

Climate Bonds Taxonomy

OCTOBER 2019

Introduction

A large segment of institutional investors have indicated their support for action to address climate change. However, when it comes to environmental criteria, investors currently have too few tools to help ensure that their investments are making a significant impact, particularly for debt based investments. The market needs independent, science-driven guidance on which assets and activities are consistent with a rapid transition to a low-carbon economy.

The Climate Bonds Taxonomy identifies the assets and projects needed to deliver a low carbon economy and gives GHG emissions screening criteria consistent with the 2-degree global warming target set by the COP 21 Paris Agreement. It has been developed based on the latest climate science including research from the Intergovernmental Panel on Climate Change (IPCC) and the International Energy Agency (IEA), and has benefited from the input of hundreds of technical experts from around the world. It can be used by any entity looking to identify which assets and activities, and associated financial instruments, are compatible with a 2-degree trajectory.

First released in 2013, the Climate Bonds Taxonomy is regularly updated based on the latest climate science, emergence of new technologies and the Climate Bonds Standard Sector Criteria.

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A traffic light system has been adopted to indicate whether identified assets and projects are considered to be automatically compatible with a 2-degree decarbonisation trajectory. Green Light is automatically compatible. Orange Light is potentially compatible, depending on whether more specific criteria are met. Red Light is incompatible. A Grey circle is used to indicate where further work is required to determine which traffic light colour is appropriate for a specific sub-set of assets or activities.

Automatically compatible



Compatible if compliant with screening indicator



Not compatible



More work required



The Taxonomy is the foundation used by the Climate Bonds Initiative to screen bonds to determine whether assets or projects underlying an investment are eligible for green or climate finance. Where detailed analysis of a sector has been undertaken and specific eligibility Criteria have been developed, bonds in that sector can be Climate Bonds Certified. This is indicated via a blue 'Climate Bonds Certification tick'. Where detailed sector based Criteria for Certification are still under development, this is indicated by a yellow circle. In this case, bonds in this sector cannot yet be certified under the Climate Bonds Standard.

Certification Criteria Approved



















Criteria under development



Energy


ELECTRICITY & HEAT PRODUCTION

	Asset type	Asset specifics	2 degree compliant	Screening indicator	Certifiable
SOLAR 	Generation facilities (power & heat)	Photovoltaic generation facilities (onshore)	●	Facilities shall have no more than 15% of electricity generated from non-renewable sources	
		Concentrated solar power facilities (onshore)	●		
	Supply chain facilities	Manufacturing facilities wholly dedicated to onshore solar energy development such as PV cells & components, CSP dishes, troughs & components etc	●		
		Dedicated storage, distribution, installation, wholesale and retail	●		
	Infrastructure	Dedicated transmission infrastructure	●		
		Dedicated supporting infrastructure including inverters, transformers, energy storage systems and control systems	●		
EÓLICA 	Generation facilities (power & heat)	Onshore wind farms	●	Facilities shall have no more than 15% of electricity generated from nonrenewable sources	
	Supply chain facilities	Manufacturing facilities wholly dedicated to onshore wind energy development such as wind turbines	●		
		Dedicated storage, distribution, installation, wholesale and retail	●		
	Infrastructure	Dedicated transmission infrastructure	●		
		Dedicated supporting infrastructure	●		
GEO THERMAL 	Generation facilities (power & heat)	Electricity generation facilities	●	Direct emissions less than 100gCO ₂ /kWh	
		Direct heat application such as Geothermal Heat Pump (GHP)	●		
	Supply chain facilities	Manufacturing facilities wholly dedicated to geothermal energy developments such as geothermal turbines	●		
		Dedicated storage, distribution, installation, wholesale and retail	●		
	Infrastructure	Dedicated transmission infrastructure	●		
		Dedicated supporting infrastructure	●		

