



## Annex 13

## GUIDELINES ON THE ASSESSMENT OF INVESTMENT ANALYSIS

(Version 04)

## I. Background

1. In consideration of issues identified through request for reviews and reviews of requests for registration the CDM Executive Board (hereinafter referred to as the Board) considers it necessary to provide project participants and designated operational entities (DOEs) with guidance on the preparation, presentation and validation of investment analysis.

2. This general guidance is to be considered as a complement to existing materials in this area including, the “Tool for the demonstration and assessment of additionality”, “Combined tool to identify the baseline scenario and demonstrate additionality” and “Non-binding best practice examples to demonstrate additionality for SSC project activities”. The general guidance will be revised as appropriate to reflect the evolution of knowledge and best practice in this area.

## II. General issues in calculation and presentation

3. **Guidance:** The period of assessment should not be limited to the proposed crediting period of the CDM project activity. Both project IRR and equity IRR calculations shall as a preference reflect the period of expected operation of the underlying project activity (technical lifetime), or – if a shorter period is chosen – include the fair value of the project activity assets at the end of the assessment period. In general a minimum period of 10 years and a maximum of 20 years will be appropriate. The IRR calculation may include the cost of major maintenance and/or rehabilitation if these are expected to be incurred during the period of assessment. Project participants are requested to justify and DOEs are requested to validate the appropriateness of the period of assessment in the context of the underlying project activity, without reference to the proposed CDM crediting period.

**Rationale:** The purpose of undertaking an investment analysis is to determine whether or not the project activity would be financially viable without the incentive of the CDM. The actual project activity is not limited in time to the crediting period being requested.

4. **Guidance:** The fair value of any project activity assets at the end of the assessment period should be included as a cash inflow in the final year. The fair value should be calculated in accordance with local accounting regulations where available, or international best practice. It is expected that such fair value calculations will include both the book value of the asset and the reasonable expectation of the potential profit or loss on the realization of the assets.

**Rationale:** Net Present Value (NPV) or Internal Rate of Return (IRR) calculations are designed to calculate the return on the cost of investment, in cases where the capital expenditures have not been fully devalued this should be reflected as a cash inflow. Not to apply a residual value would imply that the project must repay the full value of the capital expenditure before the value of this expenditure had been consumed.

5. **Guidance:** Depreciation, and other non-cash items related to the project activity, which have been deducted in estimating gross profits on which tax is calculated, should be added back to net profits for the purpose of calculating the financial indicator (e.g. IRR, NPV). Taxation should only be included as an expense in the IRR/NPV calculation in cases where the benchmark or other comparator financial indicator is intended for post-tax comparisons.



**Rationale:** Depreciation is not an actual expense incurred by the company and as such does not directly affect the financial viability of the project. To treat both the capital cost of the assets and their depreciation as an expense to the project would be a double counting of this cost. Taxation can only be considered a relevant expense if the indicator used for comparison purposes is intended for post tax comparisons.

6. **Guidance:** Input values used in all investment analysis should be valid and applicable at the time of the investment decision taken by the project participant. The DOE is therefore expected to validate the timing of the investment decision and the consistency and appropriateness of the input values with this timing. The DOE should also validate that the listed input values have been consistently applied in all calculations.

**Rationale:** The use of investment analysis to demonstrate additionality is intended to assess whether or not a reasonable investor would or not decide to proceed with a particular project activity without the benefits of the CDM. This decision will therefore be based on the relevant information available at the time of the investment decision and not information available at an earlier or later point. Any expenditures occurred prior to the decision to proceed with the investment in the project will not impact the final investment decision as such expenses sunk costs which remain unaffected by the decision to proceed or not with a project activity.

7. **Guidance:** In the case of project activities for which implementation ceases after the commencement and where implementation is recommenced due to consideration of the CDM the investment analysis should reflect the economic decision-making context at point of the decision to recommence the project. Therefore capital costs incurred prior to the revised project activity start date can be reflected as the recoverable value of the assets, which are limited to the potential reuse/resale of tangible assets<sup>1</sup>.

**Rationale:** At the point of taking a decision to restart implementation of a project as a CDM project activity, the key issue of interest to an investor is the costs and revenues including the incentives from the CDM accruing from continuation of the investment.

