

Second-Party Opinion

Vodafone Green Bond

Evaluation Summary

Sustainalytics is of the opinion that the Vodafone 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 are aligned with those recognized by the Green Bond Principles. Sustainalytics considers that the (i) energy efficiency, (ii) renewable energy and (iii) green building assets and activities to be financed by the issuance will lead to positive environmental impacts and advance several UN Sustainable Development Goals.



PROJECT EVALUATION / SELECTION Vodafone’s internal process in evaluating and selecting projects is aligned with market practice. An internal Green Bond Committee has been established, comprising members from the company’s Treasury, Sustainable Business and Energy Performance departments.



MANAGEMENT OF PROCEEDS Vodafone’s processes for management of proceeds is aligned with market practice. The company will establish an Eligible Green Project Portfolio to which eligible projects will be allocated. Allocation to the Eligible Green Portfolio will strive to match the balance of net proceeds from the issuance of green bonds. Allocation will be tracked using Vodafone’s internal Treasury Management System and all green projects will be assigned a unique identifier that will facilitate the traceability of disbursements. Unallocated proceeds will be held in cash and/or invested in other short-term liquid instrument.



REPORTING Vodafone intends to report allocation of proceeds on its corporate website on an annual basis. In addition, Vodafone is committed to reporting, on a best effort basis, on impact metrics including direct and indirect abatement of greenhouse gas emissions and energy savings. In Sustainalytics’ view, reporting on these metrics is in line with market practice.

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Issuer Location	London, United Kingdom

Report Sections

Introduction.....	2
Sustainalytics’ Opinion	3
Appendices	9

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¹ Sustainalytics revised the Second Party Opinion for the Vodafone Green Bond Framework on 23 November 2018. The revision clarified that the 1:5 ratio cited from the GeSI Mobile Carbon Impact report references network carbon emissions to direct carbon emissions abatement from mobile technologies.

Introduction

Vodafone Group PLC (Vodafone) is a United Kingdom based global telecom operator with operations in 25 countries and 47 partner networks around the world. The company's primary business segment is mobile telecommunications services, while fixed broadband telecommunications is a growing strategic focus for the company.

Vodafone has developed the Vodafone Green Bond Framework (the "framework") under which it is considering issuing multiple green bonds and using the proceeds to finance and refinance, in whole or in part, existing and future projects that promote energy efficiency and a reduction of GHGs within its own operations and those of its clients. The framework defines eligibility criteria in three areas:

1. Energy Efficiency
2. Renewable Energy
3. Green Buildings

Vodafone engaged Sustainalytics to review the Vodafone Green Bond Framework and provide a second-party opinion on the alignment of the green bond with the Green Bond Principles 2018 (the "GBP"), as administered by the International Capital Market Association (the "ICMA"),² and the framework's environmental credentials. This framework has been published in a separate document.³

As part of this engagement, Sustainalytics communicated with Vodafone's management team to understand the sustainability impact of their business processes and planned use of proceeds, as well as management of proceeds and reporting plans for Vodafone's green bond. Sustainalytics also reviewed relevant public documents and non-public information.

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

² ICMA's Green Bond Principles 2018: <https://www.icmagroup.org/green-social-and-sustainability-bonds/green-bond-principles-gbp/>

³ <https://www.vodafone.com/content/index/about/sustainability/approach-and-reporting/reporting-centre.html>

Sustainalytics' Opinion

Section 1: Sustainalytics' Opinion on the Vodafone Green Bond Framework

Summary

Sustainalytics is of the opinion that the Vodafone Green Bond Framework is credible, impactful and aligns with the four core components of the Green Bond Principles 2018. Sustainalytics highlights the following elements of Vodafone's green bond framework:

- Use of Proceeds:
 - The use of proceeds categories Energy Efficiency, Renewable Energy and Green Buildings are viewed as impactful by the Green Bond Principles 2018.
 - The Energy Efficiency criterion includes two sub-criterion, one to support the roll-out of Internet of Things (IoT) technologies and one to support energy efficiency in Vodafone's operations.
 - Telecommunications technology, and IoT specifically, is expected to play an important role in driving energy efficiency through a range of industrial and societal applications. Examples include, but are not limited to, smart metering, smart lighting, smart parking and other aspects of smart cities, the sharing economy, including bike and electric vehicle sharing, industry automation and smart logistics. For details on the expected impact of IoT technologies, see Appendix 2.
 - Sustainalytics recognizes that IoT technologies as described in Vodafone's framework carry two risks/limitations in terms of impact:
 - The first being that the technologies have a broad impact, and can drive energy efficiency gains in a variety of industries. This does not exclude the possibility of application in fossil fuel-based industries. Sustainalytics understands that the issuer cannot control the use and application of the IoT enabling technologies once sold. This is a limitation of the use of proceeds.
 - The second is that the expansion of IoT networks and increasing data flows resulting from IoT solutions may result in additional overall energy demands on telecommunications networks. However, studies have indicated that this risk can be mitigated, as the ratio of network carbon emissions to direct carbon emissions abatement from mobile technologies is currently estimated at 1:5 in Europe and North America,⁴ while Vodafone's own ratio of operational GHG emissions vs. customer GHG emissions avoided as a result of applying IoT technology stood at 1:2.1 in 2017.⁵ Based on these studies there is evidence that telecommunications technologies are already resulting in net energy savings and carbon reductions.
 - Possible increases in energy demand on the network resulting from the deployment of IoT solutions also highlights the importance of the investments in network energy efficiency that Vodafone is simultaneously pursuing.
 - The Green Buildings eligibility criterion for new buildings or retrofits of existing buildings includes a sub-criterion based on third-party certification standards such as LEED (Gold or higher) and BREEAM (Very Good or equivalent). Sustainalytics has conducted an evaluation of the schemes used (see Appendix 1) and considers this to be in line with market practice. Other categories of green buildings include the top 15% most efficient buildings in the region, as aligned with market practice and the Climate Bond Initiative criteria for Low Carbon Buildings.
- Project Selection Process:
 - In line with market practice, Vodafone has created a dedicated Green Bond Committee to oversee the project evaluation and selection process. The committee is composed of individuals from the Treasury, Sustainable Business and Energy Performance departments. The committee will select projects based on the eligibility criteria outlined in the Vodafone Green Bond Framework.
- Management of Proceeds:

