

Fire the workers when building new houses? How proposed New Market Mechanisms would impact the value chain created in the Clean Development Mechanism.

(WORKING DRAFT)

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ABSTRACT

The Clean Development Mechanism (CDM), one key market mechanism of the current global climate governance architecture, faces an uncertain future. Policy actors across governance levels and regions are currently developing proposals for 'New Market Mechanisms' (NMMs) to complement, or even replace, the CDM after 2014. This re-design of the global carbon market will have substantial impact on the involved actors, often located in developing countries. Much of their knowledge, competences, and networks established in the CDM could be made obsolete. Building on the presumption that NMMs could benefit from utilizing what has been learned under the CDM, in this paper we assess to which extent and how the different NMM proposals would utilize the established structure of the CDM's value chain. The paper follows a two-step approach: First, we explore the current CDM market structure and how it evolved to its current state. We use 2012 data of the UNFCCC CDM Bazaar and compare the structural patterns to an earlier study from 2008. Based on this comparison, we identify the key competence clusters as well as structural trends in the CDM's value chain. Second, we analyze the current NMM proposals and identify the impact of key NMM design choices on the CDM's value chain structure. Our results show how the CDM value chain matured over the last 5 years and provide policy makers and the UNFCCC process with insights for NMM design and evaluation. For market participants, the results will provide meaningful input for strategy making and positioning.

KEYWORDS: Clean Development Mechanism, New Market Mechanisms, Carbon Trade

1 INTRODUCTION

When the Kyoto Protocol came into force in February 2005, it established three market based mechanisms that were designed with the aim of increasing capital flows into emission abatement and mitigation projects in a flexible and cost effective manner. These three mechanisms are Emissions trading, the Clean development mechanism (CDM) and Joint Implementation (JI) [1]. Together they constitute what is known today as the carbon market.

The market structure follows a value chain heavily influenced by the implementation details of each market. As this work focuses on policy impacts and experiences within the private sector's value chain, the CDM market is the focal point of interest. The CDM market is characterized by its project based approach, in which Certified Emission Reductions (CERs) are originated from low-carbon development projects in eligible countries (e.g. a wind energy project in India) and sold to buyers (e.g. a German cement producer) who eventually use the CERs for compliance to mitigate their carbon footprint. From origination to compliance - along the value chain - companies were quick in developing new business models and services catering to the different stakeholders. A new sector came into being, the carbon trade industry.

To this date, there is very little research on the current state of the carbon industry and the role both its lessons-learned and its human resources can play in designing and implementing new mechanisms, albeit proponents of different NMM approaches actively discussing the topic [2]. To answer this demand, this paper will in a first step discuss development of the value chain structure relative to the overall market growth. Following the first step, the main part of the study which is work in progress discusses the impact of global climate governance on the carbon trade industry and to which degree experience gained within the market can serve to establish improved New Market Mechanism Designs for a post-2012 climate regime.

2 BACKGROUND

Carbon markets were created as analogism to resource commodity markets prevalent in wide areas of the economy. By assigning an economic value to carbon emissions, the creators of the carbon market aimed to create effective incentives for private business to ideally scale back emissions or at

least to mitigate emissions by financing low-carbon projects outside the company, via the purchase of additional CER certificates.

In the first steps of development, the market formation mostly followed a top-down pattern, with government agencies being responsible for most of the trades. With growing confidence in the political will to enforce the mechanisms, private enterprises quickly started to develop services around this newly created commodity [3]. What started as high-level governance architecture thus quickly developed into a vivid market place for carbon emissions trading, resulting in the creation of the industry cluster that went from “boom to bust” from 2005 to this date, and which will be further analyzed in this study. [4]

Yet, the market’s main driver is the European Union’s implementation of the three mechanisms, the EU Emissions Trading Scheme (EU ETS) with about 80% of the overall trading volume [5]. Within the EU ETS, the CDM is the main mechanism through which investment is channeled. According to World Bank and IMF estimates, in the period of 2002-2010 the transaction value in the primary CDM market amounted to approx. \$27 billion, stimulating an additional \$125 billion in low-emission investment [6].

It is notable that the market structure as a whole is a product of global climate change policy. Without legally binding companies across different industries to purchase emission rights for compliance, there would be little demand on the buy side. The low importance of the voluntary market of non-compliance purchases equaling approx. 0.3% of the 2011 carbon market [7] exemplifies this. It shows the *critical degree* to which the carbon trading industry relies on stable, accountable and transparent long-term global climate governance.

