Comments on the validation of Project 'Replacement of electricity generated by existing 4 subcritical units of 120 MW of Koradi TPS by 1 unit of 660 MW based on supercritical technology, India'

JUNE 8, 2011

CDM Watch and the Sierra Club respectfully submit the following comments on the *Project Design Document (PDD) for "Replacement of electricity generated by existing 4 subcritical units of 120 MW of Koradi TPS by 1 unit of 660 MW based on supercritical technology, India*." We thank the CDM Executive Board and Designated Operating Entity (DOE), Bureau Veritas Certification Holding SAS, for recognizing the integral role of transparency in the CDM validation process, and for taking this comment into consideration.

If approved, this Project would lead to the issuance of 2,151,840 excess Certified Emissions Reductions (CERs) that do not represent additional emissions reductions, and would give the project participant an undeserved windfall on the order of € 25 million (based on current CER prices). The project activity, as presented in the PDD, is not eligible for validation under ACM0013 ver.4, the *Additionality Tool*, and other CDM tools and guidelines, for the reasons outlined below.

I. **The PDD fails to establish sub-critical coal technology as the proper baseline under *ACM00013*.** Supercritical technology has become the technology of choice for new large-scale coal fired power plants in India, and therefore is a more appropriate baseline than subcritical coal technology. India is already rapidly deploying supercritical technology, and it will continue to gain market share without CDM support due to operational advantages, market forces and government policies. Moreover, the PDD fails to adequately assess other "realistic and credible" alternative baseline scenarios, such as energy efficiency and demand side management, the reduction of transmission and distribution losses, solar thermal, strengthened grid connections, and biomass.

II. **The PDD'S investment analysis is fundamentally flawed, and fails to support the conclusion that subcritical technology is the most economically attractive alternative under *ACM00013* and the *Additionality Tool*.** The investment analysis does not address the full range of the issues necessary to determine whether the project activity would be financially viable without the incentive of the CDM. It also fails to provide the data and assumptions necessary for a reader to reproduce the results. The sensitivity analysis is also inadequate, and does not clearly show that the project activity is unlikely to be the most financially attractive alternative.

III. **The PDD fails to establish that the project will generate additional emissions reductions as a result of CDM support as required by the *Additionality Tool*.** The Project is not additional because financing for the project is already in place, construction is well under way, and the PDD provides no evidence that the potential availability of CDM credits has influenced the design of the project or the decision to proceed. As a result, the project participant cannot show that support from the CDM was a necessary element of the decision to invest in the project activity. Moreover, no realistic and credible barriers exist that would prevent the implementation of the Project if it was not registered as a CDM activity. Finally, The PDD does not adequately demonstrate that the use of supercritical technology will lead to additional CO_2 reductions, even assuming that subcritical coal is the appropriate baseline.

The PDD is materially deficient in so many critical respects that the DOE must issue a negative validation. However, should the DOE afford the project proponent the opportunity to provide clarifications or corrective action, we respectfully request that stakeholders be given the opportunity to comment on any further submissions.[1] Otherwise, the project proponent would benefit from filing an inadequate PDD by avoiding public scrutiny of key elements of its proposal.

[1] *CDM Validation and Verification Manual, Ver. 1.2, EB 55 report, Annex 1*, at 9, para. 42.

COMMENTS

I. THE PDD FAILS TO ESTABLISH SUB-CRITICAL COAL TECHNOLOGY AS THE PROPER BASELINE UNDER *ACM00013*.

1. Supercritical technology has become the technology of choice for new large-scale coal fired power plants in India, and therefore is a more appropriate baseline than subcritical coal technology.

Applicable rules

In order to identify alternative baseline scenarios under *ACM00013*, the PDD must analyze "all possible realistic and credible alternatives" including "the proposed project activity without CDM benefits."[2] As part of this analysis, the PDD must "[e]nsure that all relevant power plant technologies that have recently been constructed or are under construction or are being planned (e.g. documented in official power expansion plans) are included as plausible alternatives."[3] If the PDD proposes a baseline scenario that is different from the power plant technologies that have recently been constructed or are under construction or are being planned, it must justify this apparent discrepancy.[4]

Discussion of non-compliance

The Baseline Assessment in the PDD does not adequately assess whether the use of supercritical coal technology without CDM benefits is a "realistic and credible alternative." As a threshold matter, while the PDD implies that supercritical combustion is risky and unproven, it is actually quite mature and well-established. Supercritical processes have been in commercial use since the 1960s and have achieved broad and deep global penetration. There are now over 500 supercritical units in operation worldwide,[5] representing more than 20 percent of units installed worldwide.[6]

More importantly, the Baseline Assessment fails to consider the extent to which supercritical plants have "recently been constructed or are under construction or are being planned" in India. A proper review of the deployment of supercritical technology in India would have shown that (1) India is already rapidly adopting supercritical technology, with about 40 supercritical projects that are operational or in various stages of development; and (2) supercritical technology will continue to rapidly gain market share without CDM support

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[2] *ACM00013, Ver. 4.0*, at 3.
[3] *Id.*
[4] *Id.,* at 4.
[5] Qingshan Zhu, 2005. *Clean coal technology– Gasification vs. (pulverized coal) combustion*, at 4. *available at http://www.interacademycouncil.net/Object.File/Draft/10/338/0.pdf*
[6] World Bank, 2008. *Clean Coal Power Technology Review: Worldwide Experience and Implications for India*, at 2. *available at* http://moef.nic.in/downloads/public-information/LCGIndiaCCTjune2008.pdf

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due to operational advantages, economic and sectoral drivers and government policies. However, the Baseline Assessment makes no effort to discuss these trends, or to explain the discrepancy between the proposed subcritical baseline and the stream of supercritical projects under development as required under *ACM00013*.[7]

India is already rapidly deploying supercritical technology. As of 2010, India had 37 supercritical units between 660 MW and 800 MW under construction, with a combined generating capacity of 26 GW.[8] (see Appendix I). At least two units have come on line in the last 6 months, and at least 8 more with a capacity of 5280 MW are slated to begin operations in the next year.[9] The Government of India has also mandated supercritical technology for the "ultra-mega power projects" (UMPP), a series of 14 projects that each have a minimum capacity of 4 GW. So far, four of the planned UMPPs are in various stages of development.[10] Going forward, about 60 percent of the 75 GW of thermal power contemplated in the 12th Five-Year Plan is expected to be supercritical,[11] as well as 100 percent of new coal-fired plants in the 13th Five-Year Plan.[12] Supercritical units are likely to contribute up to 50 GW by 2020.[13]

Other power plant operators in India such as the National Thermal Power Corporation (NTPC) and CPL are rapidly embracing supercritical technology in India. CPL entirely renounced subcritical technology in 2009. At that time, its Managing Director stated that "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."[14]

[7] PDD, at 17.

[8] International Energy Agency, 2011: *Technology Development Prospects for the Indian Power Sector*, at 46. *available at* http://www.iea.org/papers/2011/technology_development_india.pdf

[9] "Media Release: Adani Power Synchronizes Country's First supercritical 660 MW unit at Mundra", December 23, 2010, *available at* http://www.adanipower.com/Data/APLMediaReleasefirst660Unit.pdf; "Barh 1 and II, 3,300MW Coal-Powered Plant Barh, India," http://www.power-technology.com/projects/barh-coal/ ; "NTPC's first supercritical tech unit commissioned," *iGovernment*, February 24, 2011, *available at* http://www.igovernment.in/site/ntpc%E2%80%98s-first-supercritical-tech-unit-commissioned-39347

[10] International Energy Agency, 2011: *Technology Development Prospects for the Indian Power Sector*, at 47. *available at* http://www.iea.org/papers/2011/technology_development_india.pdf

[11] Planning Commission, 2011. *Interim Report of the Expert Group on Low Carbon Strategies for Inclusive Growth at 37..available at* http://moef.nic.in/downloads/public-information/Interim%20Report%20of%20the%20Expert%20Group.pdf

[12] International Energy Agency, 2011: *Technology Development Prospects for the Indian Power Sector*, at 47. *available at* http://www.iea.org/papers/2011/technology_development_india.pdf; Central Electricity Authority, *Letter of 2 February 2010*, *available at* http://www.cea.nic.in/more_upload/advisory_mop_sourcing_domestic_mfrs.pdf

[13] *Id.*

[14] "Large utilities to get priority on coal supplies," *Livemint.com*, Dec. 23, 2009, *available at* http://www.livemint.com/2009/12/23234919/Large-utilities-to-get-priorit.html (quote from a CLP managing director).

