Monitoring Report Sheet (Input Sheet) [For Verification]

Table 1: Parameters monitored *ex post*

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
Monitoring period	Monitoring point No.	Parameters	Description of data	Monitored Values	Units	Monitoring option	Source of data	Measurement methods and procedures	Monitoring frequency	Other comments
25/01/2017-31/12/2017	(1)	$EC_{PJ,i,p}$	Power consumption of project electrolyzer during the period *p*	-	MWh/p	Option C	Monitored data	Electric current and cell voltage are measured by measuring equipment. - Calibration: Cell voltage: based on the manual "Calibration Verification Procedure for CVMS System" (MNT-INST-P022) Electric Current: based on the manual "Calibration Procedure for GEFRAN Meter (kA meter)," (MNT-INST-P023) - QA/QC QA/QC is based on the following manual; "Monitoring of Electrolyzers Performance in Chlor Alkali Plant" (PE-P-001)	Continuously	Input on "MRS (input_separate)"
NA	(2)	$FC_{PJ,p}$	The amount of fuel input for power generation during monitoring period *p*	-	mass or volume/p	Option B	Invoice from fuel supply company	Data is collected and recorded from the invoices by the fuel supply company.	Continuously	for option b)
NA	(3)	$EG_{PJ,p}$	The amount of electricity generated during the monitoring period *p*	-	MWh/p	Option C	Monitored data	Data is measured by measuring equipment. The measuring equipment is replaced or calibrated at an interval following the regulations in the country in which the measuring equipment is commonly used or according to the manufacturer's recommendation, unless a type approval, manufacturer's specification, or certification issued by an entity accredited under international/national standards for the measuring equipment has been prepared by the time of installation.	Continuously	for option b)

Table 2: Project-specific parameters fixed *ex ante*

(a)	(b)	(c)	(d)	(e)	(f)
Parameters	Description of data	Estimated Values	Units	Source of data	Other comments
EF_{elec}	[For grid electricity] CO_2 emission factor for consumed electricity	0.654	tCO_2/MWh	The most recent value announced by the National Committee for the Clean Development Mechanism (Saudi Arabia DNA for CDM), unless otherwise instructed by the Joint Committee.	
EF_{elec}	[For captive electricity] CO_2 emission factor for consumed electricity **Option a)**	0.000	tCO_2/MWh	NA	NA
EF_{elec}	[For captive electricity] CO_2 emission factor for consumed electricity **Option b)**	0.000	tCO_2/MWh	NA	NA
EF_{elec}	[For captive electricity] **In case the captive electricity generation system meets all of the following conditions;** - The system is non-renewable generation system - Electricity generation capacity of the system is less than or equal to 15 MW	-	tCO_2/MWh	NA	NA
$SEC_{RE,i}$	Specific electricity consumption of the reference electrolyzer *i*	-	kWh(DC)/t-NaOH	Selected from the default values set in the methodology.	Input on "MPS(input_separate)"
$SEC_{PJ,i}$	Specific electricity consumption of the project electrolyzer *i*	-	kWh(DC)/t-NaOH	Performance guarantee by manufacturer of the project electolyzer.	Input on "MPS(input_separate)"
η_{elec}	Power generation efficiency	-	%	NA	NA
NCV_{fuel}	Net calorific value of consumed fuel	-	GJ/mass or volume	NA	NA
EF_{fuel}	CO_2 emission factor of consumed fuel	-	tCO_2/GJ	NA	NA

Table3: *Ex-post* calculation of CO_2 emission reductions

Monitoring period	CO_2 emission reductions	Units
25/01/2017-31/12/2017	3,000	tCO_2/p

[Monitoring option]

Option A	Based on public data which is measured by entities other than the project participants (Data used: publicly recognized data such as statistical data and specifications)
Option B	Based on the amount of transaction which is measured directly using measuring equipment (Data used: commercial evidence such as invoices)
Option C	Based on the actual measurement using measuring equipment (Data used: measured values)

