



# WHY COAL PROJECTS IN THE CDM UNDERMINE CLIMATE GOALS

**POLICY BRIEF**

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## Policy Brief

The Clean Development Mechanism (CDM) was designed to bring clean and sustainable development to poor countries while enabling rich countries to achieve their emissions reductions cost efficiently.

The CDM now allows new coal plants to earn tradable emissions credits for claimed improvements in power plant efficiency. However, coal projects do not belong in the CDM, because they:

- Would have been built in the absence of the CDM, i.e. the projects that have come forward to date are uniformly 'non-additional' and will therefore generate carbon credits that do not represent real emission reductions
- Conflict with the CDM's sustainability objectives by inflicting toxic burdens on local populations and ecosystems
- Undermine climate mitigation goals by locking in billions of tons of CO<sub>2</sub> emissions over decades to come instead of investing in renewable energies and a low carbon development path.

In addition, these projects are awarded carbon credits based on flawed CDM rules that lead to significant over-crediting.

Unfortunately, dozens of new coal projects are lining up to register under the CDM simply to "add a new revenue stream"<sup>1</sup> to investments they are already planning to make. This policy brief outlines the impacts of coal use, explains why coal projects do not belong in the CDM and offers concrete policy solutions for the Parties of the Kyoto Protocol, the CDM Executive Board or the European Union.



Young coal worker in Shanxi, China. Courtesy of Andreas Habermann

## Coal Facts

1 kWh electricity from coal produces about 1kg of CO<sub>2</sub>.

Electricity from coal produces about twice as much CO<sub>2</sub> than electricity from natural gas.

Over 40% of world electricity is generated from coal.

Total coal combustion causes over **12 Giga tons of CO<sub>2</sub> emissions per year, two thirds of that comes from to electricity production.**

Coal accounts for about **25% of all global greenhouse gas emissions.**

(Source: IEA 2010)



Transporting coal. Courtesy of Peter Van den Bossche

## Coal projects in the CDM: the numbers

Despite substantial criticism and clear evidence that each of the first six coal projects submitted for approval are not additional, the CDM Executive Board has registered five<sup>2</sup> and rejected only one<sup>3</sup> (and that project is planning to apply again). The four Indian and one Chinese registered projects:<sup>4</sup>

- » Could generate **67 million Certified Emission Reductions (CERs)** worth over half a billion Euros over the first 10 years of their operation
- » Will emit almost **10 times the amount of CO<sub>2</sub> they claim to save, i.e. 661 million tonnes of CO<sub>2</sub> over the same time period.** To put this in context: this is more than all credits issued to CDM projects to date (670 million CERs).

- » **Another 36 coal projects** are working towards getting registered
- » Together the 44 projects currently in the CDM pipeline could **generate 440 million CERs by 2020**
- » **These coal plants are expected to emit well over 4 billion tonnes of CO<sub>2</sub> by 2020.**

Including these coal projects in the CDM is troubling. The long lifetime of power plants will lock-in billions of tonnes of CO<sub>2</sub> emissions for decades to come, compromising the ability to follow a low carbon development path. This is happening despite the fact that low or zero-carbon alternatives are readily available, including renewable power, energy efficiency and decreasing transmission losses.

But this is only the beginning.



## Why these coal projects are built regardless of CDM support

**The CDM aims to promote technology innovation and top performers. But is that really the case?**

The efficiency of recently built coal power plants ranges from 33% to 43%. There are three main coal boiler types: sub-critical units are least efficient (around 25-33%), super-critical units reach efficiencies of around 29-38% and ultra-super-critical units can reach 34-43%.<sup>5</sup> Coal projects that apply for the CDM claim that the CDM revenue will enable them to switch to a more efficient technology. Such projects seek credits for the incremental increase in efficiency they claim to achieve with the CDM subsidy.

