S&P Global Ratings

RatingsDirect®

Green Evaluation Analytical Approach

Primary Credit Analysts:
Michael Wilkins, London (44) 20-7176-3528; mike.wilkins@spglobal.com
Miroslav Petkov, London (44) 20-7176-7043; miroslav.petkov@spglobal.com
Jessica Williams, London (44) 20-7176-3884; jessica.williams@spglobal.com
Nicole D Martin, Toronto (1) 416-507-2560; nicole.martin@spglobal.com

Secondary Contacts:
Kurt E Forsgren, Boston (1) 617-530-8308; kurt.forsgren@spglobal.com
Michael T Ferguson, CFA, CPA, New York (1) 212-438-7670; michael.ferguson@spglobal.com

Table Of Contents

Green Evaluation Analytical Approach

EXECUTIVE SUMMARY

1. S&P Global Ratings' Green Evaluation provides a relative green impact score on instruments targeted at financing environmentally beneficial projects. It also provides a second opinion, which is aligned with the Green Bond Principles(1). The Green Evaluation is not a credit rating, and it does not consider credit quality or factor into our credit ratings. The evaluation provides a relative ranking of financings globally. We first consider the governance and transparency of a financing from a green perspective. We then combine this assessment with an estimate of the asset's expected lifetime environmental impact in its region, relative to maintaining the status quo. The analytical approach can evaluate both mitigation and adaptation projects.

2. Mitigation projects aim to bring environmental benefits and target areas such as natural resources depletion, loss of biodiversity, pollution control, and climate change. Adaptation projects aim to reduce exposure to and manage the impact of natural catastrophes by, for example, making communities and critical infrastructure more resilient to the risk of extreme weather events due to climate change.

3. A Green Evaluation is based on three scores--a transparency score, a governance score, and a mitigation score (environmental impact) or adaptation score (resilience level). We evaluate a financing against each category and then combine the resulting scores into a final Green Evaluation.

4. The transparency score focuses on the quality of disclosure, reporting, and management of bond (or other financial instrument) proceeds.

5. The governance score assesses what steps have been taken to measure and manage the environmental impact of the proceeds of the financing, including certification, impact assessment, risk monitoring, and risk management.

6. The mitigation score reflects the environmental impact of the use of proceeds over the life of the assets. It takes into consideration variables such as sector, technology, location of the assets, and funding allocation. It considers a variety of environmental key performance indicators (eKPIs), such as carbon, water, and waste.

   - The environmental impact calculation is done on a net benefit basis, meaning we consider each project's negative and positive environmental impact relative to the regional baseline (for example, the net benefit of a new renewable energy project compared with production from the conventional grid) for relevant eKPIs.
   - The net benefit for each eKPI is compared against a range of modelled net benefit outcomes derived from relevant regional data to determine a ranking.
   - The resulting ranking is a weighted average across the eKPIs applicable to that sector and is referred to as a net benefit ranking against the best-in-class technology within that sector or technology peer group.
   - For financings that involve multiple technologies, we calculate the net benefit rankings based on funds allocated to each project to derive the net benefit ranking for the sector. If a financing covers multiple projects in different sectors, we repeat this process for each sector.
   - We then determine the overall environmental impact for each sector based on where it fits within either our carbon or water hierarchy. This indicates the sector's relative contribution to avoiding and coping with climate change.

- To derive the mitigation score for the project financing or portfolio of projects, we then calculate the environmental impact of each sector based on funds allocated to that sector.

7. The adaptation score reflects the estimated reductions in the costs of expected damages that projects achieve. To determine the resilience benefit that may be achieved through the use of proceeds, we analyze the benefit studies prepared for the project.

8. The last step is to combine the scores from transparency, governance, and either mitigation or adaptation to derive the final Green Evaluation on a scale of 0-100. Our assessment of transparency and governance does not enhance our final Green Evaluation--rather, its impact is neutral or negative. Poor transparency and governance may have a negative impact on the outcome, but good transparency and governance does not enhance a financing's overall environmental impact, in our view.

SCOPE

9. A Green Evaluation is a point-in-time assessment, in part based on an estimate of the expected lifetime net environmental benefit of a project should it perform to industry averages.

10. A Green Evaluation considers a broad variety of projects or initiatives a given instrument (debt or equity) finances. These projects include bond-financed projects, in line with the various green bond project taxonomies available, as well as conventional financed projects outside of current green taxonomies that may have beneficial environmental implications.

11. A Green Evaluation is applicable to a wide variety of financial instruments, including those issued by corporate entities, project and structured finance vehicles, financial institutions, multilateral development banks, sovereigns, and municipalities. The evaluation is also applicable to financings by corporations whose businesses are solely focused on environmentally beneficial activities (such as wind turbine manufacturers), issuing general use-of-proceeds bonds. In addition, a Green Evaluation is applicable to portfolios of assets, including those held by financial or other institutions.

12. Our approach is relevant for pre- and post-closing of a financing and pre- or post-construction of an asset.

13. If proceeds are used for refinancing, the evaluation is based on disclosed information regarding which investments or project portfolios are being refinanced and considers an assumed asset life from the point of refinancing as if undertaking a new evaluation. In cases where this information is not disclosed, the evaluation is based on the company's existing asset profile.

14. If the financing is issued by a financial institution raising funds to on-lend, such as banks, where specific projects have not yet been identified, the evaluation considers the underlying portfolio of assets financed by previous green financings that have been issued. If all instruments finance the same portfolio of green assets without specific earmarking of assets, we assign all those instruments the same Green Evaluation.

Mitigation

15. Mitigation projects aim to provide increased mitigation of the effects of climate change. Green mitigation sectors that are currently in scope for Green Evaluations include:

- Green energy,
- Green transport,
- Green buildings,
- Energy efficiency,
- Fossil fuel power plants (decreased carbon intensity of conventional energy production),
- Nuclear power, and
- Water.

16. ***Net benefit ranking.*** The net benefit ranking calculation takes into account the full supply chain and operational phases over a project's lifetime. We consider the most material and quantifiable environmental eKPIs for each sector (see tables 2-8). These include carbon emissions, water use, and waste. Our selection of the eKPIs is based on the availability of robust quantitative data within each sector.

Adaptation

17. Adaptation projects aim to strengthen the resilience of buildings, critical infrastructure, and communities against the risk of extreme weather or longer-term shifts and variability in weather patterns caused by climate change. Strengthening flood defenses in coastal areas--to protect against the impact of storm surge due to rising sea levels, widely regarded as one consequence of climate change--is one example of an adaptation project.