Monitoring Spreadsheet: JCM_SA_AM001_ver01.0
Reference Number: SA001

		Parameters monitored *ex post*			Project-specific parameters fixed *ex ante*									Calculation of emissions of electrolyzer *i*		
Parameters	Electrolyzer *i*	$EC_{PJ,i,p}$	$FC_{PJ,p}$	$EG_{PJ,p}$	EF_{elec}	EF_{elec}	EF_{elec}	EF_{elec}	$SEC_{RE,i}$	$SEC_{PJ,i}$	η_{elec}	NCV_{fuel}	EF_{fuel}	$RE_{i,p}$	$PE_{i,p}$	$ER_{i,p}$
Description of data	Project electrolyzer No.	Power consumption of project electrolyzer *i* during the period *p*	The amount of fuel input for power generation during monitoring period *p*	The amount of electricity generated during the monitoring period *p*	[For grid electricity] CO_2 emission factor for consumed electricity	[For captive electricity] CO_2 emission factor for consumed electricity **Option a)**	[For captive electricity] CO_2 emission factor for consumed electricity **Option b)**	[For captive electricity] CO_2 emission factor for consumed electricity	Specific electricity consumption of the reference electrolyzer *i*	Specific electricity consumption of the project electrolyzer *i*	Power generation efficiency	Net calorific value of consumed fuel	CO_2 emission factor of consumed fuel	Reference emissions of project electrolyzer *i* during the period *p*	Project emissions of project electrolyzer *i* during the period *p*	Emissions reductions by the project electrolyzer *i* during the period *p*
Units	-	MWh/p	mass or volume/p	MWh/p	tCO_2/MWh	tCO_2/MWh	tCO_2/MWh	tCO_2/MWh	kWh(DC)/t-NaOH	kWh(DC)/t-NaOH	%	GJ/mass or volume	tCO_2/GJ	tCO_2/p	tCO_2/p	tCO_2/p
Monitored/ estimated values	1	23,191.35	-	-	0.654	0.000	0.000	-	2,088.00	1,990.00	-	-	-	15,914.07	15,167.15	746.92
	2	23,176.48	-	-	0.654	0.000	0.000	-	2,088.00	1,990.00	-	-	-	15,903.86	15,157.42	746.45
	3	23,410.88	-	-	0.654	0.000	0.000	-	2,088.00	1,990.00	-	-	-	16,064.71	15,310.71	753.99
	4	23,387.98	-	-	0.654	0.000	0.000	-	2,088.00	1,990.00	-	-	-	16,049.00	15,295.74	753.26
	5		-	-	0.654	0.000	0.000	-	0.00	0.00	-	-	-	0.00	0.00	0.00
	6		-	-	0.654	0.000	0.000	-	0.00	0.00	-	-	-	0.00	0.00	0.00
	7		-	-	0.654	0.000	0.000	-	0.00	0.00	-	-	-	0.00	0.00	0.00
	8		-	-	0.654	0.000	0.000	-	0.00	0.00	-	-	-	0.00	0.00	0.00
	9		-	-	0.654	0.000	0.000	-	0.00	0.00	-	-	-	0.00	0.00	0.00
	10		-	-	0.654	0.000	0.000	-	0.00	0.00	-	-	-	0.00	0.00	0.00
	11		-	-	0.654	0.000	0.000	-	0.00	0.00	-	-	-	0.00	0.00	0.00
	12		-	-	0.654	0.000	0.000	-	0.00	0.00	-	-	-	0.00	0.00	0.00
	13		-	-	0.654	0.000	0.000	-	0.00	0.00	-	-	-	0.00	0.00	0.00
	14		-	-	0.654	0.000	0.000	-	0.00	0.00	-	-	-	0.00	0.00	0.00
	15		-	-	0.654	0.000	0.000	-	0.00	0.00	-	-	-	0.00	0.00	0.00
	16		-	-	0.654	0.000	0.000	-	0.00	0.00	-	-	-	0.00	0.00	0.00
	17		-	-	0.654	0.000	0.000	-	0.00	0.00	-	-	-	0.00	0.00	0.00
	18		-	-	0.654	0.000	0.000	-	0.00	0.00	-	-	-	0.00	0.00	0.00
	19		-	-	0.654	0.000	0.000	-	0.00	0.00	-	-	-	0.00	0.00	0.00
	20		-	-	0.654	0.000	0.000	-	0.00	0.00	-	-	-	0.00	0.00	0.00
	Total	-	-	-	-	-	-	-	-	-	-	-	-	63,931.64	60,931.02	3,000.62

