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# Adaptation to climate change — Using adaptation pathways for decision making — Guide

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# Foreword

## Publishing information

This British Standard is published by BSI Standards Limited, under licence from The British Standards Institution, and came into effect on 30 April 2021. It was prepared by Subcommittee SES/1/7, *Greenhouse gas management and related activities*, under the authority of Technical Committee SES/1, *Environmental management*. A list of organizations represented on these committees can be obtained on request to the committee manager.

## Relationship with other publications

The overall approach to creating an adaptation plan is set out in BS EN ISO 14090, which mentions an Adaptation Pathway (AP) as an effective approach for planning for climate change uncertainty.

## Information about this document

This British Standard gives guidance on the following aspects of adaptation pathways (APs):

1) defining APs plan scope, objectives and constraints;
2) assessing capacity to develop and implement APs;
3) understanding uncertainties and opportunities from the current climate;
4) understanding and planning for a range of future climate change scenarios, as well as monitoring and evaluation;
5) considering adaptation options for different levels of risk and their thresholds;
6) considering interdependencies with other drivers and modifying options;
7) assembling a range of pathway options;
8) evaluating and prioritizing pathway options;
9) recommending preferred APs; and
10) establishing implementation and monitoring plans and a learning framework.

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## Presentational conventions

The guidance in this standard is presented in roman (i.e. upright) type. Any recommendations are expressed in sentences in which the principal auxiliary verb is "should".

*Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.*

Where words have alternative spellings, the preferred spelling of the Shorter Oxford English Dictionary is used (e.g. "organization" rather than "organisation").

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## Introduction

Climate change creates a range of potential risks and opportunities to physical, environmental, social and organizational systems. However, uncertainties inherent in estimating future climate change scenarios and their impacts can make it difficult to factor these potential risks and opportunities into decision-making for adaptation purposes. Given uncertainty and future change, more than one sequence of adaptation actions might need to be considered in response to climate change, at different times, in different climate change scenarios and in response to different risk and opportunity thresholds.

Adaptation pathways (APs) form an effective planning approach for responding to climate change and its associated uncertainties. APs are sequences of potential actions that can be implemented as conditions evolve in response to climate change risks and opportunities. APs can be developed in a range of forms, most of which are graphical, such as "decision trees" or "route maps". These illustrate the range of adaptation options, how they are sequenced over time and how these might be navigated or implemented as the future unfolds and becomes clearer.

APs can:

- help to develop flexible long-term responses to climate risks and opportunities in the face of uncertainty;
- provide a methodology to show how adaptation options can be implemented over time and help initiate action, encouraging consideration of "lead-in" times for actions (how long it might take to research, plan and deliver an action);
- help to incorporate a long-term vision and objectives into short-term decisions on adaptation actions;
- encourage consideration of a wide range of actions and the sequences in which they could be implemented;
- identify which short-term decisions could limit future adaptation and avoid "lock-in";
- facilitate planning for multiple futures, not just a "most likely" or single predicted future; and
- help to identify interested parties to be engaged to achieve effective outcomes.

APs can be effectively applied within broader processes of adaptation planning or similar strategic planning that an organization might already be using. APs can also be used as a starting point to help understand climate impacts and potential adaptation strategies.

This British Standard provides a nine-step iterative framework that can be used by those starting to consider APs or those already using APs, as a guidance document that includes:

- planning the scope, development and application of APs;
- understanding risks from current climate conditions;
- understanding risks and opportunities from future climate change scenarios;
- identifying and evaluating adaptation options for different levels of risk and opportunities;
- considering interdependencies with other drivers of change;
- assembling and evaluating pathway options;
- evaluating and choosing adaptation pathways;
- recommending preferred pathways; and
- implementing and monitoring of adaptation actions.



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This British Standard can be used by those with responsibilities for, or with an interest in, adapting to risks and opportunities associated with climate change. This could include those who manage water resources, flood and coastal management, assessment and planning for infrastructure resilience, operating a business or local, regional or national governments.

## 1 Scope

This British Standard gives recommendations and guidance to support organizations implementing adaptation pathways (APs). APs can be used within a broader planning process or as a stand-alone adaptation planning tool, in order to assist organizations to create long-term plans and make decisions within the uncertainty and risks of a changing climate.

*NOTE 1 BS EN ISO 14090 provides a full framework for implementing an adaptation plan and can be used in conjunction with this British Standard.*

This British Standard sets out a nine-step process for developing and applying APs. It includes guidance on each step, decision-making within the steps and continuous learning across the approach.

The intended users of this British Standard are adaptation professionals or persons assigned by an organization to use the standard (such as the environment or sustainability manager).

*NOTE 2 The information that results from the implementation of this British Standard can benefit strategic planners and decision makers within organizations who are involved in making short, medium and long-term decisions and adaptation plans.*

## 2 Normative references

There are no normative references in this document.

## 3 Terms and definitions

For the purposes of this British Standard, the following terms and definitions apply.

### 3.1 adaptation pathway (APs)

series of adaptation choices involving trade-offs between short-term and long-term goals and values

*NOTE These are processes of deliberation to identify solutions that are meaningful to people in the context of their daily lives and to avoid potential maladaptation.*

[SOURCE: IPCC, 2018: Annex I: Glossary [1]]

### 3.2 adaptive capacity

ability of systems, institutions, humans, and other organisms to adjust to potential damage, to take advantage of opportunities, or to respond to consequences

[SOURCE: BS EN ISO 14090:2019, **3.2**]

### 3.3 adaptive management

process of iteratively planning, implementing and modifying strategies for managing resources in the face of uncertainty and change

*NOTE Adaptive management involves adjusting approaches in response to observations of their effects and changes in the system brought on by resulting feedback effects and other variables.*

[SOURCE: BS EN ISO 14090:2019, **3.3**]

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### 3.4 climate change

change in climate that persists for an extended period, typically decades or longer

*NOTE 1 Change in climate can be identified by such means as statistical tests.*

*NOTE 2 Climate change might be due to natural processes, internal to the climate system, or external forces such as persistent anthropogenic changes in the composition of the atmosphere or in land use, modulations of the solar cycles and volcanic eruptions.*

[SOURCE: BS EN ISO 14090:2019, **3.5**]

### 3.5 climate change scenario

plausible description of the future that describes how the (studied) system responds to the impacts of climate change

*NOTE Climate change scenarios are neither predictions nor forecasts, but are used to provide a view of the implications of developments and actions.*

[SOURCE: IPCC, 2018: Annex I: Glossary [1]]

### 3.6 climate modelling

numerical representation of the climate system based on the physical, chemical and biological properties of its components, their interactions and feedback processes and accounting for some of its known properties

*NOTE Climate models are applied as a research tool to study and simulate the climate and for operational purposes, including monthly, seasonal and interannual climate predictions.*

[SOURCE: IPCC AR5 [2]]

### 3.7 interested party

person or organization that can affect, be affected by, or perceive itself to be affected by a decision or activity

*NOTE 1 Examples can include customers, communities, suppliers, regulators, non-governmental organizations, investors, employees and academia.*

*NOTE 2 To "perceive itself to be affected" means the perception has been made known to the organization.*

[SOURCE: BS EN ISO 14001:2015, **3.1.6**, modified — "academia" has been added to the example.]

### 3.8 lock-in

early actions or decisions that involve long lifetimes or path dependency, which will potentially increase future risk or vulnerability, and that are difficult or costly to reverse later (quasi-irreversibility)

*NOTE This can arise from an action or decision that is "business-as-usual", from a lack of an action or decision, or from a mal-adaptative action or decision.*

[SOURCE: CCRA3 [3]]

### 3.9 organization

person or group of people that has its own functions with responsibilities, authorities and relationships to achieve its objectives

*NOTE The concept of organization includes, but is not limited to, sole-trader, company, corporation, firm, enterprise, authority, partnership, charity or institution, or part or combination thereof, whether incorporated or not, public or private.*

[SOURCE: BS EN ISO 14001:2015, **3.1.4**]



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### 3.10 resilience

adaptive capacity of an organization in a complex and changing environment

*NOTE The Intergovernmental Panel on Climate Change (IPCC) [4] defines resilience as "the ability of a system and its component parts to anticipate, absorb, accommodate, or recover from the effects of a hazardous event in a timely and efficient manner, including through ensuring the preservation, restoration, or improvement of its essential basic structures and functions".*

[SOURCE: PD ISO Guide 73:2009, **3.8.1.7**, Modified: Note added.]

### 3.11 risk

effect of uncertainty

*NOTE 1 An effect is a deviation from the expected. It can be positive, negative or both. An effect can arise as a result of a response, or failure to respond, to an opportunity or to a threat related to objectives.*

*NOTE 2 Uncertainty is the state, even partial, of deficiency of information related to, understanding or knowledge of, an event, its consequence, or likelihood.*

[SOURCE: BS EN ISO 14090:2019, **3.12**]

### 3.12 term (timescale)

#### 3.12.1 long-term

expected useful life of the decision is longer than 20 years

*NOTE Within this period there is greater climate change uncertainty, which can probably be addressed using "complex" responses, i.e. effective management assumes the emergence of unanticipated vulnerabilities resulting from the changing climate that specialists cannot predict. Effective design and implementation factors increase the need for potential retrofitted adaptation during the life of the decision. Effective monitoring is designed to identify emergent vulnerabilities and develop effective responses to them.*

#### 3.12.2 medium-term

expected useful life of the decision is between 10 and 20 years

*NOTE Within this period there is greater climate change uncertainty, which can probably be addressed using "complicated" responses, i.e. vulnerabilities and solutions can be identified by a climate change specialist.*

#### 3.12.3 short-term

expected useful life of the decision is less than 10 years

*NOTE Within this period there is little climate change uncertainty, which can probably be addressed using "simple" responses, i.e. vulnerabilities and solutions can be recognizable by a generalist professional.*

### 3.13 threshold

point beyond which a system is deemed to be no longer effective (economically, socially, technologically or environmentally)

*NOTE 1 Thresholds can also be known as tipping points beyond which a system can tip into an undesirable state.*

*NOTE 2 Trigger points/levels are not the same as thresholds (see 3.15).*

### 3.14 transformation

change in the fundamental attributes of natural and human systems

[SOURCE: BS EN ISO 14090:2019, **3.14**]

### 3.15 trigger point

monitored indicator that shows conditions are approaching a threshold (3.13)

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