ANALYTICAL APPROACH

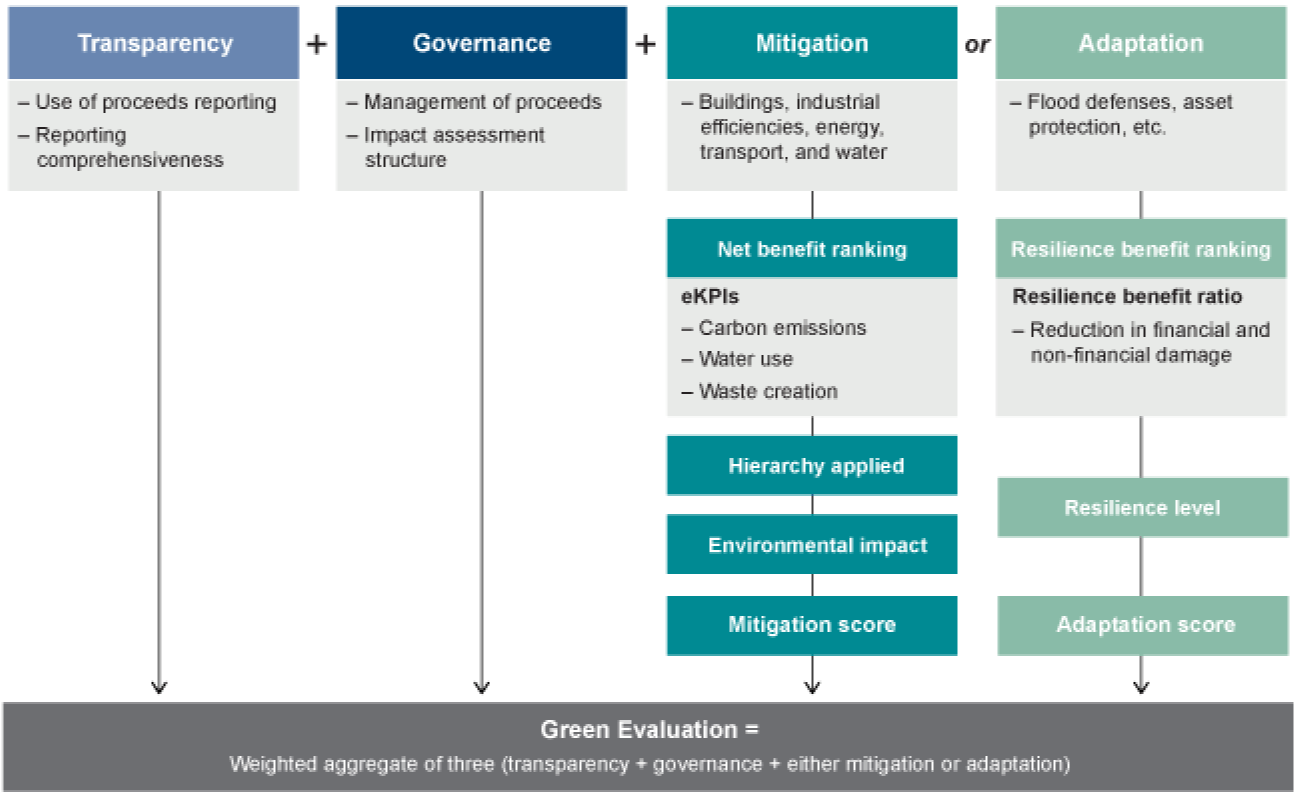
18. The Green Evaluation framework assesses four categories. We look at transparency, governance, mitigation (environmental impact), and adaptation (resilience level) (see chart 1).

19. For mitigation projects, we estimate whether a project, over its life (including construction, operations, and decommissioning phases), is expected to create a net positive or negative environmental impact based on relevant eKPIs. We call this a net benefit ranking. We then overlay a hierarchy, which places the net benefit ranking of the specific technology within the broader context of the sector (for instance, solar power within the green energy sector). The outcome is referred to as the environmental impact. If applicable, we combine the environmental impact of each sector to derive the mitigation score. We then combine the mitigation score with the transparency and governance scores to produce a Green Evaluation, which is mapped to an E score.

20. For adaptation projects, we determine the resilience level by assessing the increase in resilience a project is likely to provide. We map the resilience level to an adaptation score. We then combine that score with the transparency and governance scores to determine a Green Evaluation, which is mapped to an R score.

Chart 1

Green Evaluation Analytical Approach



A. Transparency

21. In assessing transparency, we look at the quality of reporting on the financing instruments. High-quality reporting enables investors and other stakeholders to understand and evaluate the governance of a transaction, as well as determine whether the promised environmental targets and performance are being achieved. Although not always available, independent certification of the environmental performance can further bolster stakeholders' confidence in the environmental effectiveness of the transaction, in our view.

22. Our evaluation of a transaction's transparency includes a qualitative review of:

- Use of proceeds reporting,
- Impact reporting and disclosure, and
- External verification of impact data.

23. We review public documentation of the financing transaction and, if available, actual reporting and disclosure. Our qualitative analysis of actual (or promised future) reporting is based on questions we pose to the party seeking the

green financing. (In this article, "entity" refers to the party seeking green financing.)

24. We evaluate each factor within transparency and apply weightings to determine the overall transparency score on a scale of 0-100.

Use of proceeds reporting

25. A single financing can fund multiple projects, all of which may have a beneficial environmental impact, but to varying degrees. Disclosure of the allocation of funds may be more or less detailed and can hamper an investor's ability to ascertain the overall environmental benefit. Alternatively, only a portion of the proceeds may be directed toward a project with a beneficial environmental impact. Our Green Evaluation analytical approach can accommodate either scenario. Allocating only a portion of proceeds to environmentally beneficial projects does not affect our Green Evaluation, which is based on the projects funded and applies only to that portion of the proceeds.

26. We identify the proportion of proceeds to be allocated to environmentally beneficial projects in our report.

27. In situations where the details of the projects to be funded have not been disclosed, we assume a worst-case allocation scenario.

28. We can provide our point-in-time Green Evaluation at any stage in the financing or project life. Our evaluation is based on the assumption that the project is completed and operational, if the evaluation is completed at a time when construction is anticipated to go ahead as planned and operate within average industry expectations for the technology.

29. ***Disclosure of the total signed amount of financings and the amount of allocated proceeds:*** Our appraisal of disclosure on the amount of signed and allocated proceeds is two-fold. First, we evaluate the total amount (signed for financing and the amount of proceeds allocated to the specific financing), if published, then we review the level of granularity of the reporting on allocation.

30. ***Level of disclosure on proceeds allocated to projects:*** Here we assess the depth of disclosure on proceeds allocated to eligible financings. This indicates to investors and stakeholders whether (and to what extent) an entity is following its objectives indicated at issuance. The disclosure (if any) can be project level or aggregate level by sectors. For financings being assessed pre-issuance, we look for documented intention to report.

31. ***Frequency of reporting, or commitment to report, on the use of proceeds:***A commitment to report more frequently (as well as a commitment to publish the reports) leads to a higher level of transparency than publishing less frequently and gives the investor more frequent data points. Funds allocation reporting frequency can vary from annual reporting, to less frequent, to no reporting commitment at all.

32. ***Disclosure on including and removing projects/financings from a portfolio:*** A defined process for including and removing projects in a report is important for portfolios with financings that may be added or subtracted from the portfolio from time to time. In addition, by removing from the portfolio a project that does not meet an entity's environmental targets, the entity further demonstrates its commitment to its own green principles.

33. ***Project selection protocol:*** Here we assess whether an entity has disclosed the rules and principles governing its future allocation of funds. In other words, our evaluation will examine if the principles for selecting which projects to fund are clear and transparent. This is equally applicable for single-project financings.

Reporting and disclosure on environmental impact

34. ***Commitment to reporting on environmental impact:*** A commitment to disclosing the environmental impact of funded projects enhances transparency and informs environmentally conscious investors. Environmental impact reporting frequency can vary from annual reporting, to less frequent, to no reporting commitment at all.

35. ***Disclosure of environmental impact:*** The existence of (or commitment to) at least annual quantification and disclosure of eligible projects' expected or actual environmental impact is assessed separately. The disclosure (if any) can be quantitative or qualitative, and it may be at a project or aggregate portfolio level. We do not include the disclosure of specific annual quantitative environmental impact results in our net benefit ranking.

36. ***Depth of disclosure of impact indicators:*** We evaluate the existence and quality of environmental impact indicators in line with the characteristics of different technologies. Basic indicators include location, capacity (power generation) or energy savings (energy efficiency investments), vehicle carbon intensity (green transport), and description of asset types (green buildings). Comprehensive indicators include additional disclosure related to estimated outputs, capacity factors (power generation), impact on modal split (green transport), targeted or estimated savings (energy efficiency), and estimated savings compared with baseline scenarios (green buildings). Advanced indicators have an additional layer of disclosure, such as estimated avoided carbon.

37. ***Disclosure of lifecycle impact and a project's economic life:*** An important factor when disclosing a project's impact is the time period that the disclosure covers. We can better understand the lifecycle (whole of life) impact on an annual basis if there are annualized impact indicators. The disclosures (if any) can cover the full lifetimes for all of the projects financed, the lifetimes for some of the projects financed, the economic lifetimes for all of the projects, and the economic lifetimes for some of the projects. ("Economic life" is the timespan during which the project makes an economic contribution before being decommissioned.)

38. ***Methodology for environmental impact calculation:*** Disclosure of an entity's methodology for calculating the actual and/or expected environmental impact is viewed positively. It allows for a more thorough investigation by environmentally conscious investors and facilitates stakeholder discussions. For example, understanding an entity's baseline assumptions and scope when calculating avoided emissions provides added transparency for investors. When provided, the disclosure may or may not cover all projects; the former is preferable.

External verification of impact data

39. ***Quality of assurance:*** Certification that an entity's environmental impact assessment complies with an established assurance standard improves the transparency of the transaction, in our view. A third-party appraisal of an issuer's data quality that lacks compliance with an assurance standard is not viewed as positively. Without any external verification of environmental impact data, an investor is less assured of the entity's claims regarding the environmental impact of the transaction and associated project(s).

