Institutions and intermediaries in the global carbon markets: What is the effect of institutions and intermediaries on the sustainable development contributions of the CDM and PES systems?

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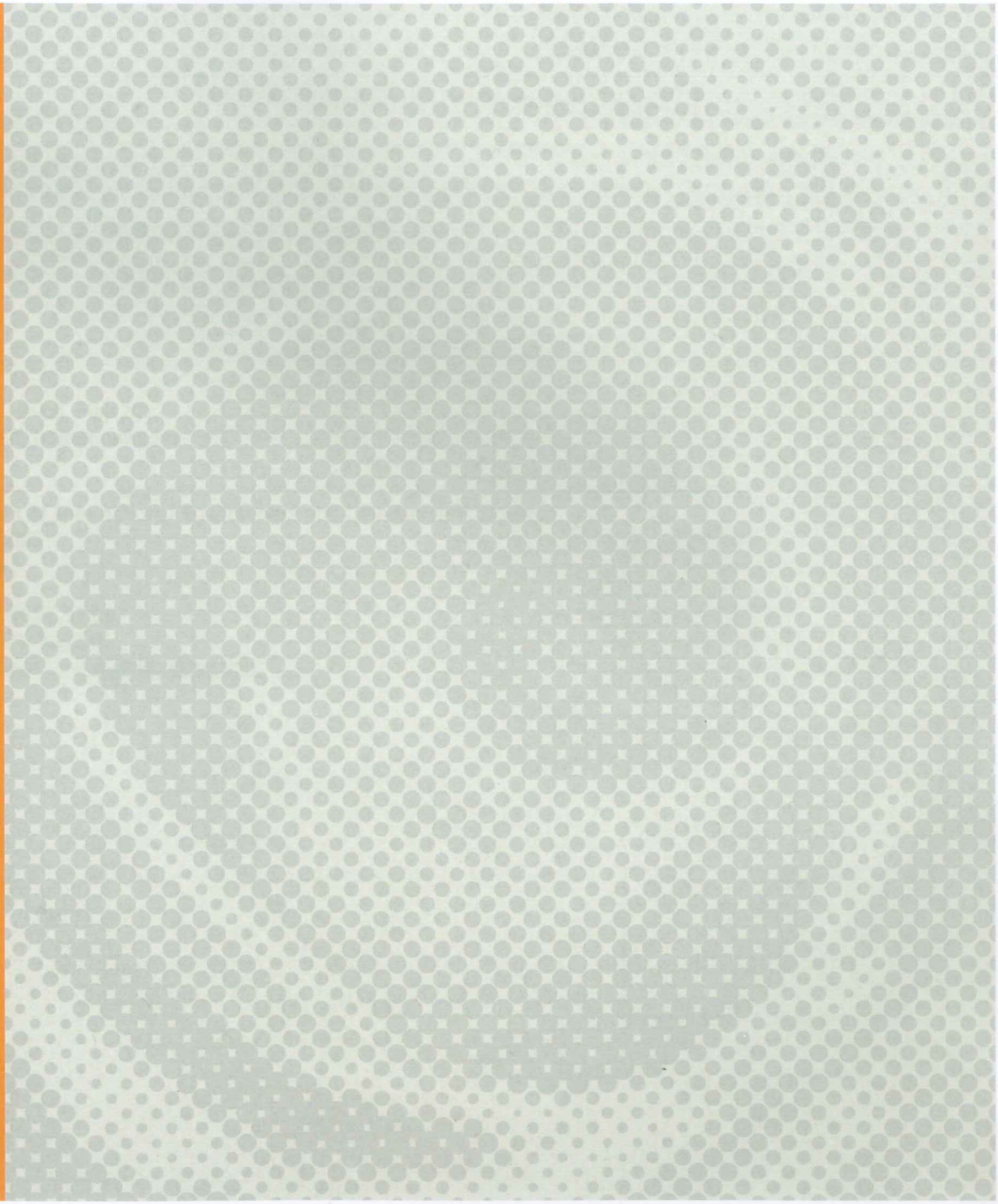

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Declaration

I, Anders Håvoll, declare that this thesis is a result of my research investigations and findings. Sources of information other than my own have been acknowledged and a reference list has been appended. This work has not been previously submitted to any other university for award of any type of academic degree.

Signature……

Date……

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Summary

This thesis is about institutions and intermediaries in the global carbon markets. In it I compare two types of financial mechanisms that have the same conceptual basis, but different governance and institutional structures. These two systems are the Clean Development Mechanism (CDM) and payment for environmental services (PES). The CDM is a compliance based system while PES is voluntary. I try to asses the institutional differences between the two systems, and examine how sustainable development (SD) is affected by these differences. I also focus on the roles and motivations of intermediaries operating in the CDM and PES systems by assessing how they affect the SD-contributions of the system they are a part of. In other words I assess how they influence the institutions they are a part of and how they in return are influenced by these institutions.

This thesis, then, has two main parts; one where I analyse the CDM and PES systems – and one where I analyze the roles and motivations of intermediaries in these systems.

In the first part of the thesis I attempt to answer the following research question:

> R1*: Do institutional differences between the compliance and the voluntary market lead to a difference in potential SD-contribution of the CDM and PES project systems?*

I do this by collecting and analysing data from 7532 CDM projects and 1569 PES projects. The data from this total of 9101 projects is sorted according to project type and categorized by how much each project type contributes to sustainable development. This makes it possible to make project distributions that show the *aggregate* potential SD-contributions of each system. I then analyze the results using a classical institutional economic theory approach. The findings show that the project type distributions between the CDM and PES systems are similar. However, if we split the PES system into two main segments big differences emerge. What I am doing is basically adding another institutional parameter to the way I organize the PES projects. PES projects use different kinds of standards for certification, and the available standards can be separated into two kinds: those that do *not* require SD-contribution in order to certify, and those that *do* require SD-contribution in order to certify. Applying this institutional parameter gives us two more project distributions. And these two new

distributions differ significantly from each other and from the other two distributions. I argue that this shows that institutional differences lead to a difference in aggregate potential SD-contribution.

In the second part of the thesis I analyse how intermediaries affect and are affected by the institutional differences established in the first part of the thesis. I do this by answering the second research question

> R2: *How do different types of intermediaries contribute to the sustainable development of the projects they are involved in?*

To do this I focus on private firm intermediaries working only in the CDM system, private firm intermediaries working only in the PES system and NGO intermediaries working in both the CDM and PES system. Here I have focused on two organizationally similar types of intermediaries (private firms) working in two different systems (CDM and PES), which makes it possible to assess how a difference in institutional context affects the motivations and roles of actors in those contexts. I have also included an organizationally different type of intermediary (NGO) in order to assess whether differences can be attributed to organizational differences rather than institutional differences.

The analysis in this part of the thesis is based on a survey. A total of 31 intermediaries responded. Of these 31, 12 where private firm intermediaries in the CDM, 10 where private firm intermediaries in PES, and 9 where NGOs working in both the CDM and PES systems. Unfortunately this was a rather limited number of respondents, so it was not possible to make any conclusive assessments – the results were however encouraging and the tendencies were clear. Basically the results showed that the roles and motivations of intermediaries were affected by the institutional context – and that different types of intermediaries contribute differently to the sustainable development of the projects they are involved in. In general, private firm intermediaries in PES are more motivated by environmental and SD-concerns that their CDM counterparts. Private firm intermediaries in PES and NGO intermediaries in CDM and PES also have a wider variety of motivations than private firm intermediaries in CDM. It was also discovered that intermediaries that specialize in one particular project type (often some kind of forest based project type) had the most direct positive effect on the SD-contribution of the systems.

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Abbreviations

ACR	– American Carbon Registry
BMV	– Brasil Mata Via
BoP	– Balance of Payments
CCBS	– Climate Community & Biodiversity Standard
CCX	– Chicago Climate Exchange
CDM	– Clean Development Mechanism
CER	– Certified Emission Reduction
CH4	– Methane
CO2e	– Carbon Dioxide Equivalent
CSP	– Corporate Social Performance
COP	– Conference of the Parties
COP/MOP	– Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol
CSR	– Corporate Social Responsibility
DOE	– Designated operational entity
EB	– Executive Board
EE	– Energy Efficiency
EU ETS	– European Union Emissions Trading Scheme
FCSI	– Forest Carbon Standard International
FP	– Financial performance
GHG	– Greenhouse gases
GS	– Gold Standard
HFC	– Hydrofluorcarbon
JI	– Joint Implementation
LDC	– Least Developed Countries
MtCO2e	– Metric Tonne Carbon Dioxide Equivalent
N2O	– Nitrous Oxide
NGO	– Non-Governmental Organisation
NGOi-CDM/PES	– NGO intermediary in both the CDM and PES system
OTC	– Over the Counter
PDD	– Project Design Documents
PES	– Payment for Environmental/Ecosystem Services

PFC	– Perfluorcarbon
PFi-CDM	– Private firm intermediary in the CDM system
PFi-PES	– Private firm intermediary in the PES system
PoA	– Programme of Activities
SD	– Sustainable Development
SF6	– Sulfur Hexafluoride
UN	– United Nations
UNEP	– United Nations Environmental Programme
UNFCCC	– United Nations Framework Convention on Climate Change
VCS	– Voluntary Carbon Standard
VER	– Verified Emission Reduction

1 Introduction

This thesis is about governance and the relationship between institutions and actors. More specifically it is about global environmental governance and how two specific market mechanisms designed to combat climate change work and how they influence and are influenced by intermediaries working in these markets. These two market mechanisms are the Clean Development Mechanism (CDM) and payment for environmental services (PES). PES is an umbrella term that includes markets dealing with carbon, biodiversity and water. Since I am comparing it with the CDM – which only deals with carbon – I only focus on the carbon part of the PES scheme. Thus this thesis is about two types of global carbon markets, how they were formed, how they work, what their strengths and weaknesses are, and the impacts intermediaries have on these markets.

Focusing on carbon also enables me to assess the different ways actors work within these market schemes. The CDM not only emphasizes the reduction of carbon, but also has a stated goal to do so in a way that promotes sustainable development (SD) – there are legal rules and regulations that are supposed to ensure the promotion of SD. The PES scheme has no such stated double goal – no legal rules and regulations that enforce SD-conciderations – and all emphasis on SD is thus a consequence of the motivations and preferences of the actors involved in the PES market. Basically the CDM market is compliance-based while the PES market is voluntary. This means that by using SD as a benchmark of comparison we can assess the roles and motivations of actors involved by how (or if) they pursue SD-considerations – in the CDM system they are obliged to pursue SD-considerations; but do they? and to what degree? – in the PES system they are not obliged to do so; but do they anyhow? and if so, why?. In essence I am using SD as a way to analyse the relationships between actors and institutions within two different types of governance systems.

This has real practical applications. Understanding how governance systems work, requires an understanding of how the institutions of these systems work and how they influence, and are influenced by, the actors in the systems. Particularly intermediaries, as actors, have been largely ignored by scholarly research, even though they play an integral part of any mature market system and thus in many governance systems. Expanding our knowledge of what drives intermediaries in the CDM and PES related markets, and how they influence the systems they are a part of will be of great value in future designs of governance systems, or

modifications of current systems. In addition to its practical application, this thesis also has theoretical value. It builds upon and further tests the classical institutional economic school of thought; using the concepts of plural motivations and plural preferences and the importance of institutions in the formation of such pluralities. By doing so I attempt to show that this theoretical approach is necessary to sufficiently explain the complex workings of the CDM and PES systems.

1.1 Research questions

In this thesis I approach the issues of global environmental governance and the sustainable development contributions of carbon markets from two related, but separate vantage points. Firstly I consider and asses the institutional workings and differences between the CDM and PES systems – I try to find out if there is a difference in aggregate SD-potential between the systems, and if there is, I try to explain why there is a difference. Secondly I focus on intermediaries working in the CDM and PES systems in order to establish their effect on the SD-contribution of projects they are involved with. I also assess to what degree motivations and roles of intermediaries can explain the potential differences found in the first part of the thesis. This leads to the following research questions:

Research question 1:

Do institutional differences between the compliance and the voluntary market lead to a difference in potential SD-contribution of the CDM and PES project systems?

Research question 2:

How do different types of intermediaries contribute to the sustainable development of the projects they are involved in?

In order to sufficiently answer the second research question, it is further broken down into three sub-questions:

(1) *What motivations do intermediaries have for being involved in the compliance or the voluntary market?*
(2) *What is the relationship between intermediaries and buyers?*
(3) *How do intermediaries affect project development and the potential SD-contributions of projects?*

These three sub-questions will enable me to answer the second main research question through a natural flow of inquiry; starting with basic motivations for participating in carbon offset projects – this helps explain the relationship[1] intermediaries have with buyers – which answers how intermediaries affect project selection and development, and the potential SD-contribution of projects.

1.2 Structure

This thesis is organized in 8 chapters. Following the introduction in chapter 1, chapter 2 provides background information on carbon markets and the CDM and PES systems – with a focus on issues pertinent to the thesis. In Chapter 3 I discuss the theoretical foundations, assumptions and considerations that form the approach taken in the thesis and use this discussion to formulate two hypotheses. In Chapter 4 I detail the methods used to arrive at the results and then I discuss the limitations of the study. In the two next chapters, 5 and 6, I present, analyse and discuss the results pertaining to research question 1 and 2, respectively. In Chapter 7 I discuss the basic findings presented in chapter 5 and 6 and the relationship between them. Finally, chapter 8 offers the main conclusions of the study.

[1] The relationship I am interested in is how first contact between intermediary and buyer is established and to what degree the preferences of the buyer and intermediary is important in the selection of projects – this will shed light on how much intermediaries influence the selection of projects and thus how they affect the SD-contribution of the project system.

2 Background

In this thesis I examine two kinds of financial mechanisms used to reduce greenhouse gas (GHG) emissions; the CDM system of the compliance market and the PES system of the voluntary market. I aim to assess if there are differences in the potential of these two systems to contribute to sustainable development (SD) and to analyse potential differences using institutional theory. I approach the issue by analysing the mechanisms with the use of carbon offsetting standards and project type distributions. Furthermore I use intermediaries in these systems as the main point of analysing potential differences.

In this chapter I will give the necessary background information on each of these aspects of the study so that subsequent arguments and discussions will be easy to follow.

2.1 Financial mechanisms in global environmental governance

It has become common to use financial mechanisms to combat global warming. One type of financial mechanisms is market based mechanisms – schemes where markets are created and formed to achieve certain goals. In the case of climate change mitigation a market based solution is seen as the most cost-effective way of reducing GHG emissions. It has the added benefit of involving the private sector because of the financial incentives it provides. These incentives make private actors lower their emissions and comply with national and international policies and targets. This also mobilises capital and channels this capital towards environmentally beneficial activities (Brown and Corbera, 2003).

There are two main types of carbon markets; the compliance market and the voluntary market. In the compliance market participants are obliged to be involved because the countries they are based in have legally binding emission reduction regulations. Those participating in the voluntary market have no such obligations. Both market types were created with the goal of reducing GHG (UNFCCC, 2011) (Brown and Corbera, 2003).

Pertaining to the voluntary market, the projects types that generate the emission reductions are commonly labelled as payment for environmental services (PES). In the compliance market there are several different systems, but the focus here is on those pertaining to the Clean Development Mechanism (CDM).

2.2 The carbon markets

There are two fundamentally different types of carbon commodities; *allowances* and *offsets*. Allowances are used in *cap-and-trade systems* while offsets are created by *baseline-and-credit systems*.

The cap-and-trade system sets an overall cap to stop the growth of emissions. Each of the involved actors (usually countries, regions, sectors and industries) gets a certain amount of allowances based on an emission reduction target. This means this country, region, sector and industry can not emit more than the set *cap*. If, for example, a sector consists of 10 factories and the cap is 1.000 MtCO2e a year for that sector, each factory[2] would get 100.000 allowance units (each unit corresponding to one tonne of CO2e). If a factory calculates it will emit more than 100 MtCO2e, it will have to either implement emission reducing measures or get a hold of more allowance units in order to counteract the projected amounts of emissions above the cap. It can do this by buying allowance units on, for example, the European Union Emission Trading Scheme (EU ETS). In effect this factory buys allowance units from other factories that will be emitting below the cap and therefore have a surplus of units to sell off and profit from.

This *cap* in the system means that there is a finite supply of allowances, set by regulations and negotiation; allowance units are not created nor removed, there is a set pool of units that is being traded between the participants (Kollmuss, et.al. 2008). This means that a cap and trade system does not reduce emissions; it only sets a roof on its growth.

[2] This is a purely hypothetical example and all numbers and the distribution of allowances are simplified in order to make a clear point.

The baseline-and-credit system on the other hand does not have a finite supply of allowances. In stead it deals with credits, and new credits are created with each new project. These credits can then be used to comply with a regulatory emission target, be traded or used to voluntary offset some sort of activity (Kollmuss, et.al., 2008). Credits that are used to comply with a target or otherwise used to offset some activity are *retired* – taken out of the system. The actor doing this is an *end user*. Credits generated by CDM (and JI) projects are called certified emission reductions (CERs) and the most common credits generated by PES projects are called verified emission reductions (VERs). One credit (both 1 CER and 1 VER) equals the reduction of one tonne of CO2e[3].

It should be noted that although the CDM is not a cap-and-trade system, it is part of the cap-and-trade scheme. CERs are bought and used by actors under Kyoto cap-and-trade regulations to keep their emissions below the set caps. This is what the CDM system is designed to do; it is one of several flexible mechanisms meant to make it cheaper and easier for actors to adhere to their Kyoto commitments.

Both the CDM and PES schemes are baseline-and-credit systems. The main difference between them is that CERs are accepted in the compliance market while VERs are not. So the PES scheme belongs to the voluntary market and the CDM scheme to the compliance market.

The main differences between the compliance market and the voluntary market is size (in volume and value), incentives for participation, and formalization and transparency of project and transaction data.

The biggest part of the compliance market is the European Union Emission Trading Scheme (EU ETS) which is a cap and trade system. In 2010, approx. 76% of the volume and 85% of the value in the global carbon markets were transacted in the EU ETS. The two systems of focus in this study are thus considerably smaller than the EU ETS. The primary and secondary markets of the CDM make up approx. 16% of the volume and 14% of the value of the global carbon markets, while the PES voluntary market makes up approx. 2% of the volume and 0,5% of the value (Peters-Stanley, et.al., 2011). Table 1 shows estimated transaction values and volumes of the global carbon market for the years 2009 and 2010.

[3] Carbon dioxide equivalent

Table 1: Transaction Volumes and Values, Global Carbon Market, 2009 and 2010

	Volume (MtCO2e)		Value (US$ million)	
Markets	2009	2010	2009	2010
Voluntary OTC	55	128	354	414
CCX	41	2	50	0,2
Other exchanges	2	2	12	10
Total voluntary markets	98	132	415	424
EU ETS	5 510	5 529	105 756	106 024
Primary CDM	135	94	2 858	1 325
Secondary CDM	889	1 005	15 719	15 904
Kyoto (AAU)	135	19	1 429	265
RGGI	768	45	1 890	436
Total regulated markets	7 437	6 692	127 642	123 954
Total Global markets	7 535	6 823	128 057	124 378

Source: Peters-Stanley, et.al., 2011

The voluntary market consists of the OTC (over the counter market), CCX (Chicago Climate Exchange – now defunct; hence the radical drop in volume and value between 2009 and 2010) and other smaller exchanges. The regulated market is substantially larger with the EU ETS dominating, but this study is concerned with the primary and secondary CDM markets.

The incentive for participation for those involved in the compliance market is regulations and legal obligations. For those involved in the voluntary market the incentives are less clear. There are no legal regulations forcing buyers to participate. One of the purposes of this study is to uncover more about these incentives and the motivations of those that participate, but for now it suffices to stress that there is a clear difference and that this has affected the size, shape and workings of the two markets.

The CDM system and the compliance market is much more formalized and transparent than the PES system and the voluntary marked. The CDM is instituted through the UN and its project cycle has always followed stringent regulatory and oversight-procedures. All data and documents pertaining to the registration of a project, its development and implementation, the monitoring process and its potential validation and production of CERs, are kept on public record. This has not been the case in the voluntary market. But as the voluntary market has

grown in size and sophistication so has the need for formalization. In recent years such a process has matured the market and made it more accessible. Registries are collecting more and more project data and the processes of monitoring and validating the additionality and SD-benefits of projects has become more important and more transparent.

Since the voluntary market is exclusively based on the PES system, which is a baseline and credits system, the most comparable counterpart in the compliance market is the CDM system, which is also a baseline and credits system. The markets related to these two systems are also more equal in size than compared to the EU ETS market – although the CDM market is nearly an order of magnitude bigger than the PES voluntary market.

The following chapter will describe the conceptual workings of the baseline-and-credit type of project system, starting with the PES system. The CDM is basically a PES type of system but more formalized and with a more complex project cycle – so describing the PES system lays the foundations for describing the CDM. Therefore the next chapter will start by describing the PES system.

2.3 Payment for Environmental Services

The Millennium Ecosystem Assessment revealed that nearly two thirds of global ecosystem services are in decline. These services are crucial in regulating and supporting natural and human systems and "[crucial] for the sustainability of human development in economic, social, cultural and ecological terms"(Corbera et al., 2007). Our engineering of the world and its resources has led to a depletion of natural resources that is often much greater than is socially optimal. All this conversion of natural capital is however not undesirable, but different forms of production and trade can have detrimental effects on ecosystems and the environment as a whole. An example of such effects are the produce of external effects (externalities) – certain production methods create by-products in the form of pollutants, certain types of land use can be harmful for a watershed, the atmosphere, biodiversity, or even all of these at once. Payment for Environmental/Ecosystem Services (PES) is a scheme that tries to engage the private sector in activities that improve these environmental services by commoditizing externalities and creating a market where these commodities can be traded.

PES is often used as a broad umbrella term that includes all kinds of market based mechanisms for conservation and ecosystem improvement. They are therefore not always easy to classify and do not necessarily fit with all the points of common definitions. Definitions have however been attempted and one of the most commonly used is suggested by Wunder (2005), which states that PES is:

(a) a *voluntary* transaction where
(b) a well-defined *environmental service* (or a land use likely to secure that service)
(c) is being 'bought' by a (minimum one) *service buyer*
(d) from a (minimum one) *service provider*
(e) if and only if the service provider secures service provision (*conditionality*)

In "pure" markets buyers and sellers enter *voluntarily* into a market that occurs because someone has something to sell that someone wants to buy. When it comes to environmental services things are more complicated. The economic value of these services is seldom recognized. When a timber company clears parts of a forest they will factor the benefits of selling the timber versus the costs of cutting down and processing the trees. They are however "unlikely to consider forest environmental services to external users" (Wunder et al., 2005), which means they will not consider the *public good* nature of the mitigation of carbon emissions that stems from not cutting down the trees. *Unless they are being directly rewarded to do so*. Hence the externalities are commoditized. Monetary value is given to the improvement of an environmental service. This is however not something that happens spontaneously, it is the act of specific policies that take a lot of effort. Rights have to be defined, the commodity delineated and the group of users and providers specified (Vatn, 2010). It is a difficult process, and a costly one at that, where exclusion often is demanding, transaction costs are high and in many instances property rights are plural or otherwise ill-defined.