Monitoring Spreadsheet: JCM_SA_AM001_ver01.0
Reference Number: SA001

Monitoring Report Sheet (Calculation Process Sheet) [For Verification]

1. Calculations for emission reductions	Fuel type	Value	Units	Parameter
Emission reductions during the period *p*	N/A	3,000.62	tCO_2/p	ER_p
2. Calculations for reference emissions				
Reference emissions during the period *p*	N/A	63,931.64	tCO_2/p	RE_p
Reference emissions during the period *p*	N/A	63,931.64	tCO_2/p	RE_p
3. Calculations of the project emissions				
Project emissions during the period *p*	N/A	60,931.02	tCO_2/p	PE_p
Project emissions during the period *p*	N/A	60,931.02	tCO_2/p	PE_p

[List of Default Values]

Specific electricity consumption of the reference electrolyzer

Current density kA/m^2	Specific electricity consumption	
4.0≤CD<4.5	2,045	kWh(DC)/t-NaOH
4.5≤CD<5.0	2,088	kWh(DC)/t-NaOH
5.0≤CD<5.5	2,131	kWh(DC)/t-NaOH
5.5≤CD<6.0	2,174	kWh(DC)/t-NaOH
6.0≤CD<6.5	2,217	kWh(DC)/t-NaOH

Monitoring Report Sheet (Input Sheet) [For Verification]

Table 1: Parameters monitored *ex post*

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
Monitoring period	Monitoring point No.	Parameters	Description of data	Monitored Values	Units	Monitoring option	Source of data	Measurement methods and procedures	Monitoring frequency	Other comments
01/01/2018-31/08/2018	(1)	$EC_{PJ,j,p}$	Power consumption of project electrolyzer during the period *p*	-	MWh/p	Option C	Monitored data	Electric current and cell voltage are measured by measuring equipment. - Calibration: Cell voltage: based on the manual "Calibration Verification Procedure for CVMS System" (MNT-INST-P022) Electric Current: based on the manual "Calibration Procedure for GEFRAN Meter (kA meter)," (MNT-INST-P023) - QA/QC QA/QC is based on the following manual; "Monitoring of Electrolyzers Performance in Chlor Alkali Plant" (PE-P-001)	Continuously	Input on "MRS (input_separate)"
NA	(2)	$FC_{PJ,p}$	The amount of fuel input for power generation during monitoring period *p*	-	mass or volume/p	Option B	Invoice from fuel supply company	Data is collected and recorded from the invoices by the fuel supply company.	Continuously	for option b)
NA	(3)	$EG_{PJ,p}$	The amount of electricity generated during the monitoring period *p*	-	MWh/p	Option C	Monitored data	Data is measured by measuring equipment. The measuring equipment is replaced or calibrated at an interval following the regulations in the country in which the measuring equipment is commonly used or according to the manufacturer's recommendation, unless a type approval, manufacturer's specification, or certification issued by an entity accredited under international/national standards for the measuring equipment has been prepared by the time of installation.	Continuously	for option b)

