS is delivered in phases: Phase I (2005-2007), Phase II (2008-2012), on-going Phase III (2013-2020) and Phase IV (to start in 2021). Currently the EU ETS is in Phase III, which requires emission reduction of 1.74% per year, ensuring 21% reduction compared to the 2005 level by 2020 (European Parliament 2009).

In the attempt to learn new lessons from the EU ETS implementation, the system is being constantly modified. As a response to the claims that EU ETS requirements are too low, a number of modifications towards stricter regulation took effect from 2013 (Phase III). The main change was that allowance allocations for Phase III were not performed according to the National Allocation Plans (NAPs) developed by the member states (supervised by the EU), but rather through National Implementation Measures that had to be harmonized with EU targets. The difference between these two approaches is that in the first two phases the EU calculated the cap summing up the requirements of the National Allocation Plans submitted by the member states, while from Phase III it will be the other way around. The cap will be set before the revision of the NIMs. Then, if after verification and approval of all NIMs the number of EUAs requested by the participants does not match the set targets, free allowances granted to each state will be reduced by the cross-sectoral correction factor. This factor is the same for all member states. In addition to this, in the third phase the share of auctioned allowances will be much higher in order to avoid 'windfall profits' which took place in case of allowances grandfathering⁵ (DECC n.d. (b)). Aviation emissions are also included from Phase III, while maritime and other emissions sources might be implemented later on.

⁵ Allowances grandfathering – free allocation of the emissions tradable units (allowances) to the firms based on their historic consumption (Böhringer and Lange 2005).

3.1.4. Mandatory Carbon Reporting (MCR)

With all the abovementioned policies in place, the UK government is not going to stop. A new legally binding carbon related measure, which is about to come into force, is Mandatory Carbon Reporting. From October 2013 all UK incorporated companies will have to report their emissions, including all company units, even those located abroad (Carbon Trust n.d.(b)). With this implemented, the UK will become the first country to oblige companies to include their GHG emissions in their annual report.

This legislative measure is fully focused on the precise emissions measurement and reporting discussed in the previous chapter. According to the estimations of DEFRA, the GHG emissions measurement will allow companies to mark a baseline for further energy efficiency and carbon management improvements and, by doing this, save around four million tCO2 emissions by 2021 (Carbon Trust, n.d.(b)). In addition to this, total organisation's emissions change is not the only subject of the report. Companies also have to report on the emissions per unit of turnover to demonstrate their energy intensity and its changes over time.

Two main points outlined as the benefits of MCR (Carbon Trust, n.d. (b)) are:

- cost reduction through using a footprint year as a baseline for development of the further strategy;

- improving the reputation through delivering to customers information on good environmental management;

 manage long-term business risks through measuring Scope 3 emissions⁶ which are becoming increasingly important for other voluntary schemes and unlocking cost savings from the supply chain.

Even though the methodology for MCR is not strictly prescribed, widely recognised methods, such as GHG Protocol Corporate Standard, need to be used. No special audit will

⁶ Scope 3 emissions include indirect emissions originating from activities other than the use of purchased electricity, heat or steam. They might include transport-related activities from the vehicles that are not property of the company, production of the purchased materials, etc. (GHG Protocol, n.d.)

be applied, but the overall consistency of all information submitted in the Director's report, to which MCR should be included, will be checked.

3.2. The role of CRC in the scope of UK climate change policies

3.2.1. Gap for CRC to fill

According to the Environment Agency (2013), CRC was implemented to fill the gap in addressing the climate change within the non-domestic sector. In order to identify this gap, Fig. 2.1. provides a simplified demonstration of the UK-applicable climate change policies and regulations.



Fig. 3.1. Interface of UK climate change regulation policies This diagram is indicative only and not to scale Source: own development

As it can be seen from Fig. 3.1., almost all industrial and non-residential sectors in the UK are already covered by CCL with only a small part of the sector not being a subject to CCL based on the *de minimis* rule (1). This section includes small supplies of fuels that are automatically qualified as 'domestic' and, therefore, are not subject to CCL (HMRC n.d.(c)). Large energy intensive production is covered by EU ETS and CCAs, which often overlap (2). In addition to this, a considerable part of the UK non-domestic sector will be a subject to Mandatory Carbon Reporting, which also includes the units of UK companies located abroad

(3). UK companies not covered by MCR are those whose equity share capital is not publicly traded on the main market of the London Stock Exchange or EEA and is not admitted to dealing on the New York Stock Exchange and/or NASDAQ (Carbon Trust, n.d.), as well as public organisations.

In this situation CRC addresses smaller energy consumers, which neither qualified for EU ETS, nor signed CCAs. All of the CRC participants are already covered by CCL, and most of them will also have to report on their emissions in the framework of Mandatory Carbon Reporting. This calls into question the rationale behind the administration of the CRC, since both of the instruments it is using now (emissions reporting and carbon charging) are applied by other policies.

3.2.2. CRC vs CCL

Basically, after scrapping most of the CRC instruments, CRC and CCL perform almost the same function, while CRC is more limited in scope of compliant organisations and more costly. With the price of £12 for allowance (one tCO₂e), CRC results in a higher fiscal burden than CCL converted in p/kWh (see Table 3.1.). Indeed, according to the calculations of the Committee on Climate Change (2010), CCL charge equals to 11€/tCO₂ based on the 2009 carbon intensities. It is expected however, that after introduction of the Carbon Floor Price, the CCL charge will become higher (WSP Group 2013). Still, adding the administration cost, CRC creates significant expenses for compliant organisations, while performing the same type of climate change influence as CCL.

Table 3.1. Cl	imate Change	Levy vs Carbon	Reduction Commi	tment cost (p/kWh)
---------------	--------------	----------------	------------------------	--------------------

	CCL cost	CRC cost
Electricity	0,524	0,649
Gas	0,182	0,22

Source: HMRC (n.d. (b)), EA (2013)

In addition to this, CRC not only resembles CCL as an economic climate change tool, but is also very similar in terms of design flaws. Being also applied to the downstream energy use, CRC, as well as CCL before Carbon floor Price introduction, fails to differentiate between the carbon content of the consumed electricity.

