

STEP BY STEP GUIDE TO MEASURE, REDUCE & REPORT YOUR ANSP'S CARBON FOOTPRINT

ATM/ANS Environmental
Transparency Working Group

Pillar 3 - Final Report



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Executive Summary

This document represents the final Report of the ATM/ANS (Air traffic management/Air navigation services) Environmental Transparency Working Group, covering the Pillar-3, on how providers are improving their organisations' environmental footprints. It equips the readers with the knowledge, skills and tools necessary to apply carbon foot printing into their own ANSP business processes. It provides an overview of what ANSPs can do to control their own environmental impact, which excludes airline emissions.

Setting the scene; every action counts

The EU has committed itself to become the first climate neutral block by 2050. Sustainability is high on the agenda and by focusing on sustainability, ANSPs can build back better. Air Traffic Management is responsible for 10% of all aircraft greenhouse gas emissions, according to the German Aviation Research Society (G.A.R.S.), yet European Institutions admit ANSPs can only influence 3 to 5% of the emissions. Many conferences, studies, webinars, and meetings are ongoing to further explore and research this problem, but what ANSPs can do right now is address their own carbon footprint. This report provides actions that can be implemented right now, because every little bit helps to reduce emissions.

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1. Introduction to Corporate footprint

As climate change mitigation and adaptation activities expand, more companies are tracking and controlling their Green House Gas (GHG) footprints. Calculating GHG emissions is a specialized technique, but you don't have to be a scientist or math genius to comprehend it. Anyone can assist their company in taking this critical first step toward enhanced sustainability by grasping some fundamental GHG accounting ideas and being aware of the tools and resources available.

Several activities determine the "magnitude" of your carbon footprint. The principal one is the amount of GHG emissions a specific activity emits into the atmosphere. The greater your carbon footprint, the greater the impact on the environment.

To arrest climate collapse and avoid its worst consequences, we must do two things: transition to a low-carbon economy and safeguard our nature in the fight against climate change which store massive amounts of carbon.

To drastically reduce GHG emissions, everyone — from individuals to corporations to countries — will need to reduce their carbon footprint radically. This guide provides you with the necessary information to get started and practical measures you'll need to take.

1.1. Why?

Carbon dioxide (CO₂) absorbs the heat released by the sun and the Earth's surface and releases it into the atmosphere. High concentrations of GHGs, notably CO₂, threaten to raise the world's average surface temperature to unbearable levels as we burn fossil fuels and cut down forests, causing a slew of life-threatening consequences.

Carbon dioxide levels in the atmosphere have increased by more than 40% since the middle of the 18th century, and climatologists estimate that present levels are the highest in 14 million years.

As CO₂ levels continue to rise, future temperature rises, the cumulative effects will be seen globally, including increased ocean acidification, rising sea levels, more frequent and violent storms, mass species extinctions, food scarcity, and increased economic inequality.

GHGs emissions due to human activities, and more particularly CO₂ and methane, have a real impact on the environment and lead in particular to climate change, which is a threat to all biodiversity.

The forecasts of IPCC¹ (The Intergovernmental Panel on Climate Change) and other organizations are formal: the climate is warming faster than expected, giving rise to extreme weather events (tornadoes, hurricanes, droughts, ...).

Thus, it becomes necessary and urgent to reduce the carbon footprint related to human activities in order to limit the effects of global warming. To achieve the 1.5-degree target², we must therefore limit the GHG emissions of everyday life, both at the level of companies and at our level as citizens.

Reaching the upper limit of two (2) degrees means that an individual can only emit 1.3 tons of CO₂ per capita.³

¹ The IPCC is an organization of governments that are members of the United Nations or WMO. The IPCC currently has 195 members. Thousands of people from all over the world contribute to the work of the IPCC.

² The 2015 Paris Agreement commits countries to limit the global average temperature rise to well below 2°C above pre-industrial levels, and to aim for 1.5°C.

³ https://www.greenpeace.de/publikationen/Verbraucherratgeber_Klimaschutz_0.pdf

Find below a few examples:

- For 1,3 tons of CO₂, an electric vehicle from ANA Lux can drive 8000 to 9000 km but for the same amount of CO₂ produced, a small family can live an entire year in Bangladesh, a country where the per capita emissions is 0,5 tonne per year.
- Four average consumers in industrialized countries, on the other hand, pollute the atmosphere correspondingly strongly through their meat consumption alone. The production of one kilo of meat releases GHGs with the effect of three to four kilos of CO₂ (including methane and nitrogen oxides).
- The outward and return flight of a family of 4 to a holiday destination 6500 kilometres away (for example Luxembourg-Dubai) also releases GHGs with the effect of 1.3 tons of CO₂.

There is still some time remaining to reach the 1.3-tonne target. However, climate protection must take place immediately as the current calculations will only work if CO₂ emissions are reduced quickly and steadily – from today on. In August 2021, the 2021 IPCC report warns that 1.5°C of warming will be reached by 2040 in all scenarios. It outlines how without transformational, urgent, and systemic change, we will be subject to the most extreme heat, flooding and scarcity climate impacts across the world.

It is therefore essential to issue GHG emissions inventory and report GHG emissions in accordance with globally recognized standards.

1.2. What?

What exactly is a corporate footprint? Your corporate footprint refers to the environmental impact of your company. The impact of your business on the environment is its corporate carbon footprint. It is a tool to measure how your business contributes to climate change.

The calculation of the corporate carbon footprint of a business is a crucial factor in moving towards a greener business strategy that is sustainable in the long run. Corporate carbon footprint considers carbon emissions under three categories or scopes:

- Scope 1: These are direct emissions from owned or controlled sources such as burning fuel for industrial production, heating, business-owned transportation, and other similar sources.
- Scope 2: These are indirect emissions from the energy purchased and consumed by the business, such as electricity.
- Scope 3: These are indirect emissions occurring in a business' value chain, such as logistics, purchased goods and services, water use, waste disposal, and business travel in vehicles not owned by the organisation.⁴

Calculating the corporate carbon footprint is necessary to know where your business stands concerning the global norms for reducing carbon dioxide emissions and global warming. While regulatory requirements may be one of the motivating factors for companies to bring environmental impact on their agenda, rising awareness about carbon footprint and climate change is driving consumers to make sustainable choices. Advantages are:

Transparency: Knowing your carbon footprint is essential for the transparency of the environmental impact caused by business activities. It encourages strategic decisions on reducing emissions to reach carbon neutrality.

⁴ Source: GHG Protocol <https://ghgprotocol.org/>

Responsibility: Another reason for knowing your carbon footprint is to garner the trust of stakeholders such as investors, employees, and customers that the business is addressing the issue and accepting responsibility.

Mandatory reporting: More and more governments worldwide have agreed to reduce the environmental impact of industrial activities, making reporting of the sustainability efforts mandatory.

1.3. How?

According to the UN's Act Now programme, the transport sector is almost entirely dependent on fossil fuels. It contributes to a quarter of all energy-related carbon emissions. Thus, it is vital to decarbonise the transportation industry if the world is to restrict global warming to less than 1.5°C by 2030⁵.

So how to go about?

Decide on the method to be followed: Employ a consistent method to calculate accurate carbon footprint, especially if the business relies on several individuals to gather and evaluate data. The GHG Protocol and ISO 14064⁶ standard are among the more popular methods to arrive at your corporate carbon footprint.

Define organisational and operational boundaries: Set clear and transparent organisational boundaries that determine which aspects will be evaluated for carbon foot printing. Operational limits determine which emission sources will be quantified.

Collate the data: Gather relevant data within the defined scope to calculate the corporate carbon footprint accurately. It is also important to identify any gaps and list assumptions made while calculating.

Apply emission factors: Carry out the final calculation using the activity data collected by standard emission factors. For monitoring purposes, prepare detailed analysis and link the factors to your business KPIs.

Monitor and verify your emission reductions: Monitor the carbon footprint year on year to know if your efforts to reduce carbon emissions and global warming have been successful. You can also get your corporate carbon footprint verified by a third party to add greater credibility and confidence to your reduction claims.

There are various standards, methodologies, references and tools when it comes to reporting GHG emissions. Hence, we created an overview to help you in the decision-making process of selecting the necessary methodology.

GHG Protocol⁷

The *Greenhouse Gas Protocol's Corporate Accounting and Reporting Standard* is a widely-accepted international standard for GHG reporting. GHG Protocol supplies the world's most widely used greenhouse gas accounting standards.

⁵ A new flagship UN report on climate change indicated that harmful carbon emissions from 2010-2019 have never been higher in human history, is proof that the world is on a "fast track" to disaster, António Guterres has warned, with scientists arguing that it's 'now or never' to limit global warming to 1.5 degrees. (April 2022)

⁶ EN_ISO_14064 (ISO 14064-1, Greenhouse gases — Part 1, EN_ISO_14064 (ISO 14064-1, Greenhouse gases — Part 1, 2 and 3)2 and 3)

⁷ Source: GHG Protocol <https://ghgprotocol.org/>

- GHG Protocol establishes comprehensive global standardized frameworks to measure and manage GHG emissions from private and public sector operations, value chains and mitigation actions.
- GHG Protocol tools enable companies to develop comprehensive and reliable inventories of their GHG emissions.
- GHG Protocol website offers multiple online learning solutions on the world's most widely used GHG accounting standards.⁸

The GHG protocol is a standard, there is no certification or similar.

It covers the accounting and reporting of the six greenhouse gases covered by the Kyoto Protocol—carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF₆).

- Scope 1 emissions are direct emissions owned or controlled by the company engaging in the reporting.
- Scope 2 emissions are indirect emissions from sources that are not owned or controlled by the company, including generation of purchased energy such as electricity, heat, or steam.

The Corporate Standard identifies both requirements and recommendations for companies preparing a GHG emissions inventory, with a focus on accounting and reporting of emissions.

According to the Corporate Standard, GHG accounting and reporting should be based on the principles of relevance, completeness, consistency, transparency, and accuracy. The GHG Protocol provides companies with a number of cross-sector and sector-specific GHG calculation tools to account for corporate-level GHG emissions. The guidance in the corporate standard also describes multiple approaches for rolling up GHG emissions data to the corporate level, managing inventory quality, and accounting for GHG reductions. The corporate standard further includes mandatory reporting requirements for companies that choose to publish a GHG emissions report.

To supplement the corporate standard, which focuses on Scope 1 and 2 emissions, the GHG Protocol has also published a Corporate Value Chain (Scope 3) Standard, which is the only internationally-accepted method for organizations to account for indirect value chain emissions.

- Scope 3 emissions are all indirect emissions that occur in the reporting company's value chain (excluding scope 2 emissions), including upstream and downstream emissions. (For an explanation of upstream and downstream emissions – see graph on page 22 of 48.)

The assumptions and methodological choices required for measuring GHG emissions can make it difficult to compare across products and brands if the methods are not standardized for the sector.

Assessment: The GHG Protocol emerged as the standard for corporate-level greenhouse gas emissions accounting. The other methodologies are largely based on the GHG protocol developed to set minimum requirements and guidance.

CDP

CDP (formerly known as the Carbon Disclosure Project) is a non-profit organization that manages a platform for companies to disclose the environmental impacts of their activities, with a focus on climate change, forests, and water security.

⁸ <https://ghgprotocol.org/training-capacity-building>

Investors and customers may view information in the CDP database, one of the largest databases of corporate environmental data in the world, to inform their decision making. Each year, CDP takes the information supplied in its annual reporting process and scores companies and cities based on their journey through disclosure and towards environmental leadership.

To reduce the disclosure burden, CDP has aligned with GRI (Global Reporting Initiative) and TCFD (Task Force on Climate-Related Financial Disclosures), and published guidance on how to link to GRI and integrate with TCFD recommendations.

Assessment: Interesting source of information. But the focus is more on cities or companies and their supply chain. No mention found about public sector.⁹

Bilan Carbone

Bilan Carbone is an organizational GHG accounting guidance document and tool produced in France by ADEME (Agence de la transition écologique). The guidance provided is more comprehensive than most other corporate GHG accounting methodologies. Emphasis is placed on physical realism in GHG accountancy. All greenhouse gases are considered, rather than the six Kyoto Protocol GHGs considered in most guides. Calculation templates that include emission factors and provide outputs relevant to reporting under several other schemes are provided.