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Energy



ELECTRICITY & HEAT PRODUCTION

	Asset type	Asset specifics	2 degree compliant	Screening indicator	Certifiable
BIO-ENERGY 	Facilities producing biofuel, biomass, biogas including fuel preparation process facilities, pretreatment facilities and biorefinery facilities (if ≥50% biomass based products produced for energy use)	Facilities producing liquid biofuel, solid and gaseous biomass for heating and cogeneration	●	(i) 80% GHG emission reduction compared to fossil fuel baseline	●
		Facilities producing liquid biofuel, solid and gaseous biomass for electricity production	●	AND	●
		Facilities producing biofuel for transport	●	(ii) Biofuel must be sourced from a sustainable feedstock (only timber feedstock allowed is waste wood)	●
	Generation facilities (power, heat & cooling)	Electricity generation facilities such as biomass power station	●	(i) Emissions of electricity generated must be lower than 100gCO ₂ /kWh	●
				AND	
				(ii) Biofuel must be sourced from a sustainable feedstock (the only timber feedstock allowed is waste wood)	
		Heating facilities	●	(ii) Emissions of biomass or biofuel used must be 80% lower than fossil fuel baseline and the energy efficiency achieved must be at least 80%	●
		Cooling facilities	●		●
		Combined Heat & Power facilities	●	AND	●
				(ii) Biofuel must be sourced from a sustainable feedstock (the only timber feedstock allowed is waste wood)	
	Supply chain facilities	Manufacturing facilities wholly dedicated to bioenergy development	●		
		Dedicated storage, distribution, installation and wholesale and retail	●		
		Blending facilities	●		
	Infrastructure	Dedicated transmission infrastructure	●		●
		Dedicated supporting infrastructure	●		

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Energy

ELECTRICITY & HEAT PRODUCTION

	Asset type	Asset specifics	2 degree compliant	Screening indicator	Certifiable
HYDROPOWER 	Generation facilities	Run of river	●	Proposed: power density > 5W/m2; or emissions of electricity generated < 100gCO2e/kWh AND Must perform an assessment, based on recognised best practice guidelines, of environmental and social risks and incorporate measures to address risks Only for pumped storage: facility will not be charged with carbon intensive energy OR facility is contributing to a grid which has at least 20% share of intermittent renewables	●
		Impoundment	●		●
		Pumped storage	●		●
	Supply chain facilities	Manufacturing facilities wholly dedicated to hydropower development such as hydro turbines and components	●		●
		Dedicated storage, distribution, installation and wholesale and retail	●		●
	Infrastructure	Dedicated transmission infrastructure	●		●
		Dedicated supporting infrastructure	●		●
MARINE RENEWABLES 	Generation facilities (power, heat & cooling)	Offshore wind farms	●	Fossil fuel back up can only be used for restart capability and monitoring, operating or resilience measures in the event of no power in the system	✓
		Offshore solar farms	●		✓
		Tidal and wave energy generation facilities			✓
		Other marine electricity generation facilities using ocean thermals, salinity, gradients, etc	●		✓
		Heating or cooling facilities using ocean thermals	●	Must achieve an 80% reduction in gCO2e/kWh compared to fossil fuel alternative	✓
	Supply chain facilities	Manufacturing facilities wholly dedicated to marine renewable energy development such as wind turbines and platforms, vertical and horizontal axis turbines, in-stream generators, etc	●		✓
		Dedicated storage, distribution, installation and wholesale and retail	●		✓

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Energy


ELECTRICITY & HEAT PRODUCTION

	Asset type	Asset specifics	2 degree compliant	Screening indicator	Certifiable
MARINE RENEWABLES	Infrastructure	Dedicated transmission infrastructure	●		●
		Dedicated supporting facilities, such as transmission terminus and transformers, grid connections, dedicated facilities for supporting vessels, equipment storage and onshore assembly	●		●
FOSSIL FUELS	Generation facilities	Coal or oil power without carbon capture and storage (CCS)	●		
		Coal or oil with carbon capture & storage (CCS)	●	CCS must capture 100% of GHG emissions	
		Coal or oil powered combine heat and power (CHP)	●		
		Waste heat recovery from coal or oil fuelled power generation	●		
		Gas power without carbon capture & storage (CCS)	●		
		Gas power with carbon capture & storage (CCS)	●		
		Gas powered combine heat and power (CHP)	●		
		Waste heat recovery from gas fuelled power generation	●		
	Mining and extraction	Coal mining or oil extraction, refining, processing or production and associated supply chain infrastructure	●		
		Gas extraction, refining, processing or production and associated supply chain infrastructure	●		
NUCLEAR	Generation facilities	Power plants	●		
		Dedicated supporting infrastructure	●		
	Mining facilities	Uranium mining	●		
OTHER	Generation facilities (heat)	Heat pumps using soil or air gradients	●		
	Advanced alternative fuel power plants	Alternative fuel power plants	●		
		Supporting infrastructure	●		

