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Draft Methodological tool

Investment analysis

Version 02.0



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1. Introduction

1.1. Scope

1. This methodological tool establishes requirements for activity participants for conducting an investment analysis in demonstrating the additionality of an Article 6.4 activity. It will be applied by activity participants of Article 6.4 activities within project design documents (PDDs) or programmes of activities design documents (PoA-DDs) or component project design documents (CP-DDs) and be used by designated operational entities (DOEs) and the UNFCCC Secretariat in assessing them.

1.2. Entry into force and validity

2. This methodological tool enters into force on DD Month YYYY.
3. This methodological tool remains valid for five years, i.e., until DD Month YYYY, unless an earlier date applies if the methodological tool is revised or withdrawn in accordance with the procedure "Development, revision and clarification of methodologies and methodological tools" (A6.4-PROC-METH-001).

2. Definitions

4. This methodological tool uses the following definitions:

2.1. General terms

5. The following general terms are applied to the methodological tool:
 - (a) "Shall" is used to indicate requirements that must be followed;
 - (b) "Should" is used to indicate that, among several options, one course of action is recommended as particularly suitable;
 - (c) "May" is used to indicate what is permitted.

2.2. Methodological terms and definitions

6. The definitions contained in the "Standard: Demonstration of additionality in mechanism methodologies" hereinafter referred as "Additionality Standard", and in the "Standard: Article 6.4 activity standard for projects", and in the "Standard: Article 6.4 activity standard for programmes of activities" shall apply.
7. In addition, the following definitions shall apply:
 - (a) **Activity participant:** A public or private entity that participates in an Article 6.4 activity;
 - (b) **Entity-specific benchmark:** The financial benchmark used by the legal entity owning/managing the assets in the Article 6.4 activity;
 - (c) **Financial benchmark:** An index against which the financial performance of an Article 6.4 activity, or alternative scenarios to the Article 6.4 activity, can be measured;

- (d) **Market benchmark:** The financial benchmark that is commonly applicable to the country, sector, and type of activity;
- (e) **Pure player:** An entity that concentrates solely on one specific line of business or service, offering maximum exposure to that particular sector.

3. Applicability

- 8. This methodological tool is applicable to Article 6.4 activities:
 - (a) That involve removals and/or emission reductions;
 - (b) That are implemented by private or public entities operating in an environment where the decision to implement an activity is mainly based on the consideration of whether the activity is financially attractive or which option is the most or least financially attractive;¹ and
 - (c) Where it is referred to in the applied mechanism methodology.
- 9. This methodological tool is applicable to proposed mechanism methodologies for Article 6.4 projects and Article 6.4 PoAs jointly referred to as Article 6.4 Activities. For Article 6.4 PoAs, this methodological tool is applicable when the relevant mechanism methodology requires that additionality is demonstrated according to paragraph 10(a) or 10(b) of the Additionality Standard. ~~This version of the tool is applicable to Article 6.4 activities implemented at the project level. The tool may be amended in the future to also cover activities implemented at other scales (e.g., programmes of activities, policies, sectoral approaches, etc).~~
- 10. Mechanism methodologies intending to use this methodological tool shall include a reference to this tool within the mechanism methodology and specify the following elements or provide guidance for how activity participants applying this tool shall address them:
 - (a) What realistic and credible alternative scenarios to the proposed Article 6.4 activity, or what minimum list of scenarios, shall be assessed by activity participants in undertaking the investment analysis or how activity participants shall identify these alternative scenarios;²
 - (b) Which of the methods for investment analysis provided in this tool (simple cost analysis, benchmark analysis, investment comparison analysis) shall be applied

¹ This tool is, for example, not applicable to a decision-making context where public authorities decide to establish public infrastructure, such as a mass rapid transport system. In this case, the investment may also be undertaken if it is not financially viable. In such instances, proponents of mechanism methodologies should propose other approaches for demonstrating additionality.

² In most sectors, the alternative scenarios considered shall provide the same type and level of products or service as the Article 6.4 activity. This requirement does not apply to some land-use activities such as afforestation or avoided deforestation, where there could be a change in the type of service between the scenario with the Article 6.4 activity and the baseline scenario. If the proposed Article 6.4 activity includes several different facilities, technologies, outputs or services, alternative scenarios for each of them should be identified separately. Realistic combinations of these should be considered as possible alternative scenarios to the proposed ~~project~~ activity. For example, in the case of a cogeneration ~~project~~-activity, alternative scenarios for heat and electricity generation should be established separately.

- by the activity participants or how activity participants may choose between these methods;
- (c) Where mitigation activities covered by the mechanism methodology do not have an end date of expected operation, what assessment period shall be used by the activity participants in conducting the analysis or how activity participants shall determine the assessment period;
 - (d) Where the investment comparison analysis or benchmark analysis is to be applied by activity participants, specify:
 - (i) Which financial indicator is most suitable for the type of mitigation activity and decision context and shall be used by activity participants, either by specifying an indicator (e.g., net present value (NPV) or internal rate of return (IRR)) and/or by describing how activity participants may choose a suitable financial indicator;
 - (ii) How the sensitivity analysis shall be conducted by activity participants in the context of the type of mitigation activities covered by the methodology, including by specifying which assumptions and parameters should be varied and the degree of these variations or how activity participants shall determine the assumptions and parameters to be varied; and
 - (iii) Whether the type of activities covered by the methodology could (1) only be implemented by the activity participants and not by any other entities³ or (2) be implemented by either the activity participants or other entities⁴, or how activity participants may make this determination.
11. Mechanism methodologies may provide further specifications and requirements for how this methodological tool shall be applied by activity participants in the context of the type of mitigation activities covered by the methodology.
12. Where the mechanism methodology referring to this tool contains requirements for conducting the investment analysis that are different from those described in this tool, the requirements contained in the methodology shall take precedence.