3.2.3. CRC vs MCR

Another important CRC role mentioned above is reporting on the total organisational emissions, which is supposed to give CRC participants an idea of their overall energy consumption and the energy intensity of their production. However, starting from this year Mandatory Carbon Reporting is addressing the same issue with the difference in the control strictness. While CRC participants are audited and penalised for underreporting, no audits will be held as a part of MCR.

As Fig. 3.1. has shown, there is a small number of companies which qualify for CRC, but do not qualify for MCR. Those are mostly small carbon emitters that have no access to the world's major stock exchanges and public institutions and administrations that are obliged to participate in CRC.

All in all, after losing a number of its instruments, the CRC scheme is duplicating the role of CCL and, from October 2013, will also require the carbon reporting very similar to that of MCR. With this overlap, the whole purpose of the CRC compliance becomes questionable, while the scheme still remains costly to administrate and comply with.

3.3. CRC interaction with EU ETS

An important issue of CRC interface with other climate change policies is its overlap in terms of not only instruments, but also targets and charges. The issue which calls attention in this discussion is CRC compatibility with EU ETS. As mentioned previously, these policies have no direct overlap. Nevertheless, there is still a contradiction in the effect they produce. According to the report published by Carbon Retirement (2011), the problem in this case is that two schemes cover the same energy production-consumption cycle. The rationale behind this is that the emissions "saved" under the influence of one scheme can be used for another scheme. It happens in the following way. If the companies compliant with CRC manage to decrease their emissions through consuming less energy, then the energy generating companies will have to provide them with less energy. As a consequence, the energy generators covered by EU ETS will use fewer allowances, which will make the unused allowances available for heavy industry, also covered by EU ETS. As a result, CRC emissions reduction will simply increase the number of EU ETS emissions available for the industrial sector and not result in the net emission reduction on the UK- or even EU-level. The emissions "saved" by the CRC participants will be "displaced, not eliminated" (Carbon Retirement 2011).

The overlap mainly originates from the electricity use which is responsible for 70% of the CRC emissions. According to the Carbon Retirement (2011) calculations, in the period 2012-2020 about 90 million tCO_2 saved by CRC participants will be consumed by heavy industry. In addition to this, the government's reputation may also be questioned since this overlap might look like a way to sell the same allowances twice, while in fact the reduction occurs only once.

In order to properly link CRC to EU ETS, the Carbon Retirement (2011) report offered two mechanisms. The first one suggested measuring the emission reduction achieved by CRC participants and retire the equivalent number of EU ETS allowances from the EU ETS National Allocation Plans. This would exclude the possibility of double accounting and ensure that the avoided emissions are not used by other sectors.

The second option offered to go even further. In order to create an easy link between the two systems, Carbon Retirement (2011) suggested selling EU ETS allowances to CRC participants with further retirement of these allowances. The rationale behind this mechanism was that it would allow to considerably decrease the emissions by increasing the number of companies covered by the EU ETS cap without changing the cap. Another supporting argument used in the report was that the price of EUA and CRC allowance was not too different (12.7£ and 12£ respectively). In case of the EUA price fluctuation, the authors offered to use a flexibility mechanism which would allow to change the ratio of the

Allowances needed for ton of CRC emissions and therefore regulate the burden of CRC participants.

While the first option might be feasible due to relatively low emissions reduction by CRC organisations and therefore low effect on the EU ETS participants, the second option does not seem to be realistic due to competitiveness considerations. Basically it means that the companies covered by EU ETS will lose a part of their emissions in favour of the CRC participants, while similar organisations in other countries will not face additional restrictions. This point is often mentioned as one of the restrictions of the economic instruments for climate change mitigation, since they cannot compromise international competitiveness of a given country, only if they are internationally unified (Richardson and Chanwai 2003). Nevertheless, it can still be a realistic option if the EU ETS cap is too high, as it happened in the first two phases due to over-allocation (Phase I) and economic recession (Phase II) (CCC 2009).

Indirect effect on prices

As it was mentioned before, the CRC is filling the gap left by the EU ETS and CCA in the regulation of the UK non-domestic sector (EA 2013). However, the energy efficiency of the companies that currently are covered by the CRC was already addressed indirectly by the EU ETS (CCC 2010). As all electricity-generating companies are already obliged to purchase EUA to cover their emissions, the price of the electricity, which is above 70% of the CRC participants' energy use, already includes the cost of carbon (CCC 2010). As a result, the CRC charge together with the growing prices for energy caused a significant increase in the energy bills of CRC participants: on average 55% more compared to 2010/2011, as estimated by Carbon Masters (2012).

In a nutshell, even though the role of CRC was clearly defined by the Environment Agency, in fact the gap it is supposed to fill is not so obvious. The first overlap, which can be observed while examining the role of CRC in the overall UK climate change action, is the duplication of the instruments. Using carbon charging and emissions reporting as the main tools, CRC resembles the combination of the Climate Change Levy and Mandatory Carbon Reporting.

The interface with EU ETS results in an even greater number of questionable issues. The most important is the clash in targets, which allows using emissions saved in one scheme for another one. The second point is very high pressure on energy prices. As a matter of fact, the CRC participants' energy use cannot be classified as "not covered by EU ETS", since they are already indirectly influenced by EU ETS affecting energy prices. Consequently, CRC participants face triple price pressure caused by CCL, EU ETS and CRC. On one hand it may be used as an evidence of the strong climate policies, but most likely it will simply result in relocation of the UK businesses abroad causing not emissions reduction, but carbon leakage.

Chapter 4. Achievements and drawbacks of the Carbon Reduction Commitment scheme

Three years of implementation have revealed numerous strong and weak sides of the CRC scheme. This chapter will discuss the main CRC achievements and the most important problems related to scheme's design and compliance procedure. Their examination will be based on the review of the CRC related research publications, analysis of the online survey of CRC participants, and personal/phone interviews with the CRC participants as well as Schneider Electric CRC experts (see Methodology subsection 1.3). The last subsection of the chapter will analyse the change of the CRC reported emissions in the sample group, making projections for the reporting year 2012-2013 and examining the sectorial differences among the participants. This part is aimed at evaluating the effect of the CRC rules change that occurred in the third CRC year and its implications for the participants and the government.

