



Navigating GHG accounting and reporting

ISCC Academy - Webinar
04.02.2025

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Welcome and Introduction to the Webinar

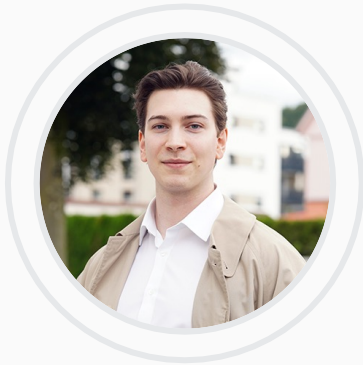
Today's Speakers



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Meo Carbon Solutions

- Close partnership with sister company ISCC
- 15 plus years of experience in helping our partners meet their environmental & social sustainability goals
- Tailored solutions for carbon footprint improvement, carbon markets, obtaining sustainability certifications, developing science-backed climate strategies & supply chain due diligence
- Background in creating certification schemes, interdisciplinary market research, capacity building & policy/regulatory advice

Navigating GHG accounting and reporting

- 01 Importance of GHG Management
- 02 Overview of Standards and Frameworks for GHG Accounting
- 03 Steps to Calculate GHG Emissions
- 04 GHG Monitoring & Communication
- 05 Certification & Validation under ISCC

01

Importance of GHG Management

Climate Change

- The **greenhouse gas emissions** blanket the Earth and trap the sun's heat leading to **global warming** and resulting in **climate change**.
- Global warming—the ongoing increase in global average temperature—and its effects on Earth's climate system. Earth in 2024 is **about 1.6°C warmer** than it was in the late 1800s.
- The last decade (2011-2020) was the **warmest** on record.
- Key contributors are human activities due to their use of fossil fuels – coal, oil and gasetc.; account for **over 75 percent** of global greenhouse gas emissions and nearly 90 per cent of all carbon dioxide emissions.

Greenhouse Gases – Global Warming Potential (GWP) and CO₂e

- Carbon dioxide (CO₂)
- Methane (CH₄)
- Nitrous oxide (N₂O)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)
- Sulfur hexafluoride (SF₆)
- Nitrogen trifluoride (NF₃)

Common chemical name or industrial designation	Chemical formula	GWP values for 100-year time horizon		
		Fourth Assessment Report (AR4)	Fifth Assessment Report (AR5)	Sixth Assessment Report (AR6)
Major Greenhouse Gases				
Carbon dioxide	CO ₂	1	1	1
Methane – non-fossil	CH ₄	25	28	27.0
Methane – fossil	CH ₄	N/A	30	29.8
Nitrous oxide	N ₂ O	298	265	273
Nitrogen trifluoride	NF ₃	17,200	16,100	17,400
Sulfur hexafluoride	SF ₆	22,800	23,500	24,300

Source: GHG Protocol, IPCC Global Warming Potential Values, 2024

E.g. 1 kg Nitrous oxide = 273 kg CO₂e (AR6)

As each of these gases have their own impact on the atmosphere, an equivalency measure is built based on the **GWP** (Global Warming Potential) of each gas → CO₂e

Why organizations report GHG emissions

Do you value it when a company provides specific carbon emissions content for a product?



79%

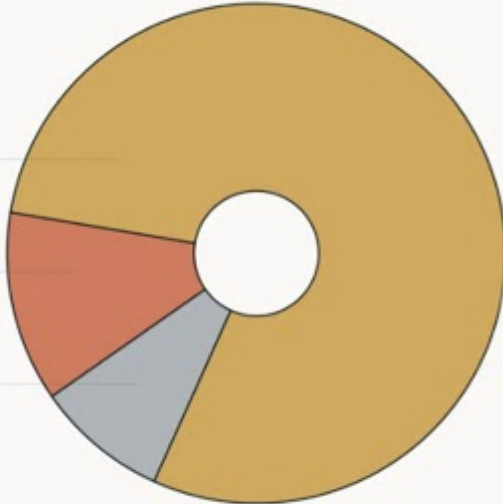
Yes

12%

No

9%

No opinion



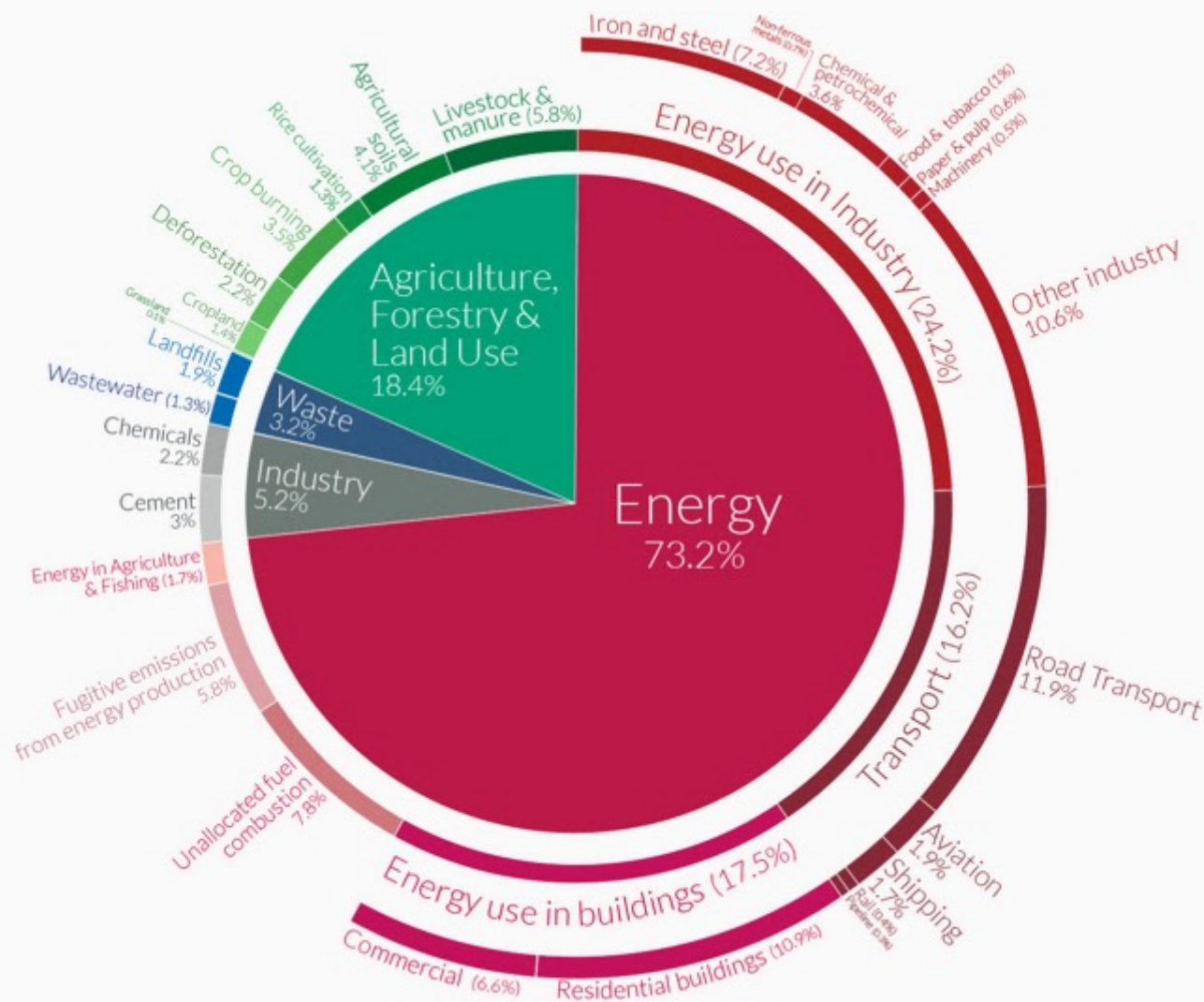
CLIMATE NEUTRAL PUBLIC INPUT SURVEY

2023 DATA

Source: Change Climate, Public Input Survey, 2022

- There are many reasons for the development of a **greenhouse gas (GHG) inventory** of a company or product
- Many options on how to develop a calculation, depending on the **requirements** of a corporation or a specific product
- Regulatory frameworks usually provide guidance on the specific **methodology** required or allowed to be used

