



GREEN
CLIMATE
FUND

Initial Risk Management Framework: Survey of Methodologies to Define and Determine Risk Appetite

GCF/B.09/13

18 February 2015

Meeting of the Board
24-26 March 2015
Songdo, Republic of Korea
Agenda item 12

Recommended action by the Board

It is recommended that the Board:

- (a) Take note of the information presented in document GCF/B.09/13 *Initial Risk Management Framework: Survey of Methodologies to Define and Determine Risk Appetite*; and
- (b) Adopt the draft decision presented in Annex I to this document.

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Initial Risk Management Framework: Survey of Methodologies to Define and Determine Risk Appetite

I. Introduction

1. By its decision B.07/05, paragraph (b), the Board adopted the Green Climate Fund's initial financial risk management framework.
2. By the same decision, paragraph (e), the Board requested the Secretariat, in consultation with the Risk Management Committee, to prepare an analysis of the Fund's potential risk appetite under different key assumptions as part of its financial risk management framework.
3. As a first step, the Board requested the Secretariat to provide a survey of methodologies used by relevant institutions to define and determine their risk appetite, for consideration by the Board at the third meeting of the Board in 2014.
4. The purpose of this document is to provide such a survey of methodologies and to provide a starting point for the analysis of the Fund's potential risk appetite under different key assumptions as part of its financial risk management framework, as requested by the Board. While the Board's decision B.07/05 concentrates on financial risks, this document takes a more general approach and considers a broader set of risks that the Fund may face. In particular, the mandate of the Fund is such that an adequate level of risk appetite must also explicitly consider climate impact risks (i.e. the risk that projects or technical assistance activities supported by the Fund do not contribute to the Fund's strategic objective on positive climate impacts). This approach ensures that the level of risk taken as part of the Fund's financial activities is not only consistent with the Fund's financial losses tolerance, but also with the type of engagements necessary to "promote the paradigm shift towards low-emission and climate-resilient development pathways".

II. Linkages with other documents

5. This document has linkages with document GCF/B.08/16 *Policies for Contributions to the Green Climate Fund: Recommendations by Interested Contributors*.

III. General conceptual framework

6. **The risk appetite of an organization is the aggregate of many dimensions of risks, each with its own risk profile.** *Risk appetite* is the overall level of risk an organization is willing to take in order to achieve its objective. More specifically, for financial institutions, the Financial Stability Board¹ has defined risk appetite as "the aggregate level and types of risk a financial institution is willing to assume within its risk capacity to achieve its strategic objectives and business plan."²
7. *Risk capacity* is the amount of risk an organization can actually bear.³
8. However, risk is not evenly spread in an organization but varies across activities. Two examples illustrate this:

¹ <http://www.financialstabilityboard.org/>.

² Principles for an Effective Risk Appetite Framework, Financial Stability Board, 18 November 2013.

³ Risk Management Society (RIMS). 2012. Exploring Risk Appetite and Risk Tolerance. RIMS Executive Report.

- (a) A commercial airline may have an overall low risk appetite that is composed of areas with *higher risk appetites* (e.g. commercial risks: the airline may choose to fly new routes with the expectation that only a fraction of them will become profitable and others will generate losses and will have to be discontinued) and other areas with *lower risk appetites* (e.g. safety risks); and
- (b) A financial institution may similarly have different levels of risk appetite for each line of business in which it engages. For example, a development bank whose objective is to support small and medium-sized enterprises (SMEs) may have an overall risk appetite which is higher than a regular commercial bank targeting large corporations. However, the development bank may be willing to take higher risks in its operations targeting companies of particular importance given the bank's mandate (e.g. fostering the growth of new very small companies) than in other areas (e.g. providing working capital to established medium-sized companies).

9. **Establishing the risk appetite also implies having a clear way to measure the returns obtained in exchange for bearing those risks.** This is generally known as establishing where each activity of the organization lies in the *risk-reward continuum*.⁴ Establishing the “reward” or return from each activity for an organization whose mandate is to maximize profits is relatively easy as this is generally the net profit obtained or some proxy thereof.⁵ Not-for-profit organizations or those with a public policy objective need to have a broader approach that incorporates a measurement of development results (in the Fund's case, climate impact results) in addition to financial indicators associated with each activity.

10. **There are four basic steps in the process of establishing the risk appetite of an organization** (see (a)–(b) below). The process begins by describing the types of risk to which the organization is exposed, dividing the organization into separate units/lines of business where risks arise and establishing an initial risk appetite for each one of those units, establishing the methodology to be used to measure risk and reward in each unit and finally, developing and approving a risk appetite statement.

- (a) Defining risk types: Multiple organizations and authors have developed different risk typologies. Table 1 presents a typology that aims to be broad enough to take into account the risks to which a fund with a public policy mandate such as the Fund may be exposed. It must be emphasized that there is not a clear standard to classify risks and that some definitions can overlap: for example, compliance risk can be considered a special case of legal risk.

⁴ This terminology assumes that higher risks imply higher potential returns.

⁵ For example, earnings before interest, taxes, depreciation and amortization (EBITDA).



Table 1: Risk typologies⁶

Type	Risk	Driver of losses	Example
Non-financial	Strategic/ business	Inadequate implementation of the strategy, including poor business choices	A development bank concentrates its efforts on developing roads in a country as a growth strategy. However, the new infrastructure remains underutilized and growth does not take place as the binding constraints to growth lie elsewhere
	Reputational	Adverse perception on the part of existing and potential stakeholders (e.g. shareholders, clients, trading counterparties, employees, suppliers, regulators, media and investors)	The press reports that a senior executive of a company was involved in illegal activities 20 years ago. While there are no pending legal matters, the bad press causes a drop in sales
	Operational/ fiduciary	Inadequate or failed internal processes, people and systems	A teller in a bank inputs the incorrect amount for a transaction in a computer system
	Legal	A defective transaction or a lawsuit	Contracts with staff are found to not fully comply with local labor laws and protracted legal proceedings follow
	Compliance	Failure to comply with applicable laws, regulations, rules, related self-regulatory organization standards, and codes of conduct	A company is fined by the health authorities due to lack of compliance with health and safety standards for its workers
Financial	Funding	Inability to raise funds through borrowing or increasing capital from shareholders	Sovereign contributors to a global development fund have to postpone contributions due to fiscal constraints in their own national budgets
	Credit	Failure of a borrower, or any other stakeholder with whom a credit contract exists, to make payment in due time	Bank borrowers default at a higher rate than expected
	Market	Drop in market prices of assets held by the organization	The portfolio of bonds used by a firm to maintain its liquidity loses value in response to an increase in interest rates
	Liquidity	Inability to monetize (i.e., convert to cash) assets	A bank facing the need to pay certain liabilities is unable to find buyers for its bond portfolio in a timely manner, and it has to resort to more expensive sources of funding
	Asset-liability mismatch	Mismatch between the terms of the assets and liabilities of an organization (note: this is a particular type of liquidity risk)	A development bank receives a request for disbursements from projects at a faster rate than expected, and it has to liquidate some of its longer-term assets at a loss

⁶ This typology is based on several frameworks in use, including: Bank for International Settlements Basel III and Basel II frameworks; Committee of European Banking Supervisors Consultation Paper 03; Committee of Sponsoring Organizations of the Treadway Commission; Legal Risk in Financial Markets, R McCormick, 2006, Oxford University Press.

