

# **Appendix 7**

## **The DA GHGI Improvement Programme 2010-2011: Industry Sector Task**

## A7.1 Introduction

This research has been commissioned under the UK and Devolved Administration (DA) Greenhouse Gas (GHG) inventory improvement programme, and aims to continue to research emissions data for a group of source sectors and specific sites where uncertainties have been identified in the scope and accuracy of available source data. This research follows on from similar work carried out in 2009/2010 (AEAT/ENV/R/2990\_3 /Issue 1). This research aims to review site-specific data and regulatory information, to resolve differences between GHG data reported across different emission reporting mechanisms.

The compilation of UK, DA and Local Authority (LA) GHG emissions inventories utilises a range of available data sources on energy and emissions from different industries and sites:

- Site-specific annual CO<sub>2</sub> emission estimates are reported by operators under the EU Emissions Trading Scheme (EU ETS), regulated by the Environment Agency, Scottish Environment Protection Agency (SEPA), Northern Ireland Environment Agency (NIEA) and the Department of Energy and Climate Change (DECC) Oil & Gas team. EU ETS submissions also include details of fuel-specific quantities and qualities used on each site on an annual basis; whilst these data are not publicly available, they are used in UK and DA GHG Inventory compilation;
- Site-specific annual emission estimates of a wide range of pollutants including CO<sub>2</sub>, other Greenhouse Gases (GHGs) and air quality pollutants are reported to regulators under Integrated Pollution Prevention and Control regulations (IPPC)<sup>1</sup>, and data are publicly available from the regulator inventories such as the Pollution Inventory (PI), Scottish Pollutant Release Inventory (SPRI) and Northern Irish Inventory of Sources and Releases (ISR). For each site, an annual estimate of total emissions (i.e. from all sources and activities cited within the installation IPPC authorisation permit) for each pollutant is submitted to the environmental regulator inventories. Where a site permit may cover a range of combustion, process and other emission sources, the IPPC data are not transparent as to the split of emissions from different sources on site;
- Site-specific, source-specific annual emission estimates of CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, NO<sub>x</sub>, CO, NMVOC, SO<sub>2</sub> and F-gases are available from the Environmental Emissions Monitoring System (EEMS) for oil and gas installations, regulated by the DECC Oil & Gas team. This system covers emissions from offshore and onshore installations, although the onshore oil and gas terminal only report voluntarily under EEMS, as they are also regulated under IPPC and hence report their annual emissions (aggregated by site rather than by source) to the PI, SPRI and ISR;
- Further details of emission estimates used within the NAEI/GHGI are compiled through direct consultation with specific process operators and trade associations, where greater detail is needed to allocate emissions to a specific source within an installation;
- Annual energy consumption statistics are available from the EU ETS (by site, as noted above, and not in the public domain), and from national energy statistics, published in DUKES (aggregated by economic sector).

From review of the emissions data it is apparent that there are inconsistencies in the different reporting mechanisms for some industry sectors and specific sites, but the reasons for these inconsistencies are not fully understood. It has been identified that there is uncertainty,

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<sup>1</sup> The IPPC Regulations are for many sites in the process of being superseded by the Environmental Permitting Regulations (EPR). In this report we have predominantly referred to "IPPC" as most of the existing permits that we have accessed are based on the IPPC regulations.

regarding any overlaps or gaps in energy and emissions data reported under the different reporting mechanisms. These uncertainties in scope of the reported data impair the accurate compilation of point source emissions data which is used to underpin DA and LA inventories; these data uncertainties for some high-emitting industrial sites will primarily affect the Scottish and English GHG inventories and the Local Authority CO<sub>2</sub> data where the sites are located.

Since the inception of the EU ETS in 2005, the AEA inventory team has conducted limited research into the data consistency between IPPC and EU ETS, and good progress has been made to improve the understanding and inventory application of data from the iron and steel and power industries. In the 2009/10 improvement task other industries such as oil and gas production, oil refining, and petrochemicals was carried out that improved the inventory quality improving the accuracy of emission estimates within UK, DA and LA emission inventories.

This research aims to collate the necessary information to enable improvements in inventory data quality to be achieved focusing on a wide range of individual processes that are in the following sectors:

- Food and drink
- Ferrous metals industry
- Chemical production
- Gas production
- Paper and processing

### ***Note on Data Disclosure***

The fuel-specific data reported by EU ETS operators and the EU ETS site scope details are not publicly available. However, this information is made available for use in the compilation of both UK energy statistics (i.e. the compilation of the Digest of UK Energy Statistics 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. Due to issues of commercial confidentiality, the site-specific details from analysis of the EU ETS data cannot be presented in this report.

## **A7.2 Research Approach**

The study team collected and analysed reported information specifically from IPPC and EU ETS reporting mechanisms. The aim was to explore the available information on reporting scope and plant design.

The study team consulted with:

- Environment Agency, SEPA and NIEA contacts (industry sector leads, registry staff, permit administrators for IPPC and EU ETS)
- A number of individual site Process Engineers or Site Inspectors, to clarify specific data reporting scope details

A large part of the work has involved communication with environmental regulators, most notably the IPPC permit registry teams within local offices of the Environment Agency, SEPA and NIEA to obtain permit and application documentation through a combination of emailed electronic files.

