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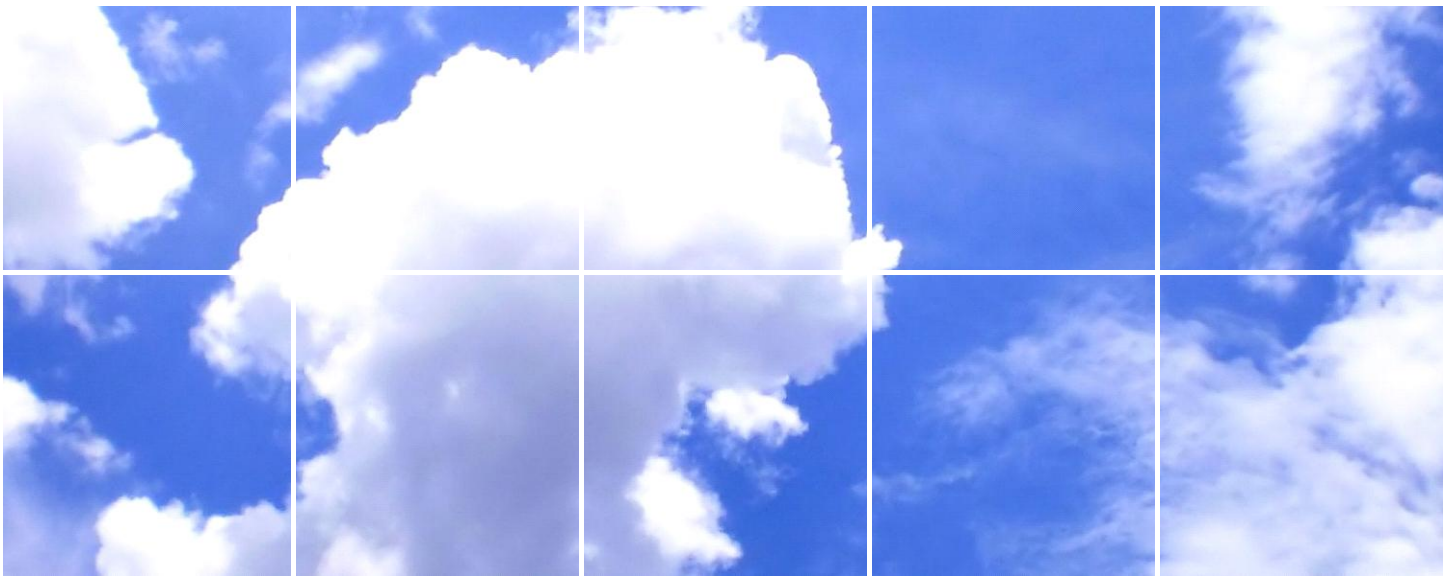

The DA GHGI Improvement Programme 2009-2010

EU ETS Task

DECC, The Scottish Government, The Welsh Assembly Government and the Northern Ireland Department of the Environment

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Executive Summary

The data analysis and reporting of GHG emission inventories in the UK, both at the national and sub-national level, is increasingly coming under scrutiny for the purposes of energy and climate change policy development, evaluation and appraisal. Part of the challenge is to develop a better understanding of the emission sources that are predominantly impacted by UK-wide emissions trading policies, primarily the EU Emissions Trading Scheme (EU ETS).

In order to support evidence-based policy development within the climate change strategies and programmes implemented by the Devolved Administration Governments of Scotland, Wales and Northern Ireland, it is necessary to develop a more detailed understanding of the scope of the "non-traded" emissions sector (i.e. those emission sources that are not within the EU ETS) and hence better understand the GHG emission sources where devolved policies can have the greatest impact.

The non-traded sector in the UK is primarily the smaller-scale emitting sites. These are usually sources where comprehensive accurate data on energy use and / or emissions are not available. Emissions from the traded sector are better known, since the mechanism for trading requires reporting of detailed emissions, activity and emission factor data. The current approach to deriving the non-traded emission estimates is therefore by difference from the total DA GHG inventory data and the EU ETS emissions data:

Non-traded emissions	**=**	**total emissions**	**–**	**traded emissions**

The DA GHG inventory data are derived from the UK GHG inventory data, which in turn is linked directly (for high emitting, energy-intensive sites, such as those within the EU ETS) to industry-specific fuel allocations within the Digest of UK Energy Statistics (DUKES).

This research task aims to further improve the detail of analysis of the EU ETS dataset, in order to maximise the usefulness of the EU ETS data within (i) the compilation of UK energy statistics for specific sectors, (ii) the development of UK and DA fuel-specific emission factors within the UK and DA GHG inventories, and hence (iii) the estimation of DA-level traded and non-traded GHG emissions. The split between traded and non-traded emissions now forms part of the compilation of the DA inventories; as the development of DA-specific climate change strategies and action plans progresses, including reporting against DA-specific emission reduction targets, it is becoming increasingly important that the traded and non-traded emission estimates can be determined accurately, and will stand up to scrutiny. This research aims to reduce the uncertainty in the DA traded and non-traded emission estimates.

The work has involved desk-based analysis of the EU ETS data, with particular emphasis on the (now available) 2008 data, in order to support the development of better country-specific inventory data.

Key Findings

The analysis has enabled a more detailed analysis of the EU ETS dataset, looking in detail at the available data for a wide range of source sectors. The EU ETS has a broader scope in 2008 with more sites now reporting in Phase II of the scheme; analysis of the larger EU ETS dataset has facilitated a greater understanding of the emissions and fuel quality data from EU ETS within each of the constituent countries of the UK.

The allocation of all EU ETS sites to DUKES categories has been conducted and agreed with DECC DUKES.

The UK-wide activity data analysis indicates that there are several source sectors where UK energy allocations within DUKES are recommended to be reviewed in light of the 2008 EU ETS dataset.

Currently the NAEI uses emission factors derived from Tier 3 analysis of fuels in the power station, autogeneration and refineries sectors only. This analysis indicates that for the majority of other sectors

and fuels there are sufficient data inconsistencies and variability to continue to limit the use of EU ETS fuel quality data within the UK GHGI estimates; only a handful of sectors provide data that appear to be consistent and repeatable as to be directly useful to displace the current UK fuel factor defaults.

The limited scope of EU ETS in Phase I (2005 to 2007) means that there is currently an insufficiently large dataset for many industry sectors from which to derive reliable new fuel quality data. It is anticipated that analysis of the 2009 EU ETS dataset will support the further use of emission factors from EU ETS, where 2008 and 2009 analyses show good consistency and reliability.

The main findings of the analysis are that the current data set is still of limited use for improving the UK and DA inventories; for those sources where the EU ETS fuel quality data are consistent across years, and cover a high overall percentage of sector activity, then these data are already being used by the Inventory Agency in the compilation of the UK and DA GHG inventories. It is proposed that when data are available for more years under the Phase II EU ETS scope, this analysis should be revisited and reassessed, to seek out additional fuel quality data that could be integrated into the UK and DA GHG inventories. See table 6.1 for IPCC sector-specific commentary on EU ETS data quality.

