CLEAN DEVELOPMENT MECHANISM

ACM0019

Large-scale Consolidated Methodology

N_2O abatement from nitric acid production

Version 04.0

Sectoral scope(s): 05

United Nations
Framework Convention on
Climate Change

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1. Introduction

1. The following table describes the key elements of the methodology:

Table 1. Methodology key elements

Typical projects	**Project activities that introduce N_2O abatement measures in nitric acid plants can use this methodology**
Type of GHG emissions mitigation action	Destruction of GHG: Destruction of N_2O emissions through abatement measures

2. Scope, applicability, and entry into force

2.1. Scope

2. This methodology applies to project activities that introduce N_2O abatement measures in nitric acid plants.

2.2. Applicability

3. The methodology is applicable under the following conditions:

(a) In the case that the nitric acid plant started commercial operation before the implementation of the CDM project activity, the project participants shall demonstrate that there was no secondary or tertiary N_2O abatement technology installed in the respective nitric acid plant;

(b) Continuous real-time measurements of the N_2O concentration and the total gas volume flow can be carried out in the tail gas stream after the abatement of N_2O emissions throughout the crediting period of the project activity;

(c) No law or regulation which mandates the complete or partial destruction of N_2O from nitric acid plants exists in the host country where the CDM project activity is implemented.

4. In addition, the applicability conditions included in the tools referred to below apply.

2.3. Entry into force

5. The date of entry into force is the date of the publication of the EB 101 meeting report on 29 November 2018.

2.4. Applicability of sectoral scopes

6. For validation and verification of CDM projects and programme of activities by a designated operational entity (DOE) using this methodology application of sectoral scope 05 is mandatory.

3. Normative references

7. This consolidated baseline and monitoring methodology is based on elements from the following approved baseline and monitoring methodologies and proposed new methodologies:

   (a) "NM0339: N_2O abatement in New Capacity nitric acid plants" prepared by N.serve Environmental Services GmbH;

   (b) "NM0340: N_2O abatement in New Nitric Acid Plants" prepared by Carbon Climate Protection GmbH and Enaex S.A.;

   (c) "AM0028: Catalytic N_2O destruction in the tail gas of Nitric Acid or Caprolactam Production Plants, Version 05";

   (d) "AM0034: Catalytic reduction of N_2O inside the ammonia burner of nitric acid plants, Version 04".

8. This methodology also refers to the latest approved versions of the following tools:

   (a) "Tool to determine the mass flow of a greenhouse gas in a gaseous stream";

   (b) "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion".

9. For more information regarding the proposed new methodologies and the tools as well as their consideration by the Executive Board (hereinafter referred to as the Board) of the clean development mechanism (CDM) please refer to <http://cdm.unfccc.int/goto/MPappmeth>.

3.1. Selected approach from paragraph 48 of the CDM modalities and procedures

10. "Existing actual or historical emissions, as applicable".

4. Definitions

11. The definitions contained in the Glossary of CDM terms shall apply.

12. For the purpose of this methodology, the following definitions apply:

   (a) **Secondary N_2O abatement** - refers to the installation of a catalyst inside the ammonia burner unit with the sole purpose of removing N_2O emissions from the stream;

   (b) **Tertiary N_2O abatement** - refers to the installation of an abatement system in the tail-gas leaving the absorption column of a nitric acid plant to destroy the N_2O generated in the ammonia burner unit.