⁴ GeSI Mobile Carbon Impact

⁵ Vodafone Sustainable Business Report 2018; <https://www.vodafone.com/content/dam/vodafone-images/sustainability/downloads/sustainablebusiness2018.pdf>

- Vodafone plans to designate an Eligible Green Project Portfolio to which proceeds from the issuance of green bonds will be allocated. Allocation will be tracked using Vodafone's internal Treasury Management System and all green projects will be assigned a unique identifier that will facilitate the traceability of disbursements. Sustainalytics views this approach as aligned with market practice.
- Reporting:
 - Vodafone will report annually on the allocation of proceeds and on the impact of the Eligible Green Portfolio until full allocation of green bond net proceeds. Allocation reporting will include the total amount of investments and expenditures in the Eligible Green Projects Portfolio, the amount or percentage of new and existing projects and the balance of unallocated proceeds. Impact reporting will include GHG emissions directly and indirectly abated and energy saved. Reporting will take place on Vodafone's corporate website as per market practice.

Internet of Things and Energy Efficiency

- The IoT is primarily an ultrafast hyperconnected network that facilitates the rapid flow and analysis of data between connected devices, including personal devices, machinery, buildings, infrastructure and a range of other connectable items, to enable and optimize the delivery of services, including new services.
- Enabling IoT can lead to energy savings across industries. Examples include, but are not limited to, smart metering, smart lighting, smart parking and other aspects of smart cities, the sharing economy, including bike and electric vehicle sharing, industry automation and smart logistics.
- Recent studies have indicated that the carbon emissions abatement that can already be attributed to mobile communications technologies stands at 180 million tons of CO₂e each year in the United States and Europe, 70% of which is attributable to the machine-to-machine communications⁶ that IoT will further enable and enhance.
- Development of IoT networks play an important role in laying the infrastructure to promote future energy savings from IoT applications, while furthering innovation in and deployment of IoT solutions and products can result in concrete gains in energy efficiency.
- For an example of impacts of IoT technologies and the mechanisms through which they can lead to energy savings, see Appendix 2. Appendix 2 highlights results from an internal Vodafone study conducted with the Carbon Trust that describes GHG abatement mechanisms for IoT products.
- While the overall network emissions from the telecommunications industry may increase as a result of expanding IoT networks and increased network traffic resulting from the application of IoT technologies, the ratio of network carbon emissions to carbon emissions abatement from mobile technologies is currently estimated at 1:5 in Europe and North America.⁷ Vodafone's own ratio of operational GHG emissions vs. customer GHG emissions avoided as a result of applying IoT technology stood at 1:2.1, up from 1:1.4 in 2015.⁸

Alignment with Green Bond Principles 2018

Sustainalytics has determined that Vodafone's Green Bond Framework aligns with the four core components of the Green Bond Principles 2018. For detailed information please refer to Appendix 3: Green Bond/Green Bond Programme External Review Form.

⁶GeSI Mobile Carbon Impact

⁷GeSI Mobile Carbon Impact

⁸Vodafone Sustainable Business Report 2018; <https://www.vodafone.com/content/dam/vodafone-images/sustainability/downloads/sustainablebusiness2018.pdf>

Section 2: Sustainability Strategy of the Issuer

Contribution of framework to Vodafone's sustainability strategy

Vodafone's sustainability strategy emphasizes eco-efficiency, reducing the impact of own operations, products and services, and providing low-carbon solutions and innovations for customers. The company's Chief Executive & Executive Committee has oversight of sustainability initiatives and receives monthly updates regarding sustainability issues,⁹ demonstrating the high priority placed on these issues at Vodafone.

