

Climate Emergency Action Planning

Guidance for asset
owning
organisations





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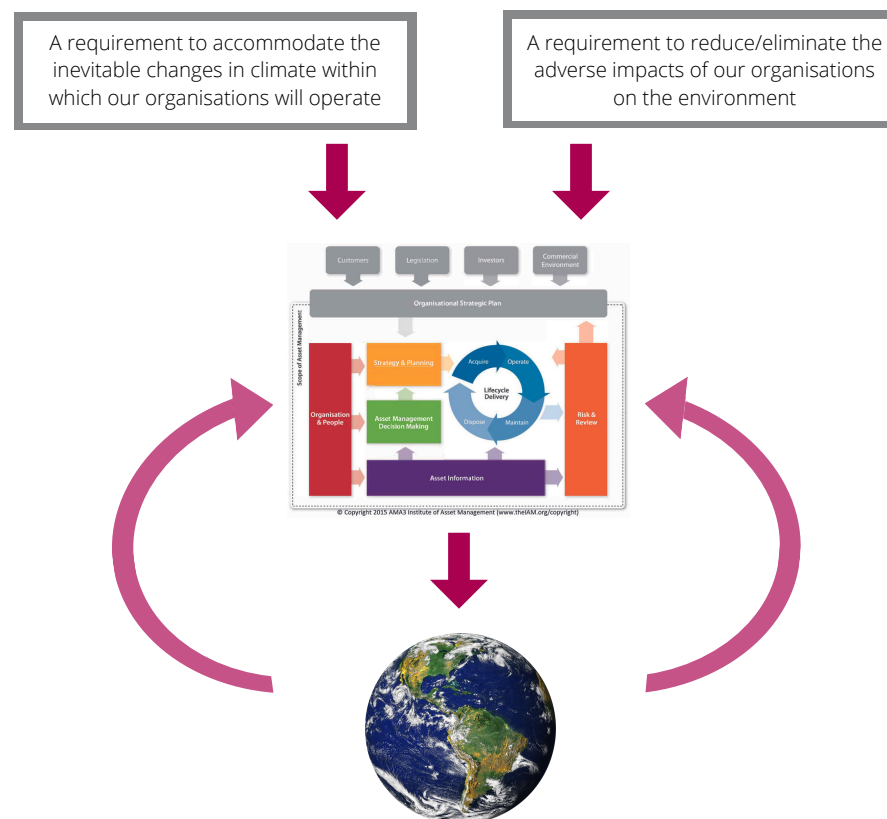
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Introduction

Purpose of this document

This document provides practical guidance to the asset management community on how to approach the climate emergency challenge and where to access additional information and knowledge. It demonstrates how the existing approach to developing Asset Management Strategies and Plans can be enhanced to address this challenge. It also provide guidance for organisations on how to develop plans to mitigate their environmental impact through the reduction or eliminations of greenhouse gas (GHG) emissions¹ and other relevant measures.

This document reflects our current understanding of how the practice of asset management can best address the climate emergency challenge, and the advice we provide will continue to evolve as we work with our members and organisations across the world in facing this challenge. We would be delighted to receive feedback on this document and suggestions for amendments or further content – [please email the IAM Climate Emergency Group](#).



Building on existing asset management capabilities to deliver sustainable organisations and support a sustainable planet



Introduction

Context

The Secretary-General of the United Nations describes the Intergovernmental Panel for Climate Change (IPCC)'s Sixth Assessment Report² as 'code red for humanity'. Rapid action is required across sectors and globally to mitigate climate change and build climate change resilience.

The Institute of Asset Management (IAM) accepts the indisputable science that we face a major climate emergency, unprecedented in human history and that this is resulting in sustainability and resilience issues across society. In combination with implementing actions to mitigate climate change through reduced GHG emissions, organisations must introduce measures to adapt their systems and infrastructure to be resilient to changes in the climate, for example addressing increased asset degradation/failure risks due to exposure to extremes of temperature, drought, and flooding. Organisations must also consider the broader issues of environmental, social and economic sustainability, by reducing their detrimental environmental impacts and using resources sustainably.

We must all address both our damaging impact on the planet and its subsequent impact on our society. Accountability to take action to reduce

the adverse impacts on our natural environment, especially our climate, falls on governments, industries, corporations, investors, and societal institutions. Engendering change requires urgent and clear leadership from these organisations. Increasingly governments throughout the world are mandating organisations demonstrate that the impact of their actions on the environment is a core part of their decision-making processes. The IAM recognises the need to include all professions and society as a whole in a collaborative effort to find and share solutions to address the different issues with which we are presented.

Making sustainable and climate conscious investment decisions is essential if we are to be effective in tackling the climate emergency. It is vital that the asset management community recognises this challenge and the significant contribution it can make to helping find and implement solutions. Consequently, the IAM is committed to support our members, organisations, governments and decision-making bodies by leading action through collaboration and the sharing of standards and good practice. Our aim is to embed the UN Sustainable Development Goals³ and other environmental and social drivers into an enhanced asset management approach, a key

component of which will be targeted strategies and actions to address the climate emergency – what the IAM is describing as **Climate Emergency Actions Plans**.

Although the focus of this document is primarily related to the role of asset management in addressing the climate emergency challenge, the approach proposed can be readily adapted to assist organisations in meeting this challenge for other aspects of their business.