- (b) Defining the organization’s risk functional units or lines of business and establishing an initial risk appetite for each of them: In this step, the organization defines the different areas where risk will be measured and managed. For an organization whose main objective is to make a profit, this can be done by looking at the balance sheet and profit and loss statements and identifying the key sources of revenue and expenses and drilling down further to define “lines of business”. As discussed below, for an organization such as the Green Climate Fund, this step needs to be tied closely to the investment framework, which defines the areas of focus of the Fund and ultimately the allocation of the Fund’s resources, and the results management framework, which was developed to measure the achievement of non-financial objectives. The risk functional units do not necessarily coincide with the administrative units as presented in an organizational chart, and the best way to define them is by looking at the organization and making a list of the activities carried out to achieve its strategic objective. The indication of risk type is accomplished by combining quantitative (e.g. how much capital or what fraction of resources will be made available for this particular business) and qualitative (e.g. high, medium or low) indicators.
- (c) Establishing a methodology to measure risk and reward: Each type of risk in each functional unit needs to be measured and tied to a reward level. In the case of a commercial bank, for example, the credit risk could be measured based on indicators such as the level of non-performing loans (NPLs)⁷ and the “reward” would be based on income (net of provisions). Business units which are not revenue-generating or whose mandate is to achieve a certain development objective require different, mostly non-quantitative indicators. For example, the business unit of a public institution supporting new low-emission energy technologies such as the Fund may have as a combined risk-reward measurement the percentage of “satisfactory” projects per US\$ 1 million of grants provided, where satisfactory is defined as the roll-out of technologies which can be scaled up without relying on continued funding from the institution. Developing and approving a risk appetite statement: This final step is very important from a governance point-of-view as it is generally approved by the board of the organization and should serve as the high-level guide for management and employees on carrying out their business. This should be a relatively short statement, easy to communicate throughout the organization and include measurable and manageable risk and reward indicators.

IV. Survey of methodologies used by other institutions

11. Before proposing an approach for the Fund, it is important to review the approach to risk appetite that other organizations take. This survey includes entities with a public policy or development mandate as well as a commercial financial institution and it is based on the review of publicly available documents posted by each entity in its own website.

4.1 Multilateral development banks

12. From a risk perspective, multilateral development banks (MDBs) financing primarily sovereign governments (e.g. the World Bank, African Development Bank) have seven key characteristics (see below) that define how risk is managed (as well as how they are assessed by credit rating agencies):

- (a) They are credit cooperatives where borrowers are also shareholders;

⁷ NPLs need to be defined. Generally, they refer to loans with payments more than 90-days past due.

- (b) They are not regulated or supervised entities but they voluntarily follow risk management processes equivalent to those of regulated entities in order to ensure a strong credit rating and access to capital markets to fund their operations;
- (c) They are considered to have preferred credit status as borrowers have historically ranked MDB-debt as senior to other creditors since MDBs are perceived to also be “lenders of last resort”;⁸
- (d) There is both a contractual as well as an implicit commitment from shareholders to support the institution in the face of extreme losses;
- (e) The credit portfolio is concentrated on a relatively small number of borrowers (this happens almost by definition since most of the borrowing is done by the shareholders, or guaranteed by them);
- (f) An important source of income has been traditionally generated from treasury operations managing their own paid-in capital (this is a consequence of having to keep a relatively high level of capital/loans ratio, in part to manage risks arising from their low level of diversification); and
- (g) A commitment to generally use the same pricing for all borrowers, or at least to minimize price differentiation which prevents MDBs from adequately pricing for risk. MDBs that have a large component of support for the private sector (e.g. International Finance Corporation, European Bank for Reconstruction and Development) are somewhat different as their portfolio is much more diversified, private clients are not shareholders and their preferred creditor status only protects them from actions taken by governments, not from default by their private borrowers due to other reasons (or losses from equity investments).⁹

4.1.1 International Bank for Reconstruction and Development¹⁰

13. The International Bank for Reconstruction and Development (IBRD), part of the World Bank Group, does not have a comprehensive appetite statement covering all risk types. Instead, its Board sets the non-financial risk appetite through the body of discussions or formal approvals of strategy papers prepared by IBRD’s management. This includes approving overall sector strategies,¹¹ fiduciary policies (including safeguards, financial management and procurement in IBRD-supported projects) and operational policies. At the country level, the Board discusses a Country Partnership Framework (CPF) for each client country (generally, “client country” refers to shareholder countries that have an ongoing lending program) which includes an *indicative* level of financial resources to be made available to that country during the CPF period, generally four years. The IBRD Board does not approve specific *ex-ante* allocations by country, but does approve each lending operation. Board oversight of financial risks is carried out by the Audit Committee.

14. With respect to financial risks, the key indicator driving risk management is the Board-approved target equity/loan ratio. This target, which traditionally had been in the 23-27 per cent range and was reduced recently to 20 per cent, is an easy-to-communicate prudential rule where equity is defined as paid-in capital plus retained earnings and loans refer

⁸ For a good discussion on the concept of preferred creditor status, see Multilateral Development Banks and Other Supranational Entities. Rating Methodology. Moody’s Investors Services. 16 December 2013.

⁹ In addition, some of these, such as IFC, also price for risk.

¹⁰ Additional details can be found in the discussion accompanying the FY2013 IBRD Financial Statements, as well as on the disclosure reports and prospectuses for IBRD bonds, presented at treasury.worldbank.org.

¹¹ During the past few years, the Board periodically discussed “sector strategies”, setting out the main areas of the Bank’s strategic thrust. As at 1 July 1 2014, a new approach based on “global practices” has been in place and it is expected that each practice would present a strategy for Board discussion.

only to borrowings by member countries (not to credit risks which may arise in IBRD's own treasury operations).¹² This is a rather high level of liquidity (a commercial bank would generally target an 8–12 per cent equity to risk assets ratio) but one that is consistent with the low level of diversification than an MDB can have. In fact, as of 30 June 2014, the eight largest borrowers accounted for 60 per cent of total borrowings. The Board also approves the Single Borrower Limit (currently US\$ 19 billion, except for India, whose limit is US\$ 20 billion).

15. Unlike a commercial institution, IBRD does not translate its available resources to withstand shocks into a level of economic capital that is then allocated to each business unit across all types of risk.¹³ Instead it uses separate approaches as follows:

- (a) Country credit risk (i.e. the risk of non-payment by Bank borrowers) is managed through a model that estimates the probability of default of each country and the correlation/concentration of each borrower with the rest of the portfolio, and defines a maximum exposure limit for each client. When the Board approves a lending operation, the Bank's country credit risk unit must confirm that the additional exposure would still be within the limit. The country credit risk model also calculates the required level of provisions as reserve against potential credit losses;
- (b) Counterparty credit risk (i.e. the credit risk that arises out of the Bank's own investments with its equity) is similarly managed through the use of quantitative models which sets exposure limits to each counterparty and generally restrict investments to counterparties with at least an "A" credit rating;
- (c) Market risk (primarily interest-rate risks) is managed through the use of derivatives, particularly to manage the sensitivity of IBRD's income to changes in interest rates as most of the loans its provides are on variable (LIBOR+) terms. The Articles of Agreement of the Bank mandate that IBRD match its borrowing obligations in any one currency (after derivatives activities) with assets in the same currency so this automatically minimizes exchange risks;
- (d) Liquidity risk is managed by keeping a "minimum prudential liquidity" level updated each fiscal year. This minimum is equal to the highest consecutive six months of projected debt service obligations, plus one-half of projected net loan disbursements on approved loans (if positive) for the relevant fiscal year; and
- (e) Operational risk is not centrally managed through an integrated framework but through the combination of different tools and risk assessments carried out by each business unit.

