

3. Industrial Emissions Data

To develop sectoral decarbonisation roadmaps for the North West, the first step was to benchmark current fossil fuel consumption. To do this we chose a base year that would act as a reference point to compare our emission reduction plan and was also representative of a non-COVID impacted period. A 2019 base year has been assumed as the most applicable full year considering COVID disruptions distorting more recent years.

Subsequently, available data sources were assessed to derive the most effective results. The data sets that were evaluated included:

- **European Union Emissions Trading System (EU ETS) (4)**

The EU ETS operates in all EU countries plus Iceland, Liechtenstein, and Norway (European Economic Area – European Free Trade Association states), limiting emissions from around 10,000 installations in the power sector and manufacturing industry, as well as airlines operating between these countries. This covers around 40% of the EU's Green House Gas (GHG) emissions.

The EU ETS works on the 'cap and trade' principle. A cap is set on the total amount of certain greenhouse gases that can be emitted by the installations covered by the system. The cap is reduced over time so that total emissions fall. Within the cap installations (or sites) buy or receive emission allowances, which they can trade with one another as needed. The limit on the total number of allowances available ensures that they have a value.

After each year, an installation must surrender enough allowances to fully cover its emissions, otherwise heavy fines are imposed. If an installation reduces its emissions, it can keep the spare allowances to cover its future needs or sell them to another installation that is short of allowances. Trading brings flexibility that ensures emissions are cut where it costs less to do so. A robust carbon price also promotes investment in innovative, low-carbon technologies.

It should be noted that since the departure from the European Union (EU), a UK Emissions Trading Scheme (UK ETS) replaced the UK's participation in the EU ETS on January 1st 2021. The UK ETS follows the 'cap and trade principle'. The UK ETS applies to energy intensive industries (EII), the power generation sector and aviation. It covers activities involving combustion of fuels in installations with a total rated thermal input exceeding 20MW (except in installations for the incineration of hazardous or municipal waste). The aviation routes covered by the UK ETS will include UK domestic flights, flights between the UK and Gibraltar, and flights departing the UK to the European Economic Area states for all aircraft operators, regardless of nationality. If an installation carries out an

activity covered by the UK ETS, a greenhouse gas emissions permit will be required (5).

At the time of this report, the UK ETS database was in development and therefore EQUANS used the data contained within the EU ETS database to provide information on EU ETS installations, which included verified emissions and compliance status for the period 2005-2020.

- **UK National Atmospheric Emissions Inventory (NAEI) (6)**

There are several international commitments including, EU Directives and other national legislation aimed at reducing emissions of air pollutants and GHGs.

The NAEI provides a wide range of data necessary to support the reporting associated with these commitments. Full details of the UK's commitments can be found on the Department for Business, Energy and Industrial Strategy (BEIS) website for GHGs (7) and Department for Environment, Food and Rural Affairs (Defra) website for air pollutants (8).

The NAEI is funded by BEIS, Defra, the Scottish government, the Welsh government and the Northern Ireland Department of Agriculture, Environment and Rural Affairs.

The NAEI estimates annual emissions from 1970 to the most current publication year for most pollutants. Several pollutants are estimated from 1990 or 2000 to the most current publication year due to the lack of adequate data prior to the later date and the specific reporting requirements for each pollutant. To deliver these estimates, the NAEI team collect and analyse information from a wide range of sources – from national energy statistics through to data collected from individual industrial plants (9).

- **Energy Saving Opportunity Scheme (ESOS) and energy survey reports.**

ESOS is a mandatory energy assessment and energy saving identification scheme typically delivered through an energy survey, introduced by the UK government for large organisations. The scheme applies throughout the UK and must be carried out by a qualified Lead Energy Assessor every 4 years. EQUANS has extensive experience in helping businesses to comply with ESOS, identifying savings through energy auditing and energy survey reports.

Prior to conducting an energy survey, a request for information (RFI) form is submitted at the project initiation to start the data collection process. Afterwards an energy survey is carried out at site, where the ESOS assessor reviews the current energy consumption, existing processes, and potential improvements. Finally, an ESOS report is produced detailing the information captured from the RFI and energy survey.

There is no mandatory requirement for businesses to implement the energy saving opportunities identified by the ESOS audits. However, they do offer a valuable opportunity for businesses to reduce their energy use and costs. The measures identified could range from simple 'quick-fix, fast-return' solutions, such as installing LED lighting, through to longer-term investment programmes.

