

Transitioning Away from Large-Scale Power Projects: a Simple and Effective Fix for the CDM?

Key Findings

- Despite years of development, experience, and revision, the Clean Development Mechanism’s method for assessing additionality remains controversial and contested. For some project types, additionality is relatively certain, but for large-scale power supply projects, which are expected to generate the majority of CDM credits going forward, additionality is hard to demonstrate with high confidence.
- The value and integrity of the CDM may hinge on the net emissions impact of these large-scale power supply projects. If they are truly additional and operate well beyond the credit issuance period, they can lead to a decrease in global greenhouse gas emissions. If they are mostly non-additional, as research suggests, they could increase cumulative global greenhouse gas emissions by over a gigaton of CO₂e through 2020.ⁱ
- A transition away from such CDM projects could help address the over-supply of certified emission reductions (CERs), support projects that truly depend on CERs, and improve the CDM’s overall mitigation impact. However, such a transition would need to be carefully considered, bearing in mind governance and legal aspects and the need for investor confidence.

The CDM at the crossroads

With the future of the Kyoto Protocol uncertain, and rock-bottom CER prices imperiling carbon markets, the Clean Development Mechanism faces a critical moment. It is a key pillar of the global effort to mitigate climate change. Yet in order to survive and be more effective, it needs internal and external reforms to address the growing supply-demand imbalance and ongoing integrity concerns.

This policy brief, based on new SEI research for the High Level Panel of the CDM Policy Dialogue, shows how large-scale power supply projects may undermine the value and integrity of the CDM and proposes a simple solution: to transition the CDM away from them.

Context

The CDM embodies the United Nations Framework Convention on Climate Change (UNFCCC) principle of “common but differentiated responsibilities”. It is designed to help countries achieve sustainable development while simultaneously helping industrialized countries meet their emissions reduction targets. Thus far, it has achieved successes, experienced challenges, and undergone reforms to streamline and improve operations.

Given a large supply of CERs, however, demand over this decade will likely fall far short of the levels required to stimulate significant new and additional investment in emission reduction projects. Therefore, for the CDM to remain relevant and viable, more radical solutions are needed to address both demand and supply.

In September 2011, the CDM Executive Board asked an independent High Level Panel on the CDM Policy Dialogue to take stock of the CDM and suggest ways to help avert a carbon market crisis and increase the ambition of mitigation efforts. In its final report, *Climate Change, Carbon Markets and the CDM*:



CDM-financed hydropower dam, India © International Rivers/flickr

A Call to Action, released in September 2012, the Panel made several innovative and practical recommendations with the aim of stabilizing the market (e.g. through a fund to buy credits), increasing mitigation impact, improving operations, strengthening governance, and adapting to changing conditions.

SEI assisted the High Level Panel by conducting an analysis of the net mitigation impact of the CDM. Based on this research, the Panel’s commissioned report, *Assessing the Impact of the CDM*, included the policy option of excluding large-scale power supply projects from the CDM. Although the Panel did not ultimately include this option among its recommendations, we believe it warrants further consideration. Transitioning away from large-scale power supply projects could achieve multiple benefits: an increase in the CDM’s likely mitigation impact, a significant reduction in the over-supply of CERs, and the opportunity to focus on more effective support mechanisms for lower-carbon power in the developing world.



Coal-fired power plant, China © Kleinreolive

The CDM and net mitigation impact

In principle, the CDM should not affect global emissions. While CDM projects lead to emission reductions in host countries, the resulting CERs allow purchasers in other countries to increase their own emissions (above targets levels) by a corresponding amount. Thus, in theory, the CDM should have zero net mitigation impact – it simply makes mitigation more economically efficient by shifting the location of mitigation action to developing countries where abatement costs are lower.

