

# **Win-win? CDM hydropower projects and their implications for climate justice**

## **Abstract**

The current discussion about global warming and the possibility to reduce greenhouse gas emissions through hydropower has given a new turn to the debate about dams, resulting in the re-evaluation of this otherwise disputed technology. This trend materializes in the massive financial support that the United Nation's carbon offsetting scheme *Clean Development Mechanism* (CDM) mobilizes for the construction of new hydropower plants in developing countries. As defined in the Kyoto Protocol, CDM projects are supposed to avoid greenhouse gas emissions while simultaneously contributing to sustainable development. The objective of this chapter is to analyze to what extent carbon-offsetting-dams are able to live up to this 'win-win' expectation. By identifying considerable challenges and constraints it is argued that the contribution of large hydropower projects to climate protection as well as their sustainability impact is in many cases highly doubtful. Given the controversial effects large dams may have on the local level it is discussed in which respect carbon-offsetting-dams constitute a form of 'carbon colonialism' that results in the exacerbation of one of the most problematic aspects of global warming: the asymmetries of problem causation and burden-sharing.

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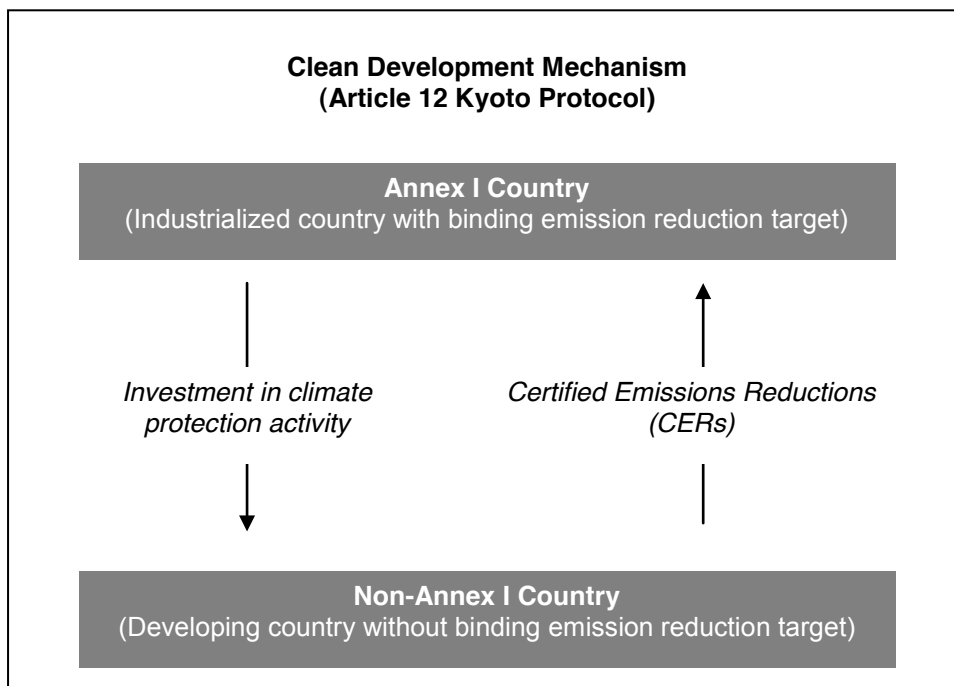
## **Introduction**

Since the rise of environmentalism in the 1980s the appreciation of large dams has been impaired profoundly. Reports about the destruction of river ecosystems, the struggle of resistance movements all over the world and the often miserable fate of dam-displaced people, which are estimated to add up to 40-80 million persons worldwide (WCD 2000a), had a strong influence on the public perception of dams: “*Dam has been a dirty word for years*” (The Economist 2009). From symbols of progress dams had evolved into controversial large-scale projects, and for some even into examples par excellence of failed development interventions (Roy 2001). However, the debate on large dams has taken a new turn recently. Hydropower dams are experiencing a positive re-evaluation as a means of mitigating climate change. In addition to other important factors such as the strongly increasing energy demand of emerging economies or the aspiration of some countries to become more independent from volatile energy imports, it is the ‘clean and green’ credentials on hydropower that are leading to a reinforced interest in dams: “*Hydropower continues to be the most important and economic source of commercial renewable energy worldwide, and its popularity is increasing with the surge of interest in clean energy prompted by concerns about climate change*” (UNESCO 2009: 118). The share of hydropower in the sector of renewable energy is dominant. It accounts for around 83% of the globally produced renewable electricity; the vast majority of the approximately 18% that all renewables together contribute to the total electricity generation (REN21 2009). Although hydropower is an ‘old-timer’ in the group of renewable energies it benefits substantially from the financial support that governments and companies mobilize in order to promote the dissemination of regenerative technologies. This is most evident through the incorporation of hydropower into the trade with emission certificates. The United Nation’s *Clean Development Mechanism* (CDM), one of the most important instruments of international climate policy, recognizes hydropower dams as sustainable carbon offsetting projects and supports the construction of hundreds of large-scale projects (> 15 MW) in developing countries through the allotment of tradable carbon credits. However, the contribution of these carbon-offsetting-dams towards fulfilling the goals of the CDM in terms of climate protection and sustainable development is disputed (Haya 2007, Nagle 2009). Moreover, the outsourcing of controversial climate protection projects to the South gives rise to questions regarding equity and justice in climate change mitigation (Lohmann 2008, Wright 2007).

Against this background, the aim of this chapter is to analyze carbon-offsetting-dams with respect to (a) their ability to advance the goals of the CDM and (b) their implications for climate justice. The text is structured into three sections. The first section explores the rationale of carbon offsetting and outlines the administrative structure of the CDM as well as the most important regulations governing the accreditation and implementation of CDM projects. Subsequently, the CDM support for hydropower development is examined. By identifying various challenges and constraints it is analyzed to what extent carbon-offsetting-dams are able to contribute to the CDM objectives of climate protection and sustainable development. In the third section, these findings are discussed with respect to their implications for climate justice: under which circumstances are CDM dams in a position to mitigate the asymmetries of climate change causation and burden-sharing and when do they constitute cases of ‘carbon colonialism’ that exacerbate existing disparities?