4.1.2 Inter-American Development Bank

16. The approach followed by the Inter-American Development Bank (IDB) is similar to IBRD's so this section will highlight key differences. From a risk perspective, the main difference between the IDB and IBRD is that IDB has, in a single balance sheet, its concessional and non-concessional loans to sovereign governments, as well as its lending and equity investments in private companies (most of the portfolio (95 per cent) is to sovereigns or has a sovereign

¹² It must be stressed that part of the value of this metric lies in its relative simplicity. It, however, lacks a true credit risk adjustment as it does not take into account the true credit risk of the portfolio (i.e. it treats equally loans to borrowers of different credit quality). Credit rating agencies correct for this when assessing the IBRD and other MDBs that use a similar approach.

¹³ The Multilateral Investment Guarantee Agency, a member of the World Bank Group, does use an economic capital methodology to estimate its overall distribution of risks and allocate its risk bearing capacity.

guarantee). The Budget and Financial Policies Committee of the IDB Board sets and oversees risk management policies in the institution.¹⁴

17. As with IBRD, non-financial risks are managed through policy discussions by shareholders in the IDB Board. Similarly, the main parameter used for financial risk management is the level of capital adequacy that is also defined as the ratio of equity to loans, targeted at a higher level than in IBRD to reflect the higher level of concentration risk in a regional bank. In 2010 the IDB Board approved a Capital Adequacy Plan that sets out a longer-term strategy to allocate capital to all risks, though at this point the focus has remained on the level of equity resources to be held in support of the loan portfolio. This ratio stood at 33 per cent at the end of 2013 and the ten largest borrowers accounted for 80 per cent of IDB's total exposure. The other key parameter is the minimum prudential liquidity through a policy that calls for the maintenance of liquidity sufficient to cover between 6 and 12 months of debt repayments and loan disbursements, a level higher than IBRD's. Like in the IBRD, a quantitative credit risk model is used to assign exposure limits to each country.

18. Credit risks arising in the investment portfolio are managed by limiting most transactions to "A" rated or higher instruments and setting exposure limits to counterparties. These limits and the policy for investments were reviewed in early 2010 in response to important losses in IDB's investment during 2008. With respect to market risks, the main difference with IBRD is that IDB prices almost all its loans to clients using a "cost pass through" formulation, whereby increases in interest rates are passed on directly to clients.¹⁵

4.1.3 International Finance Corporation

19. International Finance Corporation (IFC), part of the World Bank Group, lends (and makes equity investments) to private sector firms in developing countries. While IFC's investments do not benefit from sovereign guarantees or preferred creditor status with respect to commercial defaults,¹⁶ it has a much more diversified portfolio given its much broader set of borrowers. The IFC Board's Audit Committee (the same terms of reference as IBRD's) oversees implementation of the Corporation's risk management policies. In the past year, IFC has adopted an enterprise-wide risk management framework that seeks to have an integrated approach to most of the risk types presented in Table 1 and uses allocation of economic capital as the instrument to implement risk decisions. This includes having a set of risk appetite statements for business units. The 30 June 2014 Management's Discussion and Analysis accompanying IFC's financial statements summarizes the Corporation's approach to risk management:

"IFC's risk appetite, as it pertains to financial sustainability, has been defined by Senior Management and the Board of Directors as maintaining a triple-A rating over a three-year time horizon. The capital required to maintain this rating is measured using an economic capital framework, which is the foundation of financial risk management at IFC. Economic capital acts as a "common currency of risk" across the organization, providing IFC with an objective, quantifiable measure of risk that can be applied consistently across business lines, products, regions and sectors. IFC holds economic capital for credit, market and operational risks."

¹⁴ Additional details can be found in the discussion on the financial statements accompanying the FY2013 IDB Annual Report.

¹⁵ About 95 per cent of IDB's loans use the cost pass-through approach. About 80 per cent of loans in the IBRD's portfolio use a similar Variable Spread Loan approach that uses a formula that also passes through the cost of funding but at a slower rate to avoid sudden changes in pricing.

¹⁶ It is assumed, however, that IFC would benefit from preferred credit status with respect to actions related to its country shareholders. For example, the IFC would be free of transfer risks (i.e. the risk that a private borrower may not be able to repay debts to IFC because the host government prevents the transfer of foreign currency to make such payments).

20. At the strategic level, the main parameter used to ensure capital adequacy is the maximum leveraging exposure (defined as the ratio of drawn debt to the sum of total subscribed capital plus accumulated earnings) that has been set at 400 per cent (equivalent to a 25 per cent equity to loan ratio to use IBRD and IDB terminology).

21. For the past few years, IFC has developed and continuously refined a Capital, Pricing, and Risk (CAPRI) model, which by combining availability of resources (economic capital), risk, and pricing (i.e. reward) provides a more comprehensive business (not just risk) management tool. The CAPRI framework mandates that IFC maintain a minimum level of resources (including paid-in capital, total loss reserves and retained earnings) equal to total potential losses for all exposures at a level that allows the IFC to maintain a “AAA” rating. The CAPRI framework estimates potential losses for all IFC transactions (including lending and equity investments with clients as well as its own treasury operations), assigns a level of economic capital and a minimum price or income that the Corporation needs to receive to cover costs, including risk costs (i.e. the opportunity cost of the funds which will need to be kept as reserves). The CAPRI framework includes a capital allocation also for operating risk (expressed as a percentage of gross income). With this economic capital approach, the objective of the risk management function is to ensure that available capital exceeds the required capital as calculated under the CAPRI framework; management can implement changes in risk appetite by adjusting the level of economic capital available to different business units.

4.2 International Development Association

22. The International Development Association (IDA) is the World Bank’s fund for poorer countries. Initially established to provide highly concessional loans (essentially interest-free), over the last decade it has provided resources in grant terms to countries with higher debt burdens (close to a fifth of resources during the three-year IDA16 period finalized on 30 June 2014 were provided on grant terms). The strategic risk appetite of IDA is reassessed every three years as part of the discussions among members during the replenishment period. IDA management prepares a series of papers on broader strategic issues to be considered by the members, particularly the “themes” on which IDA will concentrate its engagement, but also on other operational and ad hoc issues requiring member review such as changes in the overall framework to allocate resources to IDA recipients. A key difference between IDA and other funds is that each country gets an overall allocation that is not assigned to specific themes. Therefore, the “special themes” agreed for each replenishment (current themes are inclusive growth, gender equality, climate change, and fragile and conflict-affected states) are meant to provide guidance to management on the key areas in which countries ought to be engaged, but resources are not earmarked.