Global Greenhouse Gas emissions by sector



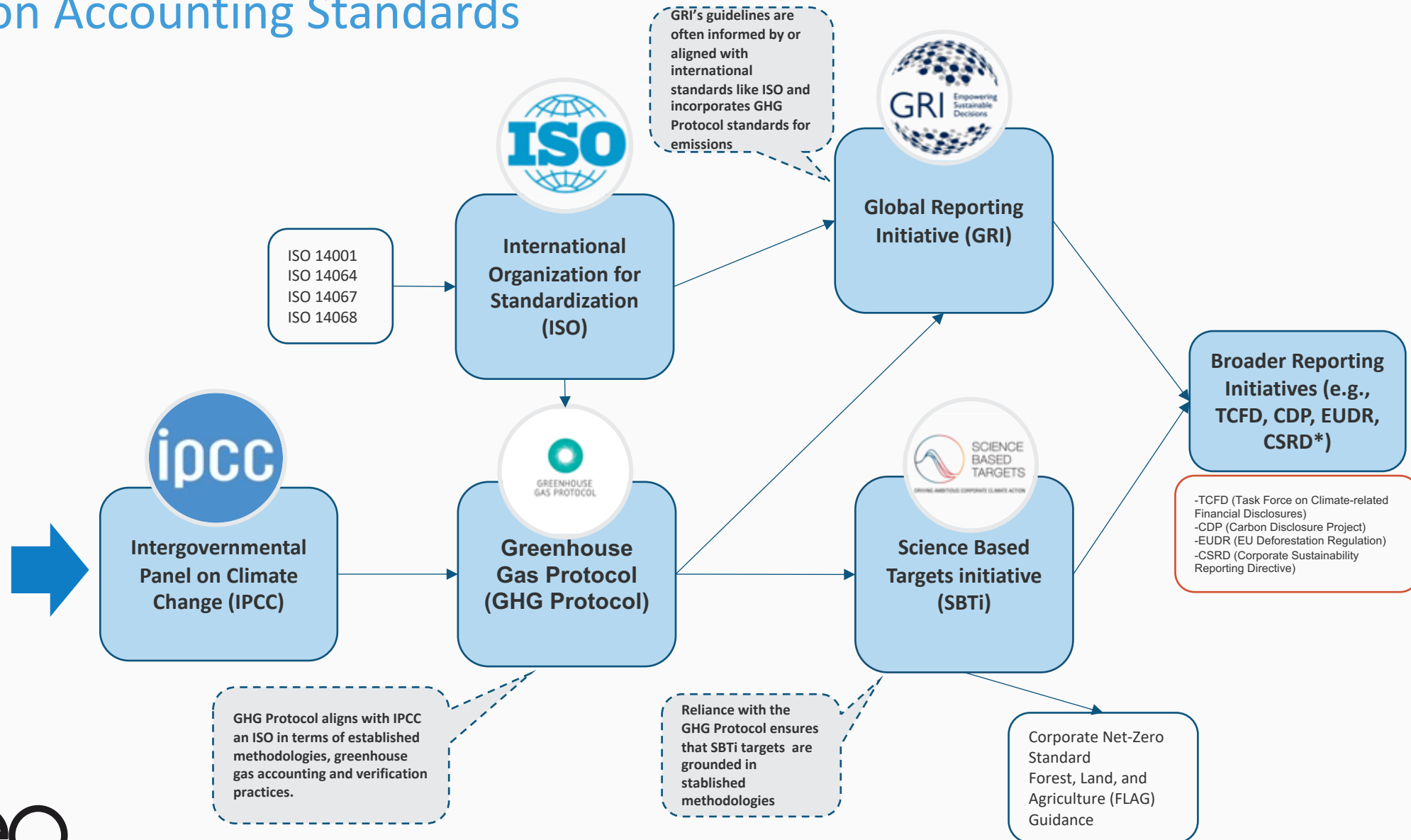
- Today, greenhouse gas emissions are linked to 5 key economic sectors
- The energy sector dominates, contributing 73.2% of global emissions.
- Regulated markets primarily cover sectors like energy (red share), while the others remain largely unregulated in terms of climate impact requirements.

02

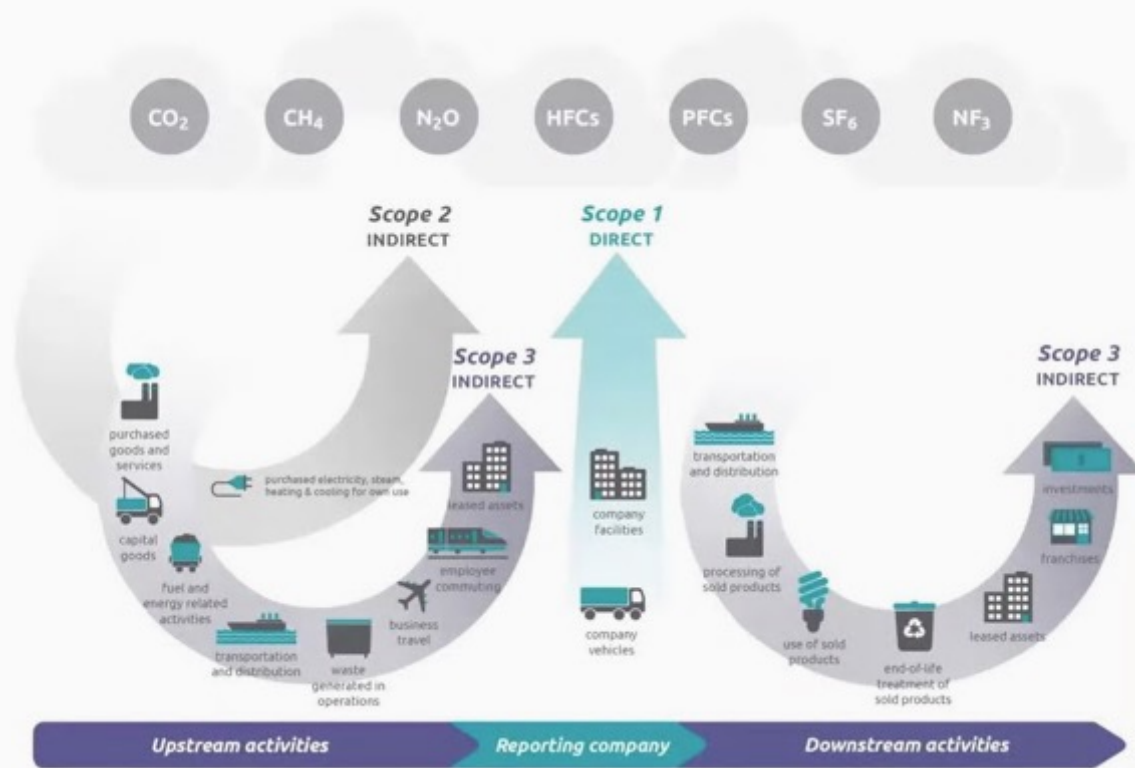
Overview of Standards and Frameworks for GHG Accounting

Sustainability frameworks and initiatives

Carbon Accounting Standards



Greenhouse Gases - Scopes 1 & 2 (mandatory)



Source: GHG Protocol, 2024

Scope 1 emissions

- Direct GHG emissions from sources a company owns or controls

Scope 2 emissions

- Indirect GHG emissions from purchased electricity, steam, heating and cooling

Scope 3 emissions

- Other indirect emissions, such as those from the supply chain, employee commuting, and product use.