According to the CDM Policy Dialogue’s September 2012 final report, it is exactly this *critical reliance* on policy that brought the carbon market into peril [8]. An overabundance of supply due to weak governance [9] paired with an unknown future after the end of the first commitment period by the end of 2012 led to a massive price decline and negatively impacted the carbon trade industry as a whole. Currently, both market observers and professionals evaluate the potential for short-term solutions as very limited [10, 11, 12]. Various design proposals for improved follow-on New Market Mechanisms exist and are being actively discussed on a multilateral level by the members of the United Nations Framework Convention on Climate Change (UNFCCC), interest groups and government agencies

within the *Ad hoc Working Group on Long-term Cooperative Action under the Convention (AWG-LCA)*.

3 MARKET STRUCTURE 2008-2012

In this chapter, we explore the current CDM market structure and how it evolved to its current state. We use 2012 data of the UNFCCC CDM Bazaar [13] and compare the structural patterns to an earlier study. In their 2008 article “Navigating the global carbon market - An analysis of the CDM’s value chain and prevalent business models” [14], Malte Schneider et. al laid the groundwork for the following value chain analysis. They established a value chain model of the industry which this study revisits and brings up to date. Based on the value chain evolution, we identify the key competence clusters as well as structural trends in today’s CDM value chain.

Where the 2008 version of the Risoe Database consisted of 495 companies, the 2012 version featured 1201 entries. As shown in Table 1, for each of these companies the database listed 26 market activities. In the chosen approach, the value chain is established by using a principal component analysis of the 26 activities. The number of value chain steps is somewhat intuitive due to the CDM policy design elements. To identify business models within the value chain, the results of the principal component analysis were fed into a k-means cluster analysis. A scree plot and the elbow criterion indicated 9 as an optimal number of clusters, which we double checked by manually analyzing cluster composition for its fit with the existing carbon market.

While the value chain’s steps remained relatively constant (see), the data shows a clear path towards integration along the 26 activities. A detailed manual analysis of the principal components showed that while the 2008 data analysis resulted in many specialized business models provided by relatively young, small companies (start-ups), the 2012 data shows the important amount of experience gained during 5 years of market expansion. Important changes occurred in the level of integration, specialization and number of players in certain steps of the value chain. The market matured, indicated mainly by the integration of services along the value chain steps by influential market participants. Another noticeable trend was the number of companies value chain steps directly related to the project implementation process grew faster and the number of market enablers (law-firms, human resources firms, trade journals and trade fair hosts). This hints to the great importance of these knowledge multipliers especially in young markets, and that as markets mature multipliers do not have to

grow linear to the market to perform their function (e.g. the market does not benefit marginally from a high number of trade shows, but from well visited ones).

Rotated Component Matrix

Market activities	Identified Components						
	Carbon Services	Technology Provision & Operation	Validation & Verification	Sales	Procurement	Market enablers	Purchase
S33_Baseline development	,848	,063	,003	,103	,271	,094	,009
S36_Assistance with PDD	,761	,098	,087	,187	,404	,090	,183
S32_New method	,776	,139	,067	,029	,210	,191	,106
S25_Project ID	,702	,209	,091	,223	,414	,073	,231
S28_Assistance PIN	,728	,168	,101	,201	,432	,080	,205
S26_Feasibility	,697	,290	,108	,190	,351	,067	,208
S44_Monitoring	,722	,137	,017	,126	,274	,128	,051
S34_Assisting registration	,717	,031	,038	,140	,435	,183	,115
S35_Training	,681	,111	,040	,174	,186	,323	,116
S29_Project risk analysis	,608	,192	,071	,141	,484	,266	,128
S27_Business Plan	,510	,307	,108	,183	,496	,178	,205
S37_Market analysis	,504	,072	,010	,105	,584	,215	,032
S43_ERPA negotiations	,440	,038	,038	,121	,640	,314	,085
S31_Due diligence	,501	,111	,026	,170	,449	,323	,145
S40_Comm Advisory	,346	,124	,025	,085	,598	,442	,057
SP2_TechSolution	,332	,832	,003	,155	,150	,088	,107
S46_DOE	,047	,012	,978	,075	,044	,031	,063
SE2_Primary	,196	,102	,046	,904	,139	,076	,132
Seller	,230	,115	,055	,890	,157	,080	,142
SE3_Secondary	,100	,001	,008	,875	,059	,045	,096
S38_Credit Procurment	,351	,064	,002	,087	,769	,084	,011
S39_Credit Sales	,394	,036	,019	,111	,780	,067	,060
S30_Financial services	,260	,297	,020	,092	,679	,185	,029
S41_Legal advisory	,195	,051	,021	,078	,207	,872	,057
S42_Contractual arrangements	,312	,082	,032	,100	,501	,605	,060
Buyer	,237	,106	,082	,171	,110	,096	,884