Introduction

Sharing experiences and good practice

Developing robust climate emergency action plans will be a challenge for most organisations and the IAM considers that it is vital that knowledge, experiences and examples of good practice are widely shared. We will continue to work with our members and other organisations throughout the world:

- to further develop our understanding of climate change challenges and opportunities and how this knowledge can be applied to influence the delivery of sustainable solutions; and
- to provide an international platform for knowledge sharing from a variety of disciplines to promote alignment within and across sectors and geographical boundaries.

In addition, the IAM will maintain a list of documents, standards and other materials published by other organisations that provide information or specialist advice on addressing the climate emergency challenge.





Building on Existing
Good Asset Management
Practice

IAM Conceptual Asset Management Model

The foundation of good asset management is the delivery of long-term sustainable value. This is achieved using a whole-life, whole-system approach that is guided by stakeholder expectations, optimises the use of resources and has clearly defined targets based on transparent processes and evidenced-based methodologies. In addition, the whole-life approach also supports the concept of a circular economy, where the longevity and durability of material selection, and end-of-life repurposing opportunities are encouraged. Central to this approach is the avoidance of functional, organisational and technical boundaries that can lead to sub-optimal solutions.

These are precisely the characteristics required for the development of robust climate emergency action plans, and many organisations around the world are using their established asset management systems to address this challenge. However, even for experienced asset management organisations, the scale of the challenge is such that a detailed understanding of how to exploit the opportunities provided by an effective asset management system will undoubtedly improve the robustness of the plans produced.

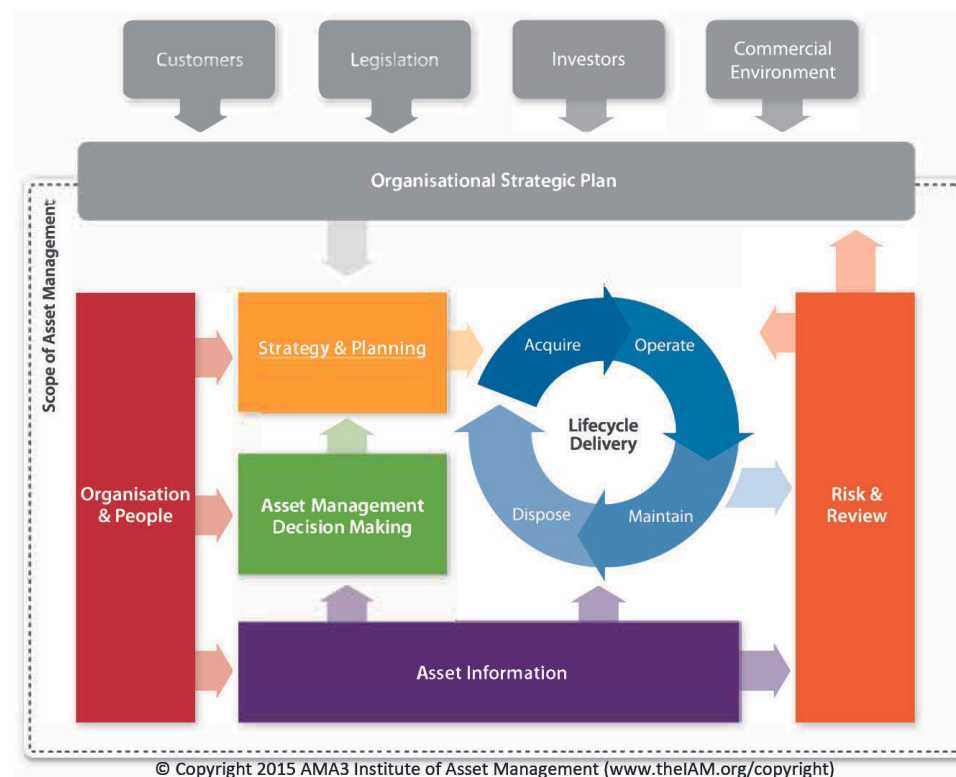


The IAM's conceptual model for asset management (right) identifies the six key subject groups that together enable an organisation to ensure that its approach to asset management effectively, efficiently and sustainably supports the delivery of the organisational strategic plan and objectives.

The IAM has carried out a detailed appraisal of how the guidance it currently provides for each of these subject groups can be enhanced to ensure that organisations are able to:

- provide senior leadership with sufficient information and options to enable them to develop a corporate climate emergency strategy and objectives;
- understand the changes needed to the asset base and how it is managed to address the climate challenge; and
- develop robust (transparent and evidence-based) Asset Management Strategies and Plans that will support the delivery of the organisation's climate emergency objectives.

The output of this appraisal and the resulting revised guidance is summarised below. More details can be found on the IAM website.



Strategy and Planning

Strategy & Planning is the most critical group of activities within an organisation's asset management system, identifying the asset and asset-system related activities that are necessary to deliver long-term value to the organisation and its stakeholders, and to support the delivery of the organisation's strategy and objectives. As a consequence, reviewing the activities included in this subject group should be a priority for an organisation addressing the climate emergency challenge. It is important to note that, as described above, it is not necessary (and probably highly ineffective) to develop a strategy and plan for addressing climate emergency separately from that necessary to deliver other organisational objectives. Existing Asset Management Strategies and Plans should be broadened in scope to address the additional climate emergency requirements.

To achieve this the senior team within the organisation must determine and communicate its requirements for addressing the climate emergency challenge, both in terms of scope and timescales. This should be based on a detailed understanding of stakeholder needs and expectations, and an understanding of the capability of the organisation, its assets and its supply chain partners to meet these requirements. The organisation's Asset

Management Policy should be updated to reflect these requirements and its value criteria, and decision support tools enhanced to evaluate strategic options.