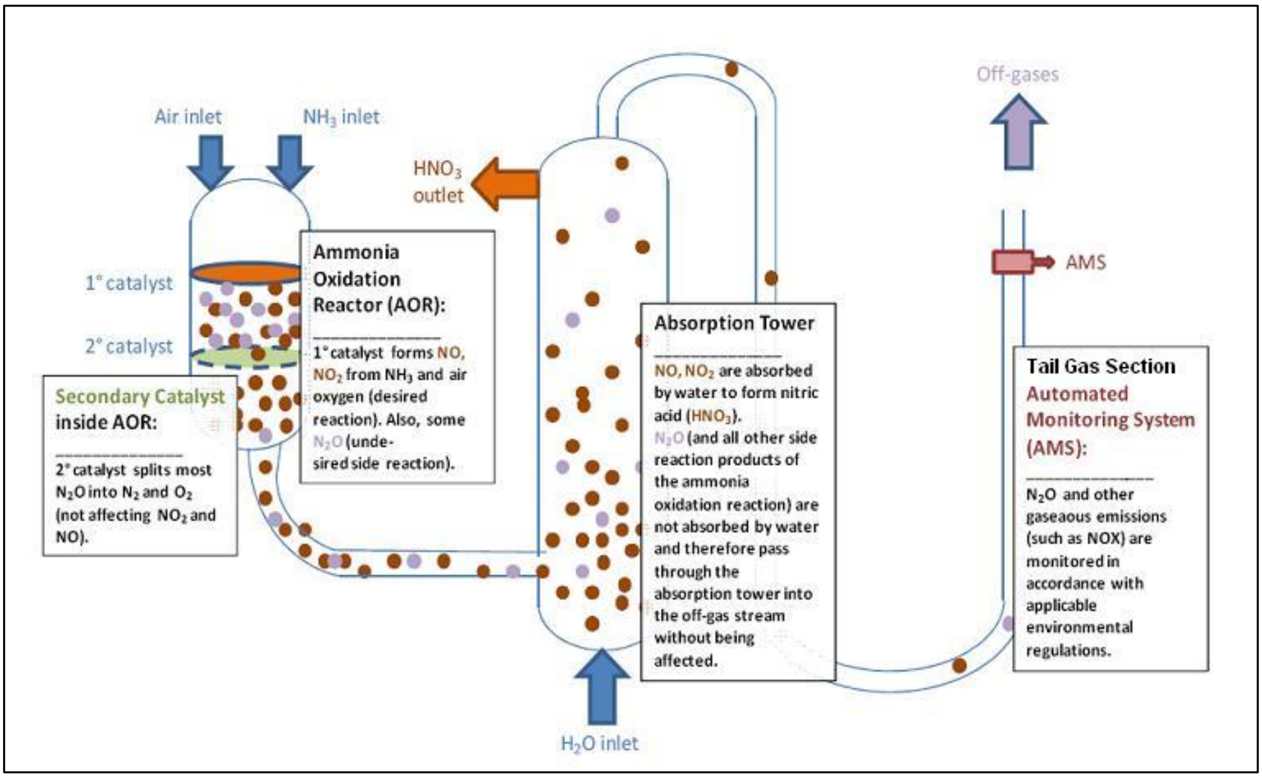
5. Baseline methodology

5.1. Project boundary

13. The spatial extent of the project boundary encompasses the facility and equipment for the nitric acid production process from the inlet of the ammonia burner to the outlet of the tail gas section.