The main limitations of the current dataset can be summarised as:

- **Disparity between DUKES and EU ETS sector fuel use totals.** The EU ETS dataset is used by DECC DUKES to help inform the allocation of fuel in the following year's national energy statistics. There are several industrial sectors where large differences are evident in the 2008 fuel allocations within DUKES, compared to the data reported by operators under EU ETS. These DUKES allocations may be revised in the next compilation of DUKES, to reduce these data inconsistencies, and the Inventory Agency has shared this analysis with the DECC DUKES team with such allocation revisions in mind. *Were the detailed EU ETS fuel use data to be provided earlier by EU ETS regulatory agencies to DECC for direct integration into the DUKES compilation system, the DUKES data could show much greater consistency with the EU ETS sector-specific and fuel-specific activity data, thereby reducing data discrepancies between EU ETS and the GHGI. The earlier provision of EU ETS data by EU ETS regulators to DECC DUKES is a matter that was raised within the 2009 DA GHGI Review Report and is being considered by the UK GHGI National Inventory Steering Committee.*

- **Differences in scope and definitions between IPCC sectors and EU ETS reporting.** IPCC reporting requires that a distinction is made between fuel combustion emissions and process emissions, and all emissions from all sources need to be captured. The scope of EU ETS reporting is not always comprehensive, i.e. emissions from some sources on site may be excluded from EU ETS data. Furthermore, the reporting format of the EU ETS does not explicitly separate the GHG emission sources between different activities on site. These scope and reporting limitations make it very difficult to either directly use in, or reconcile the reported data with the IPCC format emissions calculated and presented within the UK and DA GHG inventories.

- **Large differences between the reported emission factors within EU ETS and the inventory**. In order to justify changing from the emission factors currently used within the GHG inventory to factors reported in EU ETS, it is important to ensure that the new factors would be of a higher quality, and more representative of fuels used in the UK, than the current factors. It is not possible to fully assess this when:

    - The reported emission factors are highly variable between operators or across years
    - The data are based on only a limited number of operators using higher tier reporting
    - The data covers only a small proportion of the fuel use within a given sector

    A larger dataset of EU ETS emission factors is needed for the analysis of fuel quality to be taken forward and more EU ETS-derived factors to be used within the UK and DA GHGI.

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1 Introduction

The data analysis and reporting of GHG emission inventories in the UK, both at the national and sub-national level, is increasingly coming under focus for the purposes of energy and climate change policy development, evaluation and appraisal. Part of the challenge is to develop a better understanding of the emission sources that are predominantly impacted by UK-wide emissions trading policies, primarily the EU Emissions Trading Scheme (EU ETS).

In order to support evidence-based policy development within the climate change strategies and programmes implemented by the Devolved Administration Governments of Scotland, Wales and Northern Ireland, it is necessary to develop a more detailed understanding of the scope of the "non-traded" emissions sector (i.e. those emission sources that are not within the EU ETS) and hence better understand the GHG emission sources where devolved policies can have the greatest impact.

Furthermore, within the GHG emission reporting mechanisms that are being developed to meet the data reporting and policy tracking requirements of the Climate Change (Scotland) Act 2009 and the Wales Climate Change Strategy, there is a need to be able to report explicitly on the non-traded sector emissions within each country,

The non-traded sector in the UK is primarily the smaller-scale emitting sites. These are usually sources where comprehensive accurate data on energy use and / or emissions are not available. Emissions from the traded sector are known to a lower uncertainty, since the mechanism for trading requires reporting of detailed emissions, activity and emission factor data. The current approach to deriving the non-traded emission estimates is therefore by difference from the total DA GHG inventory data and the EU ETS emissions data:

Non-traded emissions = total emissions – traded emissions

This research task aims to further improve the detail of analysis of the EU ETS dataset, in order to maximise the usefulness of the EU ETS data within (i) the compilation of UK energy statistics for specific sectors, (ii) the development of UK and DA fuel-specific emission factors within the UK and DA GHG inventories, and hence (iii) the estimation of DA-level traded and non-traded GHG emissions. The split between traded and non-traded emissions now forms part of the compilation of the DA inventories, and it is therefore becoming increasingly important that the split and the data behind the split are accurate, and will stand up to scrutiny.

The work has involved desk-based analysis of the EU ETS data, with particular emphasis on the (now available) 2008 data, in order to support the development of better country-specific inventory data. The research aims to ensure that the consistency of sector-specific data from EU ETS and presented in DUKES is fully understood. It is envisaged that research outputs will be useful to support the production of future DUKES publications, improve data consistency between the EU ETS and the UK GHGI, and lead to more widespread use of EU ETS fuel quality data within the UK and DA GHGI.

1.1 Note on Data Disclosure

The fuel-specific data reported by EU ETS operators are available for use in the compilation of both UK energy statistics (i.e. the compilation of the Digest of UK Energy Statistics - DUKES - by DECC) and the UK GHG inventory (compiled by AEA under contract to DECC). There are legal mechanisms in place to secure and control the use of EU ETS data within these systems.

Note, however, that due to issues of commercial confidentiality we cannot release site-specific details within our analysis of the EU ETS data presented here. Therefore, within this report we have included only generic, anonymous data and limited the detail of reported issues where this may lead to data disclosure (e.g. where only one or two sites within an economic sector are reported within the EU ETS dataset for a given year).

2 Overview

2.1 EU ETS, DUKES and GHGI Data

Under EU ETS, site operators of large industrial plant in the UK report their fuel use and CO_2 emissions to environmental regulators. The data management system includes a data verification step by independent third parties, to check the source data and factors / assumptions (such as fuel-specific Calorific Values and CO_2 emission factors) applied in the derivation of the emission estimates. In the most energy-intensive sectors, there is a requirement on site operators to conduct fuel sampling and analysis in order to determine site-specific fuel quality data, including fuel-specific CO_2 emission factors. This requirement is not applied across all sites and all fuels within a given economic sector; default values for fuel types are provided for sites to use, where the regulators regard the use of defaults as representative.

The fuel-specific data are made available to the team of energy statisticians within DECC, to enable them to use the EU ETS annual fuel use data reported by operators across different industry sectors to inform the development of national energy statistics within DUKES. The fuel quantity and quality data (such as reported calorific values) are available for use by the DECC team. However, due to the limited scope of EU ETS reporting (e.g. not all sites within a given economic sector are included within the scheme), the EU ETS data are of limited use; the EU ETS data are primarily used to inform the de-minimis fuel allocations to each economic sector, with supplementary data from other sources also used by DECC to determine the overall fuel use by sector reported within DUKES.

The DUKES fuel use data are the primary data source used to compile the energy sector emission estimates within the UK GHG inventory. The AEA inventory team also use the EU ETS data directly to inform the CO_2 emission factors that are applied to each of the fuel types evident within the UK energy balance from DECC. In some cases where the EU ETS data are assessed to be good quality, comprehensive and the best available current analysis of fuel quality, then the data from EU ETS fuel analyses are used directly within the UK GHGI compilation. In many sectors, however, there is limited new analysis of fuel quality (i.e. Calorific Values and CO_2 emission factors) and/or the scope of reported data is limited to a small number of sites. In these instances, the EU ETS data may be used as a quality check for other fuel quality data sources that are available and used in the UK GHGI compilation.

There is increasing pressure from the European Commission to work towards greater integration of the EU ETS and national inventory reporting. Hence as the EU ETS data has developed in recent years (i.e. greater scope, more reporting sites, more new fuel analysis data across many sectors), there is an increasing focus on the use of the EU ETS data within national energy statistics and emission inventories.