Treatment of general use of proceeds transactions by pure play entities

40. "Pure play" companies that focus solely on environmentally beneficial activities, such as solar panel or wind turbine manufacturers, often issue general use-of-proceeds bonds. We assume these issuances are fully committed to eligible green projects.

Portfolios

41. For portfolios of multiple financings, we would expect to review the criteria for selecting or deselecting assets within the portfolio.

B. Governance

42. In our governance assessment, we look at the procedures in place to manage proceeds allocation and to evaluate environmental impact over the life of the assets.

43. We consider whether there are well-defined procedures in place for:

- Selecting projects eligible to be financed,
- Preventing proceeds of the bond from being used for other purposes than the intended green financings,
- Appraising and managing environmental impacts, and
- Complying with environmental regulations.

44. We evaluate each factor within governance and apply fixed weightings to determine the overall governance scores on a scale of 0-100.

Management of proceeds

45. ***Selection rules of eligible investments or financings:*** The existence of a well-defined selection protocol is important for ensuring that proceeds are allocated to projects with environmental benefits. We view favorably transactions with well-defined environmental objectives and explicit selection principles to achieve those objectives.

46. ***Proportion of total issued amount committed to green financings:*** The higher the commitment to green financings, the higher the score on these factors because we view it is an indicator of the extent to which the proceeds are committed to being used or already are being used to finance environmentally beneficial projects.

47. ***Tracking, non-contamination, and allocation of proceeds:*** These three factors cover the oversight and internal control of proceeds. When analyzing issue-related governance processes, we consider whether a subaccount separation of proceeds is, or is intended to be put, in place (allowing for transparent tracking of the use of proceeds). We also assess any protocols in place to prevent proceeds from being used for purposes other than the stated financing objectives in the documentation.

48. ***Verification of proceeds allocation or future commitment to verify proceeds allocation:*** A third-party review provides additional assurance to investors that proceeds are being allocated as expected. We therefore view the quality of governance as higher when an external independent reviewer reviews proceeds allocation. The provision of regular evaluations in line with an assurance standard is also viewed positively.

Evaluation of environmental impact

49. ***Measuring the positive and negative environmental impact:*** We look at whether a qualitative or quantitative environmental impact evaluation of the funded projects is available to investors. We view a quantitative and transparent evaluation of the environmental impact of the project over its full life cycle more favorably than just the economic life of the asset.

50. ***Compliance with regulations:*** For projects with intended environmental benefits, we expect an entity to evidence relevant environmental regulations are being complied with. If an entity doesn't provide this evidence, generally we score governance lower.

Certificates against industry standards

51. This factor currently covers green building certificates, such as BREEAM or LEED, and differentiates between their various levels as an assurance that industry standards or above industry standards are being considered when

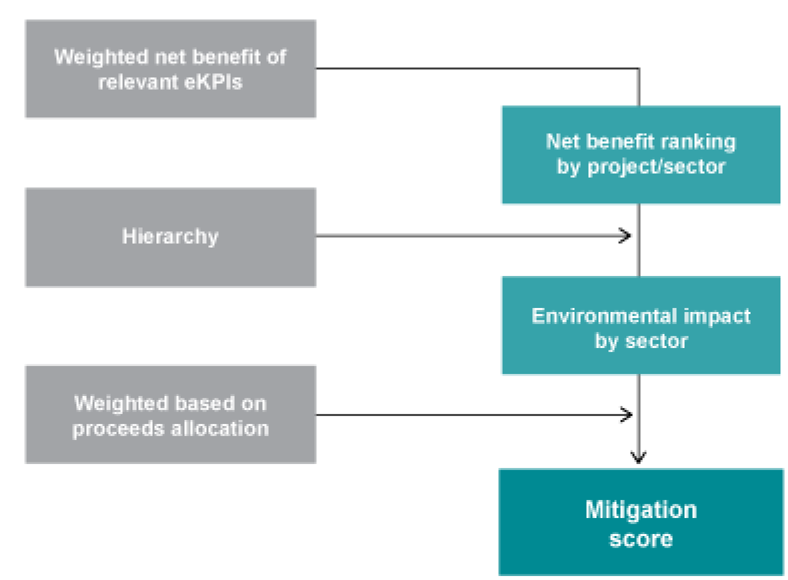
financing such projects.

C. Mitigation

52. Our assessment of mitigation reflects the environmental impact of a financing's proceeds over the life of the assets that it finances. It considers a variety of eKPIs, such as carbon, water, and waste. We use those to determine a project's net benefit ranking. We then assess where each project fits within either our carbon or water hierarchy (which indicates the sector's relative contribution to avoiding and coping with climate change) to determine the environmental impact. Finally, we calculate the environmental impact of each sector a project covers based on funds allocated to that sector to derive the mitigation score (see chart 2).

Chart 2

Determining The Mitigation Score



Net Benefit Ranking

53. In assessing a project from a mitigation perspective, we use a net benefit approach. We estimate a project's positive and negative impact compared with a baseline scenario to determine its net environmental impact overall compared with other technologies in the same sector. We call this a net benefit ranking. We consider the material stages of a project lifecycle, from the supply chain (including construction), through operations, to end-of-life. The operational phase is the assumed lifetime of the project or asset, minus an assumed one-year construction phase, and is the point at which we would consider the environmental impact of the project relative to its baseline.

54. For example, for a renewable wind energy project, we would consider the environmental impact of constructing,

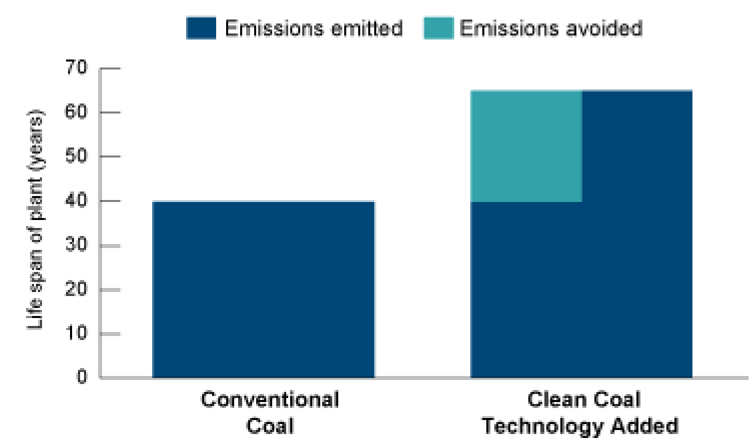
operating, and decommissioning a windfarm against the benefits of using the windfarm to produce energy instead of the conventional grid in that country over the lifetime of the windfarm.

55. We estimate the positive and negative impact over the life of a project for each of the material eKPIs in its sector. For a renewable energy project, we estimate the net benefit to the environment over its lifetime after considering the carbon emissions, waste creation, and water usage (eKPIs for green energy) associated with the supply chain, operation, and decommissioning.

56. Our analytical approach compares emissions savings to a baseline scenario. For an energy project, for example, the baseline scenario would be the business-as-usual emissions rate for the grid system in the region where the project is based. Therefore, some projects, such as clean coal projects (which make the burning of coal more efficient and reduce emissions per MWh of energy produced), could score very well in terms of absolute quantities of carbon saved. However, in this scenario, the project would also invest in a fossil fuel energy source and effectively extend the lifespan of the plant, thereby locking fossil fuel energy into the grid. As a result, the total emissions from the asset over its lifetime would increase (see chart 3).

Chart 3

Emissions Generated Over Project Life Span



Data requirements

57. The net benefit ranking is designed to compare the relative green impact of the projects being financed. We take into consideration the sector, the technology, and the location of each asset. (If the specific country, U.S. state, or Canadian province is not known, we use regional or global factors as appropriate.) We calculate the net benefit using conservative assumptions, meaning that, in the absence of disclosure, we assume the technology within the sector and country mix with the lowest net benefit. If the subsector type is known (i.e., green power generation or green power technology), then the calculation can be refined further, with the most granular level of detail at the individual project level (i.e., wind power generation or smart grid). This concept is illustrated in table 1 for the category of green energy.

