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N₂O emissions from adipic acid production

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Two major segments in adipic acid consumption

- Adipic acid is a synthetic monomer at the root of two groups of downstream industries

	polyamide 6.6 (nylon)	other industries
applications	textile, automotive, carpets...	resins, coatings, plastics, plasticizers, detergent ...
consumption	1 300 000 ton/year	1 400 000 ton/year
growth rate	2,2 %	3,8 %
makers	polyamide 6.6 producers	new players and polyamide 6.6 producers

- Typical wordscale plant: 150 000 – 300 000 ton/year

Average world price: 1 600 – 2 200 US\$/ton

Sources: PCI, SRI, Solvay

N₂O is a fatal by-product of adipic acid production but technologies exist to destroy most N₂O emissions

- all adipic acid plants worldwide by-produce N₂O in similar ratios

N₂O emissions at a typical worldscale plant: 13 000 000 – 26 000 000 tCO₂e / year

- no economic rationale to capture and re-use N₂O
- two main technologies to reduce the N₂O emissions: thermal and catalytic destructions

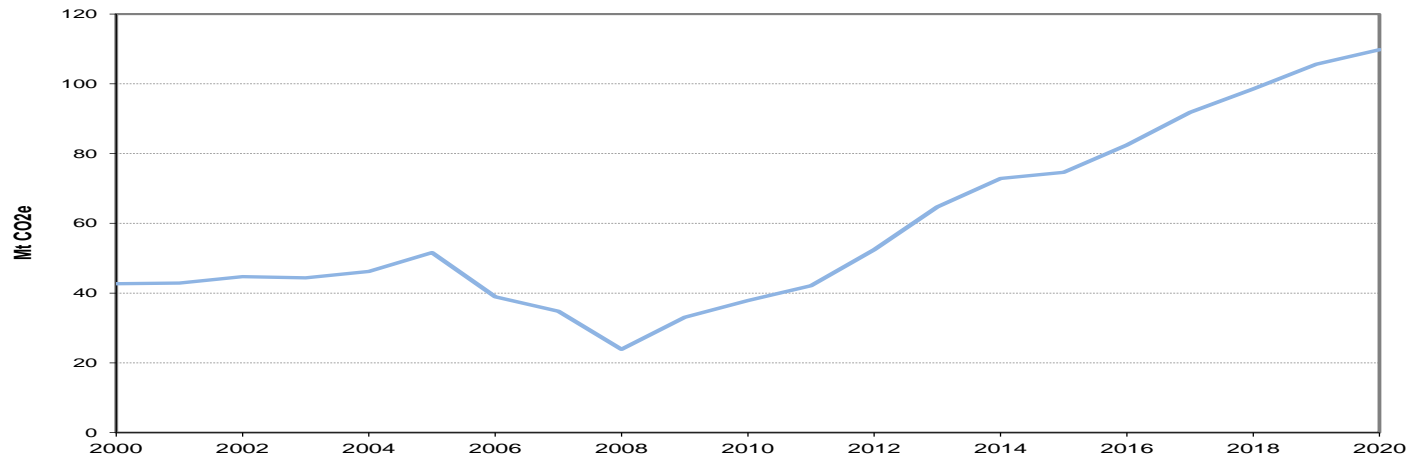
reduction of N₂O emissions can reach 95% and above

economic barriers:

- 15 – 30 mn US\$ investment for N₂O destruction technology at a worldscale plant
- running costs ~50 US\$ per ton of adipic acid
- hidden costs to achieve 95% and above reductions: minimization of N₂O emissions must become a driving parameter of the adipic acid production

The trend to reduce N₂O emissions has been reversed while CDM treatment stays unresolved for new plants

Worldwide N₂O emissions from adipic acid production



- 1990es voluntary investments to reduce N₂O emissions at historical plants
- 2000 - 2005 growth of production at recent plants
- 2006 - 2009 CDM investments to reduce N₂O emissions at recent plants (pre-2005)
JI investments to further reductions at historical plants
- since 2010 several new plants commissioned - no CDM rule set for post-2005 plants

A price signal is needed to re-launch the reduction of N₂O emissions and to reach record low levels

- CDM and JI enabled to overcome economic barriers and to reach record emission reductions
- In 2010, debate on CER from adipic acid due to two observations: the growth of production in CDM regions above world average and the level of the incentive
In 2011-2014 , considerable new production by new players despite no CDM incentive
Existing CDM plants face difficulties covering running costs following EU-ETS ban
- No debate on ERU from adipic acid.
JI projects prepared the EU industry to include N₂O emissions in the compliance scope of the EU-ETS
JI projects for adipic acid were actually a combination of domestic reductions and international credits

Include N₂O emissions of all adipic acid plants, incl. new units, in market mechanisms (CDM or New Market Mechanism, or cap and trade)

and leverage the JI successfull experience with benchmark-based crediting which has a strong net mitigation potential and prepares including units in ETS.

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