With this experience, EQUANS manages a depository of data on energy consumption and energy saving opportunities for industrial sites from a variety of sectors. Previously collected data for the purpose of compliance with ESOS has been collated for this study to generalise the variety of energy efficiency opportunities based on the sector of the industrial sites, protecting the identity of previous clients.

Energy saving opportunities for each sector have been aggregated to simulate the variety of solutions available. Where the same solution was proposed for different industrial sites within the same sector, the energy and carbon savings were averaged and compared to the baseline figures to attain a benchmark that can be applied to the whole sector in the North West. The results of this analysis are elaborated on in Section 5.2.

• The GHG inventory

The GHG inventory covers the seven direct greenhouse gases under the Kyoto Protocol, carbon

dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF₆), and nitrogen trifluoride (NF₃). These gases contribute directly to climate change due to their positive radiative forcing effect. HFCs, PFCs, SF₆ and NF₃ are collectively known as the 'F-gases'. In general terms, the largest contributor to global warming is CO₂ which makes it the focus of many climate change initiatives. CH₄ and N₂O contribute to a smaller proportion, typically less than 20%, and the contribution of 'F-gases' is even smaller (despite their high Global Warming Potentials) at less than 5% of the total (10).

The GHG Protocol Corporate Standard classifies a company's GHG emissions into three 'scopes'. Scope 1 emissions are direct emissions from owned or controlled sources. Scope 2 emissions are indirect emissions from the generation of purchased energy. Finally, Scope 3 emissions are all indirect emissions (not included in scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions.

For the purposes of this report, CO₂ emissions are classified by Scope 1 and Scope 2. Scope 3 emissions specify fifteen categories, including purchased goods, waste generated, fuel-related activities, use of sold products, investments, franchises, and employee commuting. These categories will require significant collaboration through stakeholder interviews with each of the sites and companies within the North West. To derive the most effective outcomes in the time available, a desktop assessment of Scope 1 and 2 was used to inform the analysis. Further development of Scope 3 emissions is recommended to be explored with sufficient time allowed for the significant organisational challenges in creating an effective data set.

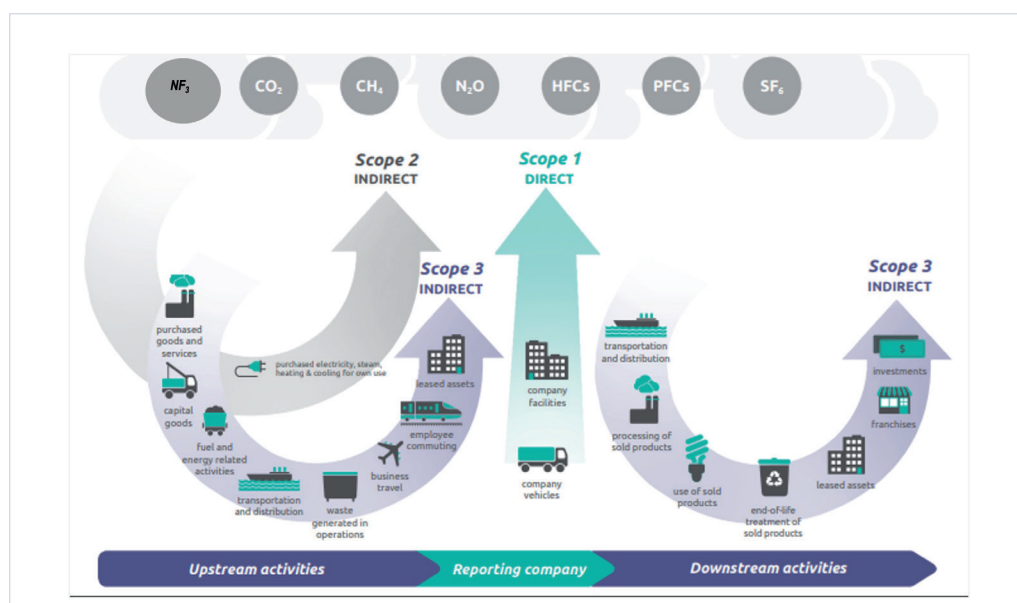


Figure 1 Overview of the GHG Protocol scopes and emissions across the value chain (151)