2.4 The Clean Development Mechanism

The overarching goal of the UN Framework Convention on Climate Change (UNFCCC) is to stabilize the concentration of greenhouse gases in the atmosphere in order to limit the pace and magnitude of climate change. There is a further goal to do this in a way that helps assure food security, service ecosystems and promote sustainable economic development. This will require profound reductions of global emissions compared to current trends (Ellis, et.al., 2005). The Kyoto-negotiations tried to find ways to achieve these goals by asking how the global community can reduce GHG emissions in a socially and environmentally sustainable way. One of the answers to this question was the Clean Development Mechanism. The CDM was supposed to be one instrument, amongst several, in a global pursuit to achieve the aims of the UNFCCC.

The CDM is a mechanism established by the UN to help facilitate the agreements of the Kyoto Protocol. Basically it is an institutionalized scheme where developed (Annex 1) countries can meet their emission targets in a cost efficient way by funding projects in developing (non-Annex 1) countries. An Annex 1 country actor pays for a project in a non-Annex 1 country and in return gets carbon credits known as certified emission reductions (CERs), each equivalent to one tonne of CO2 (or CO2 equivalent – CO2e). These CERs can then be retired to let the actors reach their own emission targets or they can be traded on the carbon market. The projects must in some way reduce emissions compared to a *business as usual* scenario, and they must promote sustainable development. Basically the CDM projects are based on the same reasoning as the PES projects described above – externalities are commoditized and a market is created wherein they can be traded.

The rationale and basic workings of the CDM system is thus conceptually similar to the PES system – but the project cycle is more complex: The highest authority in the CDM system is the Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol (COP/MOP). The COP/MOP has authority over and makes rules for the CDM, decides on the recommendations made by the Executive Board (EB) and designates operational entities that are provisionally accredited by the EB. The EB has the daily supervision of the CDM and the designated operational entities (DOEs) perform the tasks of validating, verifying and

certifying the CDM project activities throughout the project cycle (UNFCCC, 2011) (Paulsson, 2009).

When a project developer wants to register a project in the CDM pipeline, it has to prepare a project design document (PDD) where it describes the planned project activities. This has to be validated by the DOE. In addition it also needs a letter of approval from the Designated National Authority (DNA) which makes sure the project contributes to the sustainable development priorities of the host country. It also needs a letter of approval from the DNA of the Annex 1 country funding the project. If the project gets a positive validation, relevant documents (validation report, PDD, written approval from parties involved) are sent to the EB which has to approve or reject the request for registration. If the project gets approved and registered, the project owner must monitor the emission reductions and provide a second DOE with a monitoring report. This report must in turn also be verified. Based on the monitoring report and on-site inspections, the DOE writes a verification report. If the monitoring is found to be satisfactory the verification report serves to certify to the EB that the claimed emission reductions have actually been made. If the EB have no further objections, they issue CERs corresponding to the emission reductions. A share of the proceeds is subtracted to cover administrative expenses and 2% of the CERs set aside for the adaptation fund. The rest of the CERs can be used to count against the host countries carbon emission targets or traded with on the carbon market (Paulsson, 2009).

The biggest difference between the CDM and the PES systems is that the CDM is much more of a top-down type of construct with heavy oversight, lots of regulations and a complex project cycle. The PES system is simpler in its workings.

2.5 Additionality and SD-benefits

Additionality is the measure of actual reductions of GHG emissions compared to a business as usual scenario. It answers the questions of whether there has been a reduction of emissions and whether this reduction would have happened anyway if it was not implemented as an offset project.

The topic of additionality is one of the most important and contentious issues in the carbon offsetting schemes (Kollmuss, et.al., 2008), and the ability to measure and prove the additionality of a project is essential to secure the integrity of the mechanisms and the markets. The measuring of additionality is also closely connected to the setting of baselines; determining what level of emissions one shall measure reductions against in order to establish additionality. These two factors – baseline-setting and additionality – are the most important aspects of most CDM methodologies, and the focal point of much of the CDM literature.

SD-benefits is the measure of how a project contributes to sustainable development – or the measure of benefits the project generates in addition to additionality. A study of 744 CDM projects by Olsen and Fenhann (2008) categorizes the main categories of SD-benefits as environmental benefits, social benefits, economic benefits and other benefits. These types of SD-benefits are what is meant by sustainable development improvement and apply to how CDM and PES projects influence stakeholders. Further sub-categorization, dimensions and criteria for the SD-benefits used in this study are listed in table 3 (chapter 5.1).

2.6 Standards and project types

In order to generate CERs or VERs, projects, in theory, have to produce actual results. Real emissions reductions have to be made – one credit must correspond with one tonne of reduced CO2e. Standards and methodologies are the way the CDM and PES schemes try to ensure this.

2.6.1 The CDM methodologies

The CDM has an extensive registry of methodologies. All these various methodologies are tools and guides to how different projects and project types shall be monitored and assessed. For a project to become a CDM project and generate CERs it must be verified and validated by an accredited third party. The CDM methodologies set the standards and give the instructions as to what criteria must be met in order for the project to be verified and validated. The main focus of these methodologies is how to set baselines and measure additionality. There are in some cases mentions of CDMs dual goal (with a focus on

improving the lives of women and children) (UNFCCC, 2011), but these are seen as indirect SD-benefits such a methodology might produce and there are no formal mechanisms for monitoring and verifying the actual SD-outcomes of these projects.

2.6.2 The PES standards

In 2010 standards became a real force in the voluntary market with 90% of its traded credits validated by one or more standards (Peters-Stanley, et.al., 2011). It should be noted that CERs are accepted in the voluntary market, so buyers have the option to either buy credits from CDM and JI projects or from PES projects (Kollmuss, et.al., 2008). In the case of the voluntary market, CDM is a type of standard. It is however far from the most commonly used standard. The most important standards are the: Verified Carbon Standard (VCS), Climate, Community & Biodiversity Standard (CCBS), Climate Action Reserve (Reserve), Gold Standard (GS), Brasil Mata Via (BMV) Standard, Forest Carbon Standard International (FCSI), American Carbon Registry (ACR), ISO-14064-2, SOCIALCARBON, and Plan Vivo.

All of these standards have different criteria for validation – some are concerned only with additionality, some are concerned only with SD-benefits and some with both additionality and SD-benefits. (Kollmuss, et.al., 2008). The standards listed represent approximately 90% of the market share of transacted credits in the voluntary market (Peters-Stanley, 2011).

2.6.3 Project types

There are many different types of projects that produce offsets. These types are categorized in different ways, but the categorization used in this thesis is the one used by the UNFCCC, as shown in Table 2. Here the project types have been categorized according to sector. In this thesis the sector categorization is not important because it is too broad – there are significant differences between the project types within the sectoral categorizations – so the important aspect of Table 2 is the right column which lists the project types within each sector. The name of project types used in the PES system differ to some degree from the ones listed in Table 2, but there was no problem in conforming them to the nomenclature of the UNFCCC.

Table 2: CDM and PES project categories and types

Project category	*Project type*
HFC & N2O reduction	HFCs PFCs SF6 N2O
Renewables	Biomass energy Geothermal Hydro Solar Tidal Wind
CH4 reduction & Cement & Coal mine/bed	Agriculture Cement Coal bed/mine Fugitive Landfill gas
Supply side EE distribution	EE supply side EE own generation Energy distribution
Fuel switch	Fossil fuel switch
Demand-side EE	EE households EE industry EE service
Afforestation & reforestation	Afforestation Reforestation
Transport	More efficient transport, biofuels are under biomass energy

Source: UNEP Risø Centre, 2012

2.7 Intermediaries

Intermediaries in the CDM and PES projects and markets can be non-profit or for-profit actors (NGOs and private firms) and mostly offer the same services. The main services can broadly be labelled as *project development* and *financial services*. Most intermediaries offer services in both these categories, but some only offer one or the other. There are also many intermediaries that operate in both the compliance market and the voluntary market.

2.7.1 Project development services

Project development services entail all services that directly involve the project development process. For the CDM system this means the preparation of all documents required in the CDM project cycle registration process, actual on ground project implementation using a CDM methodology corresponding to the project type, and subsequent monitoring of the project. This type of service can also include other pre-work such as measuring the GHG emissions of a client and identifying viable CDM projects.

The project development services in PES related projects and markets differ little from the typical CDM project development services. There is less work with project document preparation because the project cycle is less stringent, but there is still some degree of this type of service needed. Otherwise project developers prepare, implement and monitor projects.

2.7.2 Financial services

Financial services are mainly comprised of strategic market analysis and risk assessments, brokering services and funding. In addition to this some intermediaries in the voluntary market also act as wholesalers and retailers, but these are in the minority[4].

The intermediaries researched in this study are private firms and NGOs that offer both project development and financial services, or one of the two.

[4] The market share by business type in 2010 was approx. 65% project developers – 21% brokers – 11% retailers – 3% wholesalers (Molly Stanley-Peters, et.al., 2011)

3 Theory

On the most basic level this thesis operates within the social constructivist paradigm and my approach is based on the classical institutional economics school of thought.

The epistemological consequences of this is the belief that there are more complex ways of arriving at the truth than those prescribed by neoclassical economics and that their ways are, although easily accessible and based on simple and clear models, sometimes to simplistic to give a thorough representation of the world as it really is. There are definitely merits to simple models, but there is a such thing as too much simplicity; to echo a sentiment made by Albert Einstein; “Everything should be made as simple as possible, but not simpler.”

This sentiment coupled with the core tenants of Elinor Ostrom’s thoughts on research approaches forms the ontological and epistemological foundations of this study. Ostrom argues that “unfortunately, the preference for simple solutions to complex governance problems continues to be strong” and goes on by stating “Instead, we need to recognize and understand the complexity to develop diagnostic methods to identify combinations of variables that affect the incentives and actions of actors under diverse governance systems” (Ostrom, 2007). Thus in this thesis I value complexity, recognize the importance of context, reject reliance on absolutes and am acutely aware of the reality of change[5].

3.1 Theoretical assumptions

In this thesis I use the core theoretical assumptions of classical institutional economic theory in my analysis of the compliance and voluntary carbon markets. This theory stands in contrast to and challenges the core assumptions of neoclassical economic theory. Neoclassical economical theory is axiomatically based on the central concept of rational choice as maximizing individual utility. This entails that individuals as actors will always act rationally, and a rational act is one that attempts to maximize the utility/happiness of the actor. From this central tenet one can define three core assumptions of neoclassical economical theory;

[5] Change in this context means change of preferences, change of behaviour and change of context.

(a) rational choice as maximizing individual utility, (b) stable preferences and (c) outcomes as equilibrium states. When acting rationally the individual actor always tries to maximize its utility and he is not influenced by institutional context i.e. his preferences are stable. This entails that external influences and changes do not affect the preferences of the individual. Furthermore, such stable preferences lead to equilibrium states. Given stable preferences the only acts rational actors can undertake are exchanges – they exchange goods (tangible or intangible) which can be demarcated and which maximize utility. They will do this until no more gain can be achieved; thus producing an equilibrium state (Vatn, 2005).

Classical institutional theory is founded on a social constructivist perspective and thus challenges the core assumptions of neoclassical economic theory. Fundamentally this entails the belief that rationality is in fact context dependent; motivations and preferences – and thus actions – are socially influenced. Individuals form institutions and are in turn formed by institutions; as the context changes, so do we – and as we change, so does the context. Rational choice is not limited to utility maximization, preferences are not stable, and evolution is the norm, not equilibrium states. This classical institutional economic perspective thus leads to the assumptions that people and institutional actors can have more than one motivation and therefore can have several different preferences that may change depending on institutional changes and social pressure. It also assumes that institutions are formed by its actors, and in turn influence and form these actors. This implies an acceptance of the complexities of socio-ecological systems and the contention that big systems such as the CDM or the PES need to be analysed with other approaches than just those prescribed by neoclassical economic theory.

These assumptions are made on the background of the extensive area of research and literature concerning the issue of human choice – especially the large number of publications on behavioural experiments presented over the last couple of decades. The standard model of rational choice – the one neoclassical economic theory is based on, as explained above – can be labelled as rationality as maximizing individual utility (RMIU) (Vatn, 2009). The RMIU model does however not sufficiently explain the data from many behavioural experiments. People are observed to cooperate and share in situations where doing so could not be said to maximize their utility – there are no evident or explicit gains for the individual. These empirical observations come from different types of behavioural experiments such as: *Ultimatum games* (Güth et al., 1982); (Gintis, 2000) – *Public goods games* (Ledyard, 1995)

(Gintis, 2000) – and the so called *crowding out* literature that shows similar outcomes, e.g. (Frey, 1997). What these experiments and literature show is essentially a willingness to compromise ones maximization of utility in favour of cooperation and fairness to others – in a way that does not backhandedly favour the individual making the choice. By this I mean that proponents of the RMIU model could argue that the individual cooperates and shares because it calculates that doing so will favour him or her in the long run and thus it will in a deeper sense actually be a purely selfish act. However, many of the experiments are single shot games where there is no future interaction to strategically consider, and still a high number of individuals cooperate and share.

The literature on the field offers different models to try and explain this phenomenon of cooperation. Several of them boil down to a broadening of the utility concept and an expansion of the utility function. The RMIU model, for example, handles these results by broadening the concept of utility in a way that, in my opinion, renders the concept nearly meaningless and takes away its ability to make any sensible predictions. By terming all types of choices and actions as some sort of deeper indirect expression of utility leaves you nothing left that is not utility-based – which is to grossly devaluate the complexity of human emotions and cognitive functions and indeed the interconnectedness of human society. Other approaches include the idea of *reciprocity*, or a *second generation model of bounded rationality* that combines many of the other models (see Vatn, 2009, for a discussion on these models and explanations). All these models and explanations are however based on methodological individualism. In this thesis I follow Vatns (2009) attempt to go beyond models limited by methodological individualism.

What following Vatns approach basically means is to work from the assumptions that behaviour can be motivated by both individual and social rationality and that institutions have a more prominent role in determining the motivations and preferences of actors in a social setting. Institutions are seen as "socially constructed remedies that help people coordinate their behaviour. Institutions define the logic of a situation, differentiating between circumstances where the individual can pursue its own interest as opposed to where it should (also) take the interest of others into account and cooperate" (Vatn, 2008). The observations from the behavioural experiments are thus explained with the role of institutions and their relationship with us individuals. Institutions (laws and regulations, norms, conventions) endow social contexts with a rationality that affects the behaviour of actors in those contexts.

It also allows for a plurality of motivations and preferences which I think are essential in order to understand and explain any system of a certain complexity that involves several actors in different settings. Institutions facilitate and coordinate the interactions of people and society – an absolute necessity in any complex system.

Neoclassical economic theory and the RMIU model based on methodological individualism would probably not be able to explain all the facets of the CDM and PES systems, because it does not accept the importance and prominence of the plurality of changing motivations and preferences that classical institutional economic theory assumes. A neoclassical economic approach is very useful in many circumstances, but it is, in my opinion, at times too simplistic and only applicable within a certain set of parameters, and I would claim that the CDM and PES systems have complexities that go beyond such parameters and thus need a different approach in order to be sufficiently understood. Classical institutional economic theory offers such an approach.

3.2 Hypotheses

In the following I will use the theoretical assumptions discussed above to formulate two hypotheses – each of which will correspond to the two main research questions.

Firms are by design motivated primarily by the maximization of profits. This means that firms operating as buyers within the scope of market based mechanisms for global environmental governance will gravitate towards projects and types of projects that promise the biggest returns at the lowest costs. Buyers in the CDM system are compelled to participate in the system because of regulations. And as such they are only interested in fulfilling their obligations, and they strive to do this as cost-effectively as possible. This entails the assumption that CDM buyers are only interested in cheap CERs and that they do not care what types of projects these CERs come from. This furthermore leads to the assumption that buyers in the CDM system are not concerned with the SD-benefits of the projects they are involved with.

For buyers in the PES systems the reasons for participation are less clear. They have no legal or regulatory obligation to participate, but choose to do so anyway. There has to be assumed other motivations at play than just profit maximization. The assumption, then, is that buyers in the PES system are driven by a plurality of motivations. There will certainly be those who are primarily motivated by profits – seeing the voluntary carbon market as a business opportunity or assuming that participation in environmentally friendly projects garner positive PR and that this leads to increasing profits. But other motivations are also assumed. Such motivations include: altruism or philanthropy, corporate social responsibility (CSR), social pressure, pre-compliance positioning, or a combination of these – the wish to work on environmentally friendly projects for the sake of doing so, but with the added benefit of making profit. The main assumption here is that there are a plurality of motivations and preferences at play in the voluntary market. This also entails the assumption that buyers in the voluntary market have different criteria for measuring the success of the projects they are a part of; that there is a segment of the buyers that is genuinely concerned with the actual outcomes of the projects they are involved in, not only the credits garnered from the project.

So, working from the assumptions that institutions affect actors and in return are affected by these actors, and that PES actors are assumed to have a wider variety of motivations, including, but not limited to, more altruistic motivations than CDM actors; it should stand to reason that there will be differences in the aggregate SD-contributions of the two systems – thus the first hypothesis is

> H1: *Institutional differences between the CDM and PES systems lead to differences in the aggregate potential of these systems to produce sustainable development benefits.*

The second part of the thesis focuses on the intermediaries in the CDM and PES systems. It is assumed that the private firm intermediaries of the two systems have motivations that mirror those of the buyers in these systems. This assumption entails that the private firm intermediaries who only operate in the CDM system (PFi-CDM) are mostly concerned with profits and are not particularly concerned with the SD-benefits of the projects they are involved with – for the private firm intermediaries only operating in the PES system (PFi-PES) it entails that they have more varied reasons for working within the system and that their motivations include other things than just profits; and thus that they are more concerned with the SD-benefits of the projects they are involved with. This study also includes NGO

intermediaries working in both the CDM and PES systems (NGOi-CDM/PES). The assumption is that because NGOs are designed to pursue altruistic and philanthropic goals they will be mostly concerned with the actual outcomes of the projects they are a part of; thus they serve as an opposite to the PFi-CDM. The assumption is that on a scale PFi-CDM and NGOi-CDM/PES will be on opposite sides and the PFi-PES will lie somewhere in between these two. I also distinguish between organizational motivation and motivation of output. This means that I consider both what the intermediary wants for itself *out* of a project, and what it wants to achieve *with* the project – organizational motivation vs. output motivation.

Figure 1 illustrates these assumptions and propels the second hypothesis of the thesis.

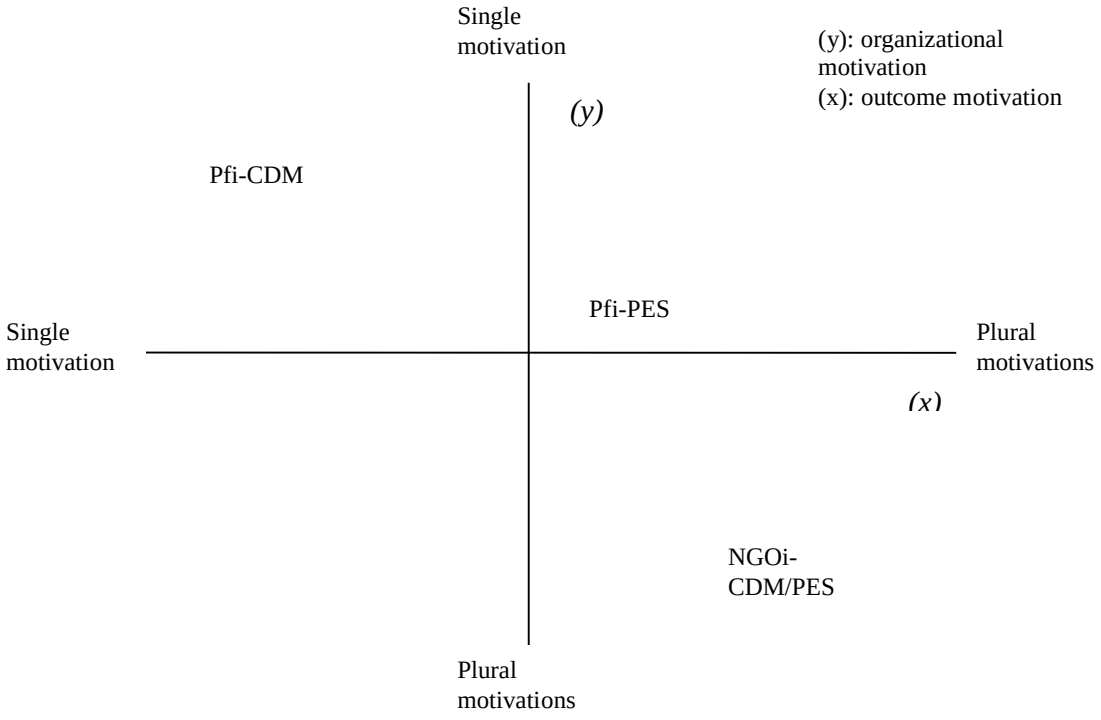


Figure 1: The position of different types of intermediaries on a hypothetical motivational axis. The horizontal x-axis is the outcome motivational axis – which means that the more to the right you are, the more plural your motivations for outcomes are. The vertical y-axis is the organizational motivational axis – which means the higher up you are the more singular the motivations for what you want to achieve for your organization are.

The second main research question of the study asks: *How do different types of intermediaries contribute to the sustainable development of the projects they are involved in?*. Based on the assumptions above, as illustrated in Figure 1, the second hypothesis of this thesis, then, is:

> H2: *There is a difference in motivations and preferences between the different types of intermediaries depending on what system they are a part of and this leads to a different contribution to the sustainable development of the projects they are involved in.*

4 Methods

This thesis is designed using a mixed methods approach using academic literature, a survey and data from online registries. It is primarily a desktop study with both primary and secondary sources. The primary sources consist of data collected from online registries, webpage-research and a survey of a selection of PES and CDM intermediaries. The secondary sources consist of available academic literature on the research topics.

4.1 The use of academic literature

The research began with an examination of the available academic literature on the topics of the compliance and the voluntary market and its related CDM and PES project systems. This was approached by using the "snowball method": the most recent articles on the topics were found and then the relevant articles cited in these were found, and then the relevant articles cited in these were found. The chain was exhausted by the fourth round and a satisfactory body of the relevant literature had been amassed.

The academic literature has been used throughout the thesis to inform, and reflect on, the data gathered from the primary sources. It has provided a backdrop to the data found and a benchmark for how to analyse and discuss this data.

4.2 Data collection and analysis

The thesis has made use of data gathered from online registries. The CDM system has a single and extensive registry of all its projects. It also has sources with analysis of the data in this register – a CDM-pipeline spreadsheet provided by the UNEP Risø Centre on Energy, Climate and Sustainable Development. The registry and its linked analysis have been used as primary and secondary sources, respectively, in this thesis.

The PES system and the voluntary market does not have a single complete registry. There are instead several registries and there are no sources linked to these registries that comprise and

analyse the data in them, so in the case of these registries all the data was gathered and analysed for this thesis. What this means is that in the case of the PES data I had to read through project descriptions of 1569 PES projects to identify project types and standards used for certification.

The data gathered from these online registries thus included 7532 CDM projects and 1569 PES projects. The data of the total of 9101 projects was sorted according to project type, certification standards used, and a ranking of potential SD-contribution of project types based on a study done by Olsen and Fenhann (2008). These project type distributions were analysed using a chi-square test for independence using excel- and graphpad software.

4.3 Selection of cases

Ideally I would have selected four categories of interview objects, all intermediaries in the CDM- or PES-system:

- private firms working *only* in the CDM-system
- NGOs working *only* in the CDM-system
- private firms working *only* in the PES-system
- NGOs working *only* in the PES-system.

