

# Waste Management Criteria

The Climate Bonds Standard & Certification Scheme's  
Waste Management Criteria

Criteria Document

December 2019

## List of Acronyms and Abbreviations

C&I waste - commercial & industrial waste  
CD&E waste - construction, demolition and excavation waste  
CH<sub>4</sub> - methane  
CI - carbon intensity  
CO<sub>2</sub> - carbon dioxide  
CO<sub>2e</sub> - carbon dioxide equivalent  
CV - calorific value  
E-waste - electronic waste  
EfW – energy from waste  
EPR - Extended Producer Responsibility  
GIB - Green Investment Bank  
GWMO - The Global Waste Management Outlook  
GWP - global warming potential  
HDPE - high density polyethylene  
ICT - information and communications technology  
IEA - International Energy Agency  
IPCC - The Intergovernmental Panel on Climate Change  
LCA - life cycle assessment  
MBT – mechanical biological treatment  
MRFs - material recovery facilities  
MSW - municipal (solid) waste  
PAS - Publicly Available Specification  
PET - polyethylene terephthalate  
PP – polypropylene  
SLCP - short-lived climate pollutant  
TCFD - Task Force on Climate-related Financial Disclosures  
WEEE - waste electrical and electronic equipment

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## Definitions

**Certified Climate Bond:** A Climate Bond that is certified by the Climate Bonds Standard Board as meeting the requirements of the Climate Bonds Standard, as attested through independent verification.

**Climate Bond Certification:** allows the issuer to use the Climate Bond Certification Mark in relation to that bond. Climate Bond Certification is provided once the independent Climate Bonds Standard Board is satisfied the bond conforms with the Climate Bonds Standard.

**Climate Bond:** A climate bond is a bond used to finance – or refinance - projects needed to address climate change. They range from wind farms and solar and hydropower plants, to rail transport and building sea walls in cities threatened by rising sea levels. Only a small portion of these bonds have been labelled as green or climate bonds by their issuers.

**Climate Bonds Initiative (CBI):** An investor-focused not-for-profit organisation, promoting large-scale investments that will deliver a global low carbon and climate resilient economy. The Initiative seeks to develop mechanisms to better align the interests of investors, industry and government so as to catalyse investments at a speed and scale sufficient to avoid dangerous climate change.

**Climate Bonds Standard (CBS):** A screening tool for investors and governments that allows them to identify green bonds where they can be confident that the funds are being used to deliver climate change solutions. This may be through climate mitigation impact and/ or climate adaptation or resilience. The CBS is made up of two parts: the parent standard (Climate Bonds Standard v2.1) and a suite of sector specific eligibility Criteria. The parent standard covers the certification process and pre- and post-issuance requirements for all certified bonds, regardless of the nature of the capital projects. The Sector Criteria detail specific requirements for assets identified as falling under that specific sector. The latest version of the CBS is published on the Climate Bonds Initiative website.

**Climate Bonds Standard Board (CBSB):** A board of independent members that collectively represents \$34 trillion of assets under management. The CBSB is responsible for approving i) Revisions to the Climate Bonds Standard, including the adoption of additional sector Criteria, ii) Approved verifiers, and iii) Applications for certification of a bond under the Climate Bonds Standard. The CBSB is constituted, appointed and supported in line with the governance arrangements and processes as published on the Climate Bonds Initiative website.

**Green Bond:** A Green Bond is where proceeds are allocated to environmental projects. The term generally refers to bonds that have been marketed as “Green”. In theory, Green Bonds proceeds could be used for a wide variety of environmental projects, but in practice they have mostly been the same as Climate Bonds, with proceeds going to climate change projects.

**Industry Working Group (IWG):** A group of key organisations that are potential issuers, verifiers and investors convened by the Climate Bonds Initiative. The IWG provides feedback on the draft sector Criteria developed by the TWG before they are released for public consultation.

**Technical Working Group (TWG):** A group of key experts from academia, international agencies, industry and NGOs convened by the Climate Bonds Initiative. The TWG develops the Sector Criteria - detailed technical criteria for the eligibility of projects and assets as well as guidance on the tracking of eligibility status during the term of the bond. Their draft recommendations are refined through engagement with finance industry experts in convened Industry Working Groups and through public consultation. Final approval of Sector Criteria is given by the CBSB.