4.1. CRC achievements

4.1.1. Board level discussion of energy efficiency

Even though CRC was much wider criticised than praised, all interviewees and survey respondents unanimously agreed that the main achievement of CRC is that it raised the question of energy efficiency to a higher level within companies' hierarchy. As CRC compliance involves high expenditures for the scheme administration and purchasing allowances, the board level management for the first time seriously considered the energy use of the companies and in many cases for the first time got consolidated data on the overall company's energy consumption (Seuren 2013; Tsvetkova 2013; Kovandzic 2013; Abubakar 2013; Fulop 2013). As Anonymous Participant (2013) has mentioned in the interview, a considerable annual CRC charge became a more serious question than any monthly energy payment, which gets lost among the other monthly expenses.

The next step, however, was considering how to reduce the CRC cost and an answer to this question varied from participant to participant. Unfortunately, at the time of recession

many companies did not opt for the energy efficiency improvement as a means to decrease the total cost of running the business since it required additional investments, but chose downsizing and firing people (Seuren 2013).

4.1.2. Signing Climate Change Agreements

Another important accomplishment of CRC is encouraging more companies to sign the Climate Change Agreements. As being a party to CCA and meeting the goals set for a given sector now allows to claim exemption not only on the Climate Change Levy (90% reduction for electricity, 65% for all other fuels), but also full exemption from participating in CRC, the number of CCA covered companies is constantly increasing.

According to the data of the EA (n.d. (b)), 2757 participants registered for the Introductory Phase of the CRC. Out of these organisations, one third had CCAs, which made them exempt from CRC participation (Fig. 4.1). Their number continues to grow as many CRC consultancies suggest CCA as a rescue from CRC burden and eligible participants are happy with this option (Tsvetkova 2013).



Fig. 4.1. CCA status of the CRC participants at the footprint year Data source: EA (n.d.(b))

As a matter of fact, many organisations with industrial processes eligible for CCA have never heard about CCAs and first got to know about them only as a means of getting the CRC exemption. Obviously, encouraging companies to commit to decreasing their emissions in the framework of the general sectorial CCA is also an important result demonstrated by the CRC scheme.

4.2. Problems of CRC design and implementation

Unfortunately, the number of the CRC flaws significantly outweighs its moderate achievements. As it was mentioned in Chapter 2, one of the drawbacks of the economic instruments' use for climate change mitigation purposes is the uncertainty of their effects and the need for further assessment and adjustment (Richardson and Chanwai 2003). Indeed, after its implementation CRC was widely discussed with stakeholders and its environmental and financial implications were evaluated in multiple ways, which resulted in serious changes of the scheme. CRC turned out to have more flaws than it was expected.

4.2.1. Cost and complexity

Administrative cost

One of the CRC problems most often mentioned by the participants is an extremely high administrative cost. Understanding CRC rules, defining companies' boundaries, gathering the regular data on all energy supplies became a serious financial burden for almost all CRC participants, not mentioning the cost of allowances. In response to this, the Environment Agency (n.d.) claimed that CRC was designed in such a manner that it covers only those companies which can save enough money on cutting the energy bills to cover the administrative expenses of CRC participation. In this case CRC would be a win-win scheme for both participants and the government. Still the estimations of the participation cost and comments of the CRC covered organisations show a different situation: CRC cost prevents the scheme from achieving its goals. Most of the participants do not think that they can benefit from CRC participation in any way. As the participants' survey has shown (Fig. 4.2), about three quarters of the respondents agreed that the government could benefit from CRC implementation, followed by environment (43%). Meanwhile, only 22% of the surveyed participants reckoned that they could also obtain benefits from CRC participation. The comments demonstrated that companies see no way to benefit from the scheme due to all CRC related expenses, which leave no funds for any investments.



Fig. 4.2. Survey results: Participants' opinion on CRC benefits Data source: online survey

The high cost of CRC administration as well as the excessive complexity of the scheme were demonstrated in the research conducted by KPMG (2012). It has estimated the average administrative cost of the first year of CRC compliance (Phase I, footprint year) as £35,000 and £62,000 for the whole Phase I. The total administrative expenses of the phase were estimated at the level of £172 m.

This situation demonstrates that the message about the win-win nature of the scheme might be misleading. In fact, the cost of CRC compliance is so high that participants have no funding for energy efficiency and carbon management improvement. According to the UK

Heidelberg Group (Hanson UK) Energy Managers, "now, at the time of recession, companies have no spare cash and the money spent on CRC administration is not spent on something else. Like energy efficiency" (Newton and Kilner 2013).

Nevertheless, it is expected that the administrative costs will go down as the participants become more efficient at CRC compliance (KPMG 2012) and the greatest part of expenses will disappear after the footprint year (see Fig 4.3). Moreover, with the simplifications DECC expects a reduction of 55% in administrative cost. This would save £272 m by 2030 (EA n.d.).



Fig. 4.3. CRC administrative cost Source: KPMG (2012)

Many participants indeed agree with CRC being easier to administrate after the simplification process of 2012-2013 reporting year. Three quarters of the surveyed organisations agreed with this, yet only 26% think that now there are no significant problems (see Fig. 4.4). Some participants took the changes as an unavoidable part of CRC compliance: "Complications are inevitable for any 'one size fits all' scheme" (Anonymous Participant 2013). At the same time, 9% mentioned that CRC simplifications involved new difficulties related to re-adaptation of the internal reporting processes and re-education of the staff.



Have the simplifications made CRC easier to administrate?



The responses of participants together with the comments of the analysts put under question the acceptability of the CRC scheme with regards to its goals: energy efficiency and carbon management improvement. Even after the simplifications which made the scheme much easier to administrate, the cost of CRC is still seen by most participants as a very high burden leaving them without funds available for energy efficiency investment.

Complexity

Complexity of the CRC scheme is another major point of criticism (KPMG 2012). The complicated process of defining company's boundaries, exemption status of sites, the list of reportable fuels, the scope of reportable supplies as well as a large number of other issues make CRC rules very hard to understand and apply properly.

As it was mentioned by the Energy Managers of Hanson UK (Newton and Kilner 2013), one of the problems of the CRC as a scheme is that there is no point at which participants do not have to pay. Basically, after the removal of the PLT and revenue recycling it turned into a tax, but still remained complex and expensive to comply with. Complexity is an acceptable thing when there is a possibility of getting the revenue or at least not losing money. If there is a need pay in any case, there must be no complexity (Newton and Kilner 2013).