An initial scoping analysis compared the available site CO<sub>2</sub> emissions data between IPPC, EU ETS and EEMS (for sites reporting to EEMS) to identify the priority sites where greatest data discrepancies were evident. A review of the AEA point source database assisted in the identification of priority sites in England, Wales, Scotland and Northern Ireland.

The analysis involved a comparison of reported emissions from each site together with review of the available permits and information on emission reporting scope under IPPC and EU ETS. This work has enabled the assessment of the scope of emissions data, relationships between different data reporting mechanisms and allocation of emissions to inventory sources to be based on much more detailed understanding of activities on each site whereas in the past these data sources have not been used and there has been reliance on limited information sources along with “expert judgement”.

Where data discrepancies were identified and not resolved through direct comparison of the available information, the study team consulted with the environmental regulators for IPPC, EU ETS to seek clarifications on correct interpretation of the data, to resolve inconsistencies and determine accurate emission allocations by site.

The aim of the analysis was to ensure that each site is correctly assigned to IPCC source sectors within the AEA point source database, understand where emissions from different sources are aggregated (e.g. where waste water treatment emissions are included within emission estimates) and minimise the risks of gaps and double-counts within emission inventories.

The information collected under this and previous improvement tasks will continue to be useful across several different areas of work under the NAEI work programme; the data gathering phase has enabled us to cost-effectively collate information that has applications across other inventory outputs such as the UK Air Accounts, mapping of emissions, energy and heat, and the Pollution and Climate Mapping research for DECC and Defra.

## A7.3 Overview of Emission Reporting Mechanisms

High emitting industrial sites in the UK are regulated under a range of mechanisms; annual pollutant emission estimates from such installations may be reported under Integrated Pollution Prevention and Control (IPPC) and the EU Emissions Trading System (EU ETS).

A summary of these different reporting mechanisms is shown below.

**Table A7.1 Overview of IPPC, EU ETS**

	IPPC (SPRI/PI/ISR)	EU ETS
Legal basis	IPPC Directive enabled by The Pollution Prevention and Control (PPC) Act 1999 and the Pollution Prevention and Control (Scotland) Regulations 2000. The Regulations specify the types of activities covered by the Regulations and the procedures that must be applied when regulating these activities.	UK regulations require all installations carrying out any activity listed in Schedule 1 to hold a greenhouse gas emissions permit. The conditions of the permit require installations to monitor and report emissions in accordance with the monitoring plan approved by the regulator agencies (EA, SEPA, NIEA, DECC).

	IPPC (SPRI/PI/ISR)	EU ETS
Air Emissions (reportable substances)	Dependant on permit conditions, but may include a very wide range of pollutants, often including: CO <sub>2</sub> , NO <sub>x</sub> , SO <sub>2</sub> , CO, PM <sub>10</sub> , NH <sub>3</sub> , CH <sub>4</sub> , NMVOCs, N <sub>2</sub> O, heavy metals, speciated VOCs, fluorinated gases, PAHs, dioxins and furans, HF, HCl	CO <sub>2</sub> (the scheme may be expanded in future to include emissions of other GHGs)

## A7.4 IPPC Permits

IPPC permits include a breakdown of the different emission sources on site, such as combustion units (boilers, engines), flares, vents, process activities, waste and water treatment facilities, materials storage, transfer and handling facilities. The information most commonly of interest includes the breakdown of combustion units on site, the main fuel sources used within each unit and any emissions abatement equipment information that may be included in the permit.

To understand the scope and detail of the IPPC installations is extremely useful for the development of the UK inventories, as it (i) enables inventory compilers to make more informed decisions regarding emissions data (e.g. dealing with time-series inconsistencies, making judgements on source allocation issues, assessing likely impacts of new policy initiatives / legislation), and (ii) provides evidence for dealing with enquiries from inventory review teams, for example where the completeness of the UK inventory is questioned.

The IPPC permit information has been collected for the sites detailed in Table A7.2 to Table A7.4.

All of the IPPC permit documents for the processes detailed in Tables A7.5 to A7.8 were reviewed and summary information tabulated, to determine:

- Scope of licenses, details of combustion units/processes, thermal outputs, whether carbon is released, fuels used along with other process unit information (design and capacity).

**Table A 7.2 IPPC Documents for Sites Regulated in England and Wales by the Environment Agency (EA)**

Site Name	IPPC Permit Reference
<b>England</b>	
Aylesford Newsprint Limited	BJ7336IL
Aylesford Newsprint Limited	BJ7344IP
BP Chemicals Limited	BJ8162IR
Brunner Mond (UK) Limited	SP3430BF
Brunner Mond (UK) Limited	SP3630BE
Grain LNG Limited	BV5572IB
Huntsman Petrochemicals UK Limited	BU4503IW
Huntsman Petrochemicals (UK) Limited	BS3590IE
INEOS Chlor Limited	BS5428IP
Kemire Growhow UK Limited	BS5347IJ
Thame Steel Limited Sheerness Steel works	BU5224IV
Tioxide Europe Limited	TP3532PK
<b>Wales</b>	
Celsa Manufacturing UK Limited	BV0767IT
Celsa Manufacturing UK Limited	TP3639BH
Corus UK Limited	BS3905IP
Corus UK Limited	BR7321IK
Dragon LNG Limited	AP3136UA
South Hook LNG Terminal Company Limited	XP3538LD