23. IDA uses the following approach to manage financial risks:¹⁷

- (a) Resources are allocated to countries using a performance-based allocation formula that provides resources on the basis of need (poverty level), size (population) and performance (using a country performance rating based mostly on the World Bank’s Country Policy and Institutional Assessment). The country’s level of debt sustainability is then used to assess whether the country receives the resources on grant (higher level of debt distress) or concessional loan terms (lower level of debt distress). It is important to note that this approach to allocating resources does not explicitly take into account the overall credit worthiness of the country, and this is by design: an underlying assumption is that most IDA countries do not have access to the markets because they

¹⁷ Additional details can be found in the discussion on the financial statements of IDA accompanying the FY2013 World Bank Annual Report.

are not credit-worthy.¹⁸ This approach makes sense from a development point-of-view, though its outcome is actually contrary to what a true risk-based pricing of loans would be (in IDA, countries with a better risk profile and a more sustainable debt level actually pay a higher rate for their loans than countries experiencing debt distress, which pay zero; this is the opposite of a market-driven approach where countries with a higher risk would have to pay a higher interest rate);

- (b) In the event of default, a credit provision is made and the country is put in arrears status. In practice, IDA donors have historically been called to provide grants to clear arrears before a country can become eligible for IDA resources once again. Furthermore, there have been very few instances of default and IDA is considered to have a preferred creditor status; and
- (c) Liquidity is managed by having a “minimum prudential liquidity” which has been set at one third of average annual disbursements. These resources are kept in highly liquid instruments and would allow IDA to make disbursements for four months, even in the absence of any contributions from donors or repayments from existing IDA borrowers. IDA uses currency forwards to manage the foreign exchange risk (FX risk) between contributions (which can be made in each donor’s local currency) and disbursements. IDA’s commitment authority is calculated in Standard Drawing Rights, a basket of currencies composed of the euro, Japanese yen, pound sterling and the US dollar. Asset-liability management is carried out by minimizing the duration gap between IDA’s assets and liabilities through the investment of IDA resources in tranches with different durations to achieve an overall duration of about three years.

24. During the current IDA cycle, donors are for the first time able to provide concessional loans in addition to grants. This has led to IDA increasing its minimum prudential liquidity to also be able to make repayments on its loans as necessary. While its Articles of Agreement provide for the option of IDA raising funds through borrowing in the markets, this has not been done. IDA does not have a credit rating.

4.3 KfW

25. Reconstruction Credit Institute (KfW) is a development financial institution fully owned by the Federal Republic of Germany (80 per cent) and the German federal states (20 per cent). Its public policy mandate covers both domestic (fostering financing for SMEs, housing loans, and municipalities) and international areas (export-import credit and the provision of development finance to developing and transition countries). KfW has a full guaranty from the German Government for all its obligations. The German Ministry of Finance currently supervises KfW, not the European or German banking authorities. However, the KfW law was changed in late 2013 and over the next three years, in a phased approach, the institution will have to comply with supervision requirements from the German financial regulator and the central bank. KfW has a “AAA” rating from the three major rating agencies.

26. KfW explicitly refers to “risk appetite” as part of the strategic guidance provided by the institution’s Executive Board. This business strategy is the primary input in developing a “risk strategy” whose objective is to “ensure economic and regulatory risk-bearing capacity and promotional capacity”. In this case, “risk-bearing capacity” refers to measuring the risks of the institution and ensuring that losses that could arise from such risks are adequately covered by the capital available to KfW; the expression “promotional capacity” refers to the institution’s

¹⁸ This is certainly not the case anymore as many IDA recipients are actually able to tap international bond markets. This is an issue of concern among some shareholders, as IDA should focus its resources on countries without ready access to financial markets.

ability to carry out its development mandate. The development of this risk strategy and its implementation is overseen by the Credit, Market, Price and Operational risk committees that serve as the interface between the board and the risk management units. The institution carries out a yearly process to prepare an Internal Capital Adequacy Process (ICAP). The ICAP has four elements:

- (a) An inventory of risks being faced by the institution and updates to the methodologies and processes to measure them;
- (b) Reporting processes down to each business unit;
- (c) Allocation of capital to each business unit; and
- (d) Stress testing to ensure that even under extreme situations, the capital allocated will be sufficient to cushion losses in each business unit.

27. The capital allocation is the critical step as it starts by assigning a risk appetite “traffic light” to each business unit and, based on that unit’s business plans, it assigns regulatory and economic capital to support the planned activities. The regulatory capital is the amount of resources KfW would have to hold as a cushion for losses if it were a regulated bank under applicable German and European Union requirements. Economic capital is a broader measure of capital, used by most large financial institutions,¹⁹ which takes into account the characteristics of the overall risk profile of the institution (e.g. portfolio diversification) and the credit rating it seeks to have. KfW calculates its economic capital targeting a confidence level of 99.99 per cent over a one-year horizon. This means that it seeks to have sufficient capital so that there is only a 0.01 per cent probability of default over the following 12 months. This essentially targets a “AAA” rating for KfW. With this approach, KfW can then measure the risk-adjusted return on regulatory or economic capital for each business unit, thus having a clear way to measure where each one of its activities lies in the risk-return continuum. The final step in this process is to periodically run “stress-tests” simulating extreme events to ensure that the maximum levels of loss can still be covered by the available capital under most scenarios.²⁰

28. In addition to the ICAP, KfW uses a limit management system that takes into account country credit risk, counterparty credit risk, market risk and the like, and also has a liquidity management system.

4.4 Adaptation Fund

29. The AF provides grants to support adaptation activities. Projects and programs can be implemented through implementing entities that are national, regional, or multilateral. A key peculiarity of the AF is that it is not only funded by donors, it also receives 2 per cent of the carbon emission reductions (CERs) issued for activities supported by the Clean Development Mechanism as established under the Kyoto Protocol.

30. The Adaptation Fund (AF) does not have an explicit risk appetite statement but has used its body of decisions in its Board meetings to effectively define the risk appetite with respect to non-financial risks. Given the importance that the AF assigns to developing the capacity of national implementing entities (NIEs), a substantial amount of work has gone into defining the requirements for entities to qualify as NIEs and in developing a certification process as a way to reduce the fiduciary and legal risks that may arise.

¹⁹ For a discussion on economic capital in the financial sector see, for example: Best practices for calculating economic credit risk capital, McKinsey & Company. Working Papers on Risk, Number 11, 2009.

²⁰ Additional details can be found in KfW’s annual report for 2013 and using the United States Securities and Exchange Commission (SEC) KfW disclosure documentation, which can be accessed through the SEC’s EDGAR system.

31. With respect to financial risks, a grant-making fund such as the AF would be primarily exposed to funding risk and, given the importance of CERs to its funding structure, to market risk. The World Bank, as trustee of the AF, reports on the availability of resources that the AF can commit to recipients and prevents the possibility of over-committing by committing only on the basis of cash resources (including CERs monetized), but not CERs that are held but not monetized. This approach has been appropriate at least until now because the AF's overall level of commitment remains fairly low (US\$ 253 million out of US\$ 428 million available).