NTPC's experience may be even more illuminating. NTPC is the largest state-owned power generating company in India. It operates nearly 27 GW of coal-fired capacity[15]—almost 29 percent of India's total.[16] As early as 2008, it had already adopted supercritical technology for units over 500MW, and was moving towards even higher steam parameters (ultra-supercritical) for upcoming projects.[17] At that time, NTPC already had six 660MW units of supercritical technology in advanced stages of construction, and orders placed for two more.[18] It also had seven other 660MW units and sixteen 800MW units "upcoming."[19]

Supercritical technology will continue to rapidly gain market share without CDM support due to operational advantages, market forces and government policies. Supercritical technology offers considerable advantages over subcritical. According to NTPC's Chief Design Engineer, NTPC switched to supercritical technology for its large boilers due to improved plant efficiency and fuel tolerance; reduced coal consumption, ash production and pollutant emissions; and better operational performance than subcritical technology.[20] At the same time, NTPC concluded that the downsides were minimal or non-existent. Supercritical boilers were a "mature and established" technology that used materials that were "proven and already in use" and equally as available as sub-critical.[21] Moreover, it also concluded that project implementation and operations and maintenance of supercritical technology were "essentially [the] same as sub-critical."[22]

In addition to the operational benefits of supercritical boilers identified by NTPC, other non-CDM related factors are driving this technological shift. Rising coal prices and severe domestic shortages have provided a strong impetus for operators to install more

[15] http://www.ntpc.co.in/index.php?option=com_content&view=article&id=96&Itemid=175&lang=en
[16] *Ministry of Power, Government of India. available at* http://www.powermin.nic.in/
[17] *Supercritical Technology in NTPC India-A Brief Overview*, presentation by Pankaj Gupta, Chief Design Engineer, NTPC to APEC Energy Working Group's Cleaner Coal Workshop, Ha Long City, Vietnam August 19-21, 2008, at 16, 24. *available at* http://www.egcfe.ewg.apec.org/publications/proceedings/CleanerCoal/HaLong_2008/Day%202%20Session%203A%20%20Pankaj%20Gupta%20Supercritical%20Technology%20in%20.pdf
[18] Sipat-I (3x660MW) and Barh-I (3x660MW) were in advanced stages of construction, while orders had been placed for Barh-II (2x660MW). *Supercritical Technology in NTPC India-A Brief Overview*, presentation by Pankaj Gupta, Chief Design Engineer, NTPC to APEC Energy Working Group's Cleaner Coal Workshop, Ha Long City, Vietnam August 19-21, 2008, at 16, 24. *available at* http://www.egcfe.ewg.apec.org/publications/proceedings/CleanerCoal/HaLong_2008/Day%202%20Session%203A%20%20Pankaj%20Gupta%20Supercritical%20Technology%20in%20.pdf
[19] North Karanpura (3x660MW), Tanda-II (2x660MW), Meja (2x660MW), Darlipali,(4x800MW), Lara (5x800MW), Cheyyur (3x800MW), Marakanam (4x800MW). *Supercritical Technology in NTPC India-A Brief Overview*, presentation by Pankaj Gupta, Chief Design Engineer, NTPC to APEC Energy Working Group's Cleaner Coal Workshop, Ha Long City, Vietnam August 19-21, 2008, at 16. *available at* http://www.egcfe.ewg.apec.org/publications/proceedings/CleanerCoal/HaLong_2008/Day%202%20Session%203A%20%20Pankaj%20Gupta%20Supercritical%20Technology%20in%20.pdf
[20] *Id.*, at 10.
[21] *Id.*, at 13.
[22] *Id.*

efficient generating technology.[23] Over the last five years, persistent shortages of coal have inhibited the ability of generators to produce and sell electricity to the grid,[24] and have forced both plant operators[25], and the country's main coal producer[26]-- Coal India -- to look abroad for supplies. In fact, Indian coal imports grew by 36 percent between 2007 and 2009, reaching 16.5 percent of total consumption in 2009.[27]

This imported coal is considerably more expensive than domestic coal, since state-run Coal India subsidizes domestic consumers by discounting its output by as much as 50 percent below global prices.[28] As of 2008, coal prices were 633 percent higher in Germany and 490 percent higher in Chinese Taipei than in India (see charts below). This situation is unsustainable, and Coal India has expressed its intent to more closely align its prices with world markets.[29] Coal India raised prices by 12 percent in February, 2011. While it excluded the power sector,[30] future price hikes are expected to cover all sectors.[31]

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[23] *See, e.g.*, David Victor, "He protests too much; India is already going green," *Newsweek*, Aug. 17, 2009 ("Shortages in coal, which supplies about three quarters of India's electricity, are forcing India to accelerate this trend to higher efficiency.") (LexisNexis Academic)

[24] *See, e.g.*, "Thermal plants' coal shortage worsening, *Business Line*," Apr. 4, 2005, *available at* http://www.thehindubusinessline.com/2005/04/04/stories/2005040401750500.htm ; "Thermal plants face acute coal shortage (coal stock at 8,689 million tonnes against normal replacement of 22 million tonnes)," *India Business Insight*, Apr. 2, 2008 (LexisNexis Academic); "Coal situation worsens at thermal stations (several stations super critical with stocks for less than 4 days)," *India Business Insight*, May 9, 2008, *available at* http://www.thehindubusinessline.com/2008/05/09/stories/2008050952240100.htm ; "Corporate power crisis looms large as key thermal stations starve for coal," *Business Line*, Aug. 9, 2008, *available at* http://www.thehindubusinessline.com/2008/08/09/stories/2008080950460300.htm ; "Inadequate coal linkages hit power stations," *The Press Trust of India*, Jan. 26, 2009*, available at* http://www.highbeam.com/doc/1G1-192610842.html ; "Govt revises coal import target upwards to 35 MT in FY'10," *The Press Trust of India*, Mar. 20, 2009 (LexisNexis Academic); "Thermal stations continue to battle coal shortages," *Business Line*, Apr. 16, 2009, *available at* http://www.thehindubusinessline.com/2009/04/16/stories/2009041651511500.htm; "Shortage of coal, gas to hit power sector," *Financial Express*, Nov. 2, 2009 (LexisNexis Academic); "Indian market ready for plants, but needs steady supply of coal," *Platts Coal Outlook*, Nov. 16, 2009 (LexisNexis Academic); "India's NTPC shuts two coal plants on coal shortages," *Platts International Coal Report*, Nov. 23, 2009 (LexisNexis Academic).

[25] "Adani to invest $1.6 billion in Indonesian project," *Reuters, available at* http://in.reuters.com/article/2010/08/25/idINIndia-51045420100825

[26] "CIL readies war chest for acquiring overseas mines," *The Asian Age*, *available at* http://www.asianage.com/business/cil-readies-war-chest-acquiring-overseas-mines-082

[27] IEA Coal Statistics, 2010.