2.2 Calculating the Non-Traded Sector GHG Emissions

The “non-traded sector” is the component of the economy that is not included within the EU ETS. It is characterised by small-scale industry, commercial, public sector, transport and domestic emission sources. The non-traded sector is also the primary area of main interest for the focus and development of DA Government energy and climate change policy, as the traded sector sites are dominated by the reserved (i.e. UK Government) policy of emissions trading.

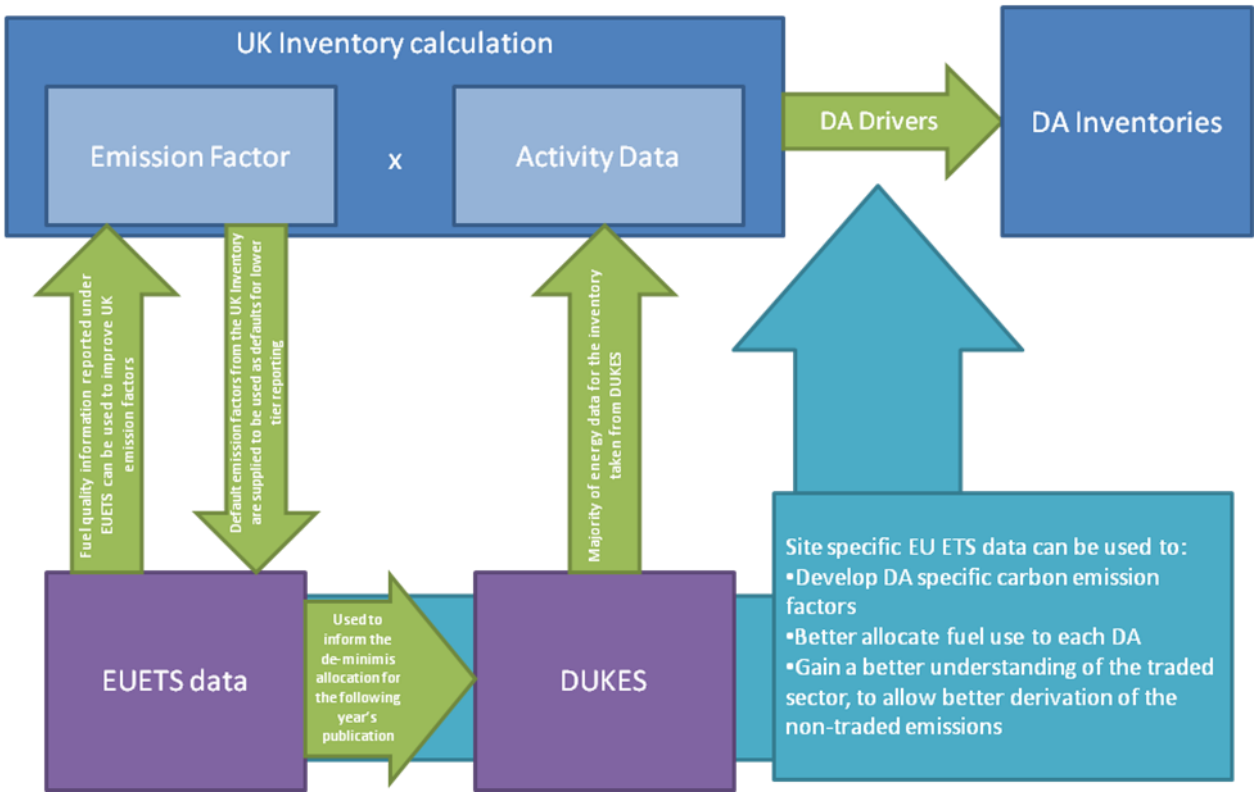
Currently there is no division within UK energy statistics to indicate the fuel-specific allocations to the traded and non-traded sectors. The analysis, therefore, of the non-traded sector emission estimates is determined by difference:

Non-traded Sector CO_2	**=**	**National Inventory CO_2**	**MINUS**	**Traded Sector CO_2**

The EU ETS data are used within the compilation of the “National Inventory CO_2”, and the “Traded Sector CO_2”, and hence indirectly are important to the derivation of the “Non-traded Sector CO_2”.

Figure 2.1 details how the EU ETS data feed into the inventory at a UK level, and the potential for improvements in how the data are used at DA level.

Figure 2.1 Use of EU ETS data in informing the UK and DA inventories



Therefore, by a more complete analysis of the EU ETS fuel use and fuel quality (i.e. CO_2 emission factors) data at UK and DA level, the understanding of the non-traded sector emissions for each DA will be improved.

In this research, we have conducted several tasks to further develop the usefulness and understanding of the EU ETS data:

1) Site and Fuel Allocation

- Allocation of all sites within the 2008 EU ETS data to a DUKES and IPCC sector
- Allocation of all fuels within the 2008 EU ETS data to a DUKES fuel category
- Checked these allocations with the DECC DUKES team

2) Activity Data Analysis

- Compared the sum of EU ETS fuel use against DUKES data for 2008, overall and by sector, for UK only. (Major fuels only: coal, fuel oil, gas, OPG)

3) Fuel Quality Analysis

- Reviewed the EU ETS fuel quality data across different economic sectors, to determine where EU ETS data may be used directly within the compilation of the UK GHGI and the DA GHGI. (Major fuels only: coal, fuel oil, gas, OPG)
- Identification of fuel quality outliers, leading to recommendations for revisions / corrections in EU ETS data, and to assess the overall fuel data quality. Ensuring good data quality is essential where EU ETS data are to be integrated into the GHGI.
- This analysis has been conducted at DA level, to help identify where fuel quality varies across the UK. These data are therefore directly useful in improving the DA GHGI data quality, and hence the analysis of the non-traded sector in each DA.

3 Site and Fuel Allocation

In 2008, many more sites have operated within the EU ETS system, following the cessation of several of the sector-wide Climate Change Agreement opt-outs which limited the inclusion of many sites from energy-intensive sectors during the 2005-2007 EU ETS Phase 1. As a result, the 2008 EU ETS dataset is bigger than the 2005 to 2007 dataset, with many more sites to allocate to economic sectors, and fuels to allocate to DUKES fuel categories.

The AEA inventory team conducted an initial allocation exercise to prepare a first draft of the site and fuel allocations, and this draft has been reviewed by the DECC DUKES team. Several recommendations were made by DECC for revisions to site allocations, and these have been made to the dataset used by AEA within this analysis.

The allocations of sites to sectors and EU ETS fuel records to DUKES fuel categories enables the aggregation of the EU ETS data into economic sectors and fuels aligned with the format used within the UK national energy balances from DECC. The EU ETS sites comprise the most energy intensive sites within a given economic sector, and hence represent a sub-set of the total energy use within each economic sector. In the compilation of DUKES, DECC may use the EU ETS data to provide a de-minimis fuel allocation for the economic sector.