4.5 Clean Technology Fund

32. The Clean Technology Fund (CTF) provides middle-income countries and private sector organizations with grants and concessional loans to promote scaled-up financing for the demonstration, deployment and transfer of low-carbon technologies with significant potential for long-term greenhouse gas emissions savings. The CTF does not have an explicit process or statement on risk appetite. However, this is effectively achieved by a combination of very explicit investment eligibility criteria defining the parameters that projects seeking financing must meet (criteria which could in principle be tightened further to vary the risk appetite); an iterative discussion of the national investment plans used by the CTF as the first step in approving financing for projects (during which the risks of each proposed project for funding are identified); and a risk management framework document approved by the Board.²¹ This framework defines a series of risks, similar to those in Table 1, and establishes "risk mitigation measures" for each of them, which currently concentrate on issues of risk reporting for its Board to make decisions rather than describing ex-ante risk appetite or management measures. As part of this ongoing process, a "risk dashboard" was developed in early 2014 to provide shareholders with a relatively short and visual report on the risks facing the CTF.

33. With respect to management of credit risk, the approach used by the CTF assumes that the implementing entity (MDB) will be responsible for assessing the credit risk of projects and that, in the case of default, it will take steps in accordance with the MDB's policies and procedures to collect the amounts due on both CTF-funded and MDB-funded loans.

4.6 Global Environment Facility

34. Rather than a risk appetite-setting framework, the Global Environment Facility GEF has a well-defined resource allocation mechanism that effectively serves as an instrument for members to define the overall risk appetite of the Facility. The allocation system (System for Transparent Allocation of Resources (STAR)) uses a combination of parameters associated with need and performance (similar to the one used by IDA) to allocate resources to countries and specific themes (biodiversity, climate change, chemicals and waste, international waters, land degradation, non-grant instrument pilots, and corporate programmes). By adjusting the parameters that STAR uses as part of the policy discussions associated with each replenishment, GEF members can adjust the amount of resources flowing to countries or themes with different risk profiles. As most of the GEF resources have so far been provided in grant terms, the main risks facing the Facility are strategic risk and funding risks. Funding risks are avoided by committing only on the basis of cash available, not pledged contributions, and keeping an additional reserve to manage foreign currency risks. Financial risks associated with investment of resources are managed by the World Bank as trustee of the Facility.

²¹ This document is for the Strategic Climate Fund and the CTF: Updates to the Elaboration of an Enterprise Risk Management Program for the Climate Investment Funds, August 2013.

4.7 Commercial financial institution: Hong Kong and Shanghai Banking Corporation

35. The process to set the risk appetite and manage risks is converging among large regulated financial institutions as global approaches to bank regulation and supervision are put in place through mechanisms such as the Basel III Accord. In fact, the descriptions presented above for IFC and KfW to setting risk appetite and risk management is fairly consistent with modern practices in most large financial institutions today. As an additional example, the following is the approach followed by Hong Kong and Shanghai Banking Corporation (HSBC), the United Kingdom-based bank that, with US\$ 2.8 trillion in assets, is the second largest bank in the world:²²

- (a) The Bank's Board, advised by the Group Risk Committee (GRC), establishes the Group's risk appetite and the risk management framework. This includes an annually approved statement on risk appetite describing the risk tolerance levels for different business units;
- (b) As part of this process, the GRC updates the inventory of risks, highlighting "top and emerging" risks faced by the institution;
- (c) The risk appetite for each business unit is set through risk-weighted asset (RWA) targets. RWAs are an indicator of how much business the bank wants to develop that year in each unit, taking into account the level of risks (e.g. "increase the retail lending portfolio by US\$ 1 billion while keeping NPLs below 5 per cent");
- (d) Based on the RWAs, the Board approves a Group Capital Management Plan that allocates the capital required to support the level of business each unit is going to carry out (i.e. cushion losses). The Bank estimates the necessary regulatory capital as well as the economic capital to target a 99.95 per cent level of confidence for banking activities (i.e. sufficient capital is allocated to ensure that there is only a 0.05 per cent probability of insolvency). The Bank then uses the return on risk-weighted assets (RoRWA) as the metric to run the business on a day-to-day basis;
- (e) The Bank uses credit-rating models to estimate potential credit losses; and
- (f) The Board periodically reviews the overall risk appetite of the institution to ensure that it remains within the parameters necessary to maintain its credit rating (A+ from Standard & Poor's (S&P), AA3 from Moody's, AA- from Fitch) and, consistent with regulatory requirements, carries out stress tests to ensure continued solvency under extreme events.

4.8 Key lessons for the Fund

36. **Table 2 summarizes the key characteristics of the institutions reviewed with respect to risks.** These funds can be characterized based on the type of funding they receive and how they transfer resources out.

²² Additional details can be found in the HSBC Holdings plc 2013 Annual Report and the HSBC Holdings plc Capital and Risk Management Pillar 3 Disclosures as at 31 December 2013.

Table 2: Risk appetite-setting and management: Characteristics of institutions reviewed

	Credit-funded lending institutions with a broad client base	Credit-funded lending institutions with a limited client base (a preferred creditor status)	Mostly grant-funded lending institutions with a limited client base	Grant-making institutions
Examples	KfW, HSBC, International Finance Corporation	International Bank for Reconstruction and Development, Inter-American Development Bank	International Development Association, Clean Technology Fund	Adaptation Fund, Global Environment Facility
Key risk managed	Credit risk	Credit and liquidity risks	Funding and credit risks	Strategic/business and funding risks
Supervised or credit rated	Yes	Yes	No	No
Main instrument to operationalize risk appetite	Allocation of economic capital and credit risk measurement through rating models	Credit risk limits and internal liquidity requirements	Policy discussions during board meetings or replenishment process policy discussions; process to allocate resources and use of minimum prudential liquidity	Policy discussions during board meetings or replenishment process and process to allocate resources
Loss-bearer	Shareholders	Shareholders	Donors (loans and grants)	Grant recipients (as there would be fewer resources to allocate)

37. **Setting the risk appetite and managing risks is ultimately about allocation of resources.** In the case of regulated financial institutions, this means deciding how to deploy capital. For development and climate change-related funds this is implemented through the mechanisms in place to allocate resources (grants or loans).

38. **Setting risk appetite is a fundamental outcome of replenishment processes.** Funds with specific replenishment periods, such as the GEF and IDA, use the policy discussions during the replenishment to review results and adjust the risk appetite. This is probably a more efficient process as it sets the strategy for a well-defined period of time, as opposed to continuous changes that may take place in funds with more frequent board meetings.

39. **With respect to managing credit risks, regulated financial institutions without preferred creditor status may be a good model for the Fund.** The approach followed by MDBs, IDA and CTF may not be adequate for the Fund. In both cases, the credit risk is assumed to be mitigated by having preferred credit status (directly in the case of IBRD, IDB and IDA, and indirectly through the MDBs in the case of the CTF). The Fund could explore the use of A/B loan structures with MDBs, whereby the borrower signs a loan agreement with the MDB (i.e. it has an obligation to the MDB, which is a preferred creditor). The MDB would then sign a separate agreement with the Fund so that part of that loan is actually funded by the Fund. In this case it would still be important to manage credit risk actively and ensure a strong alignment of incentives of the intermediary and the Fund to manage risks.

40. **Funding and liquidity risks need to be managed more actively as the fund grows.** Smaller funds such the AF can manage funding risks with relatively simple approaches (essentially, committing the funds only against available resources). As the fund grows, this may not be a very effective approach as it leaves resources unproductive for a long period of time. A larger fund may require a more systematic approach, such as the one used by IDA, to maximize its commitment authority.

