Second-Party Opinion

Munich Re Green Bond Framework

Evaluation Summary

Sustainalytics is of the opinion that Munich Re's Green Bond Framework is credible and impactful and aligns with the four core components of the Green Bond Principles 2018. This assessment is based on the following:

USE OF PROCEEDS The eligible categories for the use of proceeds – Renewable Energy, Energy Efficiency, Clean Transportation, Green Buildings, Sustainable Water and Wastewater Management, Eco-Efficient and/or Circular Economy, Environmentally Sustainable Management of Living Natural Resources and Land Use – are aligned with those recognised by the Green Bond Principles 2018. Sustainalytics considers that the eligible project categories will lead to positive environmental impacts and advance the UN Sustainable Development Goals (SDGs), specifically SDG 6, 7, 11, 12 and 15.

PROJECT EVALUATION / SELECTION Munich Re's Head of Alternative Investments will be in charge of proposing eligible projects to a Green Bond Committee, which will be responsible for project evaluation and selection. Sustainalytics considers the project selection process to be in line with market practice.

MANAGEMENT OF PROCEEDS Munich Re's Group Investment Management department will manage the allocation of net proceeds using a portfolio approach. Pending full allocation, funds will be allocated to temporary investments such as cash, cash equivalents and/or other liquid instruments giving priority to green bonds and following the exclusion criteria established in the Green Bond Framework. This is in line with market practice.

REPORTING Munich Re commits to publish allocation and impact reporting on its website a year after each issuance and annually thereafter until full allocation. Allocation reporting will include the net proceeds of the outstanding green bonds; amount of net proceeds allocated to each category; a list of projects including a description and allocated amounts (subject to confidentiality considerations); proportional allocation of net proceeds to existing and new projects; and remaining balance of unallocated net proceeds. Munich Re is committed to providing impact reporting for each project category (provided net proceeds have been allocated to projects within such category) through key performance indicators. Sustainalytics views Munich Re's allocation and impact reporting as aligned with market best practice.

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Report Sections

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Introduction

Münchener Rückversicherungs-Gesellschaft Aktiengesellschaft in München ("Munich Re", or the "Company") is a financial services provider offering reinsurance, insurance and asset management services. With representations on every continent, Munich Re is present in over 100 countries and operates in all lines of the insurance business.

Munich Re has developed the Green Bond Framework (the "Framework") under which it considers to issue multiple green bonds and use the net proceeds to finance and/or refinance, in whole or in part, existing and/or future projects, through equity participation[1] or debt instruments, that advance a transition to a low-carbon economy. The Framework defines eligibility criteria in seven areas:

1. Renewable Energy
2. Energy Efficiency
3. Clean Transportation
4. Green Buildings
5. Sustainable Water and Wastewater Management
6. Eco-Efficient and/or Circular Economy
7. Environmentally Sustainable Management of Living Natural Resources and Land Use

Munich Re engaged Sustainalytics to review its Green Bond Framework, dated September 2020, and provide a Second-Party Opinion on the Framework's environmental credentials and its alignment with the Green Bond Principles 2018 (GBP).[2] This Framework will be made available in a separate document.[3]

Scope of work and limitations of Sustainalytics' Second-Party Opinion

Sustainalytics' Second-Party Opinion reflects Sustainalytics' independent[4] opinion on the alignment of the reviewed Framework with the current market standards and the extent to which the eligible project categories are credible and impactful.

As part of the Second-Party Opinion, Sustainalytics assessed the following:

- The Framework's alignment with the Green Bond Principles 2018, as administered by the International Capital Market Association;
- The credibility and anticipated positive impacts of the use of net proceeds;
- The alignment of the issuer's sustainability strategy and performance and sustainability risk management in relation to the use of net proceeds.

For the use of net proceeds assessment, Sustainalytics relied on its internal taxonomy, version 1.5, which is informed by market practice and Sustainalytics' expertise as an ESG research provider.

As part of this engagement, Sustainalytics held conversations with representatives of Munich Re to understand the sustainability impact of the planned use of net proceeds as well as management of net proceeds and reporting aspects of the Framework. Munich Re representatives have confirmed (1) they understand it is the sole responsibility of Munich Re to ensure that information required to be disclosed to the public is complete, accurate or up to date and disclosed in a timely manner; and (2) that they have provided Sustainalytics with all relevant information in a timely manner. Sustainalytics also reviewed relevant public documents and non-public information.

This document contains Sustainalytics' opinion of the Framework and should be read in conjunction with that Framework.

Any update of the present Second-Party Opinion will be conducted according to the agreed engagement conditions between Sustainalytics and Munich Re.

[1] This also includes investments in private, non-listed companies for which at least 90% of turnover is attributable to projects that meet the Framework's eligibility criteria.
[2] The Green Bond Principles are administered by the International Capital Market Association and are available at https://www.icmagroup.org/green-social-and-sustainability-bonds/green-bond-principles-gbp/.
[3] The Green Bond Framework is available on Munich Re's website at www.munichre.com.
[4] When operating multiple lines of business that serve a variety of client types, objective research is a cornerstone of Sustainalytics and ensuring analyst independence is paramount to producing objective, actionable research. Sustainalytics has therefore put in place a robust conflict management framework that specifically addresses the need for analyst independence, consistency of process, structural separation of commercial and research (and engagement) teams, data protection and systems separation. Last but not least, analyst compensation is not directly tied to specific commercial outcomes. One of Sustainalytics' hallmarks is integrity, another is transparency.

Sustainalytics' Second-Party Opinion, while reflecting on the alignment of the Framework with market standards, is no guarantee of alignment nor warrants any alignment with future versions of relevant market standards. Furthermore, Sustainalytics' Second-Party Opinion addresses the anticipated impacts of eligible projects which can be financed with net proceeds but does not measure the actual impact. The measurement and reporting of the impact achieved through projects financed under the Framework is the responsibility of the Framework owner.

In addition, the Second-Party Opinion opines on the potential allocation of net proceeds but does not guarantee the realised allocation of the net proceeds towards eligible activities.

No information provided by Sustainalytics under the present Second-Party Opinion shall be considered as being a statement, representation, warrant or argument either in favour or against, the truthfulness, reliability or completeness of any facts or statements and related surrounding circumstances that Munich Re has made available to Sustainalytics for the purpose of this Second-Party Opinion.

Sustainalytics' Opinion

Section 1: Sustainalytics' Opinion on the Green Bond Framework

Sustainalytics is of the opinion that Munich Re's Green Bond Framework is credible and impactful and aligns with the four core components of the GBP. Sustainalytics highlights the following elements of the Framework:

- Use of Proceeds:
  - Munich Re's seven green categories are aligned with those recognised by the GBP.
  - For the "Renewable Energy" category, the Framework defines eligible projects as those related to the acquisition, conception, construction, development, installation and operations for renewable energy. Sustainalytics notes the following characteristics of selected renewable energy sources:
    - Sustainalytics notes positively the inclusion of an emissions intensity threshold of 100g CO_2e/kWh, declining to 0g CO_2e/kWh by 2050 for all renewable electricity production.
    - Sustainalytics notes positively the inclusion of an environmental and social impact assessment by a third party for all new hydropower facilities.
    - For biomass facilities, Sustainalytics notes as a strength the commitment to only finance projects that operate above 80% of GHG emissions reduction in relation to the relative fossil fuel comparator set out in EU RED II increasing to 100% by 2050.
      - For waste biomass, Sustainalytics notes positively the inclusion of forestry residue from well managed forests and agricultural residue from well managed agricultural productions.
      - For non-waste biomass, Munich Re intends to focus on advanced feedstocks and will aim for credible certifications (e.g. by the Roundtable on Sustainable Biomaterials, RSB) in case of biofuel production from crop-based sources. Sustainalytics notes that Munich Re will pursue such certifications in order to meet adequate sustainability requirements, including GHG emissions reduction and food security related to biomass production. Sustainalytics views RSB as a credible certification that is aligned with market practice (see Appendix 1 for an overview of the scheme). Moreover, Sustainalytics notes positively the exclusion of production of biofuels on land with high biodiversity and land that holds high amounts of carbon that has been converted for biofuel feedstock production.
    - The Framework includes production of hydrogen through electrolysis and, when feasible, this process will be powered by renewable electricity. Sustainalytics notes that hydrogen production from water electrolysis has significant potential to reduce emissions over its conventional pathway of production, i.e. steam reforming of natural gas. Sustainalytics encourages Munich Re to favour (onsite/offsite) the sourcing of

low-carbon-intensity power for electrolysis and to report, where feasible, on such intensity.