**Waste Management Assets and Projects:** Assets and projects relating to the management of waste, and/or the development or acquisition of associated infrastructure. These facilities might include: energy from waste, anaerobic digestion, recycling and other technologies such as the installation of effective gas collection and recovery systems on landfill sites.

The Climate Bonds Initiative gratefully acknowledges the Technical and Industry Working Group members who provided their expertise and advice in the development of these Criteria. Members are listed in Appendix 1. Particular thanks are given to Resource and Waste Solution's Terry Coleman, the lead specialist coordinating the development of the Criteria through the Technical Working Group and to Golder Associates for the use of their WRATE software ([www.wrate.co.uk](http://www.wrate.co.uk)).

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## 1 Introduction

### 1.1. Overview of this document

The focus of this Criteria Document is municipal waste management. It is the first Criteria for waste management that CBI is publishing. The document sets out the requirements and conditions under which waste management assets can be certified under the Climate Bonds Standard.

### 1.2. The Climate Bonds Standard

Investor demand for Green Bonds and Climate Bonds is strong and will increase in line with the delivery of quality products into the market. However, investor questions about the credibility of green labelling are also growing. Standards, assurance & certification is essential to improve confidence and transparency, which in turn will enable further strong growth in the market.

The Climate Bonds Standard and Certification Scheme is an easy-to-use screening tool that provides a clear signal to investors and intermediaries on the climate integrity of Certified Climate Bonds.

A key part of the Standard is a suite of sector-specific eligibility Criteria. Each Sector Criteria sets climate change benchmarks for that sector that are used to screen assets and capital projects so that only those that have climate integrity, either through their contribution to climate mitigation, and/or to adaptation and resilience to climate change, will be certified. Where a bond encompasses a mixed portfolio of assets across several sectors, each sub-category of assets will be subject to the relevant Sector Criteria for those assets.

The Sector Criteria are determined through a multi-stakeholder engagement process, including Technical and Industry Working Groups, convened and managed by the Climate Bonds Initiative, and are subject to public consultation. Finally, they are reviewed and approved by the Climate Bonds Standard Board.

The second key part of the Climate Bonds Standard is the overarching Climate Bonds Standard V3. This gives the common fund management and reporting requirements that all Certified Climate Bonds must meet, in addition to meeting the appropriate specific Sector Criteria.

### 1.3. The need for Waste Management Criteria

The World Bank has estimated GHG emissions from waste management alone as 5% of global GHG emissions or 1.6 billion tonnes CO<sub>2</sub>e, primarily from open dumping and disposal in landfills without landfill gas capture systems<sup>5</sup>. Even this underestimates the sector's potential for climate change mitigation, when the overall effects of better waste and resource management are taken into account. Prevention, reuse, recycling, and energy recovery can all reduce methane emissions from landfill, avoid emissions linked to resource extraction and production using virgin materials, and offer an alternative energy source to fossil fuels. Accounting the whole lifecycle, incorporating the benefits of recycling and energy recovery, the sector has the potential to contribute a 10 to 15% reduction in global GHG emissions<sup>6</sup>.

The sector already has \$300 billion of active projects<sup>22</sup>, of which \$85 billion relates to MSW<sup>23</sup>. The investment required to deal with future waste management within a 2°C scenario is difficult to quantify, particularly as it is the capital cost that is of interest, that cost depends on the type of management system and a lot of the investment will be in developing countries. The World Energy

<sup>5</sup> Kaza, S., Lisa, Y., Bhada-Tata, P. and Van Der Woerden, F., (2018). *What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050*. Overview booklet. World Bank, Washington, DC.

<sup>6</sup> Ellen MacArthur Foundation (EMF). 2013. *Towards the Circular Economy: Economic and business rationale for an accelerated transition*. Isle of Wight, UK: EMF.

<sup>22</sup> Over a two-year period January 2013 to December 2014.

<sup>23</sup> Ellen MacArthur Foundation (EMF). 2013. *Towards the Circular Economy: Economic and business rationale for an accelerated transition*. Isle of Wight, UK: EMF.