4. Normative references

13. This document refers to the following documents:
- (a) Standard: Demonstration of additionality in mechanism methodologies;⁵
 - (b) Standard: Article 6.4 activity standard for projects;⁶
 - (c) Standard: Article 6.4 activity Standard for programme of activities;⁷

³ This may apply, for example, to modifications to an existing plant.

⁴ This may apply, for example, to the installation of greenfield plants.

⁵ See <https://unfccc.int/sites/default/files/resource/A6.4-STAN-METH-003.pdf>.

⁶ See <https://unfccc.int/sites/default/files/resource/A6.4-STAN-AC-002.pdf>.

⁷ See <https://unfccc.int/sites/default/files/resource/A6.4-STAN-AC-004.pdf>.

5. General principles and requirements

5.1. Principles

14. The general principles described in the most recent version of the “Standard: Demonstration of additionality in mechanism methodologies” shall apply to this tool.

5.2. General requirements

5.2.1. Validity of input data

15. The data and information used in the investment analysis shall be:
- (a) Applicable to the proposed Article 6.4 activity and any alternative scenarios considered in the analysis;
 - (b) Consistent with the information presented to the entity’s decision-making management and investors/lenders, unless otherwise specified in this tool; and
 - (c) Valid and applicable at the time of the start date of the Article 6.4 activity, as defined in ~~paragraph 73 of version 02.0 of~~ the Standard “Article 6.4 activity standard for projects” and “Article 6.4 activity standard for programme of activities”.
16. Where the investment analysis in the PDD or PoA-DD used for submitting a request for registration is finalized prior to the start date of the Article 6.4 activity and therefore does not yet include data and information that is valid and applicable at the time of the start date of the Article 6.4 activity, the investment analysis shall be updated through the submission of a request for approval of post-registration changes in accordance with the procedure “Article 6.4 activity cycle procedure for projects” (A6.4-PROC-AC-002) or “Article 6.4 activity cycle procedure for programme of activities” (A6.4-PROC-AC-003) as part of the first verification of emission reductions and/or net removals, based on the data and information that was available at the start date. Where the specific CP-DD is submitted for inclusion in the PoA prior to the start date of the Article 6.4 activity, the analysis shall be updated through the submission of a change notification to the DOE as part of the first verification.

5.2.2. Article 6.4 activities with different components

17. Where an Article 6.4 activities includes different components, the investment analysis shall be applied as follows:
- (a) Where the different components of the Article 6.4 activity could also be implemented separately in the same manner without affecting each other, the investment analysis shall be conducted separately for each component of the Article 6.4 activity;⁸
 - (b) Where the different components could not be implemented separately in the same manner without affecting each other, the investment analysis shall be conducted for the entire activity, including all components.⁹

⁸ This applies, for example, to a project implemented at households where both efficient lighting and efficient cooking devices are installed.

⁹ This applies, for example, to landfill gas capture project that involves both methane utilization and methane flaring.

5.2.3. Transparency of the analysis

18. The investment analysis shall be presented in a transparent manner, to the extent that the reader can reproduce the results.
19. The assumptions, data and conclusions in the investment analysis shall be transparently documented, appropriately justified and substantiated by evidence.
20. Activity participants shall provide a spreadsheet version of the investment analysis. All formulas used in this analysis shall be readable and all relevant cells shall be viewable and unprotected. If specific elements of the analysis are confidential due to trade secrets, commercially sensitive data, personal data or security-sensitive details, the activity participants may, in addition to the spreadsheet version, provide a redacted pdf version of the analysis that may black out the relevant elements. The submission of a redacted version shall be clearly and appropriately justified. The redacted version will be made publicly available by the UNFCCC secretariat.
21. For transparency purposes, activity participants may specify in the PDDs **or PoA-DDs or specific-CP-DDs**:
 - (a) The abatement costs of the Article 6.4 activity (e.g., as USD per tCO₂e); and
 - (b) Any monetary and non-monetary benefits made available to Indigenous Peoples and Local Communities (IPLCs) or other stakeholders.

5.2.4. Accuracy and conservativeness

22. For known input data, the respective values shall be used. For data with low uncertainty (less than or equal to 5%), the mean values shall be used. Where assumptions are necessary, or where the input data is more uncertain (greater than 5%), either a conservative choice shall be made within the plausible range of outcomes, or the assumption or input data shall be varied as part of the sensitivity analysis.¹⁰

5.2.5. Relevance and completeness

23. Only data and information that is relevant for the analysis shall be presented.
24. The information presented shall be complete. No data and information that is relevant to the analysis shall be omitted.

6. Methodological approaches

6.1. Methods for investment analysis

25. The investment analysis shall be carried out using one of the following methods:
 - (a) Simple cost analysis: Demonstration that the implementation of an Article 6.4 activity is associated with costs and does not generate any cost savings or revenues other than from A6.4ERs;
 - (b) Benchmark analysis: Comparison of the financial attractiveness of an Article 6.4 activity with a financial benchmark;

¹⁰ This applies, for example, to future electricity prices. In this case, a higher value within the plausible range of electricity prices shall be used if that leads to larger revenues for the proposed Article 6.4 activity.

- (c) Investment comparison analysis: Comparison of the financial attractiveness of an Article 6.4 activity with alternative options.