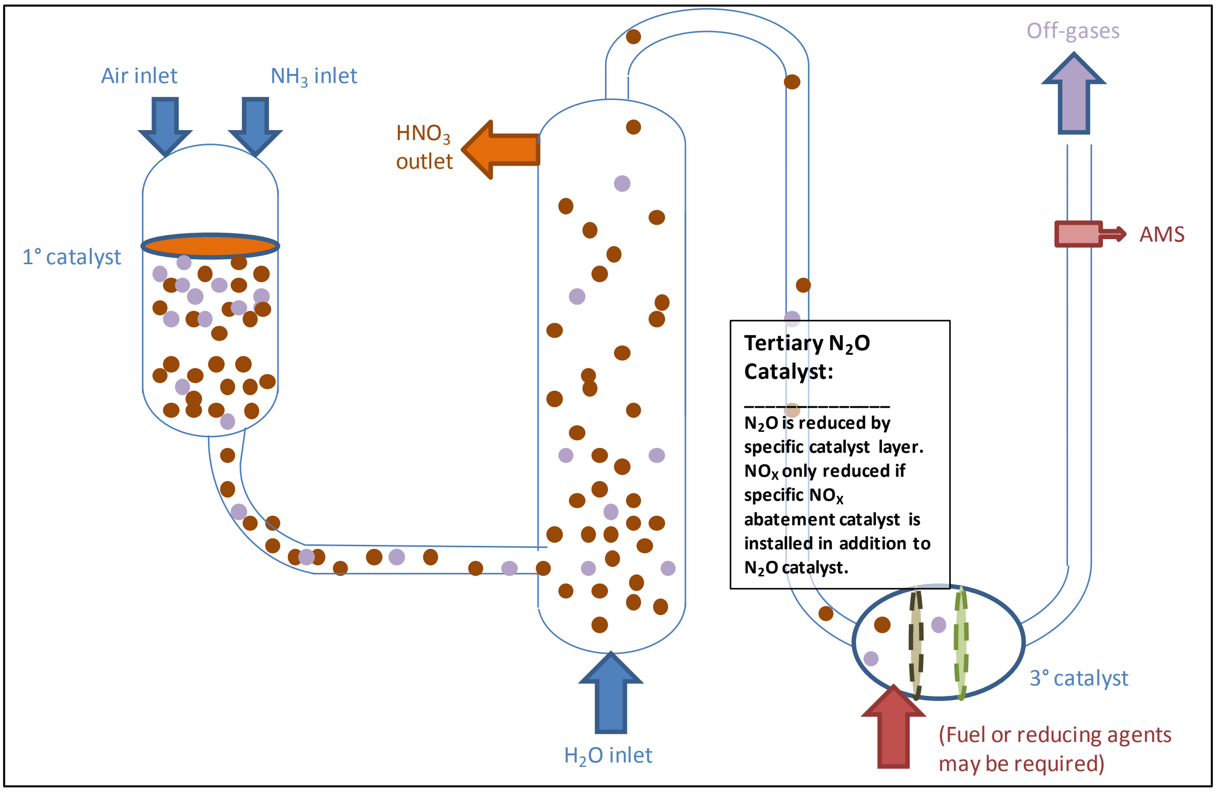
14. If the project activity introduces only secondary and no tertiary N_2O abatement, then the only gas to be included as project emissions is the N_2O that is not destroyed and is still present in the tail gas stream of the plant. The situation using a secondary abatement technology is illustrated below in Figure 1.

Figure 1. Project boundary if the project activity includes the introduction of a secondary N_2O abatement measure (simplified standard nitric plant layout displaying the location of the N_2O abatement catalyst, process sources of N_2O and the sampling point location for the Automated Monitoring System (AMS))



15. If the project activity introduces tertiary N_2O abatement, then any remaining N_2O emissions from the project plant and CO_2 emissions arising from the operation of the tertiary N_2O abatement system are included as project emissions in the project boundary. The situation using a tertiary N_2O abatement technology is illustrated below in Figure 2.

Figure 2. Project boundary if the project activity includes the introduction of a tertiary N_2O abatement measure (simplified standard nitric plant layout displaying the location of the N_2O abatement catalyst, process sources of N_2O and the sampling point location for the Automated Monitoring System (AMS))



16. The greenhouse gases included in or excluded from the project boundary are shown in Table 2.

Table 2. Emission sources included in or excluded from the project boundary

	Source	Gas	Included	Justification/Explanation
Baseline	NH3 oxidation at the primary catalyst gauze	CO_2	No	The project activity has no influence on these types of emissions, if present
		CH_4	No	
		N_2O	Yes	Included, main emission source
Project activity	NH3 oxidation at the primary catalyst gauze	CO_2	No	The project activity has no influence on these types of emissions, if present
		CH_4	No	
		N_2O	Yes	Included, main emission source
	Operation of a tertiary N_2O Abatement facility	CO_2	Yes	In some cases, fossil fuels are used as reducing agent and/or for decomposing the tail gas as part of a tertiary N_2O abatement facility. In this case the fossil fuels are mainly

Source		Gas	Included	Justification/Explanation
		CH_4	No	converted to CO_2. CO_2 emissions arising from the production of ammonia are assumed to be small and not taken into account
		N_2O	Yes	Included

5.2. Identification of the baseline scenario and demonstration of additionality

17. In the absence of regulations requiring the abatement of N_2O emissions, the operator of the nitric acid plant has no economic incentives to take any N_2O abatement measures because this entails capital and operating costs but no financial benefits. Therefore, the CDM project activity is considered additional and the baseline scenario is that the N_2O is emitted to the atmosphere with no N_2O abatement measure being implemented.