Table 1

Green Energy Sector
Green energy technologies
Photovoltaic solar power generation
Concentrated photovoltaic solar power generation
Solar thermal
Small hydropower generation (<30MW)
Large hydropower generation (>30MW)
Onshore wind power generation
Offshore wind power generation
Wave and tidal power generation
Landfill gas power generation
Geothermal power generation
Biomass power generation

Sector-specific approaches

58. When assessing a project's net benefit, we consider a variety of eKPIs. Tables 2-8 show the eKPIs for projects in several sectors. The sectors and project types listed are not exhaustive. We do not model expected growth or decline in energy demand or water availability. We work on the assumption that new generation assets will replace existing generation assets.

59. ***Green energy.*** A key environmental impact of renewable energy generation is that it supplies the grid with low-carbon electricity, which reduces the local/national carbon intensity of electricity. Indeed, we assume that the electricity a renewable energy power plant produces would have been produced by the existing power plants connected to the same grid in the event that this project had not existed. As a result, the amount of carbon dioxide avoided by a particular renewable energy power plant is dependent on the collective carbon content of all the energy connected to this grid, netted by the carbon costs of installing these assets. Adding renewable energy in a carbon-intensive electric system, heavily reliant on fossil fuels, will avoid more emissions as it replaces comparatively carbon-intensive electricity.

Table 2

Renewable Energy eKPIs Considered In Net Benefit

Carbon	Waste	Water use
X	X	X

60. ***Buildings.*** Green buildings projects aim to reduce the environmental impact of buildings over their lifespan. Buildings accounted for one-third of global carbon emissions and half of global electricity consumption in 2012. Between 2000 and 2012, the sector's final energy consumption increased by 1.5% per year, on average, well beyond the 0.7% that would limit the global temperature rise to no more than two degrees Celsius above preindustrial levels(2). Green buildings target a variety of environmental impacts. However, the focus remains primarily on two main eKPIs: energy efficiency and water saving. Globally accepted green building certifications include BREEAM, LEED, Energy Star, Green Star, and many others(3).

61. The two key types of green buildings projects across commercial and residential are:

- Construction of new buildings, and
- Retrofit of existing buildings.

62. Within both subcategories are many asset types, including residential, retail, industrial, and health care. Examples of energy-saving initiatives in both new buildings and refurbishments include:

- Energy-efficient heating, ventilation, and air conditioning systems;
- Double glazing of glass windows/walls to improve thermal insulation;
- High-efficiency pool equipment;
- Smart meters;
- High-efficiency water heating; and
- Roof and wall insulation.

Table 3

Green Buildings eKPIs Considered In Net Benefit

Carbon	Waste	Water use
X		X

63. ***Green transport.*** A key environmental impact of low-carbon transportation sources is meeting transportation demand without emitting the carbon dioxide associated with fossil fuel combustion. Transport accounts for a large share of human-generated carbon dioxide emissions and requires significant evolution. For instance, the International Energy Agency estimates that the electric vehicle market has to increase by 80% per year by 2025 to be on track for a two-degree scenario (restricting global warming to no more than two degrees above preindustrial levels, the main objective of the U.N. Paris Agreement). As a result, providing low-carbon transport solutions, such as electric private or public transport, is a key aspect of the energy transition and can achieve significant environmental benefits.

64. Project subcategories are:

- Urban rail system,
- Electric vehicles,
- Fuel-efficient vehicles, and
- National rail and freight systems.

Table 4

Green Transport eKPIs Considered In Net Benefit

Carbon	Waste	Water use
X		

65. ***Energy efficiency.*** The key environmental impact of energy-efficiency projects is the ability to provide the same service while reducing energy demand(4). Energy efficiency is integral to achieving low-carbon transition in traditional sectors, such as buildings, transportation, and industry. The scope of the savings and the techniques required depend on the sector they are applied to and location.

66. Many of these technologies are assessed in other sectors (green buildings, green energy, and green transport), leaving two main categories of projects to consider within energy efficiency: energy-efficient products (such as those with an Energy Star certification) and industrial efficiencies.

Table 5

Energy Efficiency eKPIs Considered In Net Benefit

Carbon	Waste	Water use
X		

67. ***Water.*** While other sectors, such as green energy, green transport, and green buildings are targeted at decarbonization of the economy, water-related mitigation projects focus on using water resources and networks more efficiently and improving the quality of water treatment for various end uses and the environment. Projects focusing on water are increasingly important as climate change warms the atmosphere, altering the hydrologic cycle and changing the amount, timing, form, and intensity of precipitation(5). These projects aim to address problems of water scarcity and pollution, often at local and watershed levels. Therefore, the key environmental impact can be more efficient water use or distribution, increased levels of water recycling, and improved water treatment compared with the baseline scenario. Importantly, the majority of projects in this sector take into account regional scarcity factors.

68. We recognize that water projects improve the resilience to drought risk and, therefore, also have an adaptation element. We reflect that by incorporating water scarcity in the net benefit calculation. However, we consider projects whose main objective is to reduce water consumption or improve water quality as mitigation. At the same time, water projects whose primary motivation is to increase communities' resilience to drought will likely be considered as adaptation, provided that the resilience benefit is quantified (see section D).

69. The water sector in scope encompasses a broad range of water-focused projects, such as water demand reduction, water treatment, water treatment to increase supply, and wastewater treatment with or without energy recovery. The specific types of projects in scope are listed below.

70. Water demand reduction projects are:

- Conservation measures in residential buildings,
- Conservation measures in commercial buildings,
- Conservation measures in industrial equipment,
- Smart metering in residential buildings, and
- Reducing water losses in the water distribution network.

71. Water treatment to increase supply covers:

- Water desalination to supply potable municipal water,
- Recycling wastewater to supply potable municipal water,
- Recycling wastewater to supply non-potable water for agricultural uses, and
- Recycling wastewater to supply non-potable water for other industries.

72. Wastewater projects are:

- Wastewater treatment with no energy recovery, and
- Wastewater treatment with energy recovery.

Table 6

Water eKPIs Considered In Net Benefit

Carbon	Waste	Water use
X		X

73. ***Fossil fuel power plants.*** The fossil fuel power plants sector considers a variety of carbon reduction initiatives in the conventional energy sector, including "clean coal" and coal-to-gas conversion projects. The global average efficiency of coal-fired power plants currently in operation is roughly 33%, significantly lower than the 45% efficiency possible with modern, ultra-supercritical coal-fired power plants(6). These figures highlight that there is scope for improving the

carbon efficiency within existing and planned conventional power generation capacity. The key environmental impact that these projects target is reducing greenhouse gas emissions through the decreased carbon intensity of conventional energy production.

74. Project subcategories are:

- Coal plant efficiency upgrades,
- New clean coal plants, and
- Coal-to-gas conversions.

Table 7

Fossil Fuel Power Plants eKPIs Considered In Net Benefit

Carbon	Waste	Water use
X	X	X

75. ***Nuclear.*** The key environmental benefit of nuclear power generation is extremely low greenhouse gas emissions. Low-carbon power generation technologies, such as renewable power generation and nuclear, continue to play an important role in the decarbonization the power sector(7). However, the high carbon-intensity of uranium mining required to power nuclear technology(8) reduces its net contribution to decarbonization, compared with renewable energy generation, when taking supply chain emissions into account.

Table 8

Nuclear eKPIs Considered In Net Benefit

Carbon	Waste	Water use
X	X	X

Weighting eKPIs and determining the ranking

76. In order to convert our estimate of the absolute net benefit impact in terms of each relevant eKPI, such as cubic meters of water, tons of waste, and tons of carbon, into a relative ranking, the net benefit is compared against net benefit results for each eKPI and for each technology within a technology's peer group.

77. The comparison uses percentiles to assign a score. For example, if the carbon net benefit result of a project financing fits between the 20th and 30th percentiles of the representative range of carbon outputs, the instrument scores 30 out of 100. This net benefit ranking is a best-in-class approach because it compares a particular financing's environmental impact against results achieved for each eKPI within the sector.

78. To derive the representative range, net benefit calculations use all the available project types in the peer group and a group of relevant countries. For example, within the renewable energy sector, we refer to the 61 countries responsible for 95% of power generation capacity(9). The carbon net benefit for every type of renewable energy power generation technology considered in the peer group (such as wind, solar, and geothermal) is calculated to produce the representative range.