In an explicit departure from that zero-sum calculus, the Cancún Agreements in 2010 called for “one or more market-based mechanisms” capable of “ensuring a net decrease and/or avoidance of global greenhouse gas emissions”, an intent that was further reiterated at COP17 in Durban in 2011. This has

raised several questions: Is the CDM, with its current methodologies, procedures, and project pipeline, producing more or fewer emission reductions than the number of CERs issued and used? And if the Parties make this an explicit aim of the CDM in the future, what are the options to improve the net emissions impact of the CDM?

SEI’s analysis for the High Level Panel explored the extent to which CERs represent additional GHG reductions (i.e., the projects would not have happened except for the incentive provided by the CDM), and whether, in aggregate, CERs are matched by a corresponding level of actual GHG reduction (i.e., whether they are over- or under-credited).

Researchers have documented the most significant additionality concerns with large-scale (over 15 MW) hydropower and wind projects, natural gas and higher-efficiency coal, projects that generate electricity from waste gases in the iron and steel sector, and, to a lesser extent, projects that use biomass (especially agricultural residues) for power or heat generation. Additionality concerns have been less pronounced (but may still exist) for small-scale (under 15 MW) power projects, which are forecast to produce nearly 10% of power-sector CERs through 2020.

Table 1 shows the projected sources of CERs through 2020. Though power projects represent about a quarter of CERs issued to date (late 2012), they are expected to generate nearly 70% of total CERs between 2013 and 2020. Large-scale projects are expected to account for over 90% of those power-sector CERs.

Table 1. Share of CER issuance and prevalence of additionality-related concerns by major CDM project types

Project type	Share of CERs to date	Share of projected CERs, 2013-2020 from projects in the CDM pipeline	Significant additionality concern?
Industrial gases	66%	20%	
HFC-23	44%	1%	
N ₂ O – Adipic acid	18%	4%	
N ₂ O – Nitric acid	4%	3%	
Other	0%	1%	
Methane recovery	5%	12%	
Landfill gas	3%	4%	
Coal mine/bed	1%	5%	
Manure/wastewater	1%	2%	
Other	<1%	1%	
Power supply: renewable	17%	53%	
Hydro	9%	26%	●
Wind	7%	25%	●
Other renewable energies	<1%	2%	
Power supply: other	10%	15%	
Iron and steel waste gas	4%	3%	●
Fuel switch (natural gas)	3%	6%	●
Biomass	2%	4%	●
Higher efficiency fossil (coal)	0%	2%	●
Supply-side efficiency (other)	0%	1%	
Other	0%	<1%	
Other	3%	4%	

Source: SEI analysis, based largely on Institute for Global Environmental Strategies (IGES) project database and forecasts. Does not account for demand constraints, such as the EU’s post-2012 ban on CERs from HFC23, N₂O, and non-LDC projects registered after 2012.

Table 2. Potential CERs 2013-2020 in play from large-scale power supply projects (in billion CERs)

Option:		Buyers disallow use of CERs issued after 2012		Cease renewal of 2 nd and 3 rd crediting periods	Cease registration of projects in the pipeline	Cease future registrations
		Total forecast CERs 2013-2020	Total forecast CERs 2015-2020	Registered CERs in 2 nd or 3 rd CPs due for renewal post 2012	In pipeline but not yet registered as of June 1 2012	Future inflow
Quantity, by project Type:	Hydropower	0.6	0.5	0.2	0.1	0.1
	Wind power	0.7	0.5	0.2	0.1	0.1
	Natural gas	0.2	0.1	0.1	<0.1	<0.1
	Biomass	0.1	0.1	<0.1	<0.1	<0.1
	Coal power	0.1	<0.1	<0.1	<0.1	<0.1
Total potential impact:		1.6	1.2	0.4	0.3	0.2

Source: SEI analysis, scaled down from forecasts in the underlying research report (*Assessing the Impact of the Clean Development Mechanism*, Table 14). See endnote 1 for further information.