The reason for excluding intermediaries working in *both* systems was to streamline the cases into distinctively separate categories so that comparisons between the systems could easily be made. It was however discovered there were no NGOs working *only* in the CDM-system. In fact, most of NGOs working in carbon offsetting do so either in the PES-system or in a mix of both the CDM- and PES-system. Therefore the only viable option was to make three categories:

- private firms working *only* in the CDM-system
- private firms working *only* in the PES-system
- NGOs working in *both* the PES- and CDM-system

These categorizations are used frequently in the subsequent parts of the thesis so in order not to confuse the reader they are henceforth abbreviated in the following way:

- private firm intermediaries in the CDM-system = *PFi-CDM*
- private firm intermediaries in the PES-system = *PFi-PES*
- NGO intermediaries in both systems = *NGOi-CDM/PES*

The selection of cases was made from a database amassed from available online registries. The registries used were the CDM project cycle database (UNFCCC, 2012) and the CDM Bazaar (cdmbazaar.net, 2012), ecosystemmarketplace.com, cdmgoldstandard.org, markit.com, carboncatalog.org and vcs.com. Using these databases, intermediaries working in the CDM or PES system were identified and collected in a database. The database thus amassed consisted of 1091 potential cases. The next step was to eliminate cases that did not fit the parameters of the study. One parameter, as explained above, was that the private firm intermediaries had to work exclusively in one of the two systems. This meant excluding those that operate in both systems. The second parameter was that they had to be a big part of the life cycle of the project. This means that they had to be influential in the selecting of projects, the implementing of projects and the transactions of credits ensuing from the projects – the interesting intermediaries were those that offered extensive project development services and/or financial services. The reason for this parameter is to exclude intermediaries that do not substantially affect the life cycle of projects and thus do not affect the potential SD-contribution of projects – the purpose of the second part of the thesis is to answer the research question of: *How do different types of intermediaries contribute to the sustainable development of the projects they are involved in?* – answering this required intermediaries that are sufficiently involved to actually have an effect. This second parameter lead to the exclusion of the following types of intermediaries:

- *those offering only technical services*: companies that only develop the technology used in projects, software developers producing computer programs for GHG emissions accounting, etc.
- *law firms*: companies only offering legal services
- *third party verifiers/certifiers*: companies and NGOs offering only verification and certification services
- *media/press*: companies offering only communication consultancy

In addition to these exclusions were potential cases that offered no information in English, German, Swedish, Danish or Norwegian. There were also cases where webpage links were broken and/or no contact details were provided.

These exclusions were done by identifying intermediaries from the different databases and then visiting and reading their web-pages to learn the necessary information about the respective firms and NGOs.

The exclusions based on the second parameter reduced the number from 1091 to 353 potential cases. These 353 cases consisted of 321 private firms and 32 NGOs. The next step was to exclude companies that worked in both the compliance- and the voluntary market – exclusion based on the first parameter. These kinds of companies turned out to be in the majority, making up for 195 of the 321 remaining potential cases. Thus the final number of cases that fit the parameters of the study was 158; 76 PFi-CDM, 50 PFi-PES and 32 NGOi-CDM/PES.

4.4 Surveying and analysis of survey answers

Ideally a face to face interview with all of the 158 intermediaries would be preferred. This was however not at all possible because the firms and NGOs of interest are spread out across the globe and there were *some* resource limitation to this thesis. Telephone interviews was also an option, but turned out to be impossible to execute because potential respondents were reluctant to commit to the time it would take to do a meaningful interview. Thus in this part of the thesis I used a survey to gather my data. Given the resource limitations this was the only method that ensured a high enough number of respondents.

All of the 158 cases were contacted by mail and/or telephone and asked to participate in the survey. The final number of participants who responded to the survey was 31 of the 158 potential cases. 12 of these were PFi-CDM, 10 were PFi-PES and 9 were NGOi-CDM/PES.

I performed a manual textual analysis of the answers given to the survey; identifying frequently used words and phrases that indicate motivations and preferences and compiled these into tables and figures.

4.5 Limitations

The two main parts of the thesis have different limitations. In the first part I analyze the CDM and PES systems based on project data available from different online registries and use a ranking of project types based on a study by Olsen and Fenhann (2008) to compare the distribution of project types across the two systems. This part of the thesis has two factors with possible limitations: the quality and possible incompleteness of the registries used, and the methodology of the Olsen and Fenhann study.

Regarding the registries used there is no problem with the CDM registry. All CDM projects have to be registered in the official UNFCCC run CDM project cycle database – so both the quality and completeness of this registry is ensured. Regarding the PES projects the data collected is more incomplete. The authoritative study on the voluntary carbon market is Ecosystem Marketplace' yearly report, and the numbers of their most resent report (Peters-Stanley, et.al., 2011) conservatively estimates that 90% of transacted credits in 2010 stem from projects that have been certified by a standard. So the PES project data gathered for this thesis should cover at least 90% of the total PES projects – so this is not a serious limitation, but it warrants a mention.

The limitation of using the Olsen and Fenhann study, and its result as a ranking system, are in the assumptions made in their study. For example, it is assumed that qualitative information about SD-contributions of projects, gathered from the project design documents (PDD) of the projects, is a *proxy* for the actual contributions of the projects. Furthermore, their study makes the assumption that each SD-dimension and SD-criteria have equal weight. Their study does not measure the *actual* SD-contributions of CDM project types, but *estimates* average SD-contributions based on a *proxy*. The analysis in this thesis shows that the Olsen and Fenhann ranking is very likely a good *estimation* of the average SD-contributions of project types, and it is the best available study that has ranked project types according to potential SD-contribution. Nevertheless, subsequent studies using different methodologies might produce results that could prompt a different analysis than the one I offer in this thesis.

The second part of the thesis has two main limitations. One is a possible selection bias, and the second is the quantity and quality of survey answers.

While the CDM registry was complete and unbiased, the PES registry was incomplete and possibly biased. There are no formal rules governing the voluntary market and PES project account holders can choose not to be listed in the registries used in this study. The bias then is that all selected PES cases have chosen to be listed in these registries. This could mean they are more open and have different preferences than those not listed. The problem with assessing this is there is no way to know how many firms and NGOs choose not to be listed and therefore no way to estimate the statistical significance of the bias. This possible bias was considered during analysis.

The limitation of quantity and quality of survey answers is one connected to statistical significance of the results and general limitations to the depth of answers that can be gained from using a survey.

There were a total of 31 survey respondents – 12 PFi-CDM, 10 PFi-PES and 9 NGOi-CDM/PES – which unfortunately is not enough to make any conclusive judgements or any meaningful statistical analysis. This is definitely a limitation. The answers to the survey were however in general very extensive and informative and gave many results that strongly suggest definitive trends. Enough so that the analysis of this part of the study was made with confidence. It would be very interesting if future studies, with more resources, managed to get enough respondents to conclusively confirm the trends I identified in this thesis.

The second limitation is the use of a survey as opposed to an interview. When trying to uncover the motivations of individual actors it is an advantage to establish trust with your interviewee – this is easiest in face to face interviews, and nigh impossible with surveys. In face to face interviews it is also possible to observe all non-verbal communication and other visual clues as to the sincerity of the interviewee. Furthermore, in face to face interviews the answers will be more spontaneous and less polished than those provided in surveys. The crux of it is that by using a survey it is harder to judge whether the answers given represent the real motivations of the respondent, or if they are strategic answers given to further their own interests. This was remedied by making participation completely anonymous, which should have reduced the perceived strategic benefits of providing polished answers. Furthermore questions in the survey were worded as to not give away the underlying purpose of the survey, and questions were asked that could indirectly confirm or reject the answers of other questions. In the analysis of the survey responses answers were cross-checked with each other

and also with information found on the webpages of the intermediaries. These precautions and double checking do however not ensure that the answers given are 100% honest. Although, this can never be ensured when dealing with complex issues such as the motivation and behaviour of other people – for most people it is not even always possible to identify our own motivations. This was all considered during the analysis of the survey responses and the analysis based on them were made with reasonable confidence.

5 Analysis – the SD-contribution of CDM and PES projects

In this first part of the analysis I will attempt to answer the first research question:

> *Do institutional differences between the compliance and the voluntary market lead to a difference in potential SD-contribution of the CDM and PES project systems?*

I will do so by presenting the data gathered from the online registries and databases coupled with the project ranking of the Olsen and Fenhann (2008) study and use these to show that there are both important similarities and differences in the potential of the CDM and PES systems to contribute to sustainable development. These similarities and differences will then be discussed using institutional theory and used to test the hypothesis which states that:

> *Institutional differences between the CDM and PES systems lead to differences in the aggregate potential of these systems to produce sustainable development benefits.*

5.1 Project type ranking and categorization

In a 2008 study, Olsen and Fenhann developed a new methodology for sustainability assessment of CDM projects. By using text analysis of the PDD documents of CDM projects they created a way of assessing the aggregate SD-benefit potential of the body of projects in the CDM Pipeline – by using their criteria and assessment method on a selection of projects one can get a crude estimate of the potential SD-benefits of project types. In this 2008 study, Olsen and Fenhann used their new methodology on 744 CDM projects. One outcome of this study was a profile of the average number of SD-benefits per project type – as shown in Figure 1.

This is a ranking of project types based on the proxy measure of the maximum possible sustainability contribution of project types. The SD-benefits in this figure are expressed as the number of SD-benefits from 100 projects in each project type (Olsen and Fenhann, 2008). There are 13 SD criteria used in this evaluation (see Table 3) and each bar in Figure 2 represents how many of the 13 SD criteria are on average met by each project type. So, on

each end of the scale, we find N2O projects which average 1 benefit per project (0,6 social benefits and 0,4 other benefits) and Energy distribution projects which average 5,5 benefits per project (1 environmental benefits – 2,4 social benefits – 2,1 economic benefits). So what Figure 2 shows is how many SD criteria are on average met by each project type – those who meet the most criteria are those with the highest potential SD-contribution. The 13 criteria used in the Olsen and Fenhann study are listed and explained in Table 3.

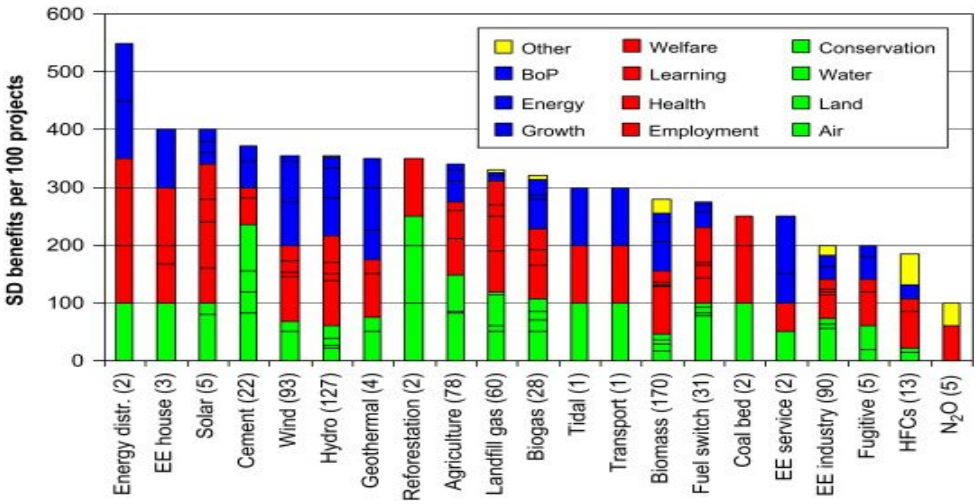


Figure 2: SD profiles of project types.

Source: Olsen and Fenhann, 2008

There are some limitations to this approach. As Olsen and Fenhann pointed out themselves, the methodology they developed and used tells which/how many SD-benefits the project types are likely to produce, but not to what degree each of these SD-benefits are produced. It is therefore no accurate measure of how much individual projects contribute to sustainable development, but it indicates "the maximum possible SD contribution at aggregated levels" (Olsen and Fenhann, 2008). It is therefore well suited for this study – which is concerned with the whole body of projects in both the compliance and voluntary market.

Table 3: Taxonomy for assessment of sustainable development benefits of CDM projects

Dimension	Criteria	Indicators
Environmental benefits	Air	Improving air quality by reducing air pollutants such as SO_x, NO_x, suspended particulate matter, non-methane volatile organic compounds, dust, fly ash and odour
	Land	Avoid soil pollution including avoided waste disposal and improvement of the soil through the production and use of e.g. compost, manure nutrient and other fertilizers
	Water	Improved water quality through e.g. wastewater management, water savings, safe and reliable water distribution, purification/sterilization and cleaning of water
	Conservation	Protection and management of resources (such as minerals, plants, animals and biodiversity but excluding waste) and landscapes (such as forests and river basins)
Social benefits	Employment	Creation of new jobs and employment opportunities including income generation
	Health	Reduction of health risks such as diseases and accidents or improvement of health conditions through activities such as construction of a hospital, running a health care centre, preservation of food, reducing health-damaging air pollutants and indoor smoke
	Learning	Facilitation of education, dissemination of information, research and increased awareness related to e.g. waste management, renewable energy resources and climate change through construction of a school, running of educational programmes, site visits and tours
	Welfare	Improvement of local living and working conditions including safety, community or rural upliftment, reduced traffic congestion, poverty alleviation and income redistribution through e.g. increased municipal tax revenues
Economic benefits	Growth	Support for economic development and stability through initiation of e.g. new industrial activities, investments, establishment and maintenance of infrastructure, enhancing productivity, reduction of costs, setting an example for other industries and creation of business opportunities
	Energy	Improved access, availability and quality of electricity and heating services such as coverage and reliability
	Balance of payments (BoP)	Reduction in the use of foreign exchange through a reduction of imported fossil fuels in order to increase national economic independence
Other benefits	Sustainability tax	Collection of a sustainability tax for support of sustainable development activities
	Corporate social responsibility	Support for ongoing corporate social responsibility activities that are indirect or derived benefits of the CDM project activity

Source: Olsen and Fenhann, 2008

Using the proxy ranking of Figure 2 we can categorize the project types into three different groups:

Table 4: Categorization of project types by SD-contribution ranking

High potential SD-contribution	**Medium potential SD-contribution**	**Low potential SD-contribution**
Energy distr.	Agriculture	Coal bed
EE households	Landfill gas	EE service
Solar	Biogas	EE industry
Cement	Tidal	Fugitive
Wind	Transport	HFCs
Hydro	Biomass	N2o
Geothermal	Fuel switch	
Reforestation		

Ranking the project types like this makes it possible to highlight the aggregate differences in potential SD-contribution between the CDM and PES body of projects (se Figures 3 – 10 below).

The categorization could have been done differently – one could have included more project types in the *medium* and *low* categories and fewer in the *high* category. In fact the original intention was to divide the 21 project types into three groups of seven – which would be the natural way to categorize. However, the project types Geothermal and Reforestation, which are ranked seventh and eighth, have exactly the same SD-contribution potential. So to put Geothermal into the high potential SD-contribution category, and Reforestation in the medium potential SD-contribution would not make much sense. Therefore both of them are categorized as high potential SD-contributors. Similarly the low potential SD-contribution category only have six project types because Fuel switch and Biomass projects only differ by 0.1 points in the Olsen and Fenhann ranking so it was natural to include both these two in the same category. This categorization does make the CDM and PES schemes seem more likely to produce many SD-benefits than if the categorization had been done in different ways. So when reading the figures below it is important to keep in mind that the categorization used paints an optimistic picture. If the categorization had put Geothermal and Reforestation in the

medium potential SD-contribution category and Fuel switch in the low potential SD-contribution category, the figures would look less favourable, but not by much

The difference is however not important in relation to this study – which is more interested in the differences between the CDM and PES systems and not the distribution of categories within the single systems. The aim is to compare two systems at an aggregate level and the important thing is not the relative distribution of categories within each project system, but rather the total distribution of one project system (CDM) in relation to the total distribution of the other project system (PES). The important thing is to use the same categorization in each of the project systems and then to compare these two systems.

5.2 Project type distribution in the CDM system

This part of the study uses data from 7532 CDM projects. Table 5 lists the data used for analysis. This table is a combination of an analysis made by the UNEP Risø Centre (cdmpipeline.org, 2012) and research on the CDM pipeline done for this thesis.

The CDM pipeline is dominated by wind- and hydro-projects which make up 52% of all projects. Both of these project types have a high potential SD-contribution. Following these project types however are several with a medium or low potential rating. In fact, if we disregard wind and hydro, only 6% of the remaining projects have a high potential SD-contribution ranking; 2,5% solar projects, 1,1% EE households projects, 0,8% afforestation and reforestation projects, 0,8% cement projects and 0,3% Energy distribution projects.

Table 5: Total distribution of project types in the CDM system. Table shows nr. of projects in each project type and the % of projects in each project type relative to the total sum of CDM projects.

Project type	*nr. of projects*	*% of total*
Hydro	1992	26%
Wind	1932	26%
Biomass energy	823	11%
Methane avoidance	717	10%
EE own generation	481	6%
Landfill gas	375	5%
Solar	189	2.5%
EE Industry	152	2.0%
Fossil fuel switch	140	1.9%
EE Supply side (power plants)	107	1.4%
Coal bed/mine methane	100	1.3%
N2O	92	1.2%
EE Households	82	1.1%
Afforestation & Reforestation	62	0.8%
Cement	57	0.8%
Fugitive	53	0.7%
Transport	47	0.6%
EE Service	34	0.5%
Energy distribution	25	0.3%
HFCs	23	0.3%
Geothermal	22	0.3%
PFCs and SF6	18	0.2%
CO2 usage	5	0.1%
Tidal	2	0.03%
Agriculture	2	0.03%
Total:	7532	100%

Source: UNEP Risø Centre, 2012. UNFCCC, 2012.

The data of Table 5 can be coupled with the ranking of Figure 2 and the categorization of Table 4 to express the distribution of project types - colour coded to show the popularity of each ranking category. This is expressed in Figure 3.

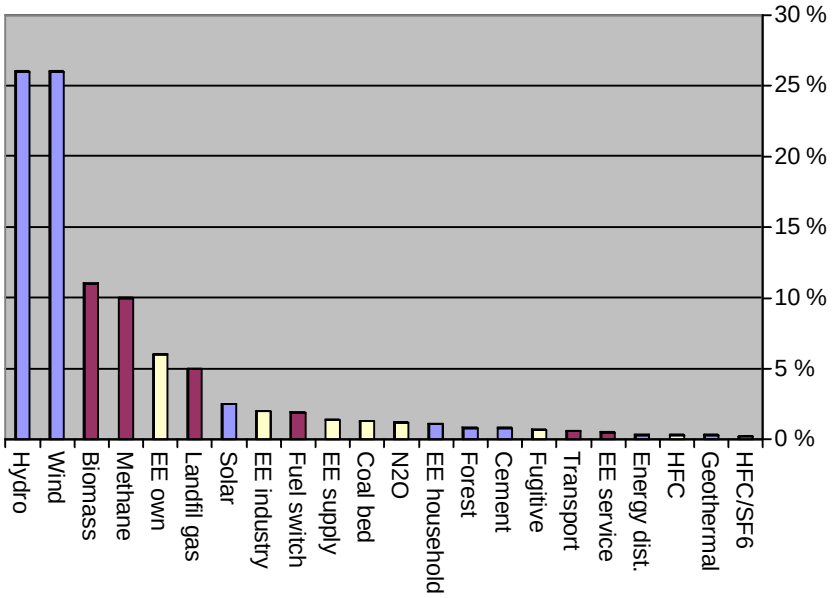


Figure 3: Total distribution of projects in the CDM pipeline categorized by project type – colour coded to highlight the popularity of each ranking category.

Sorting the data from table 5 and Figure 3 into the three categorizations of high-, medium- and low potential SD-contribution we get the distribution of Figure 4.

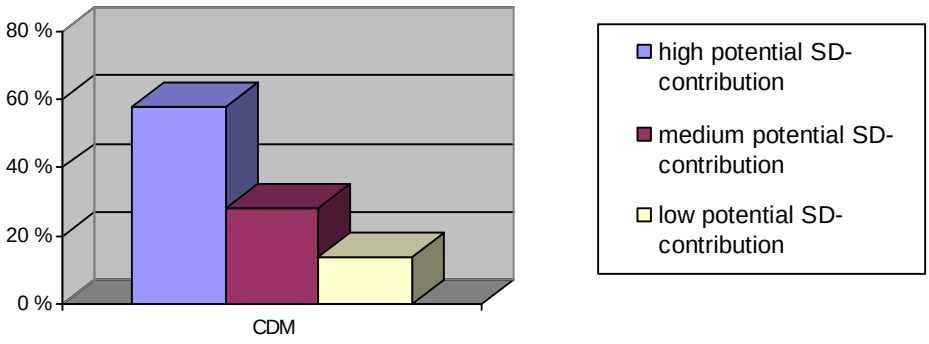


Figure 4: Total distribution of project types within the CDM system categorized by how much they contribute to SD-benefits.

This distribution shows that 58% of the projects in the CDM pipeline have a high potential SD-contribution, 28% have a medium potential SD-contribution and 14% have a low potential SD-contribution. Of the projects with medium potential, biomass energy projects and methane avoidance projects are the most dominant with 11% and 10% of the projects, respectively. Of the projects with low potential, EE own generation projects and EE industry projects are the most dominant with 6% and 2% of the projects, respectively. As noted, the high percentage of high potential SD-contribution is due to the dominance of wind- and hydro projects.

According to a study done on the cost-effectiveness of project types in the CDM pipeline (Green, 2008) the two project types dominating the pipeline – wind and hydro – are also two of the least cost effective i.e. they have amongst the highest transaction costs of all project types. This means that the vastly most popular project types are project types with relatively high costs and a high potential SD-contribution rating. This could lead one to draw the conclusion that SD-benefits of projects are more important than cost-effectiveness, and thus that market actors in the CDM system are more concerned with securing SD-benefits than cheap CERs. Such a conclusion would contradict our initial assumptions that CDM actors are only motivated by compliance. Such a conclusion would in fact also be wrong.

The compliance motivation is not only one of cost-effectiveness, but also one of risk and expediency. In fact, the most important issue for buyers of carbon credits in the compliance market is to *comply* with regulations. Doing it as cheap as possible is of course a priority, but even more important is the actual production of credits – the most important thing is that the projects they are involved in actually get CDM certified and thus actually produce CERs that can be used to comply with emission regulations. Therefore there are three main factors when choosing projects: risk, speed and cost. Buyers want as little risk as possible when choosing projects; they want the projects to be CDM certified and produce CERs as fast as possible, and preferably as cheap as possible. That wind- and hydro power are as popular as they are, is a testament to the priority of buyers – low risk and expediency take priority over costs.

Wind- and hydro projects have established methodologies, the technologies they use are mature and generally reliable (Hodes and Kamel, 2007); wind- and hydro projects produce a lot of CERs and they do so reliably. Table 6 illustrates this by showing the CER issuance success rates of projects types.

Table 6: Issuance success of CDM project types. Table shows project types, number of projects with issued CERs, number of CERs issued by each project type and the success rate of issuances – the issuances success is the CERs issued divided by the CERs expected for the same period of time.