There are several complexities to be addressed within this phase of the research:

- **Site allocation to DUKES economic sectors and IPCC inventory reporting sectors.** The reporting of emissions for an individual installation in EU ETS may cover a range of emission sources on the site. For a majority of sites, the EU ETS emissions can be allocated on a one-to-one basis to a specific economic sector, and the emissions reported are all from fossil fuel combustion sources. In these instances, the allocation of sites to DUKES sectors and the subsequent reporting of emissions to IPCC sectors within the UK and DA GHG inventories is a straightforward decision. However, there are a minority of sites where activities on-site span several economic sectors, and/or where the emissions cover a range of different source types and hence need to be assigned on a one-to-many basis across several IPCC sectors. In such instances, the allocation of emissions to DUKES and IPCC sectors is somewhat uncertain and judgements have to be made. Through checking the site allocations to DUKES sectors with DECC, the AEA team has ensured that our analysis here is on a consistent basis with the use of the EU ETS data within DUKES compilation; this addresses the uncertainty regarding allocation of sites to DUKES sectors. On the inventory reporting issue, it must be noted that for some sites (such as mineral processing sites and iron & steel sites) the EU ETS fuel use and emissions must be allocated across two (or in some cases three) IPCC sectors, for example where there may be both fuel combustion and process emissions of CO_2. This issue cannot be overcome, and it limits the detail of the traded / non-traded analysis, as there is a need to aggregate several IPCC sectors in order to present an accurate picture.

- **Allocation of EU ETS fuels to DUKES fuel categories.** A wide range of fuel names are used by operators within EU ETS, and in many cases the allocation of those fuels to DUKES fuel categories is highly uncertain. The AEA team has confirmed the initial allocation of fuels to DUKES categories with the DECC energy statistics team, but there remains a high degree of uncertainty in some of the fuel allocations. This limits the usefulness of the EU ETS data within DUKES and GHGI compilation. In conducting the initial allocation of EU ETS fuels to DUKES categories, the AEA team has considered: (i) the name used by the site operators, (ii) the implied CO_2 emission factor from the EU ETS data, (iii) the fuel Net Calorific Value reported by site operators within EU ETS, (iv) fuel names and data reported by site operators in other EU ETS years, where time-series inconsistencies in reported data are evident.

To resolve some of these uncertainties, the AEA team has approached the EU ETS regulatory agencies to request further information on specific site activities and reported data. In several cases this has led to the resolution of inconsistent data within the EU ETS data systems.

Note that due to data disclosure issues, it is not possible to present a breakdown of any detailed findings of this exercise here.

4 Activity Data Analysis

This analysis compares the operator-reported fuel use activity data from EU ETS against the sector totals in DUKES, by fuel type. This analysis can only be conducted at UK level as there are no DA energy balances for industrial fuel use. Through comparing the EU ETS and DUKES fuel use data for each economic sector, it should be possible to determine those economic sectors where fuel use (and therefore emissions) is dominated by installations in the non-traded sector, and therefore where DA-specific energy efficiency and emission reductions policies should be focussed.

The detailed fuel use data from the EU ETS regulators is made available for use in energy data compilation during late Spring / early Summer, which is currently too late for use directly within the compilation of energy balances that are published in summer by DECC. This means that the annual EU ETS data (e.g. for 2008) are not available in time for the production of the energy statistics for that year. The EU ETS data will, however, be used to inform the de-minimis fuel allocation for that year in the following year's DUKES publication. Therefore in the tables presented in this section of the report, the 2007 EU ETS data have been used to inform the revised 2007 DUKES estimates (published in 2009), but the 2008 EU ETS data were not available for the 2008 statistics. This leads, in some cases, to an apparent under estimate in the DUKES allocation to the individual sectors in 2008.

During the Phase 1 EU ETS, from 2005 to 2007, several economic sectors had many sites that were opted-out of EU ETS due to pre-existing emissions trading arrangements within sector-wide Climate Change Agreements (CCAs). However, from 2008 onwards the CCA opt-outs have ceased and hence the number of UK installations operating within the EU ETS has increased. Within the analysis conducted here for the years 2007 and 2008, the impacts of the cessation of CCA opt-outs is evident within the fuel data (and emissions) for specific economic sectors, where much greater fuel use and emissions are reported in 2008 (e.g. in the mineral processing sector).

Individual examples are highlighted within the text below.

4.1 Natural Gas

See the table comparing DUKES and EU ETS gas use data for 2007 and 2008, below.

Key points of note:

- In both years, very close agreement is evident between DUKES and EU ETS for the power generation sector;
- There are notable increases in scope of coverage of EU ETS between 2007 and 2008, e.g. within the chemicals sector, minerals sector, paper industry, food & drink sector, iron and steel sector, where much higher fuel consumption is reported within the 2008 EU ETS dataset;
- There is a suspected under-report in DUKES for the minerals sector that warrants further consideration given the high gas use data reported across 2008 EU ETS sites;
- There is a suspected under-report in DUKES for the Other Energy Industry sector. This is evident in both 2007 and 2008 data with the EU ETS total (mainly from large-scale gas compressor sites) higher than the DUKES allocation. Depending on the total number of gas compressor stations, this could be quite a significant under-report. There may be some site allocation errors between this sector and the "oil and gas extraction" sector which could resolve this;
- There is a suspected under-report in DUKES for 2008 for the petroleum refineries sector, although this is not a major gas-consuming sector overall, according to both DUKES and EU ETS. Note that fuel use data are provided directly to DECC from the refiners during the compilation of DUKES;
- The overall coverage of the EU ETS sector in gas use in 2008 is 68%. When Phase 3 of EU ETS commences and sources such as industrial driers and furnaces are then included under the scope of EU ETS, this percentage is likely to increase further, with sectors such as chemicals, food & drink, textiles and leather, iron and steel and non-ferrous metals likely to show increases in gas use within EU ETS.

Table 4.1 Natural Gas Consumption: DUKES and EU ETS, 2007 and 2008 (Mth)

	DUKES Data		EU ETS Data		EU ETS / DUKES %	
Sector	2007	2008	2007	2008	2007	2008
Agriculture	68	74	29	27	43%	37%
Autogenerator	1102	1110	171	193	15%	17%
Chemicals	1255	1227	695	899	55%	73%
Coke manufacture	0	0	0	0	N/A	N/A
Commercial	1226	1295	2	1	0%	0%
Electrical engineering	134	133	1	2	1%	2%
Food, beverages etc.	893	884	273	483	31%	55%
Iron & steel	249	233	72	118	29%	51%
Major power producers	10914	11637	11095	11714	102%	101%
Mechanical engineering	267	264	3	2	1%	1%
Mineral products (bricks & ceramics)	383	378	16	107	41%	144%
Mineral products (cement)			0	0		
Mineral products (glass)			61	247		
Mineral products (lime)			23	59		
Mineral products (other)			57	133		
Miscellaneous	590	616	8	5	1%	1%
Non-ferrous metals	116	113		4	0%	4%
Oil & gas extraction	2228	2123	365	434	16%	20%
Other energy industry	160	146	176	170	110%	117%
Other industries	337	332	62	80	18%	24%
Paper, printing etc.	369	364	16	532	4%	146%
Petroleum refineries	83	64	64	86	77%	133%
Public administration	1518	1614	261	222	17%	14%
Textiles, leather etc.	218	208	2	1	1%	1%
Transport - air	0	0	24	26	N/A	N/A
Transport - rail	0	0	1	1	N/A	N/A
Vehicles	302	295	79	88	26%	30%
Total	**22413**	**23111**	**13554**	**15633**	**60%**	**68%**

4.2 Fuel Oil

See the table comparing DUKES and EU ETS fuel oil use data for 2007 and 2008, below.