Based upon the outcome of this analysis – and following agreement with the senior team and key stakeholders (which may involve adjustments to the organisation's strategy and goals) – a revised set of Asset Management Objectives will be produced containing explicit reference to the delivery of the climate emergency goals. Climate emergency related objectives could include, for example: an asset climate resilience review to be completed by 2022, a climate resilience strategy to be in place for the five most critical asset classes by first quarter 2023, a climate change mitigation plan to be in place for the top 10 GHG emitting assets/processes by 2023. The existing Asset Management Strategy, the Strategic Asset Management Plan (SAMP) and supporting Asset Management Plans should then be updated, budgets adjusted and delivery and monitoring regimes put in place. These plans must include consideration of GHG emissions and other environmental outcomes, such as bio-diversity, as well as whole-life cost, if the planning and delivery of asset maintenance and operations is to be sustainable and climate resilient.



Lifecycle Delivery

Organisations incur the majority of their asset-related expenditure during the activities in the Lifecycle Delivery stage. We need to adjust the focus from simply the avoidance of cost, and recognise that mitigating environmental impact and remaining adaptable and sustainable are equally, if not more, valuable to the organisation and its stakeholders. Asset investment appraisal criteria must reflect this broader understanding of value and must include consideration over the whole-life of the asset.

With capital assets often having a lifespan of many decades, the decisions and actions taken within the Lifecycle Delivery stage have long lasting consequences from an environmental and sustainability perspective, and organisations' assets must operate within the context of a rapidly changing environment. It is therefore imperative that asset managers ensure that all activities across the entire asset life (including asset disposal and repurposing opportunities) mitigate the impact of current and future assets on the environment; and that they can adapt to rapid and unprecedented changes to operating environments; whilst still remaining a sustainable solution.

Addressing climate emergency best practice and strategies, the Lifecycle stages (represented

in the conceptual model) will need to reflect an asset's vulnerability to climate effects and facilitate adaptation measures over the lifetime of an asset, for example to accommodate changes in technology and resources. A vital component of this consideration will be addressing environmental requirements within systems engineering. The Lifecycle stages will need to allow for mitigation opportunities throughout the life of an asset and minimise the asset's GHG footprint while still achieving the organisations objectives. This requires an understanding of the overall GHG contribution (embodied, operational and maintenance, and during disposal) as well as the environmental impacts.



Risk and Review

The International Organization for Standardization (ISO) defines risk as the 'effect of uncertainty on objectives'. Although it is understood that climate change will have significant impacts on assets, products and services, the degree or extent of various climate-related impacts across different time horizons remains uncertain. The impact of this climate risk or uncertainty upon organisations is that sustainability and GHG emissions targets must be managed within thresholds of variation.

For example, technology changes may not deliver the expected asset reliability or reduced emissions benefits, or suppliers may not deliver their emission or sustainability targets. In addition, climate change effects (both in terms of frequency and severity) could have an impact on the performance of assets and therefore on the delivery of organisational objectives. It is essential therefore that climate emergency uncertainties (both adverse and opportune) are thoroughly explored and levels of risk appetite and tolerance re-examined. An understanding of stakeholder expectations is a vital part of these considerations. Risk models and lists of priority/critical assets should be reviewed and updated to reflect these uncertainties and to facilitate the development of robust climate change plans.

Monitoring and review are essential components of an effective asset management system, primarily to ensure that the actions necessary to support the implementation of the Asset Management Strategy have been executed effectively. These steps are crucial for ensuring that desired outputs are achieved and that processes are subject to continuous improvement. Organisations should recognise that climate-related risks pose new challenges to achieving corporate objectives and changes which address those risks should be identified as part of an Asset Management Strategy. For example, new or increased asset vulnerabilities to climate changes will need to be identified and monitored, with potentially greater use of lead indicators to predict asset degradation or failure. Monitoring of goods and services provided by suppliers is also likely to require enhancing and may need to be more intrusive, particularly relating to GHG emissions. Consideration should also be given to the risks associated with supply chain disruption, especially considering reliance on resources, parts and materials that are difficult to source or need to be transported over long distances.



Asset Management Decision Making

To ensure the most effective management of assets in line with climate change causes and risks, targeted risk-based decisions need to be made at each asset lifecycle stage.

Organisations need to consider sustainability, effect on the environment and output requirements to ensure greater asset resilience from climate changes. It is vital for organisations to understand the climate and environmental impact from their assets and then to ensure robust and timely mitigations are in place, minimising GHG emissions and climate change causes as much as possible. The asset management system should ensure that robust decision-making processes and criteria are defined and recorded and that regular reviews take place to learn lessons of previous decisions.

Organisations should also consider all processes within the asset management system that increase associated GHG emissions: for example, construction methodologies, operations and maintenance provision, outage and shutdown strategies (which may require release of harmful emissions) and resourcing strategies including sourcing of spares and specialist tools. Developing value-based analysis and lifecycle costing tools which take into account the impact on the organisation's triple bottom line (financial, societal and

environmental) will be essential in providing the organisation with the information needed to make informed decisions at each lifecycle stage. It will also be important to develop risk models that consider the local and global effect of climate change which is increasing adverse weather effects, such as flooding, drought, higher atmospheric temperatures, and increased wind speed, which will then enable decisions to be made to keep, change or modify existing assets to further support or maintain asset resilience.