The results of the participants' survey confirmed this argument: 87% of the respondents agreed that the CRC scheme needs further simplification, although the way in which it should be done varied. The rest (13%), however, thinks that CRC should not be further altered explaining it in the comments by the fact that their internal reporting processes are already in place and the staff is trained to comply with CRC. Therefore, any new changes would involve extra cost.

4.2.2. No incentives to reduce emissions

Even though the main goal of CRC is an improvement of energy efficiency and, as a result, decreasing emissions of the non-domestic UK sectors, the way in which it addresses these issues is vague. As the results of the survey and the interviews have demonstrated, most of the participants did not turn to energy efficiency improvement as a measure to minimise the CRC burden. The head of the Schneider Head of Sustainability Consultancy Services added that most of the clients see CRC "mainly as an inconvenience" (Seuren 2013).

The survey (see Fig. 4.5) has shown that just a bit more than one third of the surveyed participants (35%) has implemented any changes to their energy efficiency policy as a result of CRC influence. The comments revealed that the main accent was placed on changing the behavioural energy use pattern of the company's staff, as this measure is cheaper to implement compared to the technical improvements. The technical improvements, indicated in the responses, included more efficient heating and lighting (LED lamps in particular). No industry specific technical improvements, such as more efficient machinery, were mentioned in the comments.



Has CRC influenced your decisions with regards to energy

Fig. 4.5. Survey results: energy efficiency improvement Data source: online survey

Nevertheless, these improvements can hardly be attributed to CRC only. The majority of the participants who admitted that CRC influenced their energy efficiency approach also specified that CRC is not the biggest motivation for them but rather just one of the multiple reasons. Energy cost was mentioned as the most important energy efficiency motivator.

The rest of the participants (65%) who claimed that they are improving their energy efficiency due to the other reasons bring this argument even further. One of the respondents clearly stated that CRC is seen as a "necessary evil ... with no real drive to reduce this cost" and is dealt with mainly by outsourcing to the consultants. There are already multiple energy policies in place to address the energy efficiency of the UK companies with the high energy prices (already addressed by Climate Change Levy, Carbon Price Floor and indirectly by EU ETS) producing the stronger influence. Therefore, CRC has just become another tax increasing the financial burden of the companies, while not providing any new incentives after the revenue recycling and PLTs were abolished.

As a result, CRC compliance made the organisations look for ways to rather 'avoid emissions', than decrease them in either absolute volume or per unit of turnover (Tsvetkova 2013). This means that CRC participants are much more interested in excluding certain sites

or supplies from their CRC reports, looking for the loopholes in the regulations, instead of investing in energy efficiency improvement.

The high penalties for underreporting have also placed the accent on the wrong aspect of CRC compliance. As CRC Analyst Idris Abubakar (2013) mentioned, CRC participants are much more concerned about the accurate reporting and audits, motivated by the fear of penalties. "Everyone is worried about the figures in the report, while no additional effort of energy efficiency improvement was visible after CRC implementation" (Abubakar 2013).

The fiscal nature of the CRC scheme, in addition, has also provoked certain problems. As a number of the surveyed CRC participants indicated in the comments, they incorporate the cost of CRC in their business model and passed it on to the consumers with no extra energy efficiency effort. Public organisations in turn are likely to include this cost in the public charges, effectively passing them on to the taxpayers. Therefore CRC has clearly failed as a scheme and turned into a tax facing all the problems of the fiscal instruments in the time of recession.

No cap and no need for energy use forecasting

Another problem of CRC is never implementing the instruments that were supposed to create direct and indirect incentives for emissions reduction. According to the initial design, the CRC participants could purchase an unlimited number of allowances only in the Introductory Phase paying the fixed price of £12 per tCO2. In the following phases, however, the number of sold emissions had to correspond to a cap established by the government (CCC 2010). In case the CRC participants would have needed more emissions, they could have purchased them directly from the EU ETS through the safety valve mechanism. This was intended to encourage a better energy use forecasting and decrease the overall CRC emissions according to the governmental plan by reducing the cap. Nevertheless, both of these requirements have been removed. Now the CRC participants simply have to pay a fixed price for their emissions at the end of the year with no cap on the total emissions. This also considerably weakened the CRC incentives initially created for the participants (Fulop 2013).

4.2.3. Instruments' problems

Carbon charging

One of the most important issues in terms of the CRC instrument analysis is the carbon price, since after the simplifications carbon charging became the key element of CRC. The price of one ton of emitted carbon is £12, however the opinion on the adequacy of this figure with regards to the CRC goal is questionable.

The opinion of the Schneider CRC analysts on this issue was not uniform. Half of the respondents mentioned that the price is too high backing it with the arguments about lack of funds for energy efficiency investments, while the other half claimed that it is too low. The explanation for the second option was that for most of the companies an extra payment of 0,64 pence per kWh of electricity is too low to provoke any actions, especially those which require considerable investments in the renovation/change of the equipment. In an attempt to verify the latter point of view with the participants, one of the survey questions was asking the opinion on a possibility of increasing the CRC allowances' price. As can be seen in Fig 4.6, 74% of participants claimed that it would not make them care more about the energy efficiency of their organisation with 39% mentioning that they already are making all possible efforts. Yet 17% agreed that a higher price would be a stronger motivator.



If the price of the CRC allowances was higher, would it make you care more about the energy efficiency of your organisation?

Fig. 4.6. Survey results: CRC allowances' price Data source: online survey

Supporting those 17%, Energy Managers of Hanson UK claimed that the cost of carbon is not high enough to have a real effect on the decision-making it terms of fuel choice, but in fact it should not be (Newton and Kilner 2013). The cost of fuel has to define the choice, not the complicated scheme of carbon charging. Indeed, including the price of carbon on the energy bill, either in the form of a tax or any other charge, would cause the same effect with much less difficulties for both the government and the companies.

Performance League Table

In order to compare the participants' progress, PLT included a number of criteria, which intended to make the ranking fair. Still it was often criticised in many ways.