6.2. Simple cost analysis

26. The simple cost analysis may be undertaken if:

- (a) The implementation of the Article 6.4 activity does not generate any cost savings or revenues other than from A6.4ERs; and
- (b) Possible alternative scenarios to the Article 6.4 activity also do not generate cost savings or revenues.¹¹

27. The simple cost analysis shall be conducted in the following steps:

- (a) Describe the Article 6.4 activity scenario and the alternative scenarios to be considered in conducting the analysis;
- (b) Determine the assessment period;
- (c) Demonstrate that the Article 6.4 activity scenario does not generate any cost savings or revenues other than from A6.4ERs during the assessment period, and justify the analysis with appropriate evidence;
- (d) Demonstrate that the alternative scenarios do not generate any cost savings or revenues during the assessment period, and justify the analysis with appropriate evidence;
- (e) Document any public funding provided to the Article 6.4 activity. If the public funding, expressed in grant equivalents, is larger than the expected revenues from A6.4ERs (e.g., based on common market prices for A6.4ERs for the type of Article 6.4 activity), demonstrate that public funding would not have filled the funding gap of the Article 6.4 activity (considering capital expenditure (CAPEX) and operational expenditure (OPEX) and any revenues other than A6.4ERs of the activity) in the absence of revenues from A6.4ERs. This may, for example, apply to public funding schemes that are designed to pay for the funding gap of mitigation activities.¹²

¹¹ For some activities which recover and destroy by-product gases that are greenhouse gases, the only plausible alternative is the continuation of current practice to emit the gases since there is no plausible use of the recovered gases. Further, recovery and destruction of by-product gases does not generate cost savings or revenues but may only incur expenses such as fuel costs. In this case, the simple cost analysis may be applicable. Note that for recovery of gases from solid waste disposal sites, one possible alternative scenario could be using the captured gas for energy generation, which provides revenues and could, in some instances, be financially attractive and hence the most likely course of action. In such cases, the investment comparison analysis shall be used instead of the simple cost analysis.

¹² This could, for example, apply to public funding provided through “contracts for difference” under which governments pay companies for the additional costs of adopting low greenhouse emission technologies. For example, a low emissions technology could cost USD 100 per unit of output whereas an emissions-intensive technology could cost only USD 60. Without any revenues from A6.4ERs or other carbon credits, the government would close the funding gap and pay the company USD 40 per unit of output. Any additional funding through A6.4ERs (e.g., additional USD 10 per unit of output) could simply reduce funding through the government (e.g., from 40 to 30 USD per unit of output). In this case, the activity would be implemented irrespective of the incentives from the Article 6.4 mechanism.

28. The simple cost analysis is concluded positively for any Article 6.4 activity that satisfies the requirements of paragraph 27 (i.e., it is demonstrated that the Article 6.4 activity is not financially viable without the incentives from the mechanism).

6.3. Benchmark analysis

29. The benchmark analysis may be undertaken where the only alternative scenario to the Article 6.4 activity is the continuation of the current situation without any alternative investment by the activity participants.
30. The benchmark analysis shall be conducted in the following steps:
- (a) Describe the Article 6.4 activity scenario to be considered in conducting the analysis;
 - (b) Determine the assessment period;
 - (c) Select the financial indicator for assessing the financial viability of the Article 6.4 activity, consistent with the specification by the mechanism methodology;
 - (d) Determine the financial benchmark for the selected financial indicator, such as the cost of equity or the weighted average cost of capital (WACC), and justify the determination with appropriate evidence;
 - (e) Calculate the financial viability of the Article 6.4 activity without revenues from A6.4ERs, using the selected financial indicator, and justify the calculation with appropriate evidence;
 - (f) Demonstrate that the Article 6.4 activity without revenues from A6.4ERs is not financially viable, by comparing the financial viability of the Article 6.4 activity determined in sub-paragraph (e) with the financial benchmark determined in sub-paragraph (d);
 - (g) Conduct a sensitivity analysis to demonstrate that the analysis is robust to reasonable variations in the critical parameters and assumptions, including as specified by the mechanism methodology referring to this tool, and justify the calculation with appropriate evidence;
 - (h) Provide credible evidence that the incentives from A6.4ERs enable the implementation of the Article 6.4 activity;
 - (i) public funding provided to the Article 6.4 activity. If the public funding, expressed in grant equivalents, is larger than the expected revenues from A6.4ERs (e.g., based on common market prices for A6.4ERs for the type of Article 6.4 activity), demonstrate that public funding would not have filled the funding gap of the Article 6.4 activity (considering CAPEX and OPEX and any revenues other than A6.4ERs of the activity) to meet the benchmark in the absence of revenues from A6.4ERs. This may, for example, apply to public funding schemes that are designed to pay for the funding gap of mitigation activities.¹²
31. The benchmark analysis is concluded positively for any Article 6.4 activity that satisfies the requirements of paragraph 30 (i.e., it is demonstrated that the Article 6.4 activity is not financially viable without the incentives from the mechanism and that the incentives from the mechanism enable the implementation of the activity).