The methodology is built in 7 steps:

1. Create awareness within the company,
2. Need to measure in order to improve, know where your priorities are (we will dig into this one later)
3. Analysis to understand the biggest contributors, allow to compare and give priorities. Identify the hotspots and set reduction objectives,
4. Involve your collaborators to find sustainable ways to reduce waste, and improve processes in a sustainable way,
5. Classify actions, assign them to a person and give a timeline to enable follow up,
6. Communication, in addition to the initial awareness – internally but also externally,
7. Check status of actions, adjust if needed. Carbon calculation should ideally be done yearly to adjust action plan, to update internal and external communication.

Assessment: Interesting and pragmatic database included which is providing useful references (e.g.: average CO₂ consumption) for each of the 3 scopes.

International Integrated Reporting Council (IIRC)

The International Integrated Reporting Framework identifies and describes guiding principles and content elements, the content that the IIRC has determined should be included in integrated reports. The IIRC is a coalition that promotes a focus on value creation in corporate reporting. The coalition, which consists of regulators, investors, companies, standard setters, as well as individuals from the accounting profession, academia and NGOs (Non-governmental organization), seeks to promote

⁹ Tip : There is an interesting paper from CDP helping better understand the GRI: Linking GRI and CDP - How are the GRI Sustainability Reporting Standards and CDP's 2017 climate change questions aligned?

<https://www.globalreporting.org/media/zrtnejcx/gri-standards-and-cdp-2017-climate-change-linkage-document.pdf>

integrated reporting of financial and nonfinancial metrics to focus the corporate community on financial stability and sustainable development.

The Framework considers a broad base of capitals — financial, manufactured, intellectual, human, social, and relationship – to promote understanding of their interdependencies and encourage an emphasis on short- medium- and long-term value creation.

The principles-based guidance for entities preparing integrated reports is intended to work alongside other corporate reporting initiatives.

IIRC guiding principles underpin the preparation of an integrated report, informing the content of the report and how information is presented:

- Strategic focus and future orientation: insight into the organization's strategy, and how it relates to the organization's ability to create value in the short, medium and long term, and to its use of and effects on the capitals,
- Connectivity of information: holistic picture of the combination, interrelatedness and dependencies between the factors that affect the organization's ability to create value over time,
- Stakeholder relationships: insight into the nature and quality of the organization's relationships with its key stakeholders, including how and to what extent the organization understands, takes into account and responds to their legitimate needs and interests,
- Materiality: disclose information about matters that substantively affect the organization's ability to create value over the short, medium and long term,
- Conciseness,
- Reliability and completeness: include all material matters, both positive and negative, in a balanced way and without material error,
- Consistency and comparability: on a basis that is consistent over time; and in a way that enables comparison with other organizations.

Companies would not be able to coordinate consistent reporting through the use of the International IR Framework alone, given the framework's limitations.

Assessment: Focus on sustainability and integration with financial and non-financial reporting. Some interesting guidance.

Sustainability Accounting Standards Board (SASB) and Task Force on Climate-Related Financial Disclosures (TCFD)

SASB standards identify the subset of environmental, social, and governance issues most relevant to financial performance in each of 77 industries. SASB standards enable businesses around the world to identify, manage and communicate financially-material sustainability information to their investors.

SASB embrace sustainability dimensions, which are broad sustainability themes, including: environment, social capital, human capital, business model & innovation, and leadership & governance.

SASB Standards also include a technical protocol for each accounting metric, which helps companies communicate performance on each disclosure topic in a consistent, comparable, and reliable way.

When the topic being measured is GHG emissions, SASB Standards specify that the metric shall be calculated according to the globally accepted methodology contained in the Greenhouse Gas Protocol: A corporate accounting and reporting standard ("the GHG Protocol").

Alignment of the Frameworks

The TCFD recommendations serve as a global foundation for effective climate-related disclosures. The CDSB (Climate Disclosure Standards Board) framework helps organizations integrate and disclose financially material climate and natural capital-related information into their annual reports. The SASB standards help organizations to collect, structure, and effectively disclose related performance data for the material, climate-related risks and opportunities they have identified.

Assessment: Mainly financially driven, broad sustainability scope.

Science Based Targets Initiative (SBTi)

Science Based Targets initiative's (SBTi) mission is ensuring that companies have the tools they need to set targets in line with climate science, recognizing that the science itself is nuanced and dynamic. Methods endorsed by the SBTi are instructive frameworks that may be used by companies to set emissions reduction targets consistent with the best available climate science. These methods are constructed from three main elements: a greenhouse gas (GHG) budget, a set of emission scenarios, and an allocation approach.

Companies who want to have their science-based targets approved are required to complete a recent, comprehensive greenhouse gas emissions inventory following the Greenhouse Gas Protocol (GHG Protocol) Corporate Accounting and Reporting Standard.

The SBTi does not currently assess targets for cities, local governments, public sector institutions, educational institutions or non-profit organisations. However, these stakeholders are encouraged to consider science-based target setting methods.

Assessment: SBTi Corporate Manual and SBTi How to Guide provide interesting guidance on how to set science-based targets that could be useful, even though public administration cannot be officially assessed.

Global Reporting Initiative (GRI)

The Global Reporting Initiative (GRI) is a large multi-stakeholder network of experts worldwide, who participate in GRI's working groups and governance bodies, use the GRI Guidelines to report, access information in GRI-based reports, or contribute to develop the Reporting Framework.

The GRI Reporting Framework sets out principles and performance indicators that organizations can use to measure and report their economic, environmental, and social sustainability performance.

74% of the world's largest 250 companies that report on sustainability performance use GRI Standards to do so. More than 23,000 GRI reports are recorded in the organization's database.

GRI offers three universal standards used by all organizations reporting under GRI:

- The Foundation (GRI 101), which helps identify material topics;
- General Disclosures (GRI 102), in which companies can disclose relevant contextual information; and
- Management Approach (GRI 103), a guide to reporting how the company manages the material topic.

Note: A material topic is defined in the GRI 103 as a topic that reflects a reporting organization's significant economic, environmental and social impacts; or that substantively influences the assessments and decisions of stakeholders)

In addition, GRI features three series of topic-specific standards related to environmental, economic, and social impacts. Companies use GRI 101 to identify material topics for which it should complete

topic-specific standards. Environmental standards cover energy use, water use, materials, and biodiversity, among other topics.

GRI 300 – series

GRI 300 series is a disclosure standard on environmental indicators which includes:

- GRI 301: Materials 2016
- GRI 302: Energy 2016
- GRI 303: Water and Effluents 2018
- GRI 304: Biodiversity 2016
- GRI 305: Emissions 2016
- GRI 306: Effluents and Waste 2016
- GRI 306: Waste 2020
- GRI 307: Environmental Compliance 2016
- GRI 308: Supplier Environmental Assessment 2016

Assessment: Very detailed and excellent source for defining/refining the right KPIs.

GRI 305 standard

GRI 305: Emissions is a topic-specific GRI Standard in the 300 series (Environmental topics).

In the context of the GRI Standards, the environmental dimension of sustainability concerns an organization's impacts on living and non-living natural systems, including land, air, water, and ecosystems. *GRI 305* addresses emissions into air, which are the discharge of substances from a source into the atmosphere. Types of emissions include greenhouse gas (GHG), ozone-depleting substances (ODS), and nitrogen oxides (NO_x) and sulfur oxides (SO_x), among other significant air emissions.

The reporting requirements for GHG emissions in this Standard are based on the requirements of the 'GHG Protocol Corporate Accounting and Reporting Standard' ('GHG Protocol Corporate Standard') and the 'GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard' ('GHG Protocol Corporate Value Chain Standard').

This Standard includes disclosures on the management approach and topic-specific disclosures. These are set out in the Standard as follows:

- Management approach disclosures (this section refers to *GRI 103*)
- Disclosure 305-1 Direct (Scope 1) GHG emissions
- Disclosure 305-2 Energy indirect (Scope 2) GHG emissions
- Disclosure 305-3 Other indirect (Scope 3) GHG emissions
- Disclosure 305-4 GHG emissions intensity
- Disclosure 305-5 Reduction of GHG emissions
- Disclosure 305-6 Emissions of ozone-depleting substances (ODS)
- Disclosure 305-7 Nitrogen oxides (NO_x), sulfur oxides (SO_x), and other significant air emissions

Assessment: the scope of the GRI 305 is larger than the GHG protocol and provides detailed guidance on what to report and how to calculate emissions.

ISO 14064

ISO 14064-1:2006 specifies principles and requirements at the organization level for quantification and reporting of GHG emissions and removals. It includes requirements for the design, development, management, reporting and verification of an organization's GHG inventory.

ISO 14064-1 is the base guideline for compiling a corporate GHG inventory, or, in other words, calculating the corporate carbon footprint (scope 1, 2, 3). The choice on which scopes to include depends on company's needs and where most of the emissions take place.

Carbon footprint verification (corporate GHG scope 1, 2 and 3)

ISO 14064-2:2006 specifies principles and requirements and provides guidance at the project level for quantification, monitoring and reporting of activities intended to cause greenhouse gas (GHG) emission reductions or removal enhancements. It includes requirements for planning a GHG project, identifying and selecting GHG sources, sinks and reservoirs relevant to the project and baseline scenario, monitoring, quantifying, documenting, and reporting GHG project performance and managing data quality.

ISO 14064-2 is the base guideline for implementing an emission reduction project. Setting up an emission reduction project will help to identify opportunities for reduction of scope 1, scope 2 and/or scope 3 emissions.

Emission reduction validation / verification

ISO 14064-3:2006 specifies principles and requirements and provides guidance for those conducting or managing the validation and/or verification of greenhouse gas (GHG) assertions. It can be applied (optional) to organizational or GHG project quantification, including GHG quantification, monitoring and reporting carried out in accordance with ISO 14064-1 or ISO 14064-2.

The verification is performed in line with ISO 14064-3 – the guideline for verifiers on how to verify emissions

ISO/TR 14069 Quantification and reporting of GHG emissions for organizations (Carbon footprint of organization) -- Guidance for the application of ISO 14064-1. The objective of this Technical Report is to offer organizations guidance on the quantification and reporting of their GHG inventory, using a process that incorporates the principles of relevance, completeness, consistency, accuracy and transparency. This kind of GHG inventory is expressed as net global warming potential in carbon dioxide equivalent (CO₂e). ISO 14069 is not an actual standard but a technical report.

Technical Report Guidance for the application of ISO 14064-1

Assessment: ISO 14069 has very similar approach to GHG protocol, it develops Scope 3 in more detail.

Carbon Neutrality Initiative

The European Innovation Council (EIC) has developed a brand-new initiative to promote beneficiaries that put efforts in GHG emission reductions.

They are implementing a new feature to certify the environmental engagement.

As you use the EIC GHG tool to get a better understanding of your carbon footprint and pinpoint mitigation measures and solutions that work best for your business, you can engage in the complementary GHG badges & label initiative that is meant to award your 'green' commitment.

This is provided free of charge and officially supported by the European Commission. Each beneficiary that has reached one of the two first milestones of the journey, will be awarded a personalized badge. Beneficiaries reaching CO₂ neutrality will be awarded the full Company EIC CO₂ Neutral label.

Assessment: Following your progression, you can use it as a proof of your environmental engagement and share it with your clients and community.

2. Impact of the Green Deal on your corporate operations

2.1. Why?

According to the European Commission, the Climate change and environmental degradation are an existential threat to Europe and the world. To overcome these challenges, the European Green Deal will transform the EU into a modern, resource-efficient, and competitive economy, ensuring:

- no net emissions of greenhouse gases by 2050
- economic growth decoupled from resource use
- no person and no place left behind

The European Green Deal is also our lifeline out of the COVID-19 pandemic. One third of the 1.8 trillion euro investments from the NextGenerationEU Recovery Plan¹⁰, and the EU's seven-year budget will finance the European Green Deal.

The European Commission adopted a set of proposals to make the EU's climate, energy, transport, and taxation policies fit for reducing net greenhouse gas emissions by at least 55% by 2030, compared to 1990 levels.¹¹

2.2. What?

The EU Green Deal is a policy framework and package aimed at transforming the European economy to reach climate neutrality by 2050 and raise the ambition of existing emission reduction targets.