One of the most widely used arguments was that those companies which have invested the least in the emissions reduction prior to CRC could easily perform well, while those who have already made certain steps towards carbon cuts could not show fast reduction compared to 2010/11 (UES Energy n.d.). In addition to this, PLT did not make a differentiation among various subsectors, which did not allow to properly compare the success of CRC participants (Carbon Master 2012). Anonymous Participant (2013) has also criticised the PLT criteria saying: "Where did we finish compared to our competitors?" was asked more than "How much did it cost us?".

Another problem was that a number of companies were registered under the names of parent companies or holdings, which made participating companies hard to identify for the wide public. Therefore, the major tool of PLT "naming and shaming" did not work properly (Carbon Master 2012), as "naming" did not actually name the company. CRC Analyst Idris Abubakar confirmed it: "After abolishment of revenue recycling, only two relatively known companies out of 18 CRC participants I am working with showed interest in PLT" (Abubakar 2013). This demonstrates, that only big companies, which take care of their image, could be influenced by PLT, while the smaller ones, which are the majority of the CRC participants, are not so sensitive to the "name and shame" instruments.

The survey confirmed this statement. The importance of PLT itself had a minor influence on the participants when the revenue recycling was cancelled, with 78% saying that PLT had no

influence of their energy efficiency policies at all (see Fig. 4.7). Dissatisfaction by the revenue abolishment was shown by 35% of the surveyed participants together with 44% being neutral on this point. An interesting fact is that the public sector seems to be more interested in the results of the public ranking than the private sector, which can be seen from the survey comments.



Fig. 4.7. Survey results: PLT and its abolishment Data source: online survey

Therefore, the naming and shaming method had no real influence as a part of the scheme due to the multiple imperfections of the ranking methodology as well as other obstacles.

Revenue recycling

Out of all instruments incorporated in CRC, revenue recycling was the most promising from a theoretical point of view (see Subsection 2.2) and the only one attractive for the participants (Tsvetkova 2013). Yet, it was not that well designed to become a fair redistribution instrument. A number of CRC participants wanted to turn revenue recycling into a form of business, explained Schneider CRC Analyst Idris Abubakar (2013). Indeed, companies hoped to make money with the scheme, but mostly not due to higher energy efficiency, but using the numerous loopholes left by the scheme rules. An example of this may be intentionally including in the initial 90% of the reporting emissions those sites which had to be shut down soon. As a result, the companies could significantly reduce their emissions, while no energy efficiency improvement actually took place. To avoid this, more attention could be paid to the emissions per unit of turnover, further commented Abubakar (2013). However, in this case it is still very hard to take into consideration selling and purchasing of the sites or other production units. It means that if a company has sold a factory and purchased a range of offices instead, the turnover might be the same while the energy consumption will drop. All these issues gave companies numerous opportunities to cheat on their PLT ranking.

4.2.4. Misleading incentives with regards to the used fuels

Renewable electricity

The CRC approach towards the renewable energy is another point of strong criticism (Kovandzic 2013). Having the same principle as the Climate Change Levy, CRC is applied to the downstream energy and does not differentiate between the energy sources based on embedded carbon. In this way, any type of purchased electricity is charged in the same way regardless of its origin.

Responding to this, the EA mentioned that renewable energy use is already widely incentivised by the other policies and it is not a CRC task to address this issue (EA n.d.). In addition to this, renewable self-generated electricity can be exempt from the CRC charge, unless the Renewable Obligation Certificates (ROCs)⁷ or Fit-in-Tariff (FIT)⁸ were claimed.

⁷ Renewable Obligation Certificate (ROC) is a certificate issued to the renewable energy generators and later is sold to the suppliers together with electricity. It is a tradable commodity and has no fixed price. Licensed UK energy suppliers are required to source a specified proportion of their electricity from eligible renewable sources. This proportion is set annually. Introduces: 2002 (DECC n.d.)

However, it solves just a tiny bit of the problem, as it does not apply to the purchased electricity (EA 2013). Moreover, allowing the companies to get the CRC exemption only for the electricity not covered by ROCs or FITs does not make much sense since the government support which the electricity generating participants can get in the form of ROCs and FITs is higher than CRC abatement (Tsvetkova 2013). As a result, there are almost no participants who actually claim CRC exemption for self-generated electricity.

The opinion of the participants on this situation varies. Those companies which purchase a considerable part of the energy from renewable sources claimed that it was unfair. The others, however, said that even though they do not agree with this principle, they do not want the electricity differentiation, as it would involve further administrative problems, which are a more important and problematic issue.

Other fuels

Simplification of CRC regarding the number of reported fuels created another misleading incentive, which was mentioned by the representatives of Hanson UK (Newton and Kilner 2013). As from 2012-13 reporting year participants have to report only on electricity and natural gas consumption compared to the first two years when they had to report on 29 fuels, many companies have lost the incentives to switch from more polluting fuels (such as coal, LPG, etc.) not covered by CRC to electricity or natural gas. This problem, however, in most cases does not apply to the public organisations and commercial companies whose supply rarely includes any other fuels except for electricity and natural gas. Still for industrial sector, which accounts for one third of the CRC emissions (CCC 2010) and is the main consumer of "other fuels", it makes a considerable difference.

⁸ Fit-in-Tariff (FIT) scheme ensures that energy users, who have installed small-scale (<50kW), low-carbon electricity generation system, will be paid by energy supplier for the electricity generated and/or exported to the grid. Introduced: 2010. (DECC n.d.)

4.2.5. Political instability

One of the important aspects of delivering an environmental policy is its stability and predictability (Golombek et al 2010). From this perspective, cancelling the revenue recycling, which occurred during the first year of the scheme implementation, might have become an undesired shock for CRC participants.

As Golombek et al (2010) explain, one of the major goals of climate change policies is triggering technological innovation, which requires certain investments. This means that after the introduction of the climate change policy instrument (e.g. carbon taxes), companies are likely to invest in green technologies with an expectation of a future reward for these expenditures. However, after achieving this immediate effect, the government may be tempted to cancel the pre-announced policies since the innovations are already in place. As a result, the firms lose trust in the government commitment to the announced policies and the investment in green R&D development does not happen.

