
SEI RESPONSE TO CRITICISM RAISED ABOUT THE SEI WORKING PAPER ON ADIPIC ACID CDM PROJECTS

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We have received several comments and questions regarding our adipic acid paper. Below, we respond to the most pertinent critiques and hope to clarify some of the issues that have been raised. The original paper can be downloaded here: <http://sei-us.org/publications/id/353>

Critique 1: The profits are overestimated in the paper as they are based on secondary CER prices and do not take into account CER taxes in China.

It is correct that primary CER (pCER) prices are generally lower than secondary CER prices, due to the increased risk for the buyer that CERs may not materialize because of project rejection, underperformance, delays or other factors. But even using lower estimates for CER prices and profits the strong competitive advantage for CDM plants in the adipic acid market remains. Furthermore, because the risk for adipic acid projects is very low relative to other CDM project types, the spread between primary and secondary CERs is likely to be relatively small. Pricing information for primary adipic acid CERs is confidential.¹ According to some analysts the average price of primary CERs ranged from EUR 8 to 11 in the later half of 2009, when secondary prices hovered in the low teens.² CER prices in 2008, the other year we examined, were considerably higher than in 2009.

Using a 13 EUR CER price, we estimated CDM profits at about EUR 1000 per ton of adipic acid in our paper. If we were to assume primary CER prices of 9.5 EUR (the midpoint of the 2009 range noted above), and the Chinese CER tax on N₂O projects of 30%, CDM revenues would still be over 500 Euros per ton of adipic acid produced. This level of profit is still several times the plant-by-plant variation in production costs (about 120 EUR for most plants).³ Even with these lower pCER revenues, CER profits are still likely to be in the same order of magnitude or even to exceed the profits from adipic acid sales. CER profits would be 500 EUR per ton (assuming pCER prices and the CER tax) compared to adipic acid sales where a profit margin of 25% would result in profits of EUR 163-375 per ton of adipic acid.

This shows that even with this lower estimate, CDM revenues provide CDM plant owners with a considerable competitive advantage compared to their competitors. Furthermore, profits from CER sales represent a relatively predictable revenue source for a cyclical business that has experienced considerable price fluctuations in recent years.

¹ Yet it is likely that all projects set up forward CER sales contracts with their buyers, see for example Rhodia: "In order to manage exposure to future CER price fluctuations, Rhodia has set up forward CER sales contracts, with or without guarantee of delivery." http://www.rhodia.com/en/binaries/consolidated_financial_statements_december_2009_EN.pdf

² <http://www.carbonpositive.net/viewarticle.aspx?articleID=1705>

³ According to industry experts, average cost of adipic acid production in the period we examined has ranged between about EUR 650 and EUR 1,500 per ton of adipic acid yet it is important to keep in mind that the large fluctuation in adipic acid production costs of about EUR 650 and EUR 1,500 per ton of adipic acid comes mostly from prices for feedstocks varying over time - not so much from strongly varying costs between individual plants.

Critique 2: *The study calculates leakage rates assuming that the four CDM plants would have operated at the average global plant utilization rate observed in the industry. This assumption does not reflect the economic reality of adipic acid production which has shifted (independently of CDM) from the US and Europe to Asia (especially China). Furthermore, the economic downturn was much greater in Europe than in China which accounts for the higher production rate in China and not the impact of the CDM revenues as is claimed in the paper.*

As with all counterfactuals, a leakage calculation of this nature is inherently uncertain, since it is impossible to know precisely how the four CDM plants would have operated without the incentives from the CDM and how other plants would have been affected. Our estimate that carbon leakage⁴ from adipic acid projects in 2008 and 2009 was approximately 20% of total adipic acid CERs issued is based on the assumption that:

- The four CDM plants would have operated at the average global plant utilization rate observed in the industry and
- The resulting lower production in the CDM plants would have been distributed across all non-CDM plants according to their capacity.

Some CDM adipic acid project owners have suggested that these assumptions are invalid because the economic downturn in Europe and the US was much larger than in Asia (especially China). At the same time, adipic acid is used for exported goods, and according the industry reports, the Chinese adipic acid manufacturers faced significant challenges as a result:

As newly-built adipic acid facilities successively came on-stream, the production capacity for adipic acid in China reached around 500kt/y in 2009. However, due to the severe impact from the global financial crisis, downstream PU [polyurethane] coatings and sole resin industries suffered a lot, as export volumes of synthetic leather and footwear continued waning. The whole market was more competitive against an oversupply background, and whether production capacity surplus would occur became the focus of debate among PU players. Meanwhile, PetroChina Liaoyang Petrochemical, who represented China's adipic acid industry applied for an anti-dumping investigation on adipic acid from US, EU and South Korea.