This multi-year effort, announced in 2019, would produce new and modify existing regulations, including the EU's first-ever climate law. It is ambitious and far-reaching, affecting practically every area of the economy.

Furthermore, the plan focuses on policies and tactics to ensure the supply of clean and inexpensive energy, build a circular economy, reduce pollution, protect biodiversity, and create sustainable food and transportation systems.

2.3. How?

As a company it is crucial to follow up the current evolving EU legislation in relation with the Green Deal. New policies should be placed aside your sustainability strategy. Items you have not included but are presented in the Green Deal should be taken up into your company's sustainability plan. There are 9 pillars in the European Green Deal: compare these to your CSR/ESG/sustainability actions and adapt, implement or evolve where necessary.

¹⁰ [NextGenerationEU](#) is more than a recovery plan – it is a once in a lifetime chance to emerge stronger from the pandemic, transform our economies and societies, and design a Europe that works for everyone.

¹¹ EC 2022.

3. Sustainable Development Goals

The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. At its heart are the 17 Sustainable Development Goals (SDGs), which are an urgent call for action by all countries - developed and developing - in a global partnership. They recognize that ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests. The SDGs build on decades of work by countries and the UN, including the UN Department of Economic and Social Affairs.

In June 1992, at the Earth Summit in Rio de Janeiro, Brazil, more than 178 countries adopted Agenda 21, a comprehensive plan of action to build a global partnership for sustainable development to improve human lives and protect the environment.

Member States unanimously adopted the Millennium Declaration at the Millennium Summit in September 2000 at UN Headquarters in New York. The summit led to the elaboration of eight Millennium Development Goals (MDGs) to reduce extreme poverty by 2015.

The Johannesburg Declaration on Sustainable Development and the plan of implementation, adopted at the World Summit on Sustainable Development in South Africa in 2002, reaffirmed the global community's commitments to poverty eradication and the environment, and built on Agenda 21 and the Millennium Declaration by including more emphasis on multilateral partnerships.

At the United Nations Conference on Sustainable Development (Rio+20) in Rio de Janeiro, Brazil, in June 2012, Member States adopted the outcome document "The Future We Want" in which they decided, inter alia, to launch a process to develop a set of SDGs to build upon the MDGs and to establish the UN High-level Political Forum on Sustainable Development. The Rio +20 outcome also contained other measures for implementing sustainable development, including mandates for future programmes of work in development financing, small island developing states and more.

In 2013, the General Assembly set up a 30-member open working group to develop a proposal on the SDGs. In January 2015, the General Assembly began the negotiation process on the post-2015 development agenda. The process culminated in the subsequent adoption of the 2030 Agenda for Sustainable Development, with 17 SDGs at its core, at the UN Sustainable Development Summit in September 2015.

2015 was a landmark year for multilateralism and international policy shaping, with the adoption of several major agreements:

- Sendai Framework for Disaster Risk Reduction (March 2015),
- Addis Ababa Action Agenda on Financing for Development (July 2015),
- Transforming our world: the 2030 Agenda for Sustainable Development with its 17 SDGs was adopted at the UN Sustainable Development Summit in New York in September 2015,
- Paris Agreement on Climate Change (December 2015),
- Currently, the annual High-level Political Forum on Sustainable Development serves as the central UN platform for the follow-up and review of the SDGs.

Today, the Division for Sustainable Development Goals (DSDG) in the United Nations Department of Economic and Social Affairs (UNDESA) provides substantive support and capacity-building for the SDGs and their related thematic issues, including water, energy, climate, oceans, urbanization, transport, science and technology, the Global Sustainable Development Report (GSDR), partnerships and Small

Island Developing States. DSDG plays a key role in the evaluation of UN system wide implementation of the 2030 Agenda and on advocacy and outreach activities relating to the SDGs. In order to make the 2030 Agenda a reality, broad ownership of the SDGs must translate into a strong commitment by all stakeholders to implement the global goals. DSDG aims to help facilitate this engagement.¹²

3.1. Why?

The SDG's a universal call to action to end poverty, protect the planet, and ensure that by 2030 all people enjoy peace and prosperity.

The 17 Sustainable Development Goals ARE the 2030 Agenda, the map of the world we seek.

3.2. What?

Goals	Objective	Description
Goal -1	No Poverty	By 2030, eradicate extreme poverty for all people everywhere.
Goal -2	Zero Hunger	End hunger, achieve food security and improved nutrition by 2030.
Goal -3	Good Health and Well-being	Ensure healthy lives and promote well-being for all at all ages by 2030.
Goal -4	Quality Education	Ensure that all girls and boys complete free, equitable and quality primary and secondary education by 2030.
Goal -5	Gender Equality	To achieve gender equality and empower all women and girls.
Goal -6	Clean Water and Sanitation	Ensure availability and sustainable management of water and sanitation for all by 2030.
Goal -7	Affordable and Clean Energy	Ensure access to affordable, reliable, sustainable and modern energy for all by 2030.
Goal -8	Decent Work and Economic Growth	Promote sustained, inclusive and sustainable economic growth.
Goal -9	Industry, Innovation and Infrastructure	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation by 2030.
Goal -10	Reduced Inequality	Reduce inequality within and among countries by 2030.
Goal -11	Sustainable Cities and Communities	Make cities and human settlements inclusive, safe, resilient and sustainable.
Goal -12	Responsible Consumption and Production	Ensure sustainable consumption and production patterns.

¹² Excerpt from UNSDG

Goals	Objective	Description
Goal -13	Climate Action	Take urgent action to combat climate change and its impacts.
Goal -14	Life Below Water	Conserve and sustainably use the oceans, seas and marine resources for sustainable development.
Goal -15	Life on Land	Protect, restore and promote sustainable use of terrestrial ecosystems, combat desertification and halt biodiversity loss.
Goal -16	Peace and Justice Strong Institutions	Promote peaceful and inclusive societies for sustainable development; provide access to justice for all.
Goal -17	Partnerships to achieve the Goal	Strengthen the means of implementation and revitalize the global partnership for sustainable development.

Figure 1: Table of the 17 Sustainable Development Goals with Objectives and Descriptions



Figure 2: The 17 Sustainable Development Goals

3.3. How?

In order to become a sustainable organisation it is imperative to incorporate the SDG's into your CSR (Corporate social responsibility), ESG (Environmental, social, and corporate governance) or

sustainability plan. Online many SDG's logo's and tools are available. B-Corp ¹³also provides an online SDG impact measurement tool.

¹³ Certified B Corporations, or B Corps, are companies verified by B Lab to meet high standards of social and environmental performance, transparency, and accountability.

4. ESG Strategy

4.1. Why?

Environment, Social, and Governance (ESG) issues have gained increasing concern from investors, consumers, government, and the general public in the present business environment. Why? The Global Risks Report 2022 highlights societal and environmental risks as the most concerning global risks. Pressure from the different stakeholders including shareholders and clients has increased the demand for companies and organizations to adopt sustainable business practices and hence sustainability, or ESG has become a crucial part of business growth and survival. In fact, not only do companies create most of the global sustainability challenges through factors such as pollution and emissions, but they also have the potential to deliver solutions to the sustainability challenges mainly through investments and resource mobilization.

4.2. What?

Sustainability in business involves minimizing adverse impacts of business operations and adopting business models that create a positive impact on the environment and society. Sustainability strategies incorporate ESG issues in key business decisions and create value for all the stakeholders of the business.

Sustainability strategies provide a roadmap for companies to coordinate and manage the resources of the organization for the benefit of the planet and society. Some of the benefits of arising from having a sustainability strategy include:

- Positive environmental impact. Environmental protection through a reduction in pollution, and emissions and improving biodiversity;
- Enhanced Social impact. Social benefits and job creation through directing investments and funding to projects with greater and more favourable community impact;
- Brand loyalty. Adopting sustainable business practices leads to increased customer support for the company's products and services;
- Improved performance. Sustainability strategies help in cost reduction for businesses and thus improve performance. According to a study by McKinsey, the study discovered a substantial link between a firm's resource efficiency derived from sustainability initiatives and financial performance. The study findings show that such initiatives can enhance operating profits by as much as 60%;
- Increase employee attraction and retention. Employees would prefer to work for companies that have sustainable business practices. Sustainable companies enhance the motivation of employees as they promote purpose and value creation.

Sustainability has become a critical component of companies' operations as businesses have shifted from pure profit maximization towards adopting the Triple Bottom Line (TBL) approach which consists of profit, people, and the planet. Ultimately as a Business Owner or stakeholder, having a sustainability strategy for your business, whether small, mid-sized or otherwise, is proving to be the only path forward you can take.

4.3. How?

To start with a sustainability strategy:

- One must create a materiality matrix through a full stakeholder assessment;

- Based on the most materiality topics a sustainability vision can be created which can be translated into the organisation's mission;
- The materiality topics should be reviewed along the SDG's and the European Green Deal.
- A basis for a strategy can be created combining the goals, policies and the companies most material topics;
- An action plan can grow from the strategy.

This exercise can be executed by a sustainability professional or an external sustainability firm can be hired to develop such a strategy. However, the most important and difficult task is to ensure that sustainability becomes engrained in the DNA of the company and employees. It should be found back in every department and any employment level. Sustainability is a holistic concept that should be the social licence to continue operating in the aviation industry.

5. Calculating your carbon footprint

5.1. Define scope

The organization needs to assess and select the disclosure mechanism that is most suited, and in any case need to develop Scope 1, 2 and/or 3 GHG emissions

The right standard and methodology should be adapted -and at a latest stage the right metrics and targets should be set- considering various factors, e.g. the EU Green Deal, national energy and climate plans, but also the various approaches to sustainability and environmental management systems from interested parties.

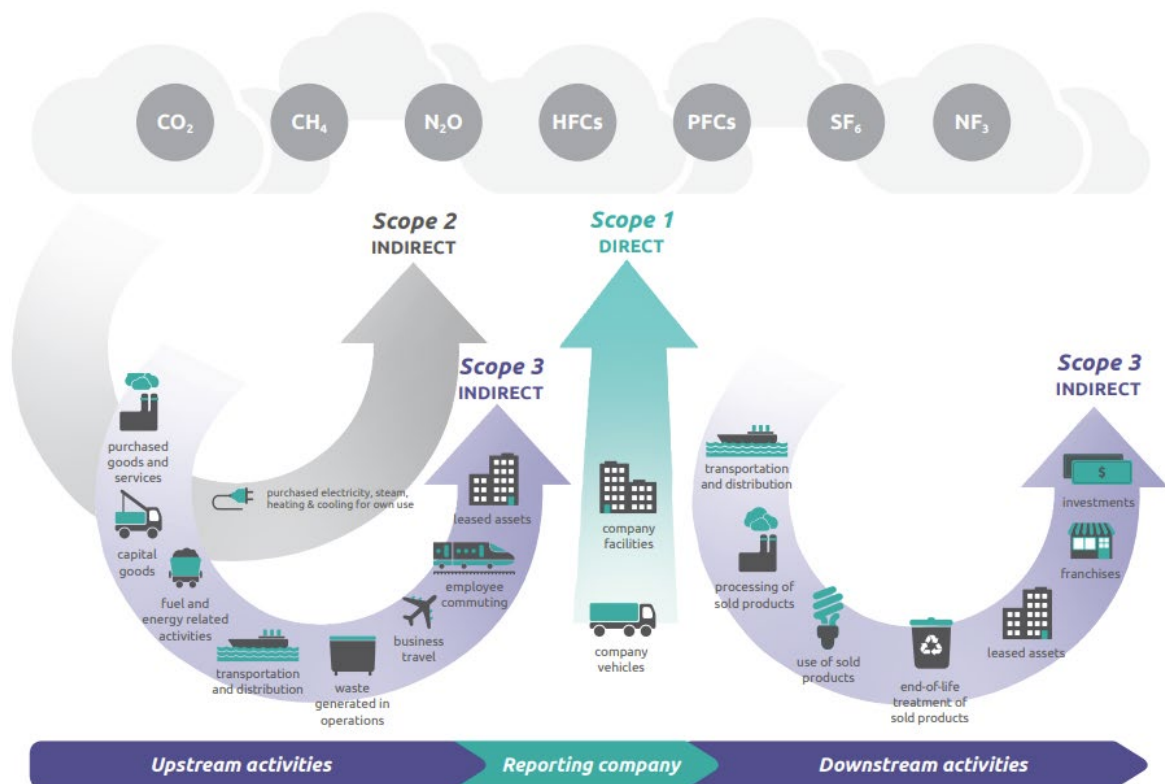
5.2. How to measure

In the context of a sustainable development approach, the analysis responds to a problem of identification, quantification and prioritization of sources of GHG (greenhouse gas) emissions. The goal of a carbon footprint analysis is also to identify possible ways of improvement and quantify their effects.