Vodafone has outlined its plan for reducing the impact of energy consumption through the Energy Innovation pillar of its sustainability strategy.¹⁰ The company's targets include a reduction in GHG emissions of 40% by 2025 against a 2010 baseline and the purchase of 100% renewable energy by 2025.¹¹ Certification of operations in Germany, Greece, Ireland, Turkey and the United Kingdom to ISO 50001¹² is one way Vodafone has advanced these goals. The company also has a commitment to supporting its customers in reducing their GHG emissions through its services.¹³ Vodafone's commitment to operating in an environmentally sustainable manner is reinforced by joining the RE100,¹⁴ an initiative led by the Climate Group, in partnership with CDP and includes major businesses that are committed to switching to 100% renewable energy. The company reports on progress towards achieving its goals in its annual Sustainable Business Report.¹⁵

Given Vodafone's sustainability strategy and commitments, executive responsibility for sustainability, as well as Vodafone's sustainability targets and progress reporting, Sustainalytics considers that Vodafone is well positioned to issue green bonds and that the eligible categories outlined in the Vodafone Green Bond Framework will contribute directly to furthering the company's sustainability strategy.

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

Sustainalytics recognizes that the eligible categories outlined in the Vodafone Green Bond Framework entail social and environmental risks. These risks include: human rights challenges in the supply chain for raw materials critical to the telecommunications industry; health and safety risks associated with the construction of infrastructure to promote energy efficiency and in the construction/renovation of green buildings; biodiversity and waste management risks associated with the construction of new assets; and exposure to data privacy, security and censorship risks.

Sustainalytics is of the opinion that Vodafone has adequate policies and programmes in place to mitigate the main environmental and social risks associated with the use of proceeds, as follows:

- i. Vodafone has adopted a due diligence framework to mitigate risks associated with the sourcing of conflict minerals and the metals commonly used to manufacture electronics equipment.¹⁶ The framework includes the implementation of a conflict mineral management system, a risk identification and assessment process, a strategy design and implementation phase to address the risks identified during the assessments, third party audits of smelters and refiners and annual reporting.¹⁷ The

⁹ Vodafone Corporate Website; <https://www.vodafone.com/content/sustainabilityreport/2015/index/vision-and-approach/managing-sustainability/governance.html>

¹⁰ Vodafone Sustainable Business Report 2018; <https://www.vodafone.com/content/dam/vodafone-images/sustainability/downloads/sustainablebusiness2018.pdf>

¹¹ Vodafone Our Contribution to the UN SDGs; <https://www.vodafone.com/business/sustainability>

¹² Vodafone Sustainable Business Report 2018; <https://www.vodafone.com/content/dam/vodafone-images/sustainability/downloads/sustainablebusiness2018.pdf>

¹³ Vodafone Our Contribution to the UN SDGs; <https://www.vodafone.com/business/sustainability>

¹⁴ Vodafone Sustainable Business Report 2018; <https://www.vodafone.com/content/dam/vodafone-images/sustainability/downloads/sustainablebusiness2018.pdf>

¹⁵ Vodafone Sustainable Business Report 2018; <https://www.vodafone.com/content/dam/vodafone-images/sustainability/downloads/sustainablebusiness2018.pdf>

¹⁶ Vodafone Conflict Minerals Report 2017 <https://www.vodafone.com/content/dam/vodafone-images/sustainability/downloads/conflictminerals2017.pdf>

¹⁷ Vodafone Conflict Minerals Report 2017 <https://www.vodafone.com/content/dam/vodafone-images/sustainability/downloads/conflictminerals2017.pdf>

company has a separate process to mitigate risks related to slavery and human trafficking in its supply chain, which is outlined in the group's Slavery and Human Trafficking Statement 2017-2018.¹⁸

- ii. Vodafone's approach to employee health and safety is governed by its Health, Safety and Wellbeing (HSW) Policy and the Supplier Group Policy on HSW, and is supported by local HSW plans.¹⁹ As a baseline, the company applies its Absolute Rules on Safety²⁰ to set a minimum safety standard for employees and contractors operating in environments that present safety risks.²¹ The company has identified road risks, working with electricity, working at height and laying cables in the ground as key safety challenges, and has outlined additional measures to address each these risks.²² Vodafone also monitors health and safety concerns at suppliers and contractors and engages with top suppliers on safety issues four times a year. Enforcement of health and safety expectations internally and externally is managed through a compliance programme. Reporting on health and safety performance metrics takes place annually.²³
- iii. Vodafone reports that Environmental Management Systems (EMS) are in place for all of its markets.²⁴ These systems are certified to ISO 14001 in the Czech Republic, Greece, Portugal, Romania, South Africa, Spain and the United Kingdom, demonstrating best practice for minimizing the environmental impact of operations.²⁵ In other markets the companies' EMS are designed to ensure compliance with local environmental legislation and with European regulations, demonstrating that systems are in place to mitigate potential environmental risks.
- iv. Vodafone has established an approach to data privacy, security and censorship that is outlined by a series of policies. Specifically, the company discloses commitments on customer privacy,²⁶ respecting the digital rights of children,²⁷ freedom of expression and network censorship.²⁸ Vodafone seeks to align its approach with the Telecommunications Industry Dialogue Guiding Principles, which outlines a common approach to protecting individual rights to privacy and freedom of expression.²⁹ The company is also a member of the Global Network Initiative, which promotes the same goal.³⁰ Vodafone has a group privacy team and local privacy officers to facilitate implementation of the company's confidential privacy standards, which include separate standards on Privacy Risk Management, Network Traffic Management, Law Enforcement Assistance and Permissions Policy.³¹

While the standards are not publicly available, Vodafone outlines its overall approach in its public reporting. The standards outline risk management practices and processes and require the