- For the "Energy Efficiency" category, the Framework allows for financing for improved infrastructure such as LED lighting; energy storage; energy grids – including the development, manufacture and installation of technologies that enable a more efficient transmission and distribution and/or end user demand management; smart meters and smart grid investments; and usage of waste heat.
  - These investments will provide environmental benefits related both to the decrease in grid losses and to supporting the integration of variable renewable energy sources. Sustainalytics notes these as aligned with market practice and notes positively the exclusion of usage of excess heat from fossil fuel production or operations.
  - Sustainalytics encourages Munich Re to report on estimated or achieved energy efficiency on a portfolio basis, where feasible.
- For the "Clean Transportation" category, the Framework includes expenditures in relation to zero-carbon transport including electric cars, hydrogen cars, trains or other vehicles.
  - For low-carbon transport, Sustainalytics notes positively the inclusion of a threshold of 50g CO_2/km until 2025, dropping to zero carbon emissions from 2026 onwards. In addition, Sustainalytics also notes the inclusion of a tailpipe emission intensity of 25g CO_2 per tonne-km for freight vehicles as aligned with market practice.
- For the "Green Buildings" category, eligible investments include financing for residential and commercial buildings (including existing buildings, renovated buildings and new constructions) certified by LEED (Gold or Platinum), the Living Building Challenge, BREAAM (very good or above) or other equivalent certification. Sustainalytics views these certification schemes as credible and the levels selected as impactful (see Appendix 2 for a further description of the referenced building schemes). Additionally, the Framework includes expenses for building retrofitting which results in a minimum of 20% energy savings.
- For the "Sustainable Water and Wastewater Management" category, the Framework allows for expenditures related to freshwater infrastructure and distribution systems, wastewater infrastructure and water recycling systems, wastewater treatment facilities and flood prevention/defence and stormwater management such as green roofs, wetlands and retention berms.
  - Sustainalytics notes positively the exclusion of wastewater from fossil fuel operations.
  - Sustainalytics also notes positively the inclusion of a climate risk assessment as part of the Company's due diligence for all flood prevention, flood defense or stormwater management systems.
- For the "Eco-Efficient and/or Circular Economy" category, the Company intends to finance investments related to waste management, circular economy, pollution prevention and control regarding facilities for the collection, sorting, material recovery, recycling and/or reuse of materials, facilities for the production of compost/biogas from organic waste such as forestry or agricultural residue sourced from well managed crops and facilities managing efficient waste such as waste-to-energy plants.
  - Sustainalytics notes that Munich Re will aim to segregate feedstock used for waste-to-energy plants.
  - Sustainalytics notes the importance of the waste hierarchy in assessing the impact of waste management projects and highlights positively the inclusion of waste reduction. Sustainalytics also notes positively the inclusion of an environmental and social risk assessment by a reputable third party and/or related certificates for facilities that manage electronic waste.
- For the "Environmentally Sustainable Management of Living Natural Resources and Land Use" category, Munich Re intends to finance investments in relation to:
  - Sustainable agriculture practices and climate smart farming projects such as biological crop protection or drip irrigation. Sustainalytics recognises the importance of financing sustainable agriculture operations. Sustainalytics encourages Munich Re

to promote the holistic deployment of conservation agriculture practices[5] through its investment criteria for agriculture projects.
        - Sustainable fishery and aquaculture practices certified by a reputable third-party organisation such as MSC, BAP (minimum 2 stars) or ASC. Sustainalytics considers these certifications to be indicative of net-positive overall impacts (refer to Appendix 3 for an analysis of these certifications).
        - Plantation forests, management of native forests and afforestation projects certified by a reputable third party such as FSC or PEFC. Sustainalytics views both FSC and PEFC as being credible standards upholding sustainable forest management practices (for more information on these certifications refer to Appendix 4).
    - Munich Re has provided a list of activities to be excluded from financing related to its green bond issuances under the Framework, such as energy-efficient technologies that are inherently carbon-intensive and/or primarily driven by oil and/or black coal as well as sourcing of palm oil from non-certified sources. Sustainalytics is of the opinion that the exclusionary criteria strengthen the Framework.
- Project Evaluation and Selection:
    - Munich Re's Head of Alternative Investments will be responsible for identifying potential eligible projects, which will then be assessed by a Green Bond Committee (the "Committee") in charge of final project selection and monitoring. Eligible projects must comply with the Framework's eligibility criteria and exclusions, and Munich Re's sustainability policies and procedures. The Committee will be composed of the Head of Economics, Sustainability and Public Affairs; the Head of Investor Relations; and members of the Group Investment Management Alternative Investment Investment Committee (GIM-AIIC[6]). Eligible projects will be reviewed annually by the Committee and when a project no longer meets the requirements set forth in the Framework, it will be removed and replaced with one or more qualifying projects.
    - In addition, the Group Investment Management department will track allocation of net proceeds to eligible projects using internal systems.
    - Based on the establishment of a Green Bond Committee and the commitment to ongoing review, replacement and retirement of allocation, Sustainalytics considers this evaluation and selection process to be in line with market practice.
- Management of Proceeds:
    - The Company's Group Investment Management department will be in charge of managing the allocation of the net proceeds from any issuance using a portfolio approach. Munich Re intends to achieve full allocation within 36 months from each green bond issuance.
    - Pending allocation, an amount equal to the unallocated net proceeds outstanding will be temporarily held in cash, cash equivalents and/or other liquid marketable investments (preferably green bonds) in line with Munich Re's Responsible Investment Guideline and excluding investments covered by the exclusionary criteria established in the Framework.
    - Based on the establishment of a portfolio and the handling of unallocated net proceeds, Sustainalytics considers this process to be in line with market practice.
- Reporting:
    - Munich Re commits to publish on its website an allocation and impact report for each green bond, commencing one year after issuance and to be renewed annually thereafter until full allocation.
    - Allocation reporting will include (i) the net proceeds of the outstanding green bond(s); (ii) the amount of net proceeds allocated to the eligible project categories; (iii) a list of eligible projects contained in the portfolio including a description and allocated amounts (subject to confidentiality considerations); (iv) the proportional allocation of net proceeds to existing projects and new projects; and (v) the remaining balance of unallocated net proceeds.

[5] Conservation Agriculture is a set of management practices that helps maintaining the soil health, enhance biodiversity and natural biological processes above and below the ground surface, such as through conservation tillage; sowing of diverse cover crops: multiple crop rotation: soil restoration and management: nutrient and waste management; and no or minimal pesticides or synthetic fertilizers. The Food and Agriculture Organization of the United Nations (FAO) promotes the adoption of Conservation Agriculture principles "that are universally applicable in all agricultural landscapes and cropping systems". FAO, Conservation Agriculture: http://www.fao.org/conservation-agriculture/en/.
[6] The GIM-AIIC is currently composed of the Head of Investment Strategy, the Head of Tactical Asset Allocation, the Head of Alternative Investments and the Head of Strategic Asset Allocation ERGO Life/Health.