Yet this supposed enabling of more efficient technology through the CDM is fictitious: We examined the additionality claims of 19 CDM coal projects and found none of them to be additional. We submitted detailed comments to the auditors of these projects and to the CDM Executive Board.<sup>6</sup> None of our claims have been responded to, let alone refuted. In each instance we found clear evidence that the projects violated CDM rules and were therefore ineligible, including:

- **Financing is already secured:** Projects had already secured several sources of financing and therefore do not depend on CDM support to proceed using high-efficiency technology.
- **Costs estimates are skewed:** Trying to prove the need for financial support, projects use unrealistically high estimates of project costs, and unreasonably low estimation of project costs for the subcritical alternative. Projects also consistently fail to provide the data and assumptions on which the financial analyses are based.
- **Government mandates are ignored:** Projects claimed that subcritical technology would be installed without CDM support, despite government or state directives to use supercritical technology or better and sharply rising coal prices that make the use of subcritical technology uneconomic.
- **Alternatives are never adequately assessed:** Projects failed to adequately assess other realistic and credible scenarios in order to make coal appear to be the only realistic option.

Utilizing more efficient technology is the mainstream approach for the coal industry going forward<sup>7</sup> as it provides a hedge against sky-rocketing coal prices.<sup>8</sup> International coal prices rose on average 13% annually from 2001-2008 with many coal dependent economies experiencing price increases that far exceeded the average (see graph).

When the costs of coal are considered, supercritical and even ultra super critical plants are now cost-competitive or cheaper than subcritical ones. For example, modern supercritical plants cost only 2% more to install than subcritical plants,<sup>9</sup> and the small incremental difference in capital costs can be offset by greatly reduced fuel costs over the life of the project. Moreover, supercritical technology offers considerable advantages

over subcritical including larger boilers due to improved plant efficiency and fuel tolerance; reduced coal consumption, ash production and pollutant emissions; and better operational performance.<sup>10</sup> To disguise these facts and to 'prove' their additionality, projects consistently underestimate subcritical project costs while failing to account for skyrocketing coal prices, which makes super critical and ultra super critical plants look artificially expensive.<sup>11</sup> In addition to prevailing market forces, in many cases governments are mandating a shift towards more efficient technologies.



**To summarize, in India and China where virtually all of the 44 coal projects in the CDM pipeline are located, government policies have mandated the use of super critical and even ultra super critical technology. Furthermore, our assessments clearly showed that just based on the technical additionality criteria of the CDM, none of the projects in the pipeline should be eligible for CDM support.**



China Power Plant. Courtesy of Bret Arnett

## High-efficiency coal technology business-as-usual

### India

Since the partial deregulation of the power sector in 2003, the private sector has invested in only 1 GW of subcritical coal generation in all of India.<sup>24</sup> By contrast, as of 2010, India had 37 supercritical units between 660 MW and 800 MW under construction, with a combined generating capacity of 26 GW.<sup>25</sup>

*“We will not build subcritical coal-fired power plants, and believe no one else should. We should move towards supercritical and, in due course, ultra-supercritical (USC) technology, to reduce the carbon intensity of generation.”<sup>26</sup> Managing Director of the National Thermal Power Corporation, India*

Caught between persistent coal shortages, rising prices and the need to address massive power supply deficits, the Government of India has placed a “very high priority [on]... developing or obtaining the technology for coal-based plants of high efficiency.”<sup>27</sup> For example, a mandate stipulates that all of the Ultra Mega Power Projects, a series of 14 projects with a minimum size of 3,960 MW, “shall be based on supercritical technology.”<sup>28</sup> These projects are expected to produce power at tariff rates well below those that are economically feasible from subcritical plants, due to their operational efficiency and economies of scale.