Key points of note:

- There are notable increases in scope of coverage of EU ETS between 2007 and 2008, for example within the chemicals sector and food & drink sector where much higher fuel consumption is reported within the 2008 EU ETS dataset;
- The iron & steel allocation within DUKES looks to be low, especially considering that there are likely to be several sites in that sector that are missing from the EU ETS where fuel use in combustion activities may be evident;
- The power sector allocation within DUKES also looks low, and in the UK GHGI additional fuel oil is allocated to the power sector to be consistent with EU ETS data. This may again come down to site allocation decisions, especially considering the high (relative to EU ETS data) allocation of fuel oil within DUKES to “Autogenerators”. In addition, the DUKES allocation to “Other Industries” appears to be high, and this may be due to decisions concerning the allocation of fuel use where CHP units are operated on sites, and the allocation decision could be to either “power generation” or “other industry” (or a specific industry);
- The 2008 DUKES allocation to petroleum refineries looks to be slightly low.

Table 4.2 Fuel Oil Consumption: DUKES and EU ETS, 2007 and 2008 (Mt)

	DUKES Data		EU ETS Data		EU ETS / DUKES %	
Sector	2007	2008	2007	2008	2007	2008
Agriculture	0.010	0.024	0.000	0.000	0%	0%
Autogenerator	0.148	0.180	0.000	0.003	0%	2%
Chemicals	0.096	0.088	0.006	0.051	7%	58%
Food, beverages etc.	0.048	0.051	0.027	0.051	58%	100%
Iron & steel	0.023	0.016	0.030	0.050	132%	317%
Major power producers	0.192	0.364	0.530	0.863	276%	237%
Mineral products (bricks & ceramics)	0.005	0.005	0.000	0.000	5%	0%
Mineral products (glass)			0.001	0.041	N/A	N/A
Oil & gas extraction	0.000	0.000	0.000	0.000	N/A	N/A
Other industries	0.660	0.550	0.000	0.000	0%	0%
Paper, printing etc.	0.036	0.035	0.000	0.000	0%	0%
Petroleum refineries	1.019	0.853	0.963	0.924	95%	108%
Public administration	0.045	0.071	0.015	0.006	33%	9%
Vehicles	0.026	0.025	0.003	0.002	11%	8%
Total	**2.307**	**2.262**	**1.577**	**1.991**	**68%**	**88%**

4.3 Coal

See the table comparing DUKES and EU ETS coal use data for 2007 and 2008, below.

Key points of note:

- In both years, there is very close agreement between DUKES and EU ETS for the power generation sector;
- There are notable increases in scope of coverage of EU ETS between 2007 and 2008, for example within the chemicals sector and paper industry where much higher fuel consumption is reported within the 2008 EU ETS dataset;
- There is a suspected under-report in DUKES for the iron and steel sector which may warrant review within DUKES given the higher coal use data reported within EU ETS and the likelihood that several smaller iron and steel sites do not report to EU ETS and may use coal;
- Whilst individual sector allocations may vary, the overall estimated coverage of coal use by EU ETS is consistently very high for both years. This may indicate that the overall coal allocation to industrial sources is too low within DUKES, as there is strong likelihood that industrial sites not reporting to EU ETS also use coal for operating boilers and within directly-fired production processes.

Table 4.3 Coal Consumption: DUKES and EU ETS, 2007 and 2008 (Mt)

	DUKES Data		EU ETS Data		EU ETS / DUKES %	
Sector	2007	2008	2007	2008	2007	2008
Autogenerator	1.484	1.523	1.242	1.317	84%	86%
Chemicals	0.408	0.410	0.302	0.394	74%	96%
Food, beverages etc.	0.065	0.063	0.030	0.037	47%	59%
Iron & steel	confidential data					
Major power producers	51.03	46.28	51.22	46.33	100%	100%
Mineral products (bricks & ceramics)	1.150	1.150	0.002	0.005	0%	0%
Mineral products (cement)			0.594	0.965		
Mineral products (lime)			0.000	0.061		
Other industries	0.210	0.215	0.000	0.006	0%	3%
Paper, printing etc.	0.151	0.156	0.031	0.146	20%	94%
Public administration	0.144	0.144	0.027	0.025	19%	17%
Total	**54.64**	**49.94**	**53.46**	**49.29**	**98%**	**99%**

4.4 Other Petroleum Gas (OPG)

See the table comparing DUKES and EU ETS OPG use data for 2007 and 2008, below.

Key points of note:

- The 2008 EU ETS data for power station operators indicates that the DUKES allocation may need review;
- The use of OPG on petrochemical sites (often collocated with refineries and oil & gas terminals) indicates that the DUKES allocations may need review;
- EU ETS data indicates much lower use of OPG by autogenerators compared to DUKES; this is most likely to be a site allocation issue where an on-site CHP plant could be argued to be either "autogeneration" or fuel use within an individual economic sector;
- Within EU ETS, a small number of oil and gas terminals report OPG use, and this may need to be reviewed. It is unclear where this use of OPG may be reported elsewhere within DUKES. Historically some estimates for LPG and OPG use in this sector were recorded in DUKES (up to 2002). For the UK GHGI, these EU ETS data may provide a suitable estimate for consideration.
- The data from petroleum refineries and the overall total of OPG use reported in EU ETS compared to DUKES indicates that DUKES under-reports activity for OPG use. This is a matter for further consideration by DECC DUKES and the refinery operators.

Table 4.4 OPG Consumption: DUKES and EU ETS, 2007 and 2008 (Mth)

	DUKES Data		EU ETS Data		EU ETS / DUKES %	
Sector	2007	2008	2007	2008	2007	2008
Autogenerator	117.4	160.3	0.47	3.96	0%	2%
Chemicals	0.000	0.000	103.1	259.0	N/A	N/A
Food, beverages etc.	0.0	0.0	0.0	0.0	N/A	N/A
Major power producers	0.0	0.0	0.0	29.5	N/A	N/A
Oil & gas extraction	0.0	0.0	99.5	71.3	N/A	N/A
Petroleum refineries	987.9	1079.4	1399.2	1473.3	142%	136%
Total	**1105.2**	**1239.7**	**1602.3**	**1837.1**	**145%**	**148%**

5 Fuel Quality Analysis

This part of the analysis has considered:

1. The differences between the emission factors used for higher tier EU ETS reporting and the NAEI;
2. The differences between the emission factors at DA level;
3. The differences between reported emission factors for different years.

Part 1 of this analysis could help to improve the greenhouse gas inventory at UK level, which in turn will lead to improvements in the DA inventories. Where EU ETS data covers the majority of the fuel used in a particular source sector, and the majority of the operators are reporting using higher tier methods (i.e. using plant specific emission factors), then these data can be used to derive an emission factor for this particular source and fuel.

Part 2 considers the difference in emission factors between the DAs. This could be used to derive DA specific emission factors for certain sources and fuels.