8. **Guidance:** Project participants should supply spreadsheet versions of all investment analysis. All formulas used in this analysis be readable and all relevant cells be viewable and unprotected. The spreadsheet will be made available to the Executive Board, UNFCCC secretariat and others contracted to assess the request for registration on behalf of the Board including assigned members of the Registration and Issuance Team. In cases where the project participant does not wish to make such a spreadsheet available to the public an exact read-only or PDF copy shall be provided for general publication. In case the PP wishes to black-out certain elements of the publicly available version, a clear justification for this shall be provided to the UNFCCC secretariat by the DOE when requesting registration.

**Rationale:** Paragraph 6 of Step 2 of the Tool for the demonstration and assessment of additionality (version 4) requires that investment analysis be presented in a transparent manner, to the extent that the reader can reproduce the results.

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<sup>1</sup> Capital expenditures 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 investment, demonstrating the value through assessments done by chartered specialists.



### III. Specific Guidance on the Calculation of Project IRR and Equity IRR

9. **Guidance:** The cost of financing expenditures (i.e. loan repayments and interest) should not be included in the calculation of project IRR.

**Rationale:** The purpose of the project IRR calculation is to determine the viability of the project to service debt. Therefore to include the cost of financing as an expense in this calculation would result in a double counting of this cost in the ultimate analysis.

10. **Guidance:** In the calculation of equity IRR only the portion of investment costs which is financed by equity should be considered as the net cash outflow, the portion of the investment costs which is financed by debt should not be considered a cash outflow.

**Rationale:** The purpose of the equity IRR calculation is to determine the final return on the initial equity investment. In such calculations cost of servicing debt (interest and principle payments) are considered as costs. Therefore to consider all investment costs to be a cash outflow would double count the cost of debt to the equity investor.

11. **Guidance:** Due to the impact of loan interest on income tax calculations it is recommended that when a project IRR is calculated to demonstrate additionality a pre-tax benchmark be applied. In cases where a post-tax benchmark is applied the DOE shall ensure that actual interest payable is taken into account in the calculation of income tax.

**Rationale:** In general project IRR calculations should be conducted independently of the source of financing. This guideline provides information on how to conduct calculation if a post tax benchmark is used.

### IV. Selection and Validation of Appropriate Benchmarks

12. **Guidance:** In cases where a benchmark approach is used the applied benchmark shall be appropriate to the type of IRR calculated. Local commercial lending rates or weighted average costs of capital (WACC) are appropriate benchmarks for a project IRR. Required/expected returns on equity are appropriate benchmarks for an equity IRR. Benchmarks supplied by relevant national authorities are also appropriate if the DOE can validate that they are applicable to the project activity and the type of IRR calculation presented.

**Rationale:** For the same project activity the project IRR and equity IRR will be different, therefore the benchmark shall be appropriate to the type of calculation applied.

13. **Guidance:** In the cases of projects which could be developed by an entity other than the project participant the **benchmark** should be based on parameters that are standard in the market, publicly available data sources which can be clearly validated by the DOE. Such data sources may include local lending and borrowing rates, equity indices, or benchmarks determined by relevant national authorities. The DOE's validation of such the benchmarks shall also include its opinion on whether a company-specific suitability of the benchmark or a benchmark based on parameters that are standard in the market is suitable applied in the context of the underlying project activity.

**Rationale:** If the project could be developed by a different entity the unwillingness of one investor to assume the associated risks is not sufficient evidence that the project is additional, as this may be based on the subjective profit expectations of that investor. The applied benchmark must be suitable for the specific proposed project activity. It is not suitable to compare the return of low risk investments with the returns achieved or achievable by higher risk investments.



14. **Guidance:** Internal company benchmarks/expected returns (including those used as the expected return on equity in the calculation of a weighted average cost of capital - WACC), should only be applied in cases where there is only one possible project developer and should be demonstrated to have been used for similar projects with similar risks, developed by the same company or, if the company is brand new, would have been used for similar projects in the same sector in the country/region. This shall require as a minimum clear evidence of the resolution by the company's Board and/or shareholders and will require the validating DOE to undertake a thorough assessment of the financial statements of the project developer – including the proposed WACC – to assess the past financial behavior of the entity during at least the last 3 years in relation to similar projects.