**Table A7.3 IPPC Documents for Sites Regulated in Scotland by SEPA**

Site Name	IPPC Permit Reference
Diagio Distilling Group	PPC-A-1000157
ExonMobil	PPC/A/1013494
INEOS Manufacturing Scotland Limited	PPC/A/1013141
Superglass Insulation Limited	PPC/E/20021
UPM-Kymmene (UK) Limited	PPC/E/20002
William Grant and Sons Distillers Limited	PPC-A-1003144

**Table A7.4 IPPC Documents for Sites Regulated in Northern Ireland by the NIEA**

Site Name	IPPC Permit Reference
Dale Farm	P0094/05A
Investa UK Textiles	P129/06A
Moy Park Limited	P0080/05A
Quinn Glass	P0053/04A

**Table A7.5 Process Information collected (England)**

Operator	Reference	Brief description of process	Carbon from combustion	Carbon from processes	Number of combustion plant	Combustion Processes Information	Fuel Information
<b>England</b>							
Aylesford Newsprint Limited	BJ7336IL	Production of newsprint from waste paper and associated processes.	yes		1	Flares/Incinerators	Waste derived fuels
Aylesford Newsprint Limited	BJ7344IP	CHP Plant	yes		2		Coal
BP Chemicals Limited	BJ8162IR	Acetic Acid, acetic anhydride and associated oxygenated organic chemicals production	yes	possibly	5	Boilers and Flares/Incinerators	Natural gas and waste solvents
Brunner Mond (UK) Limited	SP3430BF	Sodium Carbonate Manufacturing Site and Solvay Ammonia Production Process		possibly		Boilers	
Brunner Mond (UK) Limited	SP3630BE	Sodium Carbonate Manufacturing Site and Solvay Ammonia Production Process		possibly		Boilers	
Grain LNG Limited	BV5572IB	LNG processing plant	yes		10	Boilers	Natural gas and fuel oil
Huntsman Petrochemicals UK Limited	BU4503IW	Aliphatic and aromatic hydrocarbon production principally from naphtha	yes	possibly	7	Boilers and Flares/Incinerators	Natural gas and fuel oil
Huntsman Petrochemicals (UK) Limited	BS3590IE	Olefins production plant from naphtha as a feedstock (also flexibility to use propane and butane)	yes		29	Boilers and Flares/Incinerators	Natural gas
INEOS Chlor Limited	BS5428IP	Manufacturing of Chlorine based chemicals through the initial electrolytic decomposition of Salt	yes	no	1	Boilers	Natural gas
Kemire Growhow UK Limited	BS5347IJ	Ammonia Fertilisers and Chemicals production	Yes	Yes	3	Boilers	Natural gas and fuel oil
Thame Steel Limited Sheerness Steel works	BU5224IV	Electric Arc Furnace and hot roll mill	Possibly	yes		Furnaces	
Tioxide Europe Limited	TP3532PK	Titanium Oxide production plant		possibly	4	Boilers	Natural gas

**Table A7.6 Process Information Collected (Wales)**

Operator	Reference	Brief description of process	Carbon from combustion	Carbon from processes	Number of combustion plant	Combustion Processes Information	Fuel Information
<b>Wales</b>							
Celsa Manufacturing UK Limited	BV0767IT	Furnace processing ferrous metals and alloys serving hot rolling mills	yes			Drying Processes	Natural gas and fuel oil
Celsa Manufacturing UK Limited	TP3639BH	Production melting and refining of steel billet using electric arc furnace and melting ferrous scrap		yes	2	Furnaces	
Corus UK Limited	BS3905IP	Hot rolling of steel delivered to the plant	yes		9	Boilers and Flares/Incinerators	Natural gas and fuel oil
Corus UK Limited	BR7321IK	Steel, coating, galvanising and finishing processes	yes		11	Boilers and Flares/Incinerators	Natural gas
Dragon LNG Limited	AP3136UA	LNG processing for entry of natural gas into UK network and use of natural gas to produce electricity	Yes	No	13	Boilers, Gas Turbines and Flares/Incinerators	Natural gas and waste derived fuels
South Hook LNG Terminal Company Limited	XP3538LD	LNG processing plant	yes		24	Flares/Incinerators and Drying processes	Natural gas and fuel oil

**Table A7.7 Process Information collected (Scotland)**

Operator	Reference	Brief description of process	Carbon from combustion	Carbon from processes	Number of combustion plant	Combustion Processes Information	Fuel Information
<b>Scotland</b>							
Diagio Distilling Group	PPC-A-1000157	Distillery	Yes	Yes	3	Boilers, Drying Processes	Gas oil and natural gas
ExonMobil	PPC/A/1013494	Ethylene Processing Plant, Fife	Yes	yes	17	Boilers, Gas Turbines, Drying processes and Flares/Incinerators