China's Adipic Acid Market Analysis Report 2009. www.researchandmarkets.com/research/dc9483/chinas_adipic_aci

As we point out in our report, the difference in the plant utilization rate between CDM and non-CDM plants was even larger in Asia (90% vs. 58% in 2008; 85% vs. 45% in 2009) than on a global scale (90% vs. 70% in 2008; 85% vs. 60% in 2009), as shown in the table below.⁵

Table 7: Weighted average plant utilization rates of different groups of adipic acid plants

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
World average	91%	82%	83%	82%	83%	83%	84%	88%	73%	64%
Non-CDM plants	91%	82%	83%	83%	85%	84%	85%	86%	70%	60%
CDM plants	91%	80%	91%	75%	71%	78%	79%	94%	90%	85%
Non-CDM plants in Asia	81%	82%	74%	88%	78%	73%	85%	80%	58%	45%
CDM plants in Asia	94%	81%	90%	73%	65%	77%	77%	95%	91%	83%
Integrated plants	92%	81%	85%	82%	86%	87%	87%	87%	74%	63%
Integrated CDM plants	87%	74%	91%	70%	73%	82%	80%	93%	85%	84%
Integrated non-CDM plants	92%	81%	85%	83%	87%	87%	88%	87%	73%	61%
Non-integrated plants	88%	84%	79%	82%	78%	77%	78%	89%	71%	64%
Non-integrated CDM plants	94%	84%	90%	78%	70%	77%	79%	95%	93%	85%
Non-integrated non-CDM plants	86%	84%	77%	83%	81%	77%	78%	86%	64%	58%
Non-CDM plants commissioned after 2000	-	-	76%	79%	74%	78%	75%	75%	60%	59%
Non-CDM plants commissioned before 2000	91%	82%	83%	83%	85%	84%	85%	87%	71%	60%

⁴ Shifts in productions caused by CDM incentives which may therefore not have resulted in actual emission reductions.

⁵ Some have suggested this discrepancy is due to new Chinese plants coming on-line which did not yet run at their full capacity. In our calculations, we adjusted plant utilization rates to account for plant start dates. That may not fully account for lower plant utilization rates of new plants, which may not run at full capacity over the first few months of their operation.

Critique 3: *The paper does not take into account anti-dumping measures that have been put on adipic acid imports to China.*

Chinese CDM adipic acid project operators have claimed that China's antidumping law influenced production rates, not the CDM incentives. In 2009, China imposed five-year anti-dumping tariffs⁶, ranging from 5 - 35.4%, on imports of adipic acid from the United States, the European Union and the Republic of Korea. It is important to note that the anti-dumping tariffs were only introduced in November 2009 (with a levy put in place in mid 2009). As shown in the table above, the discrepancy in plant utilization rates between CDM and non-CDM plants was already full evident in 2008, well before the introduction of anti-dumping measures. Even with the maximum tariffs, CER profits are still likely to remain comparable to the profits from adipic acid production itself. Therefore, the basic economic incentives to shift production location would still be intact irrespective of the recent anti-dumping tariffs.

Going forward, the anti-dumping measures create a number of concerns:

- They could exacerbate carbon leakage by incentivizing the shift in production to Chinese CDM plants.
- They could increase N₂O emissions by encouraging a shift in production to non-CDM Chinese plants that do not abate. (It is important to note that none of the new Chinese plants abate their N₂O emissions, even though industry experts believe that they are equipped with the technology to do so.)

Critique 4: *It is unfair to compare adipic acid projects to HFC projects. Adipic acid producers have not engaged in fraudulent activities, the emissions reductions the projects achieve are real, measured and verified. Furthermore, the methodology puts a cap on annual adipic acid production eligible for credit in the baseline emissions based on the historic plant data and conservatively limits the baseline emissions rates. Therefore a CDM plant cannot claim additional issuance of CERs for the excess adipic acid production.*

We are not aware of any reason to suggest that adipic acid producers have engaged in anything but standard, legitimate business practices. However, while the methodology's cap on eligible production was intended to avoid increased production and to avoid leakage due to shifting production during periods of economic growth, it was not designed to address the risk of leakage during times of significant economic downturn. The data suggest that while production decreased at non-CDM plants because of the economic downturn, CDM plants had production rates in the late 2000s similar to those of the early 2000s (i.e. 80-90%). We suggest that without the CDM revenue, these plants would probably also have been forced to reduce their production levels.

In our paper we suggest a change in the methodology that could limit the scope for leakage while ensuring the viability of these projects. The current CDM methodology does not take into account that N₂O abatement has been common practice in a majority of adipic acid plants since the 1990s. This results in CDM plants getting credit for 100% of their emissions reductions whereas JI projects can only get credit for emissions reductions above 90% (the rational being that 90% abatement can be considered BAU). Accordingly, we could not find any evidence of carbon leakage caused by JI incentives. As we suggest in our paper, requiring a similarly stringent baseline emissions factor in the CDM methodology, as the one used under JI, would almost certainly stop the risk of carbon leakage of this project type and still provide enough financial incentive to make this project type viable.

⁶ <http://au.china-embassy.org/eng/xw/t623995.htm>