Table 2: Project-specific parameters fixed *ex ante*

(a)	(b)	(c)	(d)	(e)	(f)
Parameters	Description of data	Estimated Values	Units	Source of data	Other comments
EF_{elec}	[For grid electricity] CO_2 emission factor for consumed electricity	0.654	tCO_2/MWh	The most recent value announced by the National Committee for the Clean Development Mechanism (Saudi Arabia DNA for CDM), unless otherwise instructed by the Joint Committee.	
EF_{elec}	[For captive electricity] CO_2 emission factor for consumed electricity **Option a)**	0.000	tCO_2/MWh	NA	NA
EF_{elec}	[For captive electricity] CO_2 emission factor for consumed electricity **Option b)**	0.000	tCO_2/MWh	NA	NA
EF_{elec}	[For captive electricity] **In case the captive electricity generation system meets all of the following conditions;** - The system is non-renewable generation system - Electricity generation capacity of the system is less than or equal to 15 MW	-	tCO_2/MWh	NA	NA
$SEC_{RE,i}$	Specific electricity consumption of the reference electrolyzer *i*	-	kWh(DC)/t-NaOH	Selected from the default values set in the methodology.	Input on "MPS(input_separate)"
$SEC_{PJ,i}$	Specific electricity consumption of the project electrolyzer *i*	-	kWh(DC)/t-NaOH	Performance guarantee by manufacturer of the project electolyzer.	Input on "MPS(input_separate)"
η_{telec}	Power generation efficiency	-	%	NA	NA
NCV_{fuel}	Net calorific value of consumed fuel	-	GJ/mass or volume	NA	NA
EF_{fuel}	CO_2 emission factor of consumed fuel	-	tCO_2/GJ	NA	NA

Table3: *Ex-post* calculation of CO_2 emission reductions

Monitoring period	CO_2 emission reductions	Units
01/01/2018-31/08/2018	2,300	tCO_2/p

[Monitoring option]

Option A	Based on public data which is measured by entities other than the project participants (Data used: publicly recognized data such as statistical data and specifications)
Option B	Based on the amount of transaction which is measured directly using measuring equipment (Data used: commercial evidence such as invoices)
Option C	Based on the actual measurement using measuring equipment (Data used: measured values)