IPCC

Fundamentals and References

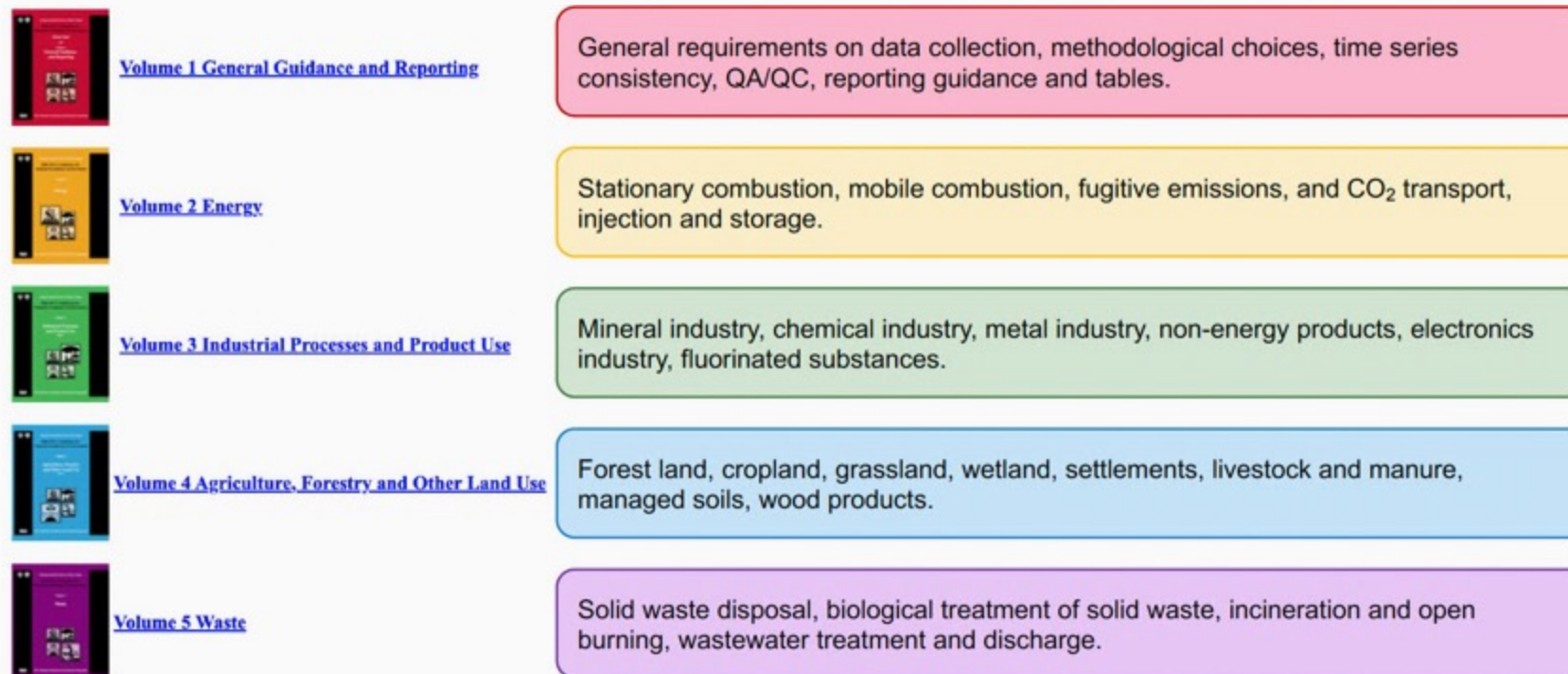
ipcc

INTERGOVERNMENTAL PANEL ON
climate change



IPCC – 2006 IPCC Guidelines for National GHG Inventories

- The 2006 IPCC Guidelines for National Greenhouse Gas Inventories **were developed** at the invitation of the **United Nations Framework Convention on Climate Change (UNFCCC)** as **the internationally agreed methodology** to be used to estimate greenhouse gas inventories and **report** them
- As member states of the UN, countries entering the convention are required to submit their National Communication (NC), and these reports include a **GHG emission inventory of the country**.



IPCC – 2006 IPCC Guidelines for National GHG Inventories

- Each *volume* contains specific guidelines and information, such as:
 - Requirements for the specific sector
 - **Methodological guidelines (Tier approaches)**
 - **Emission factors and default values**
 - **Calculation formulas**
 - Uncertainty assessment
 - Annex worksheets
- The 2019 IPCC refinement presents updated information and formulas

Volume 2: Energy

TABLE 2.2
DEFAULT EMISSION FACTORS FOR STATIONARY COMBUSTION IN THE ENERGY INDUSTRIES
(kg of greenhouse gas per TJ on a Net Calorific Basis)

Fuel	CO ₂			CH ₄			N ₂ O		
	Default Emission Factor	Lower	Upper	Default Emission Factor	Lower	Upper	Default Emission Factor	Lower	Upper
Crude Oil	73 300	71 100	75 500	3	1	10	0.6	0.2	2

TABLE 2.6
UTILITY SOURCE EMISSION FACTORS

		Emission factors ¹ (kg/TJ energy input)								
Basic technology	Configuration	CH ₄	N ₂ O	CH ₄	Lower	Upper	N ₂ O	Lower	Upper	
Liquid Fuels										
Residual Fuel Oil/Shale Oil Boilers	Normal Firing	0.8	0.3	3	1	10	0.6	0.2	2	
	Tangential Firing	0.8	0.3	3	1	10	0.6	0.2	2	
Gas/Diesel Oil Boilers	Normal Firing	0.9	0.4	3	1	10	0.6	0.2	2	
	Tangential Firing	0.9	0.4	1	0.3	3	0.1	0.03	0.3	
Large Diesel Oil Engines >600hp (447kW)		4	NA	1	0.3	3	0.1	0.03	0.3	
				3	1	10	0.6	0.2	2	
Solid Fuels										
Pulverised Combustion Boilers	Bituminous	Dry Bottom, wall fired	0.7	0.5	3	1	10	0.6	0.2	2
		Dry Bottom, tangentially fired	0.7	1.4	3	1	10	0.6	0.2	2
		Wet Bottom	0.9	1.4	3	1	10	0.6	0.2	2
Bituminous Spreader Stoker Boilers		With and without re-injection	1	0.7						
Bituminous Fluidised Bed Combustor		Circulating Bed	1	61						
		Bubbling Bed	1	61						
Bituminous Cyclone Furna										
Lignite Atmospheric Fl Bed										

EQUATION 2.1

GREENHOUSE GAS EMISSIONS FROM STATIONARY COMBUSTION

$$Emissions_{GHG, fuel} = Fuel\ Consumption_{fuel} \bullet Emission\ Factor_{GHG, fuel}$$

Source: Intergovernmental Panel on Climate Change (IPCC), 2019

ISO

Reporting and Verification



General information on the ISO-Standard

- **The International Organization for Standardization (ISO)** is an independent, non-governmental organization with a membership of 167 national standards bodies
- To this date, ISO has 24.571 International Standards covering almost all aspects of **technology and manufacturing**

ISO/TC 207 – Environmental Management (a.k.a. ISO 14000 family):

- Standardization in the field of environmental management to **address environmental and climate impacts in support of sustainable development** (also related social and economic aspects)

For example:

Environmental Management Systems (Broad Scope)

-ISO 14001

Corporate Carbon Footprint (GHG Accounting at the Organization Level)

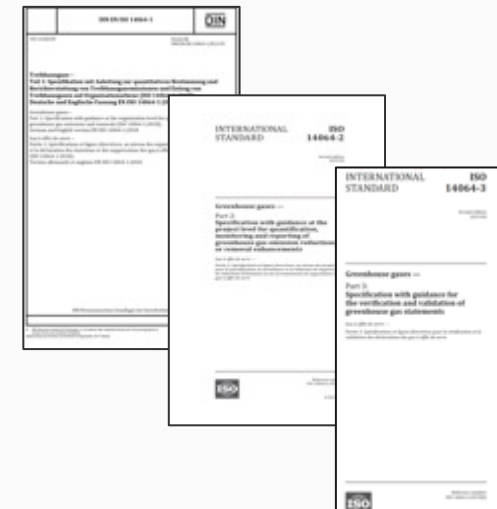
-ISO 14064

Product Carbon Footprint (GHG Accounting for Products)

-ISO 14067

Environmental Declarations & Communication

-ISO 14025



Source: ISO/TC 207 Environmental management

GHG Protocol

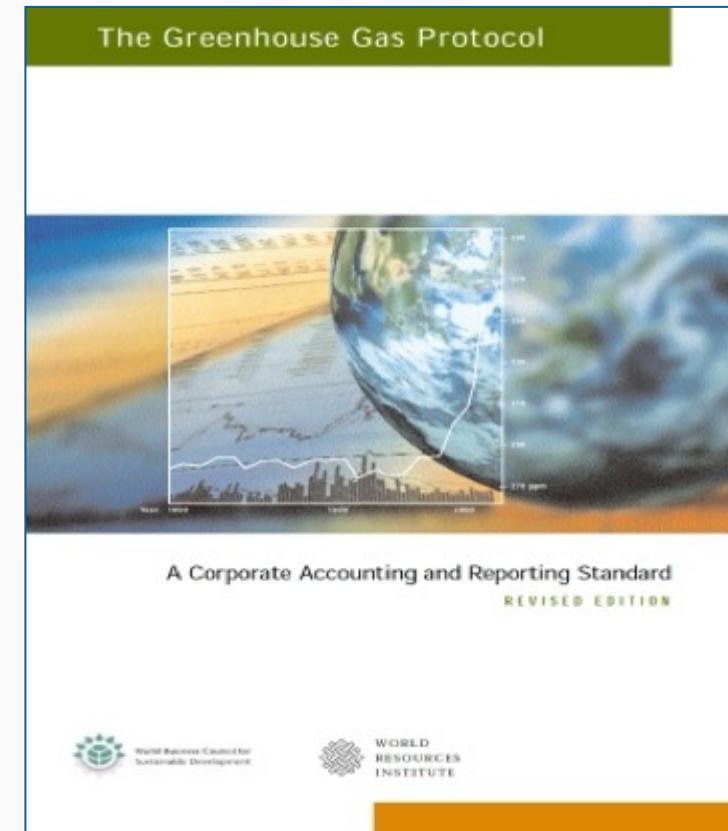
Calculations



GREENHOUSE GAS PROTOCOL

The Greenhouse Gas Protocol

- The **Greenhouse Gas Protocol (GHG Protocol)** is a multi- stakeholder partnership of businesses, non-governmental organizations (NGOs), governments, and others convened by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD).
- The GHG Protocol is one of the main methodologies referenced for the **calculation and reporting of greenhouse gases**. The GHG Protocol has been used as a reference for other standards such as the ISO 14067, PAS 2050, GRI, etc and reporting initiatives such as the CDP, SBTi or CSRD*, making it a valuable reference for compliance.
- Under this scheme, **different documents provide specific guidelines** for the calculation and reporting of GHG emissions with different scopes, perspectives and adjusting to specific sectors.
- The GHG Protocol supplies the world's most widely used greenhouse gas **accounting standards**