## Flaws in the current CDM rules lead to artificial credits

would have been built if there had been no additional CDM revenue. The lower the assumed efficiency of the hypothetical baseline plant is, the more credits a project can generate. If projects underestimate the efficiency of the hypothetical baseline plant, too many credits are issued. This over-crediting leads to the sale of artificial CERs that are not based on actual emissions reductions. The rules of how baseline emissions have to be calculated are defined in the CDM coal methodology (ACM0013).<sup>12</sup>

In June of this year, the CDM’s Methodology Panel presented evidence that the rules in the current methodology for CDM coal projects (ACM0013) lead to significant over-crediting and recommended that the CDM Executive Board suspend methodology ACM0013. The analysis by the Methodology Panel showed that current CDM crediting rules allow plant operators to use outdated information to determine baseline emissions that ignores the efficiency improvements that have occurred at new fossil fuel-fired power plants over time.<sup>13</sup> Furthermore, the current crediting method allows for the use of data that may be unreliable,<sup>14</sup> and presents signal-to-noise concerns, since the efficiency increase is very small compared to overall emissions of these plants.

### China

The Chinese government decreed that power plants must be built with the state of the art commercially available technology<sup>29</sup> which has resulted in the world’s most efficient coal fired power plants being built in China. This goal is reinforced by a number of government policies: such as a program to increase the efficiency of coal-fired industrial boilers.<sup>30</sup>

Moreover, companies can receive EUR 20-24 for every ton of coal equivalent saved.<sup>31</sup> The government now aims to control the growth of the coal industry and cap annual production capacity at 3.8 billion tons by 2015.<sup>32</sup> The cost of coal accounts for 60-80% of Chinese power producers’ costs. Taken in combination, these and other policies provide strong incentives to economise fuel consumption by investing in more efficient coal burning technology. According to the IEA, super and ultra super critical coal technology will be the norm for plants built in the coming years. About 95 super critical or ultra super critical units, each with a capacity of 600 MW or higher, had been put into operation by 2007 with another 70 to be finalised by 2010.<sup>33</sup>



Coal plant. Courtesy of davipt

### Indian Case Study

The 1,980 MW Krishnapatnam Ultra Mega Power Project (UMPP) in India – one of the world’s largest coal plants - exemplifies the lack of scrutiny and clear violations of additionality of the vast majority of coal projects in the CDM pipeline. This project is one of a series of new UMPPS that the government has mandated “shall be based on supercritical technology<sup>34</sup>.” The project also clearly does not depend on CDM as it has already secured all the necessary financing, and begun construction long before its application for CDM funding was approved. In fact, the project sponsor’s communications with its shareholders confirm that the project “will employ supercritical technology,” regardless of whether it receives CDM support, and that it considers CDM profits to be “a new revenue stream for the Company”<sup>35</sup>.

On top of the clear additionality violations, the project has been at the center of recent violent struggles in Andhra Pradesh where local villagers have adamantly opposed the numerous impacts on local environments and communities. This represents a clear violation of the CDM’s mandate to support sustainable development.

**Despite these significant issues the project was registered in June 2011.**

Unfortunately, these baseline flaws further compound the problem that these projects are non-additional. If a project is non-additional in the first place, then none of the credits it earns are representing real emission reductions. The problem is made worse if the project can claim credits based on a flawed methodology that inflates the baseline emissions, allowing it to earn more credits than if the baseline was calculated correctly.

A suspension of the methodology would have stopped any further projects from being registered, although it would not have impacted the five projects already registered under the controversial methodology.

**Despite clear evidence from the Methodology Panel the CDM Executive Board did not suspend the methodology and coal projects continue to apply for registration.**

Not putting the methodology on hold despite the concerns raised by the Methodology Panel has given project developers an incentive to speed up their validations and registration requests in case the methodology is revised and made more stringent.<sup>15</sup>

Since the last meeting, two controversial coal projects have submitted a registration request: Nabha Power Limited in India forecasts earning 1 million credits annually and Guangdong Pinghai project in China, backed by the UK government, expects to generate more than 600,000 CERs annually.