¹⁸ Vodafone Slavery and Human Trafficking Statement 2017-2018;

<https://www.vodafone.co.uk/cs/groups/public/documents/webcontent/modernslaverydisclosure.pdf>

¹⁹ Vodafone Sustainable Business Report 2018; <https://www.vodafone.com/content/dam/vodafone-images/sustainability/downloads/sustainablebusiness2018.pdf>

Vodafone Group Health, Safety and Wellbeing Policy; https://www.vodafone.com/content/dam/sustainability/pdfs/global_health_and_safety_policy.pdf

Vodafone Supplier Group Policy on Health, Safety and Wellbeing;

[https://www.vodafone.com/content/dam/group/suppliers/downloads/VPC_Supplier_Policy_A3_Health_and_Safety_\(3.0\).pdf](https://www.vodafone.com/content/dam/group/suppliers/downloads/VPC_Supplier_Policy_A3_Health_and_Safety_(3.0).pdf)

²⁰ Vodafone Sustainable Business Report 2018; <https://www.vodafone.com/content/dam/vodafone-images/sustainability/downloads/sustainablebusiness2018.pdf>

²¹ Vodafone Sustainable Business Report 2018; <https://www.vodafone.com/content/dam/vodafone-images/sustainability/downloads/sustainablebusiness2018.pdf>

²² Vodafone Sustainable Business Report 2018; <https://www.vodafone.com/content/dam/vodafone-images/sustainability/downloads/sustainablebusiness2018.pdf>

²³ Vodafone Sustainable Business Report 2018; <https://www.vodafone.com/content/dam/vodafone-images/sustainability/downloads/sustainablebusiness2018.pdf>

²⁴ Vodafone Sustainable Business Report 2018; <https://www.vodafone.com/content/dam/vodafone-images/sustainability/downloads/sustainablebusiness2018.pdf>

²⁵ Vodafone Sustainable Business Report 2018; <https://www.vodafone.com/content/dam/vodafone-images/sustainability/downloads/sustainablebusiness2018.pdf>

²⁶ Vodafone Customer Privacy Policy; https://www.vodafone.com/content/dam/vodafone-images/sustainability/df/pdf/vodafone_drf_customer_privacy.pdf

²⁷ Vodafone Respecting the Digital Rights of the Child Policy; https://www.vodafone.com/content/dam/vodafone-images/sustainability/df/pdf/vodafone_drf_digital_rights_child.pdf

²⁸ Vodafone Freedom of Expression and Network Censorship Policy; https://www.vodafone.com/content/dam/vodafone-images/sustainability/df/pdf/vodafone_drf_freedom_expression_network_censorship.pdf

²⁹ Vodafone's Alignment with the Telecommunications Industry Dialogue Guiding Principles; https://www.vodafone.com/content/dam/vodafone-images/sustainability/df/pdf/vodafone_drf_alignment_telecom_industry_dialogue_principles.pdf

³⁰ The Global Network Initiative; <https://globalnetworkinitiative.org/gni-principles/>

³¹ Vodafone Customer Privacy; https://www.vodafone.com/content/dam/vodafone-images/sustainability/df/pdf/vodafone_drf_customer_privacy.pdf

implementation of data breach management processes, for example.³² Vodafone reports that prior to entering a new market a human rights assessment is conducted to help inform the decision, taking into account freedom of expression and privacy; internet freedom; freedom of association, political participation, rule of law, gender and minority rights and labour rights.³³ The company reviews compliance with the standards annually and an in-depth review is conducted in two out of three local markets on an annual basis.³⁴

Section 3: Impact of Use of Proceeds

All three use of proceeds categories are recognized as impactful by the GBP. Sustainalytics has focused on two below where the impact is specifically relevant in the local context.

Importance of Energy Efficiency on a global scale

According to the International Energy Association (IEA), in 2017 world electricity demand rose by 3.1% while innovations in energy efficiency slowed down significantly.³⁵ According to the IEA Bridge Scenario, increasing energy efficiency, for industry, buildings and transport, is a critical action that must be taken to combat GHG emissions, and could contribute to approximately 48% of global emissions reductions by 2030.³⁶

Given this context of the need for energy efficiency across industries, Sustainalytics views Vodafone's projects in the area of energy efficiency as impactful. Vodafone's Internet of Things (IoT) technologies have broad applications with the potential to increase energy efficiency in the transportation of people and freight, the distribution of energy and the optimization of energy use in buildings and cities, amongst others.³⁷

The company's efforts to promote energy efficiency in its mobile network through improved hardware, energy saving software and funding R&D activities related to energy efficiency are also expected to have a positive impact in countries where these upgrades in infrastructure and support software are implemented. For example, with regards to mobile base stations, Vodafone's trial with an adiabatic cooling system at one of its Portuguese base stations resulted in energy savings of 35MWh in one year.³⁸ Given the potential increase in energy demand from networks resulting from increasing data flows in the coming years, these investments are viewed as particularly impactful. Some examples of projects to be refinanced include hardware and software upgrades to support energy efficiency for activities in Greece, Hungary, Italy, New Zealand, Romania, Spain, Turkey, the United Kingdom, South Africa and others. Many of the countries in which Vodafone operates have ratified the Paris Agreement on Climate Change and have submitted their Nationally Determined Contributions. Given the projected growth in emissions from the telecommunications industry, Vodafone's efforts to reduce network energy consumption may contribute to future GHG emissions savings in a number of countries.

