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Methodology for the economic assessment of EBRD projects with high greenhouse gas emissions

Technical note

European Bank
for Reconstruction and Development

Purpose of this note

From January 2019, the European Bank for Reconstruction and Development (EBRD) will undertake an economic assessment of projects with high greenhouse gas (GHG) emissions. This corporate commitment was announced on 12 December 2018, following the release of the EBRD Energy Sector Strategy 2019-23.[1] It builds on and replaces a previous methodology, published in 2014, for the assessment of coal-fired power projects.[2]

This note describes the economic assessment methodology in more detail. It is a staff working document subject to revision over time to ensure that it reflects best practice.

[1] The Energy Sector Strategy is available at: https://www.ebrd.com/power-and-energy/ebrd-energy-sector-strategy.pdf.

[2] The previous methodology for the assessment of coal-fired generation projects is available at: https://www.ebrd.com/documents/climate-finance/methodology-for-the-assessment-of-coal-fired-generation-projects.pdf.

Background

The Paris Agreement embodies a broad-based international commitment to address climate change. The Agreement commits countries to GHG emissions pathways consistent with *"holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5 °C above pre-industrial levels."* The Agreement emphasises the need for efforts to promote both climate change mitigation and climate change adaptation.

Addressing climate change is at the core of the EBRD's mandate of promoting the transition to market-based economies and of its commitment *"to promote in the full range of its activities environmentally sound and sustainable development"*.[3] Along with other development financing institutions, the Bank committed to supporting the goals of the Paris Agreement in the 2015 *Joint Statement by the Multilateral Development Banks at Paris, COP21*. This commitment was reiterated in a joint declaration with other development finance institutions at the One Planet Summit in 2017 and COP24.

Operationally, the EBRD's support for international climate goals is delivered through:

- Investment activities. In particular, the Bank has several processes and procedures to promote climate change mitigation and adaptation investments – most notably, those associated with the Green Economy Transition[4] approach.
- Policy engagement activities. These extend to:
  - support to develop, refine and increase the ambition of Nationally Determined Contributions (NDCs) – for example, through the EBRD's NDC Support Programme.
  - activities such as defining and shaping sector and/or country-specific emissions pathways.
- Technical assistance activities. Technical assistance can include market analysis and resource audits as well as training and awareness-raising.

A key element of the Bank's activities is to identify and mitigate the climate risk associated with its activities – specifically, the risk that activities are inconsistent with mitigation and/or adaptation goals. Assessing the economic merits of projects with significant GHG emission impacts the Bank offers reassurance that supported projects achieve the EBRD's transition and sustainability goals.

A carbon price can be part of the policy package to help achieve the goals of the Paris Agreement. It seeks to put a monetary value on GHG emissions and corrects for the market failure associated with this externality. Although there has been substantial progress in recent years, carbon prices remain limited or non-existent in many of the economies where the EBRD invests.

[3] Article 2.1(vii) of the Agreement Establishing the EBRD is available at: https://www.ebrd.com/news/publications/institutional-documents/basic-documents-of-the-ebrd.html.

[4] The Green Economy Transition approach is available at: http://www.ebrd.com/what-we-do/strategies-and-policies/green-economy.pdf.

Application

A mandatory economic assessment will apply to investments where the proceeds:

- increase emissions by 25,000 metric tonnes of carbon dioxide equivalent (CO_2e) per year relative to a baseline (net basis) or
- increase emissions by 100,000 metric tonnes of CO_2e per year in absolute terms (gross basis).

These thresholds have been chosen to capture projects that have significant GHG emissions.[5]

As per the current EBRD and multilateral development bank (MDB) practice, the analysis will consider Scope 1 (direct) and Scope 2 (indirect or electricity) GHG emissions. Scope 3 GHG emissions (those related to the upstream or downstream impact of the investment) will generally not be included as there is no agreed methodology for these types of impact and there is a risk of double-counting. However, as the EBRD is keen to consider the upstream or downstream impact of its projects, Scope 3 GHG emissions may be taken into consideration in some applicable infrastructure projects where these are relevant (for example energy pipelines).