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Energy

Transmission, distribution & storage

	Asset type	Asset specifics	2 degree compliant	Screening indicator	Certifiable
TRANSMISSION & DISTRIBUTION 	Infrastructure	Construction or upgrading of overground transmission and distribution lines	●	Infrastructure supports the integration of renewable energy or energy efficiency systems and their load-balancing	●
		Undergrounding of lines where exposed to climate risks	●		●
		Construction or upgrading of sub-stations, buildings, fences and busbars	●		●
	Distributed assets	Fuses, circuit breakers, disconnectors, reactors, capacitors, transformers, voltage, regulators and switchgear	●	Required for construction or upgrading of transmission & distribution infrastructure to reduce the curtailment of renewable energy into the grid	●
	ICT / smart grid applications	Controls, computers, automation, sensors, smart meters, ICT platforms and technology that is dedicated to smart systems	●		●
STORAGE	Storage assets	Batteries, capacitors, compressed air storage and flywheels	●	Reduce GHG emissions by enabling the connection of renewable energy, reducing the curtailment of renewable energy, or facilitating lower carbon sources of electricity generation during charging/ storage compared to fossil fuel options	●
	Facilities	Large scale energy storage facilities	●		●
		Manufacture facilities dedicated to any of the above	●		●

Transport


Passenger, freight & supporting infrastructure

	Asset type	Asset specifics	2 degree compliant	Screening indicator	Certifiable
PRIVATE PASSENGER TRANSPORT 	Vehicles	Electric passenger & freight vehicles	●		✓
		Hydrogen passenger & freight vehicles	●		✓
		Other passenger vehicles, e.g. hybrid vehicles	●	Vehicle meets universal gCO ₂ /p-km (passenger per kilometre) threshold based on IEA Mobility Model data	✓
		Other freight vehicles, e.g. hybrid vehicles	●	Vehicle meets universal gCO ₂ /t-km (tonne per kilometre) threshold based on IEA Mobility Model data	✓
	Supply chain facilities	Dedicated manufacturing facilities for vehicles and key components, such as batteries, being used in eligible vehicles	●		✓
	Infrastructure	Dedicated charging and alternative fuel infrastructure (when separate from fossil fuel filling stations and garages)	●		✓
		New roads, road bridges, road upgrades, parking facilities, fossil fuel filling stations, etc	●		✓
PUBLIC PASSENGER TRANSPORT 	Trains	Rolling stock and vehicles for electrified public transport, such as electrified rail, trams, trolleybuses and cable cars	●		✓
		Fossil fuel or hybrid vehicles or rolling stock	●	Passenger transport system meets universal gCO ₂ /p-km (passenger-kilometre) threshold	✓
	Buses	Buses with no direct emissions (electric or hydrogen)	●		✓
		Fossil fuel or hybrid vehicles	●	Vehicle meets universal gCO ₂ /p-km (passenger-kilometre) threshold	✓
	Supply chain facilities	Dedicated manufacturing facilities for rolling stock, buses or key components such as batteries, being used in eligible vehicles	●		✓
	Infrastructure	Dedicated infrastructure for electrified public transport	●		✓
		Dedicated product or supporting infrastructure for fossil fuel or hybrid vehicles or rolling stock	●	Eligible if the transport mode supported is eligible according to one of the above	✓
		Dedicated charging and alternative fuel infrastructure (when separate from fossil fuel filling stations and garages)	●		✓