The carbon footprint is about accounting for carbon emissions greenhouse gases from readily available data to arrive at a proper assessment of direct emissions or indirect emissions (induced by the company's activity).

It applies to any activity: industrial or tertiary companies, administrations, communities and even to the territory managed by the communities.

Overview of GHG Protocol scopes and emissions across the value chain (source: GHG Protocol) is presented at...



Source: Figure 1.1 of Scope 3 Standard.

Figure 3: Overview of the scopes (source: GHG Protocol)

<i>Emissions type</i>	<i>Scope</i>	<i>Definition</i>	<i>Examples</i>
Direct emissions	Scope 1	Emissions from operations that are owned or controlled by the reporting company	Emissions from combustion in owned or controlled boilers, furnaces, vehicles, etc.; emissions from chemical production in owned or controlled process equipment
Indirect emissions	Scope 2	Emissions from the generation of purchased or acquired electricity, steam, heating, or cooling consumed by the reporting company	Use of purchased electricity, steam, heating, or cooling
	Scope 3	All indirect emissions (not included in scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions	Production of purchased products, transportation of purchased products, or use of sold products

Figure 4: Definition and Examples of the scopes (source: GHG Protocol)

5.3. Map the flow

In the Carbon Footprint calculation, we take into account, in order of magnitude, the emissions of greenhouse gases generated by all the physical processes that are necessary for the existence of a human activity or organization, when it is possible to assign clear borders. By "necessary physical process", we must understand that the entity examined would not exist in its current form, or with its current contours, if the physical process in question was not possible. One of the fundamental points of the method consists in putting on an equal footing greenhouse gas emissions that take place directly within the entity (which are, in some way, its direct legal or territorial responsibility) with emissions that take place outside of this entity, but which are the counterpart of processes necessary for the existence of the activity or organization in its current form.

5.4. Emission factor

In the vast majority of cases, it is not possible to directly measure the greenhouse gas emissions resulting from a given action.

The only way to estimate these emissions is to obtain them by calculation, from so-called activity data: number of trucks driving and distance travelled, number of tonnes of steel purchased, number of ruminating cows, etc. The goal of a Carbon Footprint calculation is precisely to convert these activity data into estimated emissions. The numbers that allow to convert collected data into greenhouse gas emissions, expressed in carbon equivalent (CO₂ equivalent or CO₂e), are called emission factors.

5.5. Compute Data

The first benefit derived from the method is obviously to have a relatively exhaustive overview of all greenhouse gas emissions greenhouse for an activity, and therefore identify all the positions on which it is possible to act to reduce its overall impact on the climate change.

5.6. Analyse

The results of the Carbon Footprint calculation make it possible to know the GHG emissions generated by the activity of the company, either directly (i.e. by the company itself, because the use of a boiler for example), or indirectly, for example because of:

- purchased electricity,
- fossil fuels consumed,
- means of transport for employees,
- transport generated by the delivery of raw materials and supplies,
- the delivery of the manufactured products,
- construction of occupied buildings,
- the manufacture of the raw materials used by the activity,
- the end of life of the waste generated,
- the energy consumption and other emissions of the products sold,
- the end of life of these products sold.

In short, this method makes it possible to count all emissions, whether they occur directly in the company or indirectly with customers or suppliers, when they correspond to processes necessary for the activity.

Greenhouse gases have the same effect on the climate regardless of where they are issued; allowing a reduction in emissions, in the company in question or elsewhere, provides the same ultimate benefit to the planet.

The method allows the company to know its global contribution on the climate, its short- and long-term span of actions to bring it down, as well as its exposure to risk of increase in the cost of the use of fossil fuels, via a carbon tax per example.

These results make it possible in the short term to launch an action plan to reduce greenhouse gas emissions, include a reduction target in a system of environmental management (including ISO or EMAS), publish the amount of emissions, voluntarily (environmental report) or as part of eventual obligations or commitments concerning the activity.

In the long term, these results make it possible to modify the strategy of the company's activity, to make it progressively less of a contributor to greenhouse gas emissions. This analysis also makes it possible to subsequently ask suppliers to make their own Carbon Footprint Calculation in order to select them according to their performance in this area as well as to get ready for a likely increase in regulatory obligations in this area.

6. Reduce your carbon footprint (examples of good practices)

6.1. Renewable energy

Energy providers usually offer renewable energy procurement through specific contracts. Several types of contracts/certificates are usually made available by energy suppliers considering, for instance, care of biodiversity and where the renewable energy is produced. For example, Skyguide uses 100% of renewable electricity, mainly from hydropower sources. To heat premises distant heating fed by waste incineration plant is used. Systems are cooled using free-cooling and a project is on-going to use cold water from Geneva Lake.

ANA's choice for their electricity supply is also 100% European and 100% free of CO₂. The purchased electricity is powered by 50% hydro energy coming from hydroelectric power stations which are not older than 15 years, 25% wind mills, 7% biomass production and 0,5% photovoltaic facilities.

Since 2015, 100% of ENAIRE's electricity supply has come from renewable sources, resulting in almost 90000 tons of CO₂ savings. A wind turbine erected in 2002 provides 45% of the energy supply for the Canary Islands' ACC, and it has generated more than 32 GWh since its installation. And by 2025, four of the five ACC will be producing electricity from photovoltaic panels; currently, the Canary Islands ACC and Seville ACC are producing photovoltaic energy, with Madrid and Barcelona following suit.

By 2026 Skyguide will produce electricity from photovoltaic panels placed on the roofs of its premises.

Other ANSPs can also produce renewable energy which will become more and more to a European standard.

6.2. Green mobility

Combustible vehicles can be replaced by electrical vehicles. A plan should be rolled out to reduce the amount of fossil vehicles to zero by 2030.

Sites can install electric car chargers for fleet cars and employee cars to encourage green driving.

Mobility plans to promote public transport can be rolled out and if possible financed by the organisation, commuting is a major issue for Scope 3 emissions. Ride a bike. It takes up hardly any space and no fuel, is quiet, clean and keeps you fit. So: ride the good old bike to work, often as possible. Awareness plan can be created to promote bicycling or walking to work for those that live close by. A bicycling or walking allowance can boost such activities. ANA bought electric bicycles to commute between the different buildings and skeyes bought electric bicycles to commute between the buildings.

6.3. Business travels

Business travels have also a big impact on Scope 3 emissions. Try to avoid business travels if not necessary. Go for virtual meetings whenever possible. Be mindful that video has much more emissions than sound.

Hotels are energy-intensive: you need energy for heating, hot water, for the pool, for air conditioning, for washing and drying bed linen and towels, for the wellness area, for large breakfast and dinner buffets and much more. In general, the more luxury a hotel offers, the worse the carbon footprint. According to figures from the Association of German Travel Management, an average 1-star hotel in the UK produces 18 kilos of CO₂ per person per night, while a 5-star hotel produces 27 kilos.

6.4. Food and Waste management

Examples of activities to reduce waste on site is installing a waste management sorting systems and removing all bins in the office spaces. The bins in the offices can be replaced by central sorting systems in the hallways. The site should have a full container park.

Sort your waste. Rule of the 5Rs:

- Refuse packaging,
- Reduce consumption,
- Reuse,
- Recycle,
- Return to the land.

Sites with a restaurant need to make sure that the restaurant abides by the strict waste management rules and has a zero waste policy.

The restaurant should also attempt to serve seasonal foods. But there are also differences in plant-based foods: seasonal and regional fruits and vegetables are usually more climate-friendly than foods that are associated with long transport routes. In addition, fresh food performs better than frozen goods. However, this only applies as long as we actually eat the fresh vegetables and they do not end up mouldy in the bin at some point. Such restaurant food policy is also an important point for saving CO₂ in nutrition: Those who throw away less food live a more climate-friendly life.

Motivate your employees to drink water from the tap.

Animal products account for the majority of the CO₂ emissions generated by our diet. For every kilo of beef, around 13 kilos of greenhouse gases are blown into the air. Pork and poultry perform better with 3 to 4 kilos of CO₂. Organic products are somewhat more climate-friendly: one kilo of beef produced causes slightly less emissions at 11 kilos.

In addition to meat, dairy products also have a comparatively poor balance: one kilo of butter causes the emission of 23 kilos of CO₂. But cream and cheese also don't do well with 7 to 8 kilos of CO₂. Vegetarians and vegans have a better climate record than meat eaters. The latter have an average nutritional footprint of 1760 kilos of CO₂ per year. For vegetarians it is 1160 kilos, for vegans 960.

6.5. Biodiversity

Sites can execute an analysis of their biodiversity by specialised companies. Carbon sequestration can take place as well when possible. ANA has set up with the Luxembourg Airport (Lux-Airport) a bee program and produces honey. Moreover, one objective was to maintain or even increase the number of species on the aerodrome by creating shelters for endangered species. ANA conducted studies and identified the airports biodiversity to ensure that the number of species remains at least stable. ANA together with Lux-Airport detected 32 butterfly species of which 6 are endangered, and 224 plant species of which 3 are endangered.

6.6. Decarbonising CNS equipment

In September 2021, EUROCONTROL published its Think Paper #13 on "Greening European ATM's Ground Infrastructure"¹⁴. Drawing upon publicly available data from ANSPs' reports, a model was developed to estimate the electricity consumption across all of ECAC's ANSPs, which amounted to

¹⁴ <https://www.eurocontrol.int/publication/eurocontrol-think-paper-13-greening-european-atms-ground-infrastructure>

approximately 1,140 Gigawatt hours in 2020. This is equivalent to 55% of Malta's energy consumption (525,000 population and over 2 million tourist nights). It would require just under half the annual output of the world's largest offshore wind farm to provide this amount of electricity¹⁵, or roughly 10% of the annual power output from one of Europe's largest coal-fired power plants^{16,17}

Generating 1,140GWh of energy would produce 311,000 tonnes of Scope 2 CO₂ emissions, based on each State's carbon intensity of energy production (fossil, nuclear, renewable). If ECAC ANSPs could 100% decarbonise "overnight", the paper estimated that ANSPs could save up to 6.2 MtCO₂ equivalent emissions through to 2040.

That number is theoretical and possibly overestimates the emissions that could be saved. Many ANSPs are already well on the road to becoming net zero organisations, as they contribute to the aviation industry's commitments to achieve that goal by 2050 in support of the UNFCCC's Paris Agreement and the EU Green Deal. At its 41st Assembly, in October 2022, ICAO Member States "*adopted a collective long-term global aspirational goal (LTAG) of net-zero carbon emissions by 2050*"¹⁸. Although the focus in these initiatives is primarily on emissions reductions from operations, it is entirely consistent for ANSPs to be exploring how they can also save on energy and emissions across their infrastructure.

The practical measures they are taking include adoption of renewable energy contracts, efficiency gains in the management of Information Technology infrastructure, reducing the number of over-redundant ground-based Communications, Navigation and Surveillance (CNS) installations and, where a CNS facility must remain, replacing it with a more energy efficient version.

The CNS infrastructure is very probably harder to "green" than office facilities. While some CNS ground facilities will be located at ANSP premises, many could be hosted by third-party organisations (especially at other governmental facilities), whereas others will be located at geographically remote sites – for example surveillance radars on the summits of hills and mountains that afford the greatest possible coverage. If a facility is on a remote site, it may be powered by diesel generators if it is not possible to run a power cable to it. If it can be powered from the electricity grid, then back-up diesel generators will be installed.

ENAIRE's CNS equipment, for example, is powered by renewable energy. Furthermore, it has begun efforts aimed at reducing CNS equipment emissions. The first step is to investigate the use of biodiesel in backup generators as well as to lower temperature conditions to reduce energy usage.

It has begun a massive initiative to monitor energy from 100% of ENAIRE's premises and use hydrogen cells in backup generators.