## Waste Management Criteria

Council has estimated the global waste to energy market will reach \$40 billion by 2023<sup>24</sup>. Moreover, the capital expenditure for waste management in developing Asian countries has been estimated at between \$23.7 and \$90.3/tonne for composting and energy from waste respectively<sup>25</sup>. The overall investment required, taking an average of the global waste forecast to be generated between 2016 and 2050, is between \$2.1 trillion and \$7.8 trillion.

Historically, both the public sector: national or local governments, international and financing institutions, and the private sector have financed investments in the sector<sup>26</sup>. The majority of public sector funding has been from local or regional government, making service delivery vulnerable to political factors and national economic problems<sup>27</sup>. Although private operators have more flexibility because their income can be related to the cost of service delivery, they also require external funding to upgrade or develop new, capital intensive facilities.

### 1.4. Assets and projects in scope for the Criteria

These Criteria apply to assets and projects relating to the following aspects of the treatment of municipal solid waste and similar waste:

- Collection (including collection infrastructure, containers)<sup>29</sup>
- Sorting to separate recyclables
- Reuse and recycling (including processing into secondary raw materials and repair)
- Composting & anaerobic digestion of green/garden/yard and food waste
- Thermal treatment with energy recovery of residual waste (outside the EU only)
- The installation of gas recovery systems for landfill sites (for non-operational landfill sites only)

Further details of the scope of the Criteria are in Section 2, Table 1.

### 1.5. Key elements to the Criteria

As a general principle, bonds will meet the requirements of the Climate Bonds Standard, namely that the associated use of proceeds:

- Promote low carbon infrastructure;
- Promote adaptation and resilience to climate change both in respect of assets and projects themselves and the systems in which they are located.

Complete details of the requirements in respect of Waste Management assets and projects are detailed in Section 3 of this document. The reporting requirements associated with these requirements are summarised in Section 4.

### 1.6. This document and supplementary information available

This document details:

- The current scope of waste management assets and projects eligible for certification under the Climate Bonds Standard – see Section 2;
- The Climate Mitigation and Adaptation & Resilience requirements that these assets and projects must meet to be eligible for inclusion in a Certified Climate Bond – see Section 3;
- Mandatory disclosure requirements for certified bonds – see Section 4.

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<sup>24</sup> Waste to Energy 2016, World Energy Council.

<sup>25</sup> João Aleluia, Paulo Ferrão, Assessing the costs of municipal solid waste treatment technologies in developing Asian countries, Instituto Superior Técnico, University of Lisbon, Waste Management

<sup>26</sup> Ellen MacArthur Foundation (EMF). 2013. *Towards the Circular Economy: Economic and business rationale for an accelerated transition*. Isle of Wight, UK: EMF.

<sup>27</sup> Ibid.

<sup>29</sup> Collection vehicles and other transport infrastructure are covered under CBI's Transport Criteria documents.

## Waste Management Criteria

Supplementary information available online in addition to this document include:

1. Waste Management Criteria Brochure: a 2-page summary of the Waste Management Criteria.
2. Waste Management Background Paper: full background to the process of determining these Criteria, including issues raised and discussed by the TWG, and arguments and rationale for the approaches and decision taken.
3. Climate Bonds Standard V3: the umbrella document laying out the common requirements that all Certified Climate Bonds need to meet, in addition to the sector-specific Criteria (V3 is the most recent update version).
4. Climate Bonds Standard & Certification Scheme Brochure: an overview of the purpose, context and requirements of the Climate Bonds Standard & Certification Scheme. 

For more information on the Climate Bonds Initiative and the Climate Bond Standard & Certification Scheme, see [www.climatebonds.net](http://www.climatebonds.net). For the documents listed above, see [www.climatebonds.net/standard/waste](http://www.climatebonds.net/standard/waste). For more information on the Climate Bonds Initiative and the Climate Bond Standard & Certification Scheme, see [www.climatebonds.net/standard](http://www.climatebonds.net/standard).

### 1.7. Revisions to these Criteria

These Criteria will be reviewed within three years of launch, at which point the TWG will take stock of issuances that arise in the early stages and any developments in improved methodologies and data that can increase the climate integrity of future bond issuances. As a result, the Criteria are likely to be refined over time, as more information becomes available. However, certification will not be withdrawn retroactively from bonds certified under earlier versions of the Criteria.