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Transport


Passenger, freight & supporting infrastructure

	Asset type	Asset specifics	2 degree compliant	Screening indicator	Certifiable
PUBLIC PASSENGER TRANSPORT	Infrastructure	Public walking and cycling infrastructure and cycling schemes	●		✓
		Bus rapid transit systems	●		✓
FREIGHT RAIL 	Trains	Rolling stock for electrified freight rail	●	Fossil fuel freight must not be more than 50% of the freight transported (in tonne/km)	✓
		Rolling stock for non-electrified freight rail	●	(i) Fossil fuel freight must not be more than 50% of the freight transported (in tonne/km) (ii) Transport meets universal gCO ₂ /t-km (tonne-kilometre) threshold	✓
	Infrastructure	All infrastructure for electrified freight rail	●		✓
		All infrastructure for non-electrified freight rail	●	Eligible if the associated rail is eligible	✓
CROSS CUTTING		ICT that improves asset utilisation, flow and modal shift, regardless of transport mode (public transport information, car-sharing schemes, smart cards, road charging systems, etc)	●	Must deliver substantial GHG emissions savings on either a passenger/km or a tonne/km basis	✓
		Intermodal freight facilities	●		✓
		Terminals to improve journey times	●		✓
		Smart freight logistics	●		✓
		Multi-modal logistics hubs	●		✓
		Integration of transport and urban development planning	●		✓
AVIATION	Aircraft	Passenger aircraft	●	Use of low GHG fuel (e.g. solar, electric, high % of bio-fuel), delivering substantial reduction in gCO ₂ e/passenger or tonne/km	
		Cargo aircraft	●		
	Infrastructure	Dedicated manufacture	●		
		Supporting infrastructure	●		
		Supporting buildings	●	See Buildings (pg.11)	✓

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












Transport

Passenger, freight & supporting infrastructure

	Asset type	Asset specifics	2 degree compliant	Screening indicator	Certifiable
WATER-BORNE 		Cargo ships	●	Use of low GHG fuel (e.g. hydrogen, ammonia, electric, high % of biofuel), delivering substantial reduction in gCO ₂ e/tonne/km	
		Passenger ships e.g. cruise ships or ferries	●	Use of low GHG fuel (e.g. hydrogen, ammonia, electric, high % of biofuel), delivering substantial reduction in gCO ₂ e/passenger/km	
		Oil tankers or other ships solely transporting coal or oil	●		
		Supporting infrastructure, e.g. ports or manufacture	●		








Water

Supply management & wastewater treatment



	Asset type	Asset specifics	2 degree compliant	Screening indicator	Certifiable
WATER INFRASTRUCTURE 	Water monitoring	Smart networks, early warning systems for storms, droughts, floods or dam failure, water quality or quantity monitoring processes			
	Water Storage	Rainwater harvesting systems, storm water management systems, water distribution systems, infiltration ponds, aquifer storage, groundwater recharge systems, sewer systems, pumps, sand dams		No net GHG emissions are expected, and the issuer discloses the justification for this decision with supporting documentation OR	
	Water treatment	Drinking water treatment, desalination plants, water recycling systems, wastewater treatment facilities, manure and slurry treatment facilities Ecological retention system, current force reduction mechanisms		Negative net GHG emissions are expected, and the issuer has estimated and delivered the GHG mitigation impact that will be delivered over the operational lifetime of the project or asset	
	Water distribution	Rainwater harvesting systems, gravity fed canal systems, pumped canal or water distribution systems, terracing systems, drip, flood and pivot irrigation systems	 		
	Flood defences	Surge barriers, pumping stations, levees, gates			
	Nature based solutions	Water storage from aquatic ecosystems, aquifer storage, snowpack runoff, groundwater recharge systems, riparian wetlands		No net GHG emissions are expected, and the issuer discloses the justification for this decision with supporting documentation	
		Flood defences by ecological retention, restoration of riparian wetlands, relocation of assets		OR	
		Drought defences by aquifer storage, recharge zone management, wetland management,		Negative net GHG emissions are expected, and the issuer has estimated and delivered the GHG mitigation impact that will be delivered over the operational lifetime of the project or asset	
		Water treatment by natural filtration systems, forest and fire management			
		Stormwater management by permeable surfaces, erosion control systems, evapotranspiration systems			
	Products	Water saving technologies			