6.4. Investment comparison analysis

32. The investment comparison analysis may be undertaken where at least one alternative scenario to the Article 6.4 activity includes an investment by the activity participants.
33. The investment comparison analysis shall be conducted in the following steps:
- (a) Describe the Article 6.4 activity scenario and the alternative scenarios to be considered in conducting the analysis;
 - (b) Determine the assessment period;
 - (c) Select the financial indicator for assessing the financial viability of the Article 6.4 activity and the alternative scenarios, consistent with the specification by the mechanism methodology;
 - (d) Where applicable, determine the financial benchmark for the selected financial indicator, such as the cost of equity or the weighted average cost of capital (WACC), and justify the determination with appropriate evidence;
 - (e) Calculate the financial viability of the Article 6.4 activity and the alternative scenarios without revenues from A6.4ERs, using the selected financial indicator, and justify the calculation with appropriate evidence;
 - (f) Demonstrate that the Article 6.4 activity without revenues from A6.4ERs is not the most financially viable scenario, by comparing the financial indicator calculated for the Article 6.4 activity and the alternative scenarios in sub-paragraph (e)(d);
 - (g) Conduct a sensitivity analysis to demonstrate that the analysis is robust to reasonable variations in the critical parameters and assumptions, including as specified by the mechanism methodology referring to this tool, and justify the calculation with appropriate evidence;
 - (h) Provide credible evidence that the incentives from A6.4ERs enable the implementation of the Article 6.4 activity;
 - (i) Document any public funding provided to the Article 6.4 activity. If the public funding, expressed in grant equivalents, is larger than the expected revenues from A6.4ERs (e.g., based on common market prices for A6.4ERs for the type of Article 6.4 activity), demonstrate that public funding would not have filled the funding gap of the Article 6.4 activity (considering CAPEX and OPEX and any revenues other than A6.4ERs of the activity) in the absence of revenues from A6.4ERs. This may, for example, apply to public funding schemes that are designed to pay for the funding gap of mitigation activities.¹²
34. The investment comparison analysis is concluded positively for any Article 6.4 activity that satisfies the requirements of paragraph 33 above (i.e., it is demonstrated that the Article 6.4 activity is not financially viable without the incentives from the mechanism and that the incentives from the mechanism enable the implementation of the activity).

7. Requirements for determining relevant parameters and implementing the analysis

35. This section sets out further requirements for determining relevant parameters and implementing the analysis. The headline of each sub-section indicates to which methods of investment analysis it applies.

7.1. Assessment period (simple cost analysis, benchmark analysis, investment comparison analysis)

36. The assessment period shall reflect the period of expected operation of the underlying technology or practice. The activity participants shall specify and justify the appropriate assessment period.
37. Where an activity does not have an end date of expected operation, the activity participants shall specify and justify an appropriate assessment period, in accordance with any specific guidance provided by the applied mechanism methodology.

7.2. Type of expenditure, revenues and cost savings to be considered (simple cost analysis, benchmark analysis, investment comparison analysis)

38. The analysis shall include all relevant costs, including CAPEX and OPEX and all revenues and cost savings, including any public funding such as subsidies, where applicable. The analysis may also include the costs associated with any barriers faced by the proposed Article 6.4 activity where they can be monetized and quantified as additional costs.¹³
39. The residual value of the activity assets at the end of the assessment period shall be included as a cash inflow in the final year. The fair value of the assets shall be calculated in accordance with local accounting regulations, where available, or otherwise international best practice.
40. Any expenditures incurred prior to the start date of the Article 6.4 activity, as defined in paragraph 73 of version 02.0 of the "Standard: Article 6.4 activity standard for projects" (A6.4-STAN-AC002) or "Standard: Article 6.4 activity standard for programme of activities" (A6.4-STAN-AC004), shall not be considered in the analysis, as such expenditures are sunk costs which remain unaffected by the decision made whether or not to proceed with the Article 6.4 activity. This shall not apply to expenditures that the Article 6.4 activity committed to make prior to the start date but for which the payment is only made after the start date.
41. For activities whose implementation has been ceased after their initial commencement and where the Article 6.4 activity consists of the recommencement of the implementation due to consideration of the benefits from the Article 6.4 mechanism, the investment analysis should reflect the economic decision-making context at the point of the decision to recommence the activity. Therefore, CAPEX incurred prior to the decision to

¹³ For example, lack of awareness and capacity could be a barrier for projects distributing efficient household devices. In this case, costs for awareness raising or training to overcome this barrier could be included in the investment analysis.

recommence the activity can be reflected as the recoverable value of the assets, which are limited to the potential reuse/resale of tangible assets.¹⁴

42. The analysis shall not include any transaction costs associated with generating A6.4ERs (e.g., costs for preparing the PDD or PoA-DD or specific CP-DD, validation and verification fees to be paid to the UNFCCC).

7.3. Internal consistency of input values (simple cost analysis, benchmark analysis, investment comparison analysis)

43. All parameters and assumptions used in the analysis shall be internally consistent. For example, cash flows shall be expressed in either real or nominal terms consistently and be determined consistent with the financial indicator used.

7.4. Cash flow basis (benchmark analysis, investment comparison analysis)

44. The benchmark analysis or investment comparison analysis shall be conducted based on either the total cash flow or the equity cash flow, consistent with the approach used by the activity participants for making investment decisions.

7.5. Financial indicators (benchmark analysis, investment comparison analysis)

45. The financial indicators to be used for the benchmark analysis or investment comparison analysis may include the following:
- (a) Net present value (NPV): The NPV represents the total value of an investment, based on the present value of cash inflows and outflows during the assessment period;
 - (b) Project IRR: The project IRR is used to determine the viability of an activity to generate returns and service debt, based on all projected CAPEX and the series of cash flows throughout the assessment period;
 - (c) Equity IRR: The equity IRR is used to determine the final return on the initial equity investment for the proposed activity.
46. The selected financial indicator shall be consistent with the cash flow basis used for the analysis. For example, an equity IRR shall be used where equity cash flows are used and a project IRR shall be used where total cash flows are used.
47. In calculating the NPV, an appropriate discount rate shall be applied. The discount rate shall be determined consistent with the requirements on determining the financial benchmark in section 7.6 below and either represent the cost of equity (for an equity cash flow basis) or the weighted average cost of capital (for a total cash flow basis).