### **The Clean Development Mechanism**

The CDM is part of the Kyoto Protocol, the first internationally binding climate protection treaty. This agreement is characterized by a strong reliance on market-based mitigation strategies; an approach that has become known as ‘cap and trade’ (Oberthür and Ott 1999). The protocol’s target to reduce the greenhouse gas (GHG) emissions of industrialized countries by 5.2 % below the 1990 baseline until 2012 (‘cap’), is supplemented by three so-called ‘flexible mechanisms’ which are supposed to facilitate the implementation of reduction efforts through market-based instruments (‘trade’). In addition to the trading of those emission certificates that have been assigned to industrialized countries (so-called Annex I countries) based on their national reduction targets, emission certificates, also referred to as carbon credits, can be generated by investing in climate protection projects abroad. Against this background, the CDM enables Annex I countries (or companies that face binding emission restrictions within these countries) to invest in climate protection activities in Non-Annex I countries, i.e. in developing countries without binding emission reduction targets. The carbon credits generated through such a project activity, so-called Certified Emission Reductions (CERs), are transferred to the investing Annex I country and are calculated towards the country’s reduction target (cf. Fig. 1). Accordingly, the CDM is an international carbon offsetting scheme that enables industrialized countries to compensate for excess GHG emissions by purchasing carbon credits from climate protection projects in the South.

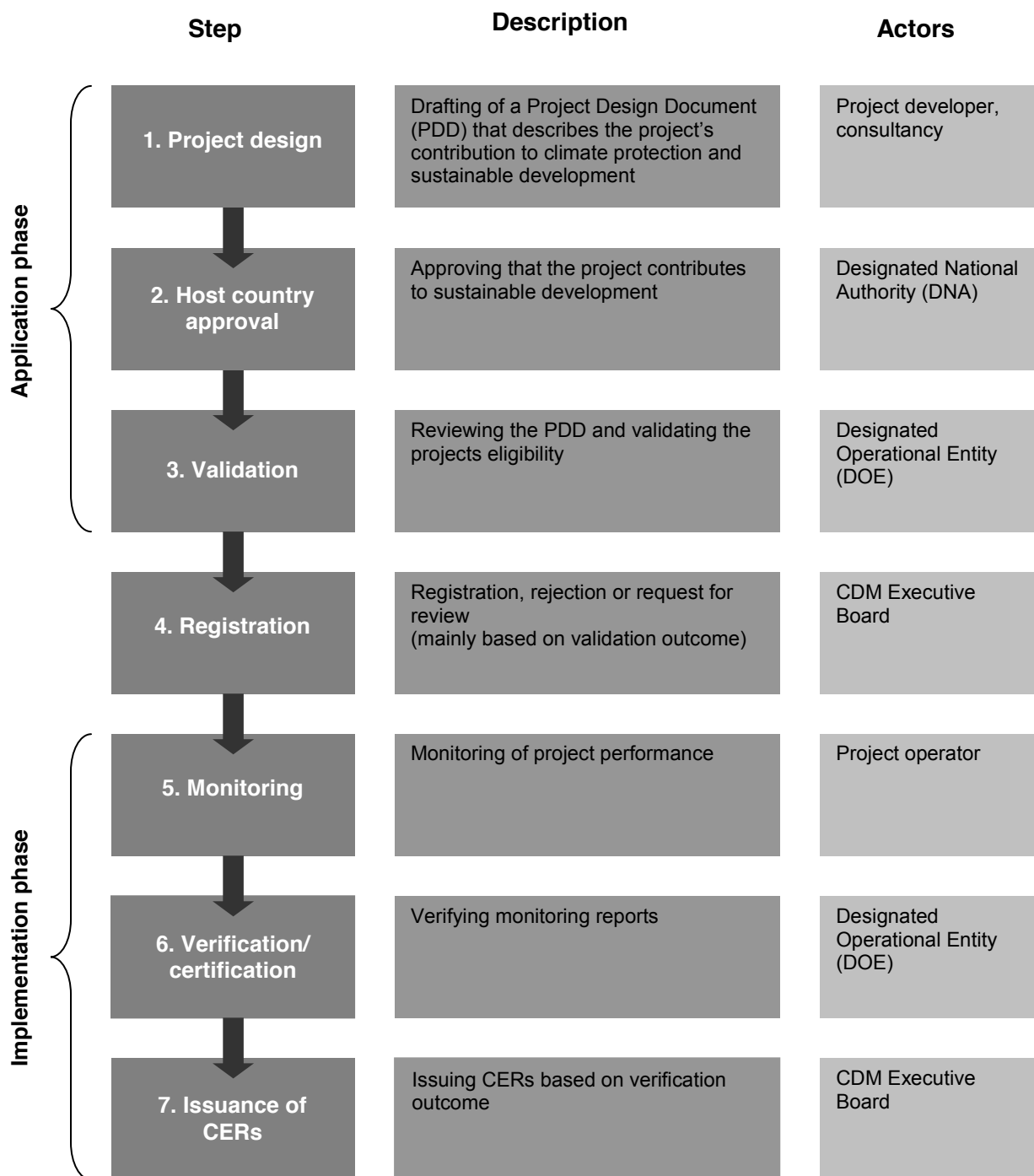


**Fig. 1** Basic structure of the Clean Development Mechanism (CDM)

The concept of carbon offsetting in developing countries is based on two essential ideas. First, it does not matter where GHGs are emitted or reduced. The principal GHGs stay in the atmosphere long enough to mix uniformly over the entire globe. Thus, their global warming potential is independent from the location of the emitting source (IPCC 2007a). Secondly, reducing GHG emissions in the developing world is less expensive than in the industrialized North. For example, reducing the emission intensity of an old inefficient thermal power plant in India is more economic than retrofitting an already very efficient thermal power plant in France. Consequently, the CDM takes advantage of “*spatially differentiated emission-abatement costs*” (Bumpus and Liverman 2008: 134), i.e. the fact that the same amount of money can reduce more emissions in the South than in the North. By commodifying carbon and creating a market for the trading of emission certificates between developing and industrialized countries the CDM does what a market mechanism is supposed to do: it aims to identify the most economic possibilities to reduce GHG emissions, so-called ‘low-hanging fruits’, in order to allocate limited resources efficiently (Oberthür and Ott 1999). Thus, in the strict sense, the CDM is not an instrument for climate protection but an instrument to reduce the costs of mitigation efforts.