As part of this research, we developed two scenarios of potential outcomes of the CDM through 2020: a “pessimistic” scenario that reflects the more critical perspectives in the research literature, and an “optimistic” scenario more typical of the views of project developers. Under the pessimistic scenario, the CDM delivers as little as 0.38 tons of actual abatement per CER issued (on average, across all project types), due mostly to non-additionality in power sector projects. Under the optimistic scenario, the CDM delivers as much as 1.57 tons of actual abatement per CER, if all power sector projects are and remain truly additional and operate well beyond their crediting periods. These scenarios underscore both the importance and the uncertainty related to the additionality of large-scale power supply projects.

Large power projects, large uncertainties

Several reviews of CDM project documents have determined that the CDM, on average, has a small effect (e.g., ~3% for wind and hydropower) on the expected rate of return of power sector projects, often a much smaller effect than normal fluctuations in other factors such as fuel prices or electricity tariffs. As a result, it is exceedingly difficult to tell whether the incentive provided by the CDM caused the project to happen – in short, whether the CDM “signal” is strong enough to rise above the “noise” created by variations in other economic factors.

Furthermore, researchers assert that many power technologies should be considered common practice, as their implementation is now widespread (e.g., hydroelectricity, wind, and higher-efficiency coal technologies), and in many cases, they receive extensive government support in the form of feed-in-tariffs, other incentives, and mandates, designed to address local priorities such as energy security.

While no approach to additionality will get the “right answer” all of the time, it remains essential that for most CERs issued, it can be demonstrated with a high degree of confidence that the CDM is the deciding factor in project implementation.ⁱⁱ As shown above, for most types of large power sector projects, such confidence is lacking. While there may be many instances where the CDM has helped move a project forward, large-scale power investments are affected by numerous factors, and it is unlikely that the value of CERs has been, or will become in the near future, a key determinant of fuel or technology choice for most large CDM power supply projects.

These concerns suggest that use of CERs from large power projects could lead to a global *increase* in GHG emissions.

One option to address this problem is to seek further improvement to additionality assessment, such as the greater use of standardized methods. However, standardized additionality approaches face significant challenges that are unlikely to be overcome for large power sectors projects: high and/or increasing penetration rates for most of the technologies in the CDM pipeline, and low (and decreasing) signal-to-noise ratios that make it less likely that the intervention caused by the CDM (e.g. CER revenues) is a decisive factor.ⁱⁱⁱ Therefore, other solutions are needed.

Addressing the supply-demand gap

In its synthesis of various market assessments, the High Level Panel suggests that between 2013 and 2020, the supply of CERs could be about 2.5 billion CERs, and demand half that amount, leaving an excess of roughly 1.25 billion CERs. As emphasized by the High Level Panel, increasing the ambition of countries’ emission reduction pledges is essential and would help address the supply-demand gap.

Another remedy recommended by the CDM Policy Dialogue is to establish a fund (or use the Green Climate Fund) to buy and then cancel CERs. While this option could reduce the CER surplus, there are significant barriers: it would be costly and could divert climate finance from other mitigation or adaptation activities. Furthermore, its mitigation benefit would be uncertain, given the lack of confidence in the additionality of power sector CERs.

Transitioning away from large-scale power projects in the CDM is a straightforward and potentially more effective remedy. It would not require new finance or divert existing flows. And it would help steer investment to project types with more certain additionality, including some that could actually help achieve a net decrease in global emissions through application of a discount or other mechanism.^{iv}

How might such a policy be implemented?

The phase-out of large power sector projects could be implemented either by CDM administrators (EB/CMP) or through a coordinated effort among major buyer-country governments. To be most effective, it would likely require both. Given the high share of large-scale power projects in the CDM pipe-

line and in many project developers' portfolios, the transition would be challenging. Among the specific options:

- The EB and/or Meeting of Parties (CMP) could cease new registrations of large-scale power projects after a given date;
- The EB/CMP could cease to renew already registered large-scale power projects for second and/or third crediting periods; and/or
- Buying countries could disallow the use for compliance purposes of CERs from large-scale power projects beyond a given year's vintage (e.g. year 7 of a project's crediting lifetime) or beyond a certain date (e.g. after 2014).