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

Table 1: Principal Component Analysis – Factor loadings of the 26 market activities

Yet, with a growing overall market, it was also observed multiple business models existing at the same value chain step, essentially indicating the need for specialized providers. This is especially exemplified within the value Chain step “sales” with *Primary and Secondary Sales* and *Project Promoters* being two very distinct business models with quite different roles in the market.

The following Table 2 details the results of the cluster analysis which are further discussed below:

Cluster Name	Final Cluster Centers								
	6	9	8	2	5	4	3	7	1
	Buyer	Market support activities	DOE	Technology and Finance Firms	Integrated non-traders	Primary and Secondary Sales	CDM Specialists	Project Promoters	Integrated Firms and Traders
Carbon Services	0,3655	0,4483	0,3995	0,3908	0,6019	0,4056	0,7768	0,3573	0,5525
Procurement	0,3776	0,5370	0,3685	0,4583	0,5628	0,3857	0,3467	0,3580	0,5144
Sales	0,1012	0,1188	0,1240	0,1195	0,2536	0,7632	0,1821	0,4453	0,8612
Market enablers	0,3249	0,4392	0,3167	0,2822	0,6108	0,3369	0,2472	0,3346	0,3629
Purchase	0,7446	0,2569	0,2731	0,2504	0,4283	0,3375	0,3467	0,1888	0,7386
Technology Provision & Operation	0,4211	0,3022	0,4541	0,7213	0,6390	0,4549	0,4447	0,3705	0,5495
Validation & Verification	0,0718	0,0745	0,9455	0,0707	0,0989	0,0913	0,0839	0,0693	0,0964

Table 2: Cluster Analysis of factor loadings

- Buyer

While the number of buyers represented in the data grew from 88 to 197, neither the value chain position nor the underlying business models changed. Buyers buy emission allowances to achieve compliance with their respective CO₂ emission targets or because the products they are selling entail reducing the amount of allowances in the market.¹

- Market support activities / Enablers

In the 2008 data, “legal advisory” was a clearly recognizable factor and cluster. Another cluster identified to be “Niche players and information providers” in 2008 contained diverse business models such as trade fair organizations, head-hunters, PR firms, professional training providers and publishers. In the 2012 dataset, these two clusters grew together to a cluster we now identify as Market support activities with 202 companies. This can be interpreted as a sign for maturing market: As the carbon market was at a young stage of development, much enabling work was demanded from legal firms and information providers. With a growing market and increased trading volumes, these two clusters did not grow at the same speed as the other clusters identified here, as legal firms, trade fair organizations etc. have a multiplier effect on the market, not an additive. This means i.e. that as a market grows, the number of trade fairs raises to a specific point beyond which there is no increased value creation - as the main goal of a trade fair organizer is concentrating the highest possible number of market

¹ Such as a climate neutral credit card offer, as marketed by a Swiss firm

participants at one place at a time. This is obviously not the case for buyers or sellers, whose increased numbers would make a market more efficient as a whole.

- DOE – Designated operational entity

A designated operational entity is qualified to validate proposed CDM projects. It verifies emissions reductions and technologies. Most often, these DOE are active in many different industries, with CDM project validation being one of their business units. This cluster grew by 78% from 9 to 16 entities. Growth mainly is attributable to Asian countries' increased presence in this sector, with for example Hong Kong and Indonesia being now present, and the German TÜV associations setting up affiliates in India.