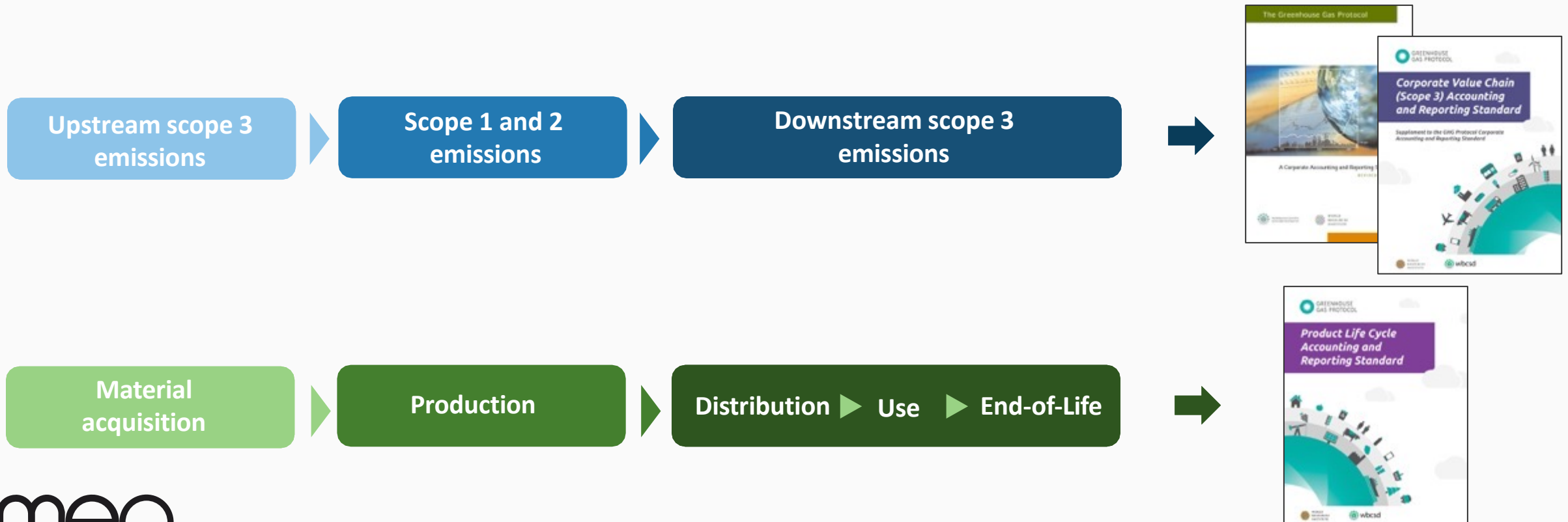
Relevant standards under the GHG Protocol

- The **Corporate Accounting and Reporting Standard** is the main document, establishing the general rules for defining the system boundaries, calculation of GHG emissions, consideration of emission reductions, and reporting and verification of emissions.
- The **Corporate Value Chain (Scope 3) Accounting and Reporting Standard** is directed to companies voluntarily including Scope 3 emissions to their corporate carbon footprint. This document includes specific descriptions and requirements for including indirect emissions and how to account for them.
- The **Product Life Cycle Accounting and Reporting Standard** is the reference document for the development of a carbon footprint of a product. This standards adjust the main guidelines to be applicable to the different stages of a product life cycle.



Differences between Product life cycle assessment and Corporate assessment

The **Corporate Standard(s)** helps a company identify GHG reduction opportunities, track performance, and engage suppliers at a **corporate level**, while the **Product Standard** helps a company meet the same objectives at a **product level**. Under the Product Life Cycle Accounting and Reporting Standard, direct and indirect emissions are classified not as scopes but based on the life cycle stage of the product.



GRI
Reporting



GRI - Global Reporting Initiative

- A globally recognized framework that provides a comprehensive framework for **sustainability reporting**, including **greenhouse gas (GHG) emissions**.
- GRI Standards are structured as a set of interrelated, modular standards
- **GRI 305: Emissions** – Details how companies should measure and report their GHG emissions, categorized by Scopes 1, 2, and 3



SBTi and FLAG

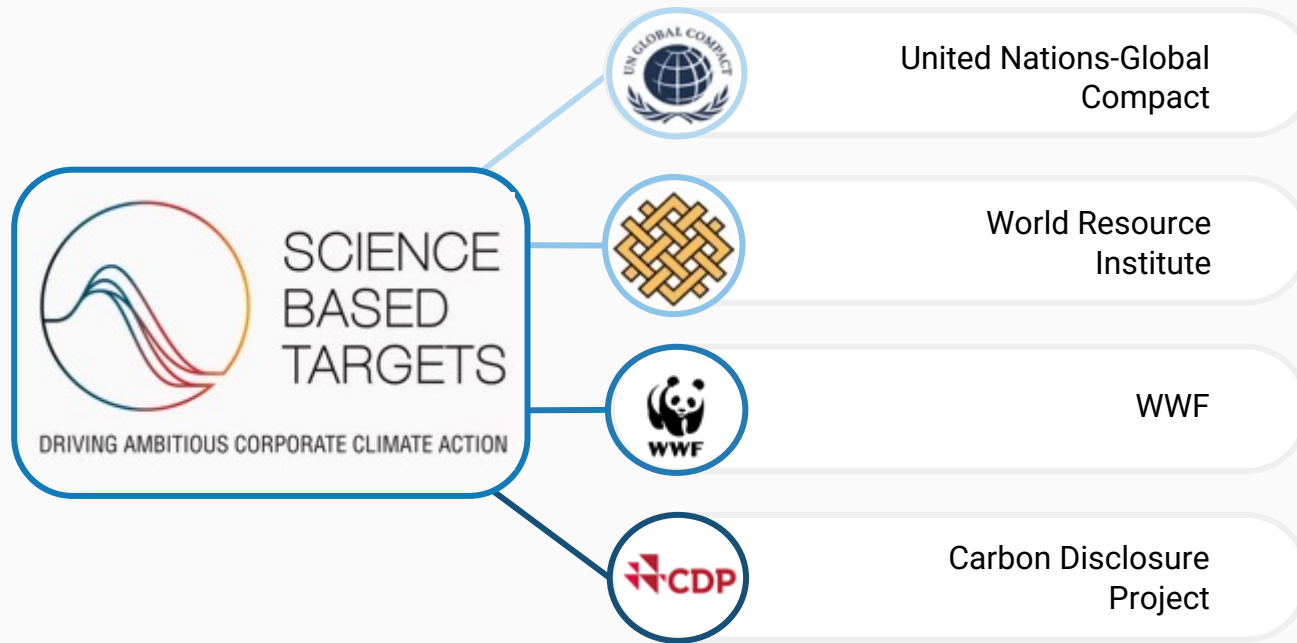
Target setting



SCIENCE
BASED
TARGETS

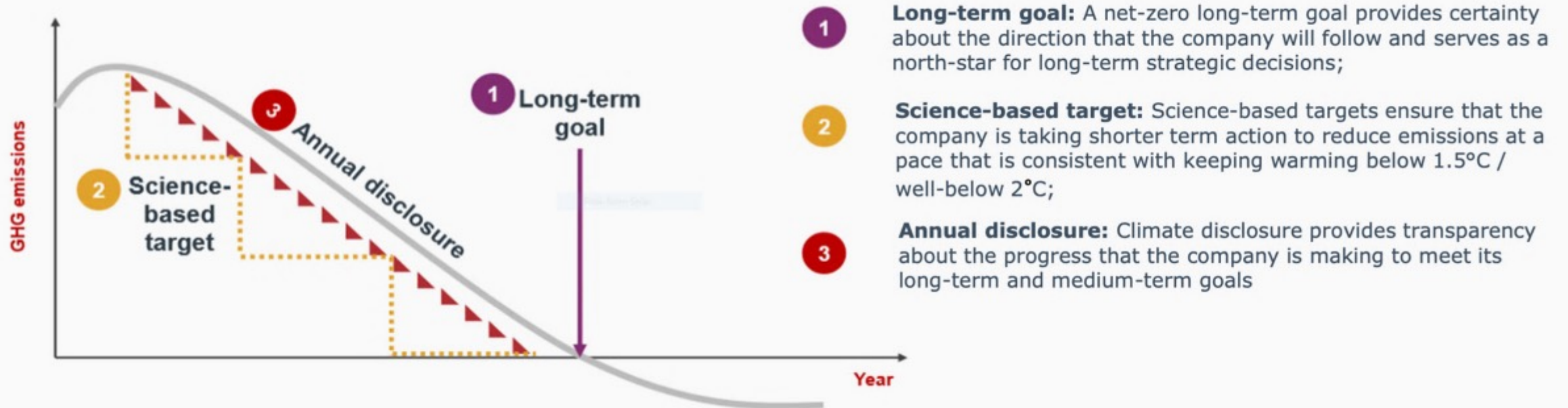
DRIVING AMBITIOUS CORPORATE CLIMATE ACTION

The Science Based Targets Initiative (SBTi)



- Drives ambitious climate action by enabling companies to set Science-Based greenhouse gas emissions reduction targets. Increase corporate ambition on climate action
- Sector-specific guidance for most relevant sectors of the economy
- Representing 90% of global emissions