Green Buildings to mitigate climate change in multiple markets

Vodafone's financing and refinancing of green buildings will be primarily focused in Europe. Examples of past projects that have achieved certification include the company's Madrid offices and the Lotto X building in Padua, Italy, which respectively achieved LEED Platinum and Gold certification in 2016. With improvements planned for buildings in Greece and the United Kingdom as well, Vodafone's activities have and will continue to contribute to the stock of green and energy efficient buildings in Europe. Sustainalytics acknowledges that Vodafone's investments in green buildings can contribute to EU climate targets of a 40% reduction in GHG emissions by 2030, 60% by 2040 and 80% by 2050 against 1990 levels.

³² Vodafone Customer Privacy; https://www.vodafone.com/content/dam/vodafone-images/sustainability/drf/pdf/vodafone_drf_customer_privacy.pdf

³³ Vodafone Sustainable Business Report 2018; <https://www.vodafone.com/content/dam/vodafone-images/sustainability/downloads/sustainablebusiness2018.pdf>

³⁴ Vodafone Sustainable Business Report 2018; <https://www.vodafone.com/content/dam/vodafone-images/sustainability/downloads/sustainablebusiness2018.pdf>

³⁵ Global Energy & CO2 Status Report 2017; <https://www.iea.org/publications/freepublications/publication/GECO2017.pdf>

³⁶ Meeting climate change goals through energy efficiency; <https://www.iea.org/publications/freepublications/publication/MeetingClimateChangeGoalsEnergyEfficiencyInsightsBrief.pdf>

³⁷ Vodafone Corporate Website; <https://www.vodafone.com/business/iot#tab-1508866409966-wg-1508866409405>

³⁸ Vodafone Sustainable Business Report 2018; <https://www.vodafone.com/content/dam/vodafone-images/sustainability/downloads/sustainablebusiness2018.pdf>

Alignment with/contribution to SDGs

The Sustainable Development Goals (SDGs) were set in September 2015 and form an agenda for achieving sustainable development by the year 2030. This green bond advances the following SDG goals and targets:

Use of Proceeds Category	SDG	SDG target
Energy Efficiency	7. Affordable and Clean Energy 8. Decent Work and Economic Growth	7.3 By 2030, double the global rate of improvement in energy efficiency 8.4 Improve progressively, through 2030, global resource efficiency in consumption and production and endeavor to decouple economic growth from environmental degradation, in accordance with the 10-year framework of programmes on sustainable consumption and production, with developed countries taking the lead
Energy Efficiency and Green Buildings	9. Industry, Innovation and Infrastructure	9.4 By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities
Green Buildings	11. Sustainable Communities and Cities	11.10 Support least developed countries, including through financial and technical assistance, in building sustainable and resilient buildings utilizing local materials
Renewable Energy	7. Affordable and Clean Energy	7.2 By 2030, increase substantially the share of renewable energy in the global energy mix

Conclusion

Vodafone Group PLC has developed a Green Bond Framework under which it intends to issue green bonds and use the proceeds to finance or refinance Eligible Projects related to (i) Energy Efficiency, (ii) Renewable Energy and (iii) Green Buildings.


Sustainalytics believes that the funding of energy efficiency, renewable energy and green buildings will result in reduced greenhouse gas emissions in the countries where activities are underway or where the company's solutions are being applied. As such, we anticipate that green bonds issued under the Vodafone Green Bond Framework will contribute towards the achievement of climate change mitigation targets across a number of countries in which Vodafone has operations or its technology is being applied.

Sustainalytics considers Vodafone to be well-positioned to issue a Green Bond and believes that the Vodafone Green Bond Framework is transparent, credible and in alignment with the four components of the Green Bond Principles 2018.

Appendices

Appendix 1: Comparison of Green Building Standards

	BREEAM	LEED
Background	<p>BREEAM (Building Research Establishment Environmental Assessment Method) was first published by the Building Research Establishment (BRE) in 1990.</p> <p>Based in the UK.</p> <p>Used for new, refurbished and extension of existing buildings.</p>	<p>Leadership in Energy and Environmental Design (LEED) is a US Certification System for residential and commercial buildings used worldwide.</p> <p>LEED was developed by the non-profit U.S. Green Building Council (USGBC) and covers the design, construction, maintenance and operation of buildings.</p>
Certification levels	<p>Pass</p> <p>Good</p> <p>Very Good</p> <p>Excellent</p> <p>Outstanding</p>	<p>Certified</p> <p>Silver</p> <p>Gold</p> <p>Platinum</p>
Areas of Assessment: Environmental Project Management	<p>Management (Man) addresses various aspects: project management, deployment, minimal environmental disturbance worksite and stakeholder engagement.</p>	<p>Integrative process, which requires, from the beginning of the design process, the identification and creation of synergies between the various project stakeholders regarding the construction choices and the technical systems.</p>
Areas of Assessment: Environmental Performance of the Building	<p>Energy</p> <p>Land Use and Ecology</p> <p>Pollution</p> <p>Transport</p> <p>Materials</p> <p>Water</p> <p>Waste</p> <p>Health and Wellbeing</p> <p>Innovation</p>	<p>Energy and atmosphere</p> <p>Sustainable Sites</p> <p>Location and Transportation</p> <p>Materials and resources</p> <p>Water efficiency</p> <p>Indoor environmental quality</p> <p>Innovation in Design</p> <p>Regional Priority</p>

