Climate project methodology No. 0017

New cogeneration project activities supplying electricity and heat to multiple customers

Developer: Yu. A. Izrael Institute of Global Climate and Ecology

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Contents

1. Terms and definitions

For the purpose of this methodology, the following definitions apply[1]:

Reference energy generation facility is the most plausible facility generating power and/or heat in the absence the proposed CDM project. The reference energy generation facility should be defined in accordance with Section 3 (*Baseline methodology*) hereof. It should be demonstrated that the reference energy generation facility is widely used in the region/country to produce outputs or services comparable with the proposed project activity.

Cogeneration facility is a facility that generates electricity and heat simultaneously by use of fossil fuels.

Crediting period is the period in which verified and certified GHG emission reductions or increases in net anthropogenic GHG removals by sinks attributable to a climate project activity, as applicable, can result in the issuance of carbon units. The time period that applies to a crediting period for a climate project activity, and whether the crediting period is renewable or fixed, is determined in accordance with Section 4 of this methodology.

Project facility is a new fossil-fuel-based cogeneration facility established through investment as CDM project activity that is either a new construction with no operational history or has less than 5 years of operation in case of project validation before 31.12.2025 and less than 2 years of operation in case of project validation after 31.12.2025, developed to generate and supply electricity and/or heat directly to recipient facility(ies) and/or to the grid or heat network.

Heat is thermal energy that is generated in a heat generation facility (e.g. a boiler, a cogeneration plant, thermal solar panels, etc.) and transferred to a heat carrier (e.g. liquids, gases, steam, etc.) for utilization in thermal applications and processes.

Specific heat is the net quantity of thermal energy per unit of mass of heat carrier that is generated in the project facility. For example, in case of a boiler it refers to the difference of the specific enthalpy of the steam generated in the boiler and the specific enthalpy of the feed water.

Heat network is the spatial extent of the heat generation facilities that are physically connected through a heating pipeline (e.g. pipeline network that supplies heat to several recipient facility(ies)), where project heat can be dispatched in this network without transmission constraints.

Recipient facility is the facility that consumes electricity and heat supplied by the CDM project activity.

Power grid is defined by the spatial extent of the power plants that are physically connected through transmission and distribution lines to the project activity (e.g. the cogeneration plant location or the recipient facility(ies) where electricity is consumed) and that can be dispatched without significant transmission constraints.

Power plant is a power plant designed for the production of electrical energy, containing a construction part, energy conversion equipment and necessary auxiliary equipment according to GOST 19431-84[2][3].

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[1] When using the regulations and sets of rules referenced in this methodology, it is recommended to check the validity of reference documents in the public information system: on the official website of the federal executive body in the field of standardization on the Internet or according to the annual information index “National Standards”.

[2] GOST 24291-90 Interstate Standard. The Electrical Part of the Power Plant and the Electrical Network. Terms and Definitions.

[3] Reference methodologies developed within the framework of the Clean Development Mechanism use the following interpretation for this term: **Power plant/unit** is a facility that generates electric power. Several power units at one site comprise one power plant, whereas a power unit is characterized by the fact that it can operate independently from

Electric power system (grid) is a set of electric power industry facilities and power receiving installations of electric power consumers, connected by a common mode of operation in a single technological process of production, transmission and consumption of electric energy under conditions of centralized operational dispatch control in the electric power industry[4,5].

2. Scope and applicability

The following table describes the key elements of the methodology:

Table 1. Methodology key elements

Typical projects	Fossil-fuel-fired cogeneration project (Project facility[6]) supplying heat and electricity to multiple project customers
Type of GHG emissions mitigation action	Energy efficiency Switch to cogeneration of steam and electricity

This methodology is unaffected by any greenhouse gases (GHG) programs[7]. If a GHG program[8] is applied, the requirements of this program supplement the requirements of the methodology. This methodology is based on the existing methodology developed under the Clean Development Mechanism (AM0048), and includes its adaptation to the current Russian regulations and standards.

2.1. Scope

This methodology applies to project activities that implement new fossil-fuel-fired cogeneration facilities (hereinafter, “project cogeneration facilities” or “Project facilities”).

The type of fossil fuel used in the baseline scenario and in the implementation of the project activity is not changed. The ratio of heat production to electricity production should be >1.

2.2. Applicability

This methodology applies to new fossil-fuel-fired cogeneration facilities that supply heat and electricity to:

(a) existing and new recipient facilities; and/or

(b) electricity to grid; and/or

other power units at the same site. Where several identical power units (i.e. with the same capacity, age and efficiency) are installed at one site, they may be considered as one single power unit.

[4] GOST 21027-2021. Interstate Standard. Power Systems. Terms and Definitions.

[5] Reference methodologies developed within the framework of the Clean Development Mechanism use the following interpretation for this term: **Grid** is an electricity network, including transmission and distribution lines and power plants. The spatial extent of the grid includes the power plants that are physically connected through transmission and distribution lines that can be dispatched by a dispatch center without significant transmission constraints.

[6] See definition in Section 1 (*Terms and Definitions).*

[7] Greenhouse gas program, GHG program is a voluntary or mandatory international, national or subnational system or scheme that registers, accounts for or manages GHG emissions, GHG removals, GHG emission reductions or GHG removal enhancements outside the organization or GHG project (ISO 14064-2:2019 | Greenhouse gases, Part 2).

[8] Examples of GHG programs in Russia include GOST R ISO 14064-1-2021 (accounting and management of GHG emissions at the level of organizations), GOST R ISO 14064-2-2021 (accounting and management of GHG emissions at the project level), GOST R ISO 14067-2021 (carbon footprint of products); at the international level – European Union Emission Trading System (EU ETS), Clean Development Mechanism (CDM), GHG Protocol for Corporate / Project / Products and for Scope 3 Accounting, Verified Carbon Standard (VCS), Gold Standard, etc.

(c) heat to heat networks.

The following applicability conditions apply:

(a) where the project activity is connected to a grid and/or a heat network, the geographical/physical boundaries of the grid and/or the heat network, to which the project activity is connected, shall be identified and documented; and

(b) the heat-to-power ratio of the project cogeneration facility shall be higher than 1.