5.3. Baseline emissions

5.3.1. Case 1: For nitric acid plants that have used AM0028 or AM0034 in the first crediting period

18. For nitric acid plants that have used AM0028 or AM0034 in the first crediting period and apply this methodology in their second or third crediting period, the baseline emissions are calculated as follows:

$$BE_y = \begin{pmatrix} min\{P_{production,y};P_{product,max}\}\times EF_{existing,y}+ \\ max\{P_{production,y}-P_{product,max};0\}\times EF_{new,y} \end{pmatrix} \times \frac{(h_y-h_{r,y})}{h_y} \times GWP_{N2O} \times 10^{-3}$$ Equation (1)

Where:

BE_y	=	Baseline emissions in year *y* (t CO_2e)
$P_{product,max}$	=	Design capacity (t HNO_3)
$P_{production,y}$	=	Production of nitric acid in year *y* (t HNO_3)
$EF_{existing,y}$	=	N_2O emission factor for nitric acid plants that have used AM0028 or AM0034 in the first crediting period in year *y* (kg N_2O/t HNO_3)
$EF_{new,y}$	=	Baseline N_2O emission factor for nitric acid production in year *y* (kg N_2O/t HNO_3)
GWP_{N2O}	=	Global Warming Potential of N_2O valid for the commitment period
h_y	=	Number of hours in year *y* during which the plant was in operation (h)
$h_{r,y}$	=	Number of hours (h) in year *y* where: For secondary N_2O abatement: the abatement system was not installed, underperforming or failed; For tertiary N_2O abatement: the abatement system is by-passed, underperforming or failed

Box 1. Non-binding best practice example 1: Design capacity (case 1)

Project participants that have used AM0028 and AM0034 in the first crediting period and apply ACM0019 for the second crediting period will calculate the baseline emissions in year *y* based on the actual production of nitric acid ($P_{production,y}$), which is capped by the maximum design capacity of the plant ($P_{product,max}$).

Example – A project activity is implemented in a nitric acid plant with a design capacity of 1000 tons per day, which based on the projected operation of 300 days/year it leads to a yearly maximum capacity of 300,000 tons per year. In any given year when the achieved production exceeds 300,000 tons, the baseline emissions are capped and emission reductions are not claimed for the additional production.

19. The N_2O emission factor for nitric acid plants that have used AM0028 and AM0034 in the first crediting period ($EF_{exisitng,y}$) will be calculated as follows:

$$EF_{existing,y} = min\{EF_{historical}; EF_{default,y}\}$$ Equation (2)

Where:

$EF_{existing,y}$	=	N_2O emission factor for nitric acid plants that have used AM0028 or AM0034 in the first crediting period in year *y* (kg N_2O/t HNO3)
$EF_{historical}$	=	Historical baseline emission factor of the nitric acid plant (kg N_2O/t HNO3)
$EF_{default,y}$	=	Default emission factor according to the operating pressure of the ammonia burner in year *y* (kg N_2O/t HNO3)

Box 2. Non-binding best practice example 2: N_2O emission factor for nitric acid plants that have used AM0028 or AM0034 in the first crediting period (case 1)

Project participants that have used AM0028 and AM0034 in the first crediting period will calculate the N_2O emission factor ($EF_{exisitng,y}$) based on the lowest values obtained during the first crediting period, capped by a default emission factor ($EF_{default,y}$).

Example 1- A project activity involves a medium pressure plant (200k – 600k Pa) that was registered in 2007, applying AM0028 for the first crediting period and applies ACM0019 in the second crediting period.

In order to calculate emission reductions in year *y* of the monitoring period, the project participant calculate the N_2O emission factor ($EF_{existing,y}$) as the minimum between the lowest baseline emission factor that was actually obtained during the first crediting period ($EF_{historical}$) and the default emission factor ($EF_{default,y}$) corresponding to the operating pressure of the ammonia burner.

The default emission factors will vary every year, decreasing by 0.2 kg N_2O/t HNO_3 each year. For medium pressure ammonia burners, in year 2013, the emission factors would be 8.4, decreasing by 0.2 kg N_2O/t HNO_3 each subsequent year, as provided in section 5.7 below "data and parameters not monitored".

Example 2- A project activity implemented at low pressure plant (0 – 200 k Pa) was registered in 2007 using AM0034 and applies ACM0019 in the second crediting period.