Part 3 gives an indication of the variability of the data (although at present, only two years are considered and the scope of reported data in 2007 and 2008 are not consistent). Where there are large year on year differences between reported fuel quality data, the EU ETS data are not used within the UK or DA GHGI compilation.
Since there are often only one or two plants operating in a given sector and reporting under the EU ETS in each of the DAs, it is not possible to present detailed data tables in this sector. However, the discussion below explains the findings of the analysis and presents data where possible.

5.1 Data Processing

In order to compare the emission factor data with the relevant data from the UK inventory, it has been necessary to convert the EU ETS reported data into consistent units. For liquid and solid fuels, the GHG inventory uses carbon emission factors on a mass basis; for gases, emission factors are presented as kt C/Mth (gross). Emission factors reported under EU ETS are expressed in various units, often for the same source and fuel combination, across different operators. It is therefore necessary to convert the data before they are compared with each other, and with the inventory. Other fuel properties (e.g. NCV) are also reported within EU ETS, although detailed analysis of the data has identified quite a number of inconsistent or erroneous data, such as errors in units used.

Therefore, in order to convert the EU ETS emission factors into consistent units for comparison against the NAEI factors, it is necessary to introduce additional assumptions, such as net to gross conversions, or corrections to data that are considered to be incorrect. This additional processing may add some uncertainty to the data analysis set out in this section.

5.2 Natural Gas

5.2.1 UK-wide Analysis

Table 5.1 shows the percentage of reported CO_2 emissions within each sector that are based on tier 3 reporting. This gives an indication of where the EU ETS data can provide new data to the inventory, and the quality of the reported data.

Table 5.1 Percentage of reported gas data based on tier 3 reporting

Sector	2007	2008
Power stations	95%	97%
Gas production	4%	15%
Offshore own gas use	85%	89%
Other industry	40%	31%

The table shows that for power stations and offshore own gas use, the majority of operators are reporting using plant-specific data, and therefore these data could be used to calculate emission factors for the greenhouse gas inventory. For gas production and other industry, a much lower proportion are reporting at tier 3, and therefore these data are less useful; many of the EU ETS operators in these sectors are reporting using default values, and to use the emission factor calculated based on data from a limited number of operators may skew the overall value used for the inventory.

Table 5.2 compares the EU ETS emission factors with the values used in the UK inventory.

Table 5.2 Comparison of EU ETS emission factor with NAEI emission factor (EU ETS/NAEI)

Sector	2007	2008
Power stations	100%	100%
Gas production	*88%*	*100%*
Offshore own gas use	82%	87%
Other industry	*99%*	*103%*

For power stations, the EU ETS emission factors are used within the UK and DA GHG inventories, and therefore there is an agreement between the EU ETS and inventory data. No other EU ETS natural gas factors are used in inventory compilation.

For offshore own gas use, the emission factor used in the inventory is based on EEMS-reported emissions data, and activity data for offshore gas use in DUKES. This approach gives a much higher emission factor than the reported EU ETS emission factor in both years. However, the approach used in the GHG inventory gives a consistent emission when compared with the EEMS data, and the apparent disparity in the emission factors indicated from the table above is more likely to be due to an under allocation of gas use to this source in DUKES. A further complexity here is that the EEMS data (and therefore the NAEI-reported emission factor for this source) includes gas and emissions from a large number of offshore oil and gas sites, which are excluded from the EU ETS data used in this analysis. The data are therefore not directly comparable, but the large difference in reported emission factors warrants further investigation.

For gas production, a very low percentage of the reported data is based on tier 3 reporting, and therefore it is difficult to draw any conclusions from these data. Similarly, for the other industry sectors, the percentage of reported emissions based on tier 3 reporting is low, although it is encouraging to see a good agreement with the inventory emission factors based on these limited data.

5.2.2 DA-specific Analysis

Table 5.3 compares the DA specific emission factors from the EU ETS with the UK average emission factor based on tier 3 reported data. Blank cells indicate that there were no emissions reported using tier 3 data, either because the source does not exist in the specific DA, or because the data are reported using a lower tier method.

Table 5.3 Comparison of DA specific data with UK average (DA emission factor/UK average emission factor)

2007	England	Scotland	Wales	Northern Ireland
Power stations	99.6%	100.8%	101.0%	102.7%
Gas production	100.0%			
Offshore own gas use	102.1%	97.3%		
Other industry	99.9%	100.4%		
2008	**England**	**Scotland**	**Wales**	**Northern Ireland**
Power stations	99.8%	101.1%	100.6%	101.1%
Gas production	96.8%	100.6%		
Offshore own gas use	96.2%	104.5%	87.9%	
Other industry	98.5%	109.1%		

The table shows that for power stations, the carbon emission factor is similar across the DAs, with the largest outlier in Northern Ireland in 2007. Since the allocation of power station emissions to the DAs is based on the reported emissions, the DA inventory fully accounts for these reported variations in the carbon content of the gas.

The data for gas production are more variable, but the limited amount of data available at tier 3 means that this comparison is not as robust as for power stations.

The reported emission factors for offshore own gas use show a variability of up to 5% across the DAs from the UK average EU ETS factor. Section 5.1.1 discusses how the emission factor for the GHG inventory is developed. Since the DA inventories are based on the reported emissions (and not activity data), the apparent variability in the gas emission factor is accounted for in the inventory. Since the quality of upstream gas is inherently variable, the differences in the reported emission factors for this sector are to be expected.

For the other industry sector, the reported natural gas CO_2 emission factor for Scotland in 2008 is 9% higher than the UK average EU ETS factor, which is higher than the emission factor currently used within the GHG inventory for this source and fuel. However, since the majority of emissions reported for this source do not use plant-specific data, the interpretation of these data is limited. Point source emissions data is used in the allocation of emissions from this sector to the DAs (in addition to an area source allocation of fuel) and so the variability in the gas carbon emission factor for larger sources (where reported) is reflected in the inventory, although the area source component is based on the UK average emission factor.

Table 5.4 compares the 2008 reported emission factors with the data for 2007 (this comparison can only be made where emission factors are available for both years). The data for power stations is very consistent across the two years, but the data across other sectors is much more variable, most notably for Scotland. This could be an indication of low data quality; this will be clearer once the 2009 data have been collated and analysed.

Table 5.4 Comparison of 2008 reported emission factor for natural gas with 2007

2008/2007	England	Scotland	Wales	Northern Ireland	UK Average
Power stations	100%	101%	100%	99%	100%
Gas production	110%				113%
Offshore own gas use	100%	114%			106%
Other industry	101%	111%			102%

5.3 Fuel Oil

5.3.1 UK-wide Analysis

Table 5.5 shows that a high percentage of operators are reporting at tier 3 level in 2008 for power stations and refineries. For 2007, and for other industry, a much lower proportion are reporting at this level, and therefore the data are less useful to the greenhouse gas inventory.

Table 5.5 Percentage of reported fuel oil data based on tier 3 reporting

Sector	2007	2008
Power stations	68%	92%
Refineries	79%	91%
Other industry	20%	18%

Table 5.6 compares the EU ETS emission factors with the values used in the UK inventory. The emission factors for power stations and refineries are already incorporated into the UK inventory and therefore there is a good agreement between the two data sources. For the “other industry” sector,

the proportion of sites reporting using tier 3 methods is too low for the data to be used within the inventory, but the reported emission factors are close to the GHG inventory defaults anyway.