The methodology is only applicable for the following situations:

(a) where the baseline scenario of electricity generation is construction of a new or operation of the existing fossil fuel based electricity generation facility, which will be closed in case of implementation of project activities; and

(b) where the baseline scenario for heat generation is construction of a new or operation of the existing fossil-fuel based heat generation facility, which will be closed in case of implementation of project activities.

In case of changes to the applicable acts of national legislation, this methodology is subject to revision in order to take into account the relevant changes[9]. In certain cases, the project developers can independently reconfigure the project development methodology taking into account changes to the national legislation, yet maintaining and observing the basic principles of this methodology.

2.3. Project boundary

The spatial extent of the project boundary encompasses the project facility.

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

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

Source		GHG	Included	Justification
Baseline	Combustion of fossil fuels to produce heat and electricity in the reference energy generation facilities	CO_2	Yes	Main emission source
		CH_4	No	Excluded for simplification
		N_2O	No	Excluded for simplification
Project activity	Combustion of fossil fuels to produce heat and electricity at the project facility	CO_2	Yes	Main emission source
		CH_4	No	Excluded for simplification
		N_2O	No	Excluded for simplification

If the facilities within the project boundary as specified in this methodology are owned by different legal entities (or are under the operational management of different legal entities), the project documentation should include a description of procedures for eliminating the possibility of double

[9] The project developer should keep in mind that the normative documents referred to in the text can be changed or canceled.

counting[10] in GHG emission reductions potentially achieved as a result of project activities, enshrined in contractual agreements.

3. Baseline methodology

The baseline[11] is set conservatively[12] for a business-as-usual activity, taking into account all existing policies and measures, but not considering additional project activities (Business-as-usual model). The GHG baseline is a quantitative reference point for emissions that would occur in the absence of the project, and provides a basis for comparison with project emissions (GOST R ISO 14064-2-2021).

To estimate the GHG baseline, it is necessary to define a baseline development scenario.

All the alternatives shall include different technologies but the same fuel that the project activity intends to implement. The project developer shall explain why the use of a less carbon intensive fuel than the project fuel is not a realistic baseline alternative.

For the proposed project activity, the baseline scenarios shall be determined separately for:

a) electricity generation;

b) heat generation.

Energy facilities identified as the most plausible baseline scenario are the reference energy generation facilities. The project developer in the determination of the specification of reference energy generation facilities shall:

a) submit a reference design for electricity and heat generation separately for the capacity that will be displaced under the project activity;

b) this reference design provides the technology, whereas the fuel used shall be that used in the project facility.

The project developer may use one of the following approaches to determine the baseline with justification for the appropriateness of the choices[13]:

1) scenario of construction/operation of energy generating facilities (separately for electricity generation and heat generation) using the best available technologies [14] that represent an economically feasible and environmentally sound course of action;

2) an ambitious benchmark scenario of construction/operation of energy generating facilities (separately for electricity generation and heat generation), where the baseline is set at least at the average emission level of the 20% best performing comparable activities providing

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[10] Double counting: accounting for GHG emissions or removals more than once. Double counting can occur between organizations, i.e. two or more reporting organizations take ownership of the same GHG emissions or removals. Double counting can also occur inside an organization when GHG emissions or removals are taken into account in different categories (this type of double counting should not occur) (ISO/TR 14069:2013 Greenhouse gases - Quantification and reporting of greenhouse gas emissions for organizations - Guidance for the application of ISO 14064-1). See also GOST R ISO 14080-2021. National Standard of the Russian Federation. Greenhouse gas management and related activities. A system of approaches and methodological support for the implementation of climate projects.

[11] Greenhouse gas baseline, GHG baseline means quantitative reference(s) of GHG emissions and/or GHG removals that would have occurred in the absence of a GHG project and provides the baseline scenario for comparison with project GHG emissions and/or GHG removals (ISO 14064-2:2019 Greenhouse gases - Part 2).

[12] Calculation of the baseline is considered conservative if the final estimate of emission reductions resulting from project activities is not overestimated. If there is any doubt, the project developer should better understate the baseline projection.

[13] Approaches to determining baselines are given in Action taken by the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement at its third session (FCCC/PA/CMA/2021/10/Add.1, Article 6, paragraph 4, p. 34, para. 36). URL: https://unfccc.int/sites/default/files/resource/cma2021_10a01E.pdf.

[14] If there are guides of the best available technologies (BAT) applicable to the conditions of the planned project, the relevant information and technical BAT guides are used.

similar outputs and services in a defined scope in similar social, economic, environmental and technological circumstances;

3) an approach based on existing actual or historical emissions, adjusted downwards by at least 5%, unless otherwise specified in the project methodology.

A clear description of the reference electricity and heat generation facility, including information on the technology, such as the efficiency and technical lifetime shall be provided in the project development documentation (PDD).

3.1. Estimation of baseline greenhouse gas emissions

The project developer has the right to use methodologies and CO_2 emissions factors legislatively approved in the Russian Federation[15]. In this case, the project developer must independently determine the most relevant approach and the level at which the methods will be applied, document and justify the applied algorithms for the validation and verification body. The minimum requirements for determining the baseline for climate projects that are implemented and used for issuing carbon units within the territory of the Russian Federation are established in Order No. 248 of the Ministry of Economic Development of Russia dated 11.05.2022[16]. The approaches proposed in this methodology are consistent with the standardized approach applied at the international level[17].