<p>Requirements</p>	<p>Prerequisites depending on the levels of certification + Credits with associated points</p> <p>This number of points is then weighted by item⁷ 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.</p> <p>BREEAM has two stages/ audit reports: a 'BREEAM Design Stage' and a 'Post Construction Stage', with different assessment criteria.</p>	<p>Prerequisites (independent of level of certification) + Credits with associated points</p> <p>These points are then added together to obtain the LEED level of certification</p> <p>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).</p>
<p>Performance display</p>	<p>☆☆☆☆☆ Unclassified ☆☆☆☆☆ Approved ☆☆☆☆☆ Good ☆☆☆☆☆ Very good ☆☆☆☆☆ Outstanding ☆☆☆☆☆ Excellent</p>	
<p>Qualitative considerations</p>	<p>Used in more than 70 countries: Good adaptation to the local normative context.</p> <p>Predominant environmental focus.</p> <p>BREEAM certification is less strict (less minimum thresholds) than HQE and LEED certifications.</p>	<p>Widely recognised internationally, and strong assurance of overall quality.</p>

Appendix 2: Vodafone Carbon Abatement Calculation Methodology Summary for FY 2017/2018³⁹

IoT application	Description	GHG abatement mechanism	GHG abatement factor
Smart metering (Domestic)	IoT-enabled meters, which regularly record utility consumption (gas, electricity or water) and communicate the information back to the energy utility company to allow remote reporting.	Smart meters are seen as an important tool to reduce domestic utility consumption and manage utility networks more efficiently. Many studies have demonstrated that the installation of smart meters and associated initiatives have resulted in energy consumption reductions.	Average electricity and gas saving assumed is 3% per annum.
Smart metering (Commercial)	As per above but for commercial properties which often have multiple smart meters to isolate different areas of consumption.	Smart meters in commercial property provide visibility to building managers as to where and when an organisation is consuming energy or water. Smart meters have been shown to lead to energy savings, as consumption can be optimised remotely.	Average electricity and gas saving assumed is 16.8% per annum.
Smart Logistics & Fleet Management (Bus)	Connected telematics system that consist of an in-vehicle unit (IVU) connected to a central server. This feeds back real time information on the GPS location of the vehicle, and may include other performance metrics such as fuel consumption and driver performance.	Connected buses can communicate with traffic light systems to prioritise bus routes, improving fuel efficiency. GPS location services can also be used to inform passengers of bus arrival times. Both features increase bus patronage and improve emissions per passenger.	Fuel saving assumed is 6%. This is applied to average annual emissions for a bus.
Smart Logistics & Fleet Management (Cars)	Connected telematics system that consist of an in-vehicle unit (IVU) connected to a central server. Within a car fleet this is primarily used for Satellite Navigation and feedback on driver behaviour. Information may also be used for Usage Based Insurance.	Fleet management systems may be used for optimised routing and avoiding congested areas, which directly reduces fuel consumption. Telematics systems can offer real time feedback to drivers on their driving performance and behaviour. This technology is an enabler, and the savings require the driver to act on the feedback.	Fuel saving assumed is 6%. This is applied to average annual emissions for a car.
Smart Logistics & Fleet Management (Light and heavy goods vehicles)	As per above, but for LGVs and HGVs. Commercial vehicle applications include optimised delivery and dispatch routing, tracking of fuel consumption and monitoring of driver performance.	Optimised delivery and dispatch routing for goods vehicles ensures that unnecessary journeys are minimised, resulting in improved fuel efficiency. Telematics systems can offer real time feedback to drivers on their driving performance and behaviour. This technology is an enabler, and the savings require the driver to act on the feedback.	Fuel saving assumed is between 2% and 10%, dependent on classification and application. This is applied to average annual emissions for an LGV or HGV.

³⁹ This appendix highlights results from an internal Vodafone study conducted with the Carbon Trust that describes GHG abatement mechanisms for IoT products. Additional details on the Carbon Abatement Methodology can be requested from Vodafone.