**Rationale:** Paragraph 4 of the Tool for the demonstration and assessment of additionality (version 3) requires that benchmarks should not include the subjective profitability expectations or risk profile of a particular project developer. Note that a company's internal benchmark can be derived in different ways, including by using the Capital Asset Pricing Model (CAPM), however, values derived based on such approaches should only be used if the resulting benchmarks were consistently used by the company in the past.

15. **Guidance:** If the benchmark is based on parameters that are standard in the market, the cost of equity should be determined either by: (a) selecting the values provided in Appendix A; or by (b) calculating the cost of equity using best financial practices, based on data sources which can be clearly validated by the DOE, while properly justifying all underlying factors. The values in the table in Appendix A may also be used, as a simple default option, if a company internal benchmark is used.

**Rationale:** The values in Appendix A reflect, as an approximate value, the returns on equity expected by the market for different sectors and countries (see details on the calculation of the table further below). The expectation of return depends on conditions of the market that can be modelled, taking into account the history (time series) of the market key variables (explaining variables proper of the technology and/or sector under analysis).

16. **Guidance:** If a company's internal benchmark is used for the expected return on equity, the cost of debt should be based on the weighted average cost of debt financing of the legal entity owning the CDM project activity. For loans, use the weighted average cost of outstanding long-term debt. For bonds, use the weighted average yield of the bonds during the last three months prior to the submission of the CDM-PDD for validation or prior to the investment decision, whichever is earlier. The use of bonds to determine the cost of debt is only appropriate for corporate bonds issued in the host country of the CDM project. In cases where the debt finance structure of the project is not yet available (e.g. a letter of intent for debt funding is not available), the cost of debt can be assumed as the commercial lending rate in the country or the yield of a 10 year bond issued by the government of the host country or, if this is not available, the bond with the maturity which is closest to 10 years. The following should be documented in the CDM-PDD: (a) for bonds: the key parameters of the bond including the time of maturity, yield, registration issuance in the financial system and set-up in the market; (b) for loans from a financial institution: the contract of lending between the financial institution and the legal entity owning the assets of the project activity, or, in absence of the contract, a letter from the bank stating its intention to award the loan and the key terms for the loan; (c) for debt financing from a parent company: the transfer of capital to the legal entity, documented with the contract of lending between the parent company and the legal entity owning the assets of the project activity and/or the parameters of the corporate bonds as mentioned above. This latter option is only valid for corporate bonds issued in the host country of the CDM project activity. If the benchmark is based on parameters that are standard in the market, the cost of debt should be calculated as the cost of financing in the capital markets (e.g. commercial lending rates and guarantees required for the country and the type of project activity concerned), based on documented evidence



from financial institutions with regard to the cost of debt financing of comparable projects. In cases where this data is not available, use the commercial lending rate in the host country to calculate the cost of debt.

**Rationale:** Interest rates charged on loans are dependant upon a company's specific credit rating. Hence company specific interest rates are only relevant for projects with only one possible project developer.

17. **Guidance:** If a company's internal benchmark is used for the expected return on equity, then the percentage of debt financing and equity financing should reflect the long-term debt/equity finance structure of the legal entity owning the assets of the project activity. The percentage should be determined based on the latest balance sheet provided under local fiscal/accounting standards and rules if: (a) the legal entity owning the assets of the project activity has balance sheets audited by a third party within two years prior to the submission of the CDM-PDD for validation; and (b) the accounting books of the legal entity reflect at least the total value of all the assets needed for the project activity. If the debt/equity finance structure is not yet available, 50% debt and 50% equity financing may be assumed as a default.

18. **Guidance:** If the benchmark is based on parameters that are standard in the market, then the typical debt/equity finance structure observed in the sector of the country should be used. If such information is not readily available, 50% debt and 50% equity financing may be assumed as a default.