The baseline emissions are the sum of emissions from generation of electricity and emissions from generation of heat:

$$BE_y = BE_{EL,y} + BE_{HT,y} \quad \text{Equation (1)}$$

Where:

BE_y = Baseline emissions in year *y* (t CO_2)

$BE_{EL,y}$ = Baseline emissions from electricity generation in year *y* (t CO_2)

$BE_{HT,y}$ = Baseline emissions from heat generation in year *y* (t CO_2)

3.1.1. Emissions for the production of electricity in year *y*

$$BE_{EL,y} = EL_{PJ,y} \times EEF_{BL} \quad \text{Equation (2)}$$

[15] See Order No. 371 of the Ministry of Natural Resources and Environment of the Russian Federation dated 27.05.2022 "On approval of methods for quantitative determination of greenhouse gas emissions and greenhouse gas removals", Order No. 15-r of the Ministry of Natural Resources and Environment of the Russian Federation dated 16.04.2015 "On approval of guidelines for conducting a voluntary inventory of greenhouse gas emissions in the constituent entities of the Russian Federation", the IPCC Guidelines (2006), Order No. 330 of the Ministry of Natural Resources and Environment of the Russian Federation dated 29.06.2017 "On approval of guidelines for quantifying the volume of indirect energy emissions of greenhouse gases".

[16] Order No. 248 of the Ministry of Economic Development of Russia dated 11.05.2022 "On approval of the criteria and procedure for classifying projects implemented by legal entities, individual entrepreneurs or individuals as climate projects, the form and procedure for reporting on the implementation of a climate project".

[17] Methodology AM0045: Grid connection of isolated electricity systems. Version 3.0. CDM Methodology

Where:

$EL_{PJ,y}$ = Amount of electricity generated by the project facility and supplied to recipient facility(ies) and/or the power grid in year *y* (MWh)

EEF_{BL} = Baseline CO_2 emission factor for electricity of the reference energy generation facility (t CO_2/MWh)

The baseline CO_2 emission factor for electricity is calculated as follows.

Determination of the emission factor for baseline scenario

$$EEF_{BL} = \frac{EF_{P,co2} \times 3.6}{\eta_{P,ref}} \quad \text{Equation (3)}$$

Where:

$EF_{P,co2}$ = CO_2 emission factor of the fuel type used by the project facility for power generation (t CO_2/TJ)

$\eta_{P,ref}$ = Average net energy conversion efficiency of the technology used by the reference energy generation facility for power generation (ratio)

3.6 TJ to MW conversion factor

<u>Note</u>: For calculation of baseline emissions, it is assumed in this methodology that the baseline fossil fuel is the same as that used by project facility.

The efficiency $\eta_{P,ref}$ shall be determined as follows:

a) use the highest of the efficiency values provided by two or more reputed suppliers/manufacturers for the technology of the reference power plant; or

b) assume a power generation efficiency of 60 percent as a conservative approach;

c) if baseline scenario 3 is used based on the current (actual) or historical emissions of an operating energy generating facility, the actual or historical efficiency of the facility may be used.

3.1.1. Emissions for the production of heat in year *y*

It is assumed that steam or hot water is produced at constant temperature and pressure.

$$BE_{HT,y} = SC_{PJ,y} \times SEF_{BL} \quad \text{Equation (4)}$$

Where:

$SC_{PJ,y}$ = Amount of steam or hot water generated in the project facility and supplied to recipient facility(ies) and/or heat networks in year *y* (TJ)

SEF_{BL} = Baseline CO_2 emission factor for steam or hot water of the reference energy generation facility (t CO_2/TJ)

The baseline CO_2 emission factor for steam or hot water is calculated as follows.

Determination of the emission factor for baseline scenario

$$SEF_{BL} = \frac{EF_{H,co2,i}}{\eta_{H,ref}}$$ Equation (5)

Where:

$EF_{H,co2,i}$ = CO_2 emission factor of the fuel type used by the project facility for heat generation (t CO_2/TJ)

$\eta_{H,ref}$ = Average net energy conversion efficiency of the technology of the reference energy generation facility for heat generation (ratio)

Note: For calculation of baseline emissions, it is assumed in this methodology that the baseline fossil fuel is the same as that used by the project facility.

The efficiency $\eta_{H,ref}$ shall be determined as follows:

(c) use the highest of the efficiency values provided by two or more reputed suppliers/manufacturers for the technology of the reference heat generation plant; or

(d) assume a heat generation efficiency of 100 percent as a conservative approach;

(e) if baseline scenario 3 is used based on the current (actual) or historical emissions of an operating heat generating facility, the actual or historical efficiency of the facility may be used.

4. Project crediting period

The starting date of project activities is not regulated.

A crediting period for emission reduction projects is a maximum of 5 years with a maximum of two renewable periods of 5 years each, or a maximum of 10 years with no option of renewal.

The crediting period begins no earlier than 5 years prior to applying for validation for projects validated until 31 December 2025, and no earlier than 2 years prior to applying for validation for projects validated after 1 January 2026.

The additionality and baseline shall be evaluated at the beginning of the crediting period and confirmed or revised at the beginning of the next 5-year phase if the project is implemented in three 5-year phases.

5. Additionality

Additionality shall be demonstrated using Guidelines No. 001 “Demonstration of the additionality of the project activity”[18] taking into account the specifics outlined in this section.

Existing measures and government programs relevant to this project activity should be clearly identified in the PDD and included in the assessment of the additionality.

Identification of alternative scenarios

Identification of alternatives to the project activity consistent with the applicable laws and regulations is performed in accordance with Step 1 of Guidelines No. 001.

[18] Implemented climate projects that are used for issuing carbon units within the territory of the Russian Federation must comply with Article 9 of Federal Law No. 296-FZ dated 02.07.2021 “On Limiting Greenhouse Gas Emissions”, as well as the criteria established in accordance with Order No. 248 of the Ministry of Economic Development of Russia dated 11.05.2022 "On approval of the criteria and procedure for classifying projects implemented by legal entities, individual entrepreneurs or individuals as climate projects, the form and procedure for reporting on the implementation of a climate project".

A realistic and credible alternative scenario available to the project participants or developers of similar projects shall be identified.

For the proposed project activity, the potential alternative scenarios shall be determined for:

(a) separate generation of electricity and heat;

(b) the scenario of constructing and operating a new cogeneration plant for electricity generation but using a different technology.

The project developer shall conduct the analysis below to establish the relevant electricity and heat alternatives for the project activity including the technology and related efficiency.

For electricity generation, the realistic and credible alternative(s) may include, inter alia:

(a) P1: The project activity not implemented as a CDM project.