If a CNS facility is physically located at a non-ANSP site, for example government buildings on top of which communications antennae may be installed, the ANSP will probably have little or no influence on how power to it is supplied or how much power it actually consumes.

¹⁵ The largest offshore wind farm to date is the UK's London Array. With a "nameplate" capacity of 630 MW and capacity factor in 2015 of 45.3%, average daily output approximates to 6,800MWh (= 2,482 GWh/year). Source: <https://ourworldindata.org/scale-for-electricity>

¹⁶ Kraftwerk Weisweiler annual average energy fed into grid (2012-2014) was 15,300GWh https://de.wikipedia.org/wiki/Kraftwerk_Weisweiler

¹⁷ Weisweiler consistently appears among the top 10 EU ETS emitters. At 14.5Mt CO₂, it was ranked 7th in 2021.

¹⁸ <https://www.icao.int/Newsroom/Pages/States-adopts-netzero-2050-aspirational-goal-for-international-flight-operations.aspx>

Burning fossil fuels generates Scope 1 CO₂ emissions for an ANSP. If an ANSP relies on power from the electricity grid, the emissions produced are entered as Scope 2 emissions in the ANSP's emissions inventory. The European Environment Agency (EEA) tracks the greenhouse gas intensity of electricity generation which, according to its latest report, continues to fall, producing in 2020 one third less CO₂ than it did just a decade ago.¹⁹ per kilowatt hour generated. Since 2010, the decrease has been almost exclusively because of the transition from fossil fuels to renewable fuels in electricity generation, with prices for emission allowances under the EU Emission Trading System increasing in relevance, especially since 2019. If the observed trend were to continue, electricity generation could be fully decarbonised in the EU by around 2050. From an ANSP energy consumption perspective, this would lead to an automatic elimination of Scope 2 greenhouse gas emissions for all buildings and facilities powered from the electricity grid by then – through simply doing nothing.

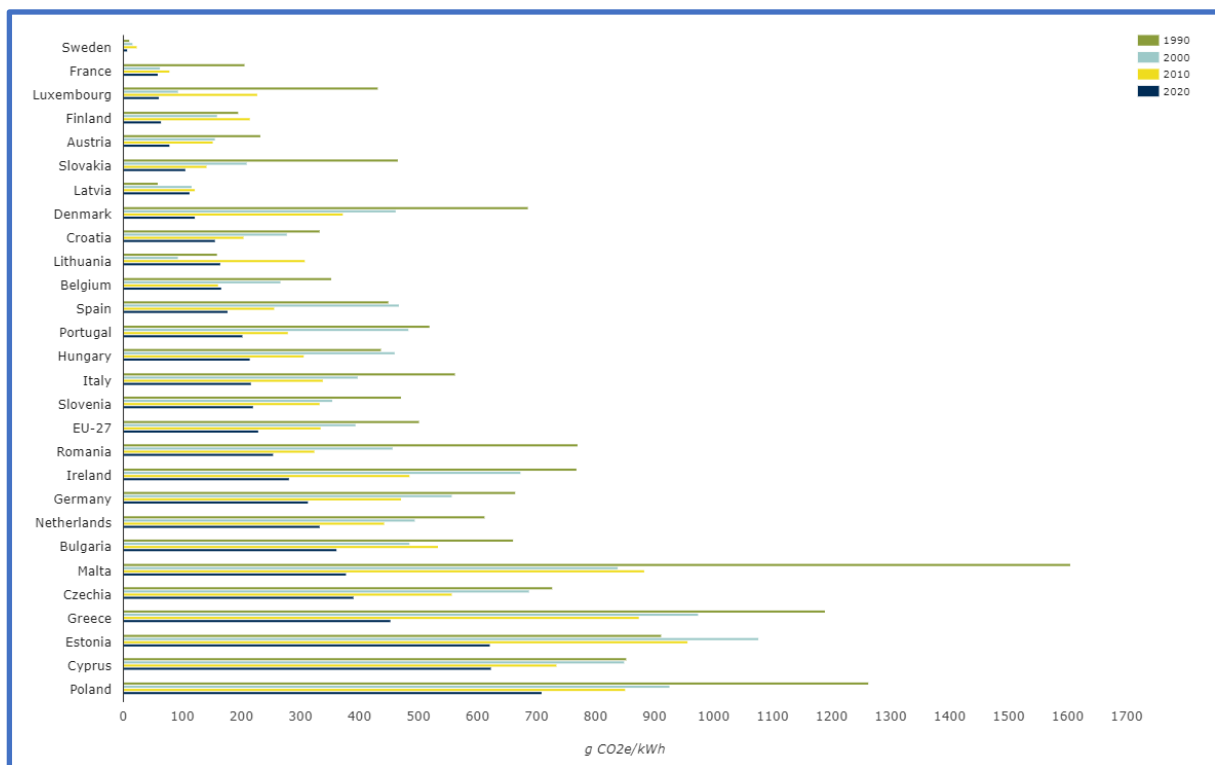


Figure 5: Greenhouse gas emission intensity of electricity generation by country 2020 (source: EEA)

However, as the graph above shows, the level of fossil fuels in current power generation is very high in some countries, and part of the mix in almost all. To decarbonise their ground infrastructure more rapidly, ANSPs cannot wait for three decades' worth of improvement in the power generation industry – ANSPs must take their own initiatives. The rest of this section sets out in some more detail what options are available.

Decommissioning of over-redundant facilities

There are over 6,000 CNS ground facilities in ECAC, resulting in excellent geographical coverage. In fact, there are many areas in which the number of facilities leads to considerable redundancy of coverage – not all are needed to provide the level of service required. There is scope for removing older facilities and many ANSPs are already doing so, focussing on VOR and NDB facilities for navigation and Mode A/C SSR for surveillance. This will automatically reduce energy consumption.

¹⁹ <https://www.eea.europa.eu/ims/greenhouse-gas-emission-intensity-of-1>

ANSPs should note however that national and local laws and rules may require that the sites of remote facilities be returned to their “natural state” after dismantling. The scope for decommissioning may narrow because of the unprovoked Russian invasion of Ukraine. Interference of Global Navigation Satellite System (GNSS) signals has increased since February 2022, with the potential not only to disrupt navigation (GPS-based navigation in particular) but also surveillance using ADS-B, as aircraft GPS position data are included in the data downlinked. This disturbance is mainly restricted to a few areas such as the Eastern Mediterranean, and some parts of the Black and Baltic Seas.

A number of ANSPs have kindly provided EUROCONTROL with the average annual electricity consumption of some of their CNS facilities. The composite annual electricity consumption data for some NAVAIDS are presented in the table below. But, coming from just seven ANSPs, some of which provided partial information only, the variance is large (up to 2x).

NAVAID	NDB	VOR	DME	VOR/DME	ILS
Annual average electricity consumption (kWh) (Draft)	10 000	15 000	10 000	20 000	25 000

Figure 6: Average estimated annual electricity consumption of selected navigation aids (source: EUROCONTROL)

Data such as this is useful to include in Cost-Benefit Analysis and Business Case modelling, as it allows ANSPs to estimate the electricity savings from the decommissioning and optimisation (including modernisation) of their CNS ground facilities. Reduced energy consumption has bottom-line benefits in reduced energy costs, and also enables the calculation of the associated Scope 1 & 2 greenhouse gas emissions savings. This not only has political and presentational advantages, but it is also becoming crucial to any application for financing – in which banks (and EU institutions providing grants) expect to see the carbon benefits of their investments. Furthermore, if an ANSP can demonstrate to the financial and political communities that it is tracking its energy budget and greenhouse gas emissions in a systematic and detailed manner, this provides reassurance that the ANSP is already adjusting to new criteria for what it means to be a responsible member of society in a decarbonising world.

To support ANSPs in this, EUROCONTROL has developed a new CBA tool for CNS infrastructure optimisation. It builds upon the model developed in 2020-2021 that was used to provide an economic assessment on behalf of the European Commission’s CNS Advisory Group. That assessment estimated that moving to a minimal operating network in navigation, coupled with an optimal mix of sensors for surveillance, could release total savings of €1.4bn (discounted) over the period 2021-2040²⁰.

The new CBA tool now includes the average annual electricity consumption of the various CNS ground facilities. Each ANSP can enter its own infrastructure plans out to 2050, covering decommissioning and renewal of existing facilities over that period as well as the introduction of new technologies in the future. The model will then calculate the energy consumption and savings on an annual basis and aggregate them over the study period. Using the carbon intensity of electricity production data for each state, the equivalent CO₂ emissions can be estimated. The economic value of those emissions can then be calculated based on the cost of a carbon allowance in the EU Emissions Trading System.

²⁰ <https://www.eurocontrol.int/publication/cns-infrastructure-evolution-opportunities>

The model can be accessed upon request to EUROCONTROL. Navigation aid data is taken from EUROCONTROL's Ground Navigation Infrastructure map tool²¹, and ANSPs can check and modify their data as required.

Replacing CNS Facilities with more modern equipment

The asset life of a CNS facility is likely to be no more than 15 years in an ANSP's accounts, by which time it will be fully amortised. The operational life, however, could be longer – perhaps up to 30 years or more for specific elements. Such old technology is unlikely to be particularly energy efficient. Replacing such facilities with the latest technology will almost certainly reduce energy use and emissions. Austrocontrol, for example, saw a 1.5GWh cut in electricity consumption over five years through deactivating its energy-intensive Buschberg radar station and replacing that functionality with a wide-area multilaterate surveillance system.²²

Ensuring new CNS facilities include a power management function

At least one ANSP is exploring with manufacturers the possibility of including a power management function in its functional requirements for new CNS equipment. The thinking is that, in times of low or no traffic (particularly at night or in remote areas), it may be possible to reduce the power consumption by switching to stand-by mode when the service will not be required. Alternatively, the power output could be modulated to reflect the real required distance from the facility within which the service must be available, such that the facility is not permanently transmitting at full power.

Renewable Energy Contracts

Several ANSPs have already concluded contracts with industry for renewable energy provision. They can cover a large portion of the energy consumption of an ANSP, and for some ANSPs their contracts already cover more than 90% of stated needs. This is almost certainly the quickest way to remove Scope 1 and 2 greenhouse gas emissions from an ANSPs greenhouse gas emissions inventory. The ability to do this will depend on the energy mix available in a particular country, the length of existing "classical" energy contracts to which the ANSP is committed, and the cost to an ANSP of cancelling those electricity/energy contracts earlier than the scheduled term date (if the ANSP wants to move quickly onto renewable energy).

Renewable Energy Generation - Solar

Many ANSPs are installing renewable energy equipment to help reduce their reliance on electricity from the grid. The most popular choice is solar power through the installation of photovoltaic (PV) panels. These can be placed on sloping and flat roofs, held in place by racks or frames attached to roof-based mounting supports. Alternatively, they can be located on open ground near to a facility, to be held in place by racks or frames that are attached to ground-based mounting supports.

The price of solar modules has declined by 99.6% since 1976 (see Figure 3) and has dropped on average by 20% for every doubling of installed capacity. In many countries it has become cheaper than ordinary fossil fuel electricity from the electricity grid since 2012.

²¹ https://ext.eurocontrol.int/ground_navigation_infrastructure/homepage/welcome.