CDM projects in the pipeline	CDM project with CERs issued		
Type (rejected projects excluded)	Projects	Issued kCERs	Issuance success
Afforestation			
Agriculture			
Biomass energy	167	21988	82%
Cement	10	1915	52%
CO2 usage	1	10	31%
Coal bed/mine methane	25	10754	52%
Energy distribution	1	316	83%
EE households	3	56	75%
EE industry	29	1757	81%
EE own generation	96	37959	79%
EE service	1	6	63%
EE supply side	9	1486	103%
Fossil fuel switch	39	28047	59%
Fugitive	5	8584	113%
Geothermal	8	2679	67%
HFCs	19	400695	107%
Hydro	429	76065	86%
Landfill gas	86	21858	44%
Methane avoidance	110	9218	51%
N2O	42	191612	118%
PFCs and SF6	4	1134	75%
Reforestation			
Solar	8	144	101%
Tidal			
Transport	2	359	47%
Wind	345	59955	85%
Total	1439	876598	94.4%

Source: UNEP Risøe Centre 2012

The highest issuance success is held by industrial gas projects such as fugitive, HFCs and N2O. Especially HFCs and N2O projects have been dominating the pipeline in respect to issued CERs. There are few such projects but they have generated by far the most CERs. These types of projects have however recently been banned from the CDM system because of several issues, one of them being their low SD-contribution – as can be seen in Figure 2. Solar projects also have a success rate above 100%, but these are small scale and expensive. As Table 5 shows, the three most popular project types (in number of projects) – wind, hydro and biomass – all produce a lot of CERs and have a very high issuance success rate.

In addition to being relatively low risk, mature and thus reliable sources of CERs, wind- and hydro projects also score high on the SD-contribution ranking; something which certainly does not hurt even if it is not the main driver of project selection – even if SD-contribution is

not the main reason for the popularity of wind- and hydro projects, indirectly it plays a part; projects which are perceived to have a high SD-contribution ranking would also carry less risk because they are regarded to reliably produce SD-benefits which makes them easier to approve and certify – thus being a factor in lowering the risk of the project as a whole.

Basically the most important thing for CDM buyers is risk aversion. They all have emission reduction obligations and if they do not fulfil them they have to pay heavy fines. Risk aversion here means that issuance rate and issuance speed take priority over cost. Interesting project are those with mature and well established methodologies that have a history of producing a high amount of CERs. Furthermore, because these are mature and well established project types and methodologies, the timeframe of the projects are quick and predictable – it is easier to estimate when credits will be ready; which is a necessity for managing to fulfil emission reduction obligations in time, thus avoiding hefty fines. There is thusly a balancing act going on between minimizing risk and minimizing cost where minimizing risk takes priority.

It is therefore this combination of several factors that makes wind- and hydro projects the most popular project types in the CDM pipeline, despite the fact that they have relatively high transaction costs.

5.3 Project type distribution in the PES system

This part of the study uses data from 1569 PES projects. All the data was collected for this study by meticulously researching available online registries. Table 7 lists this data.

According to numbers from Peters-Stanley et.al. (2011) 90% of transacted credits in the voluntary carbon market came from projects using standards. Out of these 90% not all standards have registries yet – although the vast majority has – a conservative estimation based on researching available online registries puts the number of projects using standards without registries to be around 5% of the 90% using standards. Thus a conservative estimation would be that I in this thesis use data from 85% of the total number of projects in the voluntary carbon market. This number is conservative because the Peters-Stanley et.al., study

used conservative estimations and numbers from 2010 – the trend of more standards and registration of projects has persisted each year and thus the % of projects using standards is probably slightly higher than 90%.

In this thesis I differentiate between three types of PES projects: (1) projects using standards that do *not* require SD-benefits for certification, (2) projects using standards that *do* require SD-benefits for certification, and (3) projects that do not use standards at all. The data collected for this study is limited to type (1) and (2) and is the focus of chapter 5.4, while all three types are discussed in chapter 5.5

Table 7: Total distribution of project types in the PES system. Table shows nr. of projects in each project type, and the % in relation to all PES projects

Project type	*nr. of projects*	*% of total*
Wind:	350	22,3%
Landfill gas:	207	13,3%
Forest:	181	11,5%
Hydro:	140	9%
Methane avoidance:	116	7,4%
Small, low impact hydro:	108	6,9%
Biomass:	96	6,1%
EE – household:	82	5,2%
Biogas:	65	4,1%
Coal bed/mine methane:	52	3,3%
EE – industrial:	36	2,3%
Fossil fuel switch (ceramic):	35	2,2%
Industrial gas:	32	2%
Fuel switch – to natural gas:	19	1,2%
Solar:	16	1%
Geothermal:	9	0,5%
Transportation:	9	0,5%
Cement:	8	0,5%
EE – commercial:	4	0,3%
EE – public sector:	3	0,2%
EE – agriculture:	1	0,06%
Total	1569	100%

Source: American Carbon Registry, 2012. Climate Action Reserve, 2012. Climate, Community & Biodiversity Standard, 2012. Gold Standard, 2012. Markit, 2012. Voluntary Carbon Standard, 2012.

The data of Table 7 can be coupled with the ranking of Figure 2 and the categorization of Table 4 to express the distribution of project types - colour coded to show the popularity of each ranking category. This is expressed in Figure 5.

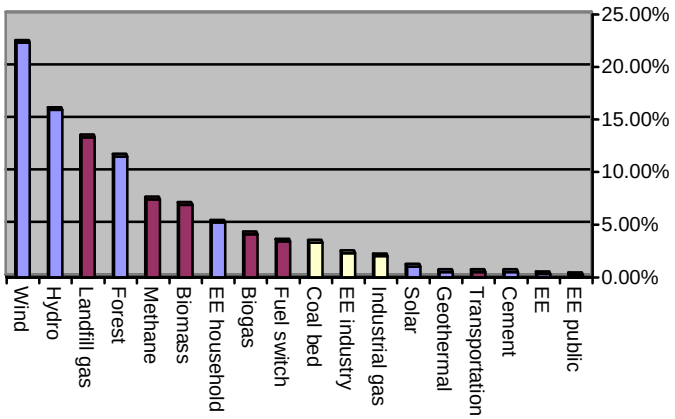


Figure 5: Total distribution of projects in the PES system categorized by project type – colour coded to highlight the popularity of each ranking category.

Figure 5 combines the categories *Hydro* and *Small, low impact Hydro*, because these are counted as one category within the CDM system – which is why *Hydro* is the second most popular project type, not *Landfill Gas* which is listed second in table 7.

The PES system is also dominated by wind and hydro projects – although to a lesser degree – making up 38% of the total number of projects. This more even distribution within the category high potential SD-contribution is one of the differences between the CDM and the PES systems. This is due to the afforestation and reforestation projects and the EE household projects which are relatively more common within the PES system. Another difference is the relationship between the categories medium- and low potential SD-contribution, as shown in Figure 5.

Project types with a high potential SD-contribution are almost identically distributed within the CDM and PES systems, with 58% and 57% respectively. But there are relatively more projects in the PES system with a medium potential ranking, and fewer with a low potential ranking, than is the case in the CDM system. 35% of the PES projects have a medium potential ranking and only 8% have a low potential ranking. In the CDM system these numbers are 28% and 14%, respectively. These two distributions are expressed in Figure 6.

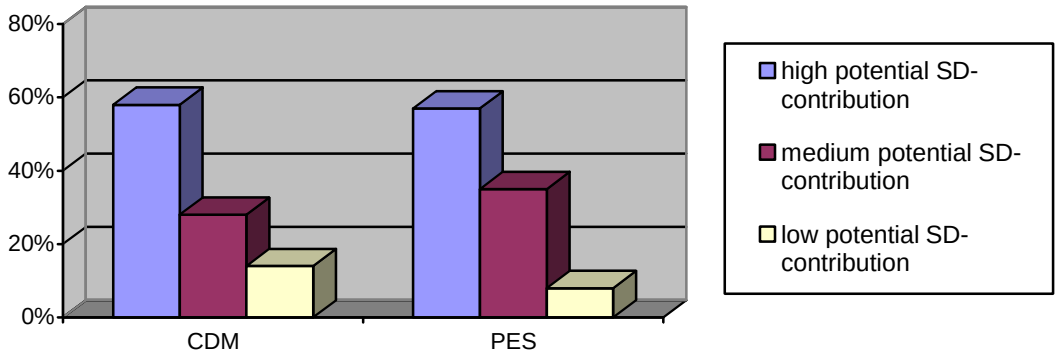


Figure 6: Total distribution of project types within the CDM- and PES system categorized by how much they contribute to SD-benefits.

5.4 Project type distribution in the PES system when separating between types of standards used for certification

All of the 1569 PES projects used in this thesis use a standard to be certified, but one can differentiate between two types of standards: (1) those that do *not* require that projects produce SD-benefits in order to certify, and (2) those that *do* require that projects produce SD-benefits in order to certify. Standards of the first type – those that do *not* require SD-benefits in order to certify – are similar to the CDM seen as a standard; the important thing is for projects to set baselines and to produce additionality. These are the merits on which the projects are certified or not. Standards of the second type – those that *do* require SD-benefits in order to certify – certify on the basis of additionality *and* SD-benefits. Table 8 shows which standards belong to which type.

There are some standards that only use SD-benefits as criteria, and projects using these standards use a separate standard to verify additionality. A common combination is to use the Verified Carbon Standard (VCS) and the Climate, Community & Biodiversity Standard (CCBS). Projects that use such a combination of standards are in this study categorized as the second type of standard – those that *do* require SD-benefits.

Table 8: Categorization of PES standards based on SD-benefit requirements. Number of projects in each standard in parentheses.

No SD-benefits required		*SD-benefits required*	
American Carbon Registry Standard	(32)	Carbon Fix Standard	(5)
Climate Action Reserve	(366)	Plan Vivo	(7)
ISO 14064-2	(14)	SOCIALCARBON	(41)
Verified Carbon Standard	(675)	Gold Standard	(362)
		Climate, Community & Biodiversity Standard	(66)

Source: American Carbon Registry, 2012. Climate Action Reserve, 2012. Climate, Community & Biodiversity Standard, 2012. Gold Standard, 2012. Kollmuss, et.al. 2008. Markit, 2012. Peters-Stanley, et.al. 2011. UNEP Risø Centre 2012. UNFCCC, 2012. Voluntary Carbon Standard, 2012.

This means we can break down the PES distribution shown in Figure 5 into two separate distributions. Table 9 lists the data of the *no* SD-benefits required category. The data of Table 9 can be coupled with the ranking of Figure 2 and the categorization of Table 4 to express the distribution of project types - colour coded to show the popularity of each ranking category. This is expressed in Figure 7.

Again wind is the dominant project type, although hydro is only the third most common project type, being surpassed by landfill gas. In fact, there is a much more even distribution between the projects with a high potential and medium potential ranking – 48% and 41%, respectively. Compared to the PES distribution in Figure 6, PES projects using standards that do not require SD-benefits have a lower percentage of high potential rankings, and a higher percentage of medium potential and low potential rankings. This is illustrated in Figure 8.

Table 9: Distribution of project types in the segment of the PES system that uses standards that do *not* require SD-benefits in order to certify. Table shows nr. of projects in each project type and the % in relation to this segment, the % in relation to all PES projects

Project types	*nr. of projects*	*% of no SD-b.*	*% of all PES*
Wind:	269	24,7%	17,1%
Landfill gas:	198	18,2%	12,6%
Hydro:	133	12,2%	8,5%
Methane avoidance:	116	10,7%	7,4%
Forest:	102	9,4%	6,5%
Biomass:	81	7,5%	5,2%
Coal bed/mine methane:	52	4,8%	3,3%
Industrial gas:	32	2,9%	2%
EE – industrial:	30	2,8%	1,9%
Biogas:	24	2,2%	1,5%
Fuel switch – to natural gas:	19	1,7%	1,2%
Cement:	8	0,7%	0,5%
EE – households:	7	0,6%	0,4%
Transportation:	6	0,6%	0,4%
Geothermal:	5	0,5%	0,3%
EE – commercial:	2	0,2%	0,1%
Solar:	2	0,2%	0,1%
EE – agriculture:	1	0,1%	0,05%
Total	1087	100%	69%

Source: American Carbon Registry, 2012. Climate Action Reserve, 2012. Markit, 2012. Voluntary Carbon Standard, 2012.

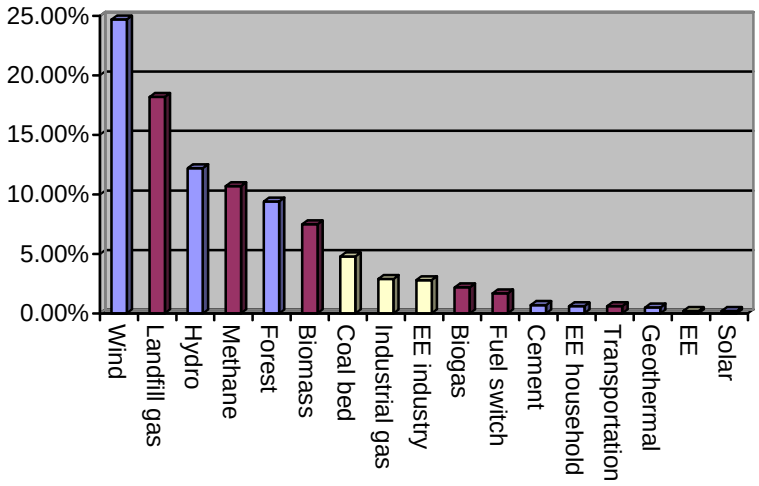


Figure 7: Total distribution of PES projects using a standard that does *not* require SD-benefits for certification

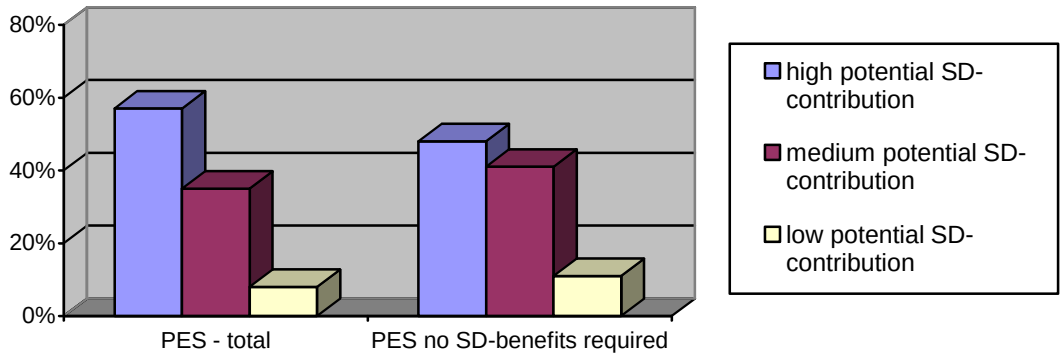


Figure 8: A comparison between the total distribution of project types in the PES system and the total distribution of project types in the segment of the PES system that uses standards that do *not* require SD-benefits for certification - categorized by potential SD-contribution.

Figure 8 shows that PES projects using a standard that does *not* require SD-benefits on average have a lower potential ranking than the total of PES projects. The corollary to this is that PES projects using a standard that does require SD-benefits on average would have a higher potential ranking than the total of PES projects, and ipso facto higher than the average of CDM projects.

This is also supported by the data. Table 10 shows the data relating to the second main segment of the PES system – projects using standards that *do* require SD-benefits for certificaton. The data of Table 10 can be coupled with the ranking of Figure 2 and the categorization of Table 4 to express the distribution of project types - colour coded to show the popularity of each ranking category. This is expressed in Figure 9.

The dominant project types in this segment are those with a high potential SD-contribution ranking. Interesting is also the high percentage of forest-type and EE household-type projects. These are project types that because of the economics of scale often have high transaction costs (small scale EE household types) and problems with lack of additionality and leakage (forest types). They are regarded to have high potential SD-contributions, but are often too expensive and/or complicated to garner much interest from the CDM system and from PES actors who belong to the segment of the PES system that uses *no* SD-benefits required standards.

Table 10: Distribution of project types in the segment of the PES system that uses standards that *do require* SD-benefits in order to certify. Table shows nr. of projects in each project type, the % of project types in relation to this segment and the % in relation to all PES projects.

Project types	*Nr. of projects*	*% of co-b.*	*% of all PES*
Small, low impact hydro:	108	22,5%	7%
Wind:	81	16,8%	5%
Forest:	79	16,5%	5%
EE – household:	75	15,6%	4,8%
Biogas:	41	8,5%	2,6%
Fossil fuel switch (ceramic):	35	7,3%	2,2%
Biomass:	15	3,1%	1%
Solar:	14	2,9%	0,9%
Landfill gas:	9	1,9%	0,6%
Hydro:	7	1,5%	0,4%
EE – industrial:	6	1,2%	0,4%
Geothermal:	4	0,8%	0,3%
Transportation:	3	0,6%	0,2%
EE – public sector:	3	0,6%	0,2%
EE – commercial:	2	0,4%	0,1%
Total	482	100%	31%

Source: Community & Biodiversity Standard, 2012. Gold Standard, 2012. Markit, 2012.

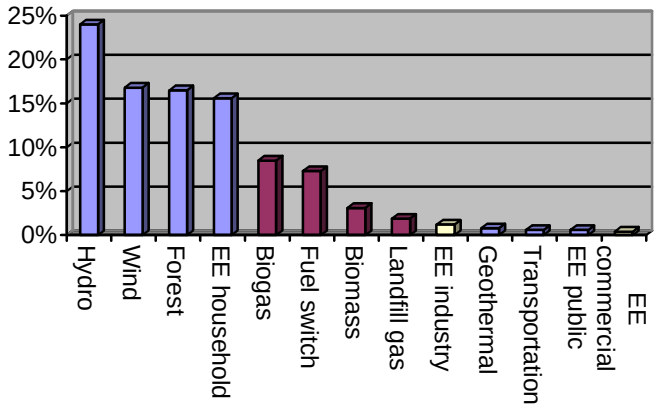


Figure 9: Total distribution of PES projects using a standard that *does* require SD-benefits for certification

In the distribution of Figure 9 however, they are very popular; strongly suggesting that actors involved in projects using standards that *do* require SD-benefits are willing to pay more and work harder for the carbon credits than the average actor in the CDM system and the other segment of the PES system. Interesting is also the almost complete lack of project types with a low potential ranking – only 2% of the projects have a low ranking (EE industry and EE commercial). Figure 10 shows this distribution compared to the total PES distribution.

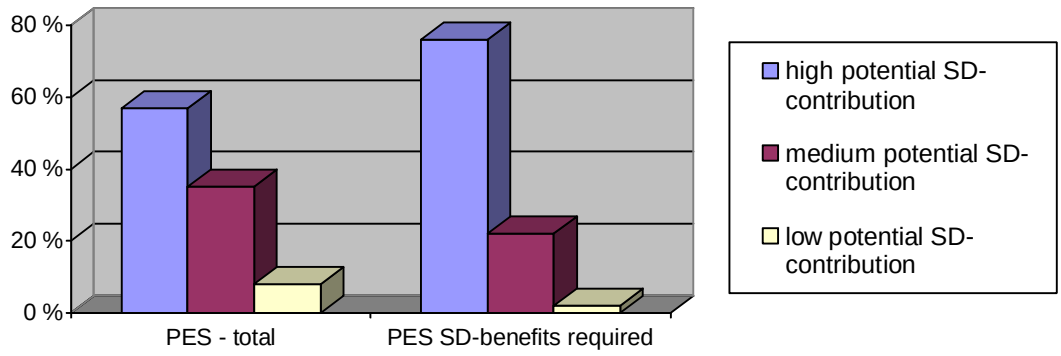
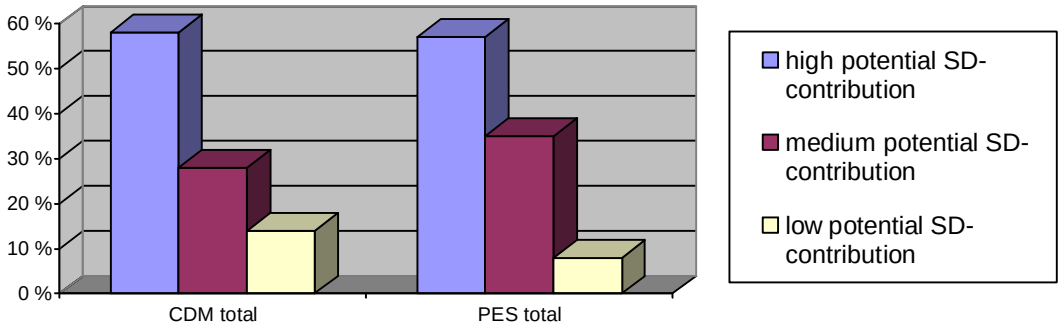


Figure 10: A comparison between the total distribution of project types in the PES system and the total distribution of project types in the segment of the PES system that uses standards that *do require* SD-benefits for certification - categorized by potential SD-contribution.

The segment of the PES system that *does* require SD-contribution for certification is clearly the one with the highest relative potential to contribute to SD. Almost 80% of the projects done in this segment fall within the categorization of high potential SD-contribution. Before delving into the significance of these distributions it is however important to statistically check the four different distributions for independence – to see if they are indeed statistically different.

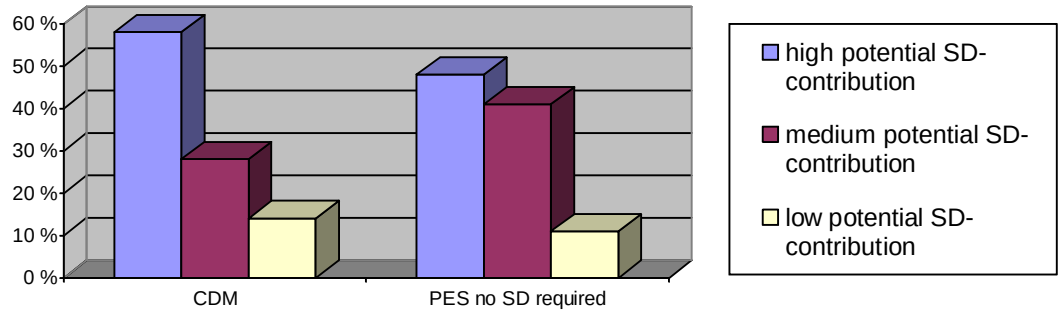
5.5 Statistical analysis of the project type distributions

Figures 11 - 16 show the four different project type distributions categorized by potential SD-ranking and system type (CDM total, PES total, PES SD-benefits *not* required, and finally PES SD-benefits *required*).