V. Green Climate Fund approach to determining risk appetite

5.1 Definition of risk types

41. **Given the mandate of the Fund and its funding and commitment²³ mechanism, an adjustment to the general risk framework is needed.** Table 3 summarizes the risks faced by the Fund. Key characteristics of the Fund taken into account in defining financial risks include:
- (a) The ultimate risk of the Fund is that it fails to achieve its global climate objective. Rather than using the generic term “strategic risk”, the term [lack of positive] “climate impact risk” is proposed;
 - (b) Rather than using the term “operational risk”, the Fund could use the term “fiduciary risk” to highlight the fact that it is ultimately operating on behalf of its members and that losses could arise if the Fund were to fail at, for example, exercising the necessary oversight of implementing entities;
 - (c) As a recipient of public resources, the Fund is expected to be subject to audits and other types of evaluations by the external auditor. This generates a particular type of compliance risk if, for example, the Fund is unable to furnish all the documentation requested by the auditing entity, which could lead to a decrease in future funding or even a request for funds to be returned to donors;
 - (d) Funding risk would materialize if contribution agreements were not effectively converted into cash or promissory notes in the previously agreed schedule and these resources had already been taken into account in the calculation of the commitment authority; and
 - (e) A potential asset liability duration mismatch would arise if there were a large duration gap between the assets and the liabilities in the Fund. For the purposes of the Fund, this can be better understood as a timing gap between the inflows (transfers from providers of resources, repayments from loan recipients and the more liquid part of the investment portfolio) and the outflows (disbursements made on the basis of commitments to implementing entities and intermediaries as well as Fund expenditures and repayment of loans). A particular challenge to the Fund will be to estimate the effective period of the grants and loans that it provides, which will depend on the rate and which projects are executed. For example, while a grant may have a very well-defined contractual period (e.g. a three year grant), the rate at which the resources are actually disbursed will depend on the speed at which projects are executed.²⁴

²³ In this paper, *pledge* refers to contributions to be made by providers of resources (grant, debt or capital) to the Green Climate Fund. *Commitment* refers to resources made available by the Green Climate Fund to implementing entities and intermediaries.

²⁴ This assumes that the Fund will disburse in tranches at a rate proportional to project implementation. This need not be the case, but other approaches such as a single tranche disbursement could generate other risks, particularly of a fiduciary nature.

Table 3: Risks faced by the Green Climate Fund

Type	Risk	Description
Non-financial	Climate impact	Failure of the Fund to accomplish its mandate to promote the paradigm shift towards low-emission and climate-resilient development pathways, as defined in the Fund's initial results management framework (decision B.07/04). This can be a result, inter alia, of: (a) Poor choice of overall strategy; (b) Failure of implementing agencies; and (c) Poor project design.
	Reputational	Adverse perception on the part of existing and potential stakeholders (e.g. shareholders, clients, trading counterparties, employees, suppliers, regulators, media and investors), as in Table 1 of this document, but with different risks associated with stakeholders in developed and developing countries, including civil society support not forthcoming.
	Fiduciary	Inadequate or failed internal processes, people and systems or from problems caused by external events, as in Table 1 of this document, but with additional emphasis on failures derived from: (a) Poor operational process in the management of financial resources by the Fund or its trustee; (b) Poor oversight of the implementing agencies (including with respect to the observance of environmental and social safeguards);
	Legal	A defective transaction or a lawsuit
	Compliance	Failure to comply with applicable laws, regulations, rules, related self-regulatory organization standards, and codes of conduct, as in Table 1 of this document, but with additional emphasis on the Fund being unable to comply with certain legal provisions from donor countries (e.g. the Fund may be subject to reviews by donors' supreme audit institutions whose standards for documenting expenses may differ from those of the Fund)
Financial	Funding	Providers of grants or lenders to the Fund may postpone or cancel previously made pledges (or change the encashment schedule of promissory notes)
	Credit	Failure of a recipient of a loan from the Fund to repay on the agreed schedule or default on securities held by the fund as an investment
	Market (incl. foreign exchange) (MK)	Drop in market prices of assets held by the organization, as in Table 1 of this document. In the Fund, this will arise primarily in the portfolio of investments and in the calculation of the commitment authority due to the FX risk arising from the currencies used in the contribution
	Liquidity	Inability to monetize assets (i.e. convert to cash), as in Table 1 of this document; it arises primarily in the portfolio of investments.
	Asset-liability mismatch	Mismatch between the terms of the assets and liabilities of an organization (Note: this is a particular type of liquidity risk), as in Table 1 of this document. For the Fund, the mismatch may arise between the effective duration of the pledges and commitments or between currencies in assets and liabilities and interest rates on funding (loan contributions) and lending

42. **The occurrence of certain events does not necessarily imply that a risk will materialize and that losses will occur.** For example, a delay in contributions from donors by itself does not lead to a financial loss to the Fund. The loss (i.e. the materialization of the risk) would only occur if, in order to be able to disburse resources previously committed and given the shortfall due to lack of donor resources, the Fund had to liquidate part of its investment

portfolio at a loss. Furthermore, effective risk management should also minimize the potential of risks materializing as a consequence of events occurring. Using the same example, the Fund can minimize its financial risks due to delays in funding from donors by drafting model grant and loan agreements with recipients which specify that the Fund could delay the disbursement of commitments if donors postpone the encashment of promissory notes. Finally, it is important to take into account that the risk types described above are not independent of one another. For example, if a funding risk event leads to an asset liability mismatch and the Fund has to delay disbursements to an implementing entity, this could be negatively reported by the press, thus leading to a reputational risk event.

5.2 Definition of risk functional units

43. **Broadly speaking, there are two types of units in the Fund.** The first set of units (*General Administration and Resource Mobilization*) could be defined as those that carry out activities that generally involve interacting with the Board and contributors of grants and providers of loans. This category would also include the activities carried out by the Fund’s Trustee. The second sets of units (*Programme Execution*) would be those that generally interact with national designated authorities, implementing entities and intermediaries. As discussed below, the Programme Execution units are more aligned to what a typical organization would describe as “business areas” rather than to specific administrative units. Table 4 outlines the key risks to which the first set of units are exposed and what the potential risk appetite would be in each of them.

Table 4: Management and Resource Mobilization Functional Risk Units²⁵

Unit	Key risks	Risk appetite
Secretariat	CI, FI, LG, CP	Zero
	RP	Low
Trustee	FU, CR, MK, LI, AL	Low
Accountability Units	FI	Very low

44. **The definition of the risk functional units with respect to Programme Execution is more complex and requires making certain assumptions (summarized in Table 5).** The guiding principle for these assumptions is that the Fund can have a higher risk appetite in areas that can be expected to have a higher development impact or in areas considered more critical to achieving the Fund’s mandate.

²⁵ Table 4 demonstrates in which units certain risks might arise, rather than which units are responsible for those risks.