[5] As per the EBRD's Environmental and Social Policy, projects leading to a relative emissions change (either increase or decrease) higher than 25 kilotonnes CO_2e annually are subject to mandatory GHG assessment. To estimate GHG emissions, the EBRD follows commonly accepted approaches for GHG accounting. The EBRD approach is available at: https://www.ebrd.com/documents/admin/ebrd-protocol-for-assessment-of-greenhouse-gas-emissions.pdf.

Outline of methodology

In applicable projects, there will be three steps.

Step 1: Define the baseline to compare the project to

The economic analysis will look at the "gross" and "net" impacts of the project. This requires comparing the proposed project with an alternative scenario or "counterfactual" (that is, what would happen in the absence of the project). The choice of counterfactual(s) will depend on the specific investment and thus will be assessed in the context of each project.

There are three potential baselines, which are not mutually exclusive:

- "**do nothing**" – for example, in a capacity upgrading project, the counterfactual would be letting the capacity gradually deteriorate until the end of the lifetime. In a "greenfield" project, the alternative would be no project at all.
- "**do minimum**" – for example, in a capacity upgrading or capacity expansion project, the counterfactual would be an investment sufficient to keep the existing capacity just operational.
- "**do something else**" – that is, the use of an alternative technology or course of action. This is appropriate once it is recognised that "something" must be done.

Where insightful, a range of feasible baselines or project options will be considered to meet the aims and objectives of the project.[6]

Step 2: Undertake an economic assessment of the project, including a sensitivity analysis

In general, when applying an economic assessment, a cost-benefit analysis (CBA) will be conducted. A CBA measures the difference between the flow of costs and benefits of the project compared to a counterfactual.

However, a cost-effectiveness analysis (CEA) will be more appropriate in some circumstances.[7] A CEA compares the costs of different – realistically available – project alternatives to achieve a given outcome. This is preferable to CBA when the outcome of the project and different alternatives are relatively homogenous and easily measurable. It can also be used where (i) benefits are equivalent across multiple options; and/or (ii) where benefits are difficult to quantify.

To ensure focus and insight, as well as a pragmatic approach, the most important material impact should be identified as early as possible in the process (to the fullest extent possible). The approach taken will be commensurate with the size and complexity of the project.

A sensitivity analysis is used to identify the "critical" variables of the project outcome. For the shadow carbon price, a "switching value" will be calculated. This is the value at which a particular variable would change the project investment decision, assuming all other variables are constant.

Step 3: Present results in the Final Review Memorandum and subsequent Board submission

A summary of the economic assessment will be included in the Final Review Memorandum, which is the basis for EBRD management to approve or reject a project, with the full results included in a dedicated annex.

The project summary document (PSD), published externally, will also refer to the economic assessment and contain a summary of the key outputs.

[6] The baseline definition for projects subject to economic assessment should be consistent with the baseline used for GHG assessment as defined by the EBRD "GET Handbook" available at: https://www.ebrd.com/documents/climate-finance/implementing-the-ebrd-green-economy-transition.pdf.

[7] For power projects a cost-effectiveness analysis will be the standard option undertaken in projects related to electricity supply unless there is a clear rationale to undertake a full CBA.

Key features and assumptions of the economic assessment methodology

Financial revenues and costs

The economic assessment will build on the project financial assessment that is routinely undertaken as part of the EBRD's investment appraisal process. Monetary values for counterfactuals should be based on likely project costs, based on country-specific conditions or an international benchmark.

The costs included in the project financial assessment may require adaptation and may sometimes be modified to capture its entire lifetime rather than the length of the EBRD loan. This will include estimating for both the project and the counterfactual(s):

- Revenues derived from the implementation of the project, normally based on sales values and market prices.
- Capital expenditures needed to set up and establish the project.
- Operating expenditures required to operate and maintain the project.
- Any operating savings from implementing the projects.