SBTs are a key tool for low carbon transition

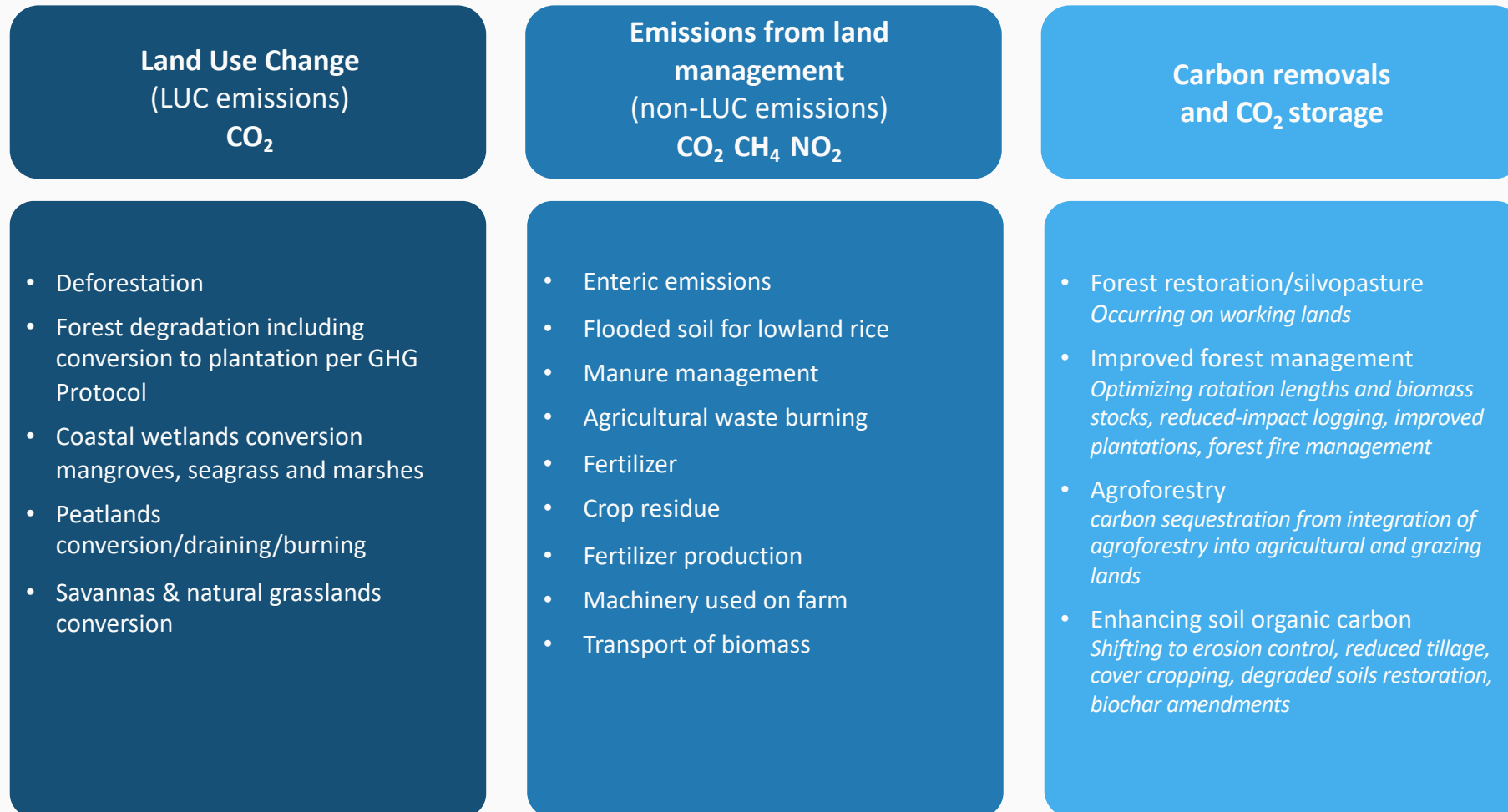


Source: GEKA, Target Validation Report 2022

Forest, land and agriculture specific targets (FLAG)

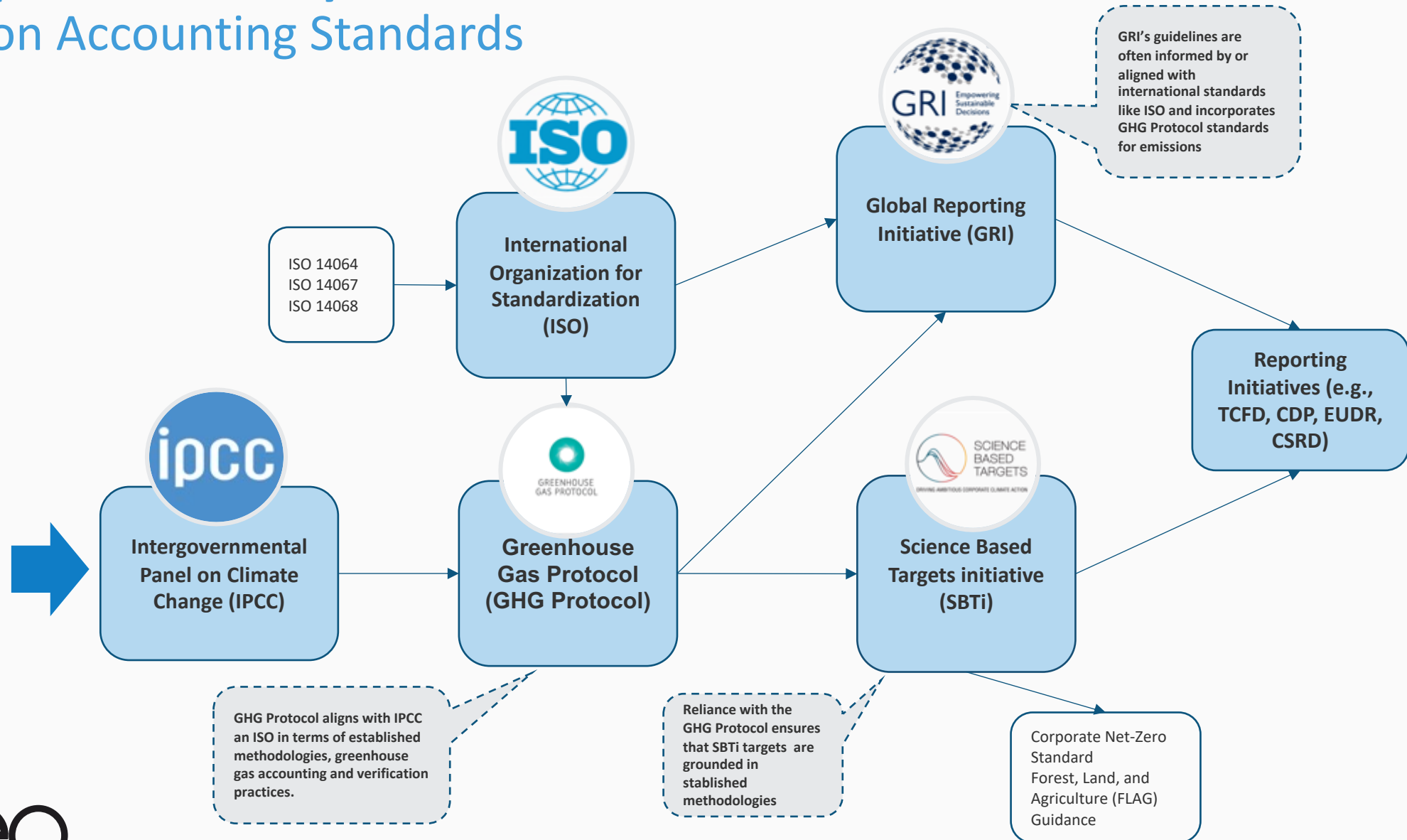
FLAG expands SBTi to include Agriculture, Forestry and Other Land Use (AFOLU) emissions

FLAG covers:



Recap: Sustainability frameworks and initiatives

Carbon Accounting Standards





10 minute Q&A Session
Please ask your question via Slido!