(b) P2: Construction and operation of a new electricity generation facility using the same fuel as that used by project activity.

For generation of heat, the realistic and credible alternative(s) may include, inter alia:

(a) H1: The project activity not implemented as a CDM project.

(b) H2: Construction and operation of a new fossil fuel based heat generation facility using the same fuel as that used by project activity.

Investment analysis

Investment analysis is performed in accordance with Step 2.1 of Guidelines No. 001.

An integrated investment analysis combining the baseline scenarios for heat and electricity shall be performed to determine the baseline scenario. Although through the above steps alternatives may be identified separately for power generation and heat generation, the economic comparison of the baseline scenario alternatives should be performed on the basis of the total cost to generate the total amount of electricity and heat to be provided by the project facility.

For investment analysis, a levelized cost comparison shall be performed between the various alternatives available to the project participant. Since the price incurred by individual recipient facility(ies) for electricity and heat is not to be considered ex ante, the project participants shall assume that the same price for electricity and heat generation is applicable to various alternatives and all alternatives considered have a similar heat to power ratio.

Barrier analysis

Barrier analysis is performed in accordance with Step 2.2 of Guidelines No. 001.

The project developer shall provide transparent and documented evidence, and offer conservative interpretations of this documented evidence, as to how it demonstrates the existence and significance of the identified barriers.

It is necessary to check whether there are planned instruments such as financing and/or institutional arrangements that could help to overcome the identified barriers during the crediting period. The project developer should describe such instruments, indicate the period of their implementation, and give a conservative evaluation of the sufficiency / insufficiency of these mechanisms to overcome the identified barriers during the crediting period. The application of financial and/or institutional arrangements should be monitored during the project lifetime.

6. Monitoring plan requirements

Describe and specify in the PDD all monitoring procedures, including the type of measurement instrumentation used, the responsibilities for monitoring, and quality assurance and quality control procedures that will be applied. Where the methodology provides for different options (e.g. use of

default values or on-site measurements), specify which option will be used. All meters and instruments should be calibrated regularly as per industry practices.

100% of the data should be monitored if not indicated otherwise in the tables in Appendix 1. Some parameters need to be monitored continuously during the crediting period, others need to be calculated only once for the crediting period, depending on the data.

All data collected as part of monitoring should be archived electronically and kept at for least two years after the end of the last crediting period.

The project developer should include in the PDD information on the data quality assurance system used. It may be data concerning the inventory, identification and description of measurement equipment used; description of quality assurance/quality control procedures applied to monitoring; organizational procedures; calibration and verification of measurement equipment; connection of standard equipment to reference samples; storage of records.

If the project developer expects to use different types of data (measurements, default values), it is necessary to document the options used. The calculation of the parameters, emission factors, and source data should be documented electronically and attached to the PDD. The documentation should include all data used to calculate the emission factors and other parameters. The data should be presented in a manner that enables reproducing of the calculation.

The data and parameters monitored / not monitored in the course of the project activity are given in Appendix 1.

7. Project scenario

The project scenario assumes the production of heat and electricity at the new cogeneration project facility.

Project activity emissions are emissions resulting from the combustion of fuel to produce electricity and heat at the project cogeneration facility.

The project emissions (PE_y) are calculated as follows:

$$PE_{j,y} = \sum FC_{j,y} \times COEF_y \quad (7.1)$$

Where:

$FC_{j,y}$	Quantity of type *i* fuel combusted in process *j* during the year *y* (mass or volume unit/yr)
$COEF_y$	CO2 emission coefficient of type *i* fuel in year *y* (tCO2/mass or volume unit)
j	Process of fuel combustion for electricity and/or heat production

Calculation of the CO_2 emission coefficient for the type of fuel used

The CO_2 emission coefficient C, can be calculated using one of the following two options, depending on the availability of data on the type *i* fossil fuel, as follows:

a) Option A: The CO_2 emission coefficient $COEFi,y$ is calculated based on the chemical composition of the type *i* fossil fuel, using the following approach:

If $FC_{j,y}$ is measured in a mass unit:	

$COEF_y = w_{C,y} \times 44/12$	(7.2)
If $FC_{j,y}$ is measured in a volume unit:	
$COEF_y = w_{C,y} \times \rho_y \times 44/12$	(7.3)

Where:

$w_{C,y}$	Weighted average mass fraction of carbon in type *i* fuel in year *y* (tC/mass unit of the fuel)
ρ_y	Weighted average density of type *i* fuel in year *y* (mass unit/volume unit of the fuel)

b) Option B: The CO_2 emission coefficient $COEF_{i,y}$ is calculated based on net calorific value and CO_2 emission factor of the type *i* fuel, specified in the current national methodology for estimating greenhouse gas emissions for organizations[19], as follows:

$$COEF_y = NCV_y \times EF_{CO2,y} \quad (7.4)$$

Where:

NCV_y	Weighted average net calorific value of the type *i* fuel in year *y* (GJ/mass or volume unit)
$EF_{CO2,y}$	Weighted average CO_2 emission factor of fuel type i in year y (tCO_2/GJ)

Weighted average net calorific value of fuel NCV_y in year *y* and weighted average CO_2 emission factor $EF_{CO2,y}$ shall be determined according to the data sheets of the fuel used or the net calorific value shall be taken equal to the net calorific value of the fuel used, given in the current version of the applicable national methodology for estimating greenhouse gas emissions for organizations[20].

Option A should be the preferred approach, if the necessary data are available.

The project developer must document and justify in the PDD the applied algorithms for the validation and verification body. The project developer has the right to use methodologies and CO_2 emissions factors legislatively approved within the territory of the Russian Federation[21].

[19] At the time of this methodology development, the latest valid version of the national methodology for estimating greenhouse gas emissions for organizations is Order No. 371 of the Ministry of Natural Resources and Environment of the Russian Federation dated 27.05.2022 "On approval of methods for quantitative determination of greenhouse gas emissions and greenhouse gas removals".