~~18. **Guidance:** Risk premiums applied in the determination of required returns on equity shall reflect the risk profile of the project activity being assessed, established according to national/international accounting principles. It is not considered reasonable to apply the rate general stock market returns as a risk premium for project activities that face a different risk profile than an investment in such indices.~~

~~**Rationale:** The required rate of return for any project activity will necessarily reflect the underlying risk profile of this project. To apply generalized risk profiles may result in an over statement of the rate of return required to attract investment in a specific project type.~~

## V. Investment comparison analysis and benchmark analysis

19. **Guidance:** If the proposed baseline scenario leaves the project participant no other choice than to make an investment to supply the same (or substitute) products or services, a benchmark analysis is not appropriate and an investment comparison analysis shall be used. If the alternative to the project activity is the supply of electricity from a grid this is not to be considered an investment and a benchmark approach is considered appropriate.

**Rationale:** The purpose of an investment analysis in the context of the CDM is to determine whether the project is less financially attractive than at least one alternative in which the project participants could have invested. In cases where the alternative requires investment anyhow and baseline emissions are based on that alternative, the only means of determining that the project activity is less financially attractive than at least one alternative is to conduct an investment comparison analysis. The benchmark approach is therefore suited to circumstances where the baseline does not require investment or is outside the direct control of the project developer, i.e. cases where the choice of the developer is to invest or not to invest.

## VI. Sensitivity analysis

20. **Guidance:** Only variables, including the initial investment cost, that constitute more than 20% of either total project costs or total project revenues should be subjected to reasonable variation (all parameters varied need not necessarily be subjected to both negative and positive variations of the



same magnitude), and the results of this variation should be presented in the PDD and be reproducible in the associated spreadsheets. Where a DOE considers that a variable which constitute less than 20% has a material impact on the analysis they shall raise a corrective action request to include this variable in the sensitivity analysis.

**Rationale:** The initial objective of a sensitivity analysis is to determine in which scenarios the project activity would pass the benchmark or become more favorable than the alternative.

21. **Guidance:** The DOE should assess in detail whether the range of variations is reasonable in the project context. Past trends may be a guide to determine the reasonable range. As a general point of departure variations in the sensitivity analysis should at least cover a range of +10% and –10%, unless this is not deemed appropriate in the context of the specific project circumstances. In cases where a scenario will result in the project activity passing the benchmark or becoming the most financially attractive alternative the DOE shall provide an assessment of the probability of the occurrence of this scenario in comparison to the likelihood of the assumptions in the presented investment analysis, taking into consideration correlations between the variables as well as the specific socio-economic and policy context of the project activity.

**Rationale:** The ultimate objective of the sensitivity analysis is to determine the likelihood of the occurrence of a scenario other than the scenario presented, in order to provide a cross-check on the suitability of the assumptions used in the development of the investment analysis.

## Appendix

### Default values for the expected return on equity

1. The table below provides default values for the approximate expected return on equity for different project types and host countries. The expected return on equity is composed of four elements: (a) a risk free rate of return; (b) an equity risk premium; (c) a risk premium for the host country; and (d) an adjustment factor to reflect the risk of projects in different sectoral scopes. All values are expressed in real terms

2. The risk free rate of return is calculated based on the long-term average returns of US treasury bonds. The US stock market is used as a proxy because it has the longest well recorded data for government bonds as well as stocks. A value of 3.0% is used.

3. The equity risk premium is derived from the long-term historical returns on equity in the US market relative to the return of bonds. Arithmetic means are used because they are more appropriate for estimating forward looking equity risk premiums than geometric means. A value of 6.5% is used.

4. The risk premium for the host country is estimated using Moody's rating for the host country as a proxy for this risk. For those countries for which ratings by Moody's are not available, the risk premiums were derived based on comparisons with countries with similar gross national product per capita. The national product per capita has shown to be one of the key economic determinants which have a strong statistical explanatory power for country credit ratings.

5. For the purpose of determining the adjustment factor to reflect the risk of projects in different sectoral scopes, three different project categories are distinguished according to the sectoral scopes used under the CDM:

Group 1: 1. Energy Industries;  
2. Energy Distribution;  
3. Energy Demand;  
13. Waste handling and disposal.

Group 2: 4. Manufacturing industries;  
5. Chemical Industries;  
6. Construction;  
7. Transport;  
8. Mining/Mineral production;  
9. Metal production;  
10. Fugitive Emissions from fuels;  
11. Fugitive Emissions from production and consumption of halocarbon, and Sulphur hexafluoride;  
12. Solvent use.

Group 3: 14. Afforestation and reforestation;  
15. Agriculture.