slido

Please download and install the
Slido app on all computers you use



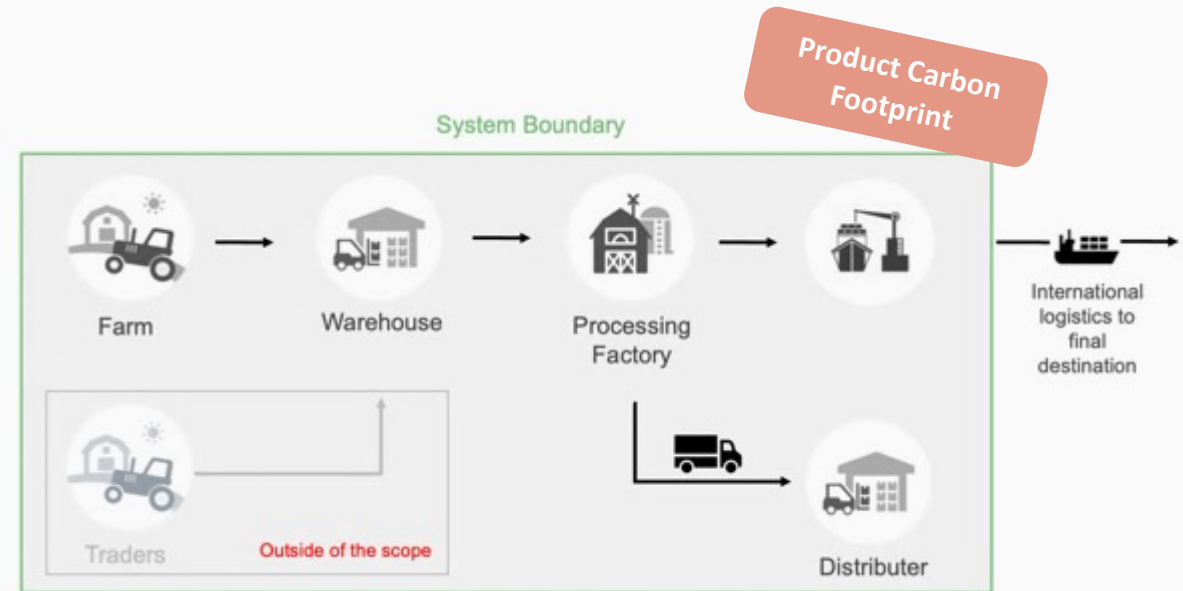
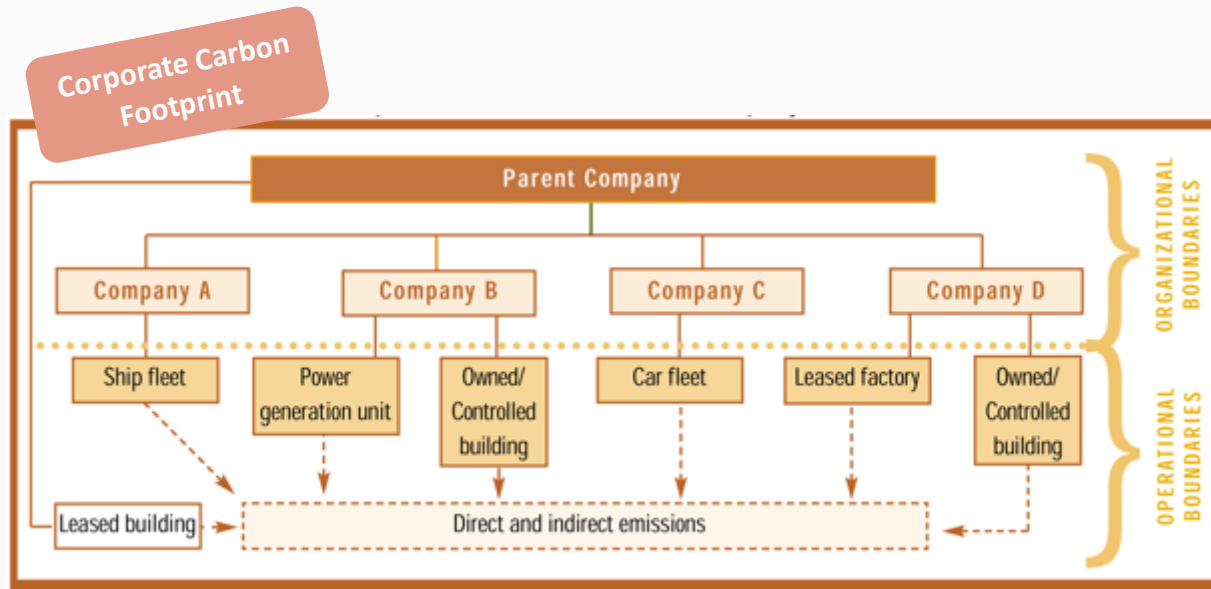
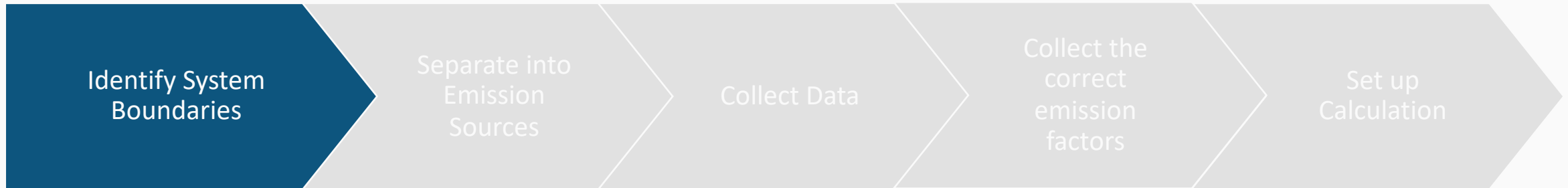
Audience Q&A

① Start presenting to display the audience questions on this slide.

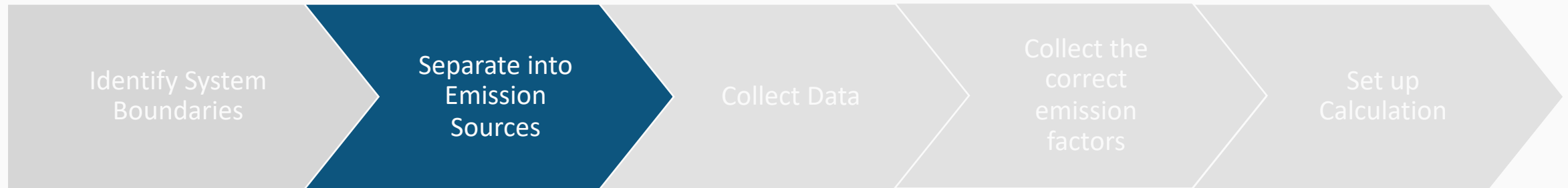
03

Steps to calculate GHG Emissions

How to conduct a GHG Calculation



How to conduct a GHG Calculation



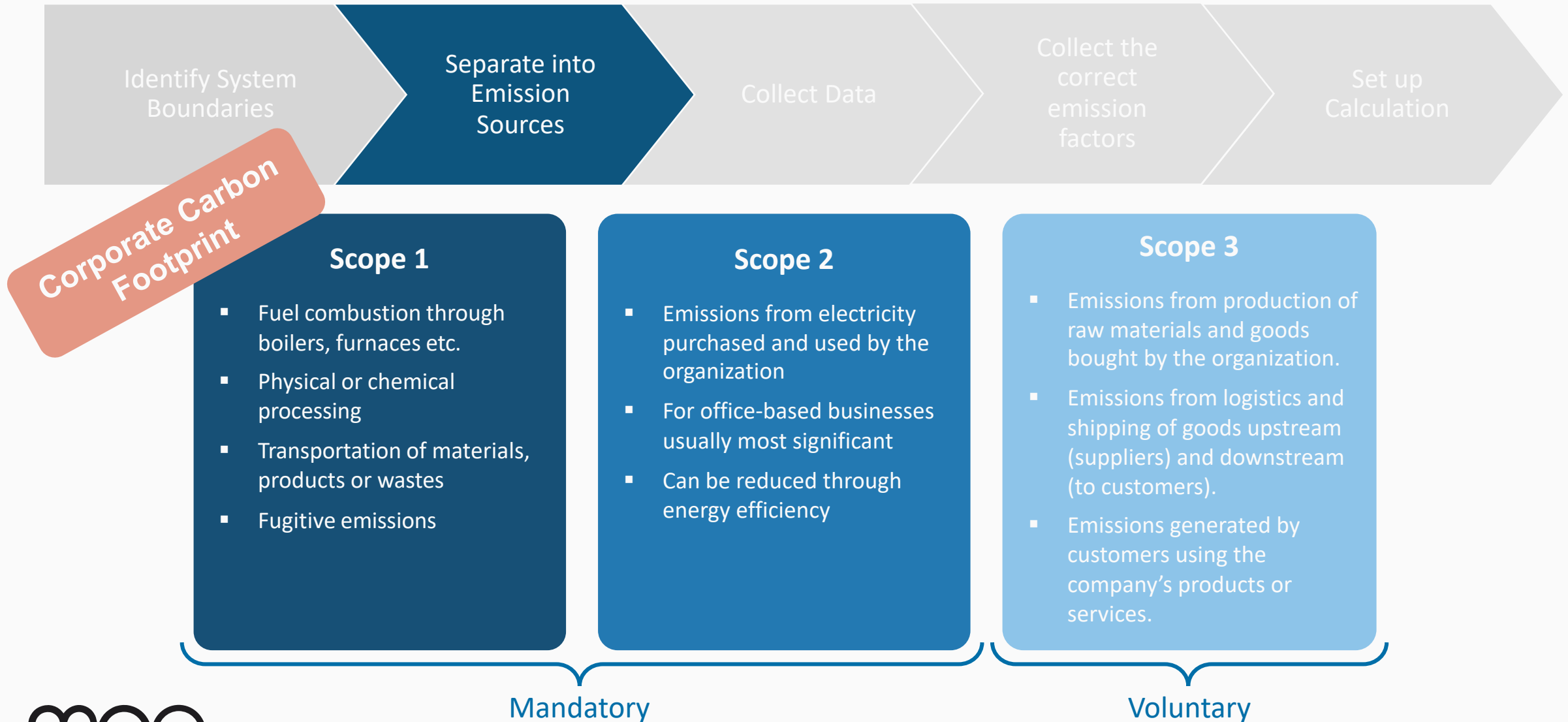
GHG Protocol Corporate Standard

- Corporate system boundaries
- Emissions classified as direct or indirect
- **Scopes** 1 and 2 mandatory, Scope 3 optional
- Excludes activities from suppliers (upstream) and clients (downstream)
- Includes emissions from administrative activities (e.g., electricity from offices)