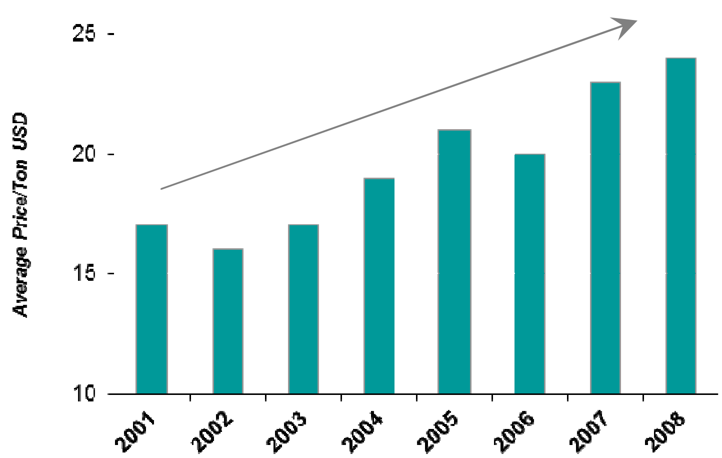
[28] "CIL to hike coal prices by 15 pc from tonight," *Times of India*, February 26, 2011, *available at* http://articles.timesofindia.indiatimes.com/2011-02-26/india-business/28636394_1_coking-coal-coal-production-cil

[29] *Id.*

[30] http://articles.economictimes.indiatimes.com/2011-03-16/news/28697785_1_price-hike-salary-hike-cil

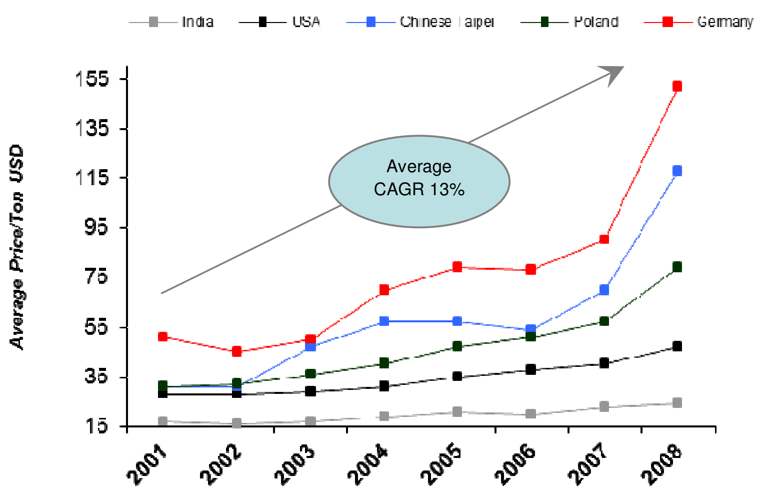
[31] *Id.*

Indian Steam Coal Prices 2001-2008



Source: EIA http://www.eia.gov/emeu/international/stmforelec.html

Selected Steam Coal Prices 2001-2008



Source: EIA http://www.eia.gov/emeu/international/stmforelec.html

UBS has warned global investors that Asian coal markets, including India, are increasingly subject to greater price volatility due to surging demand and a high correlation with oil prices.[32] Rising and volatile coal prices will squeeze plant operator profit margins. The cost of fuel inputs can account for 40-60% of the total cost of generation.[33] Variable costs in Maharashtra, for example, are as high as 2.2 cents/kwh, or 45 percent of what the Koradi plant is allowed to charge.[34]

When the costs of coal are considered, supercritical boilers are now cost-competitive or cheaper than subcritical. Modern supercritical plants cost only 2 percent more to install than subcritical plants. [35] The small incremental difference in capital costs can be offset by greatly reduced variable fuel costs over the life of the project.[36] Thus, in its 2006 *Integrated Energy Policy*, the Planning Commission concluded that "[i]t should be possible to get gross efficiency of 38-40% *at an economically attractive cost* for all new coal-based plants."[37] (emphasis added). Other studies have similarly found that supercritical technologies entail no

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[32] UBS, 2011. *Global Utilities Outlook 2011*, at 10.

[33] Chikkatur and Sagar, 2007. *Cleaner Power in India: Towards a Clean-Coal-Technology Roadmap*, at 50.

[34] http://www.prayaspune.org/peg/publications/item/140-transition-from-mou-to-competitive-bidding-good-tech-off-but-turbulence-ahead-review-of-thermal-capacity-addition-through-competitive-bidding-in-india.html

[35] Boben Anto, M.M. Hasan, undated. *Analysis of Supercritical technology in Indian Environment and Utilizing Indian coal*, at 113.

[36] *Id.*; "Fire without smoke making the switch (supercritical technology considerably lowers the costs of coal based power generation)", *India Business Insight*, Aug. 29, 2007.

[37] Planning Commission, 2006. *Integrated Energy Policy: Report of the Expert Committee*, at 49.

additional costs over subcritical,[38] and that supercritical units can actually deliver a lower cost of energy over their operating lifetime.[39] Indeed, the planned "Ultra-Mega Power Plants" (UMPPs) 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.[40]

Caught between persistent coal shortages, rising prices, and the need to address massive power supply deficits, the Government of India ("Government") has placed a "very high priority [on]… developing or obtaining the technology for coal-based plants of high efficiency."[41] Towards this end, it is adopting policies to encourage power generators to move to supercritical or even ultra-supercritical technology. The Government has mandated that all of the "Ultra-Mega Power Plants" use supercritical technology.[42] It has adopted a "mega power project policy" that waives import duties on equipment purchases and provides income tax incentives for new coal-fired power plants of 1000 MW and larger, It is also considering whether to explicitly restrict "mega power project" benefits to supercritical plants.[43] In 2009, the Power Ministry and the Coal Ministry decided to use only supercritical technology for new capacity additions wherever possible.[44] Finally, the Government is considering new policies that would give supercritical generators priority access to scarce coal supplies,[45] and may even ban subcritical plants altogether.[46]

Conclusion

To address both market and policy risks, generators now have a strong, non-CDM-related incentive to install supercritical, if not ultra-supercritical, technology. Given these trends, and the robust stream of supercritical units already in operation or in the project pipeline, it is clear that supercritical technology is the coal technology of choice in India going forward. MAHAGENCO essentially seeks to be compensated for being a late adopter of a technology that other market participants have concluded mature and widely available technology.

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[38] Center for Science and Environment, 2010. *The Challenge of the New Balance*, at 35.
[39] MIT, 2007. *The Future of Coal*, at 19.
[40] *See, e.g.*, "Rs 1.19 per unit tariff feasible: Shahi," *The Press Trust of India*, Dec. 19, 2006 ("Government today said the Rs 1.19 per unit tariff proposed by Lanco Infratech for the 4,000 MW Sasan Ultra mega power project is feasible . . . "Super critical system gives you an advantage of fuel input and cost of power which has helped lowering the tariff," he said.") (LexisNexis Academic).
[41] http://planningcommission.nic.in/reports/genrep/rep_intengy.pdf
[42] International Energy Agency, 2011. *Technology Development Prospects for the Indian Power Sector*, at 47. *available at* http://www.iea.org/papers/2011/technology_development_india.pdf
[43] "India: Power firms likely to be told to tread green path," *Daily the Pak Banker*, Jan. 4, 2010 (LexisNexis Academic).
[44] International Coal Report, March 23, 2009, *Platts*, at 10. *available at* http://china.platts.com/IM.Platts.Content/ProductsServices/Products/intlcoalreport.pdf
[45] "Large utilities to get priority on coal supplies," *Livemint.com*, Dec. 23, 2009, *available at* http://www.livemint.com/2009/12/23234919/Large-utilities-to-get-priorit.html (quote from a CLP managing director).
[46] "Sub-660 MW plants face denial," *Financial Express*, Jan. 5, 2010.

2. The PDD fails to adequately assess other "realistic and credible" alternative baseline scenarios.

Applicable rules

In addition to assessing the project activity without CDM benefits, the PDD must also analyze all other "possible realistic and credible alternatives that provide outputs or services comparable with the proposed CDM project activity."[47] *ACM00013* makes clear that (1) "[t]hese alternatives need not consist solely of power plants of the same capacity, load factor and operational characteristics"; [48] (2) the alternatives "may not be available to project participants, but could be available to other stakeholders within the grid boundary…."; and (3) "realistic combinations of [facilities, technologies, outputs or services] should be considered as possible alternative scenarios to the proposed project activity."[49] The decision to exclude scenarios must be supported by "appropriate explanations and documentation."[50]

The PDD must include "all relevant power plant technologies that have recently been constructed or are under construction or are being planned (e.g. documented in official power expansion plans)" as plausible alternatives, and should include a "clear description of each baseline scenario alternative, including information on the technology, such as the efficiency and technical lifetime."[51] If the type of power plant identified as the baseline scenario differs from those that have recently been constructed or are under construction or are being planned, the project participants shall explain this discrepancy.[52]

Discussion of non-compliance

The PDD fails to adequately consider all realistic and credible alternatives to the proposed baseline, or to fully assess all options that are currently being implemented. It also entirely fails to explore ways in plausible alternatives can be realistically combined to produce an alternative baseline scenario. Alternatives that do not receive the kind of analysis required under *ACM00013* include low- or zero-carbon alternatives such as:

Energy efficiency and demand side management: Energy efficiency and demand side management should be considered on par with expanded supply in delivering energy services. As the Government's Commission's *Integrated Energy Policy* notes, "lowering energy intensity through higher efficiency is equivalent to creating a virtual source of

[47] *ACM00013, Ver. 4.0*, at 3.
[48] *Id.*
[49] *Id.*, at 4.
[50] *Id.*
[51] *Id.*
[52] *Id.*, at 4.

untapped domestic energy….[a] unit of energy saved by a user is greater than a unit produced, as it saves on production losses as well as transport, transmission and distribution losses."[53] A recent report issued by the Planning Commission found that "[s]everal [energy efficiency] options are less expensive than coal or gas-based generation, and therefore, *should be the "first resource" considered for fulfilling demand*."[54] (emphasis added). As such, the Government of India has recognized the critical importance of energy efficiency and has undertaken an array of energy efficiency initiatives. Energy efficiency measures are a core solution to India's chronic 8-10 percent supply deficit. Recent studies have found that end-use efficiency improvements could reduce effective demand by more than 20 percent,[55] and add approximately $500 billion to India's economy between 2009 and 2017.[56]

Reduction of transmission and distribution losses: The PDD entirely omits any analysis of the potential for improvements in transmission and distribution efficiency. Reducing these losses is a top priority,[57] as the current loss rates are between 35-40 percent and place a huge strain on the economy and threaten the viability of energy sector.[58] Simply raising Indian transmission and distribution efficiencies to international best practices (less than 10 percent)[59] could eliminate the need for as much as 30 GW worth of additional capacity.[60]

Solar thermal. The PDD discusses only photovoltaic sources, and summarily dismisses them as variable and incapable of producing base load power.[61] It entirely overlooks solar thermal power (or "concentrated solar power"), which can provide baseload power and has the potential to deliver 3 to 4 times the amount of power as India's coal reserves.[62] As both the fuel and construction costs of coal-fired power plants have rapidly escalated, the price differential between coal and solar thermal power has been dramatically

53 Planning Commission, 2006. *Integrated Energy Policy: Report of the Expert Committee*, at xx.
54 Planning Commission, 2011. *Interim Report of the Expert Group on Low-Carbon Strategies for Inclusive Growth*, at 31.
55 Greenpeace India. 2009. *Still Waiting*, at 14. available at http://www.greenpeace.org/india/Global/india/report/2009/11/stillwaiting.pdf
56 Shakti Foundation, 2011. *The Hundred Billion Dollar Bonus: Global Energy Efficiency Lessons from India.*
57 *International Energy Agency*; *Technology Development Prospects for the Indian Power Sector*, at 69. *available at* http://www.iea.org/papers/2011/technology_development_india.pdf
58 Planning Commission, 2006. *Integrated Energy Policy: Report of the Expert Committee*, at 4.
59 Greenpeace India. 2009. *Still Waiting*, at 14. *available at* http://www.greenpeace.org/india/Global/india/report/2009/11/stillwaiting.pdf
60 Shankar Sharma, 2011. *Indian Power Scenario: Huge scope for low carbon energy pathway*.
61 *PDD, at 25.*
62 Ummel, Kevin. Center for Global Development Working Paper. *Concentrating Solar Power in China and India: A Spatial Analysis of Technical Potential and the Cost of Deployment*.

narrowed.[63] Furthermore, India already has a solar power manufacturing sector to rely on for increased growth in this area.[64]

Strengthened grid connections: The PDD does reference the use of connected grids to import electricity, but dismisses this alternative because of the transmission deficit. However, this quick dismissal ignores the fact that the deficit is primarily a result of the focus on building new power plants, rather than investing in grid improvements and end-use efficiency.[65]

Biomass. The PDD dismisses power from biomass on the basis of the risks associated with production and availability of biomass in India. However, India has an enormous potential of 27 GW for biomass[66], and Maharashtra has the potential for 1 GW of biomass energy.[67]

Conclusion

Each of these potential alternatives is already being implemented in India, and some such as end use efficiency, reducing transmission losses, and solar thermal are a matter of national priority. Yet contrary to the requirements of *ACM00013*, the PDD makes no effort to explain the discrepancy between such actions and the baseline scenario. The PDD also makes no effort to assess how these alternatives can be combined in ways that would produce a more attractive baseline than subcritical technology. In particular, given the Planning Commission's determination that energy efficiency should be the "first resource" in meeting demand, it is difficult to see how the PDD could not consider it as a potential baseline, either alone or in combination with other alternative scenarios.

Despite the methodology's requirement that exclusions be supported by "appropriate explanations and documentation", the PDD offers no evidence other than conclusive statements about the various risks associated with each alternative. Under *ACM00013*, the

[63] David Wheeler, 2008. *Tata Ultra Mega Mistake: The IFC Should Not Get Burned by Coal*, *available at* http://blogs.cgdev.org/globaldevelopment/2008/03/tata-ultra-mega-mistake-the-if.php

[64] *An Overview of Renewable Energy in India*, at 11. *available at* http://www.geni.org/globalenergy/library/energytrends/currentusage/renewable/Renewable%20Energy%20Potential%20for%20India%5B2%5D_%5B1%5D-1_.pdf

[65] http://blog.cleantech.com/sector-insights/energy-efficiency/india-loses-45-of-the-electricity-it-produces-expect-surge-in-energy-efficiency-investment/

[66] "Powering India with Rice Husks? An Interview with Ratnesh Yadav from Husk Power Systems," *available at* http://sierraclub.typepad.com/compass/2011/01/powering-india-with-rice-husks-an-interview-with-ratnesh-yadav-from-husk-power-systems.html

[67] *An Overview of Renewable Energy in India*, at 14. *available at* http://www.geni.org/globalenergy/library/energytrends/currentusage/renewable/Renewable%20Energy%20Potential%20for%20India%5B2%5D_%5B1%5D-1_.pdf

PDD must clearly justify the conclusion that these and other alternatives are not plausible options. It has not met this test.

II. THE PDD'S INVESTMENT ANALYSIS IS FUNDAMENTALLY FLAWED, AND FAILS TO SUPPORT THE CONCLUSION THAT SUBCRITICAL TECHNOLOGY IS THE MOST ECONOMICALLY ATTRACTIVE ALTERNATIVE UNDER *ACM00013* AND THE *ADDITIONALITY TOOL*.

1. The investment analysis is incomplete and fails to provide the data and assumptions necessary for a reader to reproduce the results.

Applicable Rules

ACM00013 and the *Additionality Tool* both require a comprehensive investment analysis to determine the baseline scenario and whether "the project activity would be financially viable without the incentive of the CDM."[68] The investment analysis must be "presented in a transparent manner and all the relevant assumptions should be provided in the PDD, so that a reader can reproduce the analysis and obtain the same results." [69] All investment analysis should be provided in spreadsheet format, with all formulas readable and relevant cells viewable and unprotected.[70] The analysis must clearly present all "[c]ritical techno-economic parameters and assumptions (such as … fuel price projections, lifetimes, the load factor of the power plant and discount rate or cost of capital)…," and must justify those assumptions "in a manner that can be validated by the DOE." [71] It should "[i]nclude all relevant costs (including, for example, the investment cost, fuel costs and operation and maintenance costs), and revenues (including subsidies/fiscal incentives, ODA, etc. where applicable), and, as appropriate, non-market cost and benefits in the case of public investors."[72] The analysis must present a clear comparison of the financial indicators for all

[68] *Tool for the demonstration and assessment of additionality, Ver. 5.2, Annex: Guidance on the Assessment of Investment Analysis*, at 12.
[69] *ACM00013, Ver. 4.0*, at 4; *Tool for the demonstration and assessment of additionality, Ver. 5.2*, at 7.
[70] *Tool for the demonstration and assessment of additionality, Ver. 5.2, Annex: Guidance on the Assessment of Investment Analysis*, at 13. The Guidance is clear that this requirement cannot be avoided on grounds of business confidentiality:

> "In cases where the project participant does not wish to make such a spreadsheet available to the public an exact read-only or PDF copy shall be provided for general publication. In case the PP wishes to black-out certain elements of the publicly available version, a clear justification for this shall be provided to the UNFCCC secretariat by the DOE when requesting registration."