²² Austrocontrol Annual Report 2019, p23

https://www.austrocontrol.at/jart/prj3/ac/data/uploads/pdfs/report_19.pdf

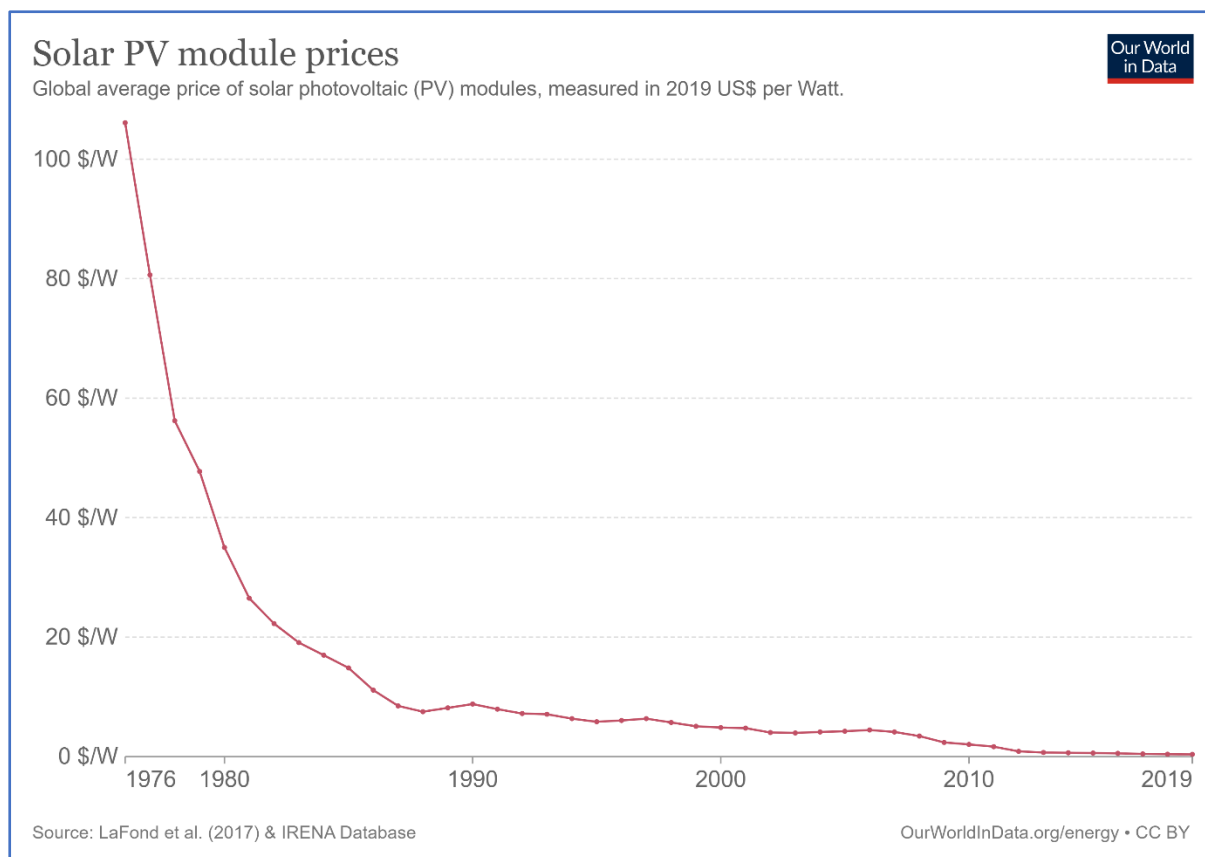


Figure 7: Evolution of price of solar photovoltaic panels 1976-2019 (source: Our World in Data).²³

The Capacity Factor of solar panels is limited primarily by geographic latitude and varies significantly depending on cloud cover, dust, day length and other factors. In the United Kingdom, seasonal capacity factor ranges from 2% (December) to 20% (July), with average annual capacity factor of 10-11%, while in Spain the value reaches 18%.²⁴

Solar panels work best on South to south-West facing sites (in the Northern Hemisphere) and if possible at an angle perpendicular to the sun, taking into account the site's latitude. As the angle from a PV panel to the sun becomes shallower this creates "grazing" rays, in which the same number of photons are spread over a larger area of the panel, thus reducing the energy captured.

Given their relatively small size, the number of solar panels can be adapted to take account of the configuration of the mounting sites, such as avoiding shade on roofs from trees. For a roof-mounted installation, it may be necessary to conduct a structural survey to determine if the roof is sufficiently strong to support the extra weight. Frankfurt Airport has installed a 13,000 square metre PV system

²³ ²³ Solar photovoltaic (PV) data for the years 1976-2009 are sourced from Lafond et al. (How well do experience curves predict technological progress? A method for making distributional forecasts. <https://arxiv.org/pdf/1703.05979.pdf> (2017)). The authors sourced this data from the Navigant Research series (<https://www.navigantresearch.com/>).

Our World in Data have extended this series up to 2019 based on the latest data from the International Renewable Energy Agency (IRENA) Resource, which reports global solar PV installed capacity and solar PV model prices. Available at: <http://resourceirena.irena.org/gateway/dashboard/>
<https://www.irena.org/publications/2020/Jun/Renewable-Power-Costs-in-2019>
²⁴ <http://euanmearns.com/estimating-global-solar-pv-load-factors/>

on the roof of a cargo warehouse in CargoCity South. It generates peak output of around 1.5 megawatts²⁵.

Alternatively, vertically mounted “fence tyle” solar panels can be used to harness the sun’s energy from East and West. Although probably not as efficient on a peak basis, they can harness sunlight for most of the day to generate large amounts of electricity. Because they take up minimal space, when placed in fields in a solar array, they should not damage grass below the panels, since they do not obstruct rain or create permanent shading.

Solar panels have both lower lifecycle and operating greenhouse gas emissions than fossil fuel and nuclear energy sources. As far back as 2012, the US National Renewable Energy Laboratory estimated photovoltaic panel life-cycle analysis greenhouse gas emissions to be approximately 40g CO₂e/kWh, of which over 50% was created during upstream processes such as extraction of raw materials through to production²⁶. Roughly 25% occurred during operations and maintenance. The equivalent for coal was estimated at 1000g CO₂e/kWh with >98% of that occurring during operations and maintenance. Given the improvements in technology since then, the advantage enjoyed by solar PV should be even greater by now.

Pay-back times for the return on investment in solar PV have been decreasing with the cost of production and installation. The exact returns will depend on geographical factors such as latitude, orientation towards the sun and weather, as well as cost, financing and renewable energy incentives. But it is reasonable to expect that a break-even point would be reached somewhere within 3-5 years.

ANSPs can be confident, therefore, that the installation of solar PV equipment will both reduce their exposure to lifecycle GHG emissions and deliver a noticeable – and relatively quick -return on investment.

ENAV, for example, has already installed photovoltaic electricity plants at 5 facilities including ENAV HQ, with plans to roll them out to 6 control towers, 2 radio centres and its training centre by the end of 2022²⁷.

Research continues into ever more efficient PV technologies. This has already led to the incorporation of solar cell technology in windows, which ANSPs may wish to consider for new-build facilities. ANSPs should ensure that they keep abreast of developments in this dynamic field prior to deciding to invest.

Renewable Energy Generation – Wind

Although ANSPs could also improve their energy mix through installation of wind turbines at their facilities, realistically, there may not be sufficient space on their land to do so. Even if there were, then planning permissions would most likely have to be given, and this will take time. Some, if not all, ANSPs may have facilities at airports, including area and approach control centres. It is unlikely that the installation of a wind turbine would be seen to be appropriate, potentially breaching the obstacle clearance surface for arriving and departing aircraft. An alternative, therefore, would be to contract for the supply of renewable energy from a provider of wind energy.

At some facilities, it may be possible to install wind turbines more appropriate for an urban environment. These would be structures whose axis of rotation is vertical, rather than horizontal (see Figure 8), although smaller, horizontal axis turbines could be considered. Such a choice would make

²⁵ <https://airport-world.com/new-photovoltaic-project-taking-shape-at-frankfurt-airport/>

²⁶ Life Cycle Greenhouse Gas Emissions from Solar Photovoltaics, US NREL, 2012

²⁷ All examples taken from ENAV Sustainability Report 2020, p107

<https://www.enav.it/sites/public/it/Servizi/Documenti/sotenibilta-inglese-2020.pdf>

sense for a new facility, whose design would take the extra weight into account. If placed on an existing building, a structural survey may be required to determine whether the roof has sufficient strength to support the turbines.



Figure 8: Urban Wind Turbines at Greenpeace offices, Hamburg, Germany

The most important factors to consider when installing an urban wind turbine include²⁸:

- Turbines should be preferably placed on large buildings with a flat roof.
- Investigate which turbine type and model is the best for the chosen building or location.
- The turbine model and the local wind regime are the most important factors determining energy yield.
- The minimum recommended average wind speed at an Urban Wind Turbine location is 5.5 m/s.
- The mast or building roof should be approximately 50% taller than the surrounding objects.
- The lowest position of the rotor has to be above the roof by at least 30% of the building height.

On average, the ICLEI factsheet claims that an urban wind turbine could reduce emissions by 0.566 kgCO₂/kWh.

Relationship between wind turbines/farms and CNS ground equipment

The rapid development of onshore wind farms has posed problems for air traffic control, as radar reflections from the rotating blades can be picked up by the radars as “clutter” that can hide or potentially be mistaken for aircraft. As a result of this, in many States, the amount of land available

²⁸ Urban Wind Power, 100% renewables fact sheet series, 2021, ICLEI - Local Governments for Sustainability e.V., supported by German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

for wind farm development has been limited because of the need to “sterilize” land out to a sufficient distance from the radars to prevent interference. This has the effect of reducing the potential amount of wind energy that a State could generate, thereby impeding its path towards a zero carbon economy. EUROCONTROL has produced Guidelines on assessing the potential impact of wind turbines on surveillance sensors.²⁹

Data recording and analysis campaigns have gradually led to the development of algorithmic filters that successfully minimise, if not eliminate, the interference caused by the radar reflections from the wind turbines. As a result, the amount of land available for onshore wind farm development is now increasing. An example is the renewal by UK NATS of its Lowther Hill Primary Surveillance Radar in Scotland, whose new technology should allow the development of wind farms that could deliver up to 2.5GW of renewable energy.³⁰

A similar situation exists with VHF Omnidirectional Range (VOR) navigation aids, whose signals also suffer from interference from wind turbines, thus requiring protection areas. The VOR networks across the ECAC States are gradually being optimised through decommissioning and, as necessary, replacement by new equipment. Where decommissioning occurs, this removes the need for protection zones, providing an opportunity for further wind farm development. DFS estimates that its VOR decommissioning programme has already led to the installation of 2100 wind turbines inside the former protection zones.³¹

ANSPs have, therefore, an opportunity to demonstrate how their own infrastructure improvement initiatives can support States in their push towards achieving a net zero economy. They should estimate the total annual CO₂ emissions avoided because of their actions, and make this information available to policy makers, the general public and their own employees.

Provision of Energy at Remote CNS Facilities

Where it is not possible to provide ground power to a remote CNS facility, or where the ANSP wishes to reduce or replace the use of diesel generators, technology solutions are emerging that could allow a partial or total decarbonisation of these sites. One example is in France, whose remote sites for radio and radar ground stations are supplied with emergency diesel generators to ensure a permanent availability of energy. As part of its Innovation Programme, the DSNA launched the SEPHER.³² project aiming at replacing fossil fuel-based power generation to one relying on renewable energy.

In March 2021, the DSNA commissioned an experimental renewable power generation facility for a communications site at Sarlat-le-Canéda in the remote Massif Central (France). This consists of solar panels and hydrogen fuel cells, operating together to deliver energy. The innovation resides in the combination of the technologies.

The objective is that the radio station should operate autonomously of the national power grid 75% of the time. It is estimated that this will reduce CO₂ emissions by nearly 60%.

²⁹ <https://www.eurocontrol.int/publication/eurocontrol-guidelines-assessing-potential-impact-wind-turbines-surveillance-sensors>

³⁰ <https://www.nats.aero/news/nats-deploys-new-radar-system-to-unlock-further-renewable-energy/>

³¹ DFS presentation to EASA-EUROCONTROL Working Group on Transparency of Environmental Reporting, 10 March 2022.

³² SEPHER - Secours Electrique à base de Pile à Hydrogène et Energies Renouvelables (or, Secondary Electric Power (supply using) Hydrogen (batteries and) Energies (which are) Renewable). The solution has been labelled ‘Be Greener’ by Solar Impulse Foundation (established by Bertrand Piccard) as an award for worldwide environmentally-friendly initiatives.

The system was inaugurated in September 2021 and is equipped with two hydrogen fuel cells rated at 2.2kW, expected to provide energy for roughly 1700 hours annually (approximately 70 days). Lithion-Ion NCA batteries have a capacity of 23.4kWh. The installation is powered by 60 photovoltaic modules organised in 12 chains for a total power output of 19.8kWc and an annual production capacity estimated to reach 25MWh annually.