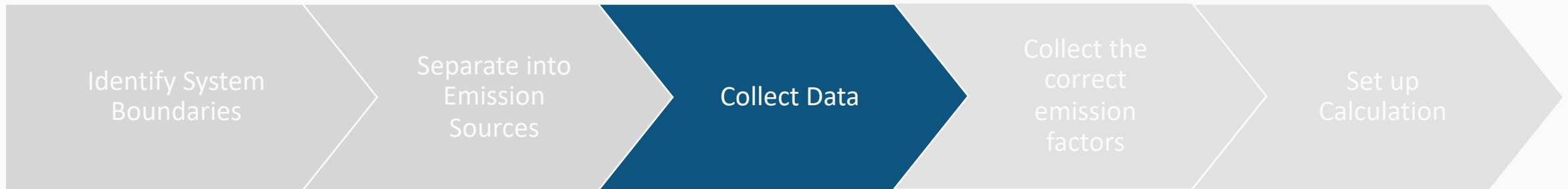
GHG Protocol Product Standard

- Focuses only on the lifecycle of a **single product** or service, no Scopes
- Emissions classified under lifecycle stage of the product
- Cradle-to-gate or cradle-to-grave calculations allowed
- The sum of all product carbon footprints is **not equal** to the corporate carbon footprint (administrative activities missing)

How to conduct a GHG Calculation



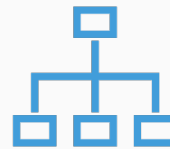
How to conduct a GHG Calculation



Select the right **standards** and **frameworks** to align with your goals



Identify required data and emission sources for the chosen frameworks

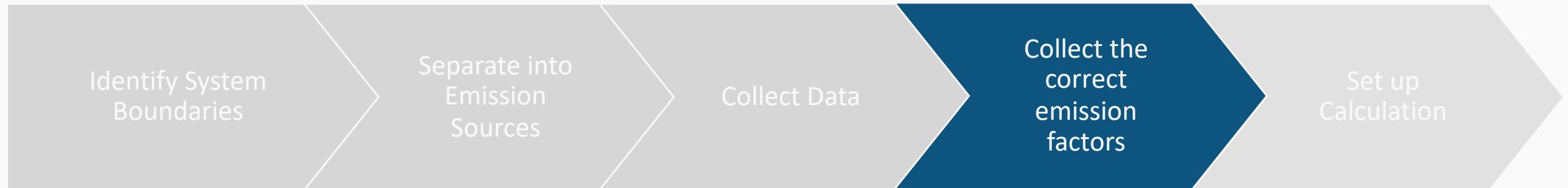


Determine the data collection **approach** (set sample sizes, assign responsibilities)



Collect data using data request templates

How to conduct a GHG Calculation



What are Emission Factors?

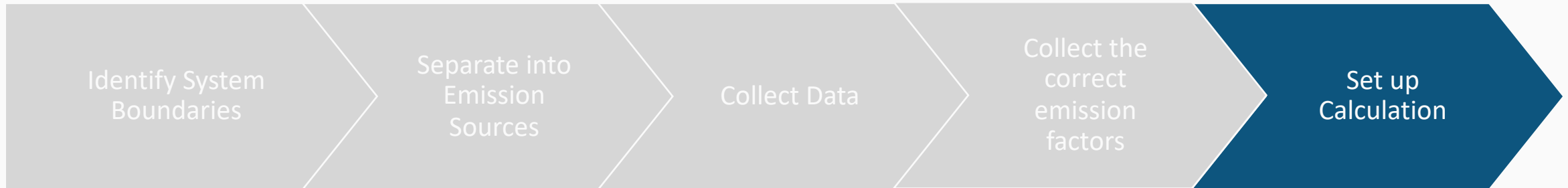
- Emission factors link **emissions** to **activities**, by specifying the kgCO₂e per unit of activity data
- They simplify and standardize emission calculations

Possible sources for Emission Factors (EFs):

- IPCC Emissions Factor Database
- Greenhouse Gas Protocol Emission Factors for Cross Sector Tools V2.0
- Ecoinvent database
- 'Official' sources, such as International Energy Agency (IEA) or governments
- GREET Model
- Other reviewed sources of data, such as E3 database, GEMIS database
- Peer-reviewed publications
- Duly documented own estimates

- In general, the listed sources are **sorted by reliability** from top to bottom, **but** it is necessary to **check** in each individual case whether there are any limitations to the **applicability of the EF**.
- **Key questions** to check whether an EF is applicable:
 - ✓ Are there any **geographical** limitations of the EF or e.g., is it globally applicable?
 - ✓ Does the EF **technically represent** the activity?
 - ✓ Is the EF taken from a **recent source**?
 - ✓ Is the source **accessible**?

How to conduct a GHG Calculation

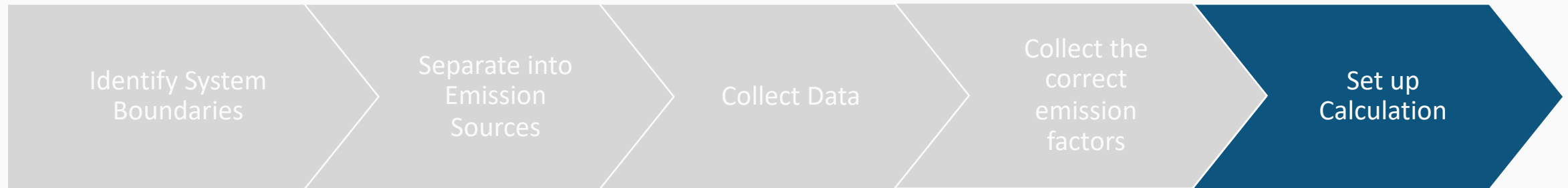


Electricity:

$$e_{electricity} \left[\frac{kg CO_2e}{year} \right] = Electricity\ consumption \left[\frac{kWh}{year} \right] \times EF_{electricity} \left[\frac{kg CO_2e}{kWh} \right]$$

example

How to conduct a GHG Calculation



Example: The quantification of GHG emissions for an agricultural supply chain

$$E = e_c + e_l + e_p + e_{td} + cs_{soc} + cs_{Boc}$$

- E total emissions from the supply chain in the final unit **kg CO₂eq/t product**
- e_c emissions from the **cultivation**
- e_l annualized emissions from carbon stock changes caused by **land-use change**
- e_p emissions from **processing**
- e_{td} emissions from **transport and distribution**
- cs_{soc} carbon sequestered from **soil carbon accumulation** via improved agricultural management
- cs_{Boc} carbon sequestered from **biomass carbon accumulation** (e.g. via tree planting activities)

example

GHG Calculator - Example

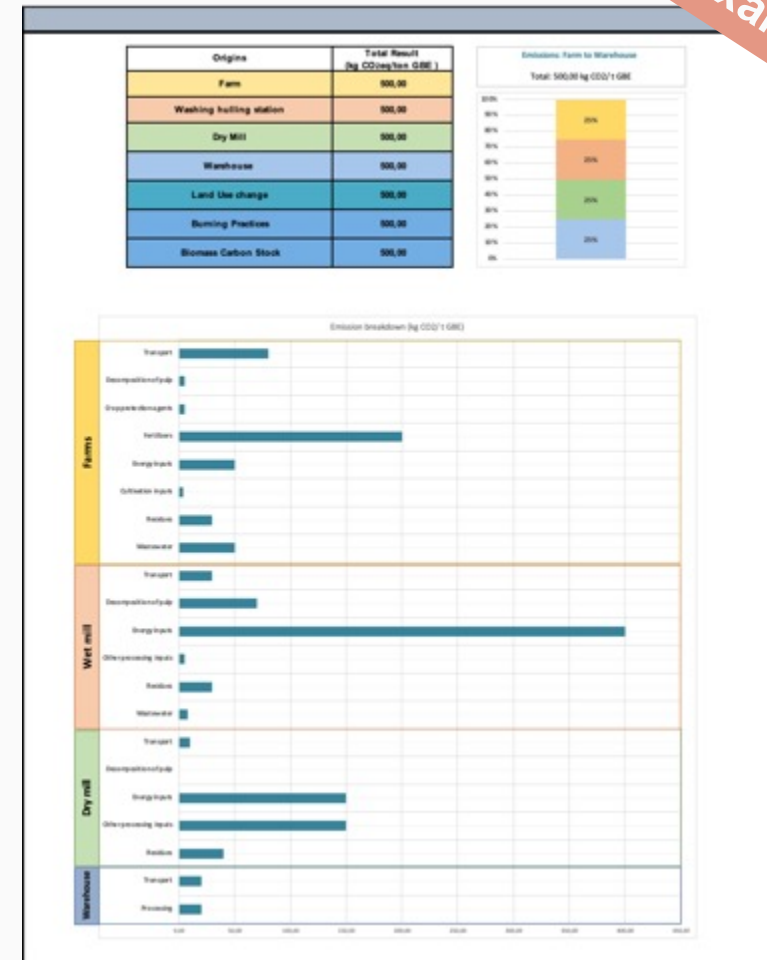
Calculator at the farm level

Example

[illegible]

Overall results

Example

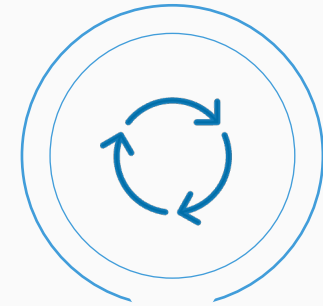


04

GHG Monitoring and Communication

Improvement plan

Purpose: Establish a structured approach to systematically and continuously reduce your GHG emissions.