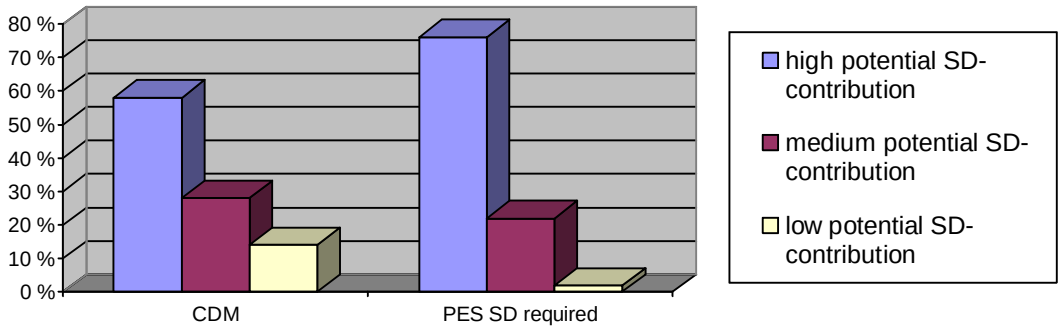
Test statistics: Chi-square; 57,805 – p < 0,0001

Figure 11: Distribution of project types categorized by potential SD-contribution; CDM total vs. PES total



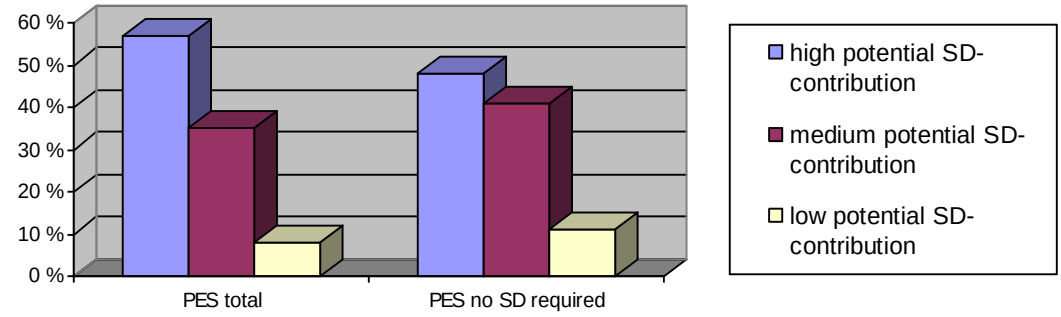
Test statistics: Chi-square; 70,048 – p < 0,0001

Figure 12: Distribution of project types categorized by potential SD-contribution; CDM total vs. PES *no* SD required



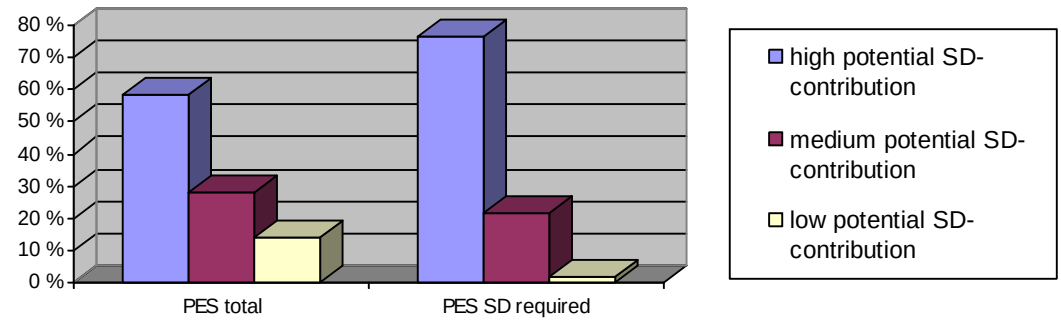
Test statistics: Chi-square; 84,128 – p < 0,0001

Figure 13: Distribution of project types categorized by potential SD-contribution; CDM total vs. PES SD *required*



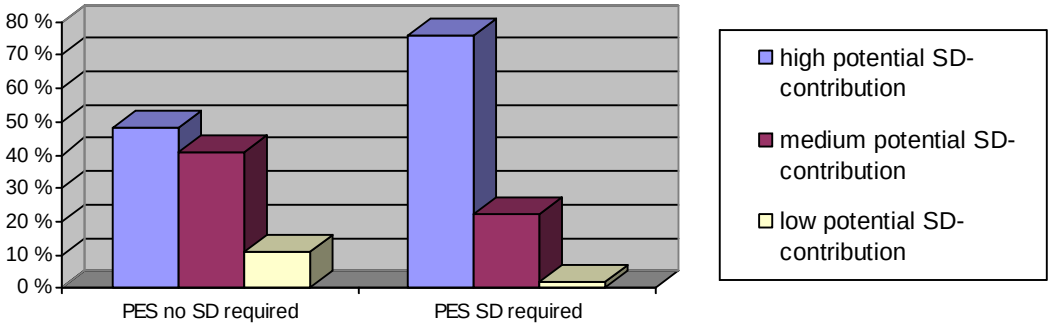
Test statistics: Chi-square; 20,635 – p < 0,0001

Figure 14: Distribution of project types categorized by potential SD-contribution; PES total vs. PES *no* SD required



Test statistics: Chi-square; 63,317 – p < 0,0001

Figure 15: Distribution of project types categorized by potential SD-contribution; PES total vs. PES SD required



Test statistics: Chi-square; 115,45 – $p < 0,0001$

Figure 16: Distribution of project types categorized by potential SD-contribution; PES no SD required vs. PES SD required

All four sets of distributions have been checked against each other for statistical independence by using excel-software (double checked by using graphpad-software) to conduct a chi-square test (see Appendix 1 for further details). Working from the null hypothesis that the distributions were similar produced a p value of $p < 0.0001$ for all sets measured against each other – leaving no doubt that there is a statistical significant difference between all of the distributions.

Incidentally, the domination of high potential project types in the category that is expected to be dominated by project types with high potential, supports the Olsen and Fenhann ranking used in this study; the only mechanism that exists in the voluntary and compliance market that measures the actual SD-contribution of projects are the standards used in the voluntary market. That these standards are dominated by the project types predicted by the Olsen and Fenhann study to contribute the most to SD can be seen as supporting the validity of the Olsen and Fenhann study and the integrity of the standards. They seem to be mutually reinforcing.

5.6 The differences between the compliance and voluntary market

In regards to the first research question of this study:

> *Do institutional differences between the compliance and the voluntary market lead to a difference in potential SD-contribution of the CDM and PES project systems?*

– the results presented above show that on average the potential is similar between the two market systems – the project distribution of CDM total has roughly the same percentage of high potential projects (58%) as PES total (57%), and the main difference between these two distributions is that CDM total has a higher percentage of low potential projects (14%) than PES total (8%). Which means that overall PES total has slightly more SD potential than CDM total. However, when breaking up the PES-system in different segments, more substantial differences between the two systems emerge. These differences will here be further described and discussed.

5.6.1 CDM and PES as different forms of institutional constructs

The institutions of the CDM and the PES systems came about differently. Vatn (2005) describes different theories on institutional change and makes the argument that to favour just one of them is unwarranted. The cases of the CDM and the PES systems make this a valid argument. They are both (1) institutional constructs formed as a reaction to crisis, but the CDM is (2) an institutional construct as designed, and PES is (3) a "spontaneous construct" from below.

As a reaction to crisis (1) both the CDM and the PES system formed because there was an imbalance between the economic process and the capacity of its surrounding natural systems (Vatn, 2005). Climate change is a crisis that presents different challenges than a purely economic crisis; the effects of the crisis are not quickly visible, but involve gradual changes that will certainly turn out to be severe, economically and socially, but not in the immediate future.[6] Systematic difficulties in balancing short- and long term goals and the complexities of international negotiations make an international reaction to such a crisis difficult and slow.

[6] Of course, there are already some severe changes visible and people already suffer from it, but it will gradually get much more severe.

The compliance and voluntary carbon markets are two responses to this crisis; one constructed from above and the other emerged from below. The very existence of these two systems is a testament to the severity of the crisis.

The difference in formation between the CDM and the PES as institutional constructs goes to the core of the differences in the foundations and workings of the two systems. As an institutional construct as designed (2), the most important institutional building blocks in the CDM system are the laws and regulations governing the system. Furthermore, by being created from above – by international treaties designed by policymakers – the affected parties operating within the system have one clear and overshadowing motivation; to oblige with the regulations – their motivation is that of compliance to a set of regulations enforced upon them from above. This means there is only one main market driver in the compliance market.

The PES system was formed not by international cooperation and policymakers, but by the involved actors partly emulating the CDM system and partly mutating it into something uniquely different. Basically it was not enforced upon them from above, but created by them from below (3). The practical effect of this is a system that is less stringent, but also less transparent because of the lack of formal regulations and registries. This lack of formal regulations, however, makes the system more malleable and flexible – and in the nomenclature of institutional change theory; more prone to mutations. One such mutation is the recent emergence and importance of standards and registries. These two mutations can be seen as two separate things. The emergence of comprehensive registries is an attempt to emulate that which works in the CDM system, giving the PES system greater transparency. The emergence of standards, however, can be seen as trying to improve on what is perceived not to work so well in the CDM system – namely ensuring that projects also contribute to sustainable development. There is also a segment of the voluntary market that do not use registries and standards. Here the thought is that the voluntary market should stay different and rather complement the compliance market. Their preference is that the voluntary market should be protected from bureaucratic requirements and kept as a market for innovative projects with a minimum of administrative burden (Kollmuss et.al., 2008).

These examples show how diversified the PES system is in relation to the CDM system – there is a diversification in the perception of what the PES system should be that stems from a diversification of motivations in the involved actors. PES actors do not have *one* driving

motivation, no compliance motivation, but rather a set of different motivations and preferences which form the institutions they are a part of, and in return are formed by them.

5.6.2 The two main segments of the PES system and how they relate to the CDM system

The different preferences in the PES system make the two main segments used in this study (*no* SD-benefits required vs. SD-benefits required) very different. The segment of *no* SD-benefits required is the one trying to emulate the CDM system. Its standards closely resemble the CDM as a standard; the requirements are baseline-setting and additionality, and its ensuing credits are relatively cheap compared to the other segment of credits. As illustrated in Figure 8, however, this segment of the PES system on average has a lower potential SD-contribution than the CDM system, meaning it performs poorer than the system it is emulating. Though this is only in relation to SD-contribution, and while the CDM has a stated dual goal (which includes sustainable development) the PES system has no such stated goal, because it does not have a third party authority/governing body that makes the rules of the game. The *no* SD-benefits required segment is likely to value the cheapness of credits and the fact that they are involved in a market which is environmentally favourable. That there are no other benefits, such as sustainable development, is in their regard not as important. So this PES segment will probably see their part of the market as a success – the market is behaving as a market; producing cheap credits and attracting investments; making it cheap and easy to pursue CSR and pre-compliance positioning motivations.

This segment is also larger than the SD-benefits *required* segment – 69% vs. 31% of the total 1569 projects. If one assumes that the *no* SD-benefits required segment, emulating the CDM system, has similar preferences as the actors in the CDM system (pre-compliance positioning, PR driven CSR motivations / profits) then it should be no surprise that this is the biggest segment. Firms are after all designed to make profits. The surprise might be, at least if you adhere to the classical economic school of thought, that the other segment is as large as it is. Using the average price of credits stemming from different standards (Peters-Stanley et.al., 2011) we can calculate the average price of credits stemming from the two segments. The average price of the *no* SD-benefits required was 4,67 US$, while the average price of the SD-benefits *required* was 8,67 US$ – nearly twice the price. That 31% of the projects in the voluntary market produce credits that are twice as expensive as other credits shows the

existence of other preferences than profit maximization. It tells us that there exists a large segment that clearly has other preferences than the CDM and the PES *no* SD-benefits required segment.

This other PES segment – SD-benefits *required* – is clearly very interested in additional benefits such as SD-benefits. This segment tries to improve on the CDM system by being more stringent with regards to certification. The consequence of this preference is that this segment has a substantial higher potential for SD-contribution (see Figure 10) with almost no projects that have a low potential SD-contribution, but it is also the smallest segment; attracting less investments and producing credits that are more expensive than the other PES segment. These clearly different preferences indicate that different actors have different preferences and different motivations.

5.6.3 Diversification and the third party authority

The diversification of the PES system is evident in its most common institutions. In the PES system there are no laws and regulations obliging actors to be involved in the system. The main institutional building blocks of this system are conventions and norms. Actors that use a certain kind of standard for certification do so not because regulation tells them to, but because the norms of the system inform them that doing so is in line with their motivations and preferences. Using, for example, the Gold Standard ensures them so called “charismatic carbon” or carbon with a storytelling appeal; there are certainly cheaper carbon credits to be bought, but few that have the same positive narrative as Gold Standard credits. So if your preference is Gold Standard credits, your motivations probably go beyond profits and enter the realm of CSR-considerations and altruism. The norms of the PES system facilitate these preferences, and indeed other preferences as well. In fact, it is the diversification of motivations and preferences and the emergence of norms to facilitate them that make the PES system inherently different than the CDM system – even though they are very alike in many superficial respects.

Another important institutional difference between the CDM and the PES market systems is the respective presence and lack of a third party authority. The CDM is governed by international laws and regulations and a formal body, the UNFCCC Executive Board (EB) that has the power to enforce these laws and regulations. The PES system has no such third

party authority. An apt comparison would be that of national vs. international cooperation. There is a theory of institutionalism in international relations which deals with the lack of a third party authority in international cooperation. The theoretical problem is to explain why international cooperation works when there is no third party authority to enforce the international agreements – what stops the most powerful actor on this stage to just do what it wants when there is no authority to keep it in check? Institutional theory makes the assertion that institutions and regimes on the international level emerge and survive because they accommodate and fulfill important functions in the relationship between states as individual actors. Furthermore it asserts that it is the formation and existence of these institutions that maintains the agreements and cooperation on the international stage – there is no anarchy on the international stage because the institutions created to accommodate and facilitate international cooperation themselves are powerful enough to ensure cooperation. Cooperation on the national level is easier to explain because there is a clear authority (usually the government) that has the power to enforce rules and regulations on the actors involved.

The parallel to the PES and CDM system is obvious: the PES system is more of an anarchy with no third party authority to govern it, while the CDM system has clear laws and rules and a third party authority. This also means that the strength in the PES system lies in its evolving institutions.

It can be argued that the governing power of the institutions in the PES system coupled with is diversification of motivations and preferences make it more resilient than the CDM system. As in ecological theory where a greater diversification of species makes an ecosystem more resilient, or in economic theory where a greater diversification of industries makes an economy more resilient – the greater diversification of motivations and preferences, and the greater diversification of institutions to facilitate them, makes the PES system more resilient. If, for example, one motivation of the voluntary market would disappear – say the American senate passed a bill making it illegal for states to enforce compliance regulations on GHG emissions, effectively removing any pre-compliance positioning motivations of actors based in USA – this would perhaps cripple the market, removing a segment of investors, but it would not destroy the market. There would still be a lot of actors that have other motivations for participation who would still invest in PES projects and trade in the voluntary market. Imagining a similar scenario for the CDM system – there was not made an agreement to extend the commitment period of the Kyoto protocol at the COP 17 summit in Durban, thus

removing the only market driver; compliance – this would probably be the end of the CDM system as it is today. The actors involved in the CDM system who wished to continue participating in projects would do so in the voluntary market. The diversification of motivations and preferences and the institutions that facilitate them make the PES system more resilient than the CDM system.

5.7 Institutional differences and potential SD-contribution

The first hypothesis of this study stated that:

> *Institutional differences between the CDM and PES systems lead to differences in the aggregate potential of these systems to produce sustainable development benefits.*

This chapter has argued that there indeed are significant institutional differences between the CDM and PES systems and that these differences exist because of how the systems were formed and how they are governed – which also has lead to the strength and weaknesses of the two systems. Thus the first assumption of the hypothesis is confirmed – there *are* significant institutional differences between the CDM and PES systems. However, the method used in this study to determine the potential SD-contribution of the two systems showed that although there was a statistically significant difference in the distribution of project types between the CDM and PES systems, the biggest difference in aggregate SD-potential became evident when breaking the PES system down into different segments. Two main segments of the PES system were indentified; one that emulates the CDM system and one that has stricter SD-criteria for certification. These showed some real differences in aggregate SD-potential. The PES segment emulating the CDM system overall had the poorest potential, while the other PES segment overall had the highest potential. So while the aggregate SD-potential of the PES system as a whole does not differ substantially from that of the CDM system, different segments within the PES system do. These different segments are furthermore driven by actors with differing motivations and preferences, creating differing norms and thus differing institutional contexts. So when applied to the two main segments of the PES system the second point of the hypothesis is confirmed; institutional differences lead to differences in aggregate potential to produce SD-benefits.

A possible reason for the similarities of the SD-potential of the CDM and PES systems is *jointness*. The least risky project types are those with well established and mature methodologies – they are technically feasible and relatively easy to implement – that offer relatively high issuance rates and has a predictable issuance speed. Project types of this nature are often project types that score high on the SD-potential ranking. As already argued; being SD-positive is traditionally seen as making the project less risky – which would make these project types popular. Given this explanation it would be expected that the same type of projects are popular in each of the systems. This will be further discussed in chapter 7.5.

This also shows that there is some strength in the articles of the Kyoto Protocol. Sustainable development is a stated goal in the articles outlining the CDM and although it is seldom the focus when projects are implemented and assessed, it still plays a part. This is evident when contrasting the CDM with the PES system that emulates the CDM (the segment using standards that do not require SD-benefits). This PES segment has a lower SD-contribution potential than the system it is emulating. This system also has no stated goal of SD-benefits. The CDM system has SD-benefits as a part of its institutional structure, the emulating PES segment does not. When the SD-criteria is thus removed from the certifications the emulating PES segment uses, it becomes unimportant and bears no real influence on the risk of projects. This leads to a clear difference between two systems that is rooted in institutional differences. This point becomes even clearer when contrasting the CDM with the other main PES segment (does that do require SD-benefits for certification). In this segment SD-benefits are as important as additionality and baseline setting, it is not just a part of the institutional structure (as it is in the CDM system), it is in focus, it is an institutional driver. This has lead to the clearly highest aggregate SD-potential. Which leads to the conclusion that the more SD-criteria are a part of the institutions of the system, the more effect they have.

6 Analysis – Intermediaries in the carbon markets

The first part of the analysis answered the question of whether institutional differences between the compliance and voluntary market lead to a difference in potential SD-contribution of the CDM and PES project systems – essentially there is an institutional difference and a difference in potential SD-contribution. In this second part of the thesis I further explore how intermediaries influence and are influenced by these differences. Here I seek to answer the second research question of:

> *How do different types of intermediaries contribute to the sustainable development of the projects they are involved in?*

This part is structured in a way that follows the sub-categorization of this research question, each part answering each of the three sub-research questions:

- *What motivations do intermediaries have for being involved in the compliance or the voluntary market?*
- *What is the relationship between intermediaries and buyers?*
- *How do intermediaries affect project development and the potential SD-contributions of projects?*

This structure provides a fluid and natural flow of arguments, starting with basic motivations for participating in carbon offset projects – this helps explain the relationship intermediaries have with buyers and sellers – which answers how intermediaries affect project selection and development, and the potential SD-contribution of projects. These three steps will be used to test the second main hypothesis of this study:

> *There is a difference in motivations and preferences between the different types of intermediaries depending on what system they are a part of and this leads to a different contribution to the sustainable development of the projects they are involved with.*

The analysis of this part of the study is based on a survey and web-page research of private firms and NGOs working as intermediaries in the CDM and PES related markets. The tables

and figures of this part of the thesis are made by manually doing a textual analysis of the survey answers and the webpages of survey respondents – identifying frequently used words and phrases that indicate motivations and preferences and compiling these into tables and figures.

6.1 Motivations for participating in carbon offsetting markets

The first sub-research question of this part of the thesis asks: *What motivations do intermediaries have for being involved in the compliance or the voluntary market?*

In the survey I pose several questions to get an answer to this question. Respondents were asked what their motivations for being involved in carbon offset markets were, and they were asked questions about how they measure the success of the projects they are involved in and how they would rank a set of success criteria.

When asked about why they ventured into the carbon offsetting markets it was possible to single out six distinct motivations:

1: *Environmental and SD-benefits* – There were various answers about the protection of ecosystems, environmental benefits and the prospects of contributing to a cleaner and more sustainable earth – these answers are categorized as *Environmental and SD-benefits*.

2: *Financial* gain – on the other end of the scale there were answers that highlighted the economic and business potential of the carbon markets – these answers are categorized as *Financial gain.*

In between these two clear motivations were four other motivations that touch on these two and each other, but are distinct enough to be classified as separate motivations. These four other motivations are those of:

3: *Previous experience* – those who started the firm or NGO had an education that gave them knowledge and competence within the field, or the firm or NGO had previously worked in tangential fields and the move to the carbon offset market was a natural transition

4: *Identified need for services* – the firm or NGO discovered that there were services to be offered from actors with knowledge and competence

5: *Identified growing national or regional market* – the identification of their home countries or regions as hot spots for future project development.

6: *Faith in market as tool for environmental protection* – several respondents stated that they ventured into the carbon offsetting markets because they had faith in a market approach to environmental governance – they believed in the merits of using financial tools to secure environmental protection and wanted to be a part of such a system.

The distribution of answers is expressed in Figure 17. Most respondents stated more than one motivation which is why the total number of answers to each motivation exceeds the total number of respondents.

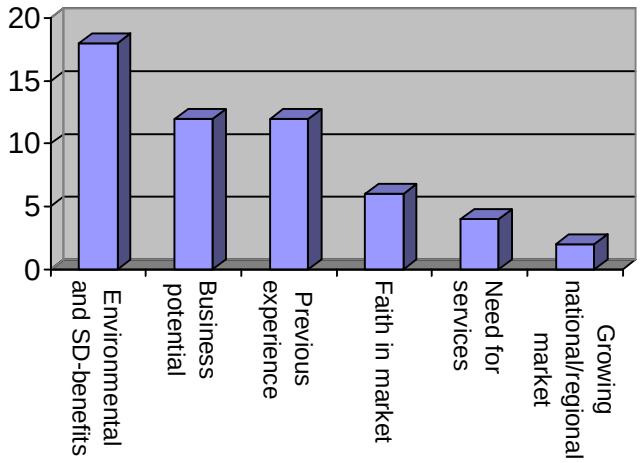


Figure 17: Motivations intermediaries had for venturing into the carbon offset markets

The most common motivation stated for why the firm or NGO choose to venture into the carbon offsetting markets was environmental and SD-benefits with 18 out of the 31

respondents stating this as a significant reason. After this the most common motivations were those of financial gain and previous experience, both of which were stated by 12 respondents as important reasons. The other tree motivations – identified need for services, identified growing national/regional market and faith in market as tool for environmental protection – were stated four, two and six times, respectively.

What is most interesting about these responses become apparent when separating them into the three categories used for this study;

- private firm intermediaries working *only* in the CDM-system (PFi-CDM)
- private firm intermediaries working *only* in the PES-system (PFi-PES)
- NGO intermediaries working in *both* the PES- and CDM-system (NGOi-CDM/PES)

The hypothesis of the thesis was that PFi-CDM would have similar motivations as the buyers in these markets and be mostly motivated by profit maximization. This would lead to expecting a lot of respondents from this group to have mostly business related motivations. Furthermore it was hypothesized that PFi-PES would be more spread across the motivational spectrum, with both profit/business related motivations, but also more philanthropic/altruistic motivations. Finally NGOi-CDM/PES were expected to mainly be motivated by philanthropic/altruistic motivations. The data gathered from the survey can be shown to support this hypothesis. Figures 18 – 20 show the distribution of answers when separated between the three categories.

