Non-CO_2 Greenhouse Gases: Nitrous Oxide

Source/Sectors: Industrial Processes/Nitric Acid Production

Technology: Non-selective catalytic reduction (B.3.1.3)

Description of the Technology:
Nitric acid (HNO_3) is used in production of synthetic fertilizers, adipic acid, and explosives. Virtually all of the nitric acid production in the United States is manufactured by the catalytic oxidation of ammonia. During this reaction, N_2O is formed as a by-product and is released from reactor and vented into the atmosphere (USEPA, 2006b).

Non-selective catalytic reduction (NSCR) uses a fuel and a catalyst to consume free oxygen in the tail gas and to convert NO_x to elemental nitrogen. Since all oxygen must be consumed before NO_x is reduced, excess fuel must be used and result in methane emissions. NSCR can reduce N_2O emission by 80-90 percent (USEPA, 2006b; IEA, 2000 & 2003).

Effectiveness: Good

Implementability: Good

Reliability: Good

Maturity: Good

Environmental Benefits: It reduces nitrous oxide emission.

Cost Effectiveness:

Technology	Lifetime (yrs)	MP (%)	RE (%)	TA (%)	Capital cost	Annual cost	Benefits
Non-selective catalytic reduction[1]	20	-	85	100	$6.29	$0.16	$0.00

Note: MP: market penetration; RE: reduction efficiency; TA: technical applicability; costs are in year 2000 US$/$MT_{CO2\text{-}Eq.}$
1: IEA (2000); IEA (2003); USEPA (2004)

Industry Acceptance Level: Good

Limitations: None reported.

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