[20] At the time of this methodology development, the latest valid version of the national methodology for estimating greenhouse gas emissions for organizations is Order No. 371 of the Ministry of Natural Resources and Environment of the Russian Federation dated 27.05.2022 "On approval of methods for quantitative determination of greenhouse gas emissions and greenhouse gas removals".

[21] See Order No. 371 of the Ministry of Natural Resources and Environment of the Russian Federation dated 27.05.2022 "On approval of methods for quantitative determination of greenhouse gas emissions and greenhouse gas removals", Order No. 15-r of the Ministry of Natural Resources and Environment of the Russian Federation dated 16.04.2015 "On approval of guidelines for conducting a voluntary inventory of greenhouse gas emissions in the constituent entities of the Russian Federation", the IPCC Guidelines (2006), Order No. 330 of the Ministry of Natural Resources and Environment of the Russian Federation dated 29.06.2017 "On approval of guidelines for quantifying the volume of indirect energy emissions of greenhouse gases".

The project developer should independently monitor updates of these legislative and methodological documents and use the latest versions in force.

If proprietary methodologies for estimating project emissions are used, the project developer should independently identify the most relevant approach and the emission sources to which the methodologies will be applied, document and justify the algorithms used to the validation and verification body.

The minimum requirements for determining project emissions for projects that are implemented and used for issuing carbon units within the territory of the Russian Federation are established in Order No. 248 of the Ministry of Economic Development of Russia dated 11.05.2022[16]. The approaches proposed in this methodology are consistent with the standardized approach applied at the international level[17].

Emission reductions

This type of project activity mainly reduces carbon dioxide emissions by increasing the energy efficiency of energy production and switching to cogeneration.

The emission reduction ER_y by the project activity during a given year *y* is the difference between baseline emissions (BE_y), project emissions (PE_y) and emissions due to leakage (L_y), calculated as follows:

$$ER_y = BE_y - PE_y - LE_y \quad (7.4)$$

Where:

ER_y	Emission reductions in year *y* (t CO_2/y)
BE_y	Baseline emissions in year *y* (t CO_2/y)
PE_y	Project emissions in year *y* (t CO_2/y)
LE_y	Leakage emissions in year *y* (t CO_2/y)

Risk management

As part of the project implementation, it is recommended to develop a risk assessment system with a description of the most likely risks that may arise at all stages of the climate project. For such an assessment, the project developer should develop a detailed matrix with the following information, as a minimum:

1. the main stages of the implementation of the climate project;

2. description of the risks that may arise at each stage of the climate project;

3. description of the probability of occurrence of risks (for this, the rating options "low, medium, high" or any other understandable numerical scales can be used);

4. description of the impact of each risk on the results of the entire project (for this, the rating options "low, medium, high" or any other understandable numerical scales can be used);

5. description of the period of influence of each risk on the entire climate project;

6. description of the developed measures to minimize or avoid each type of risks;

7. description of the time period required for the implementation of each measure that reduces or prevents the occurrence of risks.

The recommended table for completion, reflecting the outcomes of the risk management measures is given in Appendix 2.

8. Leakage assessment

According to Order No. 248 of the Ministry of Economic Development of Russia dated 11.05.2022[22], project activities should not lead to an aggregate increase in greenhouse gas emissions or reduce their absorption levels outside the scope of such activities. At the same time, it is necessary to consider and fully account for any project leakage[23] if it exists.

The project developer shall independently determine the most relevant methods to assess the leakage, document and justify the applied algorithms for the validation and verification body, including the approaches applied at the international level.

The project developer shall indicate in the PDD which leakage sources are included. If emission sources are not considered, the project developer shall provide proper justification in the PDD.

Leakage may result from the extraction, processing, liquefaction, transportation, re-gasification and distribution of fossil fuels outside the project boundary. This includes mainly fugitive CH_4 emissions and CO_2 emissions from associated fuel combustion and flaring. In this methodology, the following leakage emission sources shall be considered:

(c) fugitive CH_4 emissions associated with the extraction, processing, liquefaction, transportation, re-gasification and distribution of fossil fuels used in the project plant and fossil fuels used in the grid in the absence of the project activity;

(d) if liquefied natural gas (LNG) is used in the project plant: CO_2 emissions from fuel combustion/electricity consumption associated with the liquefaction, transportation, re-gasification and compression into a natural gas transmission or distribution system.

If leakage associated with additional electricity use occurs, CO_2 emissions from leakage can be determined as follows:

$$LE_{EC,y} = \sum EC_{LE,l,y} \times EF_{EF,l,y} \times (1 + TDL_{l,y}) \quad (8.1)$$

Where:

$LE_{EC,y}$	CO2 emissions from leakage related to electricity consumption (t CO_2 /year)
$EC_{LE,l,y}$	Net increase in electricity consumption due to leaks (MWt/year)
$EF_{EF,l,y}$	Emission factor for the consumed electricity generation (t CO_2 /MWt)
$TDL_{l,y}$	Average process losses in electricity distribution and transmission (proportion)

The emission factor for the consumed electricity generation can be determined in accordance with the recommendations in Annex 3 (in case of electricity supply from the grid) and Annex 4 (in case of electricity supply from an isolated producer).

[22] Appendix № 1 to Order No. 248 of the Ministry of Economic Development of Russia dated 11.05.2022, paragraph "c".

[23] Leakage (for a project activity) means the net change of anthropogenic emissions by sources of GHGs which occurs outside the project boundary, and which is measurable and attributable to the climate project activity, as applicable (CDM-EB07-A04-GLOS Glossary CDM terms. Version 11.0).

Determination of fugitive CH_4 emissions from leaks associated with the production and subsequent handling of project fuel shall be determined in accordance with the methodologies for estimating greenhouse gas and pollutant emissions legally approved in the territory of the Russian Federation. The project developer should independently monitor updates of the above legislative and methodological documents and use the latest valid versions.

9. Non-permanence risk analysis

Not applicable to the project activity.