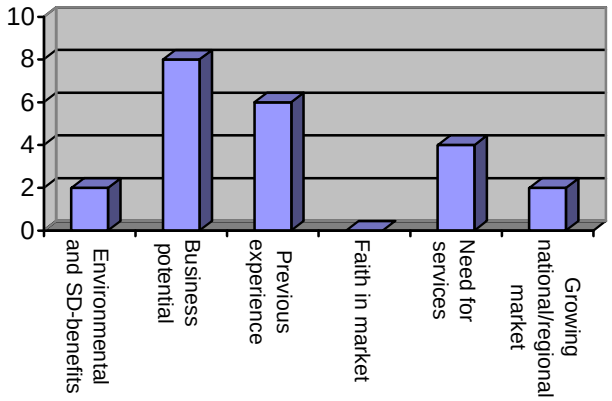


Figure 18: The motivations of private firm intermediaries working *only* in the CDM-system for venturing into the carbon offsetting market

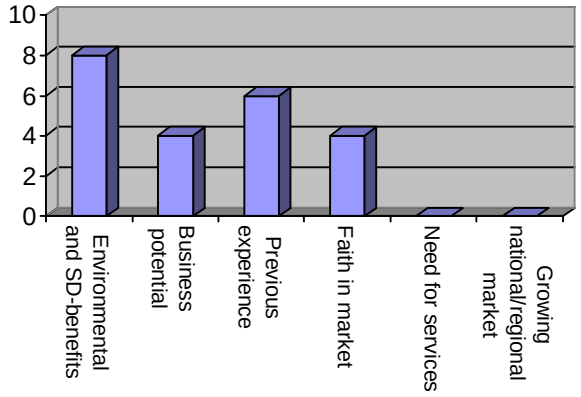


Figure 19: The motivations of private firm intermediaries working *only* in the PES-system for venturing into the carbon offsetting market

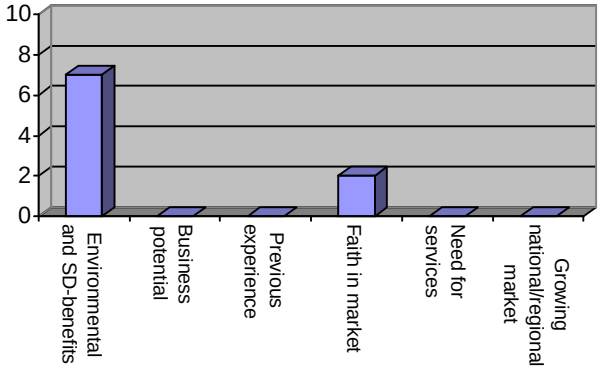


Figure 20: The motivations of NGO intermediaries working *both* in the CDM and PES-system for venturing into the carbon offsetting market

The main observation is that the environmental and SD-benefit motivation, which was the most prominent in the total distribution of answers, is almost absent in the PFi-CDM answers. Only two PFi-CDM respondents gave this as an important motivation. The majority of PFi-CDM respondents stated business related reasons; financial gain, identifying growing markets, filling a need of a service, as their motivation. On the other end of the scale, every NGOi-CDM/PES respondent, sans one, stated environmental and SD-benefits as the main motivation for participation in the carbon offsetting markets. Only two respondents stated

other motivations in addition to this; both of them had faith in markets for environmental governance and wanted to be a part of such a system – a motivation that is as much propelled by environmental and SD-concerns as with the wish to profit. Lastly the PFi-PES respondents have a more evenly distribution of motivations for their participation. Eight out of ten stated environmental and SD motivations, four out of ten stated financial gain, the same number of respondents had faith in markets as a tool and six out of ten stated previous experience as an important motivation.

These responses support the hypothesis of the study, but the limited number of respondents makes it impossible to do a conclusive statistical analysis of the significance of the differences, i.e. the results are not conclusive. The general tendency is however that most PFi-CDM respondents got involved in the CDM markets mainly because they saw business potential there. NGOi-CDM/PES respondents seem to be involved mainly because they want to improve the environment and lives of stakeholders. PFi-PES respondents are more diversified in their motivations and fall in between.

6.1.1 Measuring the success of projects

To further explore the motivations of intermediaries in carbon markets, the respondents were asked how they measured the success of the projects they participated in. The answers given made it possible to check if their stated motivations correlated with what they said they wanted to achieve with the projects they were involved in.

Basically the answers showed that there was one big difference between the three categories. This difference was the variation of stated success criteria. The PFi-CDM respondents had very similar and few criteria for how they measured success, the PFi-PES respondents were a little more evenly distributed and had one more criteria, while the NGOi-CDM/PES respondents had a very large variance in stated success criteria. Table 11 shows how many respondents stated different criteria as a measure of success.

Table 11: Stated criteria for measuring the success of projects the intermediaries are involved in. Numbers represent number of respondents stating that criteria.

	PFi-CDM (N=12)	PFi-PES (N=10)	NGOi-CDM/PES (N=9)
Issuance rate	9	3	-
Issuance speed	7	-	-
Profitability	1	1	1
SD-benefits	1	6	3
Ecological/environmental benefits	-	8	7
Stakeholder satisfaction	-	1	3
Certification	-	-	4
Return to landowner	-	-	1
Buyer satisfaction	-	-	1
Canopy establishment	-	-	1
Biodiversity benefits	-	-	1
Project longevity	-	-	1
Total	18	19	23

Table 11 shows that PFi-CDM respondents in effect have two main criteria for judging the success of the projects they are involved in; *issuance rate* and *issuance speed*. This supports the arguments made in chapter 5.2. Here it was argued that the most important preferences for buyers in the CDM market system were those of risk, speed and cost. In that order of priority. The most important factor is that projects get CDM registered and produce a high amount (relative to the projected amount) of CERs, this should then be done as quickly as possible and as cheap as possible. The PFi-CDM answers shown in Table 11 supports this – and it supports the assumption that the priorities of intermediaries mirror those of the buyers in the CDM market. Nine out of twelve PFi-CDM respondents explicitly state issuance rate as the most important factor in measuring the success of projects, and seven out of twelve respondents mention issuance speed. In fact, the majority of respondents mentions one or both of these two factors as their only criteria for success.

The PFi-PES answers were more evenly distributed, and the most important difference is the weight put to ecological/environmental benefits and SD-benefits – with eight out of ten and six out of ten responses, respectively. Issuance rate was important to three of the respondents

and a couple mentioned profitability and stakeholder benefits[7] as well. This does support the hypothesis to some degree; PFi-PES respondents are overall more concerned with environmental and SD-benefits of projects, but there are also PFi-PES respondents that are mostly concerned with more profit related criteria such as issuance rate and profitability. This suggests different criteria and motivations than the PFi-CDM respondents.

The NGOi-CDM/PES answers on the other hand strongly suggest a difference as opposed to the PFi-CDM and PFi-PES answers. Ten different criteria were identified (PFi-CDM and PFi-PES respondents stated four and five different criteria, respectively), with ecological/environmental benefits dominating with being important to seven out of nine NGOi-CDM/PES respondents. There were only two criteria not mentioned by the NGOi-CDM/PES respondents, those of issuance rate and speed, which is telling in that they are almost the only things important to PFi-CDM respondents. .

Seen together these answers do support the hypothesis; PFi-CDM and NGOi-CDM/PES on each end of the scale and PFi-PES in between.

6.1.2 Ranking of project criteria

In addition to asking the respondents how they measured the success of projects, they were asked to rank a set of five criteria in order of importance to them. These five criteria were; *profitability – client satisfaction – be certified by a standard – SD-benefits – other*.

The results from this ranking show that PFi-CDM respondents are most concerned with *client satisfaction*; ten out of twelve respondents ranked *client satisfaction* as the first or second most important criteria for the projects they are involved in. This fits with the PFi-CDM answers about issuance rate and speed being their main concern – these are the most important factors for CDM buyers, so in order to ensure client satisfaction they are also the most important factors for PFi-CDM. The second most important criteria for PFi-CDM is *profitability* followed closely by *SD-benefits – being certified by a standard* and *other* were ranked as least important. That *being certified by a standard* is ranked as low as it is can be explained with the fact that the *client satisfaction* criteria to a large degree covers the former

[7] Stakeholder benefits could be classified as SD-benefits, but in several cases this was explicitly mentioned in addition to SD-benefits. Especially by NGOi-CDM/PES respondents.

criteria; *client satisfaction* boils down to issuance success and speed and being CDM certified is a prerequisite for the issuance of CERs – thus satisfying clients entails being certified by a standard. Interestingly *profits* and *SD-benefits* are almost equally ranked by PFi-CDM respondents, but this probably also boils down to the fact that ensuring client satisfaction also ensures profitability. Generally *client satisfaction* and *profitability* were ranked higher than SD-benefits by a clear majority of respondents. However, *SD-benefits* were only ranked as least important by one of twelve respondents and mostly was ranked as second or third most important; showing that *SD-benefits* are considered.

The PFi-PES responses to this ranking were a little more evenly distributed. *Client satisfaction* and *SD-benefits* were equally weighted as the most important criteria – closely followed by *being certified by a standard. Profitability* was a little behind this and *other* was ranked as least important. It was expected that *being certified by a standard* would be weighted higher, but again, *certification* is becoming a prerequisite for client satisfaction in the voluntary market as well and this is probably the explanation for why it only ranks as the third most important criteria. In fact some of the respondents even commented on this, with one stating; "[…] *keep in mind these are somewhat false separations – a standard is a requirement usually, so if we fail to do that, the project would fail overall. So, the objective is not to achieve a standard, it is simply part of the process*." As with the CDM system, standard certification has now become part of the process for many actors in the PES system – highlighting the impact of the formalization process of the voluntary market.

On the whole it was difficult to discern any clear patterns in the PFi-PES category because the answers were very divergent. Which was to be expected based on the hypothesis; PFi-PES were hypothesized to have more plural outcome motivations and preferences, which would lead to less conformity in their rankings of project success criteria.

The NGOi-CDM/PES responses were a little clearer than the PFi-PES responses. *SD-benefits* was the first or second most important criteria for the majority of respondents, and the worst ranking it got was as the third most important. The second most important criteria was *client satisfaction*, lagging behind this was *certification* and *profitability* with an equal weighting, and *other* was ranked as least important.

Again the rankings provided by the respondents seem to follow the hypothesis. PFi-CDM rankings mostly favoured business related outcome criteria such as *client satisfaction* and *profitability* – PFi-PES rankings were more evenly distributed with *SD-benefits* and *client satisfaction* receiving the same weighting – and the *SD-benefits* criteria was on average clearly the most important criteria for the NGOi-CDM/PES respondents.

6.2 The relationship between intermediaries and buyers

The second sub-question asked in this thesis is: *What is the relationship between intermediaries and buyers?* In order to understand how intermediaries affect the selection of projects and how they value the SD-benefits of projects, one has to understand the relationship between the actors in the carbon offset project cycle – with a special focus on the relationship between intermediary and buyer.

Based on the survey and research of the websites of numerous intermediaries an overview of the relationships between actors, projects and offsets in a baseline-and-credit system has been established. In essence there is a buyer who wants carbon credits and a seller that has the opportunity to implement projects that qualify as CDM or PES projects, and can thus produce carbon credits. Because of the size and complexity of the system, intermediaries provide services that facilitate the contact between buyer and seller and the development of projects. Usually buyers approach intermediaries who then find a seller – although who approaches whom does vary, and will be addressed below. Together the intermediary and seller plan, implement and develop the project. This project is then certified or not. If it gets certified it begins to produce carbon credits. These credits then go to the buyer and intermediary. These can then either retire the credits to meet regulations or to voluntarily offset some activity, they can keep the credits for later, or they can sell them to other interested parties. Figure 21 illustrates these relationships.

Figure 21 is a simplification and shows the most common ways these relationships work. Intermediaries are not always used and buyers experienced in the market may approach sellers directly and either finance projects directly and/or develop them directly. Sometimes sellers approach intermediaries who then approach buyers. Other times intermediaries are the active

part and they approach both buyers and sellers. It is also common that established relationships are nurtured and the same actors work together on different projects. Furthermore, the way the carbon credits are divided between the actors differs depending on the initial agreements made; two typical ways to do it is that the buyer and intermediary both contribute to the financing of the project, thus sharing the risk of the project but also the resulting credits – or the buyer finances the whole project and receives all of the carbon credits, thus taking on all the risk themselves. There are several variations to the ways these agreements work.

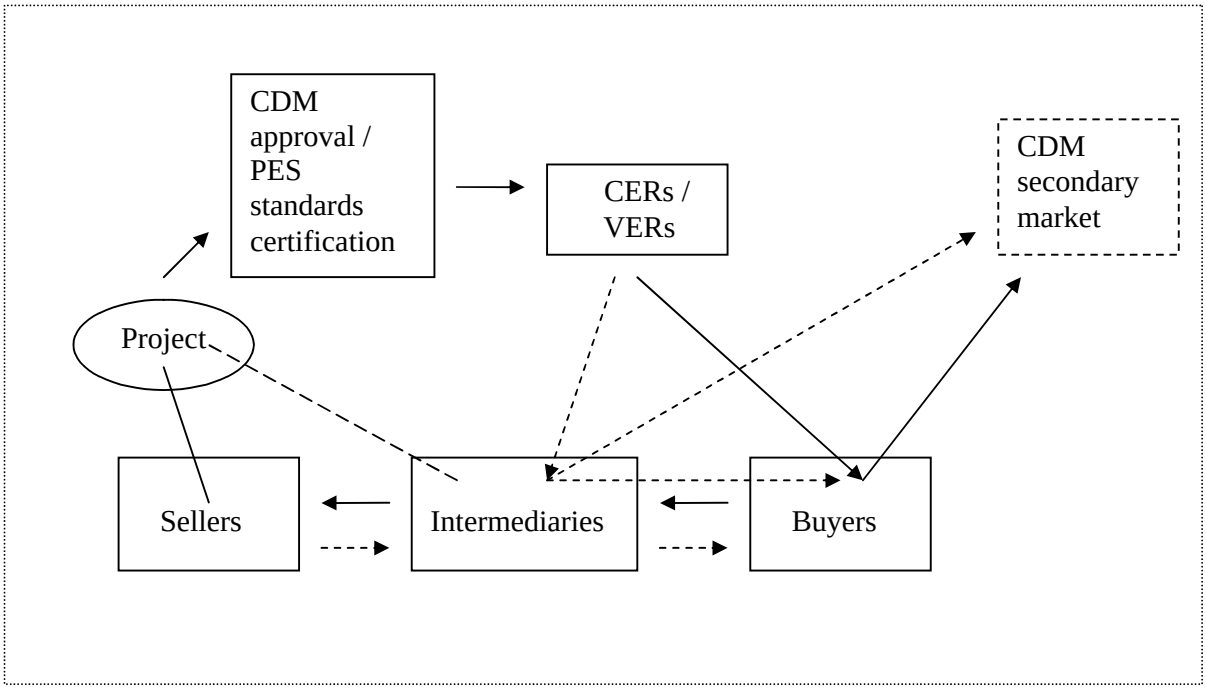


Figure 21: Flowchart of typical relationships between actors, projects and carbon credits in a baseline-and-credit type of carbon offsetting scheme.[8]

The focus of this thesis is how the relationship between intermediaries and buyers affects the choice and development of projects. The interesting intermediaries in this case are those that play a pivotal part in the entire life cycle of projects – the ones which affect the selection of projects and the implementation and development of them. The following sections explore what types of services the intermediaries in the survey offer, what types of buyers they work with and how contact between them is established.

[8] Buyers or intermediaries that have excess CERs from their project developments and transactions in the primary market can resell remaining credits in the secondary market. Credits in this secondary market carry no risk (they have already been created), but are substantially more expensive. So this part of the flowchart only applies to the CDM system.

6.2.1 Type of services offered

In this thesis I categorize services into two main types: project development and financial services. A research of the webpages of CDM and PES intermediaries showed that these two categories contain a vide variety of different specific services. Table 13 catalogues a selection of these services. Although the list is not exhaustive, it encapsulates the main types of services offered by intermediaries in these systems. The intermediaries surveyed for this study thus offer a variety of the services listed in Table 13.

Of all the 31 respondents in this survey 15 offered only project development services, 14 offered both project development and financial services and two offered only financial services. Which shows that the most important type of service offered by intermediaries in these markets is that of project development – only two out of 31 respondents do not offer any specific project development services.

Of the PFi-CDM respondents seven out of twelve offered both project development and financial services, five offered only project development services and no one offered only financial services. Of the PFi-PES respondents five out of ten offered both project development and financial services, four offered only project development services and one offered only financial services (a retailer). Of the NGOi-CDM/PES respondents two out of nine offered both project development and financial services, five offered only project development and one offered only financial services. Table 12 shows the distribution:

Table 12: Types of services offered by survey respondents.

	PFi-CDM (N=12)	PFi-PES (N = 10)	NGOi-CDM/PES (N=9)
Project development only	5	4	6
Financial Services only	-	1	1
Both	7	5	2
Total:	12	10	9

Table 13: Types of services offered by intermediaries in the CDM and PES system – categorized by two main service types; *Project development* and *Financial services*.

Project development	Financial services
Project identification and due-diligence	Carbon project financing and contract structuring
Project registration and accreditation facilitation	Structuring and contracting of carbon-based transactions
CDM/JI Project Design Document (PDD) development	Due diligence of GHG emission reduction Project
Preparation of PIN	Negotiating and preparing Emission Reduction Purchase Agreements
Assistance in Validation and Registration	Managing the issuance and transfer of carbon credits, including the establishment of registry accounts
Assistance in Host country Approval	Carbon Finance advice
Assistance in monitoring and verification	Feasibility Study and Business Plan creation
Identification of potential CDM Projects	Help in identifying and raising finance for emission reduction projects
Additionality Assessment	Marketing the emission reductions
Identification of appropriate project partners	Bank for future use (i.e. to offset future growth plans)
Stakeholder consultation	Sell externally to generate cash and profit from market opportunities
Environmental and Sustainable Development (SD) impact analysis.	Assessing the potential of your emission reduction project on the worldwide carbon markets and estimating the revenue you can expect to generate.
Assist in validation and verification of project with Designated Operational Entity (DOE)	Providing access to Carbon Finance using our extensive network of partners.
Paperwork submission to local and international authorities for all relevant permit, registration and financing requirements.	Facilitating the sale of emission reductions.
Emission reduction project identification/sourcing/screening	
Development of baseline and monitoring methodologies	
CDM bundling to enable small projects to gain best value from the Kyoto mechanisms	
Supporting negotiations with CER/VER buyers and facilitating Emissions reduction purchase agreements (ERPA)	
Technology profiling for help in screening potential emission reduction projects	
Capacity building and technology transfer	
Strategy and Policy advice	
Integrate and optimize multiple land management objectives and other ecosystem assets with carbon opportunities	
Meet internal company regulatory and voluntary requirements	
Develop end-to-end carbon projects	

Source: Webpages of CDM and PES intermediaries used in this study.

6.2.2 Type of buyers

There are several types of buyers in the carbon markets. In this thesis I differentiate between private firms, NGOs, governments, civil society and individuals. There are no PFi-CDM respondents that work with all of these, there are however two PFi-PES and five NGOi-CDM/PES respondents who state that they work with actors from all of these categories. Besides this there is not much to infer from the data; PFi-CDM, PFi-PES and NGOi-CDM/PES all work with one or several of the categories of buyers and there are no significant differences in the composition of buyers depending on which system the intermediaries work in.

Table 14 shows what types of buyers the intermediaries work with. The interesting observations here is that there is a vide variety of types of buyers intermediaries work with – and that the only recurring type of buyer is the private firm; all of the respondents in this survey work either only with private firms or with private firms and other types of buyers. The majority of CDM and PES intermediaries who work with private firms and other types, state that they work mostly with private firms.

Table 14: Intermediaries and the buyers they work with.

PFi-CDM		PFi-PES		NGOi-CDM/PES	
All	(0)	All	(2)	All	(5)
Private firms	(3)	Private firms	(1)	Private firms + individuals + other	(2)
Private firms + civ. society	(3)	Private firms + governments	(1)	Private firms + NGOs + individuals	(1)
Private firms + government	(2)	Private firms + NGOs	(2)		
Private firms + individuals	(1)	Private firms + NGOs + individuals	(1)		
Private firms + individuals + other	(1)	Private firms + NGOs + individuals + governments	(2)		
Private firms + individuals + NGOs	(1)	Private firms + NGOs + governments + civ. society	(1)		
Private firms + individuals + NGOs + governments	(1)				

This makes private firms the most important category of buyer in the CDM and PES carbon markets. Even in the voluntary market the private firm is most prominent, even if they have no formal obligations to take part. This is promising in regards to the use of financial mechanisms for environmental governance – because one of the strengths of such an approach is supposed to be the inclusion of the private sphere in the global emission mitigation efforts. The carbon markets clearly involve the private sphere.

6.2.3 Contact between intermediary and buyer

There are differences in who is approached by whom depending on which system they are part of. The survey responses show that most of the PFi-CDM are approached by the buyer, all of the PFi-PES say it goes both ways (they approach buyers and are approached by buyers in roughly equal amounts), and NGOi-CDM/PES are split down the middle with half saying it goes both ways and the other half saying they are mostly approached by buyers. Table 15 shows the distribution of answers.

Table 15: How first contact is established between intermediary and buyer.

	PFi-CDM (N=12)	PFi-PES (N=10)	NGOi-CDM/PES (N=9)
Both	3	10	5
Approached by buyer	9	0	4
Approaches buyer	0	0	0
Total	12	10	9

One of the main reasons for why the intermediaries take a more passive approach in the CDM system is that there are always more buyers than sellers. So while the intermediary might be active in its relationship with sellers – actively seeking out potential sellers and projects – there are always buyers who need carbon credits and there is a steady stream of potential buyers making contact. The intermediaries in the PES system however have to be more proactive in their relationship with buyers. They can not rely on emission reduction regulations pushing buyers to make contact, but have to market themselves to the buyers, emphasizing the benefits of voluntary emission reductions.

6.3 Choosing projects

The third sub-question asked in this thesis is: *How do intermediaries affect project development and the potential SD-contributions of projects?* In order to answer this questions survey respondents were asked questions about what types of projects the intermediaries work with, what standards they use, what the motivations of buyers are and how important the preferences of buyers are, and how projects are chosen.

6.3.1 What makes a project a success?

The question of how projects are chosen is connected to the survey question on how the intermediaries measure the success of the projects they are involved in. It was expected that the answers to the latter question would mirror those of the former; it makes sense to expect that the criteria used to measure the success of a project reflects the reasons for choosing that project. As it turns out, however, the criteria for choosing projects are more complex than the criteria for judging their success. Table 11 showed 12 criteria for measuring the success of projects as identified by the survey respondents. But when asked about how projects are chosen in the first place, 24 different criteria were identified by the survey respondents. These 24 criteria are listed in Table 16 categorized by type of intermediary.

It is hard to read anything conclusive out of this table because the answers are so spread out, across all categories, but if we look at the most answered criteria for each category there are some observations to be made. For the PFi-CDM respondents the most commonly identified criteria were pertaining to technical issues and the prospect of issuance of CERs. Technical feasibility, available expertise and complexity all refer to the difficulties of implementing projects – if the technical obstacles are few, the available expertise is good and easily accessible and the project is not too complex, then it is a potential project. Next to these factors the most important criteria for PFi-CDM respondents were those of additionality, issuance rate and profitability. That the project is additional is a prerequisite for being CDM approved, which leads to a good issuance rate and profitability. In fact, 10 out of 12 PFi-CDM respondents stated two or more of these criteria as important when selecting projects. Of the last two, one answered with a N/A, and the other with “projects which are approved by the Chinese government”. This is clearly in line with the former results of this study; PFi-CDM

select projects that are easy to implement and which offer a high probability of CER issuance within a predictable timeframe at a reasonable cost.