Table 5.6 Comparison of EU ETS emission factor with NAEI emission factor (EU ETS/NAEI)

Sector	2007	2008
Power stations	*100%*	100%
Refineries	*100%*	100%
Other industry	*98%*	*99%*

5.3.1 DA-specific Analysis

Table 5.7 compares the DA specific emission factors with the UK average. For fuel oil, this analysis shows that the reported data are relatively consistent with each other and close to the UK average – there is not much variation between the DAs. The largest outlier is only 1.5% lower than the UK average. The small variations in the emission factors for power stations and refineries are directly accounted for within the DA inventories since the DA disaggregation is based on the split of reported emissions data.

Table 5.7 Comparison of DA specific data with UK average (DA emission factor/UK average emission factor)

2007	England	Scotland	Wales	Northern Ireland
Power stations	100.0%	100.5%	99.4%	99.6%
Refineries	100.0%		99.9%	
Other industry	100.0%			
2008	**England**	**Scotland**	**Wales**	**Northern Ireland**
Power stations	100.0%	100.2%	99.9%	101.3%
Refineries	100.8%	98.5%	100.3%	
Other industry	100.0%			

Table 5.8 compares the reported emission factors across years, and this indicates quite consistent reporting across 2007 and 2008.

Table 5.8 Comparison of 2008 reported emission factor for natural gas with 2007

2008/2007	England	Scotland	Wales	Northern Ireland	UK Average
Power stations	100%	99%	100%	102%	100%
Refineries	100%		100%		99%
Other industry	101%				101%

5.4 Coal

5.4.1 UK-wide Analysis

Table 5.9 shows that almost all reported emissions from coal combustion under the EU ETS in the sectors highlighted are based on tier 3 reporting requirements. These data may therefore provide useful information to the inventory.

Table 5.9 Percentage of reported coal data based on tier 3 reporting

Sector	2007	2008
Power stations	100%	100%
Other industry	99%	94%
Autogenerators	100%	100%
Cement	100%	100%

Table 5.10 compares the EU ETS emission factors with the values used in the UK inventory.

Table 5.10 Comparison of EU ETS emission factor with NAEI emission factor (EU ETS/NAEI)

Sector	2007	2008
Power stations	100%	100%
Other industry	95%	93%
Autogenerators	100%	100%
Cement	103%	99%

For power stations and autogenerators, the emission factor from EU ETS is already incorporated into the greenhouse gas inventory. For cement, fuel specific emission factors are supplied for the inventory by the BCA. This is a more comprehensive dataset, covering the whole of the UK cement industry, and is therefore considered more appropriate for use within the inventory than any data derived from the EU ETS.

For the other industry sector, the inventory emission factor is based on the 2004 Carbon Factors Review[1], scaled annually to account for changes in the average fuel GCV (taken from DUKES). This analysis of the EU ETS data indicates that the reported emission factors are lower than the inventory value. There may be potential to include data from this analysis in the inventory in future years.

5.4.2 DA-specific Analysis

Table 5.11 compares the DA specific emission factors from the EU ETS with the UK average emission factor based on tier 3 reported data.

Table 5.11 Comparison of DA specific data with UK average (DA emission factor/UK average emission factor)

2007	England	Scotland	Wales	Northern Ireland
Power stations	100.0%	98.2%	105.2%	100.8%
Other industry	99.1%	110.1%		98.4%
Autogenerators	100.0%			
Cement	101.3%		92.2%	100.4%
2008	**England**	**Scotland**	**Wales**	**Northern Ireland**
Power stations	99.6%	98.6%	105.8%	101.0%
Other industry	103.4%	93.8%		94.7%
Autogenerators	100.0%			
Cement	99.4%	108.5%	98.2%	101.3%

The table shows that the reported emission factors for coal are vary up to 6% from the average UK factor. For power stations, the emission factor for coal in Wales is significantly higher than the UK average, and the data for Northern Ireland shows a lower emission factor for other industry in 2007 and 2008. The high value for coal in Wales is to be expected since some of the power stations located there were designed to burn the local low-volatility coals, and coals of this type would have higher carbon content than the coals burnt at other UK power stations. This variability is fully accounted for within the DA inventories, since the DA disaggregation is based on the reported emissions data from power stations.

The Scottish emission factors are highly variable across the sectors and across the years (also illustrated in Table 5.12), for example the emission factor for “other industry” ranges from 10% higher than the UK average in 2007 to 6% lower in 2008. This could indicate actual variations in the fuel quality, but it may also be an indication of the variability in scope and accuracy of the EU ETS fuel analysis across the sector. These data are not used within the compilation of the UK and DA GHGI, as it is uncertain whether the data are representative of coal used across the DAs; analysis of the 2009 data may provide a larger dataset to help to derive more information on DA-specific coal quality in these industry sectors.

The emission factors reported for cement are also variable, with a 10-11% difference between the highest and lowest DA specific value reported in each year. This might be due to allocation issues between process and fuel based emissions (the clinker production emission factors for 2007 all appear to be incorrect), or due to fuel blends being reported as coal. This limits the usefulness of these data.

Table 5.12 compares the 2008 reported emission factors with the data for 2007. The data for power stations is very consistent across the two years, but the data across other sectors is much more variable, most notably for other industry in Scotland, where the emission factor in 2008 is 17% lower than the reported value for 2007. Once the 2009 data have been collated and analysed, we will have a clearer understanding of the data variability and factors that affect reliability of the data for use in the inventory.

Table 5.12 Comparison of 2008 reported emission factor for natural gas with 2007

2008/2007	England	Scotland	Wales	Northern Ireland	UK Average
Power stations	99%	100%	100%	100%	100%
Other industry	102%	83%		94%	97%
Autogenerators	98%				98%
Cement	97%		105%	100%	99%

5.5 Other Petroleum Gas (OPG)

The analysis of OPG data in the EU ETS has focussed on reporting from refineries, offshore own gas use, and other industry.

The analysis of the refineries data indicates that the reporting was highly variable. Some data were identified as outliers and were removed from the DA specific analysis. The proportion of operators reporting at Tier 3 level is also relatively low (69% and 82% in 2007 and 2008, respectively). These two issues limit the usefulness of these data for the inventory. However, further analysis should be considered, since the nature of the fuel is variable and therefore up-to-date, plant-specific data ought to lead to improvements in the inventory where good data quality can be assured.

The greenhouse gas inventory includes an estimate for emissions from OPG use at oil terminals, allocated to the source “Gas Separation Plant” (rather than “Own Gas Use”); since 2002 there has been no activity data within DUKES for this source, but within the NAEI an annual estimate for OPG by terminals has been made. The EU ETS data supports that assumption in the NAEI and in fact provides a de-minimis fuel use estimate which could be used as a basis for future NAEI emission estimates. Within the EU ETS returns, more than 99% of operator reported emissions use tier 3 reporting methods, and therefore this data could be a useful supplement to the EEMS dataset.

For the other industry sector, more than 87% of the reported emissions are reported at tier 3 level, and the UK average emission factor from the EU ETS reporting is 22% lower than the GHG inventory value in both 2007 and 2008, which indicates that the GHG inventory value may be too high.