The second objective of the CDM is to promote sustainable development in the host countries of CDM projects. Article 12.2 of the Kyoto Protocol states, that „*The purpose of the clean development mechanism shall be to assist Parties not included in Annex I in achieving sustainable development [...] and to assist Parties included in Annex I in achieving compliance with their [...] reduction commitments*“ (UNFCCC 1998). Hence, the CDM postulates a direct nexus between the implementation of climate protection projects and the promotion of sustainable development. Based on this notion, the CDM is expected to function as a ‘win-win’ strategy that benefits all stakeholders. Developers of CDM projects can gain income by selling carbon credits; Non-Annex I countries and local stakeholders are supposed to benefit from a project’s contribution to sustainable development, while Annex I countries and their industries can meet their reduction targets more economically by purchasing inexpensive carbon credits instead of investing in more costly domestic emission reductions.

The administrative set-up of the CDM is complex and involves an array of different actors from the public and private sector. Of central importance is the CDM Executive Board of the UN climate secretariat, United Nations Framework Convention on Climate Change (UNFCCC). On behalf of the Parties of the Kyoto Protocol the Executive Board sets the regulations governing the CDM project cycle and decides upon the approval of individual project proposals. Furthermore, so-called Designated Operational Entities (DOE) play a key role. DOEs are UN accredited consulting firms that are supposed to support the decision making of the Executive Board by providing independent project assessments. The major steps and actors of the CDM project cycle, from the project proposal to the final issuance of CERs, are outlined in the figure below (cf. Fig. 2).



**Fig. 2** The CDM project cycle and its actors  
Adapted and extended from: Streck 2003: 303

In order to ensure that a project proposal qualifies for the CDM, it is essential to thoroughly analyze to what extent the project can be expected to contribute to climate protection and sustainable development. The assessment of a project's potential to avoid GHG emissions consists basically of two procedures: the demonstration of the project's additionality and the drafting of a baseline-scenario. Additionality is the elementary prerequisite for a project's

contribution to climate change mitigation. Since the CDM is an offsetting scheme generating carbon credits that will be used by its buyers to maintain or increase emissions in Annex I countries, projects have to be *additional* to what would have happened in the absence of the CDM. Only projects that are implemented over and above the business as usual activities are able to effectively compensate emissions. Therefore, project proposals have to prove that they can only be realized with the support of the CDM. Within the scope of a so-called ‘investment barrier analysis’ it has to be demonstrated that a proposed project is financially unviable and/or faces any other technological or economic barriers that renders it unlikely to get implemented without additional income from the carbon market. Furthermore, a ‘common practice analysis’ is part of the additionality testing. Since the CDM is supposed to function as a catalyst for the transfer of new low-carbon technologies to developing countries it has to be demonstrated that the project technology is not common practice in the host country. Once these criteria are considered to be fulfilled, a baseline scenario is drafted in order to assess to what extent the project contributes to the avoidance of GHG emissions. Based on the assumption that in the absence of the CDM another more emission-intensive technology would have been deployed, this counterfactual scenario enables to calculate the amount of GHG emissions avoided. The avoidance of one tonne of CO<sub>2</sub> equivalent (CO<sub>2</sub>e) allows for the generation of one CER, which will finally allow its buyer to increase his emissions by the same amount (DEHSt 2007a).

In contrast to the complex appraisal of a project’s capacity to save GHGs, the second CDM goal, sustainable development, is generally assessed in a rather superficial manner (Olsen 2007). Given that CDM regulations stipulate that the assessment of a project’s sustainability impact is the prerogative of the host country, there are no evaluation guidelines or criteria. Even a consistent definition of what exactly is meant by sustainable development in the context of the CDM does not exist (Sutter 2003). Whereas some Non-Annex I countries have been active in developing their own tools for assessing the sustainability contribution of CDM projects, most host countries refrain from this task and apply only casual sustainability checks (Rudolph 2007).

Both the assessment of the climate protection potential as well as the appraisal of the sustainability contribution leave considerable scope for interpretation. This may lead to biased evaluations, resulting in projects that do not avoid emissions and/or fall short of contributing to sustainable development. It is due to this deficiency that the CDM has been severely criticized by numerous scholars and the media, variously arguing that these shortcomings are

not only minor pitfalls but pose a serious threat to the environmental and social integrity of the CDM as a whole (e.g. Böhm and Dabhi 2009, Gilbertson and Reyes 2009, Lohmann 2006).

### **Hydropower within the CDM**

The CDM comprises a multitude of technologies that are supposed to avoid or reduce the GHGs regulated under the Kyoto Protocol<sup>1</sup>. Eligible are mainly renewable energy and energy efficiency projects as well as technologies that capture and burn certain industrial or landfill gases. Hydropower is by far the most common project type, accounting for more than one quarter of all projects in the CDM pipeline (cf. Fig. 3)<sup>2</sup>. In terms of expected CER generation until 2012, hydro ranks first alongside hydrofluorocarbons (HFCs) reduction projects, both of which will receive around 17% of the total amount of CERs during this period (UNEP Risø 2010). Given that HFC is a particularly aggressive GHG and CERs are calculated on the basis of CO<sub>2</sub>e, HFC reduction projects, although very small in number, generate an extraordinarily large quantity of carbon credits.