79. Each eKPI for a given sector has a weighting, informed by using environmental valuations(10) to understand the most material environmental impact of a particular activity. For example, carbon may be weighted at 70%, water at 20%, and waste at 10% for a particular sector. The net benefit ranking is a weighted average of the individual eKPI percentile scores for each project. If there are multiple projects within a sector being funded by the same transaction,

we weight each project (based on funding allocation) to achieve a sector-level net benefit ranking. For sectors that cross our hierarchy categories (water and carbon), we provide a subsector total by hierarchy level.

Sector Hierarchy And Environmental Impact

80. After determining the sector (and subsector, if applicable) net benefit rankings, we apply our carbon or water hierarchy. This places the final mitigation score within the broader context of different sectors. In effect, this limits the mitigation score that projects or portfolios with potentially uncaptured negative effects are able to achieve (see chart 2). The carbon hierarchy differentiates between long-term green solutions and environmental impact reduction. For example, after applying the hierarchy, a clean coal project would not be able to achieve as high a score as a renewable energy project. Importantly, the hierarchy does not exclude any project type from the evaluation. The water hierarchy differentiates between system enhancements and demand-side improvements.

81. The water and carbon hierarchy scores range from 0 (e.g., extending the use of fossil fuel) to 100 (e.g., renewables contributing to systemic change) and carry weights of 60%-75% (see tables 9-10). Higher hierarchy scores carry a heavier weight, given we believe those projects are contributing the most environmental benefit. To determine the environmental impact score, we combine the weighted hierarchy score with the weighted net benefit ranking of each project or sector. The net benefit rankings are weighted 25%-40%.

Table 9

Carbon Hierarchy Scores And Weighting

Carbon hierarchy	Carbon hierarchy score (0-100)	Weighting of hierarchy score (%)	Weighting of net benefit ranking (%)
Systemic decarbonization	100	75	25
Significant decarbonization through low-carbon solutions	90	70	30
Decarbonization by alleviating emissions of carbon-intensive industries	80	65	35
Decarbonization technologies with significant environmental hazards	50	60	40
Improvement of fossil-fueled activities' environmental efficiency	0	60	40

Table 10

Water Hierarchy Scores And Weighting

Tier	Water hierarchy	Water hierarchy score (0-100)	Weighting of hierarchy score (%)	Weighting of net benefit ranking (%)
1	System enhancements	100	75	25
2	Marginal system enhancements	75	70	30
3	System enhancements with significant negative impacts	62.5	70	30
4	Demand-side improvements	50	65	35

Carbon hierarchy

82. The carbon hierarchy (see table 11) is based on an assessment of a technology's overall contribution to decarbonization of the economy. We do not apply the carbon hierarchy to the water sector.

83. Projects contributing to systemic decarbonization are on the top rung of the hierarchy. These include green energy projects and demand management.

84. The second level in the carbon hierarchy includes sector-specific solutions, which are already compliant with a decarbonized, or green, economy. This includes fully electric transport solutions or net-zero buildings (with zero net energy consumption). For instance, electric vehicles may achieve limited environmental benefits because of the carbon content of their electricity use, but as systemic change to the electricity grid takes place, the long-term benefits are likely to be significant.

85. Industrial efficiencies and energy-efficiency projects with significant potential for environmental benefit (lowering the impact of carbon-intensive activities) come third in our hierarchy. These project types--for example, a hybrid vehicle--optimize the environmental impact of existing technologies rather than promoting new low-carbon solutions.

86. Projects that achieve immediate, and often meaningful, environmental benefits, but at the same time prolong the use of fossil fuels, are ranked lowest. This is because these projects lock in emissions for the long term(11).

Table 11

Carbon Hierarchy

Sector	Technology
Systemic decarbonization	
Green energy	Wind power
	Solar power
	Small hydro
	Large hydro (excluding tropical areas)
Energy efficiency	Energy management and control
Significant decarbonization of key sectors through low-carbon solutions	
Green transport	Green transport without fossil fuel combustion
Green buildings	Green buildings – new build
Decarbonization by alleviating emissions in carbon-intensive industries	
Energy efficiency	Energy efficient projects (industrial efficiencies and energy star products)
Green transport	Green transport with fossil fuel combustion
Green buildings	Green buildings refurbishment
Decarbonization technologies with significant environmental hazards	
Nuclear power	Nuclear
Green energy	Large hydro in tropical areas
Improvement of fossil fuel-based activities' environmental efficiency	
Fossil fuel power plants	Coal to natural gas
	Cleaner fuel production
	Cleaner use of coal

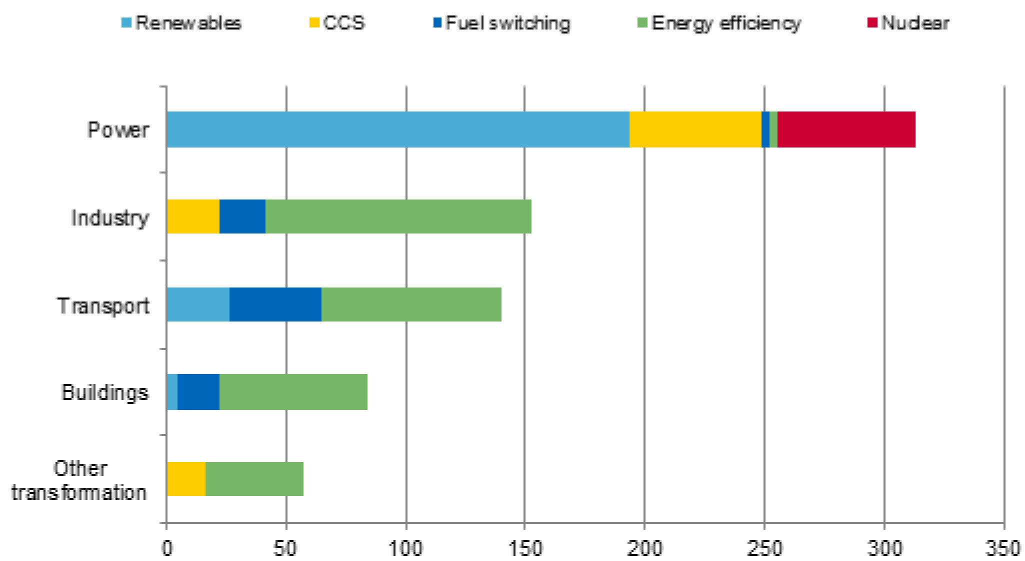
87. The principles applied to establish this hierarchy are:

- Systemic solutions prevail over sector-specific solutions: Decarbonizing electricity affects not only the power sector, but also the entire carbon intensity of economies as electricity feeds through all other economic sectors (scope 2 emissions, as defined under the Greenhouse Gas Protocol). Because of this, solutions affecting this central aspect of energy transition have a wider reach than sector-specific solutions as they allow systemic change. For instance, the deployment of electric vehicles is highly dependent on an optimal energy demand management (smart grid solutions).

- Compare low-carbon solutions with technologies that provide marginal improvement: The hierarchy distinguishes between low-carbon solutions (such as electric vehicles), which are already compliant with a low-carbon economy, and "intermediary" technologies that aim to achieve environmental savings through a marginal improvement of carbon-intensive processes (such as hybrid vehicles). Although the latter might achieve significant savings by improving a very intensive baseline, it does not directly contribute to the deployment of low-carbon solutions.
- Isolate sectors with a particularly negative environmental impact: Large hydro projects in tropical areas (>30 MW) produce low-carbon energy. However, we differentiate these projects from other renewable electricity generation given the significant methane emissions from rotting vegetation in large reservoirs in tropical areas(12). The significant carbon-intensity of uranium mining(13) and uncertainty around hazardous nuclear waste management lead us to rank nuclear energy near the bottom of our green hierarchy, despite its low-carbon intensity during operations.
- Consider a broad green universe: Country-specific standards may differ from industry-accepted taxonomies, such as the Green Bond Principles or Climate Bonds Initiative. The inclusion of clean utilization of coal or clean fossil fuel production, in the Chinese Green Bonds standards(14) only, underlines both the lack of consensus over how green these activities are and that this sector is still developing.
- Place projects that help to extend fossil fuels' lifespan at the bottom of the scale: Although a very carbon-intensive baseline can make the net environmental benefit of fossil-fuel plants retrofit (coal-to-gas transition or clean coal) significantly positive, these projects further fossil fuel usage by creating "locked-in emissions"(15).
- Apply a carbon dioxide reduction potential approach: The International Energy Agency has estimated the potential carbon emissions reduction achievable per sector in a low-carbon scenario, compared with business-as-usual(16).