Baseline Assessment

- Summary of GHG Emissions in base year
- Projected emissions in a scenario with no improvement measures

Emission Reduction Targets

- Review current methodologies and define targets for emission savings
- Defined deadlines for each target
- Use of guidelines (→SBTi)

Reduction Measures

- Define and implement scientifically-based strategies to meet set targets
- Report of all activities included in the emission reduction measure
- Include robust projection of emission savings through implementation of each measure

Monitoring Plan

- Continuously monitor and review strategies
- Update the improvement plan based on evolving standards
- Ensure and improve data quality
- Use widely accepted reporting standards
- Reflect and evaluate monitoring and take corrective actions if needed

Approach to GHG Reporting

- **Define** the requirements for reporting
 - Report is required if organization chooses to have its **GHG inventory verified or makes a public GHG statement**
 - Focus on the key parameters
 - Establish a reporting scope that is easily understandable
- **Establish** a reporting process
 - Predictability
 - Clearly assigned roles, responsibilities and expectations
 - Defined routines for data quality control
 - Integration into the existing management system
- **Choose** a standard/framework that fits the process



EUDR and CSRD Compliance



- **EU Deforestation Regulation (EUDR)** is a law to ensure that products in the EU are not linked to deforestation
- Requirements: Due diligence, tracing of supply chains, risk assessments



- **Corporate Sustainability Reporting Directive (CSRD)** is an EU regulation requiring large companies to disclose detailed information on their environmental, social, and governance impacts

Conducting your GHG Calculation, Accounting and Reporting under widely accepted standards and frameworks, such as the ones presented, can assist your company with demonstrating EUDR and CSRD compliance.

- Recognized standards ensure that your calculations are precise, traceable, credible and can withstand regulatory scrutiny
- European Sustainability Reporting Standards (ESRS) require the use of recognized standards and frameworks
- Simplified verification process

Communication: The Green Claims Directive

- Proposed by European Commission in 2023 → Expected to take effect in 2026
 - Clear criteria on how companies should **prove** their environmental claims and labels
 - Requirements for these claims and labels to be **verified** by an independent and accredited verifier
 - Prevents **vague** terms like "climate neutral" without context or data (greenwashing)
 - Encourages **detailed, substantiated** claims (e.g., *"Scope 1 and 2 emissions reduced by 30% from 2021 levels"*) based on clear **scientific evidence**
- The presented frameworks can serve as the **foundation** for reliable reporting
- Reporting under recognized standards form the basis for **certifications**

Certifications play a vital role in the Green Claims Directive, as they provide credibility and assurance to both businesses and consumers regarding the authenticity of environmental claims.



Certification

- Voluntary certification....
 - ...ensures credibility and accuracy of GHG accounting efforts
 - ...enhances transparency
 - ...builds trust with stakeholders and customers
 - ...requires investment in data collection, audits, and verification



05

Certification & Validation under ISCC

The ISCC certification process in six steps



Choose a certification for your market



Choose a Certification Body (CB)



Sign up for ISCC client section and ISCC HUB



Register with ISCC



Get Audited by your CB and receive your certificate



Handle your sustainable material and use ISCC **logos and claims**

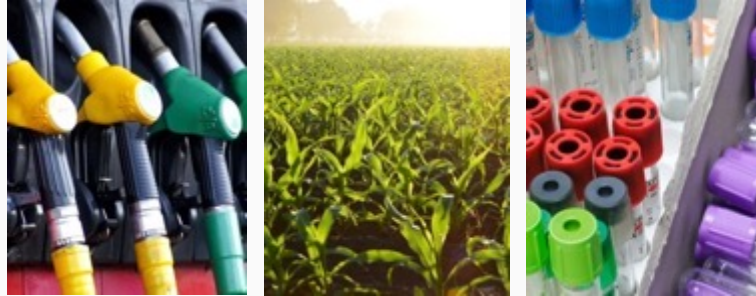
ISCC offers three certification systems, application depending on the market

ISCC EU



- Applicable for **sustainable fuels used for transport, electricity, heating and cooling in the European Union**
- Recognized by the European Commission under the RED III (RFNBO/RCF) and by the United Kingdom under the RTFO

ISCC PLUS



- Application for **voluntary** and certain **regulated markets**
 - Energy and biofuels outside the European Union (e.g. Japan, Australia)
 - Industrial applications
 - Food and feed markets
 - GHG reporting is optional

ISCC CORSIA



- Applicable for **sustainable aviation fuels under ICAO CORSIA**
- To **demonstrate compliance** with the sustainability and GHG criteria for CORSIA eligible fuels

Companies in the food, feed and industrial sector use ISCC to prove compliance with important platforms & standards

Selection



Energy

Compliance with platforms & industry standards

Selected ISCC certified companies



Food



Feed



Industrial applications

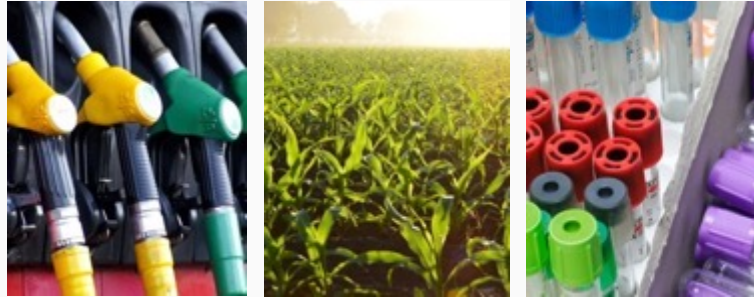


ISCC offers three certification systems, application depending on the market

ISCC EU



ISCC PLUS



ISCC CORSIA



All ISO compliant in terms of GHG accounting

Specific rules for calculating GHG according to different legal frameworks (RED, RFNBO/RCF, RTFO)

Voluntary GHG accounting
based on RED

ISCC CFC
module

Specific rules for calculating GHG according to voluntary scheme set by ICAO CORSIA

Introduction to ISCC Carbon Footprint Certification (ISCC CFC)



- Certification of product carbon footprints (PCFs)
- Low carbon claims for products with improved carbon footprint due to
 - Decarbonization measures during production (and use of conventional feedstock)
 - Use of ISCC PLUS certified feedstock
- Applicable for co-processing setups with annual verification of mass balance and volumes
- Module can be used on its own or combined with ISCC PLUS feedstock
- Iterative approach for further development of document:
 - Certification scope specific requirements for PCF calculation to aim for comparability and reproducibility of PCF results
 - Currently developed approaches include e.g. CCS and CCU
 - CFC module is under development, currently restricted certification possibilities with direct involvement of ISCC

See [webpage*](#) of ISCC CFC Module for further information and current version of documents

*<https://www.iscc-system.org/certification/iscc-certification-schemes/iscc-carbon-footprint-certification/>

ISCC Academy & Events

TRAININGS



24 – 26 February 2025, live online

ISCC EU Training (former Basic Training)

25 – 26 March 2025, live online & additional on-demand module

ISCC PLUS Training

6 March 2025, live online

ISCC RFNBOs Training

18 March 2025, live online

ISCC Net-Zero Emissions & Carbon Markets Training

19 – 20 March and 26 – 27 March 2025, live online

ISCC CORSIA Training (4 modules split)

1 – 3 April 2025, live online

ISCC EU Greenhouse Gas (GHG) Training

8 April 2025, live online

ISCC EU Waste & Residues Training

10 April 2025, live online

ISCC Low ILUC Risk Feedstock Training

EVENTS



ISCC Regional Stakeholder Meetings

5 June 2025 – **Latin America**

ISCC Technical Stakeholder Meeting

21 January 2025 – **ISCC PLUS & SAF Conference**

06 February 2025 – **RFNBOs**

8 May 2025 – **Sustainable Marine Fuels**

25 September 2025 – **Circular Economy & Bioeconomy**

WEBINARS



4 February 2025

ISCC Webinar – Navigating GHG Accounting and Reporting with Meo Carbon Solutions and ISCC

5 March 2025

ISCC Webinar – APS 5.0



10 minute Q&A Session
Please ask your question via Slido!