[71] *ACM00013, Ver. 4.0*, at 4; *Tool for the demonstration and assessment of additionality, Ver. 5.2*, at 7.
[72] *Id.*

scenario alternatives.[73] Assumptions and input data should be consistent across the project activity and its alternatives, unless differences can be well substantiated.[74]

Discussion of non-compliance

The investment analysis is deficient with respect to virtually all of the requirements set forth in *ACM00013* and the *Additionality Tool*. It barely resembles the kind of rigorous and comprehensive analysis that would actually be required to determine if the project activity requires CDM support to be the preferred alternative. The investment analysis relies on a comparison of the levelized cost of energy (LCOE) for each of three potential baselines to justify its claim that subcriticaltechnology would be the preferred option without CDM support, but fails to:

- Show the calculations it used to generate the LCOEs, or present them in spreadsheet form so they could be replicated;
- Show any of the calculations it used to generate values for other key variables or to reach its conclusions, or present them in spreadsheet form so they could be replicated;
- Demonstrate how revenue from the CDM would affect the financial viability of the project activity, and cause supercritical technology to become the preferred option;
- Offer credible fuel price projections and explain the methodology and assumptions used to generate them;
- Explain how coal subsidies provided by Coal India might be reduced over time, and how that would affect the LCOE calculations;
- Assess how the risk of regulatory changes, such as increased pollution control requirements or a carbon tax or cap and trade regime, might affect the LCOE of each alternative.
- Consider the costs of other resource inputs such as labor and water, and how they might differentially affect the LCOE for each option.

Conclusion

The investment analysis fails to assess the importance of the CDM to the project's financial viability. It asserts that subcritical technology would have the lowest LCOE, but fails to demonstrate how it reached that conclusion. By providing its data only in chart form, without showing the relevant calculations and assumptions, the PDD makes it impossible for the reader to "reproduce the analysis and achieve the same results." The Executive Board has

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[73] *ACM00013, Ver. 4.0*, at 4.

[74] *Tool for the demonstration and assessment of additionality, Ver. 5.2*, at 7; *ACM00013, Ver. 4.0*, at 4.

rejected previous proposals based on these same deficiencies,[75] and they provide a sufficient basis for the DOE to refuse to validate this project activity.

2. The sensitivity analysis is inadequate, and does not clearly show that the project activity is unlikely to be the most financially attractive alternative.

Applicable rules

ACM00013 and the *Additionality Tool* require the PDD to include a "sensitivity analysis" for all alternatives, to ensure that conclusions regarding the financial attractiveness of the project are robust with regard to reasonable variations in the critical assumptions (e.g. fuel prices and the load factor). Guidance for the Additionality Tool requires DOEs to closely assess whether the range of variations is reasonable in the context of the project. Past trends should be a guide for determining a reasonable range, but generally variations "should at least cover a range of +10% and –10%, unless this is not appropriate in the context of the specific project circumstances."[76] Moreover, "where a scenario will result in the project activity passing the benchmark or becoming the most financially attractive alternative the DOE shall provide an assessment of the probability of the occurrence of this scenario in comparison to the likelihood of the assumptions in the presented investment analysis…."[77]

The sensitivity analysis can provide a valid basis for selecting the baseline scenario or alternative "only if it consistently supports (for a realistic range of assumptions) the conclusion that the pre-selected baseline scenario [or alternative] is likely to remain the most economically and/or financially attractive."[78] Where the sensitivity analysis clearly reaffirms the result, the most economically attractive alternative should be considered the most plausible baseline scenario. However, where the sensitivity analysis is not fully conclusive, the alternative with the lowest emission rate among those that are the most financially and/or economically attractive should be selected as the baseline scenario.[79]

Discussion of non-compliance

[75] *See e.g., Review of Project Activity*: *Sichuan Liangtan Hydropower Station Second Phase Project (2410), available at* http://cdm.unfccc.int/Projects/DB/DNVCUK1197870388.18/Rejection/MAXJNK4XZBW732JI3W56I249GFEQE3 *Review of Project Activity: 10 MW Somasila Hydro Power Project for a grid system by Balaji Energy Pvt. Ltd. (1201), available at:* http://cdm.unfccc.int/Projects/DB/DNV-CUK1182338073.37/Rejection/OO2TQ0VFWPHDSIUDDMF7KXQ7SN81MN;*Review of Project Activity: BHL Palia Kalan Project (1184), available at* http://cdm.unfccc.int/Projects/DB/DNVCUK1182235542.94/Rejection/ED7ZTMB2J3G28EMMVW1C3AOS9Z6EBP

[76] *Tool for the demonstration and assessment of additionality, Ver. 5.2, Annex: Guidance on the Assessment of Investment Analysis*, at 15.

[77] *Id.*

[78] *ACM00013, Ver. 4.0*, at 4; *Tool for the demonstration and assessment of additionality, Ver. 5.2*, at 7.

[79] *ACM00013*, Ver. 4.0, at 4.

The PDD's sensitivity analysis is not robust to reasonable variations in critical assumptions, because it only varies coal prices by +/- 10 percent. In fact, prices have fluctuated by as much as 100 percent in recent years in the Indian market, and much more in the international markets. (see graphs, below). To date, coal plant operators have been shielded from the volatility of global markets by the fact that Coal India has sold its outputs to power producers at far below global prices to keep electricity prices down. However, domestic shortages have driven up coal imports over the last several years, increasingly exposing domestic power producers to the more expensive and more volatile global markets.[80] Moreover, Coal India's subsidies are increasingly unsustainable.[81] It raised prices by 12 percent in February, 2011 but excluded the power sector.[82] Future price hikes will likely cover all sectors and will recur every 18-20 months.[83] In the face of these trends, it is fanciful to assume that coal prices will not fluctuate more than 10 percent from the base case over the course of the ten year project period.

While modern supercritical plants cost about 2 percent more to install than subcritical plants,[84] they can deliver energy at the same or lower costs over their operating life due to their reduced fuel costs.[85] That being the case, a rigorous sensitivity analysis should have shown that at a certain coal price, supercritical technology will surpass subcritical as the most financially or economically attractive alternative. The Additionality Tool requires that the sensitivity analysis determine if the "switching price" will occur within a "realistic range of assumptions." [86] It further requires the DOE to independently assess "the probability of the occurrence of this scenario in comparison to the likelihood of the assumptions in the presented investment analysis…."[87]

Conclusion

By narrowly limiting the range of price variation considered in the sensitivity analysis, the PDD implies that there is no "switching price" between the technologies. This suggestion is plainly unsupportable, and it is incumbent upon the DOE to independently determine this inflection point and the likelihood that it will occur, and to reassess financial attractiveness of the options on that basis.

[80] IEA Coal Statistics, 2010; http://sierraclub.typepad.com/.a/6a00d83451b96069e20147e1433ebb970b-pi
[81] "CIL to hike coal prices by 15 pc from tonight," *Times of India*, February 26, 2011; Coal India to benchmark premium coal to world prices, *Reuters*, June 4, 2010.
[82] http://articles.economictimes.indiatimes.com/2011-03-16/news/28697785_1_price-hike-salary-hike-cil
[83] *Id.*
[84] Boben Anto, M.M. Hasan, *Analysis of Supercritical Technology in Indian Environment and Utilizing Indian Coal*, at 113.
[85] MIT, 2007. *The Future of Coal*, at 19; Center for Science and Environment, 2010. *The Challenge of the New Balance*, at 35.
[86] ACM00013, Ver. 4.0, at 4; *Tool for the demonstration and assessment of additionality*, Ver. 5.2, at 7.
[87] *Tool for the demonstration and assessment of additionality, Ver. 5.2, Annex: Guidance on the Assessment of Investment Analysis*, at 15.

III. THE PDD FAILS TO ESTABLISH THAT THE PROJECT WILL GENERATE ADDITIONAL EMISSIONS REDUCTIONS AS A RESULT OF CDM SUPPORT AS REQUIRED BY THE *ADDITIONALITY TOOL*.

1. The Project is not additional: finance for the project is already secured, construction is well under way, and the PDD provides no evidence that the potential availability of CDM credits has influenced the design of the project or the decision to proceed.