¹⁴ CAPEX should be included not at the original investment costs but at the market fair value at the point of the decision to proceed with the recommencement, demonstrating the value through assessments done by chartered specialists.

7.6. Determination of the financial benchmark (benchmark analysis) or discount rate (investment comparison analysis)

7.6.1. Basis for determining the financial benchmark or discount rate

48. The financial benchmark or discount rate (for an NPV analysis) shall be consistent with the financial indicator selected for the analysis and shall be valid and applicable at the time of the start date of the Article 6.4 activity.
49. Where the Article 6.4 activity can only be implemented by the activity participants and not by any other entities, including as determined by the applied mechanism methodology, the entity-specific benchmark shall be used as the financial benchmark or discount rate (for an NPV analysis).
50. Where the Article 6.4 activity could also be implemented by other entities, including as determined by the applied mechanism methodology, the financial benchmark, or discount rate (for an NPV analysis), shall be based on the more conservative value between:
 - (a) The entity-specific benchmark; and
 - (b) The market benchmark.

7.6.2. General aspects for determining the financial benchmark

51. To justify the entity-specific benchmark, appropriate evidence and documentation shall be provided to demonstrate that the financial benchmark has also been presented to the entity's decision-making management and investors/lenders. Where similar investments have been made by the entity in the past, it shall be demonstrated that a consistent benchmark has been used for the same country/region, or any deviations shall be duly justified.
52. Where a market benchmark is determined, the respective values shall be based on parameters that are standard in the market, as further specified in section 7.6.3.1 below.
53. If the analysis is carried out in nominal terms and the financial benchmark is only available in real terms, the financial benchmark in real terms shall be converted to a financial benchmark in nominal terms by applying the inflation rate. The inflation rate shall be obtained from the inflation forecast of the central bank of the host country for the duration of the crediting period. If this information is not available, the target inflation rate of the central bank shall be used. If this information is also not available, then the average forecasted inflation rate for the host country published by the IMF (International Monetary Fund World Economic Outlook) or the World Bank for the next five years after the start of the activity shall be used.

7.6.3. Cost of equity

54. The cost of equity refers to the rate of return expected on an investment funded through equity.
55. Where a market benchmark is determined, activity participants may:
 - (a) Use the default values in the Appendix to this tool for the cost of equity; or

- (b) Where appropriate justification can be provided that the default values are not suitable for the context of the proposed Article 6.4 activity, determine the cost of equity using the Capital Asset Pricing Model (CAPM) based on parameters that are standard in the market, which shall be modelled taking into account the history (time series) of the market key variables proper of the specific technology and/or sector, as follows:

$$r_e = r_f + \beta \times (r_m - r_f) \quad \text{Equation (1)}$$

Where:

- r_e = Cost of equity
- r_f = Risk-free rate, calculated based on local sovereign debt with a maturity date close to the project lifetime (at least 10 years) and sufficient liquidity. The latest (rather than the average over a time horizon) sovereign debt data available at the time of the investment decision should be used
- β = Beta, calculated as the weighted arithmetic average of the beta of all the pure players that have been in business for at least 3 years and over the longest common lifetime for the companies in the sample of pure players, weighted by the total capitals (i.e., equity and long-term debt) of the pure players. The individual betas shall be calculated independently without deleveraging by the debt-equity ratios of the pure players
- r_m = Expected market return, calculated using the average of the following three annualized rates of return of stock market for (1) the longest time series available, (2) a 20-year horizon (if existing), and (3) a 10-year horizon (if existing). Daily values shall be used. Should there be multiple stock exchange indices, stock issues for a given company, or sovereign debt issues, the most liquid or most frequently traded one shall be used. For stock market indices, liquidity is assessed with the volume of trading for the component stock issues

56. The cost of equity may be determined by the activity participants using the CAPM if the following conditions are satisfied:
- (a) The relevant stock exchange has operated for more than 10 years;
 - (b) The stock market is representative of the domestic economy, i.e., ratio of stock market capitalization to gross domestic product (GDP) is in excess of 20 per cent;
 - (c) The average share turnover ratio over the last calendar year is in excess of 20 per cent (a ratio of 20 per cent of the stock market is traded more than once per year);
 - (d) There are at least three domestic pure players that belong to the same sector as the Article 6.4 activity to calculate beta with at least 3 years of daily stock market data, and daily values are available;
 - (e) There are domestic government securities labelled in the domestic currency with maturities over 10 years.

7.6.3.1. Cost of debt

57. Where an entity-specific benchmark is determined, it shall be based on the weighted average cost of debt financing of the legal entity owning/managing the assets of the Article 6.4 activity, as follows:
- (a) For Article 6.4 activities financed by loans, use the weighted average cost of outstanding long-term debt of the entity or the terms of the specific loans provided by lenders to the Article 6.4 activity;
 - (b) For Article 6.4 activities financed by bonds, use the weighted average yield of the bonds during the last three months prior to the start date of the Article 6.4 activity. The use of bonds to determine the cost of debt is only appropriate for corporate bonds issued in the host country;
 - (c) In cases where the debt finance structure of the Article 6.4 is not yet available (e.g., a letter of intent for debt funding is not available), the cost of debt shall reflect the costs of debts from similar activities undertaken by the same entity in the same host country, consistent with the information presented to the entity's decision-making management and investors/lenders.
58. Where a market benchmark is determined, the cost of debt shall be calculated as the cost of financing in capital markets (i.e., commercial lending rates comparable activities in the host country), based on documented evidence from financial institutions.