Monitoring Spreadsheet: JCM_SA_AM001_ver01.0
Reference Number: SA001

		Parameters monitored *ex post*			Project-specific parameters fixed *ex ante*									Calculation of emissions of electrolyzer *i*		
Parameters	Electrolyzer *i*	$EC_{PJ,i,p}$	$FC_{PJ,p}$	$EG_{PJ,p}$	EF_{elec}	EF_{elec}	EF_{elec}	EF_{elec}	$SEC_{RE,i}$	$SEC_{PJ,i}$	η_{elec}	NCV_{fuel}	EF_{fuel}	$RE_{i,p}$	$PE_{i,p}$	$ER_{i,p}$
Description of data	Project electrolyzer No.	Power consumption of project electrolyzer *i* during the period *p*	The amount of fuel input for power generation during monitoring period *p*	The amount of electricity generated during the monitoring period *p*	[For grid electricity] CO_2 emission factor for consumed electricity	[For captive electricity] CO_2 emission factor for consumed electricity **Option a)**	[For captive electricity] CO_2 emission factor for consumed electricity **Option b)**	[For captive electricity] CO_2 emission factor for consumed electricity	Specific electricity consumption of the reference electrolyzer *i*	Specific electricity consumption of the project electrolyzer *i*	Power generation efficiency	Net calorific value of consumed fuel	CO_2 emission factor of consumed fuel	Reference emissions of project electrolyzer *i* during the period *p*	Project emissions of project electrolyzer *i* during the period *p*	Emissions reductions by the project electrolyzer *i* during the period *p*
Units	-	MWh/p	mass or volume/p	MWh/p	tCO_2/MWh	tCO_2/MWh	tCO_2/MWh	tCO_2/MWh	kWh(DC)/t-NaOH	kWh(DC)/t-NaOH	%	GJ/mass or volume	tCO_2/GJ	tCO_2/p	tCO_2/p	tCO_2/p
Monitored/ estimated values	1	17,786.62	-	-	0.654	0.000	0.000	-	2,088.00	1,990.00	-	-	-	12,205.30	11,632.45	572.85
	2	17,771.16	-	-	0.654	0.000	0.000	-	2,088.00	1,990.00	-	-	-	12,194.70	11,622.34	572.36
	3	17,938.14	-	-	0.654	0.000	0.000	-	2,088.00	1,990.00	-	-	-	12,309.28	11,731.54	577.73
	4	17,922.03	-	-	0.654	0.000	0.000	-	2,088.00	1,990.00	-	-	-	12,298.22	11,721.01	577.22
	5		-	-	0.654	0.000	0.000	-	0.00	0.00	-	-	-	0.00	0.00	0.00
	6		-	-	0.654	0.000	0.000	-	0.00	0.00	-	-	-	0.00	0.00	0.00
	7		-	-	0.654	0.000	0.000	-	0.00	0.00	-	-	-	0.00	0.00	0.00
	8		-	-	0.654	0.000	0.000	-	0.00	0.00	-	-	-	0.00	0.00	0.00
	9		-	-	0.654	0.000	0.000	-	0.00	0.00	-	-	-	0.00	0.00	0.00
	10		-	-	0.654	0.000	0.000	-	0.00	0.00	-	-	-	0.00	0.00	0.00
	11		-	-	0.654	0.000	0.000	-	0.00	0.00	-	-	-	0.00	0.00	0.00
	12		-	-	0.654	0.000	0.000	-	0.00	0.00	-	-	-	0.00	0.00	0.00
	13		-	-	0.654	0.000	0.000	-	0.00	0.00	-	-	-	0.00	0.00	0.00
	14		-	-	0.654	0.000	0.000	-	0.00	0.00	-	-	-	0.00	0.00	0.00
	15		-	-	0.654	0.000	0.000	-	0.00	0.00	-	-	-	0.00	0.00	0.00
	16		-	-	0.654	0.000	0.000	-	0.00	0.00	-	-	-	0.00	0.00	0.00
	17		-	-	0.654	0.000	0.000	-	0.00	0.00	-	-	-	0.00	0.00	0.00
	18		-	-	0.654	0.000	0.000	-	0.00	0.00	-	-	-	0.00	0.00	0.00
	19		-	-	0.654	0.000	0.000	-	0.00	0.00	-	-	-	0.00	0.00	0.00
	20		-	-	0.654	0.000	0.000	-	0.00	0.00	-	-	-	0.00	0.00	0.00
	Total	-	-	-	-	-	-	-	-	-	-	-	-	49,007.49	46,707.33	2,300.16

Monitoring Spreadsheet: JCM_SA_AM001_ver01.0
Reference Number: SA001

Monitoring Report Sheet (Calculation Process Sheet) [For Verification]

1. Calculations for emission reductions	Fuel type	Value	Units	Parameter
Emission reductions during the period *p*	N/A	2,300.16	tCO_2/p	ER_p
2. Calculations for reference emissions				
Reference emissions during the period *p*	N/A	49,007.49	tCO_2/p	RE_p
Reference emissions during the period *p*	N/A	49,007.49	tCO_2/p	RE_p
3. Calculations of the project emissions				
Project emissions during the period *p*	N/A	46,707.33	tCO_2/p	PE_p
Project emissions during the period *p*	N/A	46,707.33	tCO_2/p	PE_p

[List of Default Values]

Specific electricity consumption of the reference electrolyzer

Current density kA/m^2	Specific electricity consumption	
4.0≤CD<4.5	2,045	kWh(DC)/t-NaOH
4.5≤CD<5.0	2,088	kWh(DC)/t-NaOH
5.0≤CD<5.5	2,131	kWh(DC)/t-NaOH
5.5≤CD<6.0	2,174	kWh(DC)/t-NaOH
6.0≤CD<6.5	2,217	kWh(DC)/t-NaOH