Applicable rules

The CDM Executive Board has recognized that in order for a project activity to be considered additional, the availability of CDM credits must actually influence the design of the project activity or the decision to proceed. The Executive Board has refused to register projects that failed to substantiate that support from the CDM was a "necessary element" of the decision to invest in the project activity.[88] Proving this causality is a particular problem where (as here) the project activity is under way before validation. In such cases, the Executive Board requires project participants to demonstrate that "the incentive from the CDM was seriously considered in the decision to proceed with the project activity."[89]

The Executive Board has specified three types of evidence that the project participant must provide to prove that the prospect of CDM support was seriously considered in project decision-making. First and most important, the project participant must provide "(preferably

[88] *Review of Project Activity: Hot air generation using renewable biomass fuel for spray drying application at H. & R. Johnson (India) Ltd, Kunigal* (1545), *available at* http://cdm.unfccc.int/Projects/DB/TUEV-SUED1200568517.44/Rejection/DYSTHYWLL9HIB9ELS1BBWMTPUZIEPE; *see also Review of Project Activity: Optimization of steam consumption in the process by installation of free flow falling film finisher evaporator and retrofit to the chemical recovery boiler in Cachar Paper Mill of Hindustan Paper Corporation Limited* (1475), *available at* http://cdm.unfccc.int/Projects/DB/DNV-UK1197870388.18/Rejection/MAXJNK4XZBW732JI3W56I249GFEQE3; *Review of Project Activity: Koppal Green Power Limited Biomass Power Project* (1383), *available at* http://cdm.unfccc.int/Projects/DB/TUEV-RHEIN1192092174.11/Rejection/GTIP8G67K2EUKEQVRK61J17A5GXR0U

[89] *Guidelines for completing the Project Design Document (CDM-PDD) and the proposed new baseline and monitoring methodologies EB 41 Report, Annex 12, ver 07*, at 12.

official, legal and/or other corporate) documentation that was available at, or prior to, the start of the project activity" that demonstrates "serious consideration."[90] Second, the project participant must provide a timeline of the implementation of the proposed project activity that includes: (1) the date of the investment decision; (2) the date when construction works started; and (3) the date when the project was commissioned (if applicable). The project participant must also provide "a timeline of events and actions, which have been taken to achieve CDM registration, with description of the evidence used to support these actions."[91] Third, the project participant must show that it informed a Host Party Designated National Authority and the UNFCCC secretariat in writing of the commencement of the project activity and of their intention to seek CDM status within six months of the project activity start date.[92] If the project proponent does not provide the required notification, the DOE must conclude that the CDM was not seriously considered in the decision to implement the project activity.[93]

Discussion of non-compliance

The project has all the necessary financing and is proceeding apace without CDM support. MAHAGENCO's actions to implement the project in advance of validation demonstrate that the potential availability of CDM credits was not a "necessary element" in the design of the project activity or the decision to proceed. As early as July 2010, MAHAGENCO had already secured all of the requisite financing for the three units through the central government's power finance arm and a consortium of nationalised banks.[94] MAHAGENCO makes no claim that this financing is contingent upon the registration of the project. Moreover, construction of the facility is already well under way, and MAHAGENCO ordered the generator packages for the unit (and two subsequent 660MW units) in September 2009, paying an advance of 565.88 Crore (about US $120 million).[95]

The CDM Executive Board has refused to register another Indian supercritical project in similar circumstances. In its review of the "GHG Emission Reductions through grid connected high efficiency power generation (3020)," the Executive Board concluded that the project participant and the DOE had failed to substantiate barriers to investment in the project, because the project participant had secured financing after the project start date, but

[90] *Id.*
[91] *Id.*
[92] *Guidelines on the Demonstration and Assessment of Prior Consideration of the CDM, EB 49 Report, Annex 22, Ver. 03*, at 1.
[93] *Guidelines on the Demonstration and Assessment of Prior Consideration of the CDM, EB 49 Report, Annex 22, Ver. 03*, at 1.
[94] "Mahagenco achieves financial closure for Koradi", *The Energy Business*, *available at* *http://energybusiness.in/mahagenco-achieves-financial-closure-supercritical-units/;* "PFC to finance Koradi supercritical project", *Project Monitor*, July 14, 2010, *available at* http://www.projectsmonitor.com/POWDIST/pfc-to-finance-koradi-supercritical-project;
[95] MAHAGENCO, 2010. *Annual Report 2009-2010*, at 8, 60. *available at* http://www.mahagenco.in/soa/ANNUALREPORT2009-2010-ENGLISH.pdf

did not "clearly indicate that the lenders have taken into account the CDM registration of the project activity."[96] In that case, the fact that financing for the project did not depend on CDM support was fatal to the claim of additionality. The same rule should apply here.

The PDD meets none of the procedural requirements for demonstrating "serious consideration" that are set out in the CDM guidelines. The PDD provides no "official, legal and/or other corporate documentation" from the time the project was started that would demonstrate that the need for CDM support was seriously considered.[97] It fails to provide a timeline of key implementation actions or a timeline of actions that have been taken to achieve CDM registration.[98] Finally, while the project participant has notified the UNFCCC secretariat of its intention to seek CDM status, it has not provided any evidence that it informed the DNA in a timely fashion. Instead, the PDD claims that it will make this information available to the DOE during a site visit.[99]

Conclusion

Since MAHAGENCO already has the capital it needs to complete the project activity, has committed considerable resources to its implementation, and is already moving forward with construction, it is difficult to see how the potential for CDM support could have been a determinative factor in project decision-making. Rather, the fact that the project participant is on track to implement the project without CDM support strongly suggests that CDM support is not integral to the project's viability, and thus that the project will not generate any additional emissions reductions as a result of CDM support. In any event, the project participant has produced no evidence that the potential for CDM registration actually influenced how key project decisions were made.

2. **No realistic and credible barriers exist that would prevent the implementation of the Project if it was not registered as a CDM activity.**

Applicable rules

ACM0013 and the *Additionality Tool* require the PDD to include a "barrier analysis" to determine whether the proposed project activity faces barriers that can be overcome with CDM support. The barrier analysis consists of two parts. First, the project proponent must show "realistic and credible barriers that would prevent the implementation of the proposed project activity from being carried out if the project activity was not registered as a CDM

[96] *Review of Project Activity: GHG Emission Reductions through grid connected high efficiency power generation* (3020), *available at* http://cdm.unfccc.int/Projects/DB/DNV-CUK1254830678.73/Rejection/IWNNWJIB1G6WAG6F9RW59N3AOLQEXP
[97] PDD, at 26-27.
[98] *Id.*
[99] *Id.*, at 27.

activity."[100] To establish these barriers, the project proponent must "demonstrate the existence of the barriers and show how they prevent the realization of the activity."[101] This must be accomplished with "transparent and documented evidence" such as relevant regulations, market data, or expert opinions. Anecdotal evidence is insufficient to prove the existence of a barrier.[102]

Second, the project proponent must show that the CDM would effectively remove these barriers. "If CDM support would not alleviate the barriers that prevent the proposed project activity from occurring, the project cannot be considered additional."[103]

Discussion of non-compliance

The PDD fails to establish either element of the barrier analysis. First, it does not properly demonstrate the existence of any "realistic and credible" barriers. The PDD claims that "a lack of familiarity with operating the technology and "availability of skilled manpower" present barriers to the use of supercritical technology.[104] However, the PDD merely asserts the existence of these barriers and presents no "transparent and documented evidence" of the kind required by the Additionality Tool. It cites no legislation, regulatory information, sectoral studies, market data, or independent expert analysis to the effect that MAHAGENCO cannot acquire the relevant expertise through training, hiring or collaboration.