10. Methods to prevent double counting, negative impacts on the environment and society

The climate project should demonstrate its compliance with all legal requirements in the jurisdiction where it is located (including but not limited to the Reference list methodologies). The project developer should minimize the risk that their project might result in negative impacts for local communities, biodiversity and the environment. Such projects should not cause an increase in atmosphere, soil, surface and ground water pollution or lead to any community conflicts, land tenure issues, forceful evictions, human rights violations, or worsened health and wellbeing due to restricted access to a forest or natural area.

Efforts should be made to avoid double counting[24] between project areas (project boundaries), between company reporting and reporting on the project, between the reporting of different companies, between the constituent entities of the Russian Federation and different countries in the case of international transfer of carbon units. In the latter case, it is necessary to demonstrate that the carbon units transferred at the international level are excluded from the accounting of the quantitative goals of the contribution of the Russian Federation defined at the national level.

11. Recommendations for updating or keeping the baseline unchanged at the renewal of the crediting period and project activity

At the renewal of crediting period, the project is subject to verification with elements of validation and a technical assessment by a validation and verification body to determine necessary updates to the baseline, the additionality and the quantification of emission reductions.

The renewal of the crediting period of a registered project activity shall only be granted if the project developer can provide evidence that the original project baseline is still valid or has been updated taking account of new data where applicable.

The project developer shall update those sections of the project design document relating to the baseline, estimated emission reductions and the monitoring plan using an approved baseline and monitoring methodology: the latest approved version of the baseline and monitoring methodology, applied in the original PDD of the registered project activity shall be used whenever applicable.

The demonstration of the validity of the original baseline or its update does not require a reassessment of the baseline scenario, but rather an assessment of the emissions, which would have resulted from that scenario. The additionality at the renewal of the crediting period is checked for compliance with the criteria under Guidelines No. 001 “Demonstration of the additionality of the project activity” at the date of the beginning of the new crediting period.

If the baseline of a registered project has been revised or updated, the project developer must justify the need to deviate from the approved methodology to the validation and verification body in order to extend the crediting period.

[24] The definition is given in the notes in section 2.3.

Assessment of the validity of the original/current baseline and updates to the baseline at the renewal of a crediting period. The procedure to assess the validity of and to update the baseline at the renewal of a crediting period consists of two steps. The first step provides an approach to evaluate whether the current baseline is still valid for the next crediting period. The second step provides an approach to update the baseline if the current baseline is not valid anymore for the next crediting period (see Appendix 5).

12. Normative references

1. AM0048: New cogeneration project activities supplying electricity and heat to multiple customers. Version 05.0. CDM Methodology.
2. Order No. 248 of the Ministry of Economic Development of Russia dated 11.05.2022 "On approval of the criteria and procedure for classifying projects implemented by legal entities, individual entrepreneurs or individuals, as climate projects, the form and procedure for reporting on the implementation of a climate project" (registered with the Ministry of Justice of Russia on 30.05.2022 No. 68642).
3. GOST R ISO 14064-1-2021. National Standard of the Russian Federation. Greenhouse Gases. Part 1. Requirements and Guidance for Quantification and Reporting of Greenhouse Gas Emissions and Absorption at the Organization Level (approved and enacted by Rosstandart Order No. 1029-st dated 30.09.2021).
4. GOST R ISO 14064-2-2021. National Standard of the Russian Federation. Greenhouse Gases. Part 2. Requirements and Guidelines for Quantification, Monitoring and Reporting Documentation for Projects to Reduce Greenhouse Gas Emissions or Increase Their Absorption at the Project Level (approved and enacted by Rosstandart Order No. 1030-st dated 30.09.2021).
5. GOST R ISO 14064-3-2021. National Standard of the Russian Federation. Greenhouse Gases. Part 3. Requirements and Guidance for Validation and Verification of Greenhouse Gas Statements (approved and enacted by Rosstandart Order No. 1031-st dated 30.09.2021).
6. GOST R ISO 14065-2014. National Standard of the Russian Federation. Greenhouse Gases. Requirements for Greenhouse Gas Validation and Verification Bodies for Their Application in Accreditation or Other Forms of Recognition (approved and enacted by Rosstandart Order No. 1869-st dated 26.11.2014).
7. GOST R ISO 14080-2021. National Standard of the Russian Federation. Greenhouse Gas Management and Related Activities. System of Approaches and Methodological Support for the Implementation of Climate Projects (approved and enacted by Rosstandart Order No. 1033-st dated 30.09.2021).
8. Order No. 371 of the Ministry of Natural Resources and Environment of Russia dated 27.05.2022 "On approval of methods for quantitative determination of greenhouse gas emissions and greenhouse gas removals" (from 1 March 2023, except for certain provisions, coming into force on 1 March 2024).
9. IPCC 2006. Guidelines for National Greenhouse Gas Inventories of the Intergovernmental Panel on Climate Change, 2006 / Edited by S. Iggleston, L. Buendia, K. Miwa, T. Ngara and K. Tanabe. // T.1-5. - IGES// Hayyam. 2006.
10. TOOL01 Methodological tool. Tool for the demonstration and assessment of additionality. Version 07.0.0. CDM Methodology.
11. Methodological Tool. Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period. Version 03.0.1. CDM Methodology.
12. TOOL03. Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion. Version 03.0. CDM Methodology.
13. TOOL05. Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation. Version 03.0. CDM Methodology.

Appendix 1. Data and parameters monitored / not monitored

General parameters to be monitored / not monitored as a result of climate project implementation activities.