6. Depending on the country and sector, project participants can select the relevant benchmark value for their proposed CDM project activity. Note that the values are expressed in percentages in real terms



	Moody's Rating for Bonds	Group 1	Group 2	Group 3
Afghanistan		14.5	15.5	14
Albania	B1	13	14	12.5
Algeria		12.9	13.9	12.4
Angola	B1	13	14	12.5
Antigua and Barbuda		10.5	11.5	10
Argentina	B3	14.5	15.5	14
Armenia	Ba2	12.5	13.5	12
Azerbaijan	Ba1	11.2	12.2	10.7
Bahamas	A3	10.9	11.9	10.4
Bahrain	A2	10.8	11.8	10.3
Bangladesh	Ba3	12.75	13.75	12.25
Barbados	Baa3	11.75	12.75	11.25
Belize	B3	14.5	15.5	14
Benin		13.25	14.25	12.75
Bhutan		13	14	12.5
Bolivia	B2	13.75	14.75	13.25
Bosnia and Herzegovina	B2	13.75	14.75	13.25
Botswana	A2	10.8	11.8	10.3
Brazil	Baa3	11.75	12.75	11.25
Brunei Darussalam		10.5	11.5	10
Burkina Faso		13.75	14.75	13.25
Burundi		14.5	15.5	14
Cambodia	B2	13.75	14.75	13.25
Cameroon		13	14	12.5
Cape Verde		12.9	13.9	12.4
Central African Republic		14.5	15.5	14
Chad		13.75	14.75	13.25
Chile	Aa3	10.3	11.3	9.8
China	A1	10.5	11.5	10
Colombia	Ba1	12	13	11.5
Comoros		13.25	14.25	12.75
Congo		13	14	12.5
Cook Islands		9.5	10.5	9
Costa Rica	Ba1	12	13	11.5
Cuba	Caa1	15.5	16.5	15
Cyprus	Aa3	10.3	11.3	9.8
Côte d'Ivoire		13.25	14.25	12.75
Democratic People's Republic of Korea		9.5	10.5	9



Democratic Republic of the Congo		14.5	15.5	14
Djibouti		13	14	12.5
Dominica		12.9	13.9	12.4
Dominican Republic	B2	13.75	14.75	13.25
Ecuador	Caa3	17	18	16.5
Egypt	Ba1	12	13	11.5
El Salvador	Ba1	12	13	11.5
Equatorial Guinea		10.5	11.5	10
Eritrea		14.5	15.5	14
Ethiopia		14.5	15.5	14
Fiji	B1	13	14	12.5
The former Yugoslav Republic of Macedonia		12.9	13.9	12.4
Gabon		11.75	12.75	11.25
Gambia		13.75	14.75	13.25
Georgia		12.9	13.9	12.4
Ghana		13.25	14.25	12.75
Grenada		11.75	12.75	11.25
Guatemala	Ba2	12.5	13.5	12
Guinea		14.5	15.5	14
Guinea-Bissau		14.5	15.5	14
Guyana		13	14	12.5
Haiti		13	14	12.5
Honduras	B2	13.75	14.75	13.25
India	Baa3	11.75	12.75	11.25
Indonesia	Ba2	12.5	13.5	12
Iran (Islamic Republic of)		12.9	13.9	12.4
Iraq		9.5	10.5	9
Israel	A1	10.5	11.5	10
Jamaica	Caa1	15.5	16.5	15
Jordan	Ba2	12.5	13.5	12
Kazakhstan	Baa2	11.5	12.5	11
Kenya		13.25	14.25	12.75
Kiribati		13	14	12.5
Kuwait	Aa2	10.1	11.1	9.6
Kyrgyzstan		13.25	14.25	12.75
Lao People's Democratic Republic		13.25	14.25	12.75
Lebanon	B1	13	14	12.5
Lesotho		13.75	14.75	13.25
Liberia		14.5	15.5	14
Libyan Arab Jamahiriya		10.5	11.5	10