- Impact reporting will be done for each project category (provided net proceeds have been allocated to projects within such category) and will include key performance indicators (KPIs) such as (but not necessarily including) GHG emissions avoided per year; energy saved/reduced per year; number of smart meters installed; number of zero-carbon and/or low-carbon vehicles financed; volume of water saved; reduced or treated, etc.
- Based on the commitment to report allocation on a project level and disclose the proportional allocation of net proceeds between existing projects (refinancing) and new projects, Sustainalytics considers this to be in line with market best practice.

Alignment with Green Bond Principles 2018

Sustainalytics has determined that Munich Re's Green Bond Framework aligns to the four core components of the GBP. For detailed information, please refer to Appendix 5: Green Bond/Green Bond Programme External Review Form.

Section 2: Sustainability Performance of Munich Re

Contribution of framework to Munich Re's sustainability strategy

Sustainalytics is of the opinion that Munich Re demonstrates a strong commitment to sustainability by adopting a corporate responsibility strategy that focuses on economics, the environment and social requirements. Munich Re's corporate responsibility identifies as its key strategies: (i) adopting a shared value approach, (ii) focusing on its four fields of action, (iii) meeting voluntary commitments, (iv) achieving its sustainability targets and (v) engaging in dialogue with its stakeholders.

Sustainalytics highlights the four fields of action as being particularly aligned with the objectives of the Framework:

- Considering environmental, social and governance (ESG) aspects along its entire value chain in its core business activities.
- Recognising the importance of treating employees in a responsible and respectful way and creating the appropriate conditions to promote their personal and professional development.
- Practicing active environmental management in all its sites and continue its carbon-neutral status Group-wide.
- Support initiatives and projects that are aligned to its core business and promote environmental benefits, social cohesion or risk awareness.

ESG considerations are thus extended into both the insurance as well as the investment activities of the Company. Munich Re has developed a series of policies, guidelines and position papers around sensitive issues to better manage both fronts. Sensitive areas include coal, oil sands, fracking and mining, investments in soft commodities or farmland. As such, Munich Re's Coal Policy includes the "withdrawal from insurance of new coal power plants and coal mines; no investment in coal intensive shares and bonds"[7]. Munich Re has also embedded the PRI's Investment Framework in its Responsible Investment Guideline, covering all the PRI requirements and ESG issues of concern to Munich Re Group asset management. Its investment policy is based on the following three pillars: (i) systematic integration of ESG criteria, (ii) investment focus topics such as renewable energy technologies and (iii) defined exclusion criteria.[8]

In addition, Munich Re has identified climate change as one of the "greatest long-term risks of change for the insurance industry"[9] and has developed several environmental targets. Some of those targets include a 35% reduction in carbon emissions by 2020 (from a base year of 2009), which the Company exceeded and reached a 44% reduction in 2019; maintaining carbon neutrality across the Groups' operations (achieved since 2015);

[7] Munich Re, " Corporate responsibility in business at Munich Re" (2018), at: https://www.munichre.com/content/dam/munichre/global/content-pieces/documents/MunichRe_DB_ESG_Days_FFM_2018-10-09.pdf/_jcr_content/renditions/original.media_file.download_attachment.file/MunichRe_DB_ESG_Days_FFM_2018-10-09.pdf.
[8] Munich Re, "Corporate responsibility in investment" at: https://www.munichre.com/en/company/corporate-responsibility/corporate-responsibility-in-investment.html.
[9] Munich Re, "Group Annual Report 2019", at: https://www.munichre.com/content/dam/munichre/mrwebsiteslaunches/2019-annual-report/MunichRe-Group-Annual-Report-2019-en.pdf/_jcr_content/renditions/original./MunichRe-Group-Annual-Report-2019-en.pdf.

convert all electricity procurement to renewable energy sources; increase the percentage of environmentally friendly consumables procured and the procurement of environmentally friendly vehicles.[10]

Furthermore, the eligible categories of the Framework are well aligned to advance the company's environmental objectives. As at 31 December 2019, Munich Re's held investments (equity and debt) in renewable energies such as solar parks and wind farms totaling approximately EUR 1.6 billion and the Company intends to increase this amount to EUR 2.8 billion over the next few years. Moreover, having joined the UN-convened "Net-Zero Asset Owner Alliance", Munich Re aims to achieve a greenhouse gas (GHG) neutral investment portfolio by 2050.[10]

Sustainalytics is of the opinion that the Green Bond Framework is aligned with Munich Re's overall sustainability strategy and initiatives and will further the Company's action on its key environmental priorities.

Well positioned to address common environmental and social risks associated with the projects

While Sustainalytics recognises that the net proceeds from the bonds issued under the Framework will be allocated to eligible projects that are recognised by the GBP to have positive environmental impact, Sustainalytics also recognises that there exist environmental and social risks which could be associated with such projects. Some key environmental risks associated with the eligible green projects may include occupational health and safety, land use change and biodiversity loss and community relations. Although Munich Re has a limited role in the development of specific eligible projects which it is financing, Sustainalytics considers that the following mechanisms, systems and procedures Munich Re has in place will help mitigate the associated risks.

Munich Re's corporate governance relies on compliance with applicable laws, internal rules and principles for which it has created "Group-wide guidelines, minimum compliance requirements and suitable information and documentation systems as measures for prevention and monitoring."[10] For this purpose, the Company created the Compliance Management System (CMS), a framework for the implementation of early warning, risk control, consulting and supervision functions comprising seven elements: (i) culture, (ii) risk management, (iii) organisation and processes, (iv) consulting, communication and training, (v) reporting, (vi) monitoring and control and (vii) documentation.[10]

In addition, Munich Re's ESG risk assessment is guided by the voluntary commitments the Company adheres to, including the UN Global Compact[11], the Principles for Responsible Investment (PRI)[12], the Principles for Sustainable Insurance (PSI)[13] and the Diversity Charter[14]. To manage ESG risks, the Company has integrated ESG criteria into its underwriting processes and products to identify and minimise risks and this also applies to its investment decision-making at the Group level. Each business field has a Reputational Risk Committee (RRC) in charge of analysing specific reputational issues and ESG risks relating to individual transactions. The RRCs then make recommendations on either accepting or rejecting a particular transaction. Furthermore, the Company's Board of Management adopted a position paper outlining its commitment to respecting and upholding human rights as defined in the UN Guiding Principles on Business and Human Rights, in the International Bill of Human Rights and in the Declaration on Fundamental Principles and Rights at Work issued by the International Labour Organization (ILO).[15]

Underlying the above is the Company's Code of Conduct[16], which contains rules binding on all its subsidiaries and staff of Munich Re Group. It "obliges staff to act reliably, responsibly, transparently and with integrity."[10] Munich Re has also formulated an Environmental Guideline[17] to continually improve environmental protection, environmental performance and preventing or reducing environmental impacts.

Based on these policies, standards and assessments, Sustainalytics is of the opinion that Munich Re has implemented adequate measures and is well positioned to manage and mitigate environmental and social risks commonly associated with the eligible project categories.

[10] Munich Re, "Corporate Responsibility Report 2019", at: https://www.munichre.com/content/dam/munichre/global/content-pieces/documents/cr-report-2019.pdf/_jcr_content/renditions/original./cr-report-2019.pdf.
[11] UN, "UN Global Compact", at: https://www.unglobalcompact.org/sdgs.
[12] PRI, "About the PRI", at: https://www.unpri.org/pri.
[13] PSI, "The Principles", at: https://www.unepfi.org/psi/the-principles/.
[14] Diversity Charter, "About the Charta der Vielfalt association", at: https://www.charta-der-vielfalt.de/en/diversity-charter-association/about-the-charta-der-vielfalt-association/.
[15] Munich RE, "Human Rights" (2020), at: https://www.munichre.com/content/dam/munichre/global/content-pieces/documents/Human_Rights_declaration_2020.pdf/_jcr_content/renditions/original./Human_Rights_declaration_2020.pdf.
[16] Munich Re, "Code of Conduct – Munich Re (Group)" (2018), at: https://www.munichre.com/content/dam/munichre/global/content-pieces/documents/MunichRe-Code-of-Conduct-2018_en.pdf/_jcr_content/renditions/original./MunichRe-Code-of-Conduct-2018_en.pdf.
[17] Munich Re, "Environmental Guideline Munich Re (Group)" (2019), at: https://www.munichre.com/content/dam/munichre/global/content-pieces/documents/Environmental-Guideline-Munich-Re-Group.pdf/_jcr_content/renditions/original./Environmental-Guideline-Munich-Re-Group.pdf.