At DA level, the data are variable across the DAs, and across the years. For example, the highest reported DA specific emission factor for other industry in 2007 is 19% higher than the lowest. This could be either an indication of the variable quality of the fuel, or of the reporting (especially considering the outliers highlighted above). It would therefore be useful to consider the 2009 data before drawing any firm conclusions.

5.6 Other Fuels and Points of Note

- Fuels reported in EU ETS but not in DUKES:
    - The EU ETS dataset includes emissions of CO_2 from OPG consumption at oil terminals, anthracite consumption in iron and steel (combustion), and process gas, waste solvents and waste derived fuels in other industries. These are currently not explicitly included in the GHG inventory. The data on process gases and waste

solvent are potentially useful for comparison against data supplied directly by specific industries (such as the cement industry) and considered for use in the GHGI.

- Clinker production:
    - The implied emission factors from the EU ETS dataset for clinker production in 2007 indicate that some of the underlying data are of dubious quality. It is not clear whether the data are reported incorrectly, or if there is an allocation issue between process and fuel combustion emissions. Note however that the British Cement Association provide comprehensive data to the GHGI team annually and hence this apparent EU ETS data glitch is not a high priority to resolve.

- Blast furnace gas and coke oven gas data are not directly comparable (EU ETS v GHG Inventory) due to the use of a mass balance approach in the NAEI:
    - The EU ETS fuel quality data provides a useful new data input for consideration in future revisions to the GHG Inventory mass balance method.

- Reporting of fuel blends:
    - Some sites report data for fuel blends (e.g. coal and petroleum coke), which limits the usefulness of the data for emissions inventory purposes.

6 Conclusions

This research has enabled a more detailed analysis of the EU ETS dataset, looking in detail at the available data for a wide range of source sectors. The EU ETS has a broader scope in 2008 with more sites now reporting in Phase II of the scheme; analysis of the larger EU ETS dataset has facilitated a greater understanding of the emissions and fuel quality data from EU ETS within each of the constituent countries of the UK.

The allocation of all EU ETS sites to DUKES categories has been conducted and agreed with DECC DUKES. Furthermore, the review of EU ETS sector fuel allocations and comparisons against DECC DUKES fuel allocations has been shared with DECC and the research findings may lead to some revisions of fuel allocations in the next edition of DUKES. The research may therefore lead to improvements in the consistency between EU ETS, UK energy statistics, the UK and DA GHG inventories; these data improvements will be evident within the 1990-2009 GHGI cycle. As outlined within Section 4, some of these revisions may lead to large changes in fuel allocations to specific industries, and the DA GHG inventories will be improved where data discrepancies are reduced. For example, the OPG allocation to refineries, if revised within DUKES, will impact on the 2007 and 2008 emission totals from refineries across Scotland, Wales and England,

The DA-specific data from the EU ETS will be used directly within the compilation of the DA GHGI for many of the highest emitting sectors, and the further review and application of emission factors from EU ETS will continue to improve the overall quality of the DA and UK GHG inventories; for source sectors where the EU ETS data are assessed as providing consistent, reliable fuel quality data for use in inventory compilation, then the emissions in the DA inventories will be consistent with the DA-specific implied emission factors, to ensure that the DA inventories are representative of the fuel analysis conducted through EU ETS. However, this research has shown that for several sources and fuels where EU ETS may be expected to deliver good quality consistent data, there remain some uncertainties due in part to the limited scope of tier 3 fuel analysis.

The UK-wide activity data analysis indicates that there are several source sectors where UK energy allocations within DUKES are recommended to be reviewed in light of the 2008 EU ETS dataset. Where the DUKES fuel allocations can be resolved to be more consistent with EU ETS, then this will enable improvements to sector emission allocations within the UK and DA GHG inventories and improvements to the traded and non-traded emissions data at UK and DA level.

There remain some problems regarding the division of emissions across different IPCC sectors within GHGI reporting, where activities on a specific site cover a range of sources that are allocated to different IPCC sectors, so there will remain some need for an aggregated presentation of the traded / non-traded split for some IPCC sectors.

Currently the NAEI uses emission factors derived from Tier 3 analysis of fuels in the power station, autogeneration and refineries sectors only. This analysis indicates that for the majority of other sectors and fuels there are sufficient data inconsistencies and variability to continue to limit the use of EU ETS fuel quality data within the UK GHGI estimates; only a handful of sectors provide data that appear to be consistent and repeatable. In order that EU ETS fuel quality data is considered for use within the UK and DA GHGI compilation, a larger dataset is needed that provides strong evidence that the EU ETS data are representative of fuel quality across the DAs.

The limited scope of EU ETS in Phase I (2005 to 2007) means that there is currently an insufficiently large dataset for many industry sectors from which to derive reliable new fuel quality data. It is anticipated that analysis of the 2009 EU ETS dataset will support the further use of emission factors from EU ETS, where 2008 and 2009 analyses show good consistency and reliability.

The table below indicates the key findings of the analysis of the EU ETS data to 2008, by IPCC sector:

Table 6.1 Summary of EU ETS Data Analysis for Key IPCC Sectors

IPCC Sector	Research Findings	Next Steps
1A1a Power generation	Comprehensive, consistent, good quality data. Activity data are consistent with DUKES. EUETS emission factors are used within UK and DA GHGI compilation for all major fuels.	Repeat the analysis for the 2009 EU ETS data when it becomes available. Maintain use of EU ETS data within inventory compilation.
1A1b Refineries	Most EU ETS data appear to be good quality and consistent. Some sites have been identified where data quality are poor. OPG activity data from EU ETS are much higher than the allocations presented in DUKES.	Activity data analysis provided to DECC for consideration within the compilation of DUKES. Repeat the analysis for 2008 and extend to 2009 EU ETS data once the next issue of DUKES is available. Review use of EU ETS emission factors within GHGI, following 2009 EU ETS data analysis.
1A1c Other Energy Industries	The natural gas data for all sources show reasonable consistency. The EU ETS data is consistent with the underlying EEMS data used in the GHG inventory as regards fuel CO_2 factors, but the EU ETS activity data indicates that the DUKES allocation of gas use in this sector should be reviewed. The EEMS data does not present any discrete data on consumption of LPG and OPG, whereas a handful of oil & gas terminals do report OPG use via EU ETS.	Activity data analysis provided to DECC DUKES. Review activity data consistency within the 2009 EU ETS dataset once the next edition of DUKES is available. Review allocation of LPG/OPG use within the GHGI. Review fuel quality data from EEMS and EU ETS.
1A2f Other industry	EU ETS emission factors are highly variable for most fuels and are not considered to be reliable and representative of fuel use across the DAs, and hence are not used in the GHGI. The 2008 Scotland factor for natural gas is very high and is not consistent with most other gas quality data; these data have been disregarded. Similarly, the Scottish data for gas oil are highly variable between 2007 and 2008, and we await the 2009 dataset to determine whether more consistent data will become available in future for consideration for use in the GHGI. Activity data analysis indicates that EU ETS fuel allocations compare poorly with DUKES data for sectors such as chemicals, minerals, paper, food and drink.	EU ETS emission factors not used directly in GHGI compilation. Repeat analysis on the 2009 EU ETS dataset and review the usefulness of EU ETS emission factors. Activity data analysis provided to DECC DUKES. Review activity data consistency within the 2009 EU ETS dataset once the next edition of DUKES is available.

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