Table 16: Identified criteria for project selection. Numbers signify how many respondents of each category mentioned the criteria.

	PFi-CDM (N=12)	PFi-PES (N=10)	NGOi-CDM/PES (N=9)
Additionality	3	3	1
SD-benefits	1	4	3
Technical feasibility	5	3	-
Reputable and capable project participants	1	2	2
Due Diligence (DD)	1	1	1
Available expertise	4	-	-
Profitability	3	-	-
Location	-	2	2
N/A	1	-	2
Complexity	2	-	-
Issuance rate	3	-	1
Scalability	1	1	-
Demand	-	3	-
Projects approved by Chinese government	1	-	-
Projects with existing methodology	1	-	-
Approached by seller	-	1	-
Local knowledge	-	1	-
Leakage	-	1	-
Political context	-	1	-
Buyer preference	-	-	1
Marketability	-	1	2
Type of seller	-	-	1
Sector	-	-	1
Potential for market transformation	-	-	1
Total	27	24	18

For the PFi-PES respondents the most commonly identified criteria were more diverse than those of the PFi-CDM respondents. Some of the criteria were the same, such as technical feasibility and additionality, but the most commonly identified criteria was that of potential sustainable development benefits. Only one of the PFi-CDM respondents mentioned SD-benefits as important when selecting projects. I addition to this, there were two criteria which were almost totally unimportant to the PFi-CDM respondents, but which were frequently

mentioned by PFi-PES respondents as important; location and demand. In addition to the SD-benefit criteria, these two criteria highlight important differences between the CDM and PES systems and markets. For PFi-PES respondents, location is important. Usually they do not chose projects from all over the world, but rather focus more on local projects and projects in certain areas. This is especially true the smaller and more locally grounded the actors are. Demand is another criteria not mentioned by PFi-CDM respondents. This relates to points made above about why PFi-PES have to be more proactive in their relation to buyers than PFi-CDM have to. Intermediaries in PES are more sensitive to whether or not there is a demand for their project and its ensuing credits. In the CDM system there is always a demand, always a buyer and the buyer does not really care about where the credits come from. The buyers in the PES system are fewer and care more about where the credits come from; they are more concerned with the "storytelling appeal" of the carbon credits. Therefore PFi-PES often analyse the demand for credits stemming from a potential project before they decide on it. This also corresponds with the hypothesis of the thesis; plural motivations and preferences lead to a larger variation of ways to select projects. The important factors are not only those pertaining to cost, effort and profitability, but also ones pertaining to potential SD-benefits of projects, location of projects and project participants.

The only criteria that stick out in the NGOi-CDM/PES answers are SD-benefits. Other than this the criteria vary to a large degree from NGO to NGO. This makes it hard to comment on how these answers connect with the hypothesis. That SD-benefits was the most common answer is no surprise, though it was expected to be present in more of the responses.

6.3.2 How important are the preferences of buyers?

When asked about how important the preferences of buyers are in the selection of projects 8 of 12 PFi-CDM respondents stated that they are not particularly important because CERs are CERs and there is always a buyer; as long as the projects produce a sufficient amount of CERs at a reasonable price, the buyer does not particularly care what type of project they stem from. For the remaining four PFi-CDM respondents the preferences of buyers was somewhat important or important. For the PFi-PES respondents there was a more evenly (and more definite) split; 6 out of 10 PFi-PES claimed the preferences of buyers to be not important, while the remaining 4 claimed them to be very important or even of critical importance. For

the NGOi-CDM/PES respondents four stated buyers' preference as important, three claimed them not to be important and two answered N/A. Table 17 expresses these answers:

Table 17: The importance of buyers' preferences in the selection of projects.

	PFi-CDM (N=12)	PFi-PES (N=10)	NGOi-CDM/PES (N=9)
Important	4	4	4
Not important	8	6	3
N/A	-	-	2
Total	12	10	9

Those who claimed buyers' preferences to be very important added that without the buyers many projects would not get off the ground in the first place. This might indicate the fact that PFi-PES respondents tend to be smaller in size and capacity than their CDM counterparts. They need the financial backing of a buyer to start a project and are thus more sensitive to the preferences of the buyers. Furthermore, these particular four PFi-PES respondents are specialists and only work with forest related projects, while most of the other respondents are less specialized and work with a wider range of project types. These specialist intermediaries also tend to be smaller and have less capacity. They therefore depend more on the financial support of buyers. These smaller, more specialized intermediaries also tend to be very concerned with the SD-impacts of the projects they are involved in.

6.3.3 How are projects chosen?

The general tendency is that PFi-CDM select projects without much thought about the potential SD-benefits of those projects; focusing on how easily they can implement the projects and how many CERs the projects will produce. Buyers' preferences are only indirectly important by fulfilling the client satisfaction criteria described in chapter 6.1.2. PFi-PES are more concerned with SD-benefits of projects in addition to being concerned with the locality of the project and sensitive to market demand. Buyers' preferences has more of an direct impact on PFi-PES, in particular the smaller and more specialized intermediaries of this category depend to a large degree on identifying buyers and getting their financial support.

An interesting observation in regard to the specialized intermediaries is that the more specialized the intermediary is the more it tends to value the SD and environmental issues of projects. This is especially true for the PFi-PES category where six out of ten of the respondents were forest-specialists. These intermediaries tend to be somewhat smaller and most of them exclusively work with forest type projects. Four out of these six forest specialists only use standards that require SD-benefits, while the other two use both types of standards. None of the other intermediaries – those who are not specialists – only use SD-benefits required standards. This means that these smaller and forest-specialized intermediaries both are largely dependent on buyers and are very concerned with the environmental and SD-benefits of projects they participate in. This indicates a direct effect on the SD-contributions of the system; they use standards that require SD-benefits and have to actively find buyers that are interested in these more expensive projects. By doing so they contribute positively to the potential aggregate SD-contribution of the system they are a part of.

This relation between forest-specialist intermediaries and standards used is also evident in the NGOi-CDM/PES category where four out of nine respondents were forest-specialists. Three of these used standards that require SD-benefits and one did not. Of the remaining five NGOs two only use standards that do not require SD-benefits and three uses both types of standards. Combining all forest-specialists from the PFi-PES and NGOi-CDM/PES categories gives 10 out of 19 as forest-specialists. Out of these ten, seven use standards that require SD-benefits, two use both and one uses the other type of standards. This one exception is a forest-specialist when it comes to project development, but they purchase and retire credits from other project types in the names of their donors, it is these projects that use the no SD-benefits required standard. When it comes to the projects they develop they are very concerned with environmental impacts and impacts on the local community; they are very locally anchored. The point is that forest-specialist intermediaries – whether they are PES private firm intermediaries or NGOs – are more concerned with SD-benefits and generally use standards that require SD-benefits for certification. This means they contribute directly to the aggregate SD-potential of the PES system.

6.4 The effect of intermediaries on potential SD-contribution of projects

The hypothesis pertaining to this part of the thesis was:

> *There is a difference in motivations and preferences between the different types of intermediaries depending on what system they are a part of and this leads to a different contribution to the sustainable development of the projects they are involved in.*

This hypothesis consists of two parts – (a) that there is a difference in motivations and preferences between the different types of intermediaries and (b) that this difference somehow contributes to the sustainable development of the projects they are involved in.

Concerning the first point of the hypothesis the results of the survey clearly indicate that there *is* a difference in motivations and preferences which depends on what system the intermediaries are a part of. Furthermore, the motivations of the intermediaries generally correlate with how they were hypothesized to lie on the motivational axis of Figure 1. Private firm intermediaries in the CDM system tend to be only motivated by business decisions, both when it comes to what they want for their firm, and what they want out of the projects (organizational and outcome motivation) – placing them at the far left and top of the motivational axis. The PFi-PES category had more diverse motivations and tended to value environmental and SD-benefits of the outcome of projects, but also had a tendency to value business considerations when it came to organizational motivations – placing them around a little to the right of the middle of the motivational axis. The NGOi-CDM/PES category also fit on the motivational axis mostly the way they were hypothesized to – they were on average more concerned with environmental and SD-benefits than other issues, they were more specific in their SD-preferences; often highlighting specific issues such as stakeholder interaction and local communities. But they were also concerned with business and PR issues. Judging by the result of the survey NGOi-CDM/PES respondents are, like PFi-PES category, highly diversified and often specific in their motivations – covering the whole of the motivational spectrum.

One explanation as to why NGOi-CDM/PES category is motivationally similar to the PFi-PES category is that they are much more a part of the PES system than the CDM system. In fact, one of the NGOs that work in both the CDM and PES systems stated that the focus has shifted more and more from the CDM to the PES system during the recent years. This can be

attributed to the fact that the clear majority of NGO respondents were either forestry specialists or located within the PES geographical bubble. And as will be discussed in the next chapter, location and project type specialisation are determining factors in the motivation of intermediaries and their potential affect on SD-benefits of projects.

Concerning the second part of the hypothesis – whether the differences in motivations lead to different SD-contributions – the main thing learned from the survey was that intermediaries from the CDM and the PES systems have different criteria for success, they have a different type of relationship with buyers and they have different ways of selecting projects – this follows from the answering of the three research sub-questions. NGOi-CDM/PES and PFi-PES have more criteria and on average value environmental and SD-impacts of projects more than PFi-CDM do. Furthermore, an examination of the forest-specialist type of intermediaries showed that the way they work has a positive effect on the potential aggregate SD-contribution of the PES system. This supports the hypothesis and will be further discussed in the following chapter where the basic findings of the two parts of this study are discussed.

It should however again be stated that the number of respondents in each category, unfortunately, were too few to really be able to prove or disprove the hypothesis of this part of the thesis – although the tendency of the survey answers given are encouraging in respect to proving the hypothesis, and it is my hope that future studies will be able to further put it to the test.

7 Discussion

Throughout this thesis I have indirectly used classical institutional economic theory as a basis for analysis by formulating and testing two hypotheses, but I will briefly explicitly discuss some theoretical aspects of the results. The basic findings of the two parts of the thesis is that there are big institutional differences between the CDM and PES systems, that these differences affect the SD-contribution of each system and that institutional differences affect and are affected by intermediaries working in these systems.

These results support the basic assumptions of classical institutional economics. First of all it is clear that differences in institutional context affect the systems as a whole. This is most evident in the project type distribution of the PES SD-*required* and PES *no* SD-required segments; by adding an institutional parameter to the PES total distribution – *type of standard used* – the project type distribution changed substantially, giving two very different distributions. Furthermore the social constructivist perspective on which my theoretical approach is based says that no individual is unaffected by her surroundings – in this thesis this is extended to actors in certain types of governance structures, and it is showed that these actors both affect and are affected by the different institutional context making up these structures. Different types of intermediaries (actors) have different types of motivations and roles depending on whether they are in the CDM or PES system. And these differences in motivations and roles in turn have different effects on the systems themselves. This supports the assumptions that rationality and behaviour is context dependent and that motivations and preferences – and thus actions – are socially influenced. This means that understanding how institutions work and understanding the interplay between institutions and between institutions and actors is paramount when trying to improve the systems.

Furthermore the results of this thesis show that institutional actors (in this case intermediaries) can have more than one motivation and that preferences change depending on the institutional context. In fact PES actors are shown to have a plurality of motivations and preferences – differentiating them from their CDM counterparts who have more singular motivations and preferences. This can be attributed to the way the two systems are formed. Building on legal regulations and a central governing body as its main institutional building blocks the CDM is not as influenced by its actors as the case is with the PES system. The PES system lacks

central governing institutions and is based more on norms of behaviour and the influence of the actors of the system. These institutional differences affect the size, workings and potential of the two respective systems – showing again that institutions and actors affect each other differently; but they *do* affect each other – the institutions of the CDM and PES system are not only formed by its actors, they also form these actors.

Having established a clear connection between the theoretical approach of the thesis and the results found I will in the following discuss some potential critiques of my findings, and share some thoughts on further implications of the results.

7.1 Distinguishing between potential and actual SD-contributions

In this thesis I am concerned with institutional differences between the CDM and PES system and I use a proxy measure of *potential* SD-contribution as a basis for analysis. There are no practical ways to measure the actual SD-contributions of project types at aggregate levels because there are no mechanisms that measure the actual SD-contributions of each project. The best one can do is make estimations based on proxy methodologies. This being stated, there is a criticism in the literature on SD-benefits of CDM projects that warrants a brief discussion.

Some of the literature argues that the actual SD-contribution of the systems is lacking. Regarding the CDM the argument goes that there is a trade off between cheap CERs and SD-contribution. When designing and implementing the CDM its purpose was to meet two goals; (1) it would help Annex 1 countries meet their GHG emission targets in the most cost efficient manner, and (2) it would help non-Annex 1 countries to achieve sustainable development. Or, as formulated in article 12 of the Kyoto Protocol:

> The purpose of the clean development mechanism shall be to assist Parties not included in Annex 1 in achieving sustainable development and in contributing to the ultimate objective of the Convention, and to assist Parties included in Annex 1 in achieving compliance with their quantified emission limitation and reduction commitments (UNFCCC, 2011).

The CDM clearly has two aims; (1) to reduce GHG emissions and (2) to promote sustainable development. These two aims are those of (1) additionality and (2) SD-benefits.

As a market mechanism – providing the cheapest possible ways of reducing GHG emissions – the CDM does remarkably well and some argue that the effects of the well functioning market come at the expense of, or does not promote, sustainable development (Michaelowa and Michaelowa, 2007) (Olsen, 2007) (Paulsson, 2009). The critique goes that the CDM works perfectly as it produces the lowest cost emission reductions, but that in doing so it leaves out SD-benefits. What happens is something coined *a race to the bottom*. Because sustainable development is not monetised they play a limited role in directing investments. When non-Annex 1 countries compete for the CDM investments of Annex 1 countries they often set low sustainability standards (Olsen, 2007). They do this because it will make it cheaper for investors to improve on the business as usual sustainability conditions – the abatement costs have been dramatically lowered; it costs next to nothing to improve on sustainability standards that are as low as they can be, and thus investors get their CERs at the lowest possible price and little has really been done in terms of sustainable development. In fact it might be worse off because of how low the standards are set in order to attract the investments. There has been a *trade off* between cheap CERs and sustainable development. This has especially been a problem in the least developed countries, those in most need of foreign investments.

These arguments are valid, but rather narrow in scope. They mainly deal with issues in the least developed countries and are based on the CDM system and market such as it was in its initial phase. Since then the UNFCCC has made adjustments to the system by for example introducing the Programme of Activities (POA) initiative which makes it possible to combine several different small scale projects into clusters that can apply for CDM certification as one single project – making it easier to overcome transaction cost issues that are prominent in many small scale projects. Such projects often include EE household project types which have high SD-contribution potential (se Figure 2) and are project types that typically get implemented in least developed countries.

Furthermore, diagnosing the whole CDM system based on flaws of the system when applied in least developed countries – one small segment of the involved countries – unfairly skews the picture of the system as a whole. As table 18 shows, of the 7532 projects in the CDM pipeline, only 96 are in the least developed countries.

Table 18: CDM projects and projected CERs for 2012 in least developed countries (LDC)

CDM Projects	Number	Registered	2012 kCERs
LDC Total	**96**	**36**	**31154**
Bangladesh	5	3	1364
Bhutan	3	2	503
Cambodia	9	5	1075
Lao PDR	10	1	1550
Myanmar	1		
Nepal	9	4	1066
LDC Asia & Pacific	**37**	**15**	**5559**
Angola	5		17050
Congo DR	4	2	1017
Equatorial Guinea			
Ethiopia	2	1	306
Lesotho	1		79
Liberia	1	1	187
Madagascar	4	1	145
Malawi			
Mali	1	1	94
Mozambique	1		63
Rwanda	4	3	135
Senegal	5	1	786
Sierra Leone	1		
Sudan	2		367
Tanzania	9	1	1791
Togo	1		5
Uganda	14	9	2244
Zambia	2	1	387
LDC Afrika	**57**	**21**	**24656**
Yemen	2		940
LDC Middle East	**2**		**940**

Source: UNEP Risø Centre, 2012

96 of 7532 projects are in least developed countries and they are expected to produce approx. 1% of the CERs in 2012 (UNEP Risø Centre, 2012). There is a real and serious issue with the *race to the bottom* in the least developed countries, an issue which has got some attention, but needs more, but it is not fair to label the whole CDM system as not contributing to sustainable development based on 1% of the projects. I would assert that the system as a whole has a lot of potential when it comes to contributing to sustainable development.

I would further argue that there might be some bias at play here. My approach may be biased in the way that it only assesses *potential* SD-benefits based on *assumed* SD-contributions of project types. Thus it may paint a somewhat more favourable picture than what is actually the

case. The critics of the SD-contribution of CDM and PES projects, however, may be biased by only analysing a very limited amount of projects and focusing on troubled projects – a natural bias; in the efforts of conducting research that produces results it is easy to focus your attentions on projects you know have problems and thus know will give results. And there certainly are projects that have problems with everything from unfair contracts, to lack of additionality and problems with *a race to the bottom.* Regretfully there are no viable ways to test over 9000 projects for actual SD-contribution. I will therefore admit that the CDM and PES systems may have certain problems when it comes to sustainable development, but in general I think they contribute positively to it.

7.2 The motivation of buyers

I have throughout this thesis argued that PES actors (buyers and intermediaries) have plural motivations. This argument is founded on the assumption that there are other motivations than just the maximization of utility – that actors can (and do) act based on non-selfish reasons. These assumptions could however be challenged by arguing that the seemingly altruistic motivations of corporate social responsibility or philanthropy in fact are nothing more than just an extension of the utility function; a CSR motivation could for example be explained as being a ploy to garner positive PR for the firm which would benefit them in the longer run – social responsibility is taken not for the sake of it self, but to increase profits. To counter this potential criticism I will in the following delve a little deeper into the literature on CSR.

7.2.1 Corporate Social Responsibility

There has been an increase in social pressure over the last decades for corporations to engage in and report CSR practises. Calls have been made for better accounting of corporate social performance (CSP) in addition to financial performance, what is know as triple bottom line accounting, and more general transparency (Tsoutsoura, 2004). This is something that in the classical institutional economic thinking would yield institutional legitimacy, which ought to be a goal in it self, but it would also certainly result in a favourable reputation amongst stakeholders which might financially benefit the corporation. The crux of the matter then

being if corporations are only *in it for the money*, or if some have truly altruistic motives as well?

Corporate Social Responsibility is a vague concept which many managers purport to see as an important part of their corporation, but few have a clear idea about what it really entails. There is seldom a detailed strategy for how it should be upheld, how to report it (if at all) and what actually is meant by socially and environmentally responsible actions. There are also many definitions of CSR, but a very common one which incorporates the main thrust of the concept is one offered by the Commission of the European Communities, 2001, which states that CSR is:

> A concept whereby companies integrate social and environmental concerns in their business operations and in their interactions with their stakeholders on a voluntary basis.

There is a vagueness in the terms "social and environmental concerns", the definition speaks very broadly to the fact that a socially responsible corporation needs to concern itself with the social and environmental impact their business has on its stakeholders, but gives no guidelines as to what specifically these concerns are. The inclusion of the voluntary dimension also says something about CSR being something more than the fulfilment of legal, economic and ethical *obligations*. This echoes Archie B. Carroll's (1999) writings on the subject of what a definition of CSR should contain. He argues that CSR "involves the conduct of business so that it is economically profitable, law abiding, ethical and socially supportive", also noting that although being profitable is something most see as what a firm does for itself, it should also be considered something it does for society by providing products and services, generating jobs and facilitating the transaction of money. What we may call benefits of the institution of firms. So in Carroll's view a corporation has to be profitable to be responsible beyond just fulfilling obligations. In this regard he discusses Drucker (1984) who expands the point of how profitability and responsibility are compatible notions, to the point that business ought to "convert" its social responsibilities into business opportunities. Drucker writes: "But the proper 'social responsibility' of business is to tame the dragon, that is to turn a social problem into economic opportunity and economic benefit, into productive capacity, into human competence, into well-paid jobs, and into wealth" (Drucker, 1984). So according to Drucker, being socially responsible ought to imply the possibilities of corporations to create new revenues of income by making business decisions which go beyond the mere adherence to economic, legal and ethical obligations. Voluntarily seeking out socially responsible

ventures and making a profit by doing it. This links with the overall philosophy of the CDM and PES systems of giving the private sector the opportunity and incentives to engage in environmentally sustainable transactions while at the same time making a financial profit.

The hard thing, then, is to define is whether private firm buyers in the PES system are motivated by profit maximization or more altruistic concerns when they employ CSR as a reason for their involvement. Do they see CSR as just a gimmick that gives good PR and thus has a favourable financial effect, or are they genuinely concerned with taking social responsibility for the sake of taking social responsibility? The survey done for this thesis indicates that it is a mixture of the two – the fact is that many believe that there are no contradictions between the two; a firm can be motivated by profit maximization and altruism at the same time and CSR is a vehicle that caters to both motivations. However, much of the literature on CSR contends the notion that CSR leads to a positive financial performance. This is in fact one of the main points of tension in the literature on CSR: can corporations turn a profit from engaging in socially and environmentally sustainable projects and ventures?

7.2.2 Corporate Social Performance vs. financial performance

Much of the literature concerning the relationship between corporate social performance and financial performance (FP) complain about a lack of data and available empirical evidence. The trends that point to positive, neutral or negative relationships across any meaningful scale (anything predicative of whole industries) are highly ambiguous. Such relationships are complex, highly context-dependent and simply vary from firm to firm, industry to industry etc. depending on a whole range of factors (McWilliams and Siegel, 2001) (Saltzmann et.al, 2005) (Tsoutsoura, 2004) (Waddock and Graves, 1997). Despite this lack of certainty there are studies arguing for the positive relationship of CSP and FP (Tsoutsoura, 2004) and highlighting a link between CSP and prior FP as well as CSP and future FP (Waddock and Graves, 1997). Others argue that there is a negative or neutral relationship between CSP and FP.

With all this ambiguity and lot of research claiming that there is in fact no, or a negative, connection between being socially responsible and financial performance – it is hard to argue that CSR motivations are always just disguised profit maximization motivations. There are probably firms that believe that CSR is financially positive, and there are probably firms that

believe CSR is not financially positive. There are certainly also many firms that have employees, and CEOs, and indeed a business culture, that acknowledges the social responsibility of the firm. It is my contention that CSR as a motivation of private firm buyers in the PES system is a motivation that lies somewhere between the two ends of the motivational scale; depending on the internal culture of the firm and the social context the firm operates within, the motivations for CSR range from the financially opportunistic to the socially aware and responsible – from us to we. The bottom line is I do not think other motivations, such as CSR, are just a disguised extension of the utility motivation – they may be sometimes, but other times they are not.

7.3 The Olsen and Fenhann methodology

The final potential critique I will try to pre-empt is one concerning the methodology used in the Olsen and Fenhann study. I have addressed this previously, but it is an important aspect of this thesis and warrants a brief discussion here.

There are a couple of issues with the methodology used in the Olsen and Fenhann study. First of all they only measured *potential* SD-contributions of projects which they did by performing a textual analysis of project design documents (PDD). By doing this they were not able check if projects performed as had been projected in the PDDs and could not account for the negative aspects of projects when it comes to SD. If a hydro project, for example, projected to create 100 new jobs, easier access to energy and economic development – but also relocated 1000 people downstream – only the positive contributions to SD were measured. So there may be some projects and instances where the projected SD-contribution does not accurately represent the actual outcomes. This bias was addressed above (chapter 7.1). Furthermore, when they did their study there were only 744 projects in the pipeline and the CDM methodologies were less mature than they are today. This means that the projected SD-contribution of some of the project types were based on a limited number of projects, and if the same study had been done today, other project types might fare better or worse than they did then.