Furthermore, the fact that there are about 40 supercritical units that have been commissioned or are under construction (as of 2010) strongly suggests that other operators do not feel constrained by these supposed barriers.[105] In fact, as discussed previously, NTPC's Chief Design Engineer explicitly refuted these assertions in 2008, noting that supercritical boilers were a "mature and established" technology, and that project implementation and operations and maintenance of supercritical technology were "essentially [the] same as sub-critical."[106]

Indeed, the PDD actually concedes that MAHAGENCO will not have any problems obtaining the necessary expertise. In response to public concerns that the supercritical

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[100] *Methodological Tool: Tool for the demonstration and assessment of additionality Version 5.2*, at 8.
[101] *Id.,* at 9.
[102] *Id.,* at 9.
[103] *Id.,* at 8.
[104] PDD, at 30.
[105] International Energy Agency, 2011: *Technology Development Prospects for the Indian Power Sector*, at 46. *available at* http://www.iea.org/papers/2011/technology_development_india.pdf
[106] *Supercritical Technology in NTPC India-A Brief Overview*, presentation by Pankaj Gupta, Chief Design Engineer, NTPC to APEC Energy Working Group's Cleaner Coal Workshop, Ha Long City, Vietnam August 19-21, 2008, at 13. *available at* http://www.egcfe.ewg.apec.org/publications/proceedings/CleanerCoal/HaLong_2008/Day%202%20Session%203A%20%20Pankaj%20Gupta%20Supercritical%20Technology%20in%20.pdf

technology might be difficult to operate, MAHAGENCO responded that "[t]he operators would undergo special training to operate the power plant, *however it would not be difficult to operate as its just another technology for power generation*." [107] (emphasis added). The PDD also concedes that where necessary, operators of other supercritical projects in India have been able to secure expert support from abroad.[108]

Regarding the second step of the analysis, the PDD does not even attempt to show how CDM support could eliminate potential barriers posed by challenges of training and expertise. Absent any showing that the CDM would alleviate these issues, the barrier analysis cannot support a finding of additionality.

3. **The PDD does not adequately demonstrate that the use of supercritical technology will lead to additional CO_2 reductions, even assuming that subcritical technology is the appropriate baseline**.

Applicable rules

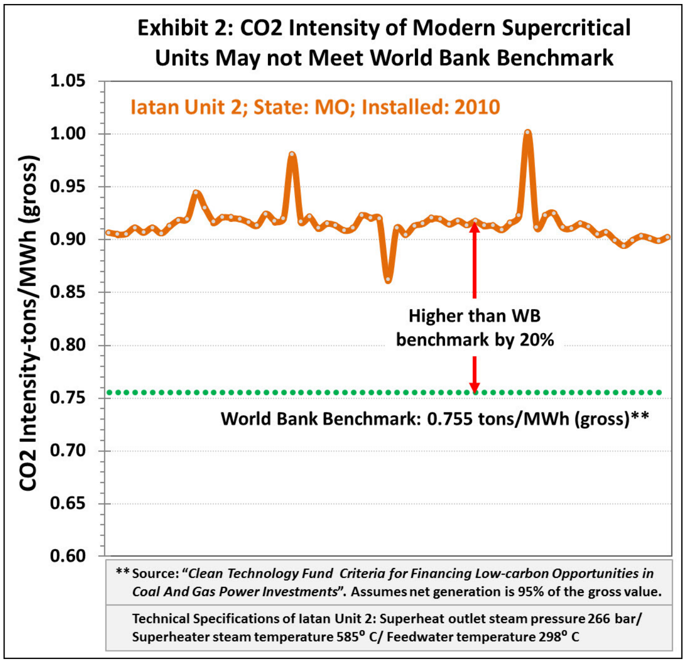
In order to demonstrate that the project activity will deliver real, additional emissions reductions, the PDD must show that it "uses a more efficient power generation technology than what would otherwise be used with the given fossil fuel category."[109] If the PDD cannot demonstrate that the project activity will have an emission rate below the selected baseline scenario, the project activity should not be considered to produce emission reductions.[110]

Discussion of non-compliance

The amount of CO_2 emissions that will be released from a given coal-fired unit can vary widely depending on a number of site specific factors. These include coal quality, heating value, site conditions, condenser pressure, plant design, and the addition of pollution control equipment such as FGD or SCR.[111] Of these factors, variability in the coal used poses a particular challenge in predicting the CO_2 emissions factor of an individual coal plant. Coal can vary in quality and characteristics even for coal of the same category.[112] This makes it impossible to predict an exact amount of CO_2 emissions for supercritical technology unless the project was minemouth or pithead utilizing coal from the exact same source year after year.[113] For example, an individual unit can fluctuate anywhere between 0.86 tons CO_2/MWh

[107] PDD, at 55.
[108] *Id.*, at 30.
[109] *ACM00013, Ver. 4.0*, at 2.
[110] *Id.*, at 4.
[111] US EPA, *Available and Emerging Technologies for Reducing Greenhouse Gas Emissions from Coal Fired Electric Generating Units*. available at: http://www.epa.gov/nsr/ghgdocs/electricgeneration.pdf; Chikkatur and Sagar, 2007. *Cleaner Power in India: Towards a Clean-Coal-Technology Roadmap*, at 192.
[112] Jahar Roy et al., 2008. *Predictive equations for CO_2 emission factors for coal combustion, their applicability in a thermal power plant and subsequent assessment of uncertainty in CO_2 estimation.*
[113] *Id.*

to 1.01 tons CO_2/MWh depending upon a variety of factors including coal quality (see chart below).[114]



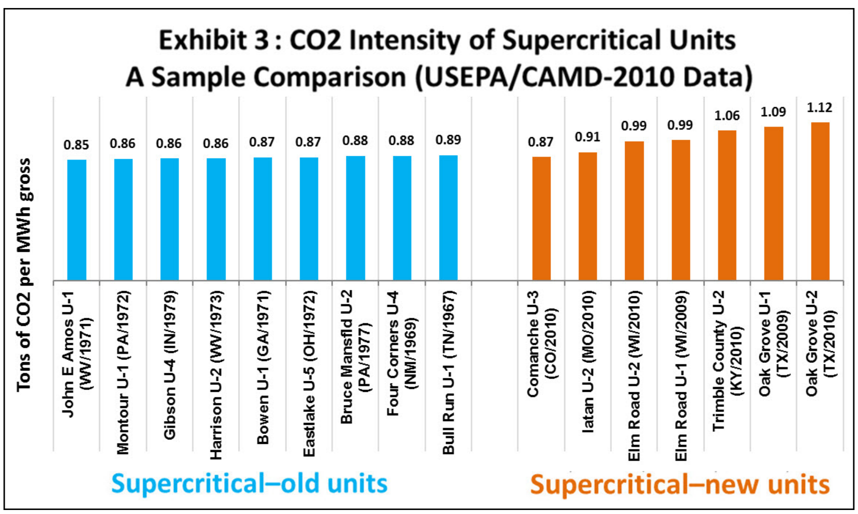
The issue of coal quality is particularly important for determining CO_2 emissions performance for Indian plants, regardless of whether the plant is subcritical, supercritical, or even ultra-supercritical.[115] Indian coal is particularly poor, with a high ash content and low calorific value. As a result, it produces lower emissions factors than those assumed in ideal conditions with higher quality coals.[116] Perhaps more importantly, it remains unclear whether it is the supercritical technology or the quality of coal that has a larger effect on CO_2 emissions intensity.[117]

Other site-specific factors are also important determinants of unit efficiency. For instance, higher water temperatures used for cooling purposes in countries like India can

[114] CO_2 Scorecard. *The World Bank's Coal Electricity Headache*. *available at* http://www.co2scorecard.org/home/researchitem/19#_ftn2
[115] Energy Information Administration, *Carbon Dioxide Emissions Factors for Coal U.S.*, *available at* http://www.eia.gov/cneaf/coal/quarterly/co2_article/co2.html
[116] Chikkatur et al, 2008. *Coal Initiative Reports* at 2. *available at*: http://www.pewclimate.org/docUploads/india-coal-technology.pdf
[117] CO_2 Scorecard. *The World Bank's Coal Electricity Headache*. *available at* http://www.co2scorecard.org/home/researchitem/19#_ftn2

reduce efficiencies by as much as 3 percent.[118] This efficiency reduction can make a significant difference in overall efficiency and therefore CO_2 output.[119]

Taken together, these factors can cause supercritical units to operate far below predicted levels, and can even eliminate the operational efficiency advantages of supercritical over subcritical technologies. For instance, Sipat, the first supercritical unit in operation in India, only delivered an efficiency of 33.8 percent-- marginally lower than the best sub-critical plants. More importantly, it had a *higher* CO_2 output (96kg/kwh) than the best subcritical plant.[120] Similar findings have emerged from the longer track record of supercritical plants in the United States.[121] Despite using far higher quality coals, many US supercritical plants operate at efficiencies far worse than the PDDs stated benchmark of .94 tons of C02/GWh (see chart below).[122]



Conclusion

While supercritical combustion is, on average, a more efficient technology, it does not always outperform subcritical alternatives. Whether or not the project activity will actually deliver reduced emissions will depend on a variety of site specific factors. Accordingly, the PDD's claim that the project activity will reduce emissions over subcritical technology, and

[118] Chikkatur and Sagar, 2007. *Cleaner Power in India: Towards a Clean-Coal-Technology Roadmap.*
[119] *Id.*
[120] Center for Science and Environment, 2010. *The Challenge of the New Balance*, at 35.
[121] CO_2 Scorecard. *The World Bank's Coal Electricity Headache*. *available at* http://co2scorecard.org/home/researchitem/19
[122] http://www.alstom.com/power/resources/brochure/iatan-us-920mw-advanced-supercritical-boiler/

that those reductions can be precisely quantified, cannot be substantiated without much more fine-grained, site-specific data than the PDD provides.