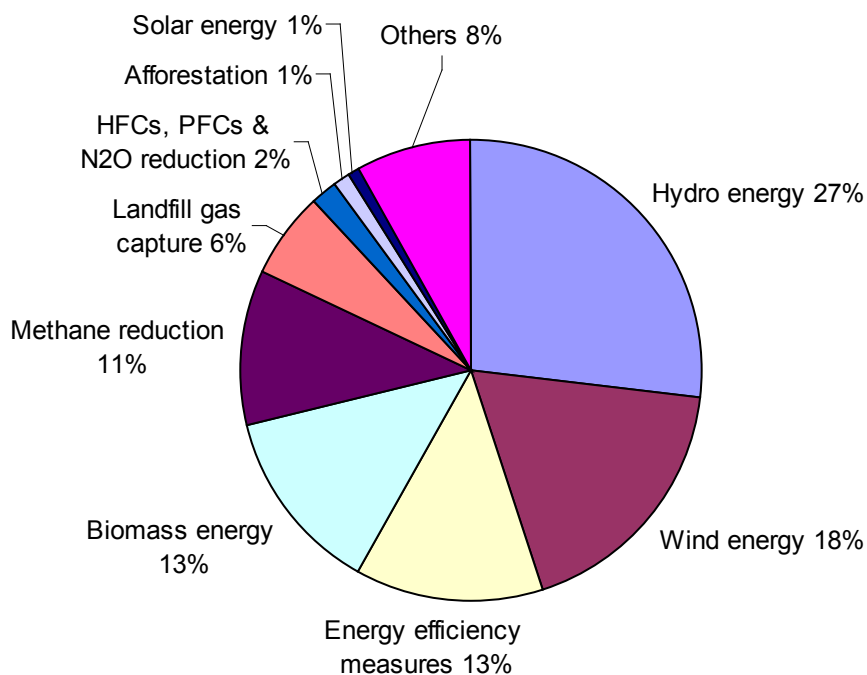
Considering the fact that the CDM is only up and running since 2004, the total number of hydropower projects that have requested CDM status is remarkable. As of 1 July 2010 there are 1,454 hydro projects in the CDM pipeline out of which 641 have already been approved by the Executive Board whereas the remaining are in the process of application. Out of the total number, 781 hydro projects pertain to the category ‘small-scale’ ( $\leq 15$  MW) and 673 to ‘large-scale’ ( $> 15$  MW). Altogether they represent an electricity generation capacity of 53,044 MW (UNEP Risø 2010). Within only six years carbon-offsetting-dams gained a share of more than five percent of the worldwide installed hydropower capacity, which is estimated to add up to almost 1,000 GW (REN21 2009). Based on the official assumption that in the absence of the CDM the generation capacity of carbon-offsetting-dams would have been installed through the construction of mostly non-renewable power plants, CDM dams are expected to avoid 492.1 million tonnes of CO<sub>2</sub>e and generate the same amount of carbon credits until 2012 (UNEP Risø 2010). At the current trading value of around €13 per CER these carbon credits are worth more than 6 billion Euros; a substantial revenue stream for project owners and the associated financial institutions.

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<sup>1</sup> The Kyoto Protocol regulates six types of GHG or groups of gases: carbon dioxide, methane, nitrous oxide, sulphur hexafluoride, hydrofluorocarbons (HFCs) and perfluorocarbons (UNFCCC 1998).

<sup>2</sup> The CDM pipeline comprises all approved and applying projects (UNEP Risø 2010).

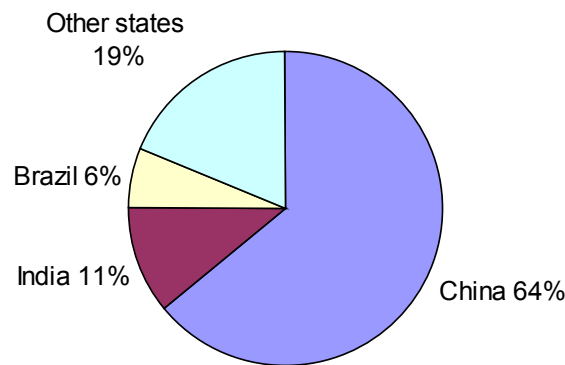




**Fig. 3** Projects in the CDM pipeline by type as of 1 July 2010  
Data source: UNEP Risø 2010

CDM hydro projects are classified as ‘run of river’, ‘new dam’ or retrofitting of ‘existing dam’ (UNEP Risø 2010). However, clear definitions for the use of these categories in the CDM are missing. A closer examination of the technical features of CDM hydro projects reveals that the term ‘run of river’ is used very broadly. Even projects that allow for several days water storage or include the diversion of whole rivers are labelled as ‘run of river’, which is clearly contradictory to the respective river engineering definitions (Strobl and Zunic 2008). For this reason, the term ‘carbon-offsetting-dam’ in this text also refers to projects which are officially categorized as ‘run of river’.

The geographical distribution of CDM projects is highly uneven. More than 70% of all projects are located in only three countries: China, India and Brazil (UNEP Risø 2010). In the case of carbon-offsetting-dams this disproportionate allocation is even more pronounced: 64% are to be found in China, followed by India with a share of 11% (cf. Fig. 4). Altogether almost 80% of all CDM hydro projects are located in Asia, many in peripheral high mountain areas.



**Fig. 4** Geographical distribution of carbon-offsetting-dams as of 1 July 2010  
Data source: UNEP Risø 2010

### **Analyzing the ability of carbon-offsetting-dams to advance the CDM goals**

#### *Climate protection through carbon-offsetting-dams?*

The first question that arises with respect to the primary goal of the CDM is elementary: is hydropower in the first place a technology that can reduce GHG emissions? Usually hydro is considered to be an emission-free mode of electricity generation. Although this generally holds true for genuine run of river projects as well as for dams in cool climate regions, the use of hydropower in mitigating global warming is questionable in the case of reservoirs in the (sub)tropics (Fearnside 2004). Depending mainly on oxygen content and the amount of solid and dissolved organic material, these reservoirs can emit enormous quantities of methane, a GHG whose global warming potential is 25 times stronger than that of CO<sub>2</sub> (IPCC 2007a). Thus, shallow (sub)tropical reservoirs that have not been cleared from vegetation before flooding as well as reservoirs with a large in-flow of organic material are especially susceptible to this phenomenon. Studies from dams in the Amazon basin show that their emission intensity per MW can outweigh that of fossil fuel power stations multiple times (Fearnside 2005). Although there is no general conclusion on the overall impact of reservoir emissions on global warming, these case studies demonstrate that dams are not *per se* climate friendly but, in some cases, may even exacerbate climate change: “*Methane squashes the green credentials of hydropower*” (Giles 2006: 524). The CDM tries to account for reservoir emissions by excluding projects with a power density of less than 4 W per flooded m<sup>2</sup> and defining a standard value for discounting the GHG reduction potential of projects with a power density between 4 and 10 W/m<sup>2</sup> (UNFCCC 2010).