Buildings

Commercial, residential & energy efficiency



	Asset type	Asset specifics	2 degree compliant	Screening indicator	Certifiable
BUILDINGS 	Commercial buildings	Including offices, hotels, retail buildings, public buildings, educational buildings, healthcare buildings etc.	●	An emissions footprint in the top 15% of emissions performance in the local market	
	Residential buildings	Private dwellings	●	OR	
		Multifamily residential buildings	●	A substantial reduction in gCO2/m2 because of upgrade or retrofit	
	Other building types	Data centres	●	See ICT (pg. 16)	
		Stations and related buildings for eligible transport	●	See Transport (pg.7)	
		Industrial buildings	●	See Industry (pg.14)	
PRODUCTS AND SYSTEMS FOR BUILDING EFFICIENCY	Energy efficiency	Facilities dedicated to manufacturing energy efficient components	●	See Industry (pg.14)	
	Low carbon building materials	Low carbon and alternative building materials such as alternatives to cement and concrete	●		

Urban development

BUILT ENVIRONMENT	Urban or semi-urban areas	Such as neighbourhood level works, upgrades and retrofits such as street lighting	●	The built environment or specific programme must improve its emissions performance (gCO2/m2) substantially	
URBAN PLANNING 	Infrastructure	District heating for residential and commercial applications	●	Fed primarily by renewable energy	
		Building, maintaining or upgrading utility tunnels for cables or pipelines	●	Significant resource and energy efficiency improvements	
	Other	Urban policies and regulations directed to climate change mitigation e.g. car-free areas	●	Significant impact on urban emissions	

Land use & marine resources


Agriculture, husbandry, aquaculture & seafood

	Asset type	Asset specifics	2 degree compliant	Screening indicator	Certifiable
AGRICULTURE (INCLUDING MIXED USE PRODUCTIVE SYSTEMS) 	Agricultural production	Agricultural land - including land used for the production of crops, agroforestry and silvopastoral systems, land used to rear livestock	●	Demonstration of significant carbon sequestration, reduction in emissions or compatibility with 'low carbon agriculture' targets	●
		Livestock	●		●
		Agricultural production on peatland	●		
	Infrastructure	Machinery and equipment to manage and cultivate eligible land or livestock	●	Eligible if the agricultural production adheres with the above	●
		Associated management, information systems and other technologies	●		●
		Drip, flood and pivot irrigation systems	●	See Water (pg.10)	●
COMMERCIAL FORESTRY 	Forests & timber production	Plantations and natural forests	●	No conversion from natural landscape and health of the forest is well managed	●
		Timber production on peatland	●		
	Infrastructure	Machinery and equipment to manage and cultivate eligible forested land	●	Eligible if the forest and timber production adheres with the above	●
		Associated management, information systems and other technologies	●		●
	Pulp & paper	Production facilities incorporating efficient pulping process, bio-refineries, use of recyclates	●		●
NATURAL ECOSYSTEM PROTECTION & RESTORATION	Land	Land remediation and clean up	●	Habitat is appropriate for the location and is maintained in good health	●
		Natural ecosystem land (managed and unmanaged)	●		●
	Infrastructure	Machinery and equipment to manage eligible ecosystems	●	Eligible if the related land is in compliance with the above	●
		Associated management and information systems and other technologies	●		●

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Land use & marine resources

Agriculture, husbandry, aquaculture & seafood

	Asset type	Asset specifics	2 degree compliant	Screening indicator	Certifiable
FISHERIES AND AQUACULTURE 	Fisheries	Wild fisheries and farmed fish	●	Must hold certification for sustainable management	●
	Infrastructure	Machinery and equipment to manage and harvest in fisheries and fish farms e.g. fishing vessels	●	Eligible if the fishery or aquaculture operation adheres with the above	●
		On shore and off shore fish processing and storage facilities connected to eligible fisheries and fish farms	●		●
		Associated management, information systems and other technologies	●		●
SUPPLY CHAIN ASSETS MANAGEMENT	Supply chain	Input supply systems for seed production, distribution and access	●	Facility is sustainable managed and certified as such	●
		Primary processing and storage facilities for eligible agricultural produce	●	Eligible if agricultural produce complies with relevant Criteria	●
		Primary processing and storage facilities for eligible forestry produce	●	Eligible if forest produce complies with relevant Criteria	●
		Primary processing facilities and storage for eligible fisheries and aquaculture activities	●	Eligible if fish produce complies with relevant Criteria	●