CONCLUSION

The role of the CDM within the Kyoto framework is to assist developing countries in achieving sustainable development and allow developed countries to meet their emission reduction obligations, with the ultimate objective of reducing overall global emissions and averting dangerous interference with the climate system. Unless a project is additional and contributes to sustainable development—not only in terms of technical compliance with methodologies, but in fact—it cannot contribute towards these fundamental goals.

This PDD is riddled with fundamental flaws, and fails to demonstrate that the project activity will produce additional emissions reductions as a result of CDM support. On a purely technical basis, the PDD fails to comply with several important provisions of the *ACM0013*, the *Additionality Tool*, and other CDM tools and guidelines. But even if the project proponents were to correct the PDD's technical deficiencies, the project activity would not be additional. India is already rapidly adopting supercritical technology due to a variety of operational, market, and regulatory factors. Moreover, the PDD provides scant evidence that this project needs CDM support to be financially viable, or that the prospect of receiving CDM credits was seriously considered during project decision-making. Indeed, the project proponent has already secured the necessary financing and is proceeding with the construction of the project.

Thus, approving CDM benefits for new supercritical projects in India would lead to excess issuance of CERs, beyond any actual emissions reductions, and undermine the objectives of both the Kyoto Protocol and the UNFCCC.

Based on these concerns, we call on Bureau Veritas Certification Holding SAS not to validate the proposed Project. Should the DOE afford the project proponent the opportunity to provide clarifications or corrective actions, we respectfully request that stakeholders be given the opportunity to comment on any further submissions.

Respectfully submitted,

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APPENDIX 1: SUPERCRITICAL PROJECTS IN INDIA[123]

Ultra Mega Power Projects

No.	Name/Location of Thermal Power Station	No. of Units	Unit capacity (in MW)	Utility
1	UMPP, Mundra	5	800	M/s. Tata Power Ltd.
2	UMPP, Sasan	6	660	M/s. Reliance Power Ltd.
3	UMPP, Krishnapatnam	5	800	M/s. Reliance Power Ltd.
4	UMPP, Tilaiya	5	800	M/s. Reliance Power Ltd.
5	Orissa, UMPP	5	800	-
6	Chhatisgarh, UMPP	5	800	-
7	UMPP, Tamil Nadu	5	800	-

Supercritical Thermal Power Stations Completed or Under Construction

No.	Name/Location of Thermal Power Station	No. of units	Unit capacity (in MW)	Utility
1	Hissar	2	660	M/s. HPGCL
2	Jhajjar	2	660	M/s. HPGCL
3	Talwandi Sabo	2	660	M/s. PSEB
4	Mundra, Kutch	2	660	M/s. Adani Power Ltd.
5	Meja IV, Uttar Pradesh	2	660	M/s. NTPC Joint Venture
6	Sipat-I, Bilaspur	3	660	M/s. NTPC Limited
7	New Nabinagar, Bihar	3	660	M/s. NTPC Joint venture
8	Krishnapatnam	3	800	M/s. APGENCO
9	Sholapur Thermal Power plant, Maharashtra	2	660	M/s. NTPC
10	Barh Super Thermal Power Station	3	660	M/s. NTPC Ltd.
11	Raghunathpur-II, West Bengal	2	660	M/s. DVC
12	Gidderbaha Station-I, Punjab	2	660	M/s. PSEB
13	Sahapur Thermal Power Company Limited	2	660	M/s. STPCL
14	Jewargi Power Company of Karnataka Limited	2	660	M/s. Power Company of Karnataka Company Ltd.

[123] Boben Anto, M.M. Hasan, undated. *Analysis of Supercritical technology in Indian Environment and Utilizing Indian coal*, at 113.

Proposed Supercritical Power Stations

No.	Name/Location of Thermal Power Station	No. of Units	Unit capacity (in MW)	Utility
1	Dhenknal, Orissa	2	660	M/s. Lanco Infratech Ltd.
2	Pussurar Region, Raigarh, Chhatisgarh	3	660	M/s. Infrastructure Leasing & Financial Services Ltd.
3	Chutru region of Jharkhand	3	660	M/s. Infrastructure Leasing & financial Services Ltd.
4	Chandil region of Jharkhand	3	660	M/s. Infrastructure Leasing & financial Services Ltd.
5	Bade Dumarpali, Raigarh, Chhatisgarh	2	660	M/s. Athena Chattisgarh Power Private Ltd.
6	Gondia, Maharashtra	3	660	M/s. Adani Power Maharashtra Private Ltd.
7	East Godavari, Kakinda	2	660	M/s. Spectrum Power Generation Ltd.
8	Sinnar, Nasik, Maharashtra	2	660	M/s. Fama Power Co. Ltd.
9	Nagapattinam, Tamil Nadu	2	660	M/s. PEL Power Ltd.
10	Nandgaon pet, Amravati, Maharashtra	4	660	M/s. Sophia Power Co. Ltd.
11	Tamnar Raigarh, Chhatisgarh	2	660	M/s. Opelina Finance and Investment Ltd.
12	Tamnar Raigarh, Chhatisgarh	2	660	M/s. Jindal Power Ltd.
13	Lathur, Maharashtra	2	660	M/s. Amravati Thermal Power Ltd.
14	Machillipatnam, Andhra Pradesh	2	660	M/s. Thermal Powertech Corporation (I) Ltd.
15	Gopuvanipalem, Krishna, Andhra Pradesh	3	660	M/s. Nagarjuna Construction Company Ltd.
16	Simar Thermal Power Plant, Junagarh, Gujarat	2	800	M/s. JSW Energy Ltd.
17	Salaboni Thermal Power Plant, Paschim Midnapore.	2	800	M/s. JSW Energy Ltd.
18	Manappad, Tuticorin, Tamil Nadu	2	660	M/s. Ind-Bharat Power (Madras) Ltd.
19	Mundra, Kutch, Gujarat	3	660	M/s. Adani Power Ltd.
20	Sompeta, Drikakulam, Andhra Pradesh	3	660	M/s. Nagarjuna Construction Company Ltd.
21	Central India Power, Phase-II, Maharashtra	1	668	M/s. Central India Power Company Private Ltd.
22	Tanda Expansion, Uttar Pradesh	2	660	M/s. NTPC Ltd.
23	Katwa, West Bengal	2	660	M/s. WBPDCL
24	Bakreshwar, Extension Project	1	660	M/s. WBPDCL

No.	Name/Location of Thermal Power Station	No. of Units	Unit capacity (in MW)	Utility
25	Koradi Extension Project, Maharashtra	2	660	M/s. Mahagenco
26	East Coast, Andhra Pradesh	2	660	M/s. East Coast Energy
27	NSL Power, Tamil Nadu	2	660	M/s. NSL Power Private Limited
28	Marakanam, Tamil Nadu	4	800	M/s. NTPC Ltd.
29	Darlipali, Orissa	4	800	M/s. NTPC Ltd.
30	Lara, Chhatisgarh	5	800	M/s. NTPC Ltd.
31	Kudgi, Karnataka	3	660	M/s. NTPC Ltd. JV with M/s. PCKL