More problematic challenges arise when it comes to examining the additionality of carbon-offsetting-dams. Whereas the imprecise consideration of reservoir emissions may lead to inexact allocations of carbon credits, non-additional projects undermine the *raison d'être* of the CDM. The verification of additionality constitutes one of the biggest challenges for the effectiveness of carbon-offsetting-dams as well as for the CDM as a whole. To prove unambiguously that the economic barriers a project proposal is confronted with can only be overcome with the support of the CDM is often impossible. Every project faces obstacles and the rating of barriers as 'decisive' or 'non-decisive' is always debatable. Several scholars argue that such scopes of interpretation are systematically (mis)used in order to influence project validations (Lohmann 2006, Schneider 2007, Witt and Moritz 2008). A study by Haya (2007) showed that 35% of all carbon-offsetting-dams registered until 2007 have already been completed at the time of requesting CDM registration. Another 54% were planned to be completed within one year after registration (Haya 2007: 6). If the CDM had been of vital importance for the implementation of these projects, as the developers claim in their registration requests, one should assume that construction only starts after the CDM approval. The case of the Allain Duhangan project in the Indian state of Himachal Pradesh exemplifies this problem. The 192 MW hydropower project was officially approved by the Executive Board in May 2007 even though the project implementation agreement had been signed in 2001 and construction began in 2004 (UNFCCC 2007a). The fact that the construction started three years before the project has been registered under the CDM suggests that the additional income from the selling of carbon credits had not been taken into consideration when the financial viability of the project was assessed. However, the developers of Allain Duhangan argue that the necessary loans were only granted on the expectation that the project will be approved by the CDM, a widespread argument that can be found in many CDM application documents. But again, this raises questions. If projects really depend on income from the carbon market, are developers willing to start with the implementation of these projects before getting the final registration approval? Although the Executive Board's rate of rejection is low such an approach is probably too risky for most developers (Haya 2007). Rather this implies that the CDM constitutes in many cases an *additional income* but is not vital for the origination of *additional projects*. Or, as an official of the Allain Duhangan project put it during a private conversation: "*The project would have gone ahead regardless [...] the CDM is just another incentive*". This problem is not confined to carbon-offsetting-dams but applies to almost all projects types. Schneider (2007: 9) estimates that up to 40% of all registered CDM projects are likely to be non-additional and would have been implemented anyway.

Without reducing any emissions whatsoever, non-additional projects generate carbon credits that enable its buyers in Annex I countries to maintain or even increase GHG emissions.

Furthermore, the additionality testing comprises a common-practice-analysis in which project proposals have to demonstrate that they contribute to the transfer and dissemination of new low-carbon technologies. However, in the case of dams this requirement is hard to fulfil. Unlike other technologies under the CDM, which are indeed new and uncommon in many regions, most forms of hydropower generation are technologically mature and widespread all over the world (McCully 2001). This applies particularly for countries like China and India where around three quarters of all CDM dams are located. In both countries hydropower development has been a priority on the national agenda for more than half a century. It seems paradoxical that *“China has built almost half of the world’s estimated 45,000 large dams and remains one of the most active dam building countries today”* (WCD 2000b: 1) and, at the same time, argues that dams under the CDM provide new technological impulses that would not have been realized without support from the carbon market. Inevitably this leads to the assumption that the common-practice-analysis and the respective validation are not taken very seriously. The Allain Duhangan project confirms this concern. In order to demonstrate the project’s contribution to technology transfer the responsible Designated Operational Entity (DOE), Det Norske Veritas (DNV), states in their validation report: *“that at the time of project implementation agreement in 2001 there were only two large hydropower projects in north India with installed capacity of 448 MW and 86 MW”* (DNV 2007: 6). Yet, the Bhakra project alone, completed in 1963 and also located in the state of Himachal Pradesh, has a capacity of 1,325 MW (Bhatia and Malik 2008). The overall hydropower capacity of the north Indian grid even amounted to 8,332 MW in 2001 (NRPC 2009: 82). Consequently, the Allain Duhangan project cannot be said to contribute to the transfer of new regenerative technologies.

#### *Sustainable development through carbon-offsetting-dams?*

Given that the second objective of the CDM consists in the advancement of sustainable development, the admission of dams as CDM projects expresses the Executive Board’s point of view that carbon-offsetting-dams are generally appropriate for the achievement of this goal. First of all, this raises the question of what exactly is meant by sustainable development. Both terms, sustainability and development, are controversially discussed concepts that carry very different and sometimes contradictory meanings (Rudolph 2007). In order to make use of these broad concepts context specific explanations are unavoidable. Yet, the CDM does not

offer any consistent definition that would clarify the meaning of sustainable development in the context of climate protection projects, not to mention any criteria or indicators that would allow a coherent assessment. The only stated constraint is that GHG emissions reductions themselves are not considered to be sufficient for meeting the goal of sustainable development (Sutter 2003). Apart of that, the appraisal of a project's contribution to sustainable development is entirely up to the priorities of the host countries (Olsen 2007).

However, even without a CDM specific definition of sustainable development the assumption that dams are generally appropriate for the achievement of this goal can be questioned. As has been mentioned at the beginning of this chapter, the pros and cons of dam-building have evolved into a long-standing debate which shows that dams are far from being uncontroversial (Nüsser 2003). Striking arguments on both sides of the debate make it difficult to draw a general conclusion on this issue. By reiterating the advantages of dams in terms of electricity generation, water supply and/or flood control, dam proponents depict dams as a kind of panacea for large-scale development (e.g. IBRD 2009, Turpin 2008). In contrast, dam opponents usually refer to the local level and emphasize the adverse social and environmental consequences that may result from inundations and river diversions, such as displacement, water quality degradation, destruction of wetlands and fishing grounds (e.g. McCully 2001, Roy 2001). Given that dams have different impacts on different spatial scales, assessments of the development contribution of dams have to address the distribution of costs and benefits between and among the various place-based and non-place-based stakeholder groups. Studies focusing on these distributional implications point out that the costs and benefits of large dams are often highly unequally shared (Dwivedi 2006). In many cases the electricity and/or water provided by dams are directly transferred to urban centres whereas marginalized population groups up- and down-stream of the dam site lose access to vital livelihood assets such as land and water (Heming et al. 2001). The most comprehensive evaluation of the development impact of large dams was performed by the World Commission on Dams (WCD). After carrying out extensive country studies and surveying more than 120 dams all over the world the WCD drew the following conclusion: "*Dams have made an important and significant contribution to human development, and the benefits derived from them have been considerable. In too many cases an unacceptable and often unnecessary price has been paid to secure those benefits, especially in social and environmental terms, by people displaced, by communities downstream, by taxpayers and by the natural environment.*" (WCD 2000a: 310). In the light of such critical findings it is difficult to understand why dams under the CDM are considered to be generally supportive for the advancement of sustainable development. This