ENAV is pursuing a similar path. It undertook a site trial at the Brancasi TBT radio centre to use hydrogen fuel cells in place of automatic backup generators to generate electricity. Rolling this out to all ENAV's peripheral sites will save an estimated 10 GWh and 5,000 tCO₂e annually. In 2022 ENAV issued one tender for a hydrogen backup power system in Central Italy and was preparing tender action for an experimental hydrogen power plant in Southern Italy.

Reducing the Carbon Footprint of IT Facilities

The IT industry continues to undergo rapid change, and the new technologies and services that have grown around the internet in the last 20 years are testament to that. Thanks to its understandably conservative nature, ATM may not necessarily be classified among the first movers when it comes to IT innovation, and yet it is a technology heavy industry. It is fair to say that this is starting to change, and has been given further impetus by both the SES Digital European Sky initiative, in which digitalisation is central, and the European Green Deal / Fit for 55 campaigns whose goals are to move Europe to a net zero carbon economy by 2050. The two are obviously complementary: digitalisation should deliver more efficiencies and thus more output per unit of energy and, hopefully, less energy consumption leading to a reduction in associated greenhouse gas emissions.

Information technology will be one of the biggest cost centres of an ANSP, and potentially its biggest consumer of energy. Reducing IT-related energy consumption is therefore among the key initiatives that an ANSP can take to green its infrastructure.

With a moderate investment, such as the usage of cold/hot corridors and intelligent power supplies, modern data centres can considerably reduce carbon footprints – which are mainly driven by air conditioning and server/storage power consumption. Furthermore, the consolidation of Data Centres and the increasing usage of Public Cloud services (highly dense, scalable and efficient) can produce efficiencies of scale and also contribute to reducing environmental impact. ANSPs such as Naviar and skyguide have made substantial savings through such investments (see EUROCONTROL Think Paper for further details).

ANSPs may consider further reducing their IT-related energy consumption through implementing paperless workplaces. Most companies have now totally replaced paper/ink by implementing end-to-end digital workflows. A simple albeit powerful example is the digital signature (see Docusign and Adobe) that saves not only energy and human work, but also related supply chain and costs³³.

Going further, ANSPs can pursue real automation as opposed to mere digitization. Digitizing documents is not enough. Storing and exchanging data contributes to pollution. An email with an attachment, sent to many receivers, may multiply the carbon cost by a factor of 1000 or even 1 million. Modern communication and automation suites (MS365, Google) allow sharing links instead of files, thus greatly reducing the overall environmental impact³⁴.

³³ <https://www.e-sign.co.uk/news-insights/how-environmentally-friendly-are-digital-signatures/>

³⁴ <https://carbonliteracy.com/the-carbon-cost-of-an-email/>

7. Reporting

The EU Corporate Sustainability Reporting Directive (CSRD) heralds a new era in sustainability reporting. This new directive, proposed by the European Commission on 21 April 2021, aims to increase transparency on corporate performance in terms of sustainability. Companies not previously required to report under the predecessor to CSRD will now be expected to comply with a broad range of reporting requirements by 1 January 2024. The changes, therefore, would affect the 2023 reporting period. Simply said, it is a law in the EU that demands certain companies to share information on how they monitor and manage both social and environmental issues.

7.1. Why?

The Corporate Sustainability Reporting Directive is beneficial to investors, civil organizations, consumers, policy makers and stakeholders so that they can determine the environmental and social success of large companies. Ultimately, the CSRD influences these large businesses to instil sustainable business habits and seek balance and success in other sectors, such as environmental and social, rather than just the financial one.

7.2. What?

The Corporate Sustainability Reporting Directive requires large companies with 500 or more employees to disclose information on the following topics:

- Environmental impacts
- Social matters, the treatment of employees and working conditions for employees
- Respect for human rights
- Mitigation of corruption and bribery
- Diversity on the company board (concerning age, gender, educational and professional background)

7.3. How?

The new reporting Directive will be another major step toward the alignment of sustainability reporting standards with financial reporting standards. Companies who are emerging leaders in sustainability as well as those companies who were early adopters of ESG are all recommended to familiarize themselves with the new upcoming requirements, as they entail significant changes and challenges.

Gather stakeholders, experts and perspectives in order to address these emerging requirements, because sustainability is increasingly becoming an indispensable part of a corporate report and business itself.

8. Internal and External Communications

While it is vital for companies to integrate sustainability in their business strategies and operations, it is also crucial to inform – even involve – their stakeholders. The goal for internal communication should be to stimulate a change in mindset (how do employees, partners, stakeholders view sustainability?) and behaviour (do people act in a sustainable way?). When you change both you can get to the point of internalisation: people will view sustainability as part of their work identity and part of the company they work for. They'll automatically apply it in their daily tasks.

There are many benefits to communicating about sustainability:

- Sustainability goals give meaning to employees' jobs. This leads to increased engagement and higher retention rates, with 4 in 10 saying they would look to change jobs if their company doesn't implement sustainable practises. (HP Workforce Sustainability Survey³⁵).
- It serves to differentiate a company. Although, ultimately, sustainability should become common practice in all layers of society, it can today still create a competitive advantage that helps business performance (HBR³⁶).
- When a company or brand embraces purpose, they build reputation and grow loyalty over time (Nielsen³⁷).
- Investors pay more and more attention to sustainability, as "they begin to look beyond short-term investment horizons to the creation of longer term shareholder value." (KPMG³⁸).
- It progresses sustainable development, for example by raising awareness and support for a sustainability issue or by motivating people to change behaviours (GTZ³⁹).

8.1. What?

Sustainability communication is the act of consciously integrating sustainability in a communication strategy by telling stakeholders about a company's sustainability goals and efforts.⁴⁰ On the one hand, companies can use one-way messaging to inform their stakeholders about sustainability. Think of a sustainability report published on a company's website and pushed to its target audience via social media. On the other hand, companies can involve their stakeholders more actively by exchanging information on sustainability issues and discussing specific topics and priorities. The goal here is to create a common understanding of sustainability challenges and build trust.

8.2. Why?

Communication can be a transformative act that powers improvement and innovation through participation. Communication can also have the objective to progress sustainable development, to communicate for sustainability⁴¹. By educating employees, suppliers, and other stakeholders, companies can help encourage sustainable behaviour. The same can happen by means of engaging dialogues. For example, by organising employee round tables to find ways to optimise the green mobility.

³⁵ <https://press.hp.com/content/dam/hpi/press/press-kits/2019/earth-day-2019/HP%20Workforce%20Sustainability%20Survey.pdf>

³⁶ [Yes, Sustainability Can Be a Strategy \(hbr.org\)](https://hbr.org/yes-sustainability-can-be-a-strategy)

³⁷ [Sustainable brands can pivot with purpose to help address COVID-19 - NielsenIQ](https://www.nielseniq.com/nl/insights/news/2020/sustainable-brands-can-pivot-with-purpose-to-help-address-covid-19/)

³⁸ <https://assets.kpmg/content/dam/kpmg/xx/pdf/2018/10/esg-investor-relations-services.pdf>

³⁹ <https://www.cbd.int/cepa/toolkit/2008/doc/Strategic%20Communication%20for%20Sustainable%20development.pdf>

⁴⁰ www.sustenuto.be

⁴¹ J. Newig et al., Communication Regarding Sustainability: Conceptual Perspectives and Exploration of Societal Subsystems, 2013

8.3. How?

No matter the type of communication a company chooses – and it's very possible that the approach differs over time or according to objective – it must respect some important nuances if it wants to pass the scrutiny of watchdogs and prevent any potential backlash by customers.

The five foundations of sustainability communications:

- Clear ambitions,
- Substantiated claims,
- Compelling messages,
- Transparent communication,
- Accessible information.

Clear ambitions

When companies truly want to take up responsibility and embrace purpose, they must be clear about their ambitions. It is important that they clarify what sustainability means for their organisation, and which goals they have set towards the future. Closely linked to this is the fact that these goals should be relevant, and that organisations talk about the sustainability efforts where they can actually make an impact.

Substantiated claims

Sustainability communication starts with a declaration of intent. Then, it is a matter of regularly communicating about the status of the sustainability activities and the progress being made. If organisations want to avoid being accused of greenwashing, it is important to substantiate any claim they make. They can do so by demonstrating the true impact of their business activities on society and the environment. For example, a company has set the ambition to render its facilities carbon neutral in scope 1, 2 and 3 by 2030. Every year, it gives an update about the progress being made in a dedicated sustainability report that closely follows the Global Reporting Initiative Standards.

Compelling messages

Organisations can leverage their sustainability goals by translating them into comprehensible messages that captivate all audiences. It is a matter of adapting the message to different stakeholder groups to ensure that each person understands what the company aims to achieve, how it will get there and what that means for them. For example, an international airline presents its sustainability strategy to its shareholders as part of the annual reporting. Employees get a more in-depth view into the actions per department via workshops and a dedicated intranet page. And customers get a more high-level introduction to the strategy by means of a video on social media.

Transparent communication

Sustainable development is never over, so an organisation's communication shouldn't solely focus on accomplishments. Instead, transparently showing progress, even if there is still a long way to go or some areas need improvement, will increase credibility and acceptance by the public. A concrete example is the 2019 sustainability report of Skeyes or NATS. The reports give transparent updates of its sustainability strategies.

Accessible information

Organisations can further boost credibility and drive involvement by transforming their sustainability story in attractive formats that are easily accessible by their target groups. Here, a multi-channel

approach, storytelling and experiences are key. One can use its sustainability report as the basis for further content development, transforming it into multiple formats for different channels and audiences. Think of an interactive workshop for employees, a video on social media, an infographic in a press release to the media, or a booklet for partners.

9. Additional resources: Certifications and Accreditations

9.1 Environmental Certifications of Organisations

ISO 14001

ISO 14001 is an internationally agreed standard that sets out the requirements for an environmental management system.

It helps organizations improve their environmental performance through more efficient use of resources, gaining a competitive advantage and the trust of stakeholders.

How to start with ISO? First document yourself, there are a lot of publications on the ISO website, but here are already a few kick-off tips:

- Tip 1 – Define your objectives. What do you want to achieve with this standard?
- Tip 2 – Get the buy-in from senior management. It is essential that the leaders of your organization define and support the objectives of an effective environmental management system and are committed to the process.
- Tip 3 – Get a good overview of existing processes and systems that are relevant to your environmental impact. This will form the basis of your environmental management system and allow you to more easily identify any gaps.
- Tip 4 – Involve the whole organization to get their buy-in. You could go to each department and have sessions with all employees to explain what the environmental approach could be and have open discussion to fulfill also the expectations of the employees.
- Tip 5 – A thorough risk and opportunity analysis has to be initiated and needs to be annually reviewed to identify any actual or potential risks.

EMAS⁴²

The EU Eco-Management and Audit Scheme (EMAS) is a premium management instrument developed by the European Commission for companies and other organizations to evaluate, report, and improve their environmental performance. EMAS is open to every type of organization eager to improve its environmental performance. It spans all economic and service sectors and is applicable worldwide.

EMAS is the most credible and robust environmental management tool on the market and goes beyond the requirements of ISO 14001.

The ISO 14001 standard has been an integral part of EMAS since 2001, and in this way, it has allowed many ISO-certified organizations to step up to EMAS through a formal process based on ISO 14 001 : 2015 standard.

Since the revision of the annexes of the EMAS Regulation, it is easier for an organization already complying to an environmental management system such as ISO 14001 to step up to EMAS.

EMAS stands for:

- **PERFORMANCE:** EMAS supports organizations in finding the right tools to improve their environmental performance. Participating organizations voluntarily commit to both evaluating and reducing their environmental impact.
- **CREDIBILITY:** Third party verification guarantees the external and independent nature of the EMAS registration process.

⁴²Source: EMAS

<https://ec.europa.eu/environment/emas>

- **TRANSPARENCY:** Providing publicly available information on an organization's environmental performance is an important aspect of EMAS. Organizations achieve greater transparency both externally through the environmental statement and internally through employees' active involvement.

How does it work?

Becoming an environmental leader and achieving continuous improvement through EMAS is facilitated thanks to a ten-step methodology and four key principles: Plan-Do-Check-Act!

A set of implementation tools have been developed and published (a lot of freely available publications in the EU website – including The EMAS User's Guide, which is a user-oriented tool which translates the EMAS Regulation into practical steps).⁴³

Step 1: Get ready for EMAS by gathering useful information from your Competent Body

Your Competent Body is there to help and provide you with customised technical support and funding opportunities made available to your organisation through implementing EMAS. Competent Bodies can also advise you on the best consultant for your organisation.