7.6.4. Determination of the weighted average cost of capital (WACC)

59. The weighted average cost of capital (WACC) is the average rate with which an entity finances its assets and can be an appropriate financial benchmark for a project IRR.
60. The weighted average cost of capital (WACC) shall be calculated as follows:

$$WACC = W_e \times r_e + W_d \times r_d \times (1 - T_c) \quad \text{Equation (2)}$$

Where:

W_e	=	Percentage of financing that is equity (%)
R_e	=	Cost of equity
W_d	=	Percentage of financing that is debt (%)
r_d	=	Cost of debt
T_c	=	Corporate tax rate

61. Where an entity-specific benchmark is determined, the weighting of debt financing and equity financing shall reflect the long-term debt/equity finance structure of the legal entity owning/managing the assets of the Article 6.4 activity. The percentage shall be determined based on the latest balance sheet provided under local fiscal/accounting standards and rules if: (a) the legal entity owning/managing the assets of the Article 6.4 activity has balance sheets audited by a third party within two years prior to the start date of the Article 6.4 activity; and (b) the accounting books of the legal entity reflect at least the total value of all the assets needed for implementing the Article 6.4 activity. If the debt/equity finance structure is not yet available, the weighting shall be consistent with information presented to the entity's decision-making management and investors/lenders.

62. Where a market benchmark is determined, the typical debt/equity finance structure observed in the sector of the country should be used.

7.7. Calculation of the financial viability of the proposed Article 6.4 activity (benchmark analysis, investment comparison analysis) and alternative scenarios (investment comparison analysis)

63. In calculating a project IRR, the costs associated with the financing of the activity shall not be taken into account because including the cost of finance would lead to double counting of this expenditure.
64. In calculating an equity IRR, only the portion of the investment financed through equity shall be considered (i.e., the cost of equity). The costs associated with the servicing of debt (interest expenses and principle repayment) are accounted as costs.
65. The investment analysis shall be conducted with post-tax cash flows. Depreciation and other non-cash items related to the ~~project~~ activity, which have been deducted in estimating gross profits on which tax is calculated, shall be added back to net profits for the purpose of calculating the financial indicator (e.g., IRR, NPV). The cash flow effects of taxation shall be included in the calculation.

7.8. Sensitivity Analysis (benchmark analysis, investment comparison analysis)

66. To ensure conservativeness, the benchmark analysis and investment comparison analysis shall include a sensitivity analysis in order to demonstrate that the outcome of the analysis is robust to reasonable variations in the critical parameters and assumptions, including CAPEX, OPEX, revenues and cost savings, as applicable.
67. A sensitivity analysis shall be carried out to assess potential scenarios in which the financial indicator for the activity would reach the level of the financial benchmark and/or the proposed activity becomes the most financially attractive alternative.
68. The variation of assumptions and parameters in the sensitivity analysis shall be consistent with any specifications in the mechanism methodology. Mechanism methodologies shall:
- (a) Require a variation of at least +/- 10% to the input values which constitute more than 20% of the total costs or total revenues, unless this is not deemed appropriate in the context of the specific circumstances of the type of mitigation activity; or
 - (b) Provide guidance how activity participants shall determine the assumptions and parameters to be varied.
69. In cases where the applied variation results in the financial indicator reaching the level of the financial benchmark and/or the proposed Article 6.4 activity becoming the most financially attractive alternative, the proposed Article 6.4 activity shall not be deemed additional.

Appendix. Default values for the cost of equity

1. The default values for the cost of equity (or expected return on equity) presented in this Appendix are calculated for each host country as the sum of the following parameters:
 - (a) Country risk premium: This is based on Moody's rating and S&P, for countries with available rating¹, PRS Composite Risk Score for frontier markets and Fitch rating. For countries where none of the above is available, a statistical algorithm developed by the UNFCCC Secretariat is used to derive the values, based on the latest available macroeconomic data² published by the World Bank, IMF and the Fragile State Index (these countries are marked with an asterisk on Table 1 below);
 - (b) Risk-free rate of return: This is calculated based on the inflation adjusted geometric average of annualized real return on the long-term US government bonds;³
 - (c) Equity risk premium: This is derived from the inflation-adjusted geometric average return on equity in the US market relative to the long-term US government bonds.⁴
2. The cost of equity provided in Table represents a post-tax benchmark.
3. The cost of equity is provided for the years 2021 to 2024. Where these default values are used, activity participants shall apply the value corresponding to the calendar year of the start date of the Article 6.4 activity, as defined in ~~paragraph 73 of version 2.0~~ of the Standard "Article 6.4 activity standard for projects" (A6.4-STAN-AC002) or **Standard "Article 6.4 activity standard for programme of activities" (A6.4-STAN-AC004)**. Where the calendar year of the start date of the Article 6.4 activity is not yet covered in the table, activity participants shall use the latest available year.

Table. Default values for the cost of equity

Country	2021	2022	2023	2024
Afghanistan*	17.91	18.17	20.31	19.94
Albania	13.06	12.95	15.47	14.58
Algeria	17.42	14.93	12.89	14.58
Andorra (Principality of)	15.96	10.38	10.99	10.78
Angola	15.96	14.93	18.92	17.51
Argentina	20.32	20.37	28.41	25.55

¹ "Risk Premiums for Other Markets"
https://pages.stern.nyu.edu/~adamodar/New_Home_Page/dataarchived.html.

² The estimates may not reflect the most recent events or extreme circumstances experienced in some countries at the time of publication.