concern is shared by the European Union, which demands that carbon-offsetting-dams with a capacity greater than 20 MW must comply with WCD sustainability recommendations if their CERs are to be traded within the Union (DEHSt 2007b). Moreover, the Gold Standard Foundation, a non-profit organization that assigns a quality label to sustainable carbon offsetting projects, largely excludes large hydro projects (Gold Standard 2009). Examples like the Allain Duhangan project show that such concerns are justified. This dam is opposed by large parts of the local population because it interferes directly with the water supply of downstream villages. Besides, the developers of Allain Duhangan did not adhere to environmental regulations and have been officially fined because of violating India's forest conservation act. With reference to this project and other similar cases Thakkar notes that *"the trouble with CDM projects in India is that the government only sees them as free gifts and is not bothered if the projects indeed qualify to be a CDM project from climate point of view, from environment impacts point of view, from social impacts point of view, from technology transfer point of view or from equity point of view"* (Thakkar 2009: 42).

Next to these technology-specific concerns, the structure of the CDM itself may hinder the achievement of the sustainability goal. Ever since the CDM's inception, scholars have pointed out that the one-sided calculation of carbon credits is problematic in this regard (Muller 2007, Sutter 2003). The amount of CERs a project receives is calculated exclusively on the basis of GHG avoidance: one ton of avoided CO<sub>2</sub>e yields one CER. To what extent the project also fulfils the sustainability objective does not have any influence on the amount of issued CERs. Consequently, there is no financial incentive for project developers to design and operate their projects in a way that fosters sustainable development. The absence of a financial incentive can even result in a trade-off between climate protection and development contribution (Sutter and Parreño 2007). On the one hand, the CDM as a market mechanism is supposed to identify the most economic options for GHG reduction. On the other hand, the realization of the sustainability objective usually requires additional investment, thus rendering sustainable projects more expensive. This may result in a situation in which the sustainability contribution of a project turns out to be a competitive disadvantage that undermines the objective of sustainable development in the long run: *"Competition among non-Annex 1 parties in attracting CDM investments may therefore create an incentive to set low sustainability standards in order to yield more projects with low abatement costs. This could lead to a 'race to the bottom' in terms of sustainable development standards"* (Sutter 2003: 68). This trade-off disadvantages small-scale projects in particular, as they generate only a small amount of carbon credits but may have a positive impact on local development. In summary, it can be

argued that the one-sided calculation of CERs is a structural obstacle for the achievement of the sustainability goal. Indeed, the initial expectation that the CDM can succeed as a ‘win-win’ instrument that delivers on both, the objectives of climate *and* development policy has largely vanished (Olsen 2007, Paulsson 2009). Many people active in the carbon trading business agree that the CDM today is almost exclusively considered to be a mechanism for the generation of inexpensive carbon credits. This viewpoint is further evident in the very small share of projects that seek to conform to the sustainability criteria of the Gold Standard.

The previous sections have shown that several factors constrain the ability of carbon-offsetting-dams to realize the CDM objectives. On the one hand, there are fundamental concerns which question the ability of dams to contribute to climate protection and sustainable development. The problem of reservoir emissions and the various negative experiences with the development impact of large dams suggest that this technology is only partially appropriate to achieve the goals of the CDM in the first place. In addition, the CDM governance structure comprises regulations that further obstruct the effectiveness of carbon-offsetting-dams. Shortcomings in demonstrating additionality and the absence of financial incentives for sustainable development challenge the environmental and social integrity of the CDM. Not only may these deficiencies render CDM projects ineffective, but they may in fact result in projects that are explicitly counterproductive in terms of climate protection and sustainable development.

<p align="center"><b>CDM objective 1: Climate protection</b></p>	<p align="center"><b>CDM objective 2: Sustainable development</b></p>
<p>Achievement through carbon-offsetting-dams questionable because of:</p> <ol style="list-style-type: none"> <li>1. Doubts about additionality</li> <li>2. Reservoir emissions</li> </ol>	<p>Achievement through carbon-offsetting-dams questionable because of:</p> <ol style="list-style-type: none"> <li>1. Partly negative experience with the sustainability impact of large dams</li> <li>2. Absence of financial incentives</li> <li>3. Absence of CDM specific definition of sustainable development</li> </ol>

**Fig. 5** Main factors challenging the contribution of large-scale carbon-offsetting-dams to climate protection and sustainable development

### **CDM dams in the context of climate justice: a case of carbon colonialism?**

The CDM as an instrument of international climate and development policy establishes new trading connections between industrialized and developing countries: “*carbon emissions are emerging as a new and dynamic commodity that links the global North and South*” (Bumpus and Liverman 2008: 128). Thus, the modalities and circumstances under which carbon offsets are generated and traded have implications for the relationship between industrialized and developing countries and the respective disparities (Wright 2007). Against this background, the conclusion of the previous analysis on carbon-offsetting-dams gives rise to questions about equity and justice in climate change mitigation.