Table A1.1. Data and parameters monitored (example)

№	Data / Parameter	Data unit	Description	Source of data	Measurement procedures	Monitoring frequency	QA/QC procedures	Any comment
1	$SC_{PJ,y}$	TJ	Amount of steam or hot water generated in the project facility and supplied to recipient facility(ies) and/or heat networks	On-site measurements	Calculated	Calculated based on continuously monitored data and aggregated as appropriate, to calculate emissions reductions	-	-

Table A1.2. Data and parameters not monitored (example)

№	Data / Parameter	Data unit	Description	Source of data	Measurement procedures (if applicable)	Any comment
1	$EF_{P,co2}$, $EF_{H,co2}$	t CO_2/TJ	CO_2 emission factor of the fuel type used by the reference facility for power generation CO2 emission factor of the fuel type used by the reference facility for heat generation	Calculated	Not applicable	

Appendix 2. Risk management

Table A2.1. Risk management

Stage of climate project implementation	Description of risk	Probability of occurrence	Impact on the project	Impact period	Risk minimization methods	Implementation period
		1. low *2. medium* *3. high*	*1. low* *2. medium* *3. high*	*1. preparation period* *2. 1-2 years after the implementation* *3. the entire period of the climate project*	*Detailed description of mitigation measures for each risk*	*Description of the time frame for the implementation of these activities*
		Scale from 1 to 5 or others	*Scale from 1 to 5 or others*			

Appendix 3. Recommended approach for calculation of the grid emission factor (emission factor for an electricity system)

1. Currently, there are no legislatively approved grid emission factors for greenhouse gases (GHG) in the Russian Federation.

2. If the initial data required to calculate the grid emission factor for the baseline and project scenarios are available, the climate project developer has the right to calculate it independently. In this case, it is recommended to use the Guidelines for the quantitative calculation of the volume of indirect energy emissions of greenhouse gases (Order No. 330 of the Ministry of Natural Resources and Environment dated 29.06.2017[25]) and the principles for calculating indirect energy emissions defined in GOST R ISO 14064-1-2021[26].

To determine the grid emission factor, a regional method for calculation of indirect energy emissions is used, which reflects the average intensity of greenhouse gas emissions at facilities generating electrical and thermal energy consumed by the organization (Order No. 330 of the Ministry of Natural Resources and Environment).

According to GOST R ISO 14064-1-2021 (Appendix E), emissions from imported electricity must be calculated by the project developer using a location-based approach[27] by applying an emission factor that best characterizes the relevant electric power system, i.e. leased transmission line, local, regional or national grid average emission factor. The grid-averaged emission factors should refer to the emissions of the reporting year, if available, or otherwise the latest available year. Grid-averaged emission factors for imported electricity should be based on the average consumption pattern from the electric power system from which the electricity is consumed.

[25] Order No. 330 of the Ministry of Natural Resources and Environment of the Russian Federation dated 29.06.2017 "On approval of guidelines for quantifying the volume of indirect energy emissions of greenhouse gases".
[26] GOST R ISO 14064-1-2021. National Standard of the Russian Federation. Greenhouse Gases. Part 1. Requirements and Guidance for Quantification and Reporting of Greenhouse Gas Emissions and Absorption at the Organization Level (approved and enacted by Rosstandart Order No. 1029-st dated 30.09.2021)
[27] The location-based approach is a method for quantifying indirect energy emissions based on average emission factors from energy production for a given geographic location, including local, regional or national boundaries.

Grid emission factors may also include other indirect emissions associated with electricity generation, such as transmission and distribution losses.

The requirements and guidance described in ISO 14064-1-2021 for electricity also apply to consumed and transferred heat, steam, cooling air and compressed air.

In case of energy from cogeneration facilities, it is necessary to use approaches to separate various forms of energy[28].

Association "NP Market Council" and JSC "TSA" have developed a concept for calculating and publishing greenhouse gas emission factors for the energy system of the Russian Federation[29]. Based on the results of the peer review, independent international auditors issued an assurance certificate, and this concept received a validation report[30]. It is assumed that the implementation of this concept will lead to a more accurate calculation and publication of grid emission factors. The approaches outlined in the concept can also be used by the project developer to calculate the emission factor of the electric power system.

3. If it is impossible to calculate the grid emission factor on its own, the project developer can use grid emission factors from the following sources:

Source 1. In 2021, JSC "Trading System Administrator of Wholesale Electricity Market Transactions" launched (in test mode) an Internet resource that publishes the grid CO_2 emission factor for the first synchronous zone of the Russian Federation for various time periods (hour, day, month, year) [31].

Source 2. Emission factors of the International Energy Agency (IEA). The data are updated annually for the entire energy system of the regions of presence (including the Russian Federation) and reflects the average carbon intensity of electricity and heat generation[32].

Source 3. Climate Transparency Global Partnership develops G20 climate indicators. The agency publishes annual reports from the G20[33] countries, including the average energy emission factor.

4. Methods and approaches applied to the calculation of the grid emission factor should be documented and specified in the PDD. It is necessary to justify the chosen calculation methodology, disclose information about the source of the initial data used, transparently and accurately document your own procedure for calculating the grid emission factor, or describe the properties of the selected and applied grid emission factor.

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[28] For example, calculation of specific fuel consumption in accordance with the "Methodological Guidelines for the Distribution of the Specific Consumption of Reference Fuel in the Production of Electric and Thermal Energy in the Cogeneration Mode Used for Tariff Regulation in the Field of Heat Supply", legislatively approved by Order No. 952 of the Ministry of Energy of the Russian Federation dated 12.09.2016.

[29] The concept of calculation and publication of greenhouse gas emission factors for the energy system of the Russian Federation. URL: https://www.np-sr.ru/sites/default/files/koncepciya_kev.pdf

[30] As part of the validation procedure, a detailed verification of the Concept was carried out for its compliance with the requirements of the international standards in the field of accounting and reporting on greenhouse gas emissions (TÜV AUSTRIA). Based on the results of the audit, the Concept was recognized by international experts as complying with high international standards and best international practices for calculating energy system emission factors. URL: https://www.np-sr.ru/sites/default/files/zaklyuchenie_o_validacii_koncepcii.pdf.

[31] URL: https://www.atsenergo.ru/results/co2

[32] URL: https://www.iea.org/data-and-statistics/data-product/emissions-factors-2021

[33] URL: https://www.climate-transparency.org/g20-climate-performance/g20report2022#1531904804037-423d5c88-a7a7

Appendix 4. Recommended approach for calculation of the indirect energy emission factor for captive use and mini-grid

1. Calculation of the indirect energy emissions factor for captive use and mini-grid electricity consumption is carried out using the market approach (Order No. 330 of the Ministry of Natural Resources and Environment of Russia dated 29.06.2017[34]).