Chart 4

Cumulative Carbon Dioxide Reductions By Sector And Technology In The Two-Degree Scenario To 2050



Note: A portfolio of low-carbon technologies is needed to reach the two-degree scenario; some solutions will be broadly applicable, while others will need to target specific sectors. CCS--Carbon capture and storage. Source: International Energy Agency (2015), Energy Technology Perspectives 2015, OECD/IEA, Paris.

Water hierarchy

88. For the water projects listed in paragraphs 70-72, we apply our water hierarchy (and not the carbon hierarchy). We have divided our water hierarchy into four tiers, based on the type of impact that the project can have:

- System enhancements,
- Marginal system enhancements,
- System enhancements with significant negative impact, and
- Demand-side improvements.

89. ***System enhancements: Directly or indirectly increase the availability of freshwater.*** Projects that fall into the top tier of the water hierarchy are those that directly or indirectly increase the availability of freshwater. These are projects that do not have a significant negative water impact and deliver freshwater through the construction of new infrastructure. For instance, a wastewater recycling plant that delivers water to agriculture will fall into this tier of the hierarchy.

90. ***Marginal system enhancements: Improve the delivery of existing freshwater supplies.*** The projects that fall into the second tier of the hierarchy are those that directly or indirectly improve the delivery of freshwater through existing infrastructure. This second tier is for projects that upgrade existing water infrastructure, rather than build new infrastructure, and do not have any significant negative water impact. An example would be upgrading the water distribution network by reducing leakage from pipes.

91. ***System enhancements: Increase the availability of freshwater but have a significant negative environmental impact.*** The projects that fall into the third tier increase the availability of freshwater by building new infrastructure but cause a significant negative water impact in the process. For instance, this includes the construction of seawater desalination plants that dispose of waste saline solution, a byproduct of the desalination process, back into seawater.

92. ***Demand-side improvements: Measures that reduce the demand on potable water supplies***. Projects that fall into the fourth tier of the hierarchy are those that reduce the demand on potable water supplies. These projects install technologies that aid in reducing the demand on freshwater sources in residential, commercial, or industrial settings. For instance, they can include the installation of smart meters in residential buildings or the installation of more efficient kitchen appliances in commercial buildings.

93. While the principles behind the carbon and water hierarchies are similar, the definitions of systemic changes differ slightly for the two hierarchies. This is because, when considering carbon projects, systemic change refers to decarbonizing power supply networks. It is substituting the use of fossil fuels with renewable energy sources, such as wind and solar. For water supply networks, systemic change involves substituting ground water withdrawals with infinitely (locally) recycled surface water, where water is not treated as a once-used commodity (similar to using carbon one time by burning it to generate energy).

Table 12

Water Hierarchy
Tier 1
System enhancements
Recycling wastewater to supply potable municipal water
Recycling wastewater to supply non-potable water for agricultural uses
Recycling wastewater to supply non-potable water for other industries
Wastewater treatment with no energy recovery
Wastewater treatment with energy recovery
Tier 2
Marginal system enhancements
Reducing water losses in the water distribution network
Tier 3
System enhancements with significant negative impacts
Water desalination to supply potable municipal water
Tier 4
Demand-side improvements
Conservation measure in residential buildings
Conservation measure in commercial buildings
Conservation measure in industrial buildings
Smart metering in residential buildings

Example of applying the hierarchy

94. Table 13 shows a simplified example of a best-in-class fossil fuel project and a worst-in-class green energy project before and after the application of the hierarchy.

Table 13

Example: Best-In-Class Fossil Fuel Versus Worst-In-Class Green Energy Project

	Net benefit ranking (0-100)	Weight (%)	Hierarchy score (0-100)	Weight (%)	Environmental impact (0-100)
Best clean coal project	100	40	0	60	40
Worst green energy project	0	25	100	75	75

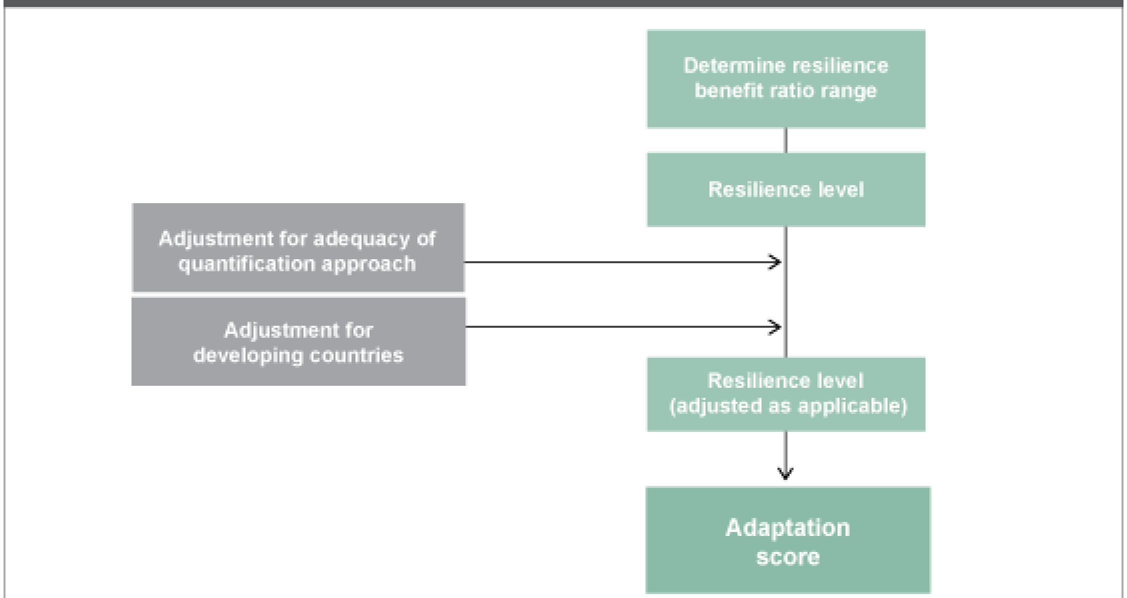
D. Adaptation

95. We base our evaluation of an adaptation project on the increase in resilience the project is likely to provide for the covered geographical area or asset base. This results in the adaptation score (see chart 5).

- First, we quantitatively evaluate the benefit of the added resilience, relative to the amount of the financing's proceeds, on a five-point scale. The benefit is the forecast reduction in the cost of expected damages caused by extreme weather events. It is based on an entity's analysis, to which we may apply quantitative adjustments.
- Second, we modify the evaluation score determined in the first step, based on our qualitative view of the adequacy of an entity's quantification approach to determining the resilience benefit.
- Third, we may apply additional adjustments in certain cases--for example, for projects that are in developing countries for which the resilience benefit may be understated because the likely significant social benefits are difficult to quantify.

Chart 5

Determining The Adaptation Score



96. We assess the environmental benefit on a five-point scale based on the resilience benefit ratio (see table 14). We define

this as the ratio of the resilience benefit and the financing derived from the bond's proceeds. The rationale underpinning the calibration of the scale is further described in appendix 2 of "Evaluating The Environmental Impact Of Projects Aimed At Adapting To Climate Change," published on Nov. 10, 2016.

Table 14

Resilience Benefit Scale

Resilience level	Range of resilience benefit ratio
1	>=4
2	>=3 & <4
3	>=2 & <3
4	>=1 & <2
5	<1

97. After considering any adjustments made in stages 2 and 3, the resilience level is mapped to an adaptation score (see table 15).

Table 15

Deriving The Adaptation Score

Resilience level*	Adaptation score
1	100
2	75
3	50
4	25
5	0

*Including any adjustments.

Determining the resilience benefit ratio range

98. In our calculation, we consider damages caused by extreme weather events or weather patterns. The publication "Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation" by The Intergovernmental Panel on Climate Change (IPCC) is a summary of the current scientific understanding of the expected impact of climate change on extreme weather. We calculate the added resilience a project offers (the resilience benefit) by estimating the reduction in expected damages the infrastructure funded by the green bond is designed to achieve over the targeted period.