- Technology and Finance Firms

In total, the cluster grew from 16 to 167 companies. Firms in this cluster show a change in their business models in terms of an increased focus towards technology provision and less financial intermediation. We see two main reasons for this which we will confirm in interviews later on. 1) As the carbon market grew, existing companies in this cluster faced increased competition from professional financial intermediaries who entered this market, their skill-set being not specifically CDM focused but having in-deep knowledge of project finance and financial products. 2) Technology companies that tried to provide financial intermediation services made the experience that with increasing project size, the amount of specialist knowledge required to mitigate increasing financial risk was too great and thus it became efficient to outsource this knowledge to specialized providers.

- Integrated non-traders

In the 2008 study, this cluster has been identified as “CDM & Technology Firms”. While the number of companies in this sector stayed relatively constant (17% growth to 117 companies), their business models changed drastically. With the exception of sales and DOE activities, they are now providing services along the whole value chain. These companies successfully applied their deep knowledge of the CDM market to grow along their customers' demands. Most of these firms have been active for a long time in the CDM market, somewhat representing the core of the market and many of its activities.

- Primary and Secondary Sales

Companies with the primary business of selling carbon allowances grew from 82 to 165. An interesting observation here is that between 2008 and 2012, there has been a clearly visible split between Sellers: Those in this cluster are firms who work at the level of the market, not specific CDM projects. They do have specialist knowledge on how to source CO₂ allowances for below market value for the buyer cluster. The next cluster, project promoters, represents the second type of seller.

- Project Promoters

With 132 firms in the cluster, Project Promoters take over an important market function which became evident with the market becoming more complex and harder to navigate for individual project developers. In essence these companies are highly specialized sellers who closely work together with individual project developers, CDM technology firms and other traders on the project level. Our thesis is that they are neither classical traders, nor do most of them sell directly to the end customers, but they support the often more technical oriented project participants with specialist knowledge on a variety of project related finance and marketing issues, for example how to find project finance investors, or how they can ensure that the CO₂ certificates an individual project is supposed to generate will be accepted by the DOE and will find buyers on the international markets. Especially this split in two prevalent business models for sellers will be further inquired in the final version of this study.

- CDM Specialists

This cluster grew from 57 to 157 companies. They adapted their business models slightly in the direction of more frequent technology consulting, but overall their business model and value chain position remained stable.

- Integrated Firms and Traders

With a growth from 27 to 48 companies, this cluster moderately grew with the market. For the companies represented in this cluster, an emission certificate is a commodity, as are other tradable instruments such as coal futures or options on the copper markets. They are not specialists in the CDM value chain and only get in touch with other market participants after carbon credits have been granted by a designated operational entity. They rarely buy directly from project developers, but from other sellers or trade on a carbon exchange.

To summarize the above, the data allows for the conclusion that during 2008 and 2012, the market matured from a market place dominated by small, specialized “experimental” providers to a full scale commodity trading industry. From this perspective, lessons learned in this market should not be ignored and market design elements that can be identified as success factors for the CDM market growth should be transferred to new mechanisms.

These findings create the main goal of this study: An assessment on how the upcoming proposals for New Market Mechanisms will influence this market and how companies that specialized in CDM related business models are impacted.

4 IMPACT ANALYSIS OF NEW MARKET MECHANISMS

This chapter is work on progress and will be put into text after the COP 18, incorporating the most up-to-date knowledge from market participants and policy advisors to reflect the latest developments.

In this chapter, the current NMM policy proposals are classified to provide a clear picture on the implied impacts of key NMM design choices on the CDM's value chain structure. The classification takes into regard all comments from governmental and non-governmental observers submitted within the AWG-LCA [15], as well as current publications by external stakeholders.

As classification framework this study uses an approach to be found in [16]. The framework developed by Sterk classifies Observer organizations' and government agencies' proposals and comments in 13 main design elements, listed below. It is notable that not every stakeholder commented on each design element, with proposals from the European Union and Alliance of Small Island States (AOSIS) being comprehensive positions. Other participants, such as China, gave input from a very general high-level perspective [17].

(Please note that the following is research in progress, the final work will include a complete synthesis of the design elements' impacts on the various business models here, as well as a graphical representation. The different proposals will be analyzed to a greater level of detail.)

1. Participation Requirements

This design element refers how stringent eligibility criteria should be defined. The range of proposal arches from proposals of the European Union [18] and the Alliance of Small Island States (AOSIS) [19] that call for more stringent eligibility criteria to the Swiss position, which proposes that NMM should be open to all parties under the convention.