### Wikileaks confirms Indian projects are non-additional

In September 2011, Wikileaks released a cable sent by the American Consulate in Mumbai to the US Secretary of State in July 2008. The cable summarised a meeting with Indian industrialists regarding their views and experience with the CDM and candidly states that Indian CDM projects do not depend on CDM funding and are not additional. It explicitly mentions coal projects:

*Mathsy Kutty [of Det Norske Veritas (DNV), a CDM validator], is concerned that [Ultra Mega Power Plant] (UMPP) Project will be rejected by the CDM Executive Board, as the use of supercritical technology in all UMPPs is a mandatory requirement stipulated by the Indian government. As this technology is the norm for all UMPPs, it has to be put in place by the project developer with or without the CDM benefit. Proving additionality is therefore difficult, she continued. (Comment: Ironically, DNV acted as the validator for the Mundra UMPP and, as per Patkar, has already validated the project. End Comment.)*

The comment at the end highlights a fundamental problem of the CDM: Given that the project developer pays the validator to recommend the project to the CDM Executive Board, it is no surprise that validations are often positive, even when the projects are clearly not additional.

What the excerpts further highlights is that Indian coal projects use CDM revenues to reduce their tariffs to under-bid competitors. The CDM may help these companies win government construction bids yet no additional emissions reductions will be achieved since the government already stipulated the use of supercritical technology.



Coal workers in Shizuishan, China. Courtesy of Bert van Dijk



# Coal's true ecological and human health costs

**CDM projects are supposed to deliver clean and sustainable development to CDM-host countries. Yet coal inflicts a heavy toxic burden on local populations and ecosystems.**

Coal's overall human and ecological toll is staggering. In China, more than 31,000 coal miners died from accidents from 2000 – 2006. In addition, the total cost of coal use

on Chinese society has been estimated at more than 7% of GDP (1.7 trillion yuan per year) when the costs of air and water pollution, ecosystem degradation, damage to infrastructure, human injuries and loss of life are included.<sup>16</sup> Similarly, a recent study of coal impacts in the US estimated that if the environmental and health damages were fully accounted for, the price of electricity from coal would double or triple.<sup>17</sup>

Therefore, coal projects hardly represent a 'clean technology' and have no place in a mechanism that aims to protect the climate and help the poor develop in a safe and sustainable way.

## Coal and climate change

**New coal power plants undermine climate mitigation goals by locking in millions of tons of CO<sub>2</sub> emissions over decades to come.**



Getting coal out of the waste for home use. Courtesy of Peter Van den Bossche

Coal power plants generate about 40% of all electricity worldwide and are responsible for over 8 Giga tons of CO<sub>2</sub> emissions.<sup>18</sup> Without additional measures and with electricity demand worldwide projected to double: by 2030 emissions from coal would then grow to over 18 Giga tonnes of CO<sub>2</sub>.<sup>19</sup>

Yet if we want to prevent severe, potentially catastrophic effects from climate change we need to quickly and dramatically reduce greenhouse gas emissions. We can only achieve such drastic emissions reductions, by rapidly phasing out the use of coal. Jim Hansen, one of the world's most renowned climate scientists

put it this way:

*"If humanity wishes to preserve a planet similar to that on which civilization developed and to which life on Earth is adapted, [...] CO<sub>2</sub> [in the atmosphere] will need to be reduced from its current 385 ppm to at most 350 ppm. [This] target may be achievable by phasing out coal use except where CO<sub>2</sub> is captured and adopting agricultural and forestry practices that sequester carbon. If the present overshoot of this target CO<sub>2</sub> is not brief, there is a possibility of seeding irreversible catastrophic effects...Present policies, with continued construction of coal-fired power plants without CO<sub>2</sub> capture, suggest that decision-makers do not appreciate the gravity of the situation."<sup>20</sup>*

Annual emission from the 44 coal plants currently in the CDM pipeline are likely to exceed the current annual CO<sub>2</sub> emissions of Australia (399 mio t), France (376 mio t) or Brazil (390 mio t). Instead of contributing to a low-carbon pathway, the CDM coal projects indeed represent largely "unconstrained coal use"<sup>21</sup> with no efforts toward carbon capture and storage.<sup>22</sup>