The discussion on climate justice forms part of the broader debate on environmental justice and focuses largely on the distributional implications of climate change (Harris 2009). Given that the underlying normative concepts and ideas vary there is no general definition of climate justice. However, there are two core arguments that are characteristic for most interpretations. The first one relates to the unequal causation of anthropogenic climate change, as “*the largest share of historical and current global emissions of greenhouse gases has originated in developed countries*” (UNFCCC 1992: 1). Although newly industrializing countries contribute increasingly to global warming, per capita emissions in the global North will continue to greatly exceed those of developing countries (IPCC 2007a). The second core argument aims at exposing the unequal distribution of adverse climate change impacts. It is widely accepted that the negative consequences of global warming are to be felt most strongly in the global South. Many developing countries lack the financial, technological and organizational capacities to adapt successfully to the expected challenges of climate change and are therefore more vulnerable (IPCC 2007b). Thus, the causal factors of anthropogenic climate change *and* its adverse impacts are distributed in a highly unequal manner: those who hardly contributed to climate change are particularly severely affected by its negative consequences. Or, as Prouty puts it: “*The distribution of the burdens of climate change is directly inverse to the benefits attained through CO<sub>2</sub> emissions*” (Prouty 2009: 517). In the context of these asymmetries climate change mitigation inevitably involves questions of justice and accountability. This notion is well established in international climate policy and gets reflected in the principle of “*common but differentiated responsibilities*” (UNFCCC 1992: 4). By stipulating “*that the developed country Parties should take the lead in combating climate change and the adverse effects thereof*” (UNFCCC 1992: 4) this principle acknowledges the historic responsibility of the industrialized world and creates the legal basis



for the distinction between Annex I countries with binding reduction targets and Non-Annex I countries without such obligations.

Whether the outsourcing of climate protection measures to the South is in line with this principle or not is the primary point of contention in the controversy about carbon offsetting and climate justice. Many scholars and activists maintain that offsetting enables emitters to circumvent their own GHG reductions and consequently distracts from the root cause of climate change, i.e. the over-consumption of fossil fuels in the global North (Gilbertson and Reyes 2009, Lohmann 2006). In this sense offsetting is equated with the selling of indulgences, thereby undermining the historic responsibility of industrialized countries (Smith 2007). Basically, this critique of offsetting is a critique of the underlying polluter pays principle<sup>3</sup>. That is to say, it is not enough that the polluter pays, the polluter also has to change (Altvater and Brunnengräber 2008). Some authors extend this critique and argue that offsetting not only enables the continuation of pollution but directly disadvantages developing countries. Smith describes the CDM “*as a form of carbon colonialism, whereby resources of countries in the Majority World [...] are used in order to maintain the levels of material privilege (in this case, high levels of energy consumption) enjoyed by Northern countries*” (Smith 2007: 25). From this point of view carbon offsetting is seen as a new mode of exploitation that exacerbates the existing North-South divide, or, as Bachram argues: “*emissions trading therefore becomes an instrument by means of which the current world order, built and founded on a history of colonialism, wields a new kind of carbon colonialism*” (Bachram 2004: 15). In direct contrast to this fundamental critique, proponents of carbon offsetting point out that the CDM mobilizes substantial financial transfers to developing countries and consequently meets the demands of those who call for more support for the global South (Mittendorf 2004). Even though the distribution of CDM projects is highly unequal and excludes most of the world’s poorest nations, this argument is hard to dismiss. The CDM does encourage investments in developing countries and has become an important factor in the foreign trade balance of various Non-Annex I countries. Thus, from an international perspective the allegation of carbon colonialism does not seem to hold true. Although it is undeniable that the CDM as a compensation scheme does not address the root causes of climate change, carbon offsetting does not necessarily take place at the expense of developing countries. However, an analysis that focuses only on the exchange between nation states obstructs the view of the local impacts of the CDM. Consequently, the due

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<sup>3</sup> The polluter pays principle is constitutive for many environmental laws. It stipulates that the costs of pollution and related mitigation efforts have to be born by the polluter (Bugge 1996).

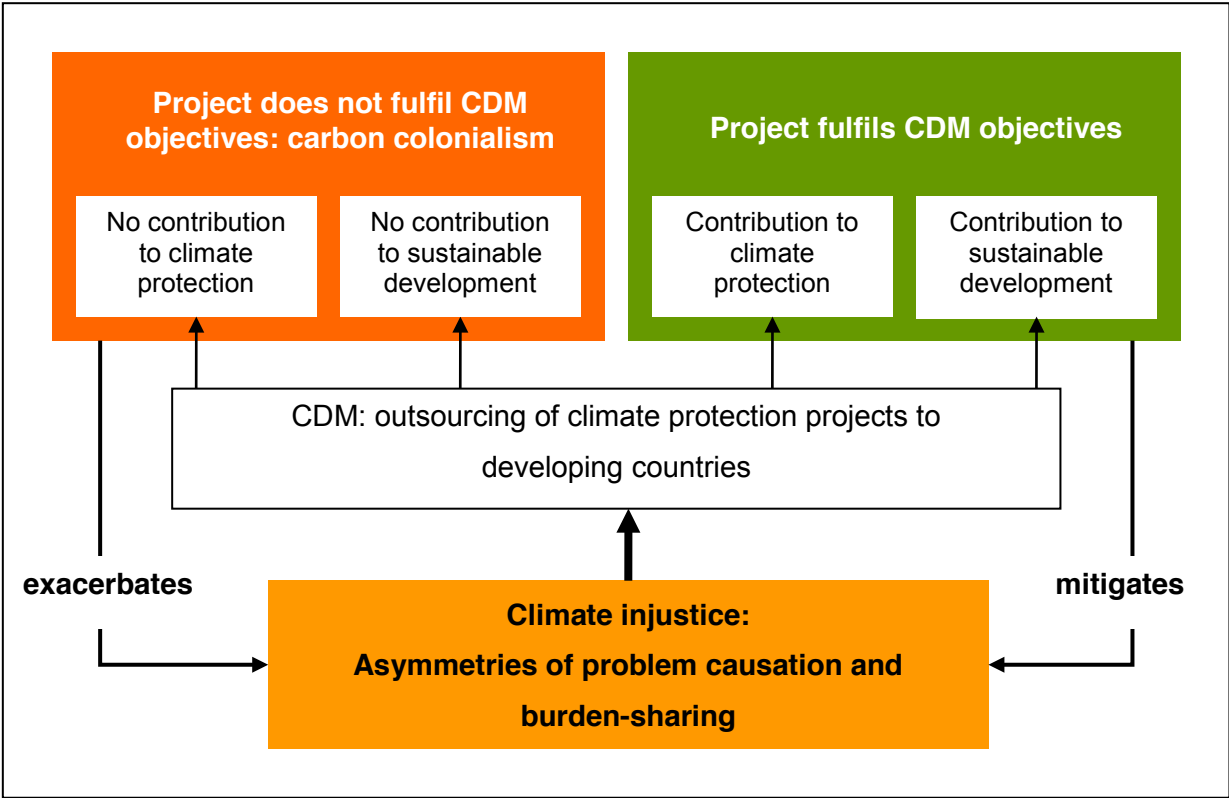
consideration of local level impacts leads to a different assessment of the CDM. If there are serious doubts about the effectiveness of CDM projects or, as the analysis of carbon-offsetting-dams has shown, reasons which suggest that projects might even be counterproductive for the achievement of the CDM objectives, the claim of carbon colonialism can be substantiated in two respects.