CRC revenue recycling abolishment became an example of the situation described above. After having introduced CRC as a fiscally neutral scheme and giving participants a year to improve their performance and receive the money back, the recycling element of the scheme's financial flow has been removed to support "public finances" (DECC 2010).

Many sceptics might say that in the time of recession nobody expects stability from the government policies. As Hanson's Energy Manager Neil Kilner commented on this government's step: "I didn't trust [the government] before, I don't trust it now". Nevertheless, it is not always the case. According to the interviewed CRC analysts from Schneider Electric, a large number of participants who have made considerable investments hoping to get this money back after revenue recycling, felt misled (Abubakar 2013; Seuren 2013). As a result, no further attempt to improve energy efficiency came from these organisations, demotivated by the assumption that there is "no way to win when playing with the government" (comment of the anonymous CRC participant).

As the results of the online survey have demonstrated, 39% of the participants claimed that their opinion on the governmental policies has worsened, commenting it: "We want to invest [in energy efficiency] being sure of what the government will do". Still, 44% indicated

that there was no change in their opinion on the government explaining it by the same arguments as those used by Hanson UK representatives.



How did your opinion about the government change after the abolishment of the revenue recycling?

Fig. 4.8. Survey results: Revenue recycling abolishment Data source: online survey

This is another confirmation of the suggestion that climate change policies cannot exist without the commitment of the government. The UK government has already realised this in relation to Climate Change Agreements, extending the current CCA period from two to seven years ensuring that the signed companies will have the Climate Change Levy relief until 2020 (EA 2011). Still CRC was not that successful in terms of stability. Unfortunately, in addition to all flaws of the scheme itself, the UK government represented by the Department on Energy and Climate Change failed to properly deliver the CRC policy, seeing it as a source of public revenue in time of recession.

Moreover, an important issue raised by the participants in the comment to online survey is that there is no evidence that the money received from selling CRC allowances in any way is used for environmental purposes. This also destabilises the perception of the government's intentions with regards to CRC as a scheme and its 'environmental' orientation.

All in all, the number of CRC drawbacks both before the simplification and after, has heavily overridden its positive effects. Instead of being a motivating environmental scheme, it became an annoying and complicated tax causing adverse effects to what it is officially aimed at.

4.3. Projection of the CRC emissions in 2012-2013 reporting year

In many cases the results of the policy implementation may be much better understood through an analysis of the quantitative indicators, if it is aimed at those. CRC indeed is aimed at emissions reductions which are measurable, but, unfortunately, due to a number of factors, an analysis of the CRC reported emissions trend does not reveal the actual situation with the energy efficiency improvement. These factors include acquisition, selling and disposal of sites, signing CCAs and the change of the CRC rules. In this way, the simplifications, which came into force in 2012-2013 reporting year, and the change of reportable fuels in particular, made current CRC emissions almost incomparable to the previous years. Still, analysing the reportable emissions change might be interesting in terms of companies' expenses and, consequently, the government revenue from CRC.

The methodology of the sampled participants selection can be found in the Methodology subsection [1.3].



Fig. 4.9. Projection of the CRC emissions Data source: EA (n.d.), own calculations

The overall change demonstrated by the sampled companies in the third CRC year is an emission reduction of 6.2%. The projection of this relative change to the total CRC emissions might lead to the emission reduction of more than 3 GtCO₂, which is shown in the Fig 4.9. However, the trend across the sectors is very different.

The public sector and commerce have demonstrated a slight increase in emissions, which can be explained by the cancellation of the 90% rule and the requirement to report on all electricity and natural gas consumption. The effect of the 90% rule abolishment on industry, however, was largely outweighed by changes in the reportable fuels list. As from 2012-2013 CRC covers only electricity and natural gas compared to the first two years covering 29 fuels, the industrial sector, which is the biggest consumer of the other fuels (coal, coke, LPG, etc.), has demonstrated a significant reduction of the reported emissions. The change of the reportable fuels allowed the government not only make the collection of the reportable data easier, but also partly decrease the CRC burden for the UK industry, which is the most energy intensive group of CRC participants. The decrease of the industrial emissions can also be partially attributed to signing the CCAs by the eligible facilities. Fig. 4.10 demonstrates these sectorial differences.



Fig. 4.10. Percentage change of the reported emissions of the sample group. Sectorial break-down.

According to the first PLT, public sector on average outperformed private sector (Carbon Master 2012). Indeed, emissions increase demonstrated by the public sector in the sample group is lower than that of the commerce. Industrial sector is out of comparison in this case.

This situation suggests that the overall result of the changes in CRC regulation applied in 2012-2013 reporting year might result in the reduction of the reported emissions and, consequently, public revenue. Still this analysis might overestimate the drop of the industrial emissions due to one of the sampled participants, which is not only very large (top 50 CRC emitters), but also heavily dependent on the fuels other than electricity and natural gas. In order to understand if this situation is common for the rest of the CRC participants of the industrial sector, a wider sample group is needed. Unfortunately, the scope of this research did not allow to obtain it.

In a nutshell, CRC turned out to be unsuccessful as a scheme not motivating participants to improve energy efficiency, but rather becoming a complicated tax. Beyond doubt, CRC has paid additional attention to the issue of the energy efficiency and helped companies to collect their energy data, but with introduction of Mandatory Carbon Reporting, discussed in Chapter 3, these achievements appear to be less important. Moreover, they are largely outweighed by an unreasonably high administrative cost, complexity, disincentivizing renewable energy use, political instability and a high number of problematic issues of CRC design.

Simplifications which entered into force in 2012/2013 reporting year indeed made the scheme easier to understand and comply with, yet they did not solve all its problems. In terms of reportable emissions, these changes resulted in easing the burden of the industrial sector and higher charges for the commercial and public sectors. As the sample group has shown, the overall CRC reported emissions are expected to go down, yet the figures of the sampled participants might overestimate this decrease.

The two previous chapters have demonstrated that CRC in its current form is not effective in terms of achieving its goals, while its administration is not cost-efficient in terms of private and public expenses. This requires changes and the way in which these changes can be implemented are different. Subsections 5.1 and 5.2 will focus on addressing two CRC problems: (1) disregarding environmental implications of the scheme and (2) the scheme's cost and complexity. The last part of this chapter, subsection 5.3, will provide brief conclusions of the research.