1 Reliance Power, Annual Report 2009-2010, p. 24, Reliance Power, Annual Report 2008-2009, p. 38  
2 Registered projects: 1,320 MW Tirora project (3225); 3,960 MW UMPP Sasan (3690); 2,000 MW Shanghai Waigaoqiao (3288); 1,320 MW Adani Mundra (2716); 3,960 MW UMPP Krishnapatnam (4533);  
3 3,960 MW Ultra Mega Power Project Tata Mundra  
4 All calculations based on information given in Project Design Documents (PDDs) available at UNFCCC website. Assumed CER price EUR 8.  
5 Values taken from: MIT, 2007, The Future of Coal. It is important to note that CO<sub>2</sub> emissions from a given coal-fired plant do not only depend on the efficiency of the boiler. CO<sub>2</sub> emissions can vary widely and depend on coal quality, heating value, site conditions, plant design, etc. Coal quality is particularly important to consider as low quality coals – a particular problem for Indian plants – generate power much less efficiently regardless of boiler technology. Taken together, site-specific factors can cause a given unit to operate far below average levels, and can even eliminate the operational efficiency advantages of supercritical over subcritical technologies.  
6 Links to all our submissions with detailed comments and analysis on individual coal projects  
7 Qingshan Zhu, 2005. Clean coal technology – Gasification vs. (pulverized coal) combustion, p. 4.  
8 World Bank, 2008. Clean Coal Power Technology Review: Worldwide Experience and Implications for India, p. 2.  
9 See, e.g., David Victor, "He protests too much, India is already going green," Newsweek, Aug. 17, 2009  
10 Boben Anto, M.M. Hasan, undated. Analysis of Supercritical technology in Indian Environment and Utilizing Indian coal, p. 113.  
11 India Business Insight, Aug. 29, 2007.  
12 Center for Science and Environment, 2010. The Challenge of the New Balance MIT, 2007. The Future of Coal  
13 Links to all our submissions with detailed comments and analysis on individual coal projects  
14 Methodology ACM0003  
15 Methodology Panel Note on ACM0013  
16 In India for example, power plants are known to over report the use of fuel to preserve their government subsidy.  
17 Note that project developers are already in a rush to get their projects registered before the end of 2012 because projects registered after 2012 have to be located in Least Developed Countries in order to sell their credits into the EU-ETS, by far the largest buyer of CERs.  
18 Mao Yushi, Sheng Hong, Yang Fuqiang. 2008. The true cost of coal.  
19 Paul R. Epstein, Jonathan J. Buonocore, Kevin Eckler, Michael Hendryx, Benjamin M. Stout III, Richard Heinberg, Richard W. Clapp, Beverly May, Nancy L. Reinhart, Melissa M. Ahern, Samir K. Doshi, and Leslie Glustrom (2011). Full cost accounting for the life cycle of coal in "Ecological Economics Reviews." Robert Costanza, Karin Limburg & Ida Kubiszewski, Eds. Ann. NY Acad. Sci. 1239: 73–98.  
20 International Energy Agency, 2010. Key World Energy Statistics  
21 International Energy Agency, 2010. CO<sub>2</sub> Emissions From Fuel Combustion. Highlights.  
22 Hansen, J., Mki. Sato, P. Kharecha, D. Beerling, R. Berner, V. Masson-Delmotte, M. Pagani, M. Raymo, D.L. Royer, and J.C. Zachos (2008). "Target Atmospheric CO<sub>2</sub>: Where Should Humanity Aim?" Open Atmos. Sci. J. 2 (1): 217–231.  
23 Ibid.  
24 Carbon capture and storage (CCS) has been proposed for coal plants. Yet the "energy penalty" from CCS, whereby 25–40% more coal would be needed to produce the same amount of energy, would increase the amount of coal combusted to produce the same amount of electricity. CCS would nearly double the costs of electricity generation from coal plants using current combustion technology. (House, K.Z., C.F. Harvey, M.J. Aziz and D.P. Schrag (2009). The energy penalty of post-combustion CO<sub>2</sub> capture & storage and its implications for retrofitting the U.S. installed base. Energy & Environmental Science 2: 193.)  
25 Estimated emissions reductions based on PDDs = 238 million, CER price = Eur 8, Estimated CER revenue: Eur 3.5 billion  
26 Det Norske Veritas, 2010. Response to request for review "GHG Emission Reductions through grid connected high efficiency power generation", at 12-13.  
27 International Energy Agency, 2011. Technology Development Prospects for the Indian Power Sector, p.46.  
28 "Large utilities to get priority on coal supplies," Livemint.com, Dec. 23, 2009, (quote from a CLP managing director).  
29 Government of India Planning Commission, 2006. Integrated Energy Policy. Report of the Expert Committee.  
30 Central Electricity Regulatory Commission, Petition 128/2010, paragraph 22, 25.  
31 Planning Commission, 2011. Interim Report of the Expert Group on Low Carbon Strategies for Inclusive Growth p.37  
32 International Energy Agency, 2011. Technology Development Prospects for the Indian Power Sector, p.47  
33 Central Electricity Authority, Letter of 2 February 2010  
34 Ibid.  
35 WRI Policy Brief, 2009. China, the United States, and the Climate Change Challenge  
36 Lawrence Berkeley National Laboratory, 2010. Assessment of China's Energy-Saving and Emission-Reduction Accomplishments and Opportunities During the 11th Five Year Plan.  
37 China's Ten Key Energy Efficiency Projects  
38 The Climate Group, 2011. Delivering Low Carbon Growth. A guide to China's 12th Five Year Plan  
39 International Energy Agency/OECD, 2009. Cleaner Coal in China.  
40 http://www.cercind.gov.in/2010/ORDER/July/signed\_order\_in\_Pet\_No\_128-2010.pdf  
41 Reliance Power, Annual Report 2009-2010, at 24, Reliance Power, Annual Report 2008-2009, at 18.