All of these options could leave in play large-scale power supply CERs that are already issued and held by actors in the carbon market.

Based on our analysis of the CDM pipeline and market forecasts, Table 2 presents estimates of potentially affected CERs from large-scale power projects at various points in the CDM pipeline.

Given that the current CER price (~ 1 euro) is close to the transaction costs of CER issuance (including monitoring and verification), removing these credits from the market would have a limited new financial impact. Furthermore, most, if not all, large scale power projects should operate regardless of CER revenue, as they tend to have low operating costs relative to other resources.

Promising opportunities to address power sector emissions

Developing countries urgently need new energy infrastructure to support livelihoods and economic growth and support to invest in low-carbon technologies. However, as an offsetting mechanism, the CDM has important limitations. It requires a high confidence in project additionality in or-

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Policy recommendations

- The CMP and the CDM Executive Board should **consider steps to graduate large-scale power supply projects from the CDM**, such as ceasing registrations and crediting period renewals of these projects.
- Buying countries should **consider disallowing purchase of CERs from large-scale power supply projects** after a certain date and/or credit vintage.
- Countries should **support mechanisms other than project-based offsets to promote lower-carbon power**.

der to avoid increasing global emissions. Large-scale power supply projects lack this level of confidence and in the case of coal or natural gas projects may further contribute to the lock-in of fossil fuel infrastructure.

As a result, other international and domestic mechanisms would be more appropriate and effective in supporting investment in low-carbon power supply. Such mechanisms include supported nationally appropriate policies and measures (NAMAs), such as renewable energy standards, feed-in tariffs, efficiency programs and standards, as well as domestic emission trading systems and carbon taxes. Many developing countries are employing or considering such approaches; transitioning away from power sector CDM could help bring them forward.

The CDM Policy Dialogue's High Level Panel suggested that some CDM project types may be ready to "graduate" from the CDM.^v Our analysis indicates that large-scale power supply projects are ready to do so. Graduating large-scale power supply projects from the CDM would have multiple benefits: addressing the over-supply of CERs, supporting projects that are truly dependent on CERs, and enabling the CDM to make a more positive mitigation impact going forward, by focusing instead on projects where abatement can more readily exceed CER issuance.

- This policy brief estimates that 1.6 billion CERs will be issued in 2013-2020 from large-scale power supply projects. If these projects are not truly additional, use of the CERs would lead to a corresponding increase in GHG emissions. This estimate was scaled down from that in Table 18 of the underlying research report (*Assessing the Impact of the Clean Development Mechanism*) that up to 3.2 billion power sector CERs could be non-additional. Adjustments were made to exclude CERs issued through the end of 2012 (cut 0.3 Gt), include future project inflow (add 0.4 Gt), scale down to match the High Level Panel's estimated 2013-2020 supply of 2.5 Gt from all project types (cut 1.6 Gt), and exclude small-scale projects (cut 0.1 Gt).
- See Chapter 3 of the CDM Policy Dialogue's report on governance for a discussion on the importance of framing additionality "as a determination that the intervention created by the CDM (i.e. expectations for the CER price signal) is causing, with a sufficiently high degree of confidence, the implementation of proposed projects" (http://www.cdmpolicydialogue.org/research/1030_governance.pdf, p. 55).
- Furthermore, performance benchmarks are difficult for renewable power projects that have an emission factor of "zero". Market penetration rates for technologies such as hydropower or biomass generally depend on the availability of hydrological and biomass resources.
- For example, a very stringent baseline for projects that capture and destroy industrial N₂O emissions could result in far more emission reductions than CERs issued, while retaining economic incentives to continue destruction activities, assuming CER prices once again rise well above abatement plus transaction costs (1 EUR per tCO₂e).
- The High Level Panel specifically recommended transitioning away from HFC-23 and N₂O adipic acid projects based on their low marginal abatement costs.