Asset Information

Good practice approaches to asset information broadly support the delivery of climate change objectives. However, asset management professionals need to recognise that more complex questions and analysis are likely to be required to address the climate emergency – both to support long term decision making when selecting optimum future strategies and to undertake enhanced reporting to demonstrate the effectiveness of actions and plans. In both these cases, new information sources, different data types and greater data volumes are likely to be used – increasing the data management challenge for organisations.

It is also important to recognise that the challenges arising from climate change will sometimes not have been experienced in the past. Extremes of impact and frequency of events will most likely increase; therefore, data and information need to be considered with these factors in mind. Leading indicators and near misses will become ever more important, as will extrapolating past data with ‘what if’ scenarios.

Innovation and emerging technologies are an important component of climate change resilience and mitigation. Specifically, asset innovations (including enhancement to existing technologies, as well as applications of

emerging technologies) may also present challenges to asset managers due to a lack of asset knowledge, data on performance, for example. This challenge must be recognised and addressed.



Organisation and People

The IPCC 6th report has stated that human activity is changing the climate in unprecedented and sometimes irreversible ways. The people within asset management organisations can have a material impact in addressing this.

Effective leadership is critical. Developing and implementing a climate emergency action plan will be a challenge for most organisations and it is essential that the senior team within an organisation fully demonstrate in both words and actions their commitment to the plan, as follows:

- **Strategy:** the senior team must ensure that the strategy is clearly articulated and regularly communicated, the necessary funds and resources are made available and describe the consequences of failing to deliver the strategy.
- **Structure:** the organisational structure and performance monitoring regime may need to be modified to reinforce the delivery of this strategy. The people within the organisation must have the competence required to enable them to address the climate emergency challenge. This may necessitate changes to staff training programmes and the creation of new roles – potentially requiring the recruitment of

- *(continued)* new staff with specific expertise in key tasks (for example, expertise in low carbon technologies, legislative and regulatory knowledge).
- **Culture:** the senior team must also ensure that the culture of the organisation underpins this approach: encouraging an environment where challenge, innovation and cross-team working is encouraged, and progress is not delayed by competing team goals, local priorities or a blame culture where an innovation has not delivered everything expected.

Most organisations rely on third parties for materials or services and the contribution that these organisations can make to the delivery of a climate emergency strategy should not be underestimated. Organisations need to identify the suppliers that are key to their success and work closely with them to ensure that their actions are fully aligned with the delivery of the strategy. This may require significant changes in the supply chain, in interactions with suppliers and moving away from organisations that do not share the organisation's commitments in preference to suppliers that have aligned values. It may also require bringing in-house some activities previously outsourced. Conversely, organisations might need to outsource some activities currently carried out

by their own teams, where the involvement of a third party would enhance the ability to deliver the strategy.





Developing Climate Emergency Action Plans

Scope and Prioritisation



As discussed above, for the majority of organisations, addressing the climate emergency challenge requires action on two key issues: reducing and removing GHG emissions and improving the resilience of the organisation's infrastructure to expected climate changes. Critically, achieving both of these must be achieved in a sustainable manner. These actions, known respectively as **climate change mitigation** and **climate change adaptation**, are explored more fully below.

As with most aspects of good practice asset management, prioritisation is essential. Before embarking on extensive plans organisations are recommended to assess the scale of the climate challenge and how this might vary in different parts of the organisation, particularly for those whose operations are geographically dispersed. It is also considered worthwhile carrying out a high-level assessment of the relative importance of mitigation and adaptation plans. Organisations must consider the vulnerability of their asset base in terms of exposure to climate change factors, such as extremes of heat or flooding (see table in 'Developing a climate change model' section). They must determine what needs to be addressed in terms of adaptation to improve resilience and mitigation to reduce emissions, and prioritise their

investment accordingly.

It is important to recognise that the purpose of effective asset management is not simply supporting the delivery of the organisation's goals, but it is also about helping the organisation formulate and shape these goals, providing the decision-makers within the organisation with an understanding of what is possible and over what timescale. These appraisal and planning processes should invariably identify choices for the organisation, presented in a format that allows the senior team to make effective decisions.

It is likely there will be significant interrelation between an organisation's climate change mitigation and adaptation strategies; this may generate both conflicts and opportunities. For example, the adaptation strategy may propose the early replacement of a specific asset or asset type to improve system resilience. However, the mitigation strategy may be encouraging the life extension of these assets to reduce GHG emissions associated with the manufacture and installation of new assets. Conversely, the early renewal of an asset to improve system resilience might provide a cost-effective mechanism to reduce emissions by the careful selection of the replacement asset. A structured approach to rationalising these

Scope and Prioritisation

opportunities and conflicts is required. It is also essential that organisations use multi-criteria assessments in their option appraisal tools, to reflect the fact that the value calculations must include consideration of GHG emissions, environmental impact, water and energy usage, costs and any other criteria that represent what the organisation values.

The approach set out in this paper identifies how organisations can build on (or transition from) their existing asset management strategy and planning methodologies to address the climate emergency challenge. These methodologies should be enhanced so that climate emergency considerations form an integral part of future strategies and plans. In line with all aspects of good asset management practice, when developing mitigation and adaptation strategies and plans all sources of information and assumptions should be documented and subject to regular review.



Climate Change Adaptation: "making systems and infrastructure resilient to changes in climate."