In order to calculate emission reductions in year *y* of the monitoring period, the project participant calculate the N_2O emission factor ($EF_{existing,y}$) as the minimum between the lowest baseline emission factor that was actually obtained in the project campaign of all the verified monitoring periods for which the certified emission reductions have been issued in the first crediting period ($EF_{historical}$) and the default emission factor ($EF_{default,y}$) corresponding to the operating pressure of the ammonia burner.

For low pressure ammonia burners, in year 2013, the emission factors would be 5.5, decreasing by 0.2 kg N_2O/t HNO_3 each subsequent year, as provided in section 5.7 below "data and parameters not monitored".

5.3.2. Case 2: For other nitric acid plants

20. Baseline emissions are calculated as follows:

$$BE_y = P_{production,y} \times EF_{new,y} \times \frac{(h_y - h_{r,y})}{h_y} \times GWP_{N2O} \times 10^{-3}$$ Equation (3)

Where:

BE_y	=	Baseline emissions in year *y* (t CO2e)
$P_{production,y}$	=	Production of nitric acid in year *y* (t HNO3)
$EF_{new,y}$	=	Baseline N_2O emission factor for nitric acid production in year *y* (kg N_2O/t HNO3)
GWP_{N2O}	=	Global Warming Potential of N_2O valid for the commitment period
h_y	=	Number of hours in year *y* during which the plant was in operation (h)

$h_{r,y}$	=	Number of hours (h) in year *y* where: (a) For secondary N_2O abatement. Abatement system was not installed, underperforming or failed; (b) For tertiary N_2O abatement. The abatement system is by-passed, underperforming or failed

Box 3. Non-binding best practice example 3: N_2O emission factor for nitric acid production (case 2)

> Project activities that involve new plants, project participants will calculate the baseline emissions based on the N_2O emission factor for nitric acid production for year *y* ($EF_{new,y}$).
>
> Example - A project activity consisting of a tertiary N_2O abatement facility was registered on 2012 applying ACM0019.
>
> In year 2013 of the monitoring period, the project participant determine the $EF_{new,y}$ according on the corresponding value of 3.70 kg N_2O/t HNO_3 for year 2013, as provided in section 5.7 below "data and parameters not monitored".

5.3.3. Calculation of $h_{r,y}$

21. An abatement system is deemed to be bypassed, not working, underperform or failed in the hour *h* in year *y* if:

5.3.3.1. Case 1: For nitric acid plants that have used AM0028 or AM0034 in the first crediting period

$$F_{N2O,tail\ gas,h} > EF_{existing\ y} \times P_{NA,h} \quad \text{Equation (4)}$$

Where:

$P_{NA,h}$	=	Nitric acid produced in the hour *h* (t HNO_3)
$EF_{existing\ y}$	=	Default N_2O emission factor for nitric acid plants that have used AM0028 or AM0034 in the first crediting period in year *y* (kg N_2O/t HNO_3)
$F_{N2O,tail\ gas,h}$	=	Mass flow of N_2O in the gaseous stream of the tail gas in the hour *h* (kg N_2O/h)

5.3.3.2. Case 2: For other nitric acid plants

$$F_{N2O,tail\ gas,h} > EF_{New,y} \times P_{NA,h} \quad \text{Equation (5)}$$

Where:

$P_{NA,h}$	=	Nitric acid produced in the hour *h* (t HNO_3)
$EF_{new,y}$	=	Baseline N_2O emission factor for nitric acid production in year *y* (kg N_2O/t HNO_3)

$F_{N2O,tail\ gas,h}$	=	Mass flow of N_2O in the gaseous stream of the tail gas in the hour *h* (kg N_2O/h)

5.4. Project emissions

22. Project emissions include emissions of N_2O which have not been destroyed by the project activity and, in case of the installation of a tertiary N_2O abatement facility, CO_2 emissions resulting from the operation of the N_2O abatement facility.

23. Project emissions are calculated as follows:

$$PE_y = PE_{N2O,y} + PE_{CO2,tertiary,y}$$ Equation (6)

Where:

PE_y	=	Project emissions in year *y* (t CO_2e)
$PE_{N2O,y}$	=	Project emissions of N_2O from the project plant in year *y* (t CO_2e)
$PE_{CO2,tertiary,y}$	=	Project emissions of CO_2 from the operation of the tertiary N_2O abatement facility in year *y* (t CO_2)

5.4.1. Project emissions of N_2O from the project plant ($PE_{N2O,y}$)

24. The amount of N_2O emissions from the project activity are the emissions from the N_2O contained in the tail gas stream of the plant which is released to the atmosphere.