2. Determination of Sector Coverage

Within in this design element, there are two major lines of thought: The first one is brought forward by AOSIS and KfW [20] who both favor a universal focus on least complex sectors such as power production. In contrast, the World Bank proposes that sector coverage should be adapted to local circumstances. It is obvious that these two opinions will have far reaching consequences especially for technology providers specialized in certain low-carbon technologies that might not apply to certain sectors in a local economy. It is equally reasonable to assume that a localized approach can lead to higher acceptance rates of more ambitious emission reduction targets (e.g. in the case of Poland), leading to faster consensus building and implementation of NMM thereby increasing the chance of survival for existing CDM companies.

3. Setting Baselines and Crediting Thresholds

Setting more ambitious goals is mainly demanded by development countries, most notably in the AOSIS proposal. The EU also further qualifies that even if the baseline remains unchanged, the crediting threshold below which tradable emissions units will be issued should be substantially below the baseline scenario. For buyers who buy emissions units for compliance purposes, this would be a negative impact as they are interested in keeping prices low, for all other market participants and the carbon trade's purpose to deliver meaningful Greenhouse gas abatement, this move would lead to strongly positive results.

4. Length of Crediting/Trading Periods

This design element describes the process how governments and the international supervisory body should manage the issuance of emission allowances. If certain sectoral crediting policies such as the Center For Clean Air Policy (CCAP) proposal [21] are carried forward, there might

be the risk of private investors not willing to invest in sectorial investment opportunities out of a perceived risk that credits are not issued for reasons outside their scope and influence. This would entail that investors willing to invest most likely will charge an increased risk premium, diminishing the returns for project developers and complicating the fundraising process. Also, future contracts will have to be adapted to reflect this risk.

5. Provisions for Monitoring, Reporting and Verification (MRV)

Most observers agree that the current project based MRV guidelines should be redesigned with the goal of lower transaction cost. As a consequence MRV providers will most likely witness a decrease in revenue. If this decrease in revenue can be set-off by a higher number of market mechanisms (e.g. increased market activities in forest carbon trade, voluntary market growth etc.) is research in progress and will be discussed in the final version of this paper.

6. Overall Accounting Framework

An accounting framework is a necessary component to track carbon credits and certificates from their origination to their use for compliance. A number of participants call for a common set of accounting rules to ensure a high level of transparency, especially non-governmental organizations. This is in contrast to recent developments e.g. in China, where the government at this point of time seems to move away from international oversight to the creation of a purely domestic accounting framework.

7. The Relationship between the NMM, the CDM and NAMAs

In relation to the accounting framework, most commentators insist that especially double counting of credits within the various market based mechanisms has to be avoided consequently. Furthermore, parties demand that new mechanisms should be additional to existing ones, with the goal of increasing total spending on low- carbon development.

8. Timetable for Implementation

The EU is the strongest proponent of a quick implementation of NMM approaches. Other participants caution that there should be a pilot phase, in part to identify weaknesses in the combination of desired design elements. The CDM itself had a number of serious design flaws

[22] leading to widespread criticism, which is a main driver for the proponents of a more cautious process.

9. Financing of the System

Administrating the NMM will most likely be financed in a way comparable to the CDM. It has yet to be discussed of additional funds will be raised by further taxing NMM transaction or other approaches.

10. Supplemmentarity

Supplemmentarity is a central issue for the ongoing negotiations. Observer organisations and countries most impacted by climate change demand a strict regimen to avoid double counting of emission reductions and more ambitious targets, especially from developing countries.

11. Sustainable Development

Design elements covering sustainable development policies are mainly pushed forward by non-governmental organizations and Ecuador [23]. If agreement on sustainable development goals can be reached, there will be opportunities for DOE and NGO to expand their business towards an increased focus on social impact assessment and monitoring.

12. Capacity Building

Similar as for the CDM, any new mechanism or policy will require activities in participating countries to educate decision makers, community activists and market enablers in the new mechanism's rules and regulations. This being a time consuming process, it would be a welcomed opportunity to leverage what has been learned in the CDM

13. Work Programme

The work programme give guidance on how to proceed in the ongoing negotiations. Multiple organizations vowed for holding more workshops and having technical papers delivered to be able to draw more educated conclusions about which NMM to adapt. The issues brought forward by also include the need for clarity regarding the governance structure for the new mechanisms. It is still negotiable if they fall under the Kyoto Protocol, or if a new framework convention will be agreed upon.