Industry

Industrial & energy intensive processes

	Asset type	Asset specifics	2 degree compliant	Screening indicator	Certifiable
PRIMARY RESOURCES 	Cement production facilities	Production facilities, incorporating dry processes, reduced clinker content	●		
	Steel, iron & aluminium production facilities	Extraction facilities and equipment, incorporating electric arc furnace, smelting reduction, efficient casting processes	●		
	Chemical production	Production facilities incorporating lower carbon ammonia feedstocks, catalyst intensification	●		
	Glass production facilities	Production facilities incorporating efficient process heating, use of recyclates	●		
	Other primary production facilities	Various	●		
FUEL PRODUCTION	Biofuel production facilities	See Bioenergy (pg.3)	●	See Bioenergy (pg.3)	●
	Hydrogen fuel production facilities		●		
CLEAN UP	Carbon Scrubber	Facilities and products for clean-up, such as treatment of exhaust gases from industrial plants	●		
		Products dedicated to clean-up or efficiency of fossil fuel energy	●		
	Carbon Capture & Storage (CCS)	Facilities and products dedicated to CCS	●	CCS has the ability to capture 100% of GHG emissions	
OTHER INDUSTRY & MANUFACTURING	Secondary processing & manufacturing	Various	●		
SUPPLY CHAIN 	Manufacturing facilities	Facilities dedicated to manufacturing key components for eligible facilities	●	Eligible if dedicated to an eligible asset type e.g. solar panel or wind turbine manufacture	
		Facilities dedicated to manufacturing energy efficient appliances and equipment e.g. fridges, cookers etc	●	Energy efficiency rating amongst top performers in the market	
	Other supply chain	Facilities dedicated to the storage, distribution or retail of eligible industrial or manufactured products	●	Eligible if dedicated to an eligible asset type e.g. all electric rail supply chain	

Waste and pollution control

Recycling, re-use & other waste managements

	Asset type	Asset specifics	2 degree compliant	Eligibility criteria	Certifiable
PREPARATION 	Facilities for collection, sorting and material recovery	Facilities and assets with high recovery rates of reusable or recyclable material			
		Collection of waste that is going to landfill			
RE-USE	Facilities for the re-use of materials	Facilities refurbishing or repairing products or cleaning components or products for reuse in their original function			
RE-CYCLING	Facilities for the recycling of materials	Facilities for recycling or metals, plastics, glass (except aggregate) and paper			
BIOLOGICAL TREATMENT FACILITIES	Anaerobic digestion facilities	Facilities for the production of biogas from green waste			
	Composting facilities	Facilities for the production of compost from residual waste			
WASTE TO ENERGY	Waste to energy plants (e.g. incineration, gasification, pyrolysis and plasma)	Facilities for solid waste treatment with production of electricity or heat as a by-product		Waste to energy conversion is at minimum 25%	
LANDFILL	Landfill with gas capture	Projects to add gas capture to existing, closed landfill facilities		Gas capture of at least 75% and the gas must be used to generate electricity	
	Land fill without gas capture				
RADIOACTIVE WASTE MANAGEMENT	Nuclear waste treatment				
	Nuclear waste disposal				
WASTEWATER	Water treatment			See Water (pg.10)	

Information & communications technology

Networks, management & communication tools

	Asset type	Asset specifics	2 degree compliant	Climate compatible indicator	Certifiable
BROADBAND NETWORKS	Broadband networks	Fibre optic and cable networks	●		
	Supporting infrastructure	Such as internet exchange points	●		
IT SOLUTIONS	Connectivity	Teleconferencing and telecommuting software and service	●		
	Data hubs	Including data storage centres	●		
	Supporting infrastructure	Such as hardware and manufacture of hardware	●		
POWER MANAGEMENT	Infra-structure, software and hardware for remote power management	Remote solutions for appliance power management, and load-balancing of renewables	●		
	In situ power management	Including automatic switching, energy monitoring & data systems	●		

Revisions and updates to the Climate Bonds Taxonomy

The Climate Bonds Taxonomy is a working document. It will be revised and updated periodically as developments are made in the Climate Bonds Standard Sector Criteria and in international green bond policies. It will also be revised when low carbon trajectories from prominent research institutions are released and updated.

Climate Bonds Initiative has an active role in developing international green bond policy and keeps up-to-date with the latest climate science and low carbon development trajectories through its Technical Working Groups and through external engagement and research.

Updates will be announced on the Climate Bonds Blog.