Understanding changes in climate and potential impact on assets

Central to effective asset management is a consideration of future changes in the environment (both business and climatic) in which the assets will operate, and it has long been recognised within the asset management community that those assets with an extended life expectancy will experience some changes in the climate in which they operate. It is now becoming increasingly evident, however, and reinforced by the IPCC 6th report that the scale and rate of change necessitates a much more immediate and thorough consideration of these issues. At a global level the UN Coalition for Climate Resilient Investment (CCRI)⁴ was created to ensure that, by 2025, physical climate risks are systematically integrated into all investment decisions.

The IAM recommends addressing this challenge by the use of risk-based models, considering the increasing likelihood and consequence of asset failure/degradation due to climate change and the impact this might have on the delivery of the organisation's goals. In summary this necessitates:

- understanding the expected changes in the climate in which the assets operate;
- assessing the likely impact of these changes on the performance of the assets and the ability to manage the assets;
- assessing the consequences of this impact in terms of the delivery of the organisation's objectives;
- developing strategies and plans to manage this impact; and
- monitoring the effectiveness of these plans and making adjustments as required.





Developing a climate change model

Developing an adaptation model requires an understanding of how the climate may change over the life of the assets, the extent of this change and the potential impact on the assets. The framework in the table on the next page provides an illustration of how this assessment can be carried out, and it is against such a framework that adaptation strategies can be considered. Multi-national organisations may need to develop a number of models, to reflect the significant geographical variations in climate change that can be expected.

Expert guidance should be used to help develop these models. Where there is considerable uncertainty in forecasts, and where relatively minor variations in climate could have a disproportionate impact on asset performance, it may be appropriate to consider a number of different climate scenarios against which asset performance and mitigation would be assessed.

In assessing the potential climate change impact, it is important that the approach adopted is not limited solely to the physical impact on the assets: the processes for managing the assets and potential changes in demand for the organisation's products and

services should also be considered. For example, adverse weather conditions could severely impede the ability of the organisation to carry out routine or corrective maintenance activities, potentially leading to further degradation to the asset. Climate change may also have a disproportionate impact on future material availability or service costs and cause disruption to local and global supply chains. Climate change may also alter demand patterns and affect migration of people as some areas of the world become less habitable. These and other impacts need to be identified so that effective action plans can be developed.

	CLIMATE CHANGES	METRICS	POTENTIAL IMPACT
Water	<ul style="list-style-type: none"> • Heavy rain, causing damage and/or leading to localised flooding • General rises in sea and river levels and flow rates • Ground movement and landslides • Increase in frequency and intensity of lightning, hail, snow or ice storms 	<ul style="list-style-type: none"> • Annual rainfall • Peak rates and duration 	<ul style="list-style-type: none"> • Transport disruption / delays • Supply chain interruptions • Damage to building foundations • Increased loading on bridge supports • Water ingress damage • Sewer flooding, reduction in water quality
Drought	<ul style="list-style-type: none"> • Reduced rainfall • Lowering of river and lake levels • Ground movement 	<ul style="list-style-type: none"> • Annual rainfall • River and lake water levels 	<ul style="list-style-type: none"> • Habitat degradation • Food shortages • forest fires • Lack of drinking water, reduction in water quality • dust storms • Inability to operate hydro-electric power stations
Temperature	<ul style="list-style-type: none"> • Changes in duration and timing of seasons (reduced predictability) • Periods of intense heat • Less frequent cold periods - but perhaps more intense • Drought and fires • Invasive species causing damage to assets (or harm to employees) • Biodiversity crisis 	<ul style="list-style-type: none"> • Daily, weekly, monthly temperatures 	<ul style="list-style-type: none"> • Impact on asset specifications • Overheating of buildings/assets • Transport disruption/delays • UV degradation • Equipment failure
Wind	<ul style="list-style-type: none"> • Speed • Dust storms 	<ul style="list-style-type: none"> • Mean wind speeds • Gust wind speeds 	<ul style="list-style-type: none"> • Impact of storm damage • Impacts of increased cooling on assets • Impact on design specifications

An illustration of a framework for assessing the impact of climate change



Developing Climate Change Adaptation Plans

The table on the following page provides an overview of how existing asset management strategy, planning and implementation processes provide the platform for developing robust, risk-based adaptation action plans. In line with the prioritisation recommendations in the 'Scope and Prioritisation' section, critical assets, processes and supply chains should be considered first, extending the approach as necessary. This further consideration may include connected assets in systems/networks to identify single points of failure for less critical individual assets that would have a whole system/network failure impact.

The selected climate change adaptation strategies (for example rerouting networks, building flood defences, replacing or improving the resilience of vulnerable assets, improved drainage, housing equipment currently exposed to the elements) should take into account the benefits delivered – including the wider societal and environmental benefits, consideration of carbon accounting and natural capital accounting techniques in order to understand the true return on organisational values. As discussed above it is important to recognise that, as with all asset management plans, it is

unlikely that there will be a single solution to the problem. For example, back-up or dual supply systems may be more cost effective than improving existing asset resilience. As a consequence, the organisation's senior team should be provided with options, that represent different sustainable outcomes, cost and reliability scenarios.

Risk	<ul style="list-style-type: none"> • Agree and document climate change assumptions (using the type of framework outlined in 'Developing a climate change model' above) for a planning horizon relevant to the expected life of the organisation's assets • Identify assets (including networks of connected assets) that are critical to the operation of the organisation. Repeat this planning process as considered necessary for other assets • Assess the likely impact of the climate change scenario(s) on these assets and the resulting business impacts using multivariate analysis techniques (expressing these impacts wherever possible in both financial and organisational value terms) • Update risk models and logs
Asset Management Decision Making	<ul style="list-style-type: none"> • Ensure decision criteria and whole-life cost and performance models are modified as necessary to take into consideration impacts arising from expected climate changes • Identify and cost options to alleviate this impact. Develop business cases for potentially viable options. Note adaptation options may include: <ul style="list-style-type: none"> ◦ improving resilience of existing assets ◦ immediate replacement of an asset with one with a revised but more resilient specification ◦ waiting until an asset is due for renewal, then replace with a more resilient asset ◦ making the asset redundant by innovation
Strategy and Planning	<ul style="list-style-type: none"> • The senior team should provide clear leadership on adaptation, ensuring that its importance is fully understood throughout the organisation • Ensure the Asset Management Policy is updated to reflect the organisation's approach to adaptation • Agree a climate change adaptation strategy, targets, timelines and monitoring regime • Update the Asset Management Strategy to reflect the requirements of the climate change adaptation strategy, providing details of: <ul style="list-style-type: none"> ◦ climate change adaptation strategy implementation costs and expected benefits ◦ how the implementation of the strategy will be monitored ◦ identify expected asset performance as a result of these plans ◦ residual risks, key enablers and key assumptions • Update the organisation's Asset Management Plan to reflect the revised Asset Management Strategy

Organisation and People	<ul style="list-style-type: none"> • Update organisational roles, responsibilities and team objectives to reflect the climate change adaptation strategy • Ensure that adequate resources are made available to deliver the climate change adaptation plan • Review employee capabilities and implement a training programme as required • Ensure the procurement strategy reflects the climate change adaptation strategy requirements, e.g. asset resilience requirements, asset life-expectancy
Asset Information	<ul style="list-style-type: none"> • Identify and source information required to develop and implement climate change adaptation plans • Identify information required to monitor the delivery and impact of the climate change adaptation plans • Update data collection processes, systems, training, communication etc. to ensure availability of the required information
Lifecycle Delivery	<ul style="list-style-type: none"> • Ensure investment approval processes and criteria reflects the climate change adaptation strategy requirements • Ensure each asset has a dynamic environmental standards register that is updated with changes to legislation and standards relevant to the asset • Document and implement revised asset specifications and/or operating and maintenance regimes with updated climate change adaptation strategy requirements • Collect required information relating to asset costs and performance, including GHG emissions and environmental impact, to assist with the review process and with further strategy development
Review	<ul style="list-style-type: none"> • Monitor the implementation of the climate change adaptation plans as defined within the organisation's Asset Management Plan • Monitor the expected level of performance of the assets • Identify improvement opportunities

Climate Change Mitigation:

"avoiding and reducing emissions of heat-trapping greenhouse gases into the atmosphere to prevent the planet from warming to more extreme temperatures."

Understanding the mitigation challenge

As stated in the IPCC 6th report, organisations must, as a matter of urgency, identify their direct and indirect carbon⁵ emissions. The GHG Protocol⁶ provides the following classification system for different types of emissions:

- **Scope 1:** direct emissions – those produced by operations owned or controlled by the organisation;
- **Scope 2:** indirect emissions – those arising from their energy providers; and
- **Scope 3:** indirect emissions that arise from the value chain.

Organisations must take steps to understand the sources of these emissions and develop plans to reduce and remove their residual GHG

emissions. The climate emergency requires urgent action – climate change mitigation plans must be ambitious and deliverable. Many organisations are quoting target dates to become carbon neutral, without really defining (or perhaps, understanding) what this means for the organisation or having any clear costed and resourced plans to achieve this.

The definitions⁷ for net-zero and carbon neutral are as follows:

- A **carbon neutral** footprint is one where the sum of the GHG emissions (in CO₂ equivalent) produced is offset by natural carbon sinks and/or carbon credits.
- To reach a state of **net-zero** emissions for companies consistent with achieving net-zero emissions at the global level in line with



- (continued) with societal climate and sustainability goals implies two conditions:
 - To achieve a scale of value-chain emission reductions consistent with the depth of abatement achieved in pathways that limit warming to 1.5°C with no or limited overshoot; and
 - To neutralise the impact of any source of residual emissions that remains unfeasible to be eliminated by permanently removing an equivalent amount of atmospheric carbon dioxide.

Carbon neutrality has a minimum requirement of covering Scope 1 and 2 emissions, with Scope 3 encouraged. Net-zero must cover Scope 1, 2 and 3 emissions. For organisations to reach net-zero they must reduce and remove as much of their GHG emissions as possible and set in place GHG removal or carbon capture measures to address their residual GHG emissions. Reductions can be made by carbon being removed from the atmosphere, for example by tree planting, peat bog restoration and emerging carbon capture technologies.

A key challenge is understanding emissions across the whole of the value chain, not just the direct emissions from the business, within the agreed boundaries. For example, if an item of equipment is purchased from a manufacturer it

is necessary to understand the Scope 3 emissions (primarily the carbon and other GHG emissions associated with its manufacture and delivery to your premises). This also applies to service providers and it is important to understand the GHG emissions that result from the delivery of these services to your organisation. GHG Protocol provides various calculation tools to enable companies to develop inventories of their emissions using best-practice methods for these different classifications. Once emissions have been calculated and the biggest emitters of the business have been identified, organisations can then work to reduce and remove these. Care must be taken when considering carbon offsetting; factors to be considered include:

- the time lag between the GHG being emitted to the atmosphere and the gas being removed by the natural sinks;
- the effectiveness of the carbon sink in removing the required volume of carbon, which can themselves be affected by the
- changing climate (for example, warming oceans reduce the efficiency of the removal process); and
- a lack of control over the amount of carbon sequestered (for example, the required number of trees may not be planted, or the trees may be cut down as a result of change of land ownership).





Developing a Climate Change Mitigation Strategy

There is a growing body of evidence that there are many ways in which an organisation can reduce its GHG emissions without incurring significant costs, and cases where technologies with lower GHG emissions than their alternatives may also be financially beneficial over the asset's lifetime. However, it is also acknowledged that achieving the required levels of reduction represents a considerable challenge and difficult decisions may need to be made.

Organisations should account for the potential impact of climate change on the value of each investment; as excluding the impacts of climate change could result in unsustainable business models. It is vital that the senior team within an organisation provide sufficient clarity on its climate change mitigation expectations and objectives to enable robust plans to be developed. As discussed above, the development of this strategy must include a detailed consideration of stakeholder expectations – including on emission targets and on off-setting⁸. Reputational damage arising from an organisation failing to address GHG emissions is cited by an increasing number of organisations as a primary driver for its strategy.

Issues for inclusion within a climate change mitigation strategy are likely to cover:

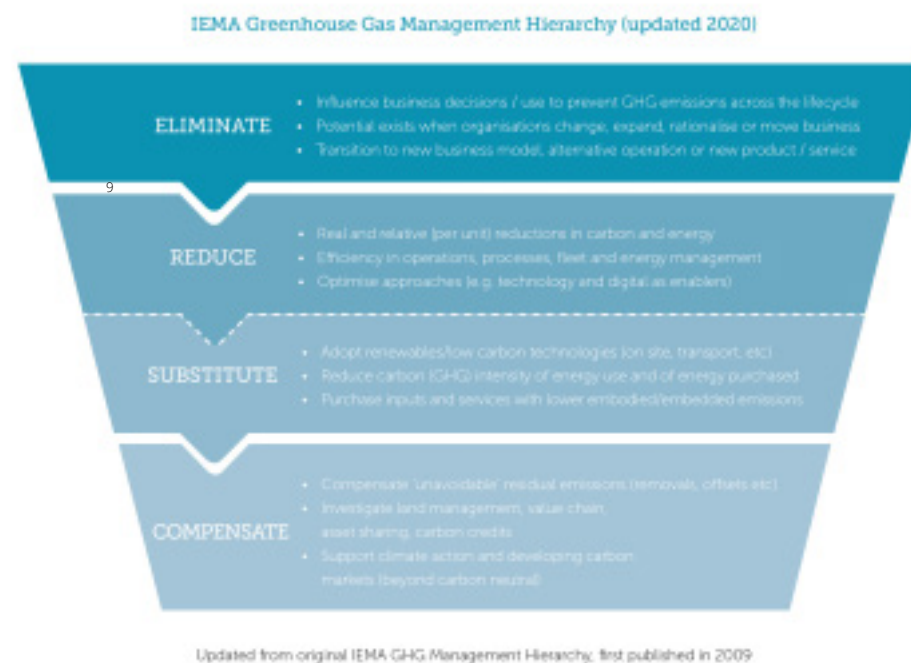
- SMART targets for GHG emission reduction and details of how these targets will be measured, including;
 - a base and target year;
 - assumptions and methodological approaches, including estimating and accounting for anthropogenic GHG emissions and, as appropriate, removals; and
 - modelling that underpins the mitigation goal.
- relevant definitions, for example carbon neutrality;
- off-setting – the level that is considered acceptable and how it should be managed;
- the amount of money the organisation is prepared to invest to reduce GHG emissions;
- reputational damage if GHG emissions targets are not challenging, or if published targets are not met;
- the criteria for considering if an operation (or product or service) should be discontinued if this would compromise the delivery of the organisation's emissions targets; and

- the approach to suppliers, including sustainability criteria for approving suppliers
- and how their emissions will be factored into the organisation's emissions totals.

In considering opportunities to reduce GHG emissions the Institute of Environmental Management and Assessment⁹ recommends the hierarchy of actions in this diagram.

In line with general asset management good practice an iterative process to develop and finalise the strategy should be adopted, with firm targets only agreed when the actions and cost necessary to deliver these targets are sufficiently well understood. As discussed above target setting is vital to the successful delivery of the strategy. Targets are considered science-based if they are in line with what the latest climate science deems necessary to meet the goals of the Paris Agreement¹⁰ – limiting global warming to well-below 2°C above pre-industrial levels and pursuing efforts to limit warming to 1.5°C.

Many organisations are signing up to 'Race to Zero' and are setting science-based targets that align their business with the Paris Agreement.



IEMA GHG Management Hierarchy as amended 2020. Please refer to IEMA for further updates.



Developing Climate Change Mitigation Plans

The table on the next page provides an overview of how existing asset management planning, strategy and implementation processes provide the platform for developing robust, risk-based climate change mitigation action plans. In line with the prioritisation recommendations in the 'Scope and Prioritisation' section, those activities that generate the highest levels of emissions should provide the primary focus for consideration. As with the development of climate change adaptation plans, it is unlikely that there will be a single solution to each challenge. As a consequence, the organisation's senior team should be provided with options, that represent a range of emission reduction scenarios.

When calculating a GHG footprint (addressing scopes 1, 2 and 3), it is important that the evaluation process provides for a thorough assessment of the potential sources of emissions. These include emissions resulting from:

- the manufacture and delivery of an asset;
- the installation, commissioning and operation of an asset;
- the maintenance (including outages and shutdowns) of an asset, including replacement parts and emissions

- associated with traveling to the asset;
- asset de-commissioning, deconstruction and repurposing;
- data collection and management;
- maintenance depots and other buildings' overheads; and
- emissions from elsewhere in the value chain, both upstream and downstream.

Risk	<ul style="list-style-type: none"> For each of the four key lifecycle activities (i.e. operate, maintain, renew, build new): <ul style="list-style-type: none"> identify the current GHG footprint, differentiating between Scope 1, 2 and 3 emissions; identify the processes/assets that generate primary sources of GHG emissions (to assist in prioritisation) Update risk models and logs
Asset Management Decision Making	<ul style="list-style-type: none"> Ensure decision criteria and whole-life cost models are modified as necessary to take into consideration requirement to and benefits from emission reductions Identify and cost options to reduce or eliminate these emissions. Develop business case for potentially viable options
Strategy and Planning	<ul style="list-style-type: none"> The senior team should provide clear leadership on mitigation, ensuring that its importance is understood throughout the organisation Ensure the Asset Management Policy is updated to reflect the organisation's approach to mitigation Agree a climate change mitigation strategy, targets, timelines and monitoring regime - targets need to be agreed (and boundaries for Scope 3 emissions decided) Update the Asset Management Strategy to reflect the requirements of the climate change mitigation strategy, providing details of: <ul style="list-style-type: none"> climate change mitigation strategy implementation costs and expected benefits how the implementation of the strategy will be monitored the expected GHG emissions as a result of the implementation of the climate change mitigation strategy residual risks Update the organisation's Asset Management Plan to reflect the revised Asset Management Strategy
Organisation and People	<ul style="list-style-type: none"> Update organisational roles, responsibilities and team objectives to reflect the climate change mitigation strategy Ensure adequate resources are made available to deliver the climate change mitigation plan Review employee capabilities and employee training programme as required Ensure the procurement strategy reflects the climate change mitigation strategy requirements, e.g. purchasing low/zero GHG equipment, partnering with organisations committed to achieving net-zero emission targets

Asset Information	<ul style="list-style-type: none"> Identify and source information required to develop and implement climate change mitigation plans Identify information required to monitor the delivery and impact of the climate change mitigation plans Update data collection processes, systems, training, communication etc. to ensure availability of the required information
Lifecycle Delivery	<ul style="list-style-type: none"> Ensure investment approval and procurement processes and criteria reflect the climate change mitigation strategy requirements Update asset processes and operations during the lifecycle to include necessary environmental assessments, using a recognised assessment criteria and baseline related to the asset Ensure environmental requirements are considered during systems processes Document and implement revised asset specifications and/or operating, maintenance and renewal regimes with updated mitigation strategies Collect required information relating to GHG emissions within the organisation and with suppliers, to assist with the review process and with further strategy development
Review	<ul style="list-style-type: none"> Monitor the implementation of the climate change mitigation plans as defined with the organisation's Asset Management Plan Monitor the expected level of performance of the assets and associated GHG emissions Identify improvement opportunities

References and notes

- 1 This term refers to all types of emission which can result in a warming off the atmosphere, of which carbon dioxide and methane are the most prevalent
- 2 www.ipcc.ch (Sixth Assessment Report)
- 3 sdgs.un.org/goals
- 4 www.resilientinvestment.org
- 5 Note that many organisations use the term 'carbon' to refer to all greenhouse gases
- 6 ghgprotocol.org (GHG Protocol Corporate Accounting and Reporting Standard)
- 7 Definitions taken from [Assurance and labelling](#) | [The Carbon Trust](#)
- 8 A carbon offset is a reduction in emissions of carbon dioxide or other greenhouse gases made in order to compensate for emissions made elsewhere
- 9 www.iema.net (IEMA GHG Hierarchy Nov 2020)
- 10 The Paris Agreement is a legally binding international treaty on climate change. It was adopted by 196 Parties at COP21 in Paris, on 12 December 2015





IAM Climate Emergency Programme

The climate emergency is a critical topic for our Institute. The Institute of Asset Management (IAM) is committed to supporting members, governments and other decision-making bodies by leading action in our community and sharing good practice, with the aim of embedding an asset management approach in climate action plans.

The foundation of good asset management is the consideration of a long-term, whole-life, whole-system approach – avoiding functional, organisational and technical boundaries that can lead to sub-optimal solutions. These principles should also provide the basis for addressing the climate emergency effectively and sustainably.

Our purpose is to promote attention to the climate emergency across the IAM's activities and include our members in developing practical solutions for their organisations and to make these available more widely.

Our aims are:

- To instil a sense of urgency in, and facilitate a response from, the asset management community to address the climate emergency by bringing asset management

- thinking and techniques to help deliver change;
- To provide an international platform for knowledge sharing from a variety of disciplines to promote alignment across sectors (and with the IAM's Resilience Programme);
- To share experiences and develop understanding and expertise, to better influence the delivery of sustainable solutions, eg Net Zero Carbon and the UN Sustainable Development Goals.

theIAM.org/climate

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Andrew Newby (Project Lead), Andrew Newby Consulting Ltd
Chris Chen, Asset Management Ontario
Randal Gilbert, NIE Networks
Kelly Greener, BMT
John Harvey, Copperleaf
James Jorgensen, GM BluePlan Engineering
Doug Marsh, Sweco UK
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John Skelton, BMT
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Chris Wood, National Grid





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