## 2 Assets

These Criteria cover assets and activities that deal with municipal waste (MSW) which consists of waste from households and similar wastes from industry and commerce. They therefore exclude other wastes from industry and commerce, all hazardous wastes and CD&E wastes. Assets and activities dealing with waste prevention are also out of scope of these Criteria, as are all assets and activities dealing with wastes other than MSW or similar wastes.

The scope of eligible assets and activities is presented in Table 1 using a traffic light system for ease of use as follows:

- Green: almost certain to be compatible with a low carbon or climate-resilient economy in all circumstances and assumed to be automatically eligible for certification
- Red: excluded either because they are incompatible with a low carbon or climate-resilient economy or because determining their eligibility is outside the mandate of the Waste Management Criteria.
- Amber: requiring further assessment to determine its eligibility

### 2.1. Assets covered by these Criteria

*Table 1: Summary scope of eligible projects and assets for Climate Bonds Certification under the Waste Management Criteria.*

Eligible activity types	Example use of proceeds	Mitigation	Adaptation & resilience
Material Reuse	Facility repairing and/or reusing products or components for same purpose for which they were conceived.		
Material Recycling	Facilities producing recycled glass, metal, paper, and plastic from post-consumer waste.		
	Facilities using recycled glass to produce glass aggregate.		
Collection Infrastructure	Containers provided for waste.		
Composting	Facility producing compost via green waste such as food, garden or yard wastes.		
Anaerobic Digestion	Facility processing food, garden or yard, or other organic materials to produce biogas and digestate for e.g. electricity generation		

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Pre-sorting	Facilities for segregating mixed recyclables into separate, saleable streams, e.g. material recovery facilities (MRFs).		
Waste Incineration or Gasification & Energy Recovery	Facility producing electric and/or heat via the combustion of municipal solid waste OR mixed residual waste.		
	Facility producing electric and/or heat via gasification of residual municipal solid waste.		
Decommissioned Landfill only, with Gas Capture & Energy Generation	<i>Project</i> to capture biogas from non-operational landfill (ceased receiving waste except inert restoration materials).		

## 2.2. Assets not covered by this Criteria

Table 2: Potential assets which have overlaps with other Climate Bonds Certification Criteria.

Assets or Activity	Comments on Applicable Sector Criteria
Municipal Solid Waste Prevention	Manufacturing facilities reducing their waste generation both pre and post-consumer are not within the scope of the Waste Management Criteria. They will be considered when Manufacturing Criteria are developed.
Remanufacturing Facility	Manufacturing facilities using reclaimed or recycled materials to manufacture goods and services are not within the scope of the Waste Management Criteria. They will be considered when Manufacturing Criteria are developed.
Land Transport	<p>Vehicles used within the waste facilities are eligible for certification if they meet the Transport Criteria. Other mobile plant assets within the facility itself are eligible for certification under the Waste Management Criteria when part of a wider eligible project.</p> <p>All collection vehicles and those used for transfer of waste are also eligible but must comply with the Transport Criteria.</p>

### 3 The Eligibility Criteria for Waste Management

These Criteria cover waste management operations for waste once it has become waste. For the avoidance of doubt, all mobile plant used at waste management facilities, such as forklifts, loading shovels etc. are included within the assets covered by these Criteria.

The Waste Management Criteria has two sets of requirements:

- Mitigation Requirement
- Adaptation and Resilience Requirement

#### 3.1. Mitigation Requirements

##### Waste Collection

Table 3: Criteria for Waste Collection

Assets covered	Eligibility Criteria
ISO containers, recycling bins, wheeled bins, green/ garden waste containers	Made from 100% recycled and recyclable materials. Containers for residual waste will not be eligible unless part of an investment that also includes an equivalent number of separate containers for material recycling.  Support source segregation of waste.
Collection vehicles	Must meet Transport Criteria

##### Waste Storage

Table 4: Criteria for Waste Storage

Assets covered	Eligibility Criteria
Storage and bulking facilities	Dedicated to eligible waste processing asset(s) downstream. Those downstream assets do not need to be certified but do need to meet the criteria for that asset type. All waste stored must be transferred to those assets.
Collection vehicles	Must meet Transport Criteria

## Waste Sorting, Separation and MRFs

Table 5: Criteria for Waste Sorting

Assets covered	Eligibility Criteria
Sorting facilities  (Includes material recovery facilities (MRFs) and some MBT plant.	Facilities sorting mixed recyclables into separate glass, metal, plastic, paper, etc. are eligible for certification where the outputs are demonstrated via invoices or weighbridge tickets to go to facilities that are or would be certifiable under the recycling criteria per Table 6.
	Facilities processing mixed residual waste to produce feedstock for EfW are eligible where they separate waste components for recycling and both the recycling and residual outputs are demonstrated via evidence to go to facilities that are or would be certifiable under the EfW criteria per Table 9.