³ Credit Suisse Global Investment Returns Yearbook 2021 – 2023 and UBS Global Investment Returns Yearbook 2024.

⁴ Credit Suisse Global Investment Returns Yearbook 2021 – 2023 and UBS Global Investment Returns Yearbook 2024.

Country	2021	2022	2023	2024
Armenia	12.19	12.06	13.91	13.26
Australia	8.70	8.50	7.70	8.00
Austria	9.08	8.89	8.39	8.58
Azerbaijan	11.61	11.47	12.02	11.66
Bahamas	11.61	12.06	15.47	14.58
Bahrain	14.03	13.94	17.19	16.04
Bangladesh	12.19	12.06	13.91	14.58
Barbados	15.96	15.91	20.64	17.51
Belarus	15.00	14.93	28.41	31.49
Belgium	9.29	9.10	8.73	8.88
Belize	18.38	18.39	23.24	21.17
Benin	14.03	12.95	15.47	14.58
Bermuda	9.52	9.34	9.16	9.24
Bhutan*	14.03	14.82	17.20	15.15
Bolivia (Plurinational State of)	14.03	13.94	17.19	18.97
Bosnia and Herzegovina	15.00	14.93	18.92	17.51
Botswana	9.52	9.69	9.77	9.75
Brazil	11.61	11.47	12.89	12.40
Brunei Darussalam*	9.52	9.34	9.16	8.88
Bulgaria	10.25	10.08	10.46	10.34
Burkina Faso	14.03	13.94	20.64	18.97
Burundi*	17.98	17.78	20.80	21.63
Cambodia	14.03	13.94	17.19	16.04
Cameroon	14.03	13.94	17.19	18.97
Canada	8.70	8.50	7.70	8.00
Cape Verde	14.03	14.93	18.92	17.51
Cayman Islands	9.29	9.10	8.73	8.88
Central African Republic*	15.65	17.39	19.96	20.47
Chad*	18.03	17.02	20.71	21.17
Chile	9.38	9.20	9.16	9.24
China (People's Republic of)	9.38	9.20	8.92	9.03
Colombia	10.54	10.38	10.99	10.78
Comoros*	17.57	14.62	18.03	16.33
Congo (Democratic Republic of)	15.96	15.91	18.92	17.51
Congo (Republic of)	17.42	17.40	23.24	21.17

Country	2021	2022	2023	2024
Cook Islands	13.06	12.95	15.47	14.58
Costa Rica	14.03	13.94	17.19	14.58
Côte d'Ivoire	12.19	12.06	13.91	13.26
Croatia	11.12	10.97	10.99	10.78
Cuba	17.42	20.37	28.41	25.55
Curacao	9.86	10.38	10.99	11.21
Cyprus	11.61	10.97	12.02	10.78
Czechia	9.29	9.10	8.73	8.88
Denmark	8.70	8.50	7.70	8.00
Djibouti*	15.97	16.02	21.42	18.96
Dominican Republic	12.19	12.06	13.91	13.26
Ecuador	18.38	18.39	24.96	22.63
Equatorial Guinea*	14.55	14.62	15.50	12.75
Egypt	14.03	13.94	17.19	18.97
El Salvador	15.00	15.91	24.96	22.63
Eritrea*	17.53	17.51	17.85	16.05
Estonia	9.38	9.20	8.92	9.03
Ethiopia	14.03	17.40	23.24	21.17
Fiji	12.19	12.95	15.47	14.58
Finland	9.08	8.89	8.39	8.58
France	9.18	8.99	8.55	8.72
Gabon	15.96	15.91	20.64	18.97
Gambia	15.00	13.94	17.19	14.58
Georgia	11.61	11.47	12.89	12.40
Germany	8.70	8.50	7.70	8.00
Ghana	15.00	14.93	28.41	22.63
Greece	12.19	12.06	13.91	11.66
Grenada*	13.76	13.64	17.56	14.37
Guatemala	11.12	10.97	12.02	11.66
Guinea	20.32	17.40	23.24	21.17
Guinea-Bissau	15.96	14.93	18.92	16.04
Guyana	14.03	12.95	10.46	10.34
Haiti	20.32	18.39	28.41	22.63
Honduras	13.06	12.95	15.47	14.58
Hungary	10.83	10.38	10.99	10.78

Country	2021	2022	2023	2024
Iceland	9.52	9.34	9.16	9.24
India	10.83	10.68	11.49	11.21
Indonesia	10.54	10.38	10.99	10.78
Iran (Islamic Republic of)	17.42	14.93	15.47	17.51
Iraq	15.96	15.91	20.64	18.97
Ireland	9.52	9.34	8.92	8.88
Isle of Man	9.29	9.10	8.73	8.88
Israel	9.38	9.20	8.92	9.03
Italy	10.83	10.68	11.49	11.21
Jamaica	14.03	13.94	17.19	14.58
Japan	9.38	9.20	8.92	9.03
Jordan	13.06	12.95	15.47	14.58
Kazakhstan	10.83	10.38	10.99	10.78
Kenya	14.03	13.94	17.19	17.51
Kiribati*	9.31	16.12	18.49	12.43
Korea	9.18	8.99	8.55	8.72
Korea (Democratic People's Republic of)	20.32	20.37	28.41	31.49
Kuwait	9.38	9.20	8.92	9.03
Kyrgyzstan	14.03	13.94	18.92	17.51
Lao People's Democratic Republic	17.42	17.40	24.96	22.63
Latvia	9.86	9.69	9.77	9.75
Lebanon	27.88	28.84	32.39	31.49
Lesotho*	18.75	17.65	19.39	19.75
Liberia	20.32	17.40	23.24	25.55
Libya	17.42	12.95	20.46	10.78
Liechtenstein	8.70	8.50	7.70	8.00
Lithuania	9.86	9.34	9.16	9.24
Luxembourg	8.70	8.50	7.70	8.00
Madagascar	15.00	14.93	18.92	18.49
Malawi	17.42	17.40	28.41	25.55
Malaysia	9.86	9.69	9.77	9.75
Maldives	15.00	15.91	20.64	18.97
Mali	15.96	15.91	23.24	21.17
Malta	9.52	9.34	9.16	9.24
Mauritania*	15.73	16.75	17.77	14.63