Table 5: Risk assumptions for programme execution activities/units

Assumption	Rationale
The Fund has a higher appetite for risk when supporting higher potential climate impact activities	Foundation of effective risk management: risks should be tied to rewards and this should be the link between the risk appetite and the Fund’s investment and results management frameworks
	Link between risk appetite and the Fund’s investment and results management frameworks
The Fund has similar risk appetite for adaptation and mitigation activities	This is a strategic decision to be made by the Board
The Fund has a higher appetite for risks when supporting activities in small island developing States and Africa than in other geographic areas	Strategic decision which needs to be made by the Board, but a reasonable assumption if support to small island developing States and Africa is of particular importance
The Fund has a high risk appetite when supporting activities through intermediaries and implementing entities	To the degree that intermediaries provide an additional layer of fiduciary control, the resultant risk to the Fund should be lower
The Fund has a higher risk appetite when supporting activities through grants than when supporting them through loans	Riskier activities cannot attract lenders and therefore require support in grant terms (because of their level of risk, there is uncertainty about their ability to generate resources to pay back a loan). On the other hand, the Fund should provide loans to lower-risk activities. This is a non-intuitive assumption, as in development finance higher-risk recipients receive grants and as their (credit) risk decreases, they become eligible for loans which increase in price as risk decreases. This is the opposite of what happens with market-driven financing charges.
The Fund has a higher risk appetite when supporting activities through interest-free loans than when supporting them through interest loans (thus covering the two types of loans to be provided by the Fund)	
The Fund has a higher risk appetite when supporting activities in innovative technologies	

45. **Table 6 presents the indicative risk appetite for the Fund’s Programme Execution units.** It is important to emphasize several key points:

- (a) This table presents overall risk, not any of the specific risks identified in Table 3;
- (b) This approach can be expanded to have different risk appetites for additional categories (e.g. the Fund may choose to have a higher risk appetite in low-emission energy projects than in transportation); and
- (c) Having a lower risk appetite in a particular area does not necessarily mean that the project supported by the Fund has lower risk, but that the Fund has a lower tolerance for losses in that particular area and therefore it may seek additional risk mitigation measures (e.g. support may only be provided through an intermediary which would guarantee repayment, in case of a loan).

Table 6: Example of risk appetite – Fund’s Programme Execution Units

Development area	Geography	Mechanism used to disburse resources ²⁶	Risk appetite		
			Grant	Loan1	Loan2
Adaptation	LDCs, SIDS & African States	Implementing entity	High–very high	High	Medium–high
		Intermediary	High–very high	High	Medium–high
	Rest of the world	Implementing entity	High	Medium	Low
		Intermediary	High	Medium	Low
Mitigation	LDCs, SIDS & African States	Implementing entity	High–very high	High	Medium–high
		Intermediary	High–very high	High	Medium–high
	Rest of the world	Implementing entity	High	Medium	Low
		Intermediary	High	Medium	Low

LDCs = least developed countries.

SIDS = small island developing States.

Loan1: interest-free loan provided by the Fund.

Loan2: loan with interest provided by the Fund.

5.3 Indicators

46. **The indicators for non-financial risks in General Administration and Resource Mobilization units are relatively straightforward.** In the case of reputational, fiduciary, legal and compliance risks, these will be qualitative indicators describing the frequency and impact of events that the Fund will tolerate. As part of the risk management framework, the Fund might at some stage consider exclusion lists to manage reputational risk and perhaps enter into the MDB cross-debarment agreement with respect to the four harmonized sanctionable practices (i.e. corruption, fraud, coercion and collusion).

47. **The indicators associated with the Trustee will be agreed as part of the Administration Agreement between the Fund and the Trustee.** During Phase I of the trustee services (as defined in the current mandate of the Interim Trustee) these indicators should concentrate on performance with respect to investment management and transfer of resources with a very low risk tolerance reflected in a “capital preservation” strategy for investment of resources. This will require establishing a minimum prudential liquidity that can be expressed in “months of expected disbursement” to be kept in very liquid form (an approach similar to IDA’s).

48. **Establishing the risk appetite for the Programme Execution units requires combining a quantitative indicator for financial risks with a qualitative indicator for climate impact risk.** This approach assumes that the two main risks considered when supporting projects are:

- (a) The possibility that loans are not repaid (the credit risk quantitative indicator will be based on the loan loss reserve approach and/or non-performing loan approach, as outlined in Annex II); and
- (b) That the projects do not achieve their climate objectives.

²⁶ Intermediaries are considered to be implementing entities with financial intermediation capacity.

VI. Implementation approach: Challenges and considerations

50. From a risk perspective, the Fund is unique as it benefits from a strong commitment to financial support from its members but, particularly with respect to its credit operations with non-sovereign entities, the Fund does not currently have preferred creditor status. Furthermore, unlike other climate-related funds, it is expected to provide direct access to concessional loans to recipients whose financial obligations are not guaranteed by a government. The following considerations should be brought for discussion by the Fund's Board as the risk management framework is finalized:

- (a) **The Fund should carefully assess risks that are more likely to materialize in the shorter term and focus initially on them.** If the Fund expects that its lending portfolio to recipients without a credit guarantee from a sovereign government will remain a relatively small part of its overall portfolio of loans and grants initially, it may be more important to focus efforts on other areas initially. In particular, funding and liquidity risks could be more important in the first years of operation of the Fund, and ensuring a good methodology to calculate the commitment authority will be critical. Organizations, particularly those with a public policy mandate, are sometimes tempted to emphasize credit risks not because they are the most material, but because they are easier to conceptualize;
- (b) **As the Fund's loan portfolio grows, it may be necessary to have an approach based on LLRs and/or NPLs, as outlined in Annex II.** Clearly the Fund does not at this point need to have a complex economic capital-based approach like the ones that large development banks or commercial banks have, but it also cannot rely on simpler approaches used by other funds that benefit from the expectation of having preferred creditor status; and
- (c) **The Fund must review with its lawyers the legal remedies that would be available to the Fund in case of default.** The approach presented in this paper assumes that an instance of default would lead to a 100 per cent loss on the amount outstanding. In practice, this is not the case, as lenders would then enforce the legal contract in court to seek recovery of the debt. In practice, this may be difficult for the Fund in instances of loans to entities not guaranteed by a government.

VII. Recommendations and next steps

51. In decision B.07/05, the Secretariat, in consultation with the Risk Management Committee, was requested to prepare an analysis of the Fund's potential risk appetite under different key assumptions as part of its financial risk management framework. This document provides the first step in this analysis.

52. As a second step, the Secretariat, in consultation with the Risk Management Committee, will present at the tenth Board meeting a methodology for determining the initial risk appetite of the Fund, for approval by the Board, as requested in decision B.07/05.

53. As a third step, the Secretariat will outline at the eleventh Board meeting various scenarios, using the approved methodology, to support the Board in the setting of the Fund's initial risk appetite as requested in decision B.07/05.

54. The Board may wish to adopt the decision as contained in Annex I.

Annex I: Draft decision of the Board

The Board, having reviewed document GCF/B.09/13 *Initial Risk Management Framework: Survey of Methodologies to Define and Determine Risk Appetite*:

- (a) Takes note of this document;
- (b) Requests the Secretariat, in consultation with Risk Management Committee, to continue the work on determining the initial risk appetite of the Green Climate Fund, consistent with decision B.07/05.

Annex II: Loan loss reserve and non-performing loan approaches

1. The loan loss reserve (LLR) and non-performing loan (NPL) approaches are outlined in this annex, using an international finance institution (IFI) as an example, and making some assumptions for the Green Climate Fund.

I. Loan loss reserve approach

2. With this approach, the IFI estimates its total primary capital as the total “cushion” available to withstand credit losses, in other words, the LLR. This would be a combination of:

- (a) Capital contributions made to the IFI;
- (b) Loan cushion provided to the IFI, which loan providers have agreed to allocate as part of the IFI; and
- (c) Fraction of repayments from loans provided by the IFI that are also added to the LLR.