Step 2: Perform the environmental review of your organisation

An environmental review is an analysis of the environmental problems caused by an organization's activities. The initial environmental review spots the most significant direct and indirect environmental aspects, as well as any impacts of your organizations. This review also establishes benchmarks in order to measure future success in impact reduction. There are five main parts to the environmental review:

An effective environmental review should:

- Identify the “external and internal issues” that can positively or negatively affect the organization's environmental management system,
- Determine the needs and expectations of interested parties,
- Give a picture of the organization's current environmental performance (all existing practices and procedures concerning environmental management),
- Identify direct and indirect environmental aspects and impacts,
- Identify applicable legal requirements AND check compliance towards them,
- Assess the significance of environmental impacts in terms of consumption of raw materials and energy, the production of waste and emissions (with a life cycle perspective),
- Identify risks and opportunities associated with its environmental management system.

Step 3: Structure your Environmental Management System (EMS) by defining an environmental policy and an environmental programme

- The environmental policy is a public document prepared by your organization, which describes your commitments to the environment and specifies your organization's overall intentions and direction in terms of environmental performance.
- The environmental program is an action plan that translates your organization's environmental policy into specific objectives – overall environmental goals directly arising

⁴³ https://ec.europa.eu/environment/emas/join_emas/how_does_it_work_step0_en.htm

from environmental policy, and targets – performance requirements that emerge from these objectives).

Step 4: Implement your Environmental Management System (EMS)

You should make sure that the internal structure and processes of your organization conform to the objectives and targets as declared in your environmental policy. If this is not the case, they should be adapted accordingly.

An environmental management system may be informal in nature, but it must have a formal structure (delegation of tasks and responsibilities, documented information related to EMS is identified, usable, under the right format, adequately protected and controlled).

A trademark of EMAS is active employee participation. This can be achieved only through an interactive and transparent internal communication, which engages the entire workforce.

Step 5: Check the effectiveness of your Environmental Management System through an internal environmental audit

Once your management system has been implemented and is operational, you will need to monitor your performance of procedures and practices in terms of environmental aspects.

Establish a management control panel with environmental performance indicators, as well as the follow up of your environmental program.

Carry out an internal environmental audit, consisting of a periodic assessment of how well the EMS is functioning and how environmental performance is being improved. The audit also checks the compliance of the EMS with the EMAS Regulation

Step 6: Aim for continuous improvement in your environmental performance

Your organization's top management should periodically check the consistency of the organizational approach and its capability to meet the goals stated in the policy and the program known as a management review.

It is considered a good practice to carry out your internal audit at the time of the management review.

Step 7: Prepare your environmental report

The environmental report (environmental statement) is your window to the world; as such it should be a clear and concise document that effectively communicates your environmental performance to stakeholders. This environmental report outlines your organization's achievements in terms of its environmental objectives, detailing both past environmental actions and measures, as well as setting future environmental targets.

The next steps will guide your organization through the verification, validation and registration process to officially become EMAS registered

Step 8: Get your EMS verified and your environmental report validated

The verification of your EMS is carried out by an independent environmental verifier, who is accredited or licensed by an EMAS Accreditation / Licensing Body of a Member State.

The environmental verifier will examine and verify your organization's conformity to the EMAS Regulation in terms of your environmental review, environmental policy, compliance to

environmental regulations, as well as the environmental management system and internal audit. This verification is carried out by the environmental verifier examining documents, visiting the organization and interviewing personnel.

The environmental verifier shall also validate the content of your environmental report.

Step 9: Submit your registration.

Send a set of documents to your competent body, most importantly the declaration signed by the environmental verifier confirming that the verification and validation was carried out in accordance with the EMAS Regulation (Annex VII of the Regulation)

Following that, your organization will be enlisted in the European EMAS register, which will make public your entry into the EMAS community, as well as make your environmental statement easily downloadable.

Step 10: Use EMAS to show your environmental commitment to your customers and suppliers, as well as towards authorities

Your organization can now use the EMAS logo to promote its registration and show its environmental commitment

Other environmental certification

Besides certifications there are many labels.

Some are for manufacturing products, others are sector specific labels:

EU LABEL

In March 2022, the EU Ecolabel officially turned 30!

Established in 1992, and recognized across Europe and worldwide, the EU Ecolabel is a label of environmental excellence that is awarded to products and services meeting high environmental standards throughout their lifecycle: from raw material extraction, to production, distribution and disposal. The EU Ecolabel promotes the circular economy by encouraging producers to generate less waste and CO₂ during the manufacturing process. The EU Ecolabel criteria also encourages companies to develop products that are durable, easy to repair and recycle.

EU LABEL (new version in 2021)

Most white goods, light bulb packaging and cars must have an EU Energy Label clearly displayed when offered for sale or rent. The energy efficiency of the appliance is rated in terms of a set of energy efficiency classes from A to G on the label, A being the most energy efficient, G the least efficient.

Cradle to Cradle

Cradle to Cradle Certified assesses the safety, circularity and responsibility of materials and products across five categories of sustainability performance:

Material Health (safe for human and environmental), Product Circularity (circular economy through regenerative products), Clean Air & Climate Protection (protecting clean air, promoting renewable energy, and reducing harmful emissions), Water & Soil Stewardship (safeguarding clean water and healthy soils), Social Fairness (respecting human rights and contributing to a fair and equitable society).

Energy star for electronic products

Energy Star (trademarked ENERGY STAR) is a program run by the U.S. Environmental Protection Agency (EPA) and U.S. Department of Energy (DOE) that promotes energy efficiency. The program provides information on the energy consumption of products and devices.

SFC for sustainable forest

Forest Stewardship Council (FSC) promotes responsible management of the world's forests.

Lean & Green initiative

It was launched in 2008 and aims at companies offering or purchasing logistics activities. The principle is based on a commitment to reduce CO₂ per ton-km (starting with an objective of 20% reduction).

What is interesting to note is that Lean & Green has developed an emission calculator tool, which is based on GHG protocol and EN 16258. The program operates a label and award scheme with 5 levels: from 1 to 5 star rating.

9.2 Sustainability Certification

Why a Sustainability certification⁴⁴ ?

- To further **improve performances** by being confronted with CSR best practices
- To build a **strong reputation/image** on national and international level
- ISO 26000 is a guideline for implementation of CSR in an organisation, not a certification
- BCorp is currently a mainstream CSR certification, but public companies under government control are not eligible for.

Possible options are:

	CSR Performance Ladder	Responsibility Europe	CIFAL UNITAR	IQNet SR10
What?	Guidance to implement and work according to a CSR management system.	A European network of labels supporting commitment to CSR	Certificate for a SDG trajectory	Certification of Social Responsibility Management Systems
Since when and by who?	Since 2010, monitored by the Foundation Sustained Responsibility (NL)	Since 2021, on the initiative of AFNOR (F), INDR (Lux) and Ecoparc (CH)	Since 2018, In collaboration with Voka's Charter for Sustainable Entrepreneurship (VCDO)	Since 1990, supported by a network of 37 partners under the lead of SQS (CH)
Target Groups	For companies and organizations from every industry	For companies that have been awarded the label in their respective countries	For public and private enterprises, starting for local governments	Companies and organizations of all sizes operating in all sectors
Frameworks	ISO 26000 and SDG's	ISO 26000	SDG's	ISO 26000 and GRI
Process	5 levels (continuous improvement) 1 to 3 years certificates	PDCA methodology and continuous improvement	3 phases: - Pioneer (3y training) - Champion (2-3y pilot) - Ambassador	Two stage audit process: - system readiness - full system assessment
Recognition	Mostly national (NL)	International	National (going for international)	International

Figure 9: Sustainability Certifications

⁴⁴ Global CSR certification, not a specific certification like EMAS, GPTW,...

CSR Performance ladder	Responsibility Europe	CIFAL UNITAR	IQNet SR10
+ Link with ISO and SDG's + Phased approach (5 levels) + Focus on performances + Guidance for stakeholders management + 3P balanced + Several certifying bodies (10+)	+ international recognition (still to build?) + network of 500 labels and 2500 commitments to the process + on-site assessment by an independent third-party body	+ baseline measurement , identification of strengths and weaknesses, corrective action plan + yearly progress control + exchange of experience (network) + public and private enterprises (100+ labelled in Belgium) + support for communication + link with UN Global Compact 10 principles + evolution towards international recognition	+ worldwide recognition + directed at any type of organization, large companies or SMEs, from public or private sectors + broad accredited third-party certification network (Vincotte in Belgium) + PDCA and continuous improvement process + strong links with ISO + link with GRI
- Limited international outreach - Few certified Cies in Belgium	- Need to have been awarded a label in own countries (currently limited to F, L en CH) - Labels and certifications must first be recognized by Responsibility Europe	- Focus on the SDG framework - CIFAL Flanders as only accreditor in Belgium	- No explicit link with the SDG's - Very few labelled Cies in Belgium - ISO-like heavy audit process - Not mainstream - More business oriented

Figure 10: Strengths & Weaknesses of the different Sustainability Certifications

Assessment: **CIFAL UNITAR**, is a process in line with a clear sustainability approach. It supports SDG initiatives of governments and it has an international evolution. **RESPONSIBILITY EUROPE**, has as objective to become an internationally recognized label, but requiring an AFNOR (Association Française de Normalisation, English: French Standardization Association)-like certification. **IQNET SR10**, is for international outreach but not the mainstream. It only has 60 certified companies. **CSR Performance Ladder**, is almost exclusively present in The Netherlands

Note: Very few public companies (and no ANSP's) have a global CSR certification.

9.3 CANSO GreenATM Accreditation Programme

What is the difference between certification and accreditation?

Certification is the provision by an independent body of written assurance (a certificate) that the product, service or system in question meets specific requirements.

Accreditation is the formal recognition by an independent body, generally known as an accreditation body, that a certification body operates according to international standards.⁴⁰

In their effort to reduce their impact on the environment, aviation stakeholders have developed environmental management certification programmes. They are independently assessed and recognise the efforts of stakeholder to manage and reduce their environmental footprint.

Pioneering this trend, ACI produced in 2008 the Airport Accreditation programme. It was since endorsed by the e European Civil Aviation Conference (ECAC), the European Commission's Directorates-General for Mobility and Climate Action and the European Organisation for the Safety of Air Navigation (EUROCONTROL) and the United Nations Framework Convention on Climate Change (UNFCCC)

CANSO GreenATM Accreditation Programme

CANSO established in 2022 its GreenATM accreditation programme, which is the only programme of that kind covering all environmental aspects managed within ANSPs. GreenATM is the first and only accreditation programme covering all environmental aspects managed within ANSPs. Made by ANSPs for ANSPs, it allows ANSP not only to communicate on their environmental contribution but also to progress in their environmental performance.

The programme uses the traditional maturity ranking models ranging from level 1 (informal arrangement) to level 5 (optimised). To be accredited by CANSO at a level, ANSPs need to follow a process during which they submit answers to questionnaires.

GreenATM is structured in 4 categories: Governance, infrastructure and utilities, other and improved ATM. Each of them, contains topics (24 in total) and for each topic a questionnaire is provided. Questions positively answered are rewarded with points.

Since all categories don't have the same environmental impact, more points can be gained in the improved ATM category than in the others. This perfectly reflects the fact that the most important impact that ANSPs have on the environment is in the services they provide rather than on the infrastructure used to deliver them.

10. Closing Remarks

This step by step guide to measure, reduce & report your ANSP's carbon footprint will help you navigate or develop your own corporate footprint. Environmental sustainability is a forever revolving concept therefore it is important to stay up to date with new policies, laws and regulations. By following this guide your ANSP will become one step closer to reducing its carbon emissions.

Note that the definition of sustainability includes people, planet, and profit, implying that sustainability is a holistic term that provides for environmental, social, and governance aspects. This document only addresses the ecological element of sustainability; however, we urge that a similar document be created to include sustainability's social and governance factors.

"The greatest threat to our planet is the belief that someone else will save it."

Let's start fresh!

Quote by Robert Swan, Author



SUPPORTING EUROPEAN AVIATION



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