All revenues and costs will be presented consistently in constant market prices.

Shadow carbon price

The EBRD will use the high and low values from the range of prices recommended by the High-Level Commission on Carbon Prices,[8] which have a range of US$ 40-80 (~€ 37-74) per metric tonne of CO_2e in 2020, rising to US$ 50-100 (~€ 46-92) per metric tonne of CO_2e by 2030. Beyond 2030 the prices will be increased by 2.25 per cent per year leading to a range of US$ 78-156 (~€ 72-144) per metric tonne of CO_2e by 2050. All values are in real terms and in constant 2017 prices.[9]

For the purposes of a core assumption in project assessment the EBRD will test the economic viability of projects against the low and the high value, and will also calculate a "switching value" carbon price to better understand what level would change the economic merits of the project.

Adjustments to account for market carbon prices used in the financial analysis will be made. Carbon prices will not be differentiated by country.[10]

The GHG emissions estimates used will be based on independent environmental and social due diligence routinely commissioned by the Bank (and internally verified).

Other environmental externalities

The EBRD will attribute costs to other relevant environmental externalities where both physical data and economic values can be found. At this stage, it is foreseen that the analysis will mostly focus on costs for air pollution impacts and it will normally not be possible to quantify the extent of other environmental externalities (for example, water pollution, noise, soil contamination, landscape deterioration, biodiversity loss, ecosystem service). The EBRD will, over time, seek to improve its approach.

Emissions of local air pollutants will be estimated based on the 2011 European Environment Agency study of the cost impacts of such emissions in the EU28 and Norway.[11] This attributes costs in constant 2017 prices for sulphur dioxide (SO_2) of €8,313/tonne; nitrogen oxides (NOx) of €8,010/tonne; fine particulates ($PM_{2.5}$) of €28,732/tonne; and large particulates (PM_{10}) of €18,008/tonne. The EBRD may adjust these values as appropriate to a given situation in an economy where the EBRD invests to reflect differences in wealth, population density and other project specifics.

[8] N. Stern and J. E. Stiglitz (2017). *Report of the High-Level Commission on Carbon Prices*. World Bank. Available at: https://www.carbonpricingleadership.org/report-of-the-highlevel-commission-on-carbon-prices/ (last accessed on 16 January 2019).

[9] The euro conversion is shown for illustration purposes using an average 2017 US$ to euro exchange rate of 1 dollar to €0.923. This is based on estimates from the US Internal Revenue Service available at: https://www.irs.gov/individuals/international-taxpayers/yearly-average-currency-exchange-rates (last accessed on 16 January 2019).

[10] Where a project is subject to a real market price of carbon and this is already included in the financial cash flows of a project, then only the difference between the actual carbon price and shadow carbon price needs to be included to avoid double counting.

[11] EEA (2011) *Revealing the Costs of Air Pollution from Industrial Facilities in Europe*.

Accounting for non-environmental externalities and other adjustments to financial values

Where there are significant additional costs and/or benefits related to a project and its counterfactuals they should be included. The approach will be proportionate to the likely size of the impact and the practicality of estimating values.

The factors to take into account will be sector-specific.[12] Typical adjustments could include:

- Estimating the price of inputs (for example, energy consumed) and of outputs (for example, energy sales), particularly in those cases where prices are administratively set and need to be replaced by "commercially driven" prices (for example, international prices of the commodities or a "cost plus margin" approach).
- Removal of certain taxes and subsidies as they are transfers from one group in society to another but do not represent a use of resources.
- In a transport project, estimating the value of travel time savings, health impacts of reduced accidents from safer roads and reliability and comfort of different transport options.