99. To determine the resilience benefit, we review the analysis an entity has already performed, in which it has quantified the benefit expected as a result of the capital expenditure. Typically, this analysis is part of the design process and is used to assess a project's viability. In our view, resilience benefits go beyond financial benefits and include reduction in humanitarian and ecological damage, both directly and indirectly. Although it is often difficult to put a financial value on those benefits, experts in the adaptation field have developed methodologies to capture these elements. To the extent that these factors are reflected in the benefit analysis an entity performs, we include them in our adaptation analysis.

100. Adaptation projects chiefly provide benefits in the case of extreme events, which are uncertain and require probabilistic representation. Therefore, methodologies used for funding purposes normally require that the benefit

assessment is done on a probabilistic basis. In practice, these assessments incorporate the benefit over a variety of modeled events covering different severities of impact and probabilities of occurrence. The evaluation is also often performed over different long-term climate scenarios, incorporating projections of how climate change might develop and exposure to the resulting risks might grow. If the benefit analysis is not performed on a probabilistic basis, it is likely, with some exceptions, that we will assess the resilience level at the lowest level (5, or adaptation score of 0 out of 100).

101. Methodologies and assumptions used for different projects and in different countries vary, and those differences affect the quantification of the benefit. Differences in the methods and key assumptions used are often justified by the specific nature of the projects. Also, those differences reflect the uncertainty regarding how policies for reducing carbon dioxide emissions affect future carbon dioxide levels and the lack of scientific agreement on the impact of those climate change scenarios on extreme weather events. For example, some entities may calculate a greater benefit because their models assume that climate change may have a more severe impact on extreme weather events.

102. We consider the magnitude of the benefit as quantified by the entity seeking financing, regardless of how sophisticated the analyses are. However, we require that the key elements of the benefit assessments be performed by an independent third party. These elements are:

- Probabilistic simulation approach to generate a sample of weather events and their financial impact,
- Climate change projections and their impact on the adaptation project, and
- Quantification of humanitarian and ecological benefits.

103. Calculating the benefit of adaptation projects often takes place amid considerable data, assumptions, and modeling challenges. These challenges may introduce material modeling uncertainty, which could cause the overall benefit to be overestimated. Therefore, if we think that the analysis may have materially overstated or understated the benefit, we may adjust it before finalizing the resilience level. Upward adjustments require prudence, so these are more limited. Our approach for such adjustments is informed by the experience we have gained from reviewing insurers' economic capital and natural catastrophe modeling, which we perform as a part of our rating analysis (see "A New Level Of Enterprise Risk Management Analysis: Methodology For Assessing Insurers' Economic Capital Models," Jan. 24, 2011; "How We Capture Catastrophe Modeling Uncertainty In (Re)insurance Ratings," April 27, 2016; and "Rating Natural Peril Catastrophe Bonds: Methodology And Assumptions," Dec. 18, 2013).

104. In determining any quantitative adjustments, we may use sensitivity analyses to assess the impact that any changes in key assumptions could have on the size of the benefit. We may use this to adjust the resilience benefit if we consider some of the tested alternative assumptions to be more appropriate than the central assumptions (for example, discount rates or climate change scenario).

105. In calibrating our adaptation scale, we considered two studies: Mechler's review of the literature on the benefit of adaptation projects ("Reviewing estimates of the economic efficiency of disaster risk management: opportunities and limitations of using risk-based cost-benefit analysis") and ECONADAPT project report "Assessing the economic case for adaptation to extreme events at different scales".

106. The lowest resilience level (5) indicates an adaptation project that would provide a lower benefit than the financing

amount. To achieve the highest resilience level (1), the resilience benefit ratio must be at least 4x, which is approximately the average/median figures reported in those studies. Our rationale is that this represents a significant resilience benefit relative to the cost of constructing the project. Furthermore, we do not consider it appropriate to differentiate above the 4x level because to do so could reward projects that address highly vulnerable infrastructure, but on a smaller scale, instead of addressing vulnerabilities on a bigger scale, which carry lower resilience benefit.

107. Our calibration assumes that the entire cost of the adaptation project is met through the financing raised by the green financing. If the adaptation project is partially funded from other sources, we prorate the resilience benefit.

Adjustment for adequacy of quantification approach

108. In the second stage in determining our resilience assessment, we may apply a qualitative adjustment to the initial assessment, based on whether we view the quantification of the resilience benefit as robust, adequate, or less than adequate. This adjustment reflects the risk of overstatement and understatement of the benefit relative to the initial assessment in stage one. Also, this adjustment could be used to reflect a smaller modeling uncertainty than in typical quantification approaches, which underlie the calibration of our resilience benefit scale.

109. In our qualitative assessment, we consider the following aspects of an entity's quantification approach:

- Scope of the model: Allows for all material benefits and negative impacts of the adaptation project.
- Modelling approach: Uses a probabilistic simulation approach to generate a sample of weather events representing the frequency, severity, and location of plausible events.
- Key financial modelling assumptions: Takes into account an assumed modeling period, as well as maintenance and financial assumptions (especially the discount rate), that are well-justified and appropriate.
- Calibration data: Utilizes a long event history for calibration purposes.
- Key modelling assumptions: Bases vulnerability assumptions on a robust calibration.
- Exposure data: Sufficiently details exposure data to allow modeling of key damage drivers.
- Exposure growth assumptions: Allows for growth in exposure over the projection period, based on robust growth assumptions.
- Allowance for climate change and variability: Allows for projected climate change caused by global warming and climate variability in its modelling assumptions.
- Modelling uncertainty and sensitivity analysis: Considers the sensitivities of the benefit to alternative projections of climate change and exposure growth rates. Assesses the sensitivities of the key parameters of the modeled weather events and vulnerability assumptions.

110. Our qualitative assessment is adequate when even though not all of the above factors are captured extensively and robustly, no key factor is missed and there are no reasons to believe that the benefit is overstated. The typical quantification approach is normally assessed as adequate and our resilience benefit ratio scale incorporates the level of modeling uncertainty associated with that. For example, we consider that the methodologies used to gain public-sector funding in developed countries or financing from international development banks are a good benchmark for our adequate assessment. We therefore make no adjustment when we assess the quantification analysis as adequate.

111. When we consider the quantification approach robust--implying that it incorporates less modeling uncertainty than typical quantification approaches--we would reduce the assessment by one (for example, to resilience level 2 from resilience level 3). We expect that this may be the case for projects that are designed to allow for the uncertainties

around estimating the impact of climate change. Such projects are typically flexible, allowing adjustments to their structure over time (for example, the height of flood defenses) to reflect improvements in the understanding of how climate change is likely to affect the covered area. We would apply this positive adjustment if the quantification strongly reflects the modeling factors listed in paragraph 109.

112. We may assess the quantification as less than adequate when some of the listed modeling factors are not captured appropriately or not reflected at all. If the quantification approach is less than adequate, we would increase the assessment by one because there may be a considerable risk that the resilience benefit is overstated.

Adjustment for developing countries

113. In the third stage, we apply additional adjustments for projects in developing countries. If no probabilistic benefit analysis has been performed, we could assess it at resilience level 4 if the entity can provide another type of analysis (such as a scenario-based analysis) that demonstrates the benefit is likely to exceed the financing.

114. We anticipate using The Notre Dame Global Adaptation Index (ND-GAIN; http://index.gain.org/; see "Climate Change Is A Global Mega-Trend For Sovereign Risk") to identify countries that have high exposure to climate risk and high vulnerability. In our view, improved resilience in such countries is likely to have significant social benefits. Those potential benefits include fewer casualties, fewer displaced people, and fewer disrupted livelihoods following extreme weather events. If we believe these social benefits have not been adequately captured in the resilience analysis, we may modify the assessment, adjusting it upward by one level.

Examples of applying adjustments

115. Here are examples of how we could adjust the resilience level in the second and third stages of our adaptation assessment. If the resilience level in the first stage is 1, a positive adjustment in the second or third stage has no effect. Similarly, if the resilience level in the first stage is 5, a negative adjustment in the second stage has no effect. Furthermore, it does not neutralize a potential positive adjustment in the third stage. Hence, a positive adjustment in the third stage, for a project in a developing country, could result in a resilience level of 4.