Country	2021	2022	2023	2024
Mauritius	10.25	10.38	11.49	11.21
Mexico	10.25	10.08	10.99	10.78
Micronesia (Federated States of)*	15.64	16.88	19.87	20.49
Moldova (Republic of)	15.00	14.93	18.92	17.51
Mongolia	15.00	14.93	18.92	17.51
Montenegro	13.06	12.95	15.47	14.58
Morocco	11.12	10.97	12.02	11.66
Mozambique	17.42	17.40	23.24	21.17
Myanmar	15.00	20.37	24.96	22.63
Namibia	12.19	12.06	15.47	14.58
Netherlands	8.70	8.50	7.70	8.00
New Zealand	8.70	8.50	7.70	8.00
Nicaragua	15.00	14.93	18.92	17.51
Niger	15.00	14.93	18.92	21.17
Nigeria	14.03	13.94	18.92	18.97
North Macedonia	12.19	12.06	13.91	13.26
Norway	8.70	8.50	7.70	8.00
Oman	12.19	12.06	13.91	11.66
Pakistan	15.00	14.93	20.64	22.63
Panama	10.25	10.38	10.99	10.78
Papua New Guinea	14.03	13.94	17.19	16.04
Paraguay	11.12	10.97	12.02	11.66
Peru	9.86	10.08	10.46	10.34
Philippines	10.54	10.38	10.99	10.78
Poland	9.52	9.34	9.16	9.24
Portugal	10.83	10.38	10.99	9.75
Qatar	9.29	9.10	8.73	8.88
Romania	10.83	10.68	11.49	11.21
Russian Federation	10.83	10.68	20.64	14.58
Rwanda	14.03	13.94	17.19	16.04
Saint Lucia*	13.82	14.57	18.55	14.94
Samoa*	15.64	14.94	20.26	18.26
San Marino*	12.83	12.57	8.87	9.26
Sao Tome and Principe*	22.25	18.57	20.48	20.53
Saudi Arabia	9.38	9.20	8.92	9.03

Country	2021	2022	2023	2024
Senegal	12.19	12.06	13.91	13.26
Serbia	12.19	11.47	12.89	12.40
Sierra Leone	21.96	18.39	22.23	22.63
Singapore	8.70	8.50	7.70	8.00
Slovakia	9.52	9.34	9.16	9.24
Slovenia	9.86	9.69	9.77	9.75
Solomon Islands	15.00	15.91	20.64	18.97
Somalia	20.32	20.37	20.62	20.56
South Africa	11.61	11.47	12.89	12.40
South Sudan*	20.08	20.37	20.31	20.57
Spain	10.25	10.08	10.46	10.34
Sri Lanka	15.96	17.40	28.41	25.55
St. Maarten	10.83	11.47	12.89	12.40
St. Vincent & the Grenadines	15.00	14.93	18.92	17.51
Sudan	27.88	28.84	32.39	31.49
Suriname	18.38	18.39	24.96	22.63
Swaziland	15.00	14.93	18.92	17.51
Sweden	8.70	8.50	7.70	8.00
Switzerland	8.70	8.50	7.70	8.00
Syrian Arab Republic	27.88	28.84	32.39	31.49
Taiwan	9.29	9.10	8.73	8.88
Tajikistan	15.00	14.93	18.92	17.51
Tanzania (United Republic of)	14.03	13.94	17.19	16.04
Thailand	10.25	10.08	10.46	10.34
Timor-Leste*	15.38	16.86	21.46	20.57
Togo	15.00	14.93	18.92	17.51
Tonga*	13.80	13.82	20.72	14.83
Trinidad and Tobago	11.12	11.47	12.89	12.40
Tunisia	14.03	15.91	20.64	21.17
Turkey	14.03	13.94	18.92	17.51
Turkmenistan*	9.35	16.14	10.40	9.64
Uganda	14.03	13.94	17.19	16.04
Ukraine	15.00	14.93	24.96	25.55
United Arab Emirates	9.18	8.99	8.55	8.72
United Kingdom of Great Britain and Northern Ireland	9.29	9.10	8.73	8.88

Country	2021	2022	2023	2024
United States	8.70	8.50	7.70	8.00
Uruguay	10.54	10.38	10.99	10.78
Uzbekistan	13.06	12.95	15.47	13.26
Vanuatu*	12.84	13.49	22.59	14.90
Venezuela	27.88	28.84	32.39	31.49
Vietnam	12.19	12.06	12.89	12.40
Yemen, Republic	27.88	20.37	32.39	22.63
Zambia	20.32	20.37	28.41	22.63
Zimbabwe	20.32	15.91	20.64	21.17

Document information

Version	Date	Description
02.0	3 July 2026	MEP 014, Annex 02, Appendix 7. A call for input on this document will be issued following the conclusion of the MEP 014 meeting. Any input received will be considered by the MEP for the further development of this document at a future meeting.
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