In energy projects, economic values for energy security, reliability and flexibility of projects will need to be estimated for options that have different output characteristics with respect to these elements. The EBRD will follow the approach in its methodology for the assessment of coal-fired generation projects, pending further review. This approach values:

- Reliability: the incremental contribution of an additional generating unit to reducing the chance that the power system will have insufficient installed capacity to meet expected peaks in demand.
- Flexibility: the ability of a generator to respond to changes in supply/demand conditions in the power system, which in practice can be represented by generators' start-up times, ramp rates and minimum stable load.
- Security of supply: the level of certainty that energy can be delivered when needed, based on factors such as the diversity and reliability of trading partners – both with respect to electricity interconnections and fuel supplies. The EBRD will assess security aspects in a qualitative manner, since they are not typically susceptible to a quantitative analysis.

Wider economic impacts and indirect impacts of the project being implemented will in general not be assessed. The EBRD will generally not calculate any change in market conditions (and associated economic impacts) from the equilibrium price as a result of the project, unless project implementation would fundamentally change the market where the investment is made.

[12] Information on other material economic costs and benefits are discussed extensively in European Commission (2014) *Guide to cost benefit analysis of investment projects*. Available at: https://ec.europa.eu/inea/sites/inea/files/cba_guide_cohesion_policy.pdf(last accessed on 16 January 2019).

Discount rate

To make costs and benefits that arise at different points in time comparable, the EBRD will use an "economic discount rate" or "social discount rate". Every discount rate entails a judgement concerning the future and it affects the weight attributed to future benefits or costs. There is no definitively agreed approach but discount rates are normally based on the social rate of return on private investments (SRRI) or social opportunity cost of capital (SOC), or the social rate of time preference.[13]

Given the range of possible methods, the EBRD has chosen to use a real discount rate of 6 per cent – in line with the approach taken by other multilaterals and governments – running sensitivities at higher and lower rates.[14]

Financing costs

In standard financial analysis the cost of financing is not included. However, for some projects the cost of finance will be a genuine cost to society and should be included. Examples would be where private firms are financing the investment although the benefits accrue to the wider society or if one investment is deemed to be riskier than another and would, in practice, incur higher financing costs.

In cases where financing costs are included, the "Spackman Approach" will be used.[15]

Project boundary and counterfactual consistency with GHG accounting

The project boundary for the calculation of the economic costs and benefits, and the calculation of the GHG emissions should be consistent. The approach to project boundary will be informed by the EBRD's internal approach to defining project boundaries and the approaches of other Multilateral Development Banks on similar types of projects. In general, the project should be a self-sufficient unit of analysis with no essential feature left out. This means projects should not be partitioned for financing, administrative or engineering reasons; and should also have clearly defined cash flows.[16]

[13] See Freeman, Groom and Spackman (2018) Social Discount Rates for Cost-Benefit Analysis: A Report for HM Treasury; OECD (2018) Cost-Benefit Analysis and the Environment – Further Developments and Policy Use; and European Commission (2014) *Guide to cost benefit analysis of investment projects*; EIB (2013) *The Economic Appraisal of Investment Projects.*

[14] As a guide, analysis for the EBRD methodology for the assessment of coal-fired generation projects suggested a likely range of applicable discount rates of between 5-8 per cent for EBRD countries, based on the social rate of time preference approach.

[15] See further discussion of financing costs and the "Spackman Approach" in the Joint Regulators Group (2012) *Discounting for CBAs involving private investment, but public benefit*. Ofcom, UK.

[16] For further discussion of defining project boundaries for economic analysis see European Commission (2014) Guide to cost-benefit analysis of investment projects.

Reporting and operational implications

Projects potentially subject to an economic assessment will be identified at the concept stage. The analysis will be undertaken as part of project due diligence and finalised prior to the final review of the project.

The results of the economic assessment will be an important resource for senior management in making a final decision on whether to approve the project. They can also provide useful information on better alternatives or different designs that would maximise impact. The approach does not propose any formal trade-off between economic assessment, transition impact, additionality or sound banking principles, rather a better-informed decision-making process.

The Board Document will include a dedicated annex setting out the outputs of the economic assessment. The project summary document (PSD), published externally, will also refer to the economic assessment and contain a summary of the key outputs.

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