25. Accordingly, $PE_{N2O,y}$ is determined as follows:

$$PE_{N2O,y} = \sum_{1}^{h_y - h_{r,y}} F_{N2O,tail\ gas,h} \times GWP_{N20} \times 10^{-3}$$ Equation (7)

Where:

$PE_{N2O,y}$	=	Project emissions of N_2O from the project plant in year *y* (t CO_2e)
GWP_{N20}	=	Global warming potential of N_2O valid for the commitment period
$F_{N2O,tail\ gas,h}$	=	Mass flow of N_2O in the gaseous stream of the tail gas in the hour *h* (kg N_2O/h)
h_y	=	Number of hours in year *y* during which the plant was in operation (h)
$h_{r,y}$		Number of hours (h) in year *y* where: (a) For secondary N_2O abatement. Abatement system was not installed, underperforming or failed; (b) For tertiary N_2O abatement. The abatement system is by-passed, underperforming or failed

5.4.2. Determination of $F_{N2O,tail\ gas,h}$

26. The amount of N_2O emissions from the tail gas stream of the project plant shall be determined using the “Tool to determine the mass flow of a greenhouse gas in a gaseous stream”.

27. In applying the tool, the following provisions apply:

   (a) Throughout the crediting periods of the project activity, the N_2O concentration and volume or mass flow of the tail gas are to be monitored continuously. The monitoring system is to be installed and maintained throughout the crediting period based on the European Norm 14181 (2004), or any more recent update of that standard;

   (b) The monitoring system should provide separate hourly average values for the N_2O concentration and the volume or mass flow of the tail gas based on two seconds (or shorter) interval readings that are recorded and stored electronically. These N_2O data sets shall be identified by means of a unique time/date key indicating when exactly the values were observed;

   (c) The correction factors derived from the calibration curve of the QAL2 audit for the monitoring components as determined during the QAL2-test in accordance with EN14181 must be applied to both the N_2O concentration and the volume or mass flow of the tail gas. This can either be applied automatically to the raw data recorded by the data storage system at the plant or it can be applied to the calculated hourly averages as part of the calculation of project emissions;

   (d) If data for either the N_2O concentration or the volume or mass flow of the tail gas are not available for more than 1/3 of any hour while the plant was in operation, the value for that hour shall be replaced with the maximum value of N_2O concentration or volume or mass flow of the tail gas observed during the monitoring period. If data for neither the N_2O concentration nor the volume or mass flow of the tail gas are available for more than 1/3 of any hour while the plant was in operation, the maximum value of mass flow of N_2O calculated during the monitoring period shall be applied to any such hour. Values observed during five operating hours before and after a plant start-up and shut-down shall not be used for the determination of the maximum values;

   (e) In the case that the N_2O concentration and the volume or mass flow of the tail gas and by-pass are automatically converted to normal conditions by the AMS during the monitoring process, the parameters P_t and T_t do not need to be monitored except, if applicable, for the purpose of determining the moisture content in the gaseous stream.

Box 4. Non-binding best practice example 4: Installation and maintenance of the monitoring system

The monitoring system is to be installed and maintained throughout the crediting period based on the European Norm 14181 or any more recent update of that standard. Example - A project activity that involves the implementation and operation of an N_2O abatement system at a nitric acid plant follows European Norm 14181 to establishment quality assurance levels (QAL) for the automated measuring systems (AMS). The project participants implement the procedure QAL2 to calibrate the AMS and determine the variability of the measured values at least once every 3 years, and the procedure QAL3 to yearly maintain and demonstrate the required quality of the measurement results during the normal operation of the AMS.

5.4.3. Project emissions from the operation of the tertiary N_2O abatement facility ($PE_{CO2,tertiary,y}$)

28. This emission source only needs to be estimated if a tertiary N_2O abatement facility is installed under the project activity and if fossil fuels are used to operate the facility or re-heat the gas after the facility.