IoT application	Description	GHG abatement mechanism	GHG abatement factor
Smart Logistics & Fleet Management (Taxis)	Connected telematics system that consist of an in-vehicle unit (IVU) connected to a central server. This is usually connected to passenger mobile applications to locate and summon nearby taxis. Multiple users may be connected to pool journeys.	Carbon savings are achieved by taxis having fewer miles travelled without a customer, based on optimised central control and dispatch of the taxis.	Uses a carbon abatement factor of 344.1 kgCO ₂ e per connection, taken from the analysis for the Vodafone Netherlands “Environmental Profit and Loss” report, which used a fuel saving figure of 5%, applied to average annual emissions for a taxi.
Smart Logistics & Fleet Management (Smart Bin)	IoT-enabled units within smart bins communicate with waste collection services to notify when full and also to prevent unnecessary journeys being made by waste collection vehicles.	The primary enablement mechanism is reduced journeys by waste collection vehicles, resulting in fuel saving.	Abatement factor of 5kgCO ₂ e per smart bin was used.
Street Lighting	IoT-enabled street lighting allows variable levels of lighting, depending upon time of day and the extent to which people are nearby.	The carbon saving is achieved through avoiding the use of street lighting when it is not necessary. Lower levels of lighting may also be used in less busy areas.	Reduction in energy consumption of street lights assumed is 20%.
Electric vehicle Charging	IoT-enabled EV charging points interact with electric vehicles or driver mobile apps to direct drivers to the most appropriate EV charging point, giving drivers the confidence to carry out more journeys in electric vehicles.	The use of an electric vehicle over a traditional fuelled vehicle has significant carbon savings. It is assumed each electric vehicle journey provided by the charging point replaces a traditional fuel journey.	Annual distance driven was calculated from the charge provided by a charging point. The saving is the difference in emissions for that distance between an average petrol car and an electric car.
Health Care	Connected devices allow chronic or high risk patients to be monitored within their own home. This prevents excess journeys to and from hospital by both patients and healthcare professionals, as well as freeing up hospital beds.	The emissions associated with one hospital stay are avoided by allowing the patient to remain at home. There are also the avoided emissions from not having to make the car journey to and from the hospital.	Assumed 42% reduction in hospital admissions.

Appendix 3: Green Bond / Green Bond Programme - External Review Form

Section 1. Basic Information

Issuer name:	Vodafone Group PLC
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Green Bond ISIN or Issuer Green Bond Framework Name, if applicable: <i>[specify as appropriate]</i>	Vodafone Green Bond Framework
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Review provider's name:	Sustainalytics
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Completion date of this form:	29 August 2018
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Publication date of review publication: <i>[where appropriate, specify if it is an update and add reference to earlier relevant review]</i>	
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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 GBPs:

- | | |
|--|--|
| <input checked="" type="checkbox"/> Use of Proceeds | <input checked="" type="checkbox"/> Process for Project Evaluation and Selection |
| <input checked="" type="checkbox"/> Management of Proceeds | <input checked="" type="checkbox"/> Reporting |

ROLE(S) OF REVIEW PROVIDER

- | | |
|---|--|
| <input checked="" type="checkbox"/> Consultancy (incl. 2 nd opinion) | <input type="checkbox"/> Certification |
| <input type="checkbox"/> Verification | <input type="checkbox"/> Rating |
| <input type="checkbox"/> Other <i>(please specify)</i> : | |

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 Executive 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 use of proceeds categories Energy Efficiency, Renewable Energy and Green Buildings are viewed as impactful by the Green Bond Principles 2018.

The Energy Efficiency criterion includes two sub-criterion, one to support the roll-out of Internet of Things (IoT) technologies and one to support energy efficiency in Vodafone’s operations. Telecommunications technology, and IoT specifically, is expected to play an important role in driving energy efficiency through a range of industrial and societal applications. Examples include, but are not limited to, smart metering, smart lighting, smart parking and other aspects of smart cities, the sharing economy, including bike and electric vehicle sharing, industry automation and smart logistics. However, increasing data flows resulting from the expansion of IoT networks may result in additional overall energy demands on telecommunications networks, increasing the importance of the investments in network energy efficiency that Vodafone is simultaneously pursuing. Additionally, one limitation of the energy efficiency use of proceeds is that while IoT technologies have a broad impact, and can drive energy efficiency gains in a variety of industries, this does not exclude the possibility of application in fossil fuel-based industries.

The onsite Renewable Energy Criterion includes solar, wind, biofuel and absorption cooling. Large hydro above 25MW and Geothermal with direct emissions above 100g CO2/kWh³ are excluded.

The Green Buildings eligibility criterion for new buildings or retrofits of existing buildings includes a sub-criterion based on third-party certification standards such as LEED (Gold or higher) and BREEAM (Very Good or equivalent). Sustainalytics has conducted an evaluation of the schemes used (see Appendix 1) and considers this to be in line with market practice. Other categories of green buildings include the top 15% most efficient buildings in the region, as aligned with market practice and the Climate Bond Initiative criteria for Low Carbon Buildings.

Use of proceeds categories as per GBP:

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

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

2. PROCESS FOR PROJECT EVALUATION AND SELECTION

Overall comment on section (if applicable):

In line with market practice, Vodafone has created a dedicated Green Bond Committee to oversee the project evaluation and selection process. The committee is composed of individuals from the Treasury, Sustainable Business and Energy Performance departments. The committee will select projects based on the eligibility criteria outlined in the Vodafone Green Bond Framework. Vodafone discloses processes to identify and management potential ESG risks associated with its use of proceeds categories through its corporate website in the form of relevant policies, commitments and management systems. The disclosures cover the relevant areas of conflict minerals, worker health and safety, environmental management and data privacy and security.