3. Then, for each transaction, an explicit provision is made by estimating the “expected loss” associated with the transaction. Strictly speaking, this would require assessing the credit risk of the recipient (i.e. the executing agency), which may be difficult to accomplish, though certain principles (see (a)–(d) below) could be followed if the recipient does not have a credit rating:

- (a) If the recipient is receiving the funding through an intermediary or implementing agency and the intermediary or implementing agency is guaranteeing repayment to the IFI, use the intermediary/implementing agency credit rating;
- (b) If the recipient is a government-owned institution (e.g. national development bank) with an implicit or explicit national government counter-guarantee, use the country’s sovereign rating;
- (c) If the recipient is not rated but it has existing loans with domestic or international banks, calculate an “inferred credit rating” as part of the IFI’s due diligence by analysing the recipient’s current cost of funding; and
- (d) If the recipient is not rated, take a conservative approach and assume a rating equivalent to an S&P rating of “C”.

4. The expected loss would be calculated as the product of the outstanding amount to the borrower and the probability of default. The probability of default can be estimated using global tables prepared by S&P, Moody’s and other credit-rating agencies. Table 1 takes S&P as reference and combines several credit ratings to have three credit-rating categories that the IFI could use as an example.

Table 1: Example probabilities of default for the international finance institution’s borrowers¹

S&P rating	Proposed credit rating category of the Green Climate Fund	Probability of Default
AAA-A	1	1%
BBB-B	2	3%
CCC-C and unrated	3	15%

5. The IFI would then establish its risk appetite by choosing how to deploy the LLR.² This approach provides the most flexibility as it is up to management to decide how to remain within

¹ See for example Standard and Poors’ Default, Transition, and Recovery: 2013 Annual Global Corporate Default Study and Rating Transitions. March 2014.

² This is akin to “deploying capital” in the case of a bank.

the cushion limit through a combination of grants (not requiring a cushion) and loans of different amounts and risk levels. The following example for an IFI illustrates this approach:

- (a) Assume an IFI has US\$ 200 million in capital and it has received US\$ 1 billion in loans. Making certain assumptions about the fraction of the loans that can be used as a cushion at the amount of repayments that the IFI can retain to cushion future losses, the estimated available cushion is calculated in Table 2:

Table 2: Example of a cushion used by international finance institutions

Capital		200
Loans to international finance institution (IFI)	1000	
Of which 10% is loan loss reserve (LLR)		100
Accumulated repayments to IFI	100	
Of which 50% is LLR		50
Total available cushion (LLR+capital)		350

- (b) Losses would be absorbed first by the LLR, and only after it is exhausted, by capital. The fraction of loans and repayments used as LLR, 10 per cent and 50 per cent respectively, are indicative but represent a good starting point for the IFI's Board to agree on a final percentage. As a reference for this discussion, in a commercial financial institution where each loan is priced differently on the basis of the borrower's risk, a part of the interest margin would be held in reserve to cover the "expected losses";³ and
- (c) The IFI can then establish its risk appetite by determining the areas in which it is willing to use the LLR, taking into account the expected credit quality of the borrowers in each of the business units. This also serves as a "risk limit" imposed on the IFI's management. For example, if the IFI wanted to give priority to mitigation activities carried out through Table 3 illustrates an example allocation of LLR for the Fund. Intermediaries, the allocation of LLR shown in Table 3 could be used. Note that this requires making an assumption about the quality of borrowers in each business unit (in this case, the assumption is that the probability of default is lower for loans made through intermediaries). Table 3 also assumes that if a borrower defaults, it either states there are no recoveries or using risk management terms that "the loss given default" is 100 per cent. In practice and depending on the legal remedies which could be exercised, there is some level of recovery, but the LLR calculated below assumes that there is none.

³ In a commercial financial institution following an economic capital approach, "expected losses" are meant to be covered by part of the interest margin being charged to each borrower. "Unexpected losses" (i.e., losses in excess of those expected during the credit assessment of borrowers) are meant to be covered capital.

Table 3: Example allocation of the loan loss reserve for the Fund

Development Area	Geography	Fund's transfer mechanism	Expected size of portfolio	Probability of default	Allocated cushion
			A	B	A x B
Adaptation	Least developed countries, small island developing States & African States	Implementing entity	300	10%	30
		Intermediary	1,000	5%	50
	Rest of the world	Implementing entity	500	6%	30
		Intermediary	1,666	3%	50
Mitigation	Least developed countries, small island developing States and African States	Implementing entity	150	10%	15
		Intermediary	1,600	5%	80
	Rest of the world	Implementing entity	250	6%	15
		Intermediary	2,666	3%	80

- (d) At this point, the financial return of each project can be measured by calculating the total expected return and dividing it by the LLR allocated. The final step would be to adjust this return by its "climate impact benefit". This can be done either by adjusting the numerator and estimating additional "future climate impact returns" or by adjusting the denominator and decreasing the required reserves. The latter is probably more intuitive and requires holding a portion of the total reserves to allocate it to projects with a higher level of development impact. This is implemented in practice by agreeing to hold a portion of the IFI's LLR in an unallocated bucket and defining the characteristics of projects that can use such additional LLRs. The following example illustrates how this could be used for the Fund:
- (e) Assumptions for the Fund: US\$ 10 million, 10-year concession loan category 2 (moderately concessional) extended by the Fund in US\$ to an implementing entity or intermediary whose credit category is "2" as per the approach proposed in Table 1. The United States 10-year treasury rate is 2.5 per cent, so an estimate of the net interest margin received by the Fund is 1.5 per cent assuming that the Fund is paying a 1 per cent coupon rate on the loans it receives. A simple return on LLR could be calculated as follows (this is a simple illustrative example, as the return on LLR would have to be expressed in net present value terms, taking into account the actual expected cash flows, which depend on the repayment profile of the loan, including the grace period). This can be seen in Table 4.

Table 4: Example return on loan loss reserve for the Fund

Loan amount	US\$ 10 million	
Credit category	2	
Loan loss reserve	US\$ 10 million x 3%	= US\$ 300,000
Net interest income	US\$ 10 million x 1.5%	= US\$ 150,000
Return on LLR	150,000/300,000	= 50%

6. The Fund could have two projects of identical financial characteristics (same return on LLR) but with different relative climate impacts. To take this into account, an “adjusted return on LLR” could be calculated, whereby the denominator is adjusted down for the project with higher positive climate impact so that it would have a higher return on LLR. This can be done by setting certain rules such as allocating part of an LLR for high-impact projects to a central bucket. As an example, certain projects could be allocated one third of their LLRs from this central bucket, so that only the LLR coming from the regular allocation would enter into the calculation of the return on LLR. In that case, using the example above, the adjusted return on LLR would be 75 per cent ($150,000/200,000$), thus reflecting its higher “positive climate impact” return.

II. Non-performing loan indicator

7. Alternatively, the IFI could be asked to approve a “maximum amount of NPLs” for different business units as well as the expected size of the portfolio. This is not necessarily different in substance from the LLR approach, but much easier to communicate. The IFI would have to follow an LLR approach to calculate what the maximum amount of NPLs per business unit would be while still having LLR resources available.