Section 3: Impact of Use of Proceeds

All seven use of proceeds categories are aligned with those recognised by the GBP. Sustainalytics has focused below on where the impact is specifically relevant in the local context.

The role of insurance companies in financing climate transition

Insurance companies are both highly impacted by and well positioned to take action against climate change. One of the consequences of climate change is the increase in frequency and severity of extreme weather-related disasters (droughts, flooding, wildfires, severe storms etc.).[18] Climate change is already causing loss of life with the previous decade recording approximately 398,000 deaths due to natural disasters.[18] A 2018 report by the World Health Organization (WHO) predicts that between 2030-2050 climate change will lead to an additional 250,000 deaths per year from malnutrition, malaria, diarrhea and heat stress.[19] This elevated mortality risk may lead to higher life insurance payouts and impact the financial stability of life insurance companies. Furthermore, the decade from 2010-2019 was the costliest in modern record of natural disasters with economic loss adding up to USD 2.98 trillion, 44% above the total for the previous decade. Record economic damage led to higher insurance payouts amounting to as much as USD 845 billion, with the US accounting for over 50% of that figure.[20] In this context, financing initiatives that mitigate environmental risk are aligned with the business objectives of large insurance companies.

In addition to being highly exposed to climate change risks, insurance companies operate on a large scale and are well placed to support significant investments that enable climate resilience. According to estimates by the OECD, in order to meet the Paris Agreement goals, investments of USD 6.9 trillion a year are required through 2030.[21] The Sustainable Insurance Forum (SIF) has identified that, with more than USD 31 trillion in assets under management, the insurance sector can use this capital base to leverage support for investments that respond to sustainability challenges,[22] such as redirecting the flow of finance towards building socioeconomic resilience to mitigate and better cope with the effects of climate change.

Impact of energy efficiency and energy storage

In addition to physical interconnection, renewable energy sources such as wind and solar are unable to provide a consistent source of energy due to natural variability in weather conditions, which can be characterised as an intermittent generation profile.[23,24] One of the important technologies for addressing this challenge is building a smart grid.[25] Smart grids actively monitor energy flows and adjust to changes in supply and demand through increased communication, more efficient transmission routing, improved demand management and other technologies.[25] Smart grids can assist in the integration of renewable energy and the EU has set a target of replacing 80% of electricity meters with smart meters by 2020[25] with some member states having to delay this goal until 2030.[26] Thus, Munich Re's (potential) investments in this sector will advance the better integration of renewable energies into electrical grids.

Another hindering factor that has been a historical impediment to increasing the capacity and efficiency of renewable energy systems is energy storage.[27] In response to an intermittent generation profile, energy storage can mitigate volatility in demand and generation by storing excess energy for periods of peak usage.[28] Today, the technology exists for energy storage[28] but much of it remains an "early-stage technology, present in only a few key markets and heavily dependent on policy support."[29] High costs and a lack of incentives are

[18] National Oceanic and Atmospheric Administration, "Billion-Dollar Weather and Climate Disasters: Time Series" (2020), at: https://www.ncdc.noaa.gov/billions/#:~:text=The%20U.S.%20has%20sustained%20273,273%20events%20exceeds%20%241.790%20trillion.
[19] WHO, "Climate Change and Health" (2018), at: https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health.
[20] Aon, "Weather, Climate & Catastrophe Insight" (2019), at: http://thoughtleadership.aon.com/Documents/20200122-if-natcat2020.pdf?utm_source=ceros&utm_medium=storypage&utm_campaign=natcat20.
[21] OECD, The World Bank, UN Environment, "Financing Climate Futures" (2018), at: http://www.oecd.org/environment/cc/climate-futures/policy-highlights-financing-climate-futures.pdf.
[22] SIF, "Sustainable Insurance: The Emerging Agenda for Supervisors and Regulators" (2017), at: https://www.unepfi.org/psi/wp-content/uploads/2017/08/Sustainable_Insurance_The_Emerging_Agenda.pdf.
[23] Union of Concerned Scientists, "How Energy Storage Works" (2015), at: https://www.ucsusa.org/clean-energy/how-energy-storage-works.
[24] Fares, Robert, "Renewable Energy Intermittency Explained: Challenges, Solutions, and Opportunities" (2015), Scientific American, at: https://blogs.scientificamerican.com/plugged-in/renewable-energy-intermittency-explained-challenges-solutions-and-opportunities/.
[25] European Commission, "Smart grids and meters" (2020), at: https://ec.europa.eu/energy/en/topics/market-and-consumers/smart-grids-and-meters.
[26] European Commission, "Benchmarking smart metering deployment in the EU-28" (2020), at: https://op.europa.eu/en/publication-detail/-/publication/b397ef73-698f-11ea-b735-01aa75ed71a1/language-en.
[27] Gibson, P. et al., "Energy Storage Changes the Playing Field for Renewable Energy" (2018), at: https://www.renewableenergyworld.com/ugc/articles/2018/09/24/energy-storage-changes-the-playing-field-for-renewable-energy.html.
[28] European Commission, "Energy Storage" (2018), at: https://ec.europa.eu/energy/en/topics/technology-and-innovation/energy-storage.
[29] IEA, "Energy Storage" (2020), at: https://www.iea.org/reports/energy-storage.

being cited as two major barriers in the deployment of energy storage systems in countries like Germany and France – the two European countries with the greatest installed storage capacity currently in place.[30] In spite of these barriers, energy storage will play an important role in reaching the EU climate targets and the Paris Climate Agreement.[28]

To address these issues, the EU implemented project stoRE, which was aimed at assessing the technical, market and regulatory barriers to energy storage and developing recommendations for adaptations of the energy framework and policies in Europe.[31] One of the lessons learned from the project was that, even with a super-grid, there is need for new energy storage capacity in Europe.[31] By potentially investing in grid modernisation and energy storage, Munich Re's green bond(s) will further support the greater adoption of renewable energy.

Importance of clean transportation in mitigating CO_2 emissions

It is estimated that passenger vehicles are responsible for approximately 12% of total EU CO_2 emissions.[32] With increasing numbers of plug-in electric vehicles in Europe[33], the European Automobile Manufacturers Association estimates that the current number of 100,000 charging stations across Europe will need to increase at least 20x to 2 million by 2025.[34] Currently, about 76% of charging stations in Europe are located in just four countries: the Netherlands, Germany, France and the UK.[34] A 2018 report published by the European Environment Agency noted that investments into vehicle recharging infrastructure are severely lacking and there are not enough EU member states providing economic incentives.[35]

Similarly, in the US, the EPA has identified the transport sector as the highest GHG contributor accounting for 28% of all GHG emissions in 2018 of which light duty vehicles accounted for 59%.[36] Moreover, it was the only consumption sector where CO_2 emissions increased in 2016.[37] Even though passenger travel is expected to increase across all transportation modes in the US through 2050 (20% increase for light-duty vehicles miles traveled), estimates point to an overall decrease in energy intensity across most transportation modes with increases in fuel efficiency.[38] Given the necessity of decarbonising the transportation sector to meet global climate targets, the electrification of the transport system can play a significant role to lower GHG emissions and improve air quality.[39] Coupled with the expansion and improvement of mass transit systems, the potential financing of these type of projects by Munich Re will have positive environmental outcomes.