5.1. Accent on the environment

One of the CRC problems mentioned by most of the participants and experts is that the scheme lost its environmental aspect and became a fiscal instrument. The way in which participants see CRC needs to be addressed, turning the scheme from "annoyance" (Seuren 2013) to an environmental programme. As can be seen from the Fig. 5.1., only a quarter of the participants see any environmental implications of CRC. For the rest it is just an irritating and complicated way of taxation.



Do you consider CRC to be useful for climate change mitigation?

Fig. 5.1. Survey results: CRC and climate change mitigation Data source: online survey

A way to improve this situation may be proper reporting on how the money collected from CRC allowances selling is spent. As a number of participants mentioned in the comments "Why are you asking about money? I don't know where it goes". Even though DECC announced that the funds received from selling CRC allowances would be just partially spent on the environmental purposes (DECC n.d.), a greater emphasis on all implemented climate change related projects is needed (Tsvetkova 2013).

Being one of the most important advantages of environmental taxation in the period of economic recession, the higher acceptability of the environmental taxes compared to the labour and social taxes (OECD 2006) supports this argument. The study of Research Council of Norway (Amundsen 2012) also confirms readiness of the taxpayers to pay higher fuel taxes after they are informed that collected funds will be used for the sake of the environment. Therefore, proper reporting on the environmental use of the CRC public revenue as well as other informative measures need to be undertaken in order to receive greater support from the CRC participants.

5.2. Complexity and cost: options for further CRC development

Complexity and very high administrative cost of CRC administration are obviously the issues which need to be dealt with, especially taking into consideration that most of the CRC instruments were abolished and now CRC clearly resembles a tax. As the comments of the surveyed and interviewed participants have proved, CRC has reached the adverse effect to what it intended, leaving companies with no funds and not giving additional incentives for energy efficiency improvement. If the CRC scheme cannot be replaced with other type of more favourable instruments such as financial incentives due to the lack of public funding in the period of recession, then it should be at least simplified. The main options of how to do it were generated from the interviews with participants and Schneider CRC experts. They include: (1) further simplify CRC but leave it as a separate scheme; (2) turn it into a tax; and (3) merge it with the other climate change related policies.

Further simplify CRC

What CRC is officially moving towards now is further simplification within the same scheme. However, this is an option which in many cases seems to result in more problems than solutions. According to Ekaterina Tsvetkova (2013), no real simplification can be achieved while trying to keep CRC as a separate regulatory measure.

It will involve new changes and consequently require a significant effort to understand CRC rules again and re-educate the staff. As an Anonymous Participant (2013) has mentioned, "we are ready to pay more, just don't alter [CRC] again". The repetitive character of CRC and the other climate change policies indicates that CRC turned out to be obsolete and redundant as a scheme and for this reason this option is not among the most favourable ones. In addition to this, as a part of the simplification process a number of incentives turned out to be misleading such as CRC rules with regards to renewable energy and fuels other than electricity and natural gas. Consequently, it is highly improbable that further simplification of CRC as a separate scheme might result in any significant complexity elimination or cost decrease while preserving the role that CRC is performing now.

Turn it into a tax

Turning CRC into a straight tax is probably the most widely discussed option, due to the carbon taxation being the key CRC instrument after the simplification. This variant suggests adding the CRC charges on the energy bills of the participants and creating the same mechanism of price influence while saving considerable amount of time and administrative expenses for both participants and the government.

In this case there will be no need for costly and complicated governmental audits as adding a charge to the energy invoices will ensure that everyone pays it. Obviously, the organisations covered by CCA or EU ETS would need to have a revised tax level, in the same way is it currently happening with CCL relief for CCA parties. In this way, turning CRC into a tax will definitely result in the elimination of the complexity and high administrative cost, yet it loses the other CRC instruments such as emissions reporting.

Merge it with the other climate change policies

Taking into consideration all CRC tools, merging the scheme with the other UK climate change policies seems to be the most logical in the view of the Mandatory Carbon Reporting introduction. This would mean that CRC participants would have to report on their emissions under Mandatory Carbon Reporting, replacing CRC reporting, and, similar to the case above, the CRC charge may be added to the energy invoice. As Anonymous Participant (2013) added, "there are too many unsynchronised schemes out there and we have to adjust out figures every time we are reporting them". This comment shows the need for coordination of various reporting requirements and supports this policy option.

In this case, however, the boundaries of MCR will have to be revised to include all CRC participants. As a result, all CRC functions will be preserved, while the complexity and high cost will be addressed. The disadvantage of this option is that the accuracy of the emissions reports might be lower since MCR reporting is not audited as thoroughly as CRC reporting. Yet the research has shown that the price incentives are the main driving force of the energy efficiency decisions, while very strict audits result in a greater focus on reports' accuracy than energy efficiency improvements.

These options have been offered to the surveyed participants and their opinion is demonstrated in the Fig. 5.2.



Does CRC need further simplification?

Fig. 5.2. Survey results: Further development of CRC Data source: online survey

Out of these variants, the most popular one among the surveyed participants was turning CRC into a tax. As the comments have revealed, most of the CRC-covered companies have a negative opinion of any type of schemes and policies, as those are always very changeable and complicated. For this reason, even though the tax in some cases would require higher charges, it most probably will be compensated by the saved administrative cost. Still, 22% agreed that CRC should be merged with the other policies. A relatively low share of participants which have chosen this option might be explained by the fact that most of the CRC participants are not aware of all current policies and their implications. As it was noted in the course of the internship, a bright example is Mandatory Carbon Reporting, which is about to be implemented, but a very few CRC participants are aware of it.

5.3. Conclusions

Intending to be a leader in climate change mitigation, the UK government has implemented a wide range of various policies and programmes in order to incentivise the more sustainable energy use and draw attention to better carbon management. The Carbon Reduction Commitment Energy Efficiency Scheme, which was applied to the UK non-energy intensive organisations in public and private sectors not yet covered by Climate Change Agreements and the European Union Emissions Trade Scheme (10% of the UK GHG emissions), became one of the most controversial ones, having met wide discussion and heavy criticism.