29. The emissions related to the operation of the N_2O destruction facility include only on-site emissions due to the fossil fuel use as input to the N_2O destruction facility:

$$PE_{CO2,tertiary,y} = PE_{FF,y} \quad \text{Equation (8)}$$

Where:

$PE_{CO2,tertiary,y}$	=	Project emissions of CO_2 from the operation of the tertiary N_2O abatement facility in year *y* (t CO_2)
$PE_{FF,y}$	=	Project emissions related to fossil fuel input to the destruction facility and/or re-heater in year *y* (t CO_2)

30. Project proponents shall use the latest version of the “Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion” to calculate the project emissions related to fossil fuels used in year *y*.

31. Specific guidance on the use of the tool:

    (a) The parameter $PE_{FC,j,y}$ used in the “Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion” corresponds to the parameter $PE_{FF,y}$in this methodology; and

    (b) The element process *j* in the tool corresponds to the consumption of fossil fuels for the operation of the tertiary N_2O abatement facility and/or the re-heating of the tail gas.

5.5. Leakage

32. Any leakage emissions sources are deemed to be negligible.

5.6. Emission reductions

33. Emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y \quad \text{Equation (9)}$$

Where:

ER_y	=	Emission reductions in year *y* (t CO_2e)
BE_y	=	Baseline emissions in year *y* (t CO_2e)
PE_y	=	Project emissions in year *y* (t CO_2e)

5.7. Data and parameters not monitored

34. In addition to the parameters listed in section 5.7, the provisions on data and parameters not monitored in the tools referred to in this methodology apply.

Data / Parameter table 1.

Data / Parameter:	**Operating pressure**
Data unit:	KPa
Description:	Operating pressure of the ammonia burner
Source of data:	Manufacturer specifications
Measurement procedures (if any):	None
Any comment:	The parameter is used to determine whether the nitric acid plant operates at a low, medium or high pressure

Data / Parameter table 2.

Data / Parameter:	$EF_{historical}$
Data unit:	kg N_2O/t HNO_3
Description:	Historical baseline emission factor of the nitric acid plant
Source of data:	Historical information from issuance reports of CDM-PDD documents
Measurement procedures (if any):	(a) For plants that used AM0028 in the first crediting period: use the lowest baseline emission factor obtained in one calendar year, from 1 January to 31 December, obtained during the first crediting period; (b) For plants that used AM0034 in the first crediting period: use the lowest baseline emission factor obtained in any project campaign among all the verified monitoring periods on the first crediting period for which certified emission reductions have been issued in accordance with the methodology AM0034.

Any comment:	This value will remain constant over the second and third crediting period

Data / Parameter table 3.

Data / Parameter:	$EF_{default,y}$
Data unit:	kg N_2O/t HNO_3
Description:	Default emission factor according to the operating pressure of the ammonia burner in year *y* (related to 100 per cent pure acid)
Source of data:	This default N_2O baseline emission factor will vary every year. In the year 2013 the emission factors will be 5.5; 8.4; and 12.6 Kg N_2O/t HNO_3 for low, medium and high pressure ammonia burners respectively. For each subsequent year, the emission factors will decrease by 0.2 kg N_2O/t HNO_3 until they reach a respective value of 2.5, 5.0 or 9.2. After 2030 the emission factor will remain constant over time: (see table below)
Measurement procedures (if any):	None
Any comment:	The decrease in the value for the baseline emission factor over time is to reflect the technological development

Year	Low pressure (0 – 200 kPa)	Medium pressure (200 – 600kPa)	High pressure (Over 600 kPa)
2013	5.5	8.4	12.6
2014	5.3	8.2	12.4
2015	5.1	8.0	12.2
2016	4.9	7.8	12.0
2017	4.7	7.6	11.8
2018	4.5	7.4	11.6
2019	4.3	7.2	11.4
2020	4.1	7.0	11.2
2021	3.9	6.8	11.0
2022	3.7	6.6	10.8
2023	3.5	6.4	10.6
2024	3.3	6.2	10.4
2025	3.1	6.0	10.2
2026	2.9	5.8	10.0
2027	2.7	5.6	9.8
2028	2.5	5.4	9.6
2029	2.5	5.2	9.4
2030	2.5	5.0	9.2

Data / Parameter table 4.