## Recycling and Reuse

Table 6: Criteria for Recycling and Reuse

Assets covered	Eligibility Criteria
Facilities processing recyclable waste fractions into secondary raw materials	The secondary raw materials (such as steel, aluminum, glass, plastics) cease to be waste and are sold to be used as secondary raw materials.
Facilities collecting, sort, clean, refurbish, recondition and/ or repair products	The products are put back to their original use without any further pre-processing required.  For waste electrical and electronic equipment (WEEE) specifically, the product is covered by an ecolabelling scheme and only those products meeting the three lowest energy use categories are eligible.

## Composting

Table 7: Criteria for Composting

Assets covered	Eligibility Criteria
Facilities processing food and/ or green/ garden/ yard waste to produce compost for agricultural, municipal or consumer applications	<ul style="list-style-type: none"> <li>• Zero measurable methane emissions</li> <li>• Monitoring, sampling and control of the following is carried out in accordance with PAS100 guidance or equivalent national or state standard or guidance:                             <ul style="list-style-type: none"> <li>- Waste inputs (to ensure only source separated, uncontaminated garden/yard and other appropriate waste is received).</li> <li>- The process (for example, to ensure temperature, moisture and emissions are aligned with correct process operation); and</li> </ul> </li> </ul>

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	<ul style="list-style-type: none"> <li>- Product quality (properly sampled and analysed for parameters that would affect its use: for example, heavy metals and other biocidal substances, particle size, contamination, stability).</li> <li>• The resulting product is not landfilled and replaces non-waste material in the market.</li> </ul>
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## Anaerobic Digestion

Table 8: Criteria for Anaerobic Digestion

Assets covered	Eligibility Criteria
Facilities which produce power and/ or heat using food and/ or green/ yard waste	<ul style="list-style-type: none"> <li>• Total methane emissions <math>\leq 1285\text{g CH}_4/\text{tonne of waste input}</math> (this is approximately equivalent to <math>100\text{g CO}_2\text{e/ kWh}</math>)</li> <li>• Woody waste must be segregated before or after processing and sent to an eligible EfW or composting plant</li> <li>• Monitoring, sampling and control of the following is carried out in accordance with PAS110 guidance or equivalent national or state standard or guidance <ul style="list-style-type: none"> <li>- Waste inputs (to ensure only source separated, uncontaminated food and other appropriate waste is received).</li> <li>- The process (for example, to ensure temperature and emissions are aligned with correct process operation).</li> </ul>                     And <ul style="list-style-type: none"> <li>- Product quality (properly sampled and analysed for parameters that would affect its use: for example, heavy metals and other biocidal substances, nutrients and contamination).</li> </ul> </li> <li>• The solid and liquid products are not landfilled and replace non-waste materials in the market.</li> </ul>

## Energy from Waste

Table 9: Criteria for Energy from Waste

Assets covered	Eligibility Criteria
Facilities which produce power and/ or heat/ cooling by the thermal processing of residual waste, including rejects from recycling/ composting/ AD	<p>For EfW facilities outside the EU only:</p> <ul style="list-style-type: none"> <li>• Plant efficiency <math>\geq 25\%</math>; AND</li> <li>• Bottom ash recovery; AND</li> <li>• <math>\geq 90\%</math> recovery of metal from ash; AND</li> <li>• Average carbon intensity of electricity and/ or heat over the life of the plant <math>\leq</math> waste management allowance (see Box 1 for how to determine this); AND</li> <li>• The capacity of the plant does not exceed the calculated residual waste at any time in the plant's life.</li> </ul> <p><i>N.B. EfW facilities within the EU are not eligible for certification.</i></p>

Box 1. Step by Step Approach to assessing the qualifying carbon intensity of Energy from Waste