## Recommendations

To summarise, coal is the world's most carbon intensive fossil fuel and its negative environmental and human health impacts are well-documented. Ongoing CDM support for coal could lavish billions of Euros<sup>23</sup> on an already grossly profitable fossil fuel industry at a time when the world desperately needs to dedicate scarce climate finance towards new renewable energy. Clearly, policy action is needed to stop coal projects from further undermining the integrity of the CDM. Policy action can be taken on three levels: by the CDM Executive Board, the Parties of the Kyoto Protocol, and the European Union. Below a summary of actions that should be taken:

### What the CDM Executive Board should do:

- **Suspend the coal methodology.** New projects should not be considered for registration until the baseline flaws are addressed.
- **Reject non-additional coal projects.** The CDM Executive Board has a mandate to ensure that only real emissions reductions are eligible for CDM credits. It must therefore exercise closer scrutiny over the projects that seek registration, and reject all projects that would proceed without CDM support.
- **Recommend to the CMP that coal be excluded from the CDM.** Despite the fact that coal projects clearly undermine climate protection goals the CDM Executive

Board does not have the explicit mandate to exclude a technology on the grounds that it is non-sustainable. Such decisions have to be made by the Parties of the Kyoto Protocol (CMP). Yet the CDM Executive Board can issue a recommendation to the CMP to exclude coal from the CDM.

### What the CMP should do:

- **Exclude coal as a project type from the CDM.** As the CMP had done for nuclear projects (which are excluded from the CDM), the CMP should exclude coal from the CDM, because of its severely negative impacts on the climate, ecosystems and human health.

### What the EU should do:

- **Ban the use of CERs from coal projects in the EU.** Last year, the EU banned HFC-23 and adipic acid projects from selling their credits to the EU-ETS. The EU must now do the same for coal projects and ban the use of CERs from coal projects from the EU-ETS and for compliance use in the European sectors currently not included in the EU-ETS.



Coal digger in China. Courtesy of Velaia



**For more info contact:**

Anja Kollmuss  
anja.kollmuss@cdm-watch.org  
www.cdm-watch.org

Steve Herz  
Steve.herz@sierraclub.org  
www.sierraclub.org