116. On the other hand, if, in the first stage, we determine the resilience level is 2, 3, or 4, and we then factor in a negative adjustment in the second stage, the resilience level could be adjusted downward to 3, 4, or 5, respectively. A positive developing country assessment (in the third stage) on that same project could then move the resilience level back to 2, 3, or 4, respectively.

E. Determining The Final E And R Scores

117. For mitigation projects, our transparency, governance, and mitigation scores together determine a Green Evaluation, which we map to a scale of E1 to E4, based on quartiles, to get the E score. For adaptation projects, our transparency, governance, and adaptation scores together determine a Green Evaluation, which we map to a scale of R1 to R4, again based on quartiles, to get the R score (see table 16).

Table 16

Composition Of The E And R Scale

Green Evaluation	E score	R score
75-100	E1	R1
50-74	E2	R2
25-49	E3	R3
0-24	E4	R4

118. The overall Green Evaluation, on a scale of 0-100, consists of a weighted average of mitigation or adaptation, governance, and transparency. The weights are 60% for mitigation or adaptation, 25% for governance, and 15% for transparency. If both mitigation and adaptation are relevant, the overall Green Evaluation will consist of two separate assessments--one for the mitigation part and another for the adaptation part, both on a scale of 0-100.

119. We believe efficient governance processes have to be in place for the proceeds to achieve their environmental impact. Governance factors relating to proceeds management increase the likelihood that proceeds are used for climate change mitigation and adaptation, and, as such, we deem them relatively more important than environmental reporting and disclosure. We therefore weight the governance score more heavily than transparency.

120. At the same time, we believe that transparency and governance do not enhance the overall environmental impact, assuming the assets function as expected. As such, in deriving the final Green Evaluation, we cap both transparency and governance at the level of the mitigation or adaptation score. If transparency or governance is as good as or better than the mitigation or adaptation score, the effect is neutral on our final Green Evaluation. However if transparency or governance is lower than mitigation or adaptation, the final Green Evaluation will be negatively affected.

121. The calculation to derive the Green Evaluation is x*G(capped) + y*T(capped) + z* M (see table 17).

Table 17

Calculation Components

	Score (0-100)	Capped scores	Weight (0-100%)
Governance	G	if G > M then G(capped) = M	x
Transparency	T	if T > M then T(capped) = M	y
Mitigation or adapation	M or A	M = M, A = A	z
Final E score	x * G(capped) + y * T(capped) + z * M		
Final R score	x * G(capped) + y * T(capped) + z * A		

122. Tables 18-20 provide examples. The capped and weighted scores are combined to derive the Green Evaluation on a scale of 0-100, shown in the left-hand column in table 16.

Table 18

Strong Transparency And Governance Have A Neutral Impact On Strong Mitigation Or Adaptation Score

	Score (0-100)	Capped scores (0-100)	Weight (0-100%)	Weighted subscores
Governance	95	90	25	22.5
Transparency	95	90	15	13.5
Mitigation or adaptation	90	N/A	60	54

Table 18

Strong Transparency And Governance Have A Neutral Impact On Strong Mitigation Or Adaptation Score (cont.)

	Score (0-100)	Capped scores (0-100)	Weight (0-100%)	Weighted subscores
Green Evaluation				90

N/A--Not applicable.

Table 19

Strong Transparency And Governance Provide No Uplift To Weak Mitigation Or Adaptation Score

	Score (0-100)	Capped scores (0-100)	Weight (0-100%)	Subscore (0-100)
Governance	95	10	25	2.5
Transparency	95	10	15	1.5
Mitigation or adaptation	10	N/A	60	6
Green Evaluation				10

N/A--Not applicable.

Table 20

Weak Transparency And Governance Have A Negative Impact On Mitigation Or Adaptation Score

	Score (0-100)	Capped scores (0-100)	Weight (0-100%)	Subscore (0-100)
Governance	40	40	25	10
Transparency	40	40	15	6
Mitigation or adaptation	80	N/A	60	48
Green Evaluation				64

N/A--Not applicable.

123. When less than 100% of the proceeds are allocated to green projects, we evaluate the proportion of proceeds that is allocated to environmentally beneficial projects. In such cases, we will make it clear the portion of the proceeds that has been evaluated by putting a percentage after the score (e.g., E2 (50%)). For example, if an instrument was evaluated as E2 with an underlying evaluation of 74 and the entire use of proceeds fell within the scope of our approach, the resulting Green Evaluation would be E2 (100%). Similarly, if only 50% of proceeds were earmarked for in-scope projects, the resulting score would be E2 (50%). The portion of proceeds would not affect the underlying Green Evaluation of 74 on our scale of 0-100.

GLOSSARY

Baseline

The reference scenario used to calculate the net impact of the project--for example, the tons of carbon avoided owing to a particular low-carbon solution. For instance, the baseline of a new power plant is the electricity currently input to the grid by the existing plants in the region or country.

Construction/Implementation impacts

The impact associated with the initial phase of a project, before it starts achieving environmental benefits. In the case of a physical infrastructure, the impact associated with the construction phase is accounted for as construction emissions. For projects focused on technology implementation, the implementation impact accounts for the impact associated with the deployment of the technology.

Grid emissions factor

Measure of carbon dioxide emissions intensity per unit of electricity generation in the grid system. (tCO2/MWh) (source: United Nations Framework Convention on Climate Change).

Modal shift

The process by which a new supply of transportation displaces users from existing transportation means.

Modal split

The distribution of transportation means used by passengers, depending on city/city type. Depending on geographies, the prevalence of private cars as a means of transportation will vary, which affects the CO2 savings that can be attributed to a given public transport infrastructure. Indeed, the more carbon-intensive the initial modal split is, the more a low-carbon public transport will avoid emissions by modal shift.

Smart grid

Electricity network that uses digital and other advanced technologies to minimize costs and environmental impact while maximizing system reliability, resilience, and stability (Source: International Energy Agency).

Water scarcity

A region is considered to be experiencing water scarcity when annual water supplies drop below 1,000 cubic meters (m3) per person (source: United Nations).

ENDNOTES

1) Green Bond Principles: An issuer can seek advice from consultants and/or institutions ("second party") with recognized expertise in environmental sustainability to review or to help in the establishment of its process for project evaluation and selection, including project categories eligible for green bond financing.

2) IEA Energy Transition Perspectives 2015

3) Whole building Design Guide, https://www.wdbg.org/resources/gbs.php

4) Energy efficiency should be distinguished from energy conservation, which is a broader term that can also include foregoing a service, such as turning down the thermostat in the winter to save energy.

5) EPA Science Matters Newsletter: Climate Change and Watersheds: Exploring the Links (Published August 2013), https://www.epa.gov/sciencematters/epa-science-matters-newsletter-climate-change-and-watersheds-exploring-links

6) IEA (2014), Emissions Reduction through Upgrade of Coal-Fired Power Plants, https://www.iea.org/publications/freepublications/publication/PartnerCountrySeriesEmissionsReductionthroughUpgradeofCoalFi

7) IEA 2015 Special Report on Energy and Climate Change, http://www.iea.org/publications/freepublications/publication/WEO2015SpecialReportonEnergyandClimateChange.pdf

8) Mudd, G.M. and Diesendorf, M. (2008). Sustainability of uranium mining and milling: toward quantifying resources

and eco-efficiency. Environmental Science and Technology. 42:2624-2630.

9) The shift project (online) available at: www.tsp-data-portal.org, date accessed Oct. 28, 2016. Primary data source: U.S. Energy Information Administration, International Energy Statistics, Go to EIA database, data accessed Dec. 20, 2012.

10) Environmental valuation is concerned with the analysis of methods for obtaining empirical estimates of environmental values, such as the benefits of improved river water quality, or the cost of losing an area of wilderness to development.

11) http://iopscience.iop.org/article/10.1088/1748-9326/9/9/094008

12) http://link.springer.com/article/10.1007/s11027-005-7303-7

13) Mudd, G.M. and Diesendorf, M. (2008). Sustainability of uranium mining and milling: toward quantifying resources and eco-efficiency. Environmental Science and Technology. 42:2624-2630.

14) http://www.icmagroup.org/News/news-in-brief/new-official-rules-for-chinese-green-bond-market/

15) http://iopscience.iop.org/article/10.1088/1748-9326/9/9/094008

16) Energy technology perspectives 2015, International Energy Agency

Additional Contact:
Infrastructure Finance Ratings Europe; InfrastructureEurope@spglobal.com