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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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International Workshop Agreement IWA 42 was approved in an online workshop hosted by BSI, in association with Our 2050 World, held in September 2022.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

0 Introduction

0.1 General

Climate change is one of the most pressing challenges that our planet faces. Scientific assessments through the Intergovernmental Panel on Climate Change (IPCC) reports have shown that many of the worst consequences of climate change can be avoided by limiting global warming to 1,5°C above pre-industrial levels. The global temperature is already over 1°C above pre-industrial levels and scenarios assessed by the IPCC indicate that limiting warming to 1.5°C with no or limited temperature overshoot requires reaching at least net zero global carbon dioxide (CO_2) emissions in the early 2050s along with deep and sustained global reductions in other greenhouse gas emissions[14] [15]. These scenarios also show that the earlier and faster emission reductions occur, the lower peak warming and the lower the likelihood of overshooting warming limits. Peak warming is determined by cumulative CO_2 emissions from the beginning of the industrial period up to the time they are reduced to net zero, and the impact of other emissions on the climate system in the decades immediately prior to that time.

This document provides guiding principles and recommendations to enable a common approach with a high level of ambition, to drive organizations to reach net zero greenhouse gas emissions as soon as possible and by 2050 at the latest. It is intended to be a common reference for governance organizations (including voluntary initiatives, adoption of standards, policy and national and international regulation), and can help organizations taking action to contribute to achieving global net zero.

This document should be interpreted and used in line with its purpose and scope to maintain and promote the highest possible climate ambition. This document does not address legal and other obligations relating to climate action.

This document builds on progress by voluntary initiatives, campaigns and governance, supporting their purpose of progressing to a climate positive future, increasing their reach and enabling a more consistent approach for future interventions and deliverables, including ISO standards.

The 2015 Paris Agreement[16] states the importance of achieving a global balance between human-led emissions by sources and removals by sinks in the second half of the 21st century, taking into account varying capabilities in different parts of the world, on the basis of equity, and in the context of sustainable development and efforts to eradicate poverty. This document therefore includes recommendations on equity and wider impact.

The scope of this document is aligned to the objectives of the “High-Level Expert Group on the Net Zero Emissions Commitments of Non-State Entities”, formed at the request of the United Nations (UN) Secretary General, and other UN developments, including the United Nations Framework Convention on Climate Change (UNFCCC).

Some initiatives and policies limit actions relating to net zero greenhouse gas emissions to those emissions and removals under the direct control of the reporting organization. This document promotes and gives guidance on taking action to address all greenhouse gas emissions, direct and indirect, in an organization’s value chain.

0.2 Use of this document

In this document, the following verbal forms are used:

- “should” indicates a recommendation;
- “may” indicates a permission;
- “can” indicates a possibility or a capability.

In Clause 3, Terms and Definitions, a "Note to entry" is used to provide additional normative information to be taken into account when reading the associated definition of a term. Notes in all other clauses provide additional information relating to principles, guidance or recommendations in that clause.

1 Scope

This document provides guiding principles and recommendations to enable a common, global approach to achieving net zero GHG emissions through alignment of voluntary initiatives and adoption of standards, policy and national and international regulation.

This document provides guidance on what governance organizations and other organizations can do to effectively contribute to global efforts to limit warming to 1,5°C, by reaching net zero no later than 2050. It provides guidance on a common and equitable contribution, and recognizes individual organizations' capability in contributing to achieving global net zero. This document, when used in combination with science-based pathways, provides guidance for organizations seeking to set robust climate strategies.

This document provides common terms and definitions, guidance, and specific recommendations on:

a) net zero guiding principles for all organizations;

b) incorporating net zero into strategies and policies;

c) what net zero means at different levels and for different types of organization;

d) setting and aligning interim and long-term targets based on equity, latest scientific knowledge, evidence, research and agreed good practice;

e) actions to take to achieve these targets;

f) greenhouse gas emission reductions within the value chain;

g) nature protection and restoration;

h) avoided emissions and other climate contributions beyond the value chain;

i) removals;

j) offsets;

k) credits;

l) claims;

m) monitoring, measuring and use of appropriate and consistent indicators;

n) equity, empowerment, fair share and wider impact;

o) transparent reporting and effective communication.

This document is intended to align territorial approaches to achieving net zero (e.g. by nations, regions, cities) and value chain approaches by organizations.

This document is intended to enable and support all organizations, including governance organizations developing policies, frameworks, standards or other initiatives on net zero for use by others.

This document is intended to complement voluntary initiatives and facilitate alignment, so that any organization looking to make or support a net zero claim takes a similar approach regardless of the initiative it is associated with.

Note 1: A single target for organizations of net zero for all GHGs, as soon as possible, or by 2050 at the latest, is used in this document to provide a common, understandable and ambitious target, in line with scientific consensus on the global effort needed to limit warming to 1.5°C with no or limited temperature overshoot. This organizational target aligns with the target stated in Race to Zero Criteria[17].

Note 2: Governance organizations include:

— national and sub-national (e.g. regional, local, municipal,) governments, as appropriate;

— regulators;

— voluntary initiatives;

— intergovernmental bodies;

— international and national non-governmental organizations.

Note 3: This document does not provide guidance on carbon neutrality for organizations or for products and services. Information on carbon neutrality for organizations will be provided in ISO 14068 [10] (under development).

2 Normative references

There are no normative references in this document.

Note: Further information and guidance on normative references is provided in the ISO Directives – Part 2 (see www.iso.org/directives).

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp
— IEC Electropedia: available at https://www.electropedia.org/

NOTE: The definitions in this clause are provided to guide the user in understanding terms in the technical sense they are used in this document. A number of terms have been drafted specifically for this document, others are based on definitions provided by the Intergovernmental Panel on Climate Change (IPCC), the Greenhouse Gas Protocol (GHGP), United Nations Framework Convention on Climate Change (UNFCCC), or other ISO documents.

3.1 Terms related to climate action

3.1.1
net zero
GHG net zero
condition in which human-caused residual greenhouse gas emissions (3.2.1) are balanced by human-led removals (3.3.3) over a specified period and within specified boundaries

Note 1 to entry: Human-led removals include ecosystem restoration, direct air carbon capture and storage; reforestation and afforestation; enhanced weathering, biochar and other effective methods.

Note 2 to entry: Human-caused and human-led are intended to be understood as synonymous with the word 'anthropogenic' in IPCC definitions. The symmetry of anthropogenic emissions and anthropogenic removals is critical for net zero.

[SOURCE: [18]IPCC AR6 Working Group III Annex 1, definition of 'net zero emissions', modified.]

3.1.2
science-based pathway
trajectory to achieve global net zero (3.1.1) greenhouse gas emissions (3.2.2) based on scientific evidence

Note 1 to entry: Scientific evidence refers to evidence that has been confirmed through peer review.

3.1.3
biodiversity
biological diversity
variability among living organisms on the earth, including the variability within and between species, and within and between ecosystems

Note 1 to entry: Further information on biodiversity is provided by the Convention on Biological Diversity.

[SOURCE: [3]ISO 14050:2020, 3.8.22, modified by addition of note 1 to entry]

3.1.4
renewable energy
energy collected from resources that are naturally replenished at a rate equal or faster than extracted or used
Note 1 to entry Renewable energy includes sources such as sunlight, wind, rain, tides, waves, biomass, and geothermal heat.

[SOURCE: [18] IPCC AR6, Working Group III, Annex 1 modified]

3.1.5
adaptation
adjustments in ecological, social or economic systems in response to actual or expected climatic stimuli and their effects or impacts

Note 1 to entry: Adaptation refers to changes in processes, practices and structures to moderate potential damages or to benefit from opportunities associated with climate change

[SOURCE: [19]UNFCCC Glossary of climate change acronyms and terms, modified].

3.2 Terms related to greenhouse gases

3.2.1
greenhouse gas
GHG
gaseous constituent of the atmosphere, natural or anthropogenic, that absorbs and emits radiation at specific wavelengths within the spectrum of infrared radiation emitted by the earth's surface, the atmosphere, and clouds

Note 1 to entry: Greenhouse gases caused by human activities and relevant for this document include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulfur hexafluoride (SF_6) and nitrogen trifluoride (NF_3).

[SOURCE: [8] - ISO 14066:2011, 3.2.1, modified by deletion of "both natural and anthropogenic" and addition of "caused by human activities and relevant to this document" and "nitrogen trifluoride (NF_3)" in Note 1 to entry.]

3.2.2
greenhouse gas emission
GHG emission
emission
release of a greenhouse gas (3.2.1) into the atmosphere

Note 1 to entry: greenhouse gas emissions include those released from:
- natural sources (e.g. decomposition of plants);
- combustion of fossil fuels;
- other processes, including unintentional release (e.g. caused by imperfections in processing equipment or conditions).

Note 2 to entry: For GHG emissions that occur not directly into the atmosphere but into a body of water or into soil, the relevant emission is the amount by which the concentration of the gas increases in the atmosphere as a result of this emission, accounting according to scientific evidence for chemical and biological processes that can occur in water or soil

[SOURCE: [3] - ISO 14050:2020, 3.9.8, modified by addition of notes to entry]

3.2.3
Scope 1 emission
direct GHG emission
greenhouse gas emission (3.2.2) from sources (3.2.7) owned or directly controlled by the organization (3.4.1)

Note 1 to entry: This document uses the concepts of equity share or control (geographical, financial and operational) to establish Scope 1 emission responsibility.

Note 2 to entry: Scope 1 emissions do not include those occurring from natural ecosystems owned or controlled by the organization that are not under management, or remain in a natural state and have not been modified.

Note 3 to entry: Scope 1 emissions for organizations operating at a territorial level refer to GHG emissions from sources located inside the boundary of that territory.

[SOURCE: [20] GHG Protocol]

3.2.4
Scope 2 emission
indirect GHG emission from purchased energy
greenhouse gas emission (3.2.2) from the generation of purchased electricity, heat, cooling or steam consumed by the organization (3.4.1)

Note 1 to entry: Scope 2 emissions for organizations operating at a territorial level refers to GHG emissions other than Scope 1 emissions, occurring as a consequence of the use of grid-supplied electricity, heat, steam and cooling within the boundary.

[SOURCE: [20] GHG Protocol]

3.2.5
Scope 3 emission
indirect GHG emission

298 greenhouse gas emission (3.2.2) that is a consequence of the organization's activities but arises from sources
299 (3.2.6) that are not owned or directly controlled by the organization (3.4.1)

300 Note 1 to entry: Scope 3 emissions include all attributable value-chain GHG emissions not included in Scope 1 or Scope 2.

301 Note 2 to entry: For organizations operating at a territorial level, Scope 3 emissions refer to GHG emissions that occur
302 fully or partially outside the territorial boundary as a result of activities taking place within the boundary and include
303 transport across boundaries.

304 [SOURCE: [20] GHG Protocol]

305 **3.2.6**
306 **avoided emission**
307 avoided GHG emission
308 potential effect on greenhouse gas emission (3.2.2) that occurs outside the boundaries of the organization
309 (3.4.1) but arising through the use of its products or services, outside of Scope 1 (3.2.3), Scope 2 (3.2.4) and
310 Scope 3 emissions (3.2.5)

311 Note 1 to entry: Avoided emissions cannot be included in claims of progress towards Scope 1, Scope 2, and Scope 3 targets.

312 **3.2.7**
313 **source**
314 GHG source
315 human-caused activity or process that releases a greenhouse gas (3.2.1) into the atmosphere

316 [SOURCE: [4] ISO 14064-1:2018, 3.1.2, modified by addition of 'human-caused activity or']

317 **3.2.8**
318 **greenhouse gas inventory**
319 GHG inventory
320 list of greenhouse gas (3.2.1) sources (3.2.7) and sinks (3.3.5), and their quantified greenhouse gas emissions
321 (3.2.2) and removals (3.3.3) over a specified period of time and within specified boundaries

322 [SOURCE: [4]-ISO 14064-1:2018, 3.2.6, modified by the addition of 'over a specified period of time and within
323 specified boundaries']

324 **3.2.9**
325 **residual emissions**
326 residual GHG emissions
327 greenhouse gas emissions (3.2.2) that remain after taking all possible actions to implement emissions
328 reductions (3.3.2)

329 Note 1 to entry: Residual emissions are estimated for each year from the net-zero target date (e.g. 2050) not for interim
330 target dates, using a 1,5°C aligned science-based pathway.

331 Note 2 to entry: All possible actions refer to what is technically and scientifically feasible.

332 ## 3.3 Terms related to mitigation of greenhouse gas emissions

333 **3.3.1**
334 **mitigation**
335 GHG mitigation

human intervention to reduce greenhouse gas emissions (3.2.2) or enhance sinks (3.3.5)

[SOURCE: IPCC AR6 WGIII Annex-I Glossary]

3.3.2

emissions reduction

GHG emissions reduction

quantified decrease in greenhouse gas emission (3.2.2) specifically related to or arising from an activity between two points in time or relative to a baseline (3.3.6)

[SOURCE: [10] ISO CD 14068:2020, 3.8.6]

3.3.3 removal

GHG removal

withdrawal of a greenhouse gas (3.2.1) from the atmosphere as a result of deliberate human activities

Note 1 to entry: Types of removals include afforestation, building with biomass (plant-based material used in construction), direct air carbon capture and storage, habitat restoration, soil carbon capture, enhanced weathering (mixing soil with crushed rock), bioenergy with carbon capture and storage.

Note 2 to entry: In this document the term removal includes storage, including the durable storage of CO2, which is referred to as carbon dioxide removal by the IPCC.

[SOURCE: [18] IPCC AR6 WGIII Annex-I Glossary]

3.3.4

offset

emissions reduction (3.3.2) or removal (3.3.3) resulting from an action outside the organization's (3.4.1) boundaries used to counterbalance the organization’s residual emissions (3.2.9)

Note 1 to entry: Offsets are usually represented by a credit that has been retired or cancelled in a registry by or on behalf of the organization that is seeking to counterbalance residual GHG emissions.

Note 2 to entry: In the context of net zero, only offsets that are removals can be used to counterbalance residual emissions.

3.3.5

sink

GHG sink

process that removes a greenhouse gas (3.2.1) from the atmosphere

[SOURCE: [3] ISO 14050:2020, 3.9.5, modified by deletion of ‘greenhouse gas’ from term]

3.3.6

baseline

GHG baseline

quantified greenhouse gas emissions (3.2.2) and removals of an organization (3.4.1) at a specified time against which assessment of progress to net zero (3.1.1) can be performed

Note 1 to entry: The GHGP provides further information on baselines.

3.3.7

credit

GHG credit

tradeable certificate representing the mitigation of a specified amount of GHG emissions

Note 1 to entry: An organization can retire a credit without using it as an offset.

3.4 Terms relating to organizations seeking to achieve net zero

3.4.1
organization
person or group of people that has its own functions with responsibilities, authorities and relationships to achieve its objectives

Note 1 to entry: The concept of organization includes, but is not limited to, sole-trader, company, corporation, firm, enterprise, authority, partnership, association, charity, or institution, or part or combination thereof, whether incorporated or not, public or private.

Note 2 to entry: A group of organizations can also be considered as an organization that has, alone or collectively, their own objectives.

[SOURCE: [4] ISO 14064-1:2018, 3.4.2, modified by addition of new Note 2 to entry.]

3.4.2
governance organization
organization (3.4.1) that decides, manages, implements and/or monitors policies, requirements, legislation or guidelines

Note 1 to entry: Governance organizations include various levels of government (global, international, regional, sub-national and local) intergovernmental organizations, private sector and nongovernmental organizations and voluntary initiatives of all types, including community initiatives.

3.4.3
value chain
all upstream and downstream activities associated with the operations of the organization (3.4.1)

Note 1 to entry: Value chain GHG emissions include Scope 1, Scope 2 and Scope 3 emissions.

Note 2 to entry: The value chain includes other organizations (e.g. suppliers, retailers, service providers) as well as end-users of products and services such as customers or the public.

[SOURCE: [20] GHGP Corporate Value Chain (Scope 3) Accounting and Reporting Standard, Glossary]

3.4.4
leadership
top management

person or group of people who direct and control an organization (3.4.1) at the highest level

Note 1 to entry: Leadership has the power to delegate authority and provide resources within the organization.

Note 2 to entry: Leadership at government level refers to the leader(s) of the government and senior officials.

Note 3 to entry: Leadership is referred to as 'top management' in ISO management system standards.

3.4.5
competent

able to apply knowledge and skills to achieve intended results

3.4.6
documented information
information required to be controlled and maintained by an organization (3.4.1) and the medium on which it is contained

Note 1 to entry: Documented information can be in any format and media, and from any source.

[SOURCE: [1] ISO 9000:2015, 3.8.6, modified by removal of notes 2 and 3 to entry]

3.4.7
indicator

quantitative, qualitative or binary variable that can be measured, calculated or described, representing the status of operations, management, conditions or impacts

[SOURCE: [3] ISO 14050:2020, 3.2.24]

3.4.9
verification
conformity assessment

confirmation of a claim, through the provision of objective evidence, that specified requirements have been fulfilled

Note 1 to entry: Verification is considered to be a process for evaluating a claim based on historical data and information to determine whether the claim is materially correct and conforms with specified requirements.

Note 2 to entry: Verification is applied to claims regarding events that have already occurred or results that have already been obtained (confirmation of truthfulness).

SOURCE: [12] ISO/IEC 17029:2019, 3,3 modified by deletion of note 3 to entry]

4 Abbreviated terms

CO_2	Carbon dioxide
GHG	greenhouse gas(es)
GHGP	Greenhouse Gas Protocol
IPCC	Intergovernmental Panel on Climate Change
ISO	International Organization for Standardization
OECD	Organisation for Economic Co-operation and Development
SBTi	Science Based Targets Initiative
UNFCCC	United Nations Framework Convention on Climate Change
VCMI	Voluntary Carbon Markets Initiative

5 Net zero guiding principles

5.1 General

The guiding principles in the following sub-clauses (see **5.2**-**5.11**) are the foundation for achieving net zero GHG emissions for organizations at every level through the use of a standard, framework or voluntary initiative. The recommendations provided in Clauses **6** to **14** of this document give guidance on how to take action in alignment with these principles to enable a common and ambitious approach.

5.2 Alignment

Policies and guidance align organizations on common climate action approaches (recognizing common but differentiated responsibilities and respective capabilities) to support meeting the goals of the Paris Agreement [16] and any subsequent United Nations' global agreements that supersede the Paris Agreement.

5.3 Urgency

Immediate and ongoing action is taken to effectively contribute to the global efforts to hold the increase in the average temperature to well below 2°C above pre-industrial levels, and pursuing efforts to limit the temperature increase to 1,5°C, by organizations achieving net zero GHG emissions as soon as possible and by 2050 at the latest.

Organizations set long term targets to meet net zero by or before 2050, and interim targets to achieve substantial emissions reductions of Scope 1, Scope 2 and Scope 3 emissions by 2030 or earlier. Subsequent targets are no more than five years from the preceding target and support long-term commitments for ongoing action towards and beyond 2050.

NOTE In order to make a fair contribution towards global net zero, some organizations will need to reach net zero well before 2050, such as those with high current or historical GHG emissions and/or high capacity to act.

5.4 Ambition

Targets are set to achieve net zero GHG emissions as early as possible. Organizations with higher capacity, historical responsibility or high current emissions take additional and ambitious action to reach net zero emissions well before the global average.

Specific interim targets are derived from long-term targets and take into account all GHG emissions to enable global achievement of net zero and to limit temperature rise to 1,5°C above pre-industrial levels.

NOTE 1 Targets take into account all processes and activities throughout the value chain.

NOTE 2 Pre-industrial levels refers to the multi-century period prior to the onset of large-scale industrial activity that occurred around 1750. The period 1850–1900 represents the earliest period of sufficiently globally complete observations to estimate global surface temperature and is used in the IPCC Sixth Assessment reports as an approximation for pre-industrial conditions.

5.5 Prioritization

Reduction of GHG emissions is prioritized for interim and long-term net zero targets, with removals used after all possible emissions reduction actions have been taken, to counterbalance eventual residual emissions.

5.6 Decision-making based on scientific evidence and indigenous knowledge

Decision-making relating to the achievement of net zero by or before 2050, limiting temperature rise, and the protection and improvement of nature, is based on current scientific evidence, and indigenous and local knowledge. Decisions align with the principle of equity and justice (see **4.8**) and take into account fair share and just transition (see **11.2**).Decisions are reviewed regularly and targets, policies and actions are adapted as knowledge and science evolves.

5.7 Risk-based approach

Risks related to climate change mitigation actions are assessed and controls are put in place to address them.

The risk-based approach takes into account uncertainty, potential negative impacts, unintended consequences and other forseeable risks

The risks of each mitigation action are compared with the risks of not taking action.

There is ongoing monitoring of mitigation actions taken and a commitment to take urgent corrective action if issues arise.

NOTE 1 Unintended consequences relate to any direct or indirect effect that reduces or eliminates the effectiveness of a mitigation action. For example:

- reversal of a removal through non-permanent storage or leakage of GHG emissions ;
- double-counting of emissions reductions, removals or offset investments made outside of the organization's boundaries or influence.

Storage is generally considered permanent if no GHG is re-released for at least 100 years after storage or within the lifespan of the GHG being counterbalanced.

NOTE 2 Further information on the risks of not taking action is provided in the IPCC's Sixth Assessment Report [15] .

5.8 Credibility

Greenhouse gas emissions reductions, removals, and offsets address issues of permanence and leakage. Mitigation actions can be demonstrated to be real and of high quality, prioritizing significant emissions reductions across all sectors, and are verifiable using internationally accepted accounting standards.

NOTE Guidance on quantifying GHG emissions and third party verification is provided in ISO 14064-1 and14064-3, and ISO 14065.

5.9 Equity and justice

Targets and actions align with the United Nations' Sustainable Development Goals [21] to support equity and global transition to a net zero economy.

Mitigation actions take a human-centred approach, safeguarding the rights of the most vulnerable people and communities. Activities take into account the burdens and benefits of climate change and ensure that responses, including responsibility for costs are equitably shared (see Clause **12**).

Mitigation actions take into account the need to preserve or enhance ecosystems and biodiversity.

NOTE This principle is based in the IPCC definitions of equity and justice and the IPCC's Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services research on nature and climate change linkage [22].

5.10 Transparency, integrity and accountability

Information relating to current emissions status, baseline, targets and plans are comprehensive and publicly reported. Independent monitoring is in place to ensure commitments are supported by meaningful actions.

Relevant information relating to progress towards achievement of net zero targets by or before 2050 is disclosed to the public regularly (see Clause **13**). Documented information is accurate, comprehensive and does not overstate achievements.

Progress towards interim and long-term targets and associated claims of net zero status are verified through a credible third party.

5.11 Achievement and continuation of net zero

Action is taken at all levels (see Clause **6**) in accordance with the principles of equity, justice (see **5.8**), including fair share (see **12.2**), to ensure all feasible GHG emissions reductions are made and residual emissions are balanced by permanent or sufficiently long-term removals to counterbalance the GHG emissions.

On achieving net zero, actions are taken towards reaching negative GHG emissions.

6 Establishing levels and boundaries for net zero

The organization should establish boundaries for determining targets, monitoring and assessment of progress towards net zero.

Scope 1, Scope 2 and Scope 3 emissions (direct and indirect emissions) should be included in net zero targets once boundaries have been established.

Boundaries at different levels can include:

a) territorial level: a physically defined territory, such as a country, region, county, city or other administrative unit;
b) sectoral level: a commercial or industrial sector, such as the retail or steel industry;
c) organizational level: a legally defined entity, such as a company or non-governmental organization;
d) investment level: a financial activity, such as investments made or held by a bank, pension fund, or trust;
e) asset level: related to the life-cycle emissions of a physically defined unit, such as a building.

When establishing the boundaries, the organization should consider the need to ensure all relevant GHG emissions are covered.

The organization should collaborate with other organizations to determine responsibility and actions to address GHG emissions over which no single organization exercises direct control, such as those Scope 3 associated with consumer use of products.

An organization operating at territorial level is not solely responsible for all GHG emissions in its boundary but should take responsibility for developing policies, initiatives and partnerships to address GHG emissions of products and services entering and leaving the territory.

As appropriate to its level, the organization should take into account factors such as:

- attribution of GHG emissions from activities that cross territorial or other boundaries (e.g. aviation, shipping (bunker fuels) or other transportation);
- consumption-based GHG emissions at a territorial level, to account for imported GHG emissions associated with purchased products and services;
- joint ventures, that can be accounted for on either a control or ownership basis;
- land-based GHG emissions, including those associated (positively or negatively) with land use changes;
- portfolio, financed, facilitated and insured GHG emissions for financial activities.

Where an organization operates in multiple territories, net zero should be quantified using a consistent approach, but applying country or region-specific (or measured) emission factors where available.

NOTE 1 When boundaries are set by organizations this includes organizational level (relating to a legally defined entity) and operational level (relating to the organization's activities).

NOTE 2 The GHG Protocol Corporate Accounting and Reporting Standard [20] and the Value Chain (Scope 3) Accounting and Reporting Standard [23] provide guidance on boundary setting at the organizational level.

NOTE 3 The UNFCCC provides reporting guidelines on annual GHG inventories for countries [24].

NOTE 4 The GHGP Global Protocol for Community-Scale Greenhouse Gas Inventories provides guidance on GHG inventories for cities [25].

7 Leadership and commitment

7.1 General

The organization should demonstrate a clear commitment to the achievement of its own interim and long-term net zero targets and to support global achievement of net zero. Targets should address all GHGs, including emissions with a relatively short lifetime in the atmosphere compared with CO_2, such as methane, ozone and aerosols.

Governance organizations setting regulations on net zero should start with larger organizations, and organizations and sectors with the largest emissions. Governance organizations should set requirements for competent annual third party verification of emissions reporting, absolute emissions reduction targets and full information about implementation plans and timelines, and how plans fit with science-based pathways. Governance organizations should consider the capacity of smaller organizations when setting applicable requirements for auditing and verification.

The criteria provided by governance organizations in policy, regulations, guidance, standards or voluntary initiatives relating to the achievement of net zero for itself and for other organizations should:

a) prioritize emissions reductions within the organization's boundaries and its value chain, using science-based pathways (including sector pathways) to set targets;

b) use alternatives to high GHG emitting processes, practices and services, taking into account the lifecycle of products, buildings and other assets;

c) prioritize environmental integrity and the protection and enhancement of nature (e.g. ending deforestation, supporting afforestation, protecting biodiversity) and the avoidance of adverse impacts;

d) require the counterbalancing of residual GHG emissions through appropriate high-quality removals and storage (e.g. investment in long-term nature-based solutions to counterbalance GHG emissions with similar atmospheric lifespans; removal of carbon emissions with permanent geological storage to counterbalance fossil CO_2 emissions);

e) include sector-specific science-based pathways and decarbonisation trajectories;

f) safeguard society, human settlements, communities and core human needs (Clause **11**).

The organization should consider setting and promoting additional more ambitious targets, for example:

— going beyond its fair share of 50% global GHG emissions reductions by 2030 (see **12.2**) from a 2018 base year;

— achieving a state of no Scope 1 or 2 GHG emissions;

— targeting residual emissions at less than 5% of baseline Scope 3 emissions;

— working towards a state in which removals exceed GHG emissions;

— developing climate solutions other organizations and consumers can use to reduce GHG emissions.

When setting policy, regulations, guidance, standards or voluntary initiatives governance organizations should take into account the best available scientific evidence and knowledge as well as relevant science-based, technical information.

7.2 Leadership commitment

The leadership of all organizations should ensure alignment between policies and actions, including public policy and advocacy. The leadership should ensure this commitment is not undermined by conflicting targets.

The leadership of the organization should demonstrate commitment to net zero and the principles provided in Clause **5**, by:

a) providing strategic direction, oversight, support and sufficient resources to set and achieve targets;

b) incorporating net zero targets into core governance documented information (e.g. articles of association, charters, legislation);

c) disclosing shareholder voting record on climate-related issues, if appropriate to the organization;

d) publicly committing to reach targets as soon as possible through communication by the highest level of leadership;

e) clearly defining leadership responsibilities;

f) appointing competent members of the organization's leadership to take responsibility for actions;

g) ensuring competent persons are appointed to relevant roles and determining the frequency of updates to leadership on climate-related issues and progress towards targets;

h) implementing incentives for delivering net zero targets;

i) ensuring consideration of actions needed to transition to net zero is prioritized throughout the organization;

j) publicly and regularly communicating transition plans and progress (see **Clause 13**).

NOTE Information what is needed to be competent in relation to GHGs is provided in ISO 14066.

7.3 Roles and responsibilities

The leadership of the organization should be directly accountable for ensuring it:

a) clearly defines its boundaries (see Clause 6), taking into account all activities, locations, products and services related to the organization and the value chain, and Scope 1, Scope 2, and Scope 3 emissions (see **8.2**);

b) sets targets for the organization to reach net zero in the shortest time possible, and no later than 2050, taking into account fair share (see 12.2);

c) sets interim targets (see **8.2.6**) for the organization consistent with its fair share of 50% global GHG emissions reduction by 2030 from a 2018 base year, taking into account just transition considerations (see **12.2**);

d) prioritizes GHG emissions reductions and removals over credits and offsets;

e) determines actions for GHG emissions reductions (e.g. implementation of more energy-efficient processes, and an energy management system to reduce energy consumption);

f) determines actions for removals;

g) determines appropriate indicators, sources of information and tools used to measure emissions reductions and removals

h) establishes quality criteria for the use of removals, credits or offsets (see Clause 7);

i) establishes and develops supply chain relationships with organizations to facilitate and support net zero in the value chain and beyond;

j) adopts best practices to reduce GHG emissions minimizing societal or environmental harm;

k) advances the global goal of achieving net zero through the use of effective net zero strategies including innovative business models, products, and solutions and advocacy of climate legislation;

l) shares knowledge and experience of using new net zero business models, products and solutions with other organizations to develop cross-sector partnerships and support wider use;

m) invests in meeting the organization's net zero target (see 8.2);

n) commits to eliminating deforestation, preservation of biodiversity and restoration of land throughout the value chain;

o) takes actions to support, enable and promote equity and empowerment (see Clause 12) in line with the net zero principles (see Clause 4);

p) identifies and acts upon wider impacts at each stage of the net zero plans, minimizing adverse impacts (see **12.1**);

q) establishes, implements and maintains measuring, monitoring (see Clause **13**) and reporting mechanisms (see 12.2)

r) establishes, implements and maintains a corrective action process to address deviation or failure to progress as expected against targets.

8 Targets

8.1 Planning actions to be taken

The organization should determine a prioritized plan of actions to be taken to achieve interim targets which support the stated long-term net zero target. Targets should take into account needs for inclusivity, fair share and just transition to global net zero (see **12.2**).

The organization should ensure that all GHG emissions (Scope 1, Scope 2 and Scope 3 emissions), are taken into account and included in planned actions to achieve net zero. The organization should consider the negative climate impacts other than from GHG emissions, such as high altitude effects due to vapour trails from aircraft, and determine appropriate actions to address these if relevant.

Governance organizations should take into account the recommendations provided in this document when taking action on its own behalf and when setting policy, regulations, guidance, standards or voluntary initiatives for implementation by other organizations.

The organization should determine:

a) the baseline from which to measure GHG emissions reduction progress, with an explanation of why the baseline has been chosen and how changes in conditions since the baseline will be accounted for, to appropriately represent changes in GHG emissions performance;

b) the current status of the organization's GHG emissions based on its GHG inventory;

c) the degree to which the GHG inventory aligns with the sector or science-based pathway for each year and identify any gaps between the inventory and requirements;

d) necessary updates to the science-based pathway, taking into account any gap arising from its climate underperformance as well as global climate underperformance;

e) separate targets for emissions reductions and removals and clarify if each target is inside or outside of the value chain;

f) the anticipated residual emissions and need for counterbalancing to achieve and maintain net zero;

g) progressive timelines, with interim targets to achieve each long-term target and to align with the science-based pathway used;

h) actions to achieve each target;

i) measurement, monitoring and evaluation mechanisms (see Clause 11);

j) controls implemented to ensure quality and accuracy of data and documented information;

k) engagement plans for the workforce and other interested parties;

l) external and internal communication and reporting mechanisms (see Clause **13**).

The organization should ensure that actions to address GHG emissions take into account emissions -related to land use and land use change, if appropriate.

In addition to actions to achieve interim and net zero targets the organization should consider assessing historical GHG emissions (pre-baseline GHG emissions accumulated over a specified period of time (see **12.2**)). The organization should follow the guidance on counterbalancing residual emissions (see Clause **10**) when counterbalancing historical emissions . The organization should treat historical GHG emissions separately and should not include actions to address these GHG emissions to meet interim and net zero targets (See Clause **8**).

NOTE 1 Guidance on establishing a baseline varies, and depends on having reliable data for that year. Further information on determining a baseline is provided in [5]ISO 14064-2.

NOTE 2 If the organization using this document is a government, baselines can include GHG emissions in cities, regions or other geographical areas, or for specific sectors based in those areas. .

NOTE 3 Further information and guidance on identifying, assessing and managing climate risks and opportunities is available from organizations such as the [26]Task Force on Climate-related Financial Disclosures, the [27] European Financial Reporting Advisory Group, and the International Sustainability Standards Board (ISSB) as well as in ISO 14091.

8.2 Target setting

8.2.1 General

The organization should set targets consistent with 50% global GHG emissions reductions by 2030 (from a 2018 global baseline), achieving net zero by 2050 at the latest and supporting global efforts to limit global warming to 1,5°C above pre-industrial temperatures.

Net zero targets should include emissions related to all relevant GHGs and all Scope 1, Scope 2 and Scope 3 emissions, as appropriate.

The organization should ensure targets are set separately for Scope 1, Scope 2 and Scope 3.

Separate targets for territorial emissions should take into account all GHG emission sources within the boundary of the country, region, state or city. When setting targets, organizations operating at a territorial level should also take into account the total GHG emissions related to products and services consumed within its boundaries and aim to counterbalance these through removals and offsets.

In addition to net zero targets the organization should set additional, separate targets to have a neutral or positive impact on nature (e.g. a biodiversity net gain target, enhanced land regeneration). The organization should apply environmental and social safeguards to ensure that net zero actions do not have adverse environmental and social impacts, and seek to enhance environmental and social benefits.

Governance organizations and other organizations with the capacity to do so should promote targets to go beyond net zero, by mitigating GHG emissions beyond the value chain and removing more GHGs than it emits. Organizations operating at a territorial level should take into account that targets can be adjusted for some cities and regions and that fair share emissions reductions vary considerably (see **12.2**). The organization should set suitable alternative targets in such situations.

Governance organizations and other organizations with the capacity to do so, should promote and support the innovation and availability of affordable, enabling technologies to support sectors to achieve net zero emissions by no later than 2050.

NOTE 1 Scopes of GHG emissions are based on those defined in the Greenhouse Gas Protocol [20] which provides further information on what GHG emissions fall into Scope 1, Scope 2 and Scope 3 emissions and the greenhouse gas categories. More information on categories of Scope 3 emissions is provided in **7.2.5**.

NOTE 2 ISO 14064-1 and ISO 14069 provide further information on indirect emissions that are included in Scope 3 and the quantification and reporting of these GHG emissions.

8.2.2 Sectoral targets

The organization should set interim and long-term targets and calculate residual emissions using sector-specific science-based pathways which:

- stay within the remaining carbon budget for a high likelihood of limiting global warming to 1,5°C above pre-industrial levels;
- reduce energy and industrial process emissions, and the use of coal, oil and gas, by an amount consistent with an internationally recognized net zero emissions scenario;
- reach net-zero CO_2 at the global level by 2050 with low reliance on removals.

Examples of sector-specific pathways are provided in Table 2.

Table 2: Examples of sector-specific targets

Sector	**2050 emissions reduction target**
Forest, land and agriculture	72%
Power	100%
Cement	95%
Iron and steel	93%
Service buildings	99.6%
Residential buildings	97.9%

NOTE 1 The examples in Table 2 are aligned to the SBTI Net Zero Standard [29], which provides a methodology and breakdown of sectoral decarbonization pathways to help determine appropriate residual emissions for organizations. This builds on the *Roadmap for the Global Energy Sector Net Zero by 2050* IEA Report (Chapter 3 *Sectoral Pathways to Net Zero Emissions by 2050*) [30].

NOTE 2 More information on sectoral targets is provided in the Race to Zero *2030 Breakthroughs* [31].

8.2.3 Targets for Scope 1 emissions

In setting targets for Scope 1 emissions the organization should:

- include targets for all Scope 1 emissions within its boundary;
- specify and justify any exclusions;
- ensure interim Scope 1 emissions reduction targets align to science-based pathways, including relevant sector-specific pathways (**8.2.2**).

Scope 1 emissions targets should include emissions from:

a) physical or chemical processing. (e.g. from manufacture or processing of chemicals);

b) transportation (e.g. of materials, products, waste, people) from the combustion of fuels in mobile combustion sources (e.g. vehicles) owned or controlled by the organization;

c) intentional or unintentional fugitive emissions (e.g. from equipment leaks from joints, seals, packing, and gaskets; methane emissions from coal mines and venting; hydrofluorocarbon (HFC) emissions during the use of refrigeration and air conditioning equipment; methane leakages from gas transport);

d) the generation of electricity, heat, or steam as a result of combustion of fuels in stationary sources (e.g. boilers, furnaces, turbines);

NOTE 1 Challenges for different types and sizes of organizations or sectors vary; interim targets can be adapted to account for specific factors if the amended targets support a science-based pathway towards global efforts to limit warming to 1,5°C.

8.2.4 Targets for Scope 2 emissions

The organization should specify how Scope 2 emissions are calculated when setting targets. The organization should set targets to reduce its energy consumption through improving energy efficiency, and to switch to the use of renewable and low carbon (non-fossil) energy. The organization should specify its criteria for the procurement of renewable and low carbon (non-fossil) energy and how it supports additional renewable and low carbon energy production. The organization should, according to its capacity, set targets which take responsibility for GHG emissions beyond its boundaries, including those caused by consumption of products and services (e.g. for cities, states, and regions), especially where these are significant.

When setting targets the organization should calculate Scope 2 emissions from energy using the average GHG emissions of the grid where the utility is based (location-based accounting) whenever possible. The organization may also calculate Scope 2 emissions on the energy purchased (market-based accounting). The organization should, if possible, use both methods of calculation and should prioritize the higher of the two values for improving energy efficiency. The organization should set targets and track progress using the same calculation method. Calculation should include all Scope 2 emissions.

The organization should set targets to significantly reduce energy consumption and increase the use of low carbon technologies and production or procurement of low carbon (non-fossil) or renewable energy by 2030 (e.g. 80% reduction of energy consumption).

The organization should aim to use 100% renewable energy. When sourcing renewable energy, the organization should ensure that its purchase leads to the development of further renewable energy. The organization should avoid reliance on certificates of origin that allocate the renewable portion of a supply that contains a mix of other sources, including fossil fuels.

Governance organizations, and other organizations if appropriate should , set targets to promote the availability of low carbon (non-fossil) or renewable energy for every hour of every day, to motivate a wholesale clean energy transformation.

NOTE 1 Information on accounting, setting targets and minimizing Scope 2 emissions is provided in ISO 14064-1:2018, the Science Based Targets Initiative [32], the GHGP Scope 2 Guidance [33] and RE100 [34] .

8.2.5 Targets for Scope 3 emissions

The organization should include all relevant Scope 3 emissions in interim targets and long-term net-zero targets and collaborate with other organizations in the value chain to achieve them. Scope 3 emission targets should be consistent with Scope 1 and 2 interim and long-term targets, by using the same baseline. Scope 3 emissions include GHG emissions related to the use of products and services and those related to financed, facilitated and insured activities that cause water-based or land-based GHG emissions (e.g. deforestation, degradation, conversion of natural resources for housing or industrial use).

The organization should set a long-term net zero target for reduction and removal of all Scope 3 emissions. The organization should focus on reducing value chain emissions by considering if a product or service is necessary and by adopting a circular business model or a 'build less' approach.

The organization should provide justification for the exclusion of any Scope 3 emissions from interim or long-term targets.

The organization should, if relevant, set commitments to achieve and maintain operations and supply chains free of deforestation by 2025 at the latest

Organizations operating in value chains or sectors which have significant technological challenges in meeting net zero by 2050 through significant GHG emissions reductions, should not set unachievable net zero targets or make false claims. These organizations should use science-based sector pathways to achieve the highest level of emissions reductions possible, and work with others, including across sectors, to develop or provide climate solutions for the global net zero goal.

The organization should take into account GHG emissions arising from the entire sequence of activities relating to its operations and products and services throughout the value chain, and consider actions that can be taken to reduce GHG emissions at each stage of use.

The categories of Scope 3 emissions include:

a) purchased products and services;

b) capital goods;

c) fuel and energy-related activities not included in Scope 1 and Scope 2 emissions;

d) upstream transportation and distribution;

e) waste generated in operations;

f) business travel (including client and visitor transport);

g) employee commuting;

h) upstream leased assets;

i) downstream transportation and distribution;

j) processing of sold products;

k) use of sold products;

l) end of life treatment of sold products (e.g. disposal, recycling, repurposing);

m) downstream leased assets;

n) franchises;

o) investments.

NOTE 1 Guidance for the process of identifying significant indirect greenhouse gas (Scope 3) emissions are provided in Annex H of ISO 14064-1:2018 [4].

NOTE 2 Information on Scope 3 (indirect) emissions is provided in GHGP Corporate Value Chain (Scope 3) Accounting and Reporting Standard [23].

8.2.6 Interim targets

The organization should set interim targets as milestones towards its net zero target, taking into account the specific recommendations for Scope, I, Scope 2 and Scope 3 and science-based pathways.

The organization should set interim targets every 2-5 years on the path to achieving net zero GHG emissions

Interim targets should be based on the organization's baseline and can include:

— a minimum target to halve all types of GHG emissions, every decade, if possible (justification should be provided for GHG emissions reductions at a lower rate) and a plan provided on how net zero GHG emissions will be achieved no later than 2050;

— sectoral targets to be achieved by 2030, if appropriate, including any international commitments to reduce GHG emissions;

— reduction of methane emissions by at least 30% by 2030, if the organization is responsible for methane emissions (taking into account that reducing fossil methane has higher abatement potential than reducing agricultural methane).

Interim targets should be based on scientific evidence and reflect maximum effort towards the full of mitigation potential of the organization, consistent with a fair share of 50% global GHG emissions reduction by 2030 (**12.2**) from a 2018 base year.

NOTE 1 If insufficient GHG emission reductions (including reductions in the production and use of fossil fuels) are made by 2030, this would make it likely that warming will exceed 1.5°C during the 21st century [15], necessitating accelerated action.

NOTE 2 The SBTi requires interim targets to be 5-10 years from date of submission following a 1,5°C science-based pathway.

NOTE 3 Over 100 countries joined the Glasgow Climate Agreement Global Methane Pledge [35] in November 2021 at COP26, committing to ensuring new facilities and operations are low emission by design with a goal of reducing global anthropogenic methane emissions by at least 30% below 2020 levels by 2030. Global IPCC pathways consistent with the Paris Agreement's 1,5°C limit reduce methane emissions by 39%[25%-53%] in 2030 relative to 2020 levels.

NOTE 4 It is important that net zero strategies avoid increasing methane emissions at all times, including after the date of net zero, regardless of if they are counterbalanced by CO2 removals. The IPCC Sixth Assessment Report [14, 15] states that expressing GHGs as CO_2 equivalent using 100 year global warming potentials overstates the impact of constant methane emissions, but understates the impact of any increase in methane emissions over the 20 years following that increase.

9 Mitigation

9.1 Planning

9.1.1 General

The organization should establish a mitigation plan for GHG mitigation actions that:

a) prioritizes emissions reductions;

b) is assessed using recognised accounting standards;

c) is based on realistic and credible baselines;

d) includes details of how they will be monitored and reported and verified by a competent third party;

e) includes removals that are permanent or sufficiently durable, with storage duration comparable to the lifespan of the GHG emission;

f) takes into account and mitigate the potential risk of a consequent rise in emissions beyond its boundaries;

g) ensure safeguards against social or environmental harm or negative impacts that arise as a consequence of mitigation actions;

The organization should identify gaps between targets and solutions currently available and encourage and facilitate broad collaboration to share or co-develop solutions.

The organization should recognize and support public and private innovation to bring enabling technologies to market and make them cost competitive.

The organization should establish a transition plan for emissions reductions and removals as part of its transition to a net zero operational model. The plan should prioritize reducing GHG emissions and increasing removals and action through restoration, regeneration and enhancement of ecosystems. Offsets should only be used when there are no alternatives available. The organization should invest early in high quality, long-term removals if it anticipates a need to rely on these to achieve net zero by its target date. Early investment is needed to scale and mature removal and storage capacity (e.g. through increased natural restoration or technological advancement).

9.1.2 Content of mitigation plans

The organization's plans for transition to net zero should include how the organization will:

a) meet interim and long-term targets;

b) align broader organizational strategy, including investments and management of assets (including decommissioning) with the organization's commitment to net zero;

c) align executive and board compensation with meeting interim and long-term targets (e.g. 20% of long-term compensation plans);

d) implement policies and requirements (such as carbon pricing) to meet net zero;

e) advocate and support climate policy and legislation and take action to ensure it is not involved (directly or indirectly) in lobbying against climate ambition;

f) provide sufficient financial, human, technical and other resources to meet net zero targets;

g) contribute to the development of missing climate and sustainability solutions;

h) implement low-carbon and renewable energy solutions;

i) implement actions that protect biodiversity and enhance ecosystems;

j) define and assign roles, ensuring roles include defined responsibility for delivering on different parts of the net zero strategy (e.g. a person or team clearly responsible for engaging suppliers in the supply chain);

k) build capability and upskill the workforce;

l) take full responsibility for reducing Scope 1, Scope 2 and Scope 3 emissions without shifting undue responsibility for GHG emissions to another organization;

m) take actions to enable and empower organizations within the value chain to reach net zero;

n) reduce or eliminate reliance on offsets after achieving net zero;

o) exclusively use removals (including removal-based offsets) to counterbalance residual emissions at net zero ;

p) ensure that removals used to counterbalance residual emissions are sufficiently long-term to maintain the net zero balance;

q) ensure removals, credits or investments in offsets are not double counted or double claimed by multiple parties and are retired in public registries after single use;

r) ensure removals do not lead to a rise in GHG emissions in other locations due to efforts to reduce GHG emissions in one location (avoiding leakage);

s) engage suppliers, customers and interested parties to collaborate to reduce Scope 3 emissions;

t) examine the potential to use alternative processes (e.g. in line with circular economy practices), equipment or facilities with lower GHG emissions;

u) reduce significant GHG emission sources or GHG emissions 'hot spots' (e.g. electric power tools instead of compressed air; public transport or electric bicycles in place of company cars);

v) utilise innovative solutions to satisfy the core need of nutrition and health, shelter;

w) communicate information to interested parties on expected GHG emission reductions.

The organization should commit to reporting publicly on progress against interim and long-term targets, and actions being taken, at least annually (Clause **13**).

NOTE Recognised accounting standards include those provided by the ISSB [28], the GHGP [20], and ISO 14064-1.

9.2 Prioritization of mitigation actions

9.2.1 General

The organization should not delay urgent mitigation actions to reach interim or long-term targets.

The organization should prioritize emissions reductions and mitigation actions that are within its direct control (see **8.2.3,** and **8.2.4)** or within the value chain (see **8.2.5**). The organization should use the full potential of all mitigation actions and not rely on use of a single action (e.g. removal, credits or investments in offsets) as a reason to underuse other actions.

The organization should, where possible, additionally act as a solution provider for consumers and for other value chains, to enable actions that lead to avoided emissions in society. These avoided emissions should not be counted towards the organization's interim or long-term net zero targets, and should be treated separately.

9.2.2 Actions to address Scope 1 and Scope 2 emissions

Consistent with its mitigation plan (see **8.1**), the organization should take actions such as:

a) accelerating transition to renewable energy for processes, buildings and sites, and setting a target to use only low-carbon then carbon-free energy as soon as possible;

b) implementing an energy management system to improve efficiency of energy consumption and promote continual improvement;

c) prioritizing low carbon (non-fossil) and renewable energy through power purchase agreements;

d) generating own low-emission or renewable energy within the organization (e.g. heat from waste biomass);

e) align energy consumption with the availability of renewable energy, and minimize consumption when the grid is reliant on high-emission energy;

f) transitioning away from dependence on the use of fossil fuels, including phasing out the use of coal;

g) establish, apply and disclose financing policies to phase out fossil fuels (e.g. halting coal use by 2030 in OECD countries and 2040 in non-OECD Countries), both by selling assets and responsibly retiring them, meeting obligations to local ecology and communities;

h) optimising energy use of buildings (e.g. through repurposing, retrofitting, digital automation, increased use of heat pump technology);

i) minimizing or eliminating the use of emission-producing resources in all operations;

j) implementing low-carbon cooling, heating, ventilation and refrigerants;

k) minimizing waste and reducing consumption of raw materials and energy by repurposing or refitting buildings rather than building new facilities;

l) facilitating working from home to reduce GHG emissions (e.g. GHG emissions from operations or commuting) if this is likely to cause fewer overall GHG emissions;

m) supporting use of low-carbon travel and creating local office hubs to reduce commuting distance;

n) using remote technology for meetings and collaboration, to avoid unnecessary travelling;

o) choosing technology and other service providers that have committed to robust net zero targets;

p) requiring lower GHG emission modes of business travel where feasible, if travel is essential (e.g. train rather than air);

q) transitioning to very low GHG emission vehicles owned or used by the organization;

r) ensuring new facilities and operations are at least low GHG emission by design;

s) ensuring all buildings, equipment, machinery and vehicles are regularly maintained;

t) integrating climate criteria into research and development and product and service design processes to improve energy performance and develop circular economy solutions;

u) provision and promotion of low-carbon diets, such as plant based food;

v) support nature-based solutions and regenerative farming practices (e.g. soil carbon sequestration);

w) systematically reduce energy, resource and material waste in all operations.

NOTE ISO 50001 provides information on implementing an energy management system.

9.2.3 Actions to address Scope 3 and other emissions

The organization should select appropriate actions for emission reductions by improving the climate impact of products and services. Actions can include, but are not limited to:

a) developing products and services that contribute to the emergence of alternative value chains (e.g. increase quality and decrease cost of plant-based protein;);

b) redesigning and developing products and services to reduce their life cycle emissions;

c) promoting, supporting and facilitating the circular economy (e.g. reuse, repair, refurbishment, repurposing, recycling);

d) requiring suppliers to commit to net zero targets, in line with the recommendations in this document;

e) prioritize suppliers based on their climate strategy, past performance and transparency of emission data;

f) collaborating with other organizations and sector or industry partners to strengthen and align procurement and purchase requirements;

g) extending collaboration with other organizations and the value chain to accelerate adoption of low carbon (non-fossil) and renewable energy and achievement of interim and long term emissions reduction targets;

h) investing in GHG emissions reduction and removals projects;

i) ensuring financial investments, including assets and pension funds, are aligned with climate strategy and net zero commitments;

j) prioritizing low-carbon mobility solutions (e.g. public transport, electric vehicles with appropriate charging infrastructure) and reducing the need for personal transportation through urban planning.

10 Counterbalancing residual emissions

10.1 General

The organization should prioritize direct reduction of all GHG emissions within its boundaries, limiting residual emissions to the minimum, in line with science-based pathways that are aligned with a high likelihood of limiting global warming to 1,5°C above pre-industrial levels.

To achieve and maintain net zero the organization should counterbalance residual emissions only through investment in high-quality removals which can be in the value chain or through removal-based offsets (see Clause **10**) and removal-based credits.

If the organization offsets emissions, only those counterbalancing residual emissions should count towards its net zero target. The organization should not use offsets towards achievement of interim targets.

When counterbalancing residual emissions, the organization should ensure that removals, including through offsets and investments in credits:

a) are based on credible accounting standards;

b) are additional, based on realistic and credible baselines and lead to mitigation which would not have occurred if the actions were not implemented;

c) are monitored, reported and verified by a competent third party;

d) are based on removals that are permanent or provide sufficiently long-term storage (especially when used to offset GHGs with long atmospheric lifespans such as carbon dioxide from fossil fuels) and include plans to manage potential impermanence;

e) are not double-counted, (e.g. counted by more than one party, or credited under more than one offset programme);

f) avoid or limit the risk of a consequent rise in GHG emissions in other locations;

g) do no social or environmental harm;

h) are from activities that provide social safeguards, promote equity and benefit both ecosystems and local communities (see Clause **12**);

i) are sourced from activities that address urgent and transformational climate priorities that are beyond the reasonable reach of unilateral action by a single country or territory.

To protect social and environmental integrity the organization should take reasonable actions to ensure removals, offsets and credits:

— are governed inclusively, through participation and consultation of experts and the people and groups impacted by them, particularly indigenous peoples, local communities and vulnerable groups (e.g. women, children, elderly people, people with disabilities);

- balance trade-offs, particularly social trade-offs (e.g. the need to use land for subsistence farming);
- are managed in an adaptive way, using flexible decision-making to adjust to uncertainties as natural outcomes change;
- protect and manage a wide range of ecosystems (e.g. avoiding single-species tree farms or other kinds of plantations that have negative impacts on biodiversity);
- create biodiversity net gain (i.e. the variety of plant and animal life increases rather than decreases as a result of the action);
- support land regeneration rather than land degradation.

If the organization counterbalances residual emissions through investments in offsets through afforestation or reforestation it should take into account the time necessary to reach maximum removal, and the permanence of the removal, taking environmental drivers, land-used management and governance into consideration. The organization should ensure that any claim related to afforestation or reforestation is independently verified.

If appropriate to its context, the organization should go beyond net zero. This can be achieved through investment in additional emissions reductions, removals, and activities to avoid emissions (e.g. protecting forests) , to go beyond its fair share of global GHG emissions reductions (see **12.2**).

Avoided emissions should not be used to counterbalance residual emissions.

NOTE 1 This document provides recommendations for the use of offsets to meet net zero targets rather than the use of offsets for other claims. ISO 14068 (under development) will provide guidance for offsets in the context of carbon neutrality.

NOTE 2 Some sector-specific science-based pathways can require that certain organizations and sectors achieve net zero with no residual emissions, and without the use of offsets. These pathways demonstrate that specific sectors and organizations need to achieve net zero earlier than 2050. Some sector-specific pathways do not include all scopes of emissions and need to be used with other pathways so all scopes are included.

NOTE 3 Residual emissions are estimated for the net zero target year and thereafter.

NOTE 4 The IPCC report *Climate Change 2022: Impacts, Adaptation and Vulnerability* [36] outlines gaps needed to meet climate priorities. The IPCC report *Climate change 2022: Mitigation of Climate Change* [15] provides information on the management of trade-offs associated with mitigation options that occupy land.

NOTE 5 The IUCN *Global Standard for Nature-based Solutions* [37] sets out a framework for the verification, design and scaling up of nature-based solution

10.2 Credits

All of the recommendations relating to counterbalancing emissions (see 10.1) relate to credits.

The organization should follow all of the recommendations in this document before it can make a claim of net zero that uses credits.

When using credits the organization should:

- specify which type of credits are used and where the credits are held (e.g. registry used; type of project);
- specify what GHG emissions, areas and scopes are covered by the credits;

— ensure credits are comparable (i.e. a carbon credit for a carbon release, rather than mismatching, for example a methane credit for a carbon release);

— confirm if credits are being used for additional voluntary action or to counterbalance residual emissions.

If the organization purchases credits in the voluntary carbon market, a share of proceeds should go towards the Adaptation Fund of the UNFCCC to finance adaptation projects in developing counties that are particularly vulnerable to the adverse effects of climate change, and a share of credits should be cancelled as a contribution to an overall mitigation in global emissions.

NOTE 1 The Integrity Council Voluntary Carbon Market *Core Carbon Principles* [39] set out the basis for identifying high-quality carbon credits. The *Core Carbon Principles* form the basis of the ICVCM's Assessment Framework, which provides criteria for evaluating whether carbon credits and carbon-crediting programmes reach a high-quality threshold.

NOTE 2 The trading mechanism defined in Article 6.4 of the Paris Agreement [16] requires 5% share of proceeds to be given to the Adaptation Fund [38] and that a minimum of 2% of credits should be cancelled.

11 Measurement and monitoring

11.1 General

The organization should determine indicators and tools to measure, monitor and calculate baselines and the impact of its mitigation actions. The organization should ensure that all GHG emissions within its boundaries (Scope 1, Scope 2) and the wider value chain (Scope 3); are separately measured, monitored and reported (see Clause **13**).

The organization should also separately measure and monitor each of the following:

a) GHG emissions increases within its boundaries;

b) GHG emissions increases in the wider value chain;

c) emissions reductions within its boundaries;

d) emissions reductions in the wider value chain;

e) removals within its boundaries;

f) removals in the wider value chain;

g) removals outside the value chain;

h) offsets and credits outside the value chain.

The organization should select quantifiable indicators that minimize uncertainty and yield accurate, consistent and verifiable results, taking into account technical feasibility. Indicators should include those that measure and monitor offsets through investments.

The methods and the data used for all measuring and monitoring should support reproducibility of the results.

NOTE The GHGP and ICVCM and standards such as [4] ISO 14064-1 (for organizations) and [5] ISO 14064-2 (for projects) provide further information and guidance on measuring and monitoring.

11.2 Use of indicators and tools

The organization should explain and justify the use of indicators and tools selected or developed.

When selecting indicators and tools the organization should consider:

- accuracy of emission and removal measurements;
- limits of application;
- uncertainty and rigour;
- reproducibility of results;
- acceptability and limitations of the tool;
- origin and level of recognition of the tool;
- consistency with intended use.

The organization should act immediately and not delay taking action to reduce GHG emissions due to incomplete data or measurement. The organization should take actions likely to reduce GHG emissions using estimates while it works to improve measurement.

The organization should implement processes to continually improve the quality and comprehensiveness of data gathered to measure progress and estimate GHG emissions reductions. The organization should:

a) develop and report how it plans to narrow data gaps (see Clause **13**);

b) collect primary data on significant GHG emissions, where possible;

c) use substitutable methodologies when primary data is not available;

d) report how it plans to account for changes in the baseline(e.g. making adjustments to reflect changes to boundaries;

e) report how it plans to account for changes in activities;(e.g. production volumes, areas occupied);

f) use credible data sources for estimating GHG emissions factors (e.g. IPCC, International Energy Agency, national databases);

g) report the type of data used, data sources and methodologies and assumptions used to determine GHG emissions data (see Clause **13**);

h) quantify levels of uncertainty introduced by use of estimates, where possible;

i) use tools like lifecycle assessment to quantify value chain Scope 3 emissions.

Note 1: Further information on measuring and monitoring greenhouse gas removals and emissions reductions is provided by GHGP, and ISO 14064-1 [4] and ISO 14064-2 [5]. ISO 14067 [6]provides information on quantifying the carbon footprint of products.

Note 2: Primary data is data about the organization's own processes.

12 Wider impact, equity and empowerment

12.1 Wider impact

The organization should consider how its net zero strategy aligns with the United Nation's Sustainable Development Goals (SDGs) and impacts:

- climate justice and equity;
- its workforce;
- indigenous peoples, local communities, and minority and vulnerable groups (e.g. women, children, elderly people, people with disabilities);
- society and cultures;
- prosperity and eliminating poverty;
- biodiversity, the integrity of ecosystems and related critical services (e.g. food, water).

The organization should take action for positive wider impact, such as:

a) setting targets for societal climate action;

b) mobilizing interested parties across the value chain;

c) working with trade associations and initiatives engaging in climate issues to support and amplify emissions reduction efforts and counteract any efforts against climate action;

d) influencing local and national policymakers to enhance climate action;

e) advocating for appropriate regulation and facilitating measures to enable alignment to achieving net zero across all organizations and halving global GHG emissions by 2030;

f) contributing to national and international events which demonstrate concrete solutions to help scale best-practice solutions;

g) facilitating circular economy practices that reduce overall emissions;

h) lobbying for policy to enable effective climate action;

i) advocating for industry bodies to take clearer and stronger positions on climate policy;

j) mitigating harm to the environment and ecosystems;

k) supporting and enhancing biodiversity;

l) supporting restoration and protection of natural and semi-natural ecosystems in their own right;

m) making immediate contributions to the preservation and restoration of natural sinks (e.g. forests, wetlands);

n) conservation and protection of water, oceans and natural resources.

NOTE Recommendations on reporting wider impacts on nature are provided by the Task Force on Nature-related Financial Disclosures [40] and SBTN [41].

12.2 Fair share and just transition

The organization should take into account the principle of equity and justice (see **5.8**) when determining fair share and how it should contribute to a just transition to global net zero.

Large organizations and those based in developed countries should aim to reach net zero earlier (potentially well before 2050) than low-emitting countries to contribute to global efforts to limit warming to 1,5C.

In determining what a fair share is for the organization, it should consider its context and take into account:

- resources and technology;
- its historical GHG emissions;
- historical GHG emissions of the nation(s) it operates in;
- historical and current GHG emissions of the sector(s) it operates in;
- current socio-economic situation of the territories it operates in.

If an organization is operating at a territorial level with comparatively less resources (e.g. emerging economies), it should consider the need to balance actions towards net zero with the need to protect communities, society and the economy. To support a just transition, organizations with greater resource and greater historical responsibility should collaborate with those organizations with less capability to act.

Fair share for organizations in nations or sectors with greater historical responsibility for GHG emissions and greater current resources should make a proportionately greater contribution towards achieving global net zero.

The organization should utilize the capacity it has to the fullest extent possible to contribute with urgency towards its fair share, regardless of specific targets that are based on historic and socio-economic factors.

To support achievement of global net zero, organizations, sectors and territories with more capability can set more ambitious interim targets, for example, by reducing GHG emissions by 50% (from a 2018 base year)earlier than 2030.

If the organization has the capability to contribute beyond its fair share, it should take additional action to reach its own targets earlier and to assist others in reaching their targets as early as possible by investing in emissions reductions and removals beyond its own boundaries. To achieve the above, the organization should take into account:

a) equitable distribution of GHG emissions reduction responsibility, including within countries or regions at different stages of development;

b) different impacts of climate change and mitigation activities on more or less vulnerable populations;

c) the need to fully inform and consult with indigenous people and vulnerable communities when formulating, adopting or implementing decisions involving their lands, territories or resources. and the need to obtain consent before taking any action which affects them;

d) the need for adaptation measures and finance to support the most affected communities, areas and vulnerable people affected by both climate impacts and the climate transition and strengthen their participation in achieving global goals;

e) the need to integrate climate action thinking and related activities into operational resilience planning across communities and societies;

f) allocation of resources to mitigate GHG emissions and to adapt to climate impacts;

g) the need to address injustices and build a more equitable future.

The organization should report information on processes to ensure equity and fair share and why they have been adopted.

12.3 Empowerment

Governance organizations should establish, implement and maintain processes to contribute to the global transition to net zero. Processes can include:

a) training and capacity building events;

b) transfer of resources;

c) supporting access to financial support;

d) knowledge sharing;

e) representation of member organizations and under-represented groups in decision-making.

13 Communication, reporting and transparency

13.1 General

The organization should implement processes to ensure transparent communication and reporting of progress to net zero to relevant interested parties. The organization should make information on progress publicly available .

The organization should report its progress on its mitigation plan and all applicable items in **8.2.1**. The organization should include the following when reporting progress towards meeting net zero targets:

a) scope of reporting (see **13.2.1**);

b) published reporting requirements, including reporting frequency;

c) baseline;

d) reporting year;

e) reporting boundaries (see Clause 5);

f) changes in emissions levels;

g) data collection and calculation methods used to prepare the report;

h) data used for reported results and where and how that data can be accessed;

i) data limitations, including confidence intervals for indicators;

j) reporting limitations (see 13.2.3);

k) improvements and solutions implemented since the previous reporting period;

l) planned new initiatives or actions;

m) if the mitigation actions taken have immediate or projected future impact on GHG emissions;

n) authors of the report and whether they are internal or external to the organization;

o) details of previously published reports and how these can be accessed.

The organization should report qualitative and quantitative progress against targets at least annually, using relevant public reporting platforms. If appropriate, the organization may report in line with accepted financial reporting timeframes, if this is equally or more frequent.

Governance organizations should recognize the need to balance reporting requirements with practical limitations on capacity, data collection, analysis and communication for some, especially smaller organizations when setting requirements for other organizations.

13.2 Scope of reporting and information to include

13.2.1 Scope of reporting

The organization should define the scope of each report taking into account relevant guidance from a governance organization, if applicable. The organization may choose to create separate reports to communicate different types of information.

The organization should report:

a) climate risks and opportunities relevant to its boundaries (see Clause **6**);

b) progress against interim and long-term targets (see Clause 8), including impacts of actions taken (see **12.1**);

c) a transition plan including information on actions planned to reduce current GHG emissions (see Clause 9) consistent with achieving interim GHG emissions targets;

d) allocation of material and human resources to achieve interim and long-term targets;

e) specific removals and offsets beyond the organization's boundaries;

f) offsets used to make specific counterbalance claims (**13.2.2**);

g) details of Scope 1, Scope 2 and Scope 3 emissions (Clause 8) including:

— separate GHG emissions data by GHG gas or activity for Scope 1, Scope 2 and Scope 3;

— breakdown of GHG emission data for Scope 1;

— separate data for the different categories of GHG emissions in Scope 3;

— what is included in the organization's Scope 3 commitment, any exclusions and the justification for those exclusions;

h) separate GHG emissions data for all GHGs;

i) separate data for direct carbon dioxide emissions from biologically stored carbon (e.g. in grasslands, forests, soils, oceans), if applicable;

j) separate progress towards emissions reduction and removal targets;

information on expected residual emissions and how these have been estimated;

k) plans for counterbalancing residual emissions through offsets and investments, including details of those offsets and how their quality has been determined;

l) details of the liability and impermanence risk of carbon storage and actions taken to mitigate these;

m) actions to mitigate residual emissions, including those completed and those planned (see Clause 10);

n) land-use change GHG emissions and removals, if relevant;

o) wider impacts (see 12.1), including actions and initiatives to support fair share (see 12.2) and empowerment (see 12.3), including:

— actions taken outside of the organization's value chain (separately to actions taken within the value chain);

— both positive and potentially negative impacts, and plans to address negative impacts;

— advocacy activities and collaborative partnerships (e.g. lobbying, participation in voluntary initiatives, trade associations, membership networks);

— progress in engaging initiatives and trade associations in working towards interim and log-term targets;

— how it is engaging workers, the supply chain, the public and other interested parties on achieving net zero;

p) case studies and lessons learned.

The organization should report qualitative and quantitative progress against targets at least annually, using relevant public reporting platforms. If appropriate, the organizations may report in line with accepted financial reporting timeframes, if this is more frequent.

13.2.2 Reporting of net zero claims

The organization should report the basis of its net zero claims at least annually.

The organization should specify whether claims are at a territorial, sector, organizational, operational, financial or asset level (see Clause **6**).

The organization should publish its criteria and processes to ensure that actions taken to counterbalance residual emissions, including offsets and credits, are of high quality and verifiable (see 10.1).

To claim net zero only residual emissions should remain and these should be counterbalanced by removals. The organization should not make a net zero claim if it is on the path to net zero and still has GHG emissions that are not residual emissions, even if the emissions are counterbalanced. If the organization meets the criteria, it may be able to make a claim of carbon neutrality.

In a situation where other emissions remain the organization should communicate progress towards specific emissions reduction targets to provide a transparent indication for the prospects of reaching net zero.

To claim achievement of its net zero target the organization should:

a) quantify all GHGs it continues to generate or which are generated as a consequence of its products and activities (i.e. all Scope 1, 2 and 3 emissions) including GHG types and origins (e.g. fossil fuels or biological);

b) quantify all GHGs it is reducing or removing, the types of storage used and the level of storage permanence;

c) explain the method used to add up the GHGs (for example metric values used, such as global warming potential);

d) provide evidence that the full potential of Scope 1, Scope 2 and Scope 3 GHG emission reductions has been achieved within the value chain;

e) provide evidence that removals or offsets fully counterbalance residual emissions;

f) the method for calculating residual emissions and the justification for the use of removals or offsets to counterbalance residual emissions;

g) provide a plan to maintain the net zero balance over the long-term, multiple decades at a minimum, including a plan to address any reversal of removed GHGs (e.g. by counterbalancing GHG emissions with additional removals and storage on similar lifetimes);

h) explain limitations of claims made and how the quality of the data has been determined;

i) include confidence levels (potential for error) in published values of indicators for claims, where possible;

j) ensure the data supporting claims made are independently verified;

k) provide justification if data verification is not possible, and include the justification in reports;

l) provide details of how double-counting of offsets and credits has been avoided.

The organization should be aware that if the storage of removed GHGs used towards a net zero claim expires before the end of the GHG's lifespan, then the organization ceases to be net zero until it takes additional appropriate action.

If the organization transfers credits to support another organization in meeting its targets, inventory adjustments should be made to avoid double-counting of progress. An inventory adjustment relates to transferring the results of the credit from the donor organization to the receiving organization, and removing the results of the credit activity from the donor organization.

NOTE 1 Article 6 of the Paris Agreement [16] has further information on adjustments for organizations operating at national level.

NOTE 2 The Integrity Council for the Voluntary Carbon Market [42] provides guidance to improve the quality of offsets and credits on the carbon market.

NOTE 3 The Voluntary Carbon Market Integrity Initiative [43] and ISO 14021 provide information on how to make claims based on investment in credits.

NOTE 4 Residual emissions at net zero cannot generally exceed the range of 5-10% compared to baseline emissions.

13.2.3 Limitations of reporting

The organization should communicate the limitations of reports, including:

a) any sources of GHG emissions which are excluded and the magnitude of its significance;

b) use of GHG emissions proxies, averages, or gaps in knowledge within value chains;

c) methods used to estimate, and proportion of total disclosed data estimated when proxies are used to cover lack of data;

d) limitations of an achievement claim about a product or service being climate or carbon neutral.

NOTE A GHG emissions proxy uses aggregated data from a range of sectors and sources to estimate GHG emissions from a complex process. Proxies usually relate to Scope 3 emissions.

13.2.4 Credibility of reports

The organization should establish processes to ensure:

a) comprehensive data collection and review;

b) accuracy of GHG emissions and removals data;

c) reports are free of material discrepancies;

d) quality of carbon credits and offsets;

e) third-party verification of data and claims.

14 Improvement

The organization should use iterative and adaptive approaches on a regular basis with an increasing level of ambition to achieve interim targets, long-term targets and wider impacts, where feasible.

The organization should take into account emerging scientific evidence, best practice and external and internal lessons learned.

The organization should determine opportunities and take action to support and accelerate the speed or extent of:

a) reducing GHG emissions;

b) counterbalancing residual GHG emissions;

c) supporting the preservation and restoration of natural sinks;

d) achieving net zero status and striving for net-negative status.

The organization should integrate and embed climate risk management indicators, measures and controls into its normal organizational processes and core risk management processes and policies.

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