<p>Step 1: Obtain the best available, detailed waste compositional analysis for the waste input.</p> <p>Step 2: Adjust if necessary for changes in recycling since the analysis.</p> <p>Step3: Combine with proximate analysis of the different waste fractions (calorific value, total carbon content, estimated proportion of fossil carbon), calculate the net CV and the fossil carbon content of the projected waste input.</p> <p>Step 4: Calculate what would be the emissions intensity of the EfW plant gCO<sub>2e</sub>/kWh produced at the minimum qualifying efficiency when the dense and film plastic has been removed (termed the waste management allowance).</p> <p>Step 5: This figure is the emissions intensity that must be demonstrated to be met if the plant is to be considered as eligible under this Criterion.</p> <p>Note that it is not necessary to remove all the dense and film plastics. The qualifying limit can be achieved through other (or a combination of) measures, such as increased plant efficiency due, e.g. to the recovery and supply of heat.</p>
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**Landfill Gas Recovery**

Table 10: Criteria for landfill gas recovery

Projects covered	Eligibility Criteria
Projects to capture biogas from closed landfill facilities	<ul style="list-style-type: none"> <li>• Gas capture &gt;= 75%; AND</li> <li>• Gas used to generate electricity and input to the natural gas grid or used as vehicle fuel; AND</li> <li>• The landfill is not accepting further waste (with the exception of restoration materials)</li> </ul>

### 3.2. Adaptation & Resilience Requirements

**Adaptation and Resilience Checklist**

The Adaptation & Resilience checklist focuses on the processes the issuer should demonstrate they have been through to determine if the issuer is asking and evaluating the right questions at the right stages of development and if the issuer is monitoring and reporting appropriately.

To meet the requirements, issuers must demonstrate that:

- Climate related risks and vulnerabilities to the asset are identified; and
- Impacts in, and beyond, the asset to ecosystems and stakeholders are identified; and
- Strategies to mitigate and adapt to the climate risks and vulnerabilities identified to protect the asset.

All elements of this checklist must be addressed, with appropriate evidence provided that these requirements are being met or are not applicable in respect of the specific assets and projects linked to the bond. It is expected that the evidence will encompass a range of assessment and impact reports and associated data, including, but not limited to, those reports required to meet national and local licensing and approval processes. This might include Development Consent Orders, Environmental Impact Assessments, Vulnerability Assessments and associated Adaptation Plans.

Table 11: Checklist for evaluating the Issuer's Adaptation & Resilience performance in respect of a waste management facility

Item	Proof given	Overall assessment
Section 1: The issuer identifies the climate related risks and vulnerabilities to the asset/site		
<p>Processes are in place (as part of both the asset design and ongoing management) to assess key risks to the assets from a changing climate.</p> <p>These key risks should include the following, plus any others felt to be of concern for the operation of these assets. The risks should be identified and interpreted in terms of the impact on the asset and the related effects for the business – e.g. impact on operating feasibility and schedules, and potential system outages, impact on maintenance requirements etc.</p> <p>N.B. This list taken from World Banks Climate and Disaster Risk Assessment Tool</p> <ul style="list-style-type: none"> <li>● Temperature changes, and extremes in temperature</li> <li>● Extreme precipitation and flooding</li> <li>● Drought</li> <li>● Sea level rise and storm surge</li> <li>● Strong winds</li> </ul> <p>How these affect the asset or site in question will be highly variable and will be for the issuer to identify and relate to their operations. These assessments should use climate information, modelling and scenarios from a peer-reviewed source.</p> <p>This assessment should be done regularly. The frequency of the assessment will depend on the nature of the climate related risks and vulnerabilities, and should be specified by the issuer and reported against in subsequent annual reporting.</p>		
Section 2: The issuer identifies the impacts in larger context (spatially and temporally) beyond the asset/site (i.e. the impacts of the underlying assets and projects on the broader ecosystem and stakeholders in that ecosystem)		
<p>Processes should be in place (as part of both the asset design and ongoing management) to assess the impact of the waste management asset on the climate resilience of other stakeholders in the social, economic and environmental system in which it operates and how to mitigate or reduce any negative impacts</p> <p>These assessments address:</p> <ul style="list-style-type: none"> <li>● Any ways in which waste management facilities might affect the climate resilience of other users/stakeholders?</li> </ul>		