Madagascar		13.75	14.75	13.25
Malawi		14.5	15.5	14
Malaysia	A3	10.9	11.9	10.4
Maldives		12.9	13.9	12.4
Mali		13.75	14.75	13.25
Malta	A1	10.5	11.5	10
Marshall Islands		12.9	13.9	12.4
Mauritania		13.75	14.75	13.25
Mauritius	Baa2	11.5	12.5	11
Mexico	Baa1	11.2	12.2	10.7
Micronesia (Federated States of)		13	14	12.5
Mongolia	B1	12	13	11.5
Montenegro	Ba3	12.75	13.75	12.25
Morocco	Ba1	12	13	11.5
Mozambique		14.5	15.5	14
Myanmar		9.5	10.5	9
Namibia		12.9	13.9	12.4
Nauru		9.5	10.5	9
Nepal		14.5	15.5	14
Nicaragua	Caa1	15.5	16.5	15
Niger		14.5	15.5	14
Nigeria		13	14	12.5
Niue		9.5	10.5	9
Oman		10.5	11.5	10
Pakistan	B3	14.5	15.5	14
Palau		11.75	12.75	11.25
Panama	Ba1	12	13	11.5
Papua New Guinea	B1	13	14	12.5
Paraguay	B3	14.5	15.5	14
Peru	Baa3	11.75	12.75	11.25
Philippines	Ba3	12.75	13.75	12.25
Qatar	Aa2	10.1	11.1	9.6
Republic of Korea	A2	10.8	11.8	10.3
Republic of Moldova	WR	9.5	10.5	9
Rwanda		13.75	14.75	13.25
Saint Kitts and Nevis		10.5	11.5	10
Saint Lucia		9.5	10.5	9
Saint Vincent and the Grenadines		11.75	12.75	11.25



Samoa		13	14	12.5
San Marino		10.5	11.5	10
Sao Tome and Principe		13	14	12.5
Saudi Arabia	Aa3	10.3	11.3	9.8
Senegal		13.25	14.25	12.75
Serbia		11.75	12.75	11.25
Seychelles		10.5	11.5	10
Sierra Leone		14.5	15.5	14
Singapore		10.5	11.5	10
Solomon Islands		13.25	14.25	12.75
Somalia		9.5	10.5	9
South Africa	A3	10.9	11.9	10.4
Sri Lanka		13	14	12.5
Sudan		13	14	12.5
Suriname	B1	13	14	12.5
Swaziland		12.9	13.9	12.4
Syrian Arab Republic		12.9	13.9	12.4
Tajikistan		13.75	14.75	13.25
Thailand	Baa1	11.2	12.2	10.7
Timor-Leste		12.9	13.9	12.4
Togo		13.75	14.75	13.25
Tonga		12.9	13.9	12.4
Trinidad and Tobago	Baa1	11.2	12.2	10.7
Tunisia	Baa2	11.5	12.5	11
Turkmenistan	B2	13.75	14.75	13.25
Tuvalu		9.5	10.5	9
Uganda		13.75	14.75	13.25
United Arab Emirates	Aa2	10.1	11.1	9.6
United Republic of Tanzania		13.75	14.75	13.25
Uruguay	Ba3	12.75	13.75	12.25
Uzbekistan		13.25	14.25	12.75
Vanuatu		13	14	12.5
Venezuela (Bolivarian Republic of)	B2	13.75	14.75	13.25



Viet Nam	Ba3	12.75	13.75	12.25
Yemen		13.25	14.25	12.75
Zambia		13.25	14.25	12.75
Zimbabwe		13.25	14.25	12.75

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### History of the document

Version	Date	Nature of revision(s)
04	EB 61, Annex 13 3 June 2011	The revision provides further guidance on the calculation of the expected return on equity, the cost of debt and the percentage of equity and debt funding. The revision also includes a new Appendix with default values for the expected return on equity.
03.1	EB 51, Annex 58 15 January 2010	Editorial changes.
03	EB 51, Annex 58 04 December 2009	Revision to provide guidance on the treatment of interest payments in income tax calculations.
02.1	EB 41, Annex 45, 02 August 2008	Revision to insert annex number.
02	EB 41, Annex 45, 02 August 2008	Revision to provide guidance on the treatment of costs incurred prior to the project activity start date.
01	EB 39, Annex 35, 16 May 2008	Initial adoption.
<b>Decision Class:</b> Regulatory <b>Document Type:</b> Guideline <b>Business Function:</b> Registration		