Upon its introduction CRC was a fiscally neutral policy and incorporated a number of instruments which together created a sophisticated mechanism of incentives and regulations. However, most of them were removed in less than three years of CRC implementation. The first change that occurred to CRC was the abolishment of the revenue recycling justified by the government's need of higher public revenues, which resulted in further distrust of CRC participants. Performance League Tables, cap-and-trade and all other policy tools except carbon charging were removed shortly after that, as a part of the simplification processes. The main reason for this, however, was not the initially wrong choice of instruments, but rather imperfections of their implementation which caused a

strong negative feedback from the participants. As a consequence, CRC turned into a de facto tax, which still remained hard and costly to comply with due to the complicated rules and long procedure of data collection and auditing.

After these changes, CRC lost its capacity to perform the role it was designed to play in the UK climate change programme. It turned into a tax almost duplicating the Climate Change Levy in terms of both policy role and charges, and indirectly overlapped with EU ETS, which already incorporated the carbon cost in the price of purchased power. The need for emissions reporting, which is considered an important CRC tool, will also become questionable in the view of Mandatory Carbon Reporting introduction. Therefore CRC became a complicated scheme with almost no input to the UK climate change regulations.

However, even apart from its mission and instruments, CRC has a number of significant flaws of design and implementation. Being very complicated and expensive to administrate, CRC does not create significant incentives for the participating organisations and is mostly seen as an inconvenience. As the research has demonstrated, almost no energy efficiency actions were undertaken by the participants as a result of CRC implementation. In fact, energy efficiency programmes were developed by the participants prior to the CRC introduction and were further implemented not as result of CRC compliance, but rather due to the overall high energy prices already addressed by the Climate Change Levy, the Carbon Price Floor and indirectly by EU ETS. CRC, in fact, restrained a number of organisations from investments in energy efficiency improvements as the funds which were allocated for this purpose were spent on managing CRC compliance.

Moreover, complicated rules of defining companies' boundaries and reportable supplies gave participants numerous opportunities to cheat on what to include in the CRC report and what not, making CRC an area of data manipulation rather than the energy efficiency scheme. Selling the sites or splitting the organisations became a much more popular way of emissions reduction than energy efficiency improvement.

These issues, together with the other CRC drawbacks, largely outweighed the scheme's achievements of drawing the higher management's attention to the question of energy efficiency, stimulating the regular collection of energy consumption information and

encouraging industrial participants to sign CCAs. An objection to this might be the positive change of the CRC reported emissions, which decreased in the second reporting year and, based on the analysis performed in this research, are expected to slightly decrease in 2013. Nevertheless, this emissions reduction cannot be attributed to the CRC scheme, but rather to the change of the CRC rules and other factors not related to the energy efficiency performance of participants.

Coming back to the aim and objectives of this research, the overall conclusion is that CRC has failed as a climate change mitigations scheme, having become expensive and redundant after just three years of implementation. Numerous complications and design flaws have resulted in the adverse effect to what the scheme aimed at, not causing any visible energy efficiency improvement among CRC participants. Obviously, this situation needs to be addressed.

There are different ways of the further scheme's development, yet incorporating the CRC charge to the energy invoices together with expanding Mandatory Carbon Reporting boundaries to include all CRC participants seems to be the most cost-effective way, while preserving the tools CRC is using at the moment. Bigger accent on the use of funds collected from selling CRC allowances is also needed in order to show environmental implications of the scheme and enhance the acceptability of the scheme.

An important aspect just partly considered in this research is the sectorial differences among the CRC participants and their view of the CRC compliance process. The analysis of the scheme perception by the Industrial, public and commercial participants as well as special needs and problems of each of these sectors might become a logical continuation of the analysis provided in this research.

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Appendix 1

Online survey sent to the participants

1. Do you consider CRC to be useful for climate change mitigation?

Yes, it directly affects energy efficiency

Yes, the money received for allowances selling is used for climate change mitigation

Yes, both in terms of energy efficiency and the use of funds

No, it has no effect on climate change

Other

If "Other", please specify

2. In your opinion, who can benefit from CRC?⁹

Participants Government Environment No one Other

If "Other", please specify

3. Has CRC influenced your decisions with regards to energy efficiency?

Yes, we are improving energy efficiency, both technically and behaviourally

Yes, we are improving energy efficiency technically

Yes, we are improving energy efficiency behaviourally

No, but we are improving energy efficiency due to other reasons

No, currently we are not committed to improving energy efficiency

Other

If "Other", please specify

⁹ Multiple answer question

4. If the price of the CRC allowances was higher, would it make you care more about the energy efficiency of your organisation?

Yes, the current price is too low to affect our decisions

No, we are already doing everything we can

No, additional charges do not provide the right incentives

Other

If "Other", please specify

5. Do you think that simplifications of CRC made the scheme easier to administrate?

Yes, now there are no significant problems with CRC compliance

Yes, but the scheme is still complicated

No, it did not become easier

No, changes involved new difficulties and/or expenses

Other

If "Other", please specify

6. Do you think that CRC needs further simplification?

Yes, it should be further simplified but remain a separate scheme

Yes, it should be merged with other climate change policies

Yes, it should be turned into a tax and appear on the energy invoices

No

Other

If "Other", please specify

7. Did the Performance League Table influence your energy efficiency and carbon management policy?

Yes, significantly

Yes, to certain extent

No

Other

If "Other", please specify

8. What is your opinion on the abolishment of PLTs?

Negative, they provided an adequate ranking of the CRC participants Neutral Positive, they provided misleading information Other

If "Other", please specify

9. How did your opinion about the government change after the abolishment of the revenue recycling?

Improved, the government is trying to improve CRC

Worsened, the government shows no commitment to the pre-announced policies No change

Other

10. Please, add any other comments in relation to CRC design/functioning or ideas on how it can be improved

Approximate interview protocol for Schneider Electric CRC analysts

- 1) Do you think that CRC is successful as a climate change mitigation policy?
- 2) Has CRC influenced energy efficiency of the participants? If yes, in what way? If no, why?
- 3) What do you think about the abolishment of the revenue recycling?
- 4) What about PLT abolishment?
- 5) What do you think about CRC policy with regards to renewable energy?
- 6) What type of measures/incentives do you consider to be the most effective in order to improve energy efficiency?
- 7) How can CRC be amended in order to achieve its goals (energy efficiency and better carbon management)?