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<ul style="list-style-type: none"> <li>• Any ways in which waste management facilities improve the adaptation capacity of other users/stakeholders?</li> <li>• For example, they may include:</li> <li>• Impact on water quality and quantity for other users in the basin</li> <li>• Waste and pollution emitted</li> <li>• Fire hazards</li> </ul>		
<p>Section 3: The issuer has designed and implemented strategies to mitigate and adapt to these climate risks and vulnerabilities</p>		
<p>An adaptation plan has been designed and is being implemented to address the risks identified in the assessments above.</p> <p>The issuer has designed or amended asset maintenance plans to ensure that scheduled maintenance is sufficient to cope with the ongoing impacts of climate change; and a plan has been established to govern how to approach emergency maintenance needs arising from sudden climate change impacts (e.g. extreme storms).</p> <p>The issuer has training, capacity and governance arrangements in place for how the organisation will deal with the impacts of exceptional events (e.g. droughts, floods, severe pollution events, extreme storms, winds etc.).</p> <p>The issuer has monitoring and reporting systems and processes to identify high risk scenarios.</p> <p>The issuer has contingency plans to address disruption to operations or loss of the asset and any resulting environmental or social damage.</p> <p>The issuer has processes for feeding risk assessment back into decision-making.</p> <p>The issuer has a budget allocated to implementing the adaptation plan and has a named member of staff responsible for its implementation.</p> <p>The issuer complies with any existing broader or higher-level adaptation plans, such as NAPAs.</p>		

## 4 Appendices

### Appendix 1: TWG and IWG members

#### Working group members

##### Waste Management Technical Working Group Members

Adam Read - Ricardo Energy & Environment  
Adrian Barnes - Green Investment Bank  
Amrita Sinha - C40  
Bernie Thomas - Resources Futures  
Brendan Edgerton - World Business Council on Sustainable Development  
Carla Tagliaferri - University College London  
Chris Hoy - Ricardo Energy & Environment  
Dominic Hogg - Eunomia  
Gary Crawford - Veolia / International Solid Waste Association  
Jess Allan - Anaerobic Digestion and Bioresources Association  
Keith James - WRAP  
Libby Bernick – Trucost  
Margaret Bates - University of Northampton  
Mariel Vilella - Zero Waste Europe  
Mia (Chang) He - CECEP Consulting  
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Professor Richard Murphy - University of Surrey  
Samantha Arnold - Golder Associates  
Shui-e Yin - Environmental Sanitation Engineering Technology Research Center of Ministry of Housing and Urban-Rural Development  
Sourabh Manuja - The Energy and Resources Institute  
Stuart Ferguson - London Waste & Recycling Board  
Suneel Pandey - The Energy and Resources Institute  
Terry Coleman - Resource and Waste Solutions LLP (Lead Technical Consultant)  
Thom Koller - Anaerobic Digestion and Bioresources Association  
Wenqin Lu - CECEP Consulting

##### Waste Management Industry Working Group Members

Alexandra Licurse - Debt Capital Markets Origination  
Andrew McIntyre - ADB  
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Desmond Ho – NEA  
Doug Farquhar - DNV GL  
Dr. Tahsin Choudhury - Tuv Nord  
Duncan Russel - ERM  
Emilie Hagan - Atelier Ten  
Eng Kim TAN - NEA  
Grace Sapuay  
Hailei Zhu (Albert) - CQC

## Waste Management Criteria

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Janina Lichnofsky - ISS  
John Sayer - Carbon Care Asia Limited  
John Scanlon - Suez  
Joseph BOEY - NEA  
Julien Grimaud - 2ei  
Larry Grant - Eden Eco Solutions  
Margaret Andrews - Suez  
Mark Berry - Norton Rose Fulbright  
Mark Fisher - EY  
Melanie Eddis - ERM  
Mike Cao - Shanghai Mu Yi Investment Advisors Ltd.  
Michael van Brunt - Covanta  
Monica Reid - Kestrel Verifiers  
Myles Cohen - Earth Link  
Paul Gilman - Covanta  
Pip Best - EY  
Rainer Winte - Tuev Nord  
Robert Rosenberg - ISS  
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