These are valid critiques and it represents a slight weakness in my thesis. However, the fact remains that the Olsen and Fehnann study is the only one that has attempted to estimate the *aggregate* SD-potential of the totality of CDM projects. Since there are no mechanisms in place that measure and document the actual SD-contributions of projects, the Olsen and Fenhann study is the *only game in town*, so to speak. It has its limitations, but these are acknowledged and considered throughout my analysis.

In the following sections I will turn from possible critiques to some general thoughts on the wider implications of the results.

7.4 The CDM and PES Bubbles

The survey and research of intermediary webpages shows that the CDM and PES systems operate in largely separate "bubbles". These bubbles are either geographical bubbles or bubbles of project types. The CDM geographical bubble consists of the Annex I parties of the Kyoto Protocol – developed countries that have ratified the Kyoto Protocol and thus have emission reduction obligations – and the non-Annex I countries where the projects are implemented (developing countries). The PES geographical bubble consists of countries that have not ratified the Kyoto Protocol and thus have no emission reduction obligations, and of any country actors who want to implement projects in their own countries[9]. Actors in these countries reduce their emissions voluntarily through the PES system and the voluntary market. This primarily concerns the USA – which has not ratified the Kyoto Protocol – and to a lesser degree any country implementing projects in their own country. So the most common project in this bubble is American actors implementing projects within the USA. Within the PES geographical bubble the whole range of project types is used, as it is in the CDM bubble. So CDM and PES projects are largely geographically separated.

This geographical separation is however not absolute, and while there are always outliers, there is a particular geographical bubble breach in the case of certain project types. In the cases where PES actors do projects in developing countries (i.e. the CDM geographical bubble), these projects usually are in a different "project type bubble". There are a lot of

[9] Something which is not allowed in the CDM system. In the CDM system only projects implemented in non-Annex I countries qualify for CDM approval.

forest-type projects that have not been CDM eligible under the first commitment period. Especially projects avoiding deforestation or conserving forests have been excluded from the CDM – due to a variety of political, practical and ethical reasons, but mainly because of difficulties in monitoring such projects to secure actual emission reductions and additionality and avoid problems like leakage and unfair contracts; there are also a lot of issues with plural legalities concerning indigenous peoples – all of which make these types of forest projects complicated. Anyway, these types of projects have been excluded from the CDM system and thus the compliance market. They are however not excluded from the PES system and the voluntary market. So when PES projects "infringe" on the CDM geographical bubble it is mainly because the project types they work on are not CDM eligible – and thus are a part of another bubble; the "project type bubble". In fact, six of the ten PES intermediary respondents were forest-specialists that exclusively work with forest related projects. Only one of these intermediaries stated working on another project type – which was EE household; a project type that usually is small scale, has high transaction costs and has traditionally been unpopular in the CDM system because of these high transaction costs and the modest amounts of CERs they produce (see Table 6). This intermediary is also located in an African developing country and based on the survey answers seems genuinely concerned with helping local communities; which would explain why they implement EE household projects in addition to forestry projects. The relationship between the bubbles is illustrated in Figure 22.

Figure 22 illustrates the point that PES exists for Annex I countries that have not ratified the Kyoto Protocol, any countries that want to implement projects in their own country, and any country that wants to implement project types not eligible for CDM approval. Basically PES is open to all countries and for all project types, it is the CDM bubbles that are constricting. This shows the relative potentials of the CDM vs. the PES systems; CDM is more constricted both geographically and in regards to project types, but is still an order of magnitude larger than the PES system. This highlights the inherent strength of the CDM system when it comes to scalability; governed from above with one strong market driver – and the weakness of the PES system; no central governing institutions and no central market driver.

The tendency from the survey and the researched intermediaries is pretty clear; the CDM and PES systems are generally separated by location, and when they are not, they are separated by project type. These separations will in the following be used as part of the explanation for the difference in motivation and preferences of CDM and PES intermediaries.

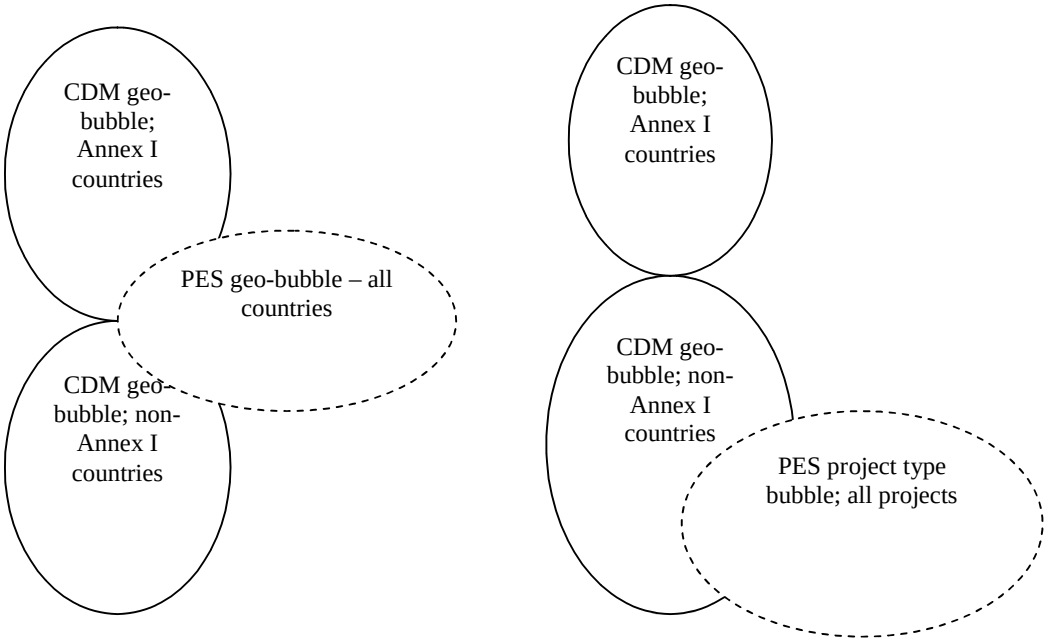


Figure 22: The CDM and PES bubbles.

7.5 Jointness

The methods used in this study to determine the aggregate SD-potential of the CDM and PES systems give generally favourable results. For the two systems as a whole upwards to 60% of the body of projects have a *high* potential SD-contribution rating and one segment of the PES system has a project body where over 75% of projects have a *high* ranking. I will in the following propose an explanation to why the CDM total and PES total project type distributions are as similar and favourable as they are; this explanation relates to the concept of *jointness*.

The concept of *jointness* in this context speaks to the correlation between choosing projects that maximize profits and the SD-potential of that project; if the least risky and cost effective project also is a project that delivers a high amount of SD-benefits and that by scaling up the project the SD-contribution is also increased at no extra cost, then there is a jointness between profit maximizing and SD-contribution.

In the case of the CDM system there is probably some jointness. Generally the two most popular project types – wind and hydro – are very scalable; the technology is mature and well tested, the expertise is readily available, and (as Figure 2 shows) the main SD-dimensions of wind and hydro projects are economic and social benefits. By scaling up a wind and hydro project economic and social benefits will increase: more jobs will be created, energy will become more readily available, economic development will increase, and so on. As discussed above, one of the reasons for the popularity of wind and hydro projects is the low risk they entail, and this low risk is partially a consequence of SD-contribution being a stated goal in the Kyoto agreements and thus projects which traditionally provide SD-benefits will be more trusted. This argument becomes even stronger when *jointness* is included – assuming there is jointness in wind and hydro projects, then this will be another reason for buyers to be attracted to these projects, which would further explain their popularity.

This furthermore indirectly explains the similar distribution of projects between the CDM and the PES systems. The jointness of popular CDM project types is part of why they are popular and increase in popularity means an increase in competence involving these project types. Tried and true project types with a high level of competent involved actors would also be available for PES actors – the technology is there, and so is the know-how. With this backdrop it is not surprising that the project type distribution of the PES system is similar to that of the CDM.

Based on this it is also not surprising that the segment within the PES that uses standards that *do* require SD-benefits for certification have a distribution that is even more SD-favourable. In this thesis I have showed that this segment has a lot of specialist intermediaries and that these are on average very concerned with environmental and SD-impacts of the projects they are a part of. The top four project types of this segment were wind and hydro – which are assumed to have jointness – and forest and EE household – which are the focus of most specialist intermediaries. The two main explanations for why this segment has the highest potential SD-contribution then is that the preferred projects are mature and have jointness, and that the intermediary actors involved are genuinely concerned with SD-impacts.

Unfortunately I did not have the time nor the capacity to empirically test the *jointness* hypothesis and only offer it here as a likely explanation for some of the results uncovered in my thesis. It will be interesting to see if future studies explore the subject further.

7.6 Improving the SD-contribution potential; system vs. actors

Even if the CDM and PES systems have a relatively favourable aggregate SD-contribution potential there are also a lot of projects with a *medium* and *low* ranking – and potential ways to improve on this further highlight the institutional differences between the CDM and PES systems.

In the CDM system, I have argued, the motivations of buyers and intermediaries largely converge. Furthermore, these motivations are relatively static and predictable – business motivations and the wish to profit dominate. It was further argued that the relatively positive SD-contribution score of the CDM system was caused by the systematic inclusion of SD-benefits in the articles outlining the CDM system, agreed upon in the Kyoto Protocol. To avoid risk actors choose predictable project types with mature and well established methodologies, and project types that generally have high SD-benefits fulfil these criteria. This means that a certain SD-benefit security is embedded in the system itself – although largely indirectly. The situation, then, is a system where the majority of actors have the same motivations and no real incentives to focus extra on other issues than risk aversion and profit maximization. To put it bluntly: CDM actors will not be changing the system. If there is a wish to further improve, and secure, the aggregate SD-contribution of the system this will have to be done through systematic and institutional changes by the UNFCCC and the Executive Board. Since the CDM is a structure of institutions mainly built on legal regulations, changing these regulations could change the aggregate SD-contribution. It could for example be made mandatory to use standards that require SD-benefits – existing methodologies could be modified to focus more on SD-benefits, and third party verifiers could be instructed to monitor these SD-benefits – initiatives to better educate the DOEs[10] in developing countries could be implemented – and so on. The point is there are ways of

[10] Designated operational entities (DOEs) are host country bodies that both set the countries SD-standards and are responsible for making sure projects fulfil the SD-benefits outlined in the project design documents (PDDs). Two survey respondents explicitly mentioned a lack of knowledge, competence and capacity of DOEs as a problem in securing the SD-contributions of projects.

changing the system. As long as there is political will and international agreement, the CDM can be changed to better contribute to sustainable development. In fact, as discussed above (chapter 7.1 – on the inclusion of the Programme of Activities (PoA) to the CDM scheme) some changes have already been implemented. There are of course reasons for not implementing big changes; there is a fear it would compromise and seriously damage the well functioning part of the system, that costs would increase too much and damage the market. And the changes *would* cost and *would* take time to implement and it is difficult to predict how the carbon market would respond – but the point remains that given its institutional formation and structure, changes can be implemented from the top that would affect the system as a whole. This is one of the advantages of a top-down system. In the case of the PES system, which is more of a vertical system, this is not as easy.

The PES system does not have a governing body and has no ways of implementing changes that will affect the entire system. Because of the way it was formed and how it now functions, changes have to come from the actors themselves. The strength of the PES system, I have argued, is the diversification of preferences of its actors which makes the system resilient – unfortunately this diversification is also a hindrance when trying to make changes to the system itself. Changes have to come from the actors of the system, therefore these changes have to be spurred by changing the very preferences of these actors. Doing so is no easy task. The only conceivable way this would happen is through massive social pressure which could lead to an internalization of social and environmental concerns as part of the business culture – making other issues than just business concerns a part of the way firms strategize. This study has shown that there are already actors who seem to have adopted this way of operating, but they are in a clear minority. If the PES system is to improve its aggregate SD-potential, social pressure must increase and business culture must continue to change. I will here claim that this is possible, but unlikely to happen at a substantial scale in the foreseeable future.

7.7 Polycentrism and the CDM and PES systems

Although the CDM and PES systems are both baseline-and-credit types of systems, they are fundamentally different. This difference stems from how they were constructed and from their most important types of institutions. Being more diversified the PES system is both more flexible and more resilient. There is also a segment of the PES system that has the decidedly highest potential for SD-contribution, and this segment is also the only one that has the mechanisms to ensure and measure *real* SD-contributions.

In line with Ostrom's recent thinking (2012) this shows the merits and viability of a polycentric approach to dealing with the climate change challenge. She argues that a global policy (like the compliance market) is often posited as the only strategy needed and that the many positive steps being taken at smaller scales are ignored.

The strengths and viability of the voluntary carbon market shows that in a polycentric system non-governmental governance systems have credence and can *supplement* more formal and government driven systems – indeed that such contributions should be encouraged and further supported.

However, as I have shown in this thesis about the PES scheme, even if it is a viable and resilient system it has one major drawback; it is unlikely to grow big enough to match the potential impacts of a government implemented and run system such as the CDM scheme. Furthermore it is very hard to steer the voluntary market because of its lack of a governing body. As such, the non-governmental approach should be treated as a *supplement* to government action, and not seen as an alternative to it.

8 Conclusion

The purpose of this thesis was to investigate the institutional differences between the CDM and PES systems and their correlating markets and to assess if these differences also lead to a difference in the aggregate SD-potential of the two systems. Furthermore it explored the roles and motivations of intermediaries in these systems and sought to uncover how they affect the outcomes of projects they are involved in.

In the first part of the thesis I attempted to answer my first research question:

> R1: *Do institutional differences between the compliance and the voluntary market lead to a difference in potential SD-contribution of the CDM and PES project systems?*

In my analysis I argued that there are indeed significant institutional differences between the CDM and PES systems. There was a statistically significant difference in the potential aggregate SD-contributions when comparing the two systems as a whole, but the differences between the distributions were rather small. In the CDM system 58% of the projects were in the high potential SD-contribution category and 14% were in the low potential SD-contribution category – in the PES systems these numbers were 57% and 8%, respectively. So the two systems had roughly the same share of high potential projects, but the CDM system had a somewhat higher share of low potential projects. Thus, on average the PES system had a slightly more favourable distribution. However, when I broke the PES system down into different segments more definite differences in SD-potential became evident. I broke the PES system in different segments by adding an institutional parameter; I separated between projects by what type of standards they used for certification. There are two main types of standards used in the PES system; standards that do *not* require SD-contributions in order to certify – and standards that *do* require SD-contributions in order to certify. By doing this I got two more project type distributions and these two distributions differed significantly from each other and the two original distributions. Based on this I argued in support of the hypothesis that that a difference of institutional context leads to differences in SD-contribution potential.

In the second part of the study I attempted to answer my second research question:

> R2: *How do different types of intermediaries contribute to the sustainable development of the projects they are involved in?*

I approached this task by answering three sub-questions:

> *(1)What motivations do intermediaries have for being involved in the compliance or the voluntary market?*
> *(2)What is the relationship between intermediaries and buyers?*
> *(3)How do intermediaries affect project development and the potential SD-contributions of projects?*

In answering the first sub-question I showed that there were six distinct motivations for being involved in the compliance or the voluntary market - *Environmental and SD-benefits*, *Financial gain, Previous experience, Identified need for services, Identified growing national or regional market* and *Faith in market as tool for environmental protection* – and that intermediaries in the PES system were more motivated by *Environmental and SD-benefits* than intermediaries in the CDM system. Furthermore the data showed that private firm intermediaries in the PES system were motivated by both *Environmental and SD-benefits* and *Financial gain*, while private firm intermediaries in the CDM system were mostly motivated only by *Financial gain*. This showed that there is a difference in motivation for involvement in the compliance or the voluntary market, and that there is a wider variety of motivations for involvement in the PES system and its voluntary market.

Answering the second sub-question showed that there is a difference in the relationships between buyer and intermediary depending on which system they are a part of. In the CDM system intermediaries are less dependent on establishing contact with a buyer before they start developing projects. This is due to the fact that in the CDM system there are always buyers who need carbon credits; there is almost no risk that intermediaries will not be able to sell the credits from their projects. In the PES system, however, there are not always buyers. Intermediaries often have to identify and contact buyers before they start their projects – making them more susceptible to the preferences of the buyers. An interesting find here is that some intermediaries in the PES system – typically specialist-intermediaries focusing on a

specific project type (often forest type projects) – that have to actively seek out buyers are not very influenced by the preferences of these buyers. These specialist intermediaries are very concerned with environmental and SD-contributions of projects and because they have to seek out their buyers they seek out buyers that share their preferences, i.e. buyers who are concerned with environmental and SD-contributions of projects. I have argued this means that specialist-intermediaries in the PES system (both private firms and NGOs) have a direct positive effect on the aggregate SD-contribution of the PES system.

The answers to the second sub-question link very well to the third sub-question. Intermediaries affect project development and the potential SD-contributions of projects differently depending on what system they belong to. In the CDM system SD-contributions are largely determined by the institutions that make up the system; the laws and regulations and the central governing body are the main drivers of how the CDM contributes to SD. In the PES system intermediaries have a much more prominent role in this respect and more directly influence the SD of projects and the system as a whole – especially the specialist intermediaries have a direct positive effect.

So the answer to the second research question is that how different types of intermediaries contribute to the sustainable development of the projects they are involved in depends on what system they are a part of – intermediaries in the PES system (private firms and NGOs) contribute more actively than those in the CDM system.

Finally, I indirectly sought to support the theoretical assumptions on which I based my analysis. By using classical institutional economic theory I formulated two hypotheses and the potential confirmation of these hypotheses would lend further credence to the merits of classical institutional economic theory. The first hypothesis:

> H1: *Institutional differences between the CDM and PES systems lead to differences in the aggregate potential of these systems to produce sustainable development benefits.*

– was to a large degree supported by the results.

The second hypothesis:

> H2: *There is a difference in motivations and preferences between the different types of intermediaries depending on what system they are a part of and this leads to a different contribution to the sustainable development of the projects they are involved with.*

– was also supported by the results, but unfortunately the amount of data gathered was insufficient to conclusively verify or falsify this hypothesis – however, the results were encouraging.

As a final point I would argue that it would be very hard to sufficiently explain the results of this study with an approach that does not allow for the important role of institutions and the existence of plural motivations and preferences.

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Appendix 1

Chi-squared tests for independence of the project type distributions in the CDM and PES systems (chapter 5.5)**:**

a) Total observed distributions:

	CDM total	PES total	PES *no* SD required	PES SD *required*
High potential	4361 (58%)	895 (57%)	527 (48%)	368 (76,5%)
Medium potential	2140 (28%)	554 (35%)	444 (41%)	104 (21,5%)
Low potential	1026 (14%)	120 (8%)	116 (11%)	8(2%)
Total	7527 (100%)	1569 (100%)	1087 (100%)	480 (100%)

b) Chi-square test for CDM total vs. PES total:

	CDM total	PES total	Total
High potential	4361	895	5265 (57,78%)
Medium potential	2140	554	2694 (29,62%)
Low potential	1026	120	1146 (12,60%)
Total	7527 (82,75%)	1569 (17,25%)	9096 (100%)

Chi-square = 57,805

Degrees of freedom = 2

P value is < 0,0001 / or 2,80417E-13

c) Chi-square test for CDM total vs. PES *no* SD required:

	CDM total	PES *no* SD required	Total
High potential	4361	527	4888 (56,74%)
Medium potential	2140	444	2584 (30,00%)
Low potential	1026	116	1142 (13,26%)
Total	7527 (87,38%)	1087 (12,62%)	8614 (100%)

Chi-square = 70,048

Degrees of freedom = 2

P value is < 0,0001 / or 6,1556E-16

d) Chi-square test for CDM total vs. PES SD *required*:

	CDM total	PES SD *required*	Total
High potential	4361	368	4729 (59,06%)
Medium potential	2140	104	2244 (28,03%)
Low potential	1026	8	1034 (12,91%)
Total	7527 (94,01%)	480 (5,99%)	8007(100%)

Chi-square = 84,128

Degrees of freedom = 2

P value is < 0,0001 / or 5,39308E-19

e) Chi-square test for PES total vs. PES *no* SD required:

	PES total	PES *no* SD required	Total
High potential	895	527	1422 (53,54%)
Medium potential	554	444	998 (37,58%)
Low potential	120	116	236 (8,89%)
Total	1569 (59,07%)	1087 (40,93%)	2656(100%)

Chi-square = 20,635

Degrees of freedom = 2

P value is < 0,0001 / or 3,30496E-5

f) Chi-square test for PES total vs. PES SD *required*:

	PES total	PES SD *required*	Total
High potential	895	368	1263 (61,64%)
Medium potential	554	104	658(32,11%)
Low potential	120	8	128 (6,25%)
Total	1569 (76,57%)	480 23,43%)	2049(100%)

Chi-square = 65,317

Degrees of freedom = 2

P value is < 0,0001 / or 6,55532E-15

g) Chi-square test for PES *no* SD required vs. PES SD *required*:

	PES *no* SD required	PES SD *required*	Total
High potential	527	368	1263 (61,64%)
Medium potential	444	104	658(32,11%)
Low potential	116	8	128 (6,25%)
Total	1087 (69,37%)	480 (30,63%)	1567(100%)

Chi-square = 115,45

Degrees of freedom = 2

P value is < 0,0001 / or 8,15826E-26

Appendix 2

Survey questions (the wording of the questions did vary to a small degree depending on if the respondent was a private firm or NGO and whether they operated in the CDM or the PES system; presented here are the questions as they were asked of private firms acting as intermediaries in the CDM system):

1. You offer intermediary services in the compliance carbon market – why did your company choose this as a business venture?

A:

2. You offer both project development and financial services? – you offer only project development services? – you offer only financial services?

A:

3. Are there any particular project types you specialize in? – why?

A:

4. What project types are you most involved with?

A:

5. Are there any particular project types you do not do? – why?

A:

6. Do you use any certification standards?

A:

7. Are standards and important to buyers?

A:

8. What kind of buyers and sellers do you work with?

- Private firms
- NGOs
- Civil society
- Governments
- Individuals
- Other

A: (choose one or more of the above)

9. What type of buyers and sellers do you work with the most?

A:

10. Which of these buyers and sellers are, in your experience, most concerned with the sustainable development benefits of projects they are involved with?

A:

11. How does your relationship with buyers and sellers work? i.e. do you approach them or are you approached by them?

A:

12. How do you choose the projects you are involved in?

A:

13. How important are the preferences of the buyers in the selection of projects?

A:

14. In your experience, which of the following motivations are the most important for buyers:

- compliance
- profits
- be certified by a standard
- sustainable development benefits
- CSR
- other (specify if possible)

A: (can you rank the above points from 1 – 6, where 1 is most important and 6 is least important?)

15. How do you measure the success of a project?

A:

16. Which of the following is the most important for you when you measure the success of projects?

- profits
- client satisfaction
- be certified by a standard
- sustainable development benefits
- other (specify if possible)

A: (can you rank the above points from 1 – 5, where 1 is most important and 5 is least important?)

17. What is your experience with perverse incentives, problems with lack of additionality or leakage, unfair contracts etc.? – have you come across it / is it something you consider a problem with the carbon market system?

A: