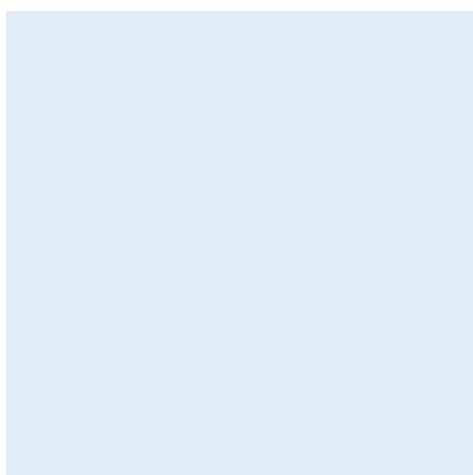


Net-zero emissions

Glossary of terms



Climate change



Advancing environmental and social performance across the energy transition

www.ipieca.org



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Introduction

In a world aspiring to a net-zero future, Ipieca has a core role in enabling the oil and gas industry to advance its environmental and social performance and contribution to the energy transition in the context of sustainable development.

Since the Paris Agreement was made in December 2015, Ipieca has continued to work on the topic of low-emissions pathways highlighting the fundamental role and contribution of the oil and gas industry in addressing the challenge of a transition to a low-emissions future.

The concept of net-zero emissions is a key element of the discussion around low-emission pathways and the energy transition required to meet the aims of the Paris Agreement.

Ipieca has coordinated a range of internal and external activities in order to:

- Enhance members' understanding of the topic of net-zero emissions
- Assist members in setting their own net-zero commitments
- Showcase investor, stakeholder, regional and industry perspectives

This glossary was developed to support the oil and gas industry and other stakeholders in the use of consistent terminology around net-zero emissions. The definitions used in this glossary are based upon those which have been observed in the public domain, including academic papers, industry experience and member companies' experts. Many of these definitions have been adapted for ease of understanding, however those which have been included verbatim, or near-verbatim, have citations. It is important to note, that this is an evolving area and many of the definitions contained within this glossary will continue to be updated as time progresses.¹

¹ Please refer to the legal note.

Terminology

ABSOLUTE-ZERO EMISSIONS:

No greenhouse gas (GHG) emissions are attributable to an actor's activities across all applicable scopes. Under this definition, no offsets or balancing of residual emissions with removals are used. ([Net Zero Climate](#))

ADDITIONALITY:

A criterion for assessing whether a project has resulted in GHG emission reductions or removals in addition to what would have occurred in its absence. This is an important criterion when the goal of the project is to offset emissions elsewhere. ([WRI/WBCSD GHG Protocol](#))

ANTHROPOGENIC GHG EMISSIONS:

Emissions of GHGs, precursors of GHGs and aerosols caused by human activities. These activities include the burning of fossil fuels, deforestation, land use and land-use changes, livestock production, fertilizer production and usage and industrial processes. (based on [IPCC](#))

ANTHROPOGENIC GHG REMOVALS:

These refer to the withdrawal of GHGs from the atmosphere as a result of deliberate human activities. These include enhancing biological sinks of CO₂ (NbS and NCS) and using technical methods to achieve long-term removal and storage. Carbon capture and storage (CCS) from industrial and energy-related sources, which alone does not remove CO₂ in the atmosphere, can reduce atmospheric CO₂ if it is combined with bioenergy production (BECCS). (based on [IPCC](#))

BIOENERGY WITH CCS (BECCS):

Bioenergy with carbon capture and storage is a negative emissions technology that offers net removal of CO₂ from the atmosphere as well as providing energy. (based on [IEA](#))

CARBON CAPTURE AND STORAGE:

This is a process in which a relatively pure stream of CO₂ from industrial and energy-related sources is separated (captured), conditioned, compressed and transported to a storage location for long-term isolation from the atmosphere. ([IPCC](#))

CARBON CREDIT:

A carbon credit is a tradeable instrument that represents either; a permit to emit one tonne of CO₂ or equivalent GHG (tCO₂e) into the atmosphere or; a certificate that represents the avoidance or removal of one tonne of CO₂ or equivalent GHG (tCO₂e) from the atmosphere. (based on [IETA](#))

CARBON INSETTING:

A carbon reduction project, verified by an offset standard, which occurs within a company's supply chain or supply chain communities. ([International Carbon Reduction & Offset Alliance](#))

CARBON NEGATIVE:

This is achieved when an actor's carbon offsetting activities exceed their anthropogenic emissions.²

CARBON NEUTRAL(ITY):

This is achieved when an actor's anthropogenic emissions are balanced by their carbon offsetting activities.²

CARBON OFFSET:

Avoided GHG emission, GHG emission reduction or GHG removal and sequestration made available to another organization in the form of a carbon credit to counterbalance unabated/residual GHG emissions. (based on ISO)

- **Avoidance offsets:**

Offsets which result in the avoidance of GHG emissions that would otherwise occur without the protective actions implemented to generate the offset, for example, the avoidance of deforestation.

² When using this term; some approaches address only CO₂ emissions, whereas others encompass all GHGs (known as CO₂ equivalent). Some approaches require these emissions to be offset by removals, whereas others allow them to be balanced by avoidance and reduction offsets.

- **Reduction offsets:**

Offsets that result in a reduction of GHG emissions from an activity that is additional, for example, CO₂ capture and geological storage.

- **Removal offsets:**

Offsets based on the withdrawal of GHG emissions from the atmosphere, for example through the use of GHG sinks or GHG removal technologies.

Note: removal offsets are important in achieving net-zero emissions as they help remove and store residual emissions.

CARBON-COMPENSATED PRODUCTS AND SERVICES:

Products or services whereby part of their life cycle GHG emissions are balanced by carbon offsets through the purchase and retirement of carbon credits issued under recognized certification standards for measurement, reporting and verification of GHG abatement.²

CARBON-NEUTRAL PRODUCTS AND SERVICES:

Products or services whereby 100% of their life cycle GHG emissions are offset through the purchase and retirement of carbon credits issued under recognized certification standards for measurement, reporting and verification of GHG abatement.²

CLIMATE NEUTRAL(ITY):

This is achieved when an actors activities result in no net effect on the climate system. This requires the balancing of residual emissions with emission removal as well as accounting for regional or local biogeophysical effects of human activities that, for example, affect surface albedo or local climate. (*based on* [IPCC](#))

Note: please refer to the IPCC for further information about this term

DIRECT AIR CAPTURE (DAC):

This is a technology to capture CO₂ from the atmosphere. The CO₂ can be permanently stored in geological formations or used as a feedstock in the production of fuels, chemicals, building materials and other products containing CO₂. (*based on* [IEA](#))

GHG AVOIDANCE:

The avoidance of GHG emissions that would otherwise occur without the protective actions implemented by an offset project.

GHG REDUCTION:

Quantified absolute decrease in GHG emissions specifically related to/arising from an activity. (ISO)

GHG REMOVAL:

Withdrawal of a GHG and/or a precursor from the atmosphere by a GHG sink or GHG removal technology. ([IPCC](#))

GHG SINK:

A reservoir (natural or human, in soil, ocean, and plants) where a GHG, an aerosol or a precursor of a GHG is stored.

Note: the UNFCCC Article 1.8 refers to a sink as any process, activity or mechanism which removes a GHG, an aerosol or a precursor of a GHG from the atmosphere. ([IPCC](#))

GHG SOURCE:

Processes or activities that release GHG emissions into the atmosphere. (ISO)

NATURAL CLIMATE SOLUTIONS (NCS):

Actions that conserve, restore or improve the use or the management of high carbon ecosystems (e.g. forests, wetlands, grasslands, and agricultural lands) while increasing carbon storage and/or avoiding GHG emissions. ([PNAS](#))

NATURE-BASED SOLUTIONS (NBS):

Actions to protect, sustainably manage and restore natural or modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits'. ([IUCN](#))

NEGATIVE-EMISSION TECHNOLOGIES:

Technologies that reduce the concentrations (or stocks) of greenhouse gases by removing them from the atmosphere and hold them in long-term geological storage.

NET EMISSIONS:

This is the amount of anthropogenic (GHG) emissions that remain after any emission reduction and/or removal via carbon offsets have been accounted for.

NET GHG INTENSITY:

Net GHG intensity represents the ratio between net GHG emissions and an amount of energy. Net GHG intensity can be expressed for an individual energy product, or more broadly for an assortment of activities conducted by a company which influence net emissions and can be related to an amount of energy produced, sold or otherwise handled by a company.

NET GHG LIFECYCLE EMISSIONS:

The Scope 1, 2 and 3 emissions attributable to an actor's activities and products, along the full value chain, that remain after any emission reduction and/or removal via carbon offsets have been accounted for.

NET-NEGATIVE EMISSIONS:

This is achieved when more anthropogenic GHG emissions are removed from the atmosphere than are emitted into it. Where multiple GHGs are involved, the quantification of negative emissions depends on the climate metric chosen to compare emissions of different gases (such as global warming potential, global temperature change potential, and others, as well as the chosen time horizon). This state (net-negative emissions) can be achieved at the global, national or company level. (*based on* [IPCC](#))

NET-OPERATIONAL EMISSIONS:

This is the amount of emissions resulting from an actor's operations (Scope 1 and Scope 2) that remain after any emissions reduction and/or removal via carbon offsets have been accounted for.

NET-ZERO EMISSIONS:

This is achieved when anthropogenic GHG emissions to the atmosphere are balanced by anthropogenic removals. Where multiple GHGs are involved, the quantification of net-zero emissions depends on the climate metric chosen to compare emissions of different gases (such as global warming potential, global temperature change potential, and others, as well as the chosen time horizon). This state (net-zero emissions) can be achieved at the global, national or company level. (*based on* [IPCC](#))

NET-ZERO OPERATIONAL EMISSIONS:

This means that all emissions resulting from an actor's operations (Scope 1 and Scope 2) are reduced, where possible, and all residual emissions are addressed by removal offsets.

PATHWAYS:

The temporal evolution of natural and/or human systems towards a future state. Pathway concepts range from sets of quantitative and qualitative scenarios or narratives of potential futures to solution oriented decision-making processes to achieve desirable societal goals. Pathway approaches typically focus on biophysical, techno-economic, and/or socio-behavioural trajectories and involve various dynamics, goals and actors across different scales. ([IPCC](#))

- **Paris-aligned pathway:**
A pathway that is aligned with meeting the goals of the Paris Agreement — limiting global warming to well-below 2°C above pre-industrial levels and pursuing efforts to limit warming to 1.5°C. ([Net Zero Climate](#))
- **Overshoot pathways:**
Pathways that exceed the stabilisation level (concentration, forcing or temperature) before the end of a time horizon of interest (e.g., before 2100) which then decline towards that level by the end of the time horizon. Once the target level is exceeded, removal by GHG sinks is required. ([IPCC](#))
 - **Higher overshoot pathway:**
A pathway whereby global warming exceeds 1.6°C but then still returns to 1.5°C by 2100. ([IPCC](#))
 - **Limited overshoot pathway:**
A pathway that limits global warming to a maximum of 1.6°C before returning to 1.5°C by 2100. ([IPCC](#))
 - **No overshoot pathways:**
Pathways giving at least 50% probability based on current knowledge of limiting global warming to below 1.5°C. ([IPCC](#))

PRE-INDUSTRIAL:

The multi-century period prior to the onset of large-scale industrial activity around 1750. The reference period 1850–1900 is used to approximate pre-industrial global mean surface temperature. ([IPCC](#))

REFERENCE SCENARIO:

A hypothetical scenario that best represents the conditions most likely to occur in the absence of any climate change mitigation.

RESIDUAL GHG EMISSIONS:

These are the GHG emissions that remain after efforts have been made by an actor to reduce emissions from its operations.

SCENARIOS:

A plausible description of how the future may develop based on a coherent and internally consistent set of assumptions about key driving forces (e.g. rate of technological change) and relationships. Note that scenarios are neither predictions nor forecasts but are used to provide a view of the implications of developments and actions. ([IPCC](#))

SCOPE 1 EMISSIONS

Direct GHG emissions occur from sources that are owned or controlled by the company, for example, emissions from combustion in owned or controlled boilers, furnaces, vehicles, etc.; emissions from chemical production in owned or controlled process equipment. ([WRI/WBCSD GHG Protocol](#))

SCOPE 2 EMISSIONS

Scope 2 accounts for GHG emissions from the generation of purchased electricity and steam consumed by the company. Purchased electricity and steam are defined as electricity and steam that is purchased or otherwise brought into the organizational boundary of the company. Scope 2 emissions physically occur at the facility where electricity and steam are generated. ([WRI/WBCSD GHG Protocol](#))

SCOPE 3 EMISSIONS

Scope 3 is an optional reporting category that allows for the treatment of all other indirect emissions. Scope 3 emissions are a consequence of the activities of the company, but occur from sources not owned or controlled by the company. Some examples of Scope 3 activities are extraction and production of purchased materials; transportation of purchased fuels; and use of sold products and services. ([WRI/WBCSD GHG Protocol](#))

STABILISATION:

A state in which the atmospheric concentrations of one GHG, or of the CO₂-equivalent of a selection of GHGs (or a combination of GHGs and aerosols) remains constant over time. ([IPCC](#))

TEMPERATURE OVERSHOOT:

The temporary exceedance of a specified level of global warming, such as 1.5°C. Overshoot implies a peak followed by a decline in global warming, achieved through anthropogenic removal of CO₂ exceeding remaining CO₂ emissions globally. ([IPCC](#))

Related resources

Exploring low-emissions pathways: advancing the Paris Puzzle (2016)

This publication provides perspective on the common elements and enablers of pathways to meet a low-emissions future.

<https://www.ipieca.org/resources/awareness-briefing/exploring-low-emissions-pathways-advancing-the-paris-puzzle/>

Exploring low-emissions pathways for transport (2019)

This awareness briefing builds on the above publication and demonstrates how the oil and gas industry is an essential partner in sustainable development and is using its skills, capabilities and resources to enable the transition to a low-emission future.

<https://www.ipieca.org/resources/awareness-briefing/exploring-low-emissions-pathways-for-transport/>

Hydrogen: enabling the energy transition and the pathways to net-zero emissions (2021)

Building on the 2016 *Exploring low-emissions pathways: advancing the Paris Puzzle* document, this briefing provides a broad overview of hydrogen technology and areas of application, exploring the different methods by which hydrogen can be produced and stored, as well as the opportunities for its use in industry, transportation and households. It also features a range of industry case studies.

<https://www.ipieca.org/resources/awareness-briefing/hydrogen-enabling-the-energy-transition-and-the-pathways-to-net-zero-emissions/>

Zigzag to zero: positive pathways to Paris (2021)

This Ipieca interactive, virtual roundtable examined the topic of the energy transition and net-zero emissions through three lenses; investors and international organizations, regional perspectives, and industry initiatives.

<https://www.ipieca.org/resources/webinars/zigzag-to-zero-positive-pathways-to-paris-an-industry-investor-and-civil-society-roundtable/>

References

- ICROA, (2016). *Insetting: Developing carbon offset projects within a company's own supply chain and supply chain communities*. https://www.icroa.org/resources/Pictures/ICROA%20Insetting%20Report_v300.pdf
- IEA, (2011). *Combining bioenergy with CCS*. IEA, Paris. <https://www.iea.org/reports/combining-bioenergy-with-ccs>
- IEA, (2020). *Direct air capture*. IEA, Paris. <https://www.iea.org/reports/direct-air-capture>
- IETA, (2017). *An introduction to carbon markets*. [https://www.ieta.org/resources/Aviation/IETA%20IATA%20Workshops/Nairobi/What%20is%20a%20carbon%20credit%20-%20ClimateCare%20\(NBO\).pdf](https://www.ieta.org/resources/Aviation/IETA%20IATA%20Workshops/Nairobi/What%20is%20a%20carbon%20credit%20-%20ClimateCare%20(NBO).pdf)
- IPCC, (2018). *Global warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty* [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. In Press. https://www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15_Full_Report_High_Res.pdf
- International Organization for Standardization (ISO). *ISO 14068:2020(E). Greenhouse gas management and related activities – carbon neutrality*. Still under development.
- IUCN, (2016). *Nature-based solutions to address global societal challenges*. 10.2305/IUCN.CH.2016.13.en. https://www.researchgate.net/publication/307608144_Nature-based_Solutions_to_address_global_societal_challenges
- Net Zero Climate. *What is net zero?* <https://netzeroclimate.org/what-is-net-zero/>
- PNAS, (2017). *Natural climate solutions*. 114 (44) 11645-11650. <https://doi.org/10.1073/pnas.1710465114>
- WRI/WBCSD GHG Protocol, (2015). *Corporate accounting and reporting standard*. <https://ghgprotocol.org/corporate-standard>

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Ipieca is the global oil and gas association dedicated to advancing environmental and social performance across the energy transition. It brings together members and stakeholders to lead in integrating sustainability by advancing climate action, environmental responsibility and social performance across oil, gas and renewables activities.

Ipieca was founded at the request of the United Nations Environment Programme in 1974. Through its non-lobby and collaborative approach Ipieca remains the industry's principal channel of engagement with the UN.

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