From this classification that will be expanded upon after the expert interviews at COP18, an impact matrix is derived. In the matrix details are given on the eventual consequences of certain combinations of policy design elements on the market's value chain. Each business model cluster will be analyzed for:

- The *relevancy* of the business model within different policy proposals
- The *diversification pressure* on a cluster due to different policy proposals
- The *diversification potential* of firms in a cluster, considering a wide range of possible future market environments.

Currently, the impact matrix is still work in progress. It will be further completed and validated by expert interviews during and after the COP18. The impact matrix will be an attachment to the study, in the paper there will rather be a condensed graphical representation. The authors will submit an updated version as soon as the expert interviews are conducted.

5 PRELIMINARY CONCLUSION

During the COP18 in Qatar, the authors will validate their findings that will lead to a detailed outlook on the future potential for the CDM industry to play a role in the New Market Mechanisms. Yet, companies across the board are already under high pressure to find new business models, and many went out of business. [24]

This is an alarming development mainly for the following aspects:

- The market growth between 2008 and 2012 led to a transfer of knowledge and capabilities towards development countries. Local firms successfully started to provide services that in 2008 have exclusively been provided by firms located in developed countries. This knowledge is about to get lost with the struggling firms looking for opportunities outside the carbon trade domain. With the introduction of NMM, this knowledge will have to be recreated from scratch if there is no short-term action to support these companies and knowledge communities.
- The UNFCCC itself refers to the CDM as a trailblazer [25] towards broader solutions. If the CDM fails without strong action by the involved parties, any New Market Mechanisms will be

met with very high scrutiny, especially by private investors. This works against one of the pillars of market based designs, the increased participation of private investors in climate action.

- Climate change is a global challenge. Answers must be found through international governance architectures. The failure to establish those due to bad governance, slow processes and short-sightedness of the involved actors casts doubt on the question if New Market Mechanisms will not face the same problem of dwindling political support over time. Additionally for a future successful implementation it has to be ensured that national governments are curbed in their attempts to favor short-term domestic gain instead of long- term climate action. Given the poor outcomes of the current negotiation mechanisms this poses a great challenge for global governance architectures and has yet to be solved.

In their publication “A call to action”, the CDM high-level Panel on the CDM Policy Dialogue published an action plan consisting of steps needed to save the carbon market. Figure 1 provides an overview about the different layers of actions needed.

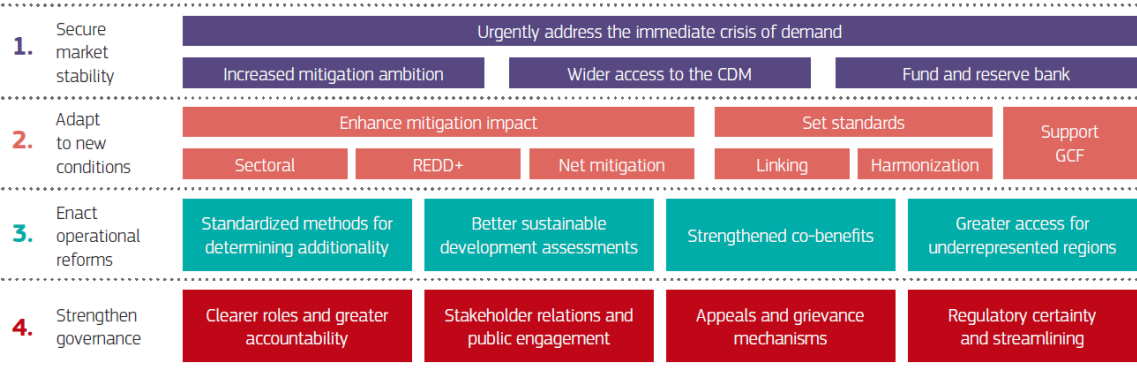


Figure 1: Overview of Recommendations [26]

The Panel identified four main areas of shortcoming that have to be addressed: On the short term, the market stability has to be solidified. Mid-term actions are policies and support programs which are meant to enable market participants to adapt to the new conditions that might provide a diversification potential for some business models in the CDM market. The next two elements, operational reforms and a stronger governance, currently remain rather long-term perspectives than fungible actions companies in the CDM market can rely on for their business decision making.

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