Alignment with / contribution to SDGs

The Sustainable Development Goals (SDGs) were set in September 2015 by the United Nations General Assembly and form an agenda for achieving sustainable development by the year 2030. Munich Re's Green Bond Framework advances the following SDGs and related targets:

Use of Proceeds Category	SDG	SDG target
Renewable Energy	7. Affordable and Clean Energy	7.2 By 2030, increase substantially the share of renewable energy in the global energy mix
Energy Efficiency	7. Affordable and Clean Energy	7.3 By 2030, double the global rate of improvement in energy efficiency

[30] Olsthoorn, M. et al., "Fast-improving energy storage technologies wait for EU market reforms" (2018), at: https://theconversation.com/fast-improving-energy-storage-technologies-wait-for-eu-market-reforms-105187.
[31] European Comission, "Facilitating energy storage to allow high penetration of intermittent renewable energy (STORE)" (2014), at: https://ec.europa.eu/energy/intelligent/projects/en/projects/store.
[32] European Commission, "Reducing CO2 emissions from passenger cars - before 2020" (2018), at: https://ec.europa.eu/clima/policies/transport/vehicles/cars_en.
[33] Reuters, "Electric car sales in Europe jump, but sill just 4% of market" (2020), at: https://www.reuters.com/article/us-europe-autos-electric/electric-car-sales-in-europe-jump-but-still-just-4-of-market-idUSKBN22O2AR#:~:text=Electric%20car%20sales%20in%20the,%2C%20while%20Norway's%20declined%2012.4%25.
[34] Kane, M., "76% Of Charing Points In Europe Are Concentrated In Just 4 Countries" (2018), at: https://insideevs.com/charging-points-europe-concentrated-4-countries/.
[35] ACEA, "Insufficient support for electric vehicle charging infrastructure hampers uptake, new report shows" (2018), at: https://www.acea.be/press-releases/article/insufficient-support-for-electric-vehicle-charging-infrastructure-hampers-u.
[36] EPA, "Fast Facts on Transportation Greenhouse Gas Emissions" 2020, at: https://www.epa.gov/greenvehicles/fast-facts-transportation-greenhouse-gas-emissions.
[37] EPA, " U.S. energy-related CO2 emissions fell 1.7% in 2016" (2017), at: https://www.eia.gov/todayinenergy/detail.php?id=30712.
[38] EIA, "Annual Energy Outlook 2019: with projections to 2050" (2019), at: https://www.eia.gov/outlooks/aeo/pdf/aeo2019.pdf.
[39] US Department of Energy, "Reducing Pollution with Electric Vehicles" at: https://www.energy.gov/eere/electricvehicles/reducing-pollution-electric-vehicles.

Clean Transportation	11. Sustainable Cities and Communities	11.2 By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons
Green Buildings	11. Sustainable Cities and Communities	11.3 By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries
Sustainable Water and Wastewater Management	6. Clean Water and Sanitation	6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally
Eco-Efficient and/or Circular Economy	12. Responsible Consumption and Production	12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse
Environmentally Sustainable Management of Living Natural Resources and Land Use	15. Life on Land	15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements

Conclusion

Munich Re has developed a Green Bond Framework under which it intends to issue green bond(s) and use the net proceeds to finance and/or refinance projects that advance a transition to a low-carbon economy. Sustainalytics considers the projects funded by the green bond net proceeds will provide positive environmental impact.

The Green Bond Framework outlines a process by which net proceeds will be tracked, allocated and managed. It also includes commitments for reporting on the allocation and impact of the use of proceeds. Sustainalytics believes that the Green Bond Framework is aligned with the overall sustainability strategy of the Company and that the eligible project categories will contribute to the advancement of the UN Sustainable Development Goals 6, 7, 11, 12 and 15. Additionally, Sustainalytics is of the opinion that Munich Re has adequate measures to identify, manage and mitigate environmental and social risks commonly associated with the eligible projects to which the net proceeds can be allocated.

Based on the above, Sustainalytics is confident that Munich Re is well positioned to issue green bonds and that its Green Bond Framework is robust, transparent and in alignment with the four core components of the Green Bond Principles 2018.

Appendices

Appendix 1: Overview of the Roundtable on Sustainable Biomaterials

	Roundtable on Sustainable Biomaterials[40]
Background	The Roundtable on Sustainable Biomaterials (RSB) is an international initiative that promotes and supports the sustainability of biomaterials production and processing, bringing together companies, farmers, NGOs and inter-governmental agencies. While the RSB was set up in 2007 as a means of ensuring the sustainability of liquid biofuels for transport, in 2013, it expanded its scope to include biomaterials.
Clear positive impact	Promoting sustainable biomaterials.
Minimum standards	The RSB sets minimum requirements in the areas of legality, planning, monitoring and continuous improvement, GHG emissions, human and labour rights, rural and social development, local food security, conservation, soil, water and air management, use of technology, inputs and management of waste, land rights and chain of custody. The RSB standard requires that biofuels achieve 50% lower lifecycle GHG emissions compared with a fossil fuel baseline. Each Principle also includes type of feedstock as a specific indicator of compliance.
Scope of certification or programme	The RSB certification addresses key risks such as human and labour rights, supply chain, resource management and land and biodiversity use through its criteria.
Verification of standards and risk mitigation	Certified entities undergo a self-assessment process and, afterwards, receives a visit from a third-party auditor. Annual audits will also take place after the validation.
Third-party expertise and multi-stakeholder process	RSB is a full member of the ISEAL Alliance and respects its Codes of Good Practice for multi-stakeholder sustainability standards. RSB's benchmarks are available with Rainforest Alliance, the Sustainable Agriculture Network, the Forest Stewardship Council, Bonsucro and the IFC Performance standards.
Performance Display	RSB
Qualitative considerations	The RSB certification is considered strong by organisations such as WWF, IUCN and NRDC. In 2017, RSB certified 50 industrial facilities and 56,784 hectares of farmland.

[40] RSB, "About certification" at: https://rsb.org/certification/about-certification/.

Appendix 2: Summary of Referenced Green Building Certification Schemes

	LEED[41]	Living Building Challenge[42]	BREEAM[43]
Background	Leadership in Energy and Environmental Design (LEED) is a US Certification System for residential and commercial buildings used worldwide. LEED was developed by the non-profit U.S. Green Building Council (USGBC) and covers the design, construction, maintenance and operation of buildings.	The Living Building Challenge is an international green building certification program and sustainable design framework run by the International Living Future Institute, a US non-profit organisation seeking to tackle climate change by pushing for a built urban environment free of fossil fuels.	BREEAM (Building Research Establishment Environmental Assessment Method) was first published by the Building Research Establishment (BRE) in 1990. Based in the UK, BREEAM can be used for new, refurbished and extension of existing buildings.
Certification Levels	• Certified • Silver • Gold • Platinum	• Zero Energy Certification • Petal Certification • Living Building Certification	• Pass • Good • Very Good • Excellent • Outstanding
Areas of Assessment	• Energy and Atmosphere • Sustainable Sites • Location and Transportation • Materials and Resources • Water Efficiency • Indoor Environmental Quality • Innovation in Design • Regional Priority	• Place • Water • Energy • Health and Happiness • Materials • Equity • Beauty	• Energy • Land Use and Ecology • Pollution • Transport • Materials • Water • Waste • Health and Wellbeing • Innovation
Requirements	Prerequisites (independent of level of certification) + Credits with associated points. These points are then added together to obtain the LEED level of certification. There are several different rating systems within LEED. Each rating system is designed to apply to a specific sector (e.g. New Construction, Major Renovation, Core and Shell Development, Schools-/Retail-/Healthcare New Construction and Major Renovations, Existing Buildings: Operation and Maintenance).	The Living Building Challenge is organised into seven performance areas called Petals. Each Petal is further sub-divided into Imperatives, which address specific issues through detailed requirements. All Imperatives assigned to a Typology are mandatory. Living Building Challenge certification requires actual, rather than anticipated, performance demonstrated over twelve consecutive months.	Prerequisites depending on the levels of certification. Credits with associated points. This number of points is then weighted by item and gives a BREEAM level of certification, which is based on the overall score obtained (expressed as a percentage). Majority of BREEAM issues are flexible, meaning that the client can choose which to comply with to build their BREEAM performance score.
Performance Display			

[41] USGBC, "LEED rating system", at: www.usgbc.org/LEED.
[42] International Living Future Institute, "Living Building Challenge Certification", at: https://living-future.org/lbc/certification/.
[43] BREEAM, "How certification works" at: https://www.breeam.com/discover/how-breeam-certification-works/.