Evaluation and selection

- | | |
|--|---|
| <input checked="" type="checkbox"/> Credentials on the issuer's environmental sustainability objectives | <input checked="" type="checkbox"/> Documented process to determine that projects fit within defined categories |
| <input checked="" type="checkbox"/> Defined and transparent criteria for projects eligible for Green Bond proceeds | <input checked="" type="checkbox"/> Documented process to identify and manage potential ESG risks associated with the project |
| <input checked="" type="checkbox"/> Summary criteria for project evaluation and selection publicly available | <input type="checkbox"/> Other (<i>please specify</i>): |

Information on Responsibilities and Accountability

- | | |
|--|--|
| <input checked="" type="checkbox"/> Evaluation / Selection criteria subject to external advice or verification | <input type="checkbox"/> In-house assessment |
| <input type="checkbox"/> Other (<i>please specify</i>): | |

3. MANAGEMENT OF PROCEEDS

Overall comment on section (*if applicable*):

Vodafone plans to designate an Eligible Green Project Portfolio to which proceeds from the issuance of green bonds will be allocated. Allocation will be tracked using Vodafone's internal Treasury Management System and all green projects will be assigned a unique identifier that will facilitate the traceability of disbursements. Sustainalytics views this approach as aligned with market practice.

Tracking of proceeds:

- | |
|---|
| <input checked="" type="checkbox"/> Green Bond proceeds segregated or tracked by the issuer in an appropriate manner |
| <input checked="" type="checkbox"/> Disclosure of intended types of temporary investment instruments for unallocated proceeds |
| <input type="checkbox"/> Other (<i>please specify</i>): |

Additional disclosure:

- | | |
|--|---|
| <input type="checkbox"/> Allocations to future investments only | <input checked="" type="checkbox"/> Allocations to both existing and future investments |
| <input type="checkbox"/> Allocation to individual disbursements | <input type="checkbox"/> Allocation to a portfolio of disbursements |
| <input type="checkbox"/> Disclosure of portfolio balance of unallocated proceeds | <input type="checkbox"/> Other (<i>please specify</i>): |

4. REPORTING

Overall comment on section (if applicable):

Vodafone will report annually on the allocation of proceeds and on the impact of the Eligible Green Portfolio until full allocation of green bond net proceeds. Allocation reporting will include the total amount of investments and expenditures in the Eligible Green Projects Portfolio, the amount or percentage of new and existing projects and the balance of unallocated proceeds. Impact reporting will include GHG emissions directly and indirectly abated and energy saved. Reporting will take place on Vodafone's corporate website as per market practice.

Use of proceeds reporting:

- | | |
|--|--|
| <input type="checkbox"/> Project-by-project | <input checked="" type="checkbox"/> On a project portfolio basis |
| <input type="checkbox"/> Linkage to individual bond(s) | <input type="checkbox"/> Other (<i>please specify</i>): |

Information reported:

- | | |
|---|---|
| <input checked="" type="checkbox"/> Allocated amounts | <input checked="" type="checkbox"/> Green Bond financed share of total investment |
| <input type="checkbox"/> Other (<i>please specify</i>): | |

Frequency:

- | | |
|--|--------------------------------------|
| <input checked="" type="checkbox"/> Annual | <input type="checkbox"/> Semi-annual |
| <input type="checkbox"/> Other (please specify): | |

Impact reporting:

- | | |
|--|--|
| <input type="checkbox"/> Project-by-project | <input checked="" type="checkbox"/> On a project portfolio basis |
| <input type="checkbox"/> Linkage to individual bond(s) | <input type="checkbox"/> Other (please specify): |

Frequency:

- | | |
|--|--------------------------------------|
| <input checked="" type="checkbox"/> Annual | <input type="checkbox"/> Semi-annual |
| <input type="checkbox"/> Other (please specify): | |

Information reported (expected or ex-post):

- | | |
|---|--|
| <input checked="" type="checkbox"/> GHG Emissions / Savings | <input checked="" type="checkbox"/> Energy Savings |
| <input type="checkbox"/> Decrease in water use | <input type="checkbox"/> Other ESG indicators (please specify): |
| | <ul style="list-style-type: none"> • Indirect abatement of Greenhouse Gas (CO₂) emissions (in tonnes CO₂) • Sq. ft. of Green Buildings |

Means of Disclosure

- | | |
|---|---|
| <input type="checkbox"/> Information published in financial report | <input type="checkbox"/> Information published in sustainability report |
| <input type="checkbox"/> Information published in ad hoc documents | <input checked="" type="checkbox"/> Other (please specify): Corporate Website |
| <input type="checkbox"/> Reporting reviewed (if yes, please specify which parts of the reporting are subject to external review): Vodafone has stated its intention to request a Limited Assurance report or Auditor comfort letter for reporting related to allocation of Green Bond Proceeds. | |

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.)

Vodafone corporate website: <https://www.vodafone.com/content/index/about/sustainability/approach-and-reporting/reporting-centre.html>
 Vodafone corporate website: <http://www.vodafone.com/content/index/about/sustainability.html>

SPECIFY OTHER EXTERNAL REVIEWS AVAILABLE, IF APPROPRIATE**Type(s) of Review provided:**

- | | |
|--|--|
| <input type="checkbox"/> Consultancy (incl. 2 nd opinion) | <input type="checkbox"/> Certification |
| <input type="checkbox"/> Verification / Audit | <input type="checkbox"/> Rating |
| <input type="checkbox"/> Other (<i>please specify</i>): | |

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.

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For more information, visit www.sustainalytics.com

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