2. The market approach is used when the electricity consumed is received under bilateral contracts for the sale of electricity, signed in accordance with the rules of the wholesale electricity and capacity market and provisions on the operation of retail electricity markets[35]. Market factors of indirect energy emissions are indicated in sales contracts, in retail electricity markets contracts; or provided in certificates confirming the volume of electricity production at generating facilities using renewable energy sources, information about which is entered in the register[36]; or calculated based on the volumes of electricity received from specific external generating facilities in accordance with the terms of sales contracts, retail market contracts or certificates for the reporting period. Methodological guidelines for the calculation are set out in Order No. 330 of the Ministry of Natural Resources and Environment of Russia dated 29.06.2017.

3. If the supplier of electricity under sales contracts, retail market contracts or certificates has several generating facilities[37], the market factor is determined only for the generating facility (or generating facilities), from which electricity is supplied to the consumer.

4. If the project activity consumes additional electrical energy that was not declared by sales contracts, retail market contracts or certificates (undeclared balance of electricity, i.e. the amount of electricity consumed in excess of the established contract(s) and/or certificate(s)), the volume of the undeclared balance of electrical energy is determined based on the information received from external generating facilities located in the regional energy system. Thus, indirect energy emissions from the consumption of electricity received under contracts and/or certificates are calculated based on the market approach, and indirect emissions from the consumption of the undeclared balance of electricity – the location-based approach (see Appendix 3).

5. In the Russian Federation, there are generating facilities that are not connected to the Unified Energy System of Russia (Technologically Isolated Territorial Electric Power System, TITEPS[38]). In such cases, calculation of indirect energy emissions should be based on the individual emission factors of all generating facilities included in the TITEPS mini-grid (Order No. 330 of the Ministry of Natural Resources and Environment of Russia dated 29.06.2017).

6. Market approach is not used to calculate indirect energy emissions from heat consumption. Thermal energy received from external generating facilities is evaluated using the location-

[34] Order No. 330 of the Ministry of Natural Resources and Environment of the Russian Federation dated 29.06.2017 "On approval of guidelines for quantifying the volume of indirect energy emissions of greenhouse gases".
[35] Federal Law No. 35-FZ "On the Electric Power Industry" dated 26.03.2003, as amended.
[36] Decree No. 117 of the Government of the Russian Federation "On some issues related to the certification of volumes of electrical energy produced at generating facilities operating on the use of renewable energy sources" dated 17.02.2014, as amended.
[37] For example, hydropower stations or thermal power stations.
[38] Technologically Isolated Territorial Electric Power System (TITEPS) is an electric power system located on the territory determined by the Government of the Russian Federation, which has no technological connection with the Unified Energy System of Russia (GOST R 57114-2016. Unified Energy System and Isolated Operating Energy Systems. Electric Power Systems. Operational and Dispatching Management in the Electric Power Industry and Operational-Technological Management. Terms and Definitions).

based approach (Order No. 330 of the Ministry of Natural Resources and Environment of Russia dated 29.06.2017).

7. The project developer needs to ensure that the approaches and data used comply with the general requirements and guidance for the accounting of imported electricity consumed by the project activity set out in GOST R ISO 14064-1-2021[39] (Appendix E).

8. The project developer needs to specify input data and data sources in the PDD, as well as the applied calculation methodology and methods used for the separation of different forms of energy (for example, in case of cogeneration, where applicable), and transparently and accurately document the procedure for calculating indirect energy emission factor based on the market approach.

Appendix 5. Assessment of the validity of the original/current baseline at the renewal of the crediting period

This appendix describes a procedure to be used to assess the validity of the original/current baseline at the renewal of the crediting period.

Assessment of the validity of the original/current baseline at the renewal of the crediting period consists of two steps.

A. Assess the validity of the current baseline for the next crediting period.

1. Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies.

If the current baseline is not in compliance with the relevant mandatory national and/or sectoral policies, or if it cannot be demonstrated that the policies are systematically not enforced and that non-compliance with those policies is widespread in the country or region, the current baseline needs to be updated for the subsequent crediting period.

2. Assess the impact of circumstances.

If the new circumstances make a continued validity of the current baseline not plausible, the current baseline needs to be updated for the subsequent crediting period.

3. Assess whether the continuation of use of the current baseline equipment or an investment is the most likely scenario for the crediting period for which renewal is requested.

If the baseline scenario of the project activity is the continuation of use of the current equipment without any investment and the project proponents or third party(ies) will undertake an investment later, but before the end of a crediting period, the current baseline needs to be updated for that crediting period or the crediting of emission reductions should be limited to the period before the baseline equipment would cease its operation.

4. Assessment of the validity of the data and parameters.

If any of the data and parameters that were only determined at the start of the crediting period and not monitored during the crediting period are not valid anymore, the current baseline **needs to be updated** for the subsequent crediting period.

[39] GOST R ISO 14064-1-2021. National Standard of the Russian Federation. Greenhouse gases. Part 1. Requirements and Guidance for Quantification and Reporting of Greenhouse Gas Emissions and Absorption at the Organization Level (approved and enacted by Rosstandart Order No. 1029-st dated 30.09.2021).

If the application of p.1, 2, 3 and 4 confirmed that the current baseline as well as data and parameters are still valid for the subsequent crediting period, such baseline, data and parameters **can be used for the renewed crediting period**. Otherwise, proceed to Step B.

B. Update the current baseline and the data and parameters.

This step is only applicable if any of the p. 1, 2, 3 and/or 4 showed that the current baseline needs to be updated.

a. Update the current baseline

Update the current baseline emissions for the subsequent crediting period, without reassessing the baseline scenario, based on the latest approved version of the methodology applicable to the project activity. The procedure should be applied in the context of the sectoral policies and circumstances that are applicable at the time of the request for renewal of the crediting period.

b. Update the data and parameters

If the application of p.4 showed that the data and/or parameter(s) that were only determined at the start of the crediting period and not monitored during the crediting period are not valid anymore, the project developer should update all applicable data and parameters.