Appendix 3: Overview and Assessment of Fishery and Aquaculture Certifications

	Marine Stewardship Council[44]	Aquaculture Stewardship Council[45]	Best Aquaculture Practices[46]
Background	Marine Stewardship Council (MSC) is a non-profit organisation founded in 1996 that issues eco-label certifications for fisheries which are sustainable and well-managed.	The Aquaculture Stewardship Council (ASC) is an independent, international NGO that manages the ASC certification and labelling program for responsible aquaculture.	The BAP certification is administered by the Global Aquaculture Alliance (GAA), a non-profit organisation focused on advocacy, education and leadership in responsible aquaculture matters.
Clear positive impact	Promoting sustainable fisheries practices.	Promoting sustainable aquaculture practices.	Promoting sustainable aquaculture practices.
Minimum standards	A minimum score must be met across each of the performance indicators. As a condition to certification, low-scoring indicators must be accompanied by action plans for improvement.	Quantiative and qualitative thresholds which are designed to be measurable, metric- and performance-based. Certification may be granted with a "variance" to certain requirements of the standard. This variance is designed to allow the standard to adapt to local conditions but has been criticised for weakening the standard and overriding the consultations involved in the standard-setting process.	The BAP assessment has mandatory minimums, but also includes indicators which allow the proponent to define individual targets. As the certification process is fishery-specific, the standard may be more robust for some species. For example, the Monterey Bay Aquarium's Seafood Watch programme recommends BAP as a reputable label for freshwater fish, mussels and shrimp, but not salmon, scallops or clams.[47]
Scope of certification or programme	The MSC standard consists of a fisheries standard and a chain of custody standard. The Fishery Standard assesses three core principles: sustainable fish stocks, minimising environmental impact and effective fisheries management; collectively, these account for the major environmental and social impacts. The Chain of Custody standard addresses certified purchasing; product identification; seperation; traceability and records; and good management.	ASC encompasses nine farm standards, covering 15 fish species as well as the harvest of seaweed. These farm standars lay out minimum requirements regarding both environmental and social performance. Additionally, a Chain of Custody Standard is mandatory for all supply chain actors in order to ensure traceablity.	Different certifications are available for different parts of the supply chain: farms, processing plants, hatcheries, feed mills. In practice, that means that a processing plant that does not necessarily source all of its fish from certified farms can still be certified (a star rating display on the label provides this information). Within each fishery-specific standard there are requirements and recommendations which apply to social, environmental, animal health & welfare and food safety issues.

[44] Marine Stewardship Council, at: https://www.msc.org/standards-and-certification/fisheries-standard.
[45] Aquaculture Stewardship Council, at: https://www.asc-aqua.org/what-we-do/our-standards/farm-standards/.
[46] Best Aquaculture Practices, at: https://www.bapcertification.org/About.
[47] Monterey Bay Aquarium Seafood Watch, at: https://www.seafoodwatch.org/seafood-recommendations/eco-certification.

Verification of standards and risk mitigation	Third-party conformity assessment bodies (CABs), certified by Accreditation Service International (ASI), carry out assessments in line with the MSC standard and ISO 17065. Certification is valid for up to five years.	Third-party conformity assessment bodies (CABs), certified by Accreditation Service International (ASI), carry out assessments in line with the ASC standard and ISO 17065. Major non-compliances must be remedied within three months.	Third-party certification bodies such as Global Trust, Bureau Veritas, Control Union, Lloyd's Register, NSF, SGS assess compliance against the standard. Non-compliance precludes recertification until the violation is remedied.
Third-party expertise and multi-stakeholder process	Aligned with the UN Code of Conduct for Reponsible Fishing and further informed by the Global Sustainable Seafood Initiative (GSSI), World Trade Organization (WTO) and International Social and Environmental Accreditation and Labelling (ISEAL)	Developed in line with United Nation's Food and Agriculture Organization (UN FAO) and International Labour Organization (ILO) principles. Managed in accordance with the International Social and Environmental Accreditation and Labelling (ISEAL) Codes of Good Practice.	The standard is managed by an oversight committee, which takes development input from a technical committee as well as public comments. Aligned with Global Food Safety Initiative (GFSI), Global Social Compliance Programme (GSCP) and Global Sustainable Seafood Initiative (GSSI).
Performance display			
Qualitative considerations	The MSC label is the most widely recognised sustainable fisheries label worldwide and is generally accepted to have positive impacts on marine environments. Proponents of the label cite the transparent science-based process for approval and its successful engagement with industry groups. Criticism from various observers include lack of focus on preventing by-catch; protecting marine mammals and endangered species; follow-up on conditions; crew safety; and live tracking of supply chains.	Widely recognised and modeled on the successful MSC certification. Some criticism has been focused on the ability to certify with a "variance", in which certain aspects of the standard can be interpreted or waived during the audit procedure. While a reputable certification overall, the standard does not fully mitigate all the risks associated with aquaculture.	Widely recognised within the industry. As the certification process is fishery-specific, the standard may be more robust for some species than for other. While a reputable certification overall, the standard does not fully mitigate all the risks associated with aquaculture.

Appendix 4: Overview and Assessment of Forestry Certifications

	FSC[48]	PEFC[49]
Background	Founded in 1993 after the 1992 Earth Summit in Rio failed to produce any international agreements to fight against deforestation, FSC aims to promote sustainable forest management practice.	PEFC was founded in 1999 in response to the specific requirements of small and family forest owners as an international umbrella organisation providing independent assessment, endorsement and recognition of national forest certification systems.
Basic Principles	• Compliance with laws and FSC principles • Tenure and use rights and responsibilities • Indigenous peoples' rights • Community relations and workers' rights • Benefits from the forests • Environmental impact • Management plans • Monitoring and assessment • Special sites – high conservation value forests (HCVF) • Plantations	• Maintenance and appropriate enhancement of forest resources and their contribution to the global carbon cycle • Maintenance and enhancement of forest ecosystem health and vitality • Maintenance and encouragement of productive functions of forests (wood and non-wood) • Maintenance, conservation and appropriate enhancement of biological diversity in forest ecosystems • Maintenance and appropriate enhancement of protective functions in forest management (notably soil and water) • Maintenance of socioeconomic functions and conditions • Compliance with legal requirements
Governance	The General Assembly, consisting of all FSC members, constitutes the highest decision-making body. At the General Assembly, motions are proposed by one member, seconded by two more and deliberated and voted on by all members. Members are entitled to vote to amend the bylaws, initiate new policies and clarify, amend or overturn a policy decision by the board. Members apply to join one of three chambers – environmental, social or economic – that are further divided into northern and southern sub-chambers. Each chamber holds 33.3% of the weight in votes and within each chamber the votes are weighted so that the North and South hold an equal portion of authority, to ensure influence is shared equitably between interest groups and countries with different levels of economic development. The votes of all individual members in each sub-chamber represent 10% of the total vote of the sub-chamber, while the votes of organizational members make up the other 90%. The members vote for the board of directors, which is accountable to the members. There is an international board elected by all members and a US board elected by the US-based members.	PEFC's governance structure is formed by the General Assembly (GA) which is the highest authority and decision-making body. It is made up of all PEFC members, including national and international stakeholders. Members vote on key decisions including endorsements, international standards, new members, statutes and budgets. All national members have between one and seven votes, depending on membership fees, while international stakeholder members have one vote each. The Board of Directors supports the work of the GA and together the GA and the Board make the formal approval of final draft standards. Standards are developed by working groups. In general, PEFC's governance structure is more representative of industry and government stakeholders than of social or environmental groups, which gives industry and governments more influence in the decision-making process. However, the organisation does include stakeholders from all sectors.