Offsetting projects that cause local socio-economic or ecological problems obviously confirm the assumptions of carbon colonialism. Such projects indeed externalize the adverse side-effects of certain climate protection measures to those who barely emit GHGs. Whereas the economic and political elites in developing countries profit from the selling of carbon credits, it is overall the existing marginalized groups who are affected by the adverse impacts of such projects (Smith 2007). This can be observed when peasants in peripheral Chinese mountain areas get displaced for the construction of carbon-offsetting-dams (UNFCCC 2007b) or when traditional land using rights are ignored for the creation of afforestation plantations as happened in Uganda and elsewhere (Eraker 2000). Other examples include biomass projects that may take place at the expense of food production (WWF 2007) or waste incineration and landfill gas projects that conflict directly with the informal recycling market and undermine the livelihood of the urban poor (Tangri 2003). These examples show that certain offsetting activities can be socially and/or ecologically harmful and may result in the exacerbation of existing inequalities: *“On a local level, longstanding exploitative relationships and processes are being reinvigorated by emissions trading”* (Bachram 2004: 8).

In the case of non-additional projects that fail to contribute to climate protection, the critique of carbon colonialism can be confirmed indirectly. Without avoiding any emissions, projects like Allain Duhangan generate ‘hot air credits’ that enable polluters in Annex I countries to increase emissions. Thereby, non-additional projects lead to the intensification of global warming. Given that the adverse impacts thereof affect vulnerable societies in the South in particular one may argue that non-additional projects eventually have an adverse effect on developing countries. In this regard the CDM may enable the continuation of the cost externalization that it is supposed to counteract.

As a result, it can be said that the charge of carbon colonialism does not apply to the CDM as a whole. Even though the outsourcing of climate protection measures to the South is problematic as it does not address the root causes of global warming, offsetting is not necessarily to the detriment of developing countries. On the contrary, if projects live up to the CDM objectives, they can contribute to the mitigation of the existing inequalities of climate

change causation and burden-sharing. However, evidence suggests that a significant number of CDM projects, particularly in the hydro sector, do not fulfil the goals of the CDM and lead to counterproductive outcomes (Haya 2007, Schneider 2007). By increasing GHG emissions and/or causing local problems such projects constitute a form of carbon colonialism that leads to the exacerbation of climate injustice (cf. Fig. 6).



**Fig. 6** Ambivalent consequences of the CDM on climate justice

**Conclusion and perspectives**

The aim of this chapter was to analyze the ability of carbon-offsetting-dams to advance the CDM goals and to assess their implications for climate justice. Building on a brief explanation of the CDM governance structure various factors have been identified that substantially constrain the capacity of carbon-offsetting-dams to live up to the ‘win-win’ expectation of the CDM. By discussing these shortcomings in the context of climate justice, it has finally been argued that projects which do not fulfil the CDM objectives may exacerbate the existing inequalities of climate change causation and burden-sharing.

In conclusion, this chapter points to the case that the promotion of dams through the CDM is a highly ambivalent strategy. The central problem is that carbon-offsetting-dams which fail to fulfil the CDM objectives are not only ineffective, but in many cases explicitly

counterproductive. Given that hydropower is by far the most common CDM project type, this ambivalence seriously challenges the environmental and social integrity of the CDM. The CDM runs the risk that its worthwhile intentions and the achievements of successful projects are undermined, or *offset*, by noncompliant projects that misuse the CDM and take advantage of insufficient scrutiny procedures. If the credibility of the CDM as a meaningful instrument of international climate and development policy is to be sustained, it has to be ensured that non-additional and unsustainable projects are excluded from the CDM as far as possible. With regard to carbon-offsetting-dams there are various reform proposals which might improve the performance of the CDM.

The simplest way to avoid the risk of funding harmful carbon-offsetting-dams is to exclude large-scale dams from the CDM. This is demanded by NGOs like CDM Watch, International Rivers and SANDRP (South Asian Network on Dams Rivers and People) who make a point in arguing that there is no reason to assume that large carbon-offsetting-dams are more sustainable than ordinary large dams as long as there are no respective regulations (Haya 2007, Thakkar 2009). This leads to another reform proposal: the introduction of binding sustainability standards, such as the EU regulation which requires large carbon-offsetting-dams to comply with the sustainability guidelines of the WCD. Although the implementation of this provision is still incoherent, it provides a systematic approach for tackling some of the most severe problems associated with carbon-offsetting-dams. By expanding this regulation to the whole CDM it could be widely ensured that the CDM does not support harmful hydropower projects. Other proposals aim at weakening the position of hydro in the CDM by making carbon-offsetting-dams financially less attractive for investors. Nagle (2009) proposes to discount CERs from Chinese carbon-offsetting-dams in order to redirect CDM investments to countries that are in greater need of foreign support.

However, such reform proposals will remain piecemeal unless the general shortcomings of the CDM are addressed. As long as the CDM is based on hardly verifiable additionality criteria and unclear sustainability aims, it will continue to fund ineffective or, as this analysis has shown, potentially counterproductive projects which tie up financial resources that could be invested in more climate friendly and more sustainable technologies.

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