Data / Parameter:	***$EF_{new,y}$***
Data unit:	kg N_2O/t HNO_3
Description:	Baseline N_2O emission factor for nitric acid production in year *y* (related to 100 per cent pure acid)
Source of data:	The baseline N_2O emission factor for nitric acid production will vary every year. In year 2005 the emission factor will be 5.1 and then it will decrease every year until it reaches a final value of 2.5 in the year 2020. The value of 2.5 will remain constant after 2020, as provided in the following table: (see table below)
Measurement procedures (if any):	None
Any comment:	The decrease in the value for the baseline emission factor over time is to reflect the technological development

Year	**Emission factor (kgN_2O/t HNO_3)**
2005	5.10
2006	4.90
2007	4.70
2008	4.60
2009	4.40
2010	4.20
2011	4.10
2012	3.90
2013	3.70
2014	3.50
2015	3.40
2016	3.20
2017	3.00
2018	2.80
2019	2.70
2020	2.50
2021	2.50
2022	2.50
2023	2.50
…	…
Year n	2.50

Data / Parameter table 5.

Data / Parameter:	$P_{product,max}$
Data unit:	t Product
Description:	Design capacity of nitric acid production during the first crediting period
Source of data:	Project operator and/or technology provider
Measurement procedures (if any):	-
Any comment:	This parameter is only for project activities applying case 1

Data / Parameter table 6.

Data / Parameter:	GWP_{N2O}
Data unit:	t CO_2e/t N_2O
Description:	Global warming potential of N_2O valid for the commitment period
Source of data:	Relevant decisions by the CMP
Measurement procedures (if any):	None
Any comment:	-

6. Monitoring methodology

6.1. Archival of monitoring information

35. All data collected as part of monitoring should be archived electronically and be kept at least for two years after the end of the last crediting period. One hundred per cent of the data should be monitored if not indicated otherwise in the tables below. All measurements should be conducted with calibrated measurement equipment according to relevant industry standards.

36. In addition, the monitoring provisions in the tools referred to in this methodology apply.

6.2. Data and parameters monitored

Data / Parameter table 7.

Data / Parameter:	$P_{production,y}$
Data unit:	$tHNO_3$
Description:	Nitric acid produced in year *y*
Source of data:	Measurements by project participants and production reports
Measurement procedures (if any):	-
Monitoring frequency:	Every monitoring period
QA/QC procedures:	Measurement devices such as weight scales shall follow QA/QC supplier recommendations
Any comment:	-

Data / Parameter table 8.

Data / Parameter:	h_y
Data unit:	H
Description:	Number of hours of operation in year *y*
Source of data:	Measured
Measurement procedures (if any):	-
Monitoring frequency:	Every monitoring period
QA/QC procedures:	-
Any comment:	Records to be maintained during project's lifetime

Data / Parameter table 9.

Data / Parameter:	$h_{r,y}$
Data unit:	h
Description:	Number of hours (*h*) in year *y* where: (a) For secondary N_2O abatement. Abatement system was not installed, underperforming or failed; (b) For tertiary N_2O abatement. The abatement system is by-passed, underperforming or failed
Source of data:	Measured
Measurement procedures (if any):	-
Monitoring frequency:	Every monitoring period
QA/QC procedures:	-
Any comment:	Records to be maintained during project's lifetime

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Document information

Version	*Date*	*Description*
04.0	29 November 2018	EB 101, Annex 10 The revision is to include non-binding best practice examples.
03.0	1 November 2017	EB 97, Annex 6 The revision clarifies the definition of the term historical baseline emissions factor.
02.0	31 May 2013	EB 73, Annex 7

Version	*Date*	*Description*
		The revision: • Provides default emission factors that can be adopted at the renewal of the crediting period for projects currently using AM0028 and AM0034 for nitric acid production project activities; • Allows project participants not to account for emission reductions whenever the project emissions exceed the baseline emission benchmark; • Incorporates provisions from "AM0034: Catalytic reduction of N_2O inside the ammonia burner of nitric acid plants" and "AM0051: Secondary catalytic N_2O destruction".
01.0.0	3 June 2011	EB 61, Annex 4 Initial adoption.

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