[48] Forest Stewardship Council, at: https://www.fsc.org/en.
[49] Programme for the Endorsement of Forest Certification, at: https://www.pefc.org/.

Scope	FSC is a global, multi-stakeholder owned system. All FSC standards and policies are set by a consultative process. There is an FSC Global standard and for certain countries FSC National standards. Economic, social and environmental interests have equal weight in the standard setting process. FSC follows the ISEAL Code of Good Practice for Setting Social and Environmental Standards.	Multi-stakeholder participation is required in the governance of national schemes as well as in the standard-setting process. Standards and normative documents are reviewed periodically at intervals that do not exceed five years. The PEFC Standard Setting standard is based on ISO/IEC Code for good practice for standardization (Guide 59)[50] and the ISEAL Code of Good Practice for Setting Social and Environmental Standards.
Chain-of-Custody	• The Chain-of-Custody (CoC) standard is evaluated by a third-party body that is accredited by FSC and compliant with international standards. • CoC standard includes procedures for tracking wood origin. • CoC standard includes specifications for the physical separation of certified and non-certified wood, and for the percentage of mixed content (certified and non-certified) of products. • CoC certificates state the geographical location of the producer and the standards against which the process was evaluated. Certificates also state the starting and finishing point of the CoC.	• Quality or environmental management systems (ISO 9001:2008 or ISO 14001:2004, respectively) may be used to implement the minimum requirements for chain-of-custody management systems required by PEFC. • Only accredited certification bodies can undertake certification. • CoC requirements include specifications for physical separation of wood and percentage-based methods for products with mixed content. • The CoC standard includes specifications for tracking and collecting and maintaining documentation about the origin of the materials. • The CoC standard includes specifications for the physical separation of certified and non-certified wood. • The CoC standard includes specifications about procedures for dealing with complains related to participant's chain of custody.
Non-Certified Wood Sources	FSC's Controlled Wood Standard establishes requirements to participants to establish supply-chain control systems and documentation to avoid sourcing materials from controversial sources, including: a. Illegally harvested wood, including wood that is harvested without legal authorisation; from protected areas; without payment of appropriate taxes and fees; using fraudulent papers and mechanisms; in violation of CITES requirements; and others, b. wood harvested in violation of traditional and civil rights, c. wood harvested in forests where high conservation values are threatened by management activities, d. wood harvested in forests being converted from forests and other wooded ecosystems to plantations or non-forest uses, e. wood from management units in which genetically modified trees are planted.	The PEFC's Due Diligence System requires participants to establish systems to minimise the risk of sourcing raw materials from: a. forest management activities that do not comply with local, national or international laws related to workers' health and labor and indigenous peoples' property, tenure and use rights. b. operations and harvesting, including land use conversion, ○ management of areas with designated high environmental and cultural values, ○ protected and endangered species, including CITES species, ○ health and labour issues, ○ indigenous peoples' property, tenure and use rights, ○ payment of royalties and taxes. c. genetically modified organisms, d. forest conversion, including conversion of primary forests to forest plantations.
Accreditation/ Verification	FSC-accredited Certification Bodies (CB) conduct an initial assessment and upon successful completion companies are granted a 5-year certificate. Companies must undergo an annual audit and a reassessment audit every 5 years. Certification Bodies undergo annual audits from	Accreditation is carried out by an accreditation body (AB). A certification body checks that a company meets the PEFC standard, the accreditation body checks that a certification body meets specific PEFC and ISO requirements. Through the accreditation process, PEFC has assurance that certification bodies are independent

[50] ISO, "ISO/IEC Guide 59:2019", (2019), at: https://www.iso.org/standard/23390.html.

	Accreditation Services International (ASI) to ensure conformance with ISO standard requirements.	and impartial and that they follow PEFC certification procedures. PEFC does not have their own accreditation body. Like with the majority of ISO based certifications, PEFC relies on national ABs under the umbrella of the International Accreditation Forum (IAF). National ABs need to be a member of the IAF, which means they must follow IAF's rules and regulations.
Conclusion	Sustainalytics views both FSC and PEFC as well as the PEFC-affiliated scheme SFI as being credible standards that are based on comprehensive principles and criteria that are aligned with ISO. Both schemes have received praise for their contribution to sustainable forest management practices[51] and both have also faced criticism from civil society actors.[52,53] In certain instances, these standards go above and beyond national regulation and are capable of providing a high level of assurance that sustainable forest management practices are in place. However, in other cases, the standards are equal or similar to national legislation and provide little additional assurance. Ultimately, the level of assurance that can be provided by either scheme is contingent upon several factors including the certification bodies conducting audits, national regulations and local context.	

[51] FESPA, "FSC, PEFC and ISO 38200" (2018), at: https://www.fespa.com/en/news-media/blog/fsc-pefc-and-iso-38200.
[52] Yale Environment 360, "Greenwashed Timber: How Sustainable Forest Certification Has Failed" (2018), at: https://e360.yale.edu/features/greenwashed-timber-how-sustainable-forest-certification-has-failed.
[53] EIA,"PEFC: A Fig Leaf for Stolen Timber" (2017), at: https://eia-global.org/blog-posts/PEFC-fig-leaf-for-stolen-timber.

Appendix 5: Green Bond / Green Bond Programme - External Review Form

Section 1. Basic Information

Issuer name:	Münchener Rückversicherungs-Gesellschaft Aktiengesellschaft in München
Green Bond ISIN or Issuer Green Bond Framework Name, if applicable:	Munich Re Green Bond Framework
Review provider's name:	Sustainalytics
Completion date of this form:	September 4, 2020
Publication date of review publication:	

Section 2. Review overview

SCOPE OF REVIEW

The following may be used or adapted, where appropriate, to summarise the scope of the review.

The review assessed the following elements and confirmed their alignment with the GBP:

☒	Use of Proceeds	☒	Process for Project Evaluation and Selection
☒	Management of Proceeds	☒	Reporting

ROLE(S) OF REVIEW PROVIDER

☒	Consultancy (incl. 2nd opinion)	☐	Certification
☐	Verification	☐	Rating
☐	Other *(please specify)*:		

Note: In case of multiple reviews / different providers, please provide separate forms for each review.

EXECUTIVE SUMMARY OF REVIEW and/or LINK TO FULL REVIEW *(if applicable)*

Please refer to Evaluation Summary above.

Section 3. Detailed review

Reviewers are encouraged to provide the information below to the extent possible and use the comment section to explain the scope of their review.

1. USE OF PROCEEDS

Overall comment on section *(if applicable)*:

The eligible categories for the use of net proceeds – Renewable Energy, Energy Efficiency, Clean Transportation, Green Buildings, Sustainable Water and Wastewater Management, Eco-Efficient and/or Circular Economy, Environmentally Sustainable Management of Living Natural Resources and Land Use – are aligned with those recognised by the Green Bond Principles 2018. Sustainalytics considers that the eligible project categories will lead to positive environmental impacts and advance the UN Sustainable Development Goals (SDGs), specifically SDG 6, 7, 11, 12 and 15.

Use of proceeds categories as per GBP:

☒	Renewable energy	☒	Energy efficiency
☐	Pollution prevention and control	☒	Environmentally sustainable management of living natural resources and land use
☐	Terrestrial and aquatic biodiversity conservation	☒	Clean transportation
☒	Sustainable water and wastewater management	☐	Climate change adaptation
☒	Eco-efficient and/or circular economy adapted products, production technologies and processes	☒	Green buildings
☐	Unknown at issuance but currently expected to conform with GBP categories, or other eligible areas not yet stated in GBP	☐	Other *(please specify)*:

If applicable please specify the environmental taxonomy, if other than GBP:

2. PROCESS FOR PROJECT EVALUATION AND SELECTION

Overall comment on section (if applicable):

Munich Re's Head of Alternative Investment will be in charge of proposing eligible projects to a Green Bond Committee, which will be responsible for project evaluation and selection. Sustainalytics considers the project selection process to be in line with market practice.

Evaluation and selection

☒	Credentials on the issuer's environmental sustainability objectives	☒	Documented process to determine that projects fit within defined categories
☒	Defined and transparent criteria for projects eligible for Green Bond proceeds	☒	Documented process to identify and manage potential ESG risks associated with the project
☒	Summary criteria for project evaluation and selection publicly available	☐	Other *(please specify):*

Information on Responsibilities and Accountability

☒ Evaluation / Selection criteria subject to external advice or verification

☐ In-house assessment

☐ Other (please specify):

3. MANAGEMENT OF PROCEEDS

Overall comment on section *(if applicable)*:

Munich Re's Group Investment Management department will manage the allocation of net proceeds using a portfolio approach. Pending full allocation, funds will be allocated to temporary investments such as cash, cash equivalents and/or other liquid instruments giving priority to green bonds and following the exclusion criteria established in the Green Bond Framework. This is in line with market practice.

Tracking of proceeds:

☒ Green Bond proceeds segregated or tracked by the issuer in an appropriate manner

☒ Disclosure of intended types of temporary investment instruments for unallocated proceeds

☐ Other *(please specify)*:

Additional disclosure:

☐ Allocations to future investments only

☒ Allocations to both existing and future investments

☐ Allocation to individual disbursements

☒ Allocation to a portfolio of disbursements

☒ Disclosure of portfolio balance of unallocated proceeds

☐ Other *(please specify)*:

4. REPORTING

Overall comment on section (if applicable):

Munich Re commits to publish allocation and impact reporting on its website a year after of each issuance and annually thereafter until full allocation. Allocation reporting will include the net proceeds of the outstanding green bonds, amount of net proceeds allocated to each category, a list of projects including a description and allocated amounts (subject to confidentiality considerations), proportional allocation of net proceeds to existing and new projects and remaining balance of unallocated net proceeds. Munich Re is committed to providing impact reporting for each project category (provided net proceeds have been allocated to projects within such category) through key performance indicators. Sustainalytics views Munich Re's allocation and impact reporting as aligned with market best practice.

Use of proceeds reporting:

☐ Project-by-project

☒ On a project portfolio basis

☒ Linkage to individual bond(s) ☐ Other *(please specify):*

Information reported:

☒ Allocated amounts ☐ Green Bond financed share of total investment

☒ Other *(please specify): net proceeds of the outstanding green bond(s); amount of net proceeds allocated to eligible project categories; a list of the eligible projects in Munich Re's eligible project portfolio, including a description of the projects and allocated amounts (subject to confidentiality considerations); the proportional allocation of net proceeds to existing projects and new projects; the remaining balance of unallocated net proceeds, if any.*

Frequency:

☐ Annual ☐ Semi-annual

☒ Other (please specify): annually until full allocation of the net proceeds as well as in the event of any material changes of the allocation as long as the Green Bond is outstanding

Impact reporting:

☐ Project-by-project ☒ On a project portfolio basis

☐ Linkage to individual bond(s) ☒ Other (please specify): impact reporting will be done for each eligible project category (provided net proceeds have been allocated to projects within such category)

Information reported (expected or ex-post):

☒ GHG Emissions / Savings ☒ Energy Savings

☒ Decrease in water use ☒ Other ESG indicators (please specify): number of smart meters installed; number of zero-carbon and/or low-carbon vehicles financed; number of electric vehicle charging points installed; number of green buildings/units financed; total energy produced from

biogas and waste-to-energy projects; surface area of land preserved/restored, etc.

Frequency

☐ Annual

☐ Semi-annual

☒ Other (please specify): annually until full allocation of the net proceeds as well as in the event of any material changes of the allocation as long as the Green Bond is outstanding

Means of Disclosure

☐ Information published in financial report

☐ Information published in sustainability report

☐ Information published in ad hoc documents

☒ Other (please specify): allocation and impact reporting will be made available on Munich Re's website.

☒ Reporting reviewed (if yes, please specify which parts of the reporting are subject to external review): allocation reporting

Where appropriate, please specify name and date of publication in the useful links section.

USEFUL LINKS (e.g. to review provider methodology or credentials, to issuer's documentation, etc.)

www.munichre.com

SPECIFY OTHER EXTERNAL REVIEWS AVAILABLE, IF APPROPRIATE

Type(s) of Review provided:

☐ Consultancy (incl. 2nd opinion)

☐ Certification

☐ Verification / Audit

☐ Rating

☐ Other *(please specify):*

Review provider(s): **Date of publication:**

ABOUT ROLE(S) OF INDEPENDENT REVIEW PROVIDERS AS DEFINED BY THE GBP

i. Second-Party Opinion: An institution with environmental expertise, that is independent from the issuer may issue a Second-Party Opinion. The institution should be independent from the issuer's adviser for its Green Bond framework, or appropriate procedures, such as information barriers, will have been implemented within the institution to ensure the independence of the Second-Party Opinion. It normally entails an assessment of the alignment with the Green Bond Principles. In particular, it can include an assessment of the issuer's overarching objectives, strategy, policy and/or processes relating to environmental sustainability, and an evaluation of the environmental features of the type of projects intended for the Use of Proceeds.

ii. Verification: An issuer can obtain independent verification against a designated set of criteria, typically pertaining to business processes and/or environmental criteria. Verification may focus on alignment with internal or external standards or claims made by the issuer. Also, evaluation of the environmentally

sustainable features of underlying assets may be termed verification and may reference external criteria. Assurance or attestation regarding an issuer's internal tracking method for use of proceeds, allocation of funds from Green Bond proceeds, statement of environmental impact or alignment of reporting with the GBP, may also be termed verification.

iii. Certification: An issuer can have its Green Bond or associated Green Bond framework or Use of Proceeds certified against a recognised external green standard or label. A standard or label defines specific criteria, and alignment with such criteria is normally tested by qualified, accredited third parties, which may verify consistency with the certification criteria.

iv. Green Bond Scoring/Rating: An issuer can have its Green Bond, associated Green Bond framework or a key feature such as Use of Proceeds evaluated or assessed by qualified third parties, such as specialised research providers or rating agencies, according to an established scoring/rating methodology. The output may include a focus on environmental performance data, the process relative to the GBP, or another benchmark, such as a 2-degree climate change scenario. Such scoring/rating is distinct from credit ratings, which may nonetheless reflect material environmental risks.

Disclaimer

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Sustainalytics, a Morningstar Company, is a leading ESG research, ratings and data firm that supports investors around the world with the development and implementation of responsible investment strategies. The firm works with hundreds of the world's leading asset managers and pension funds who incorporate ESG and corporate governance information and assessments into their investment processes. The world's foremost issuers, from multinational corporations to financial institutions to governments, also rely on Sustainalytics for credible second-party opinions on green, social and sustainable bond frameworks. In 2020, Climate Bonds Initiative named Sustainalytics the "Largest Approved Verifier for Certified Climate Bonds" for the third consecutive year. The firm was also recognized by Environmental Finance as the "Largest External Reviewer" in 2020 for the second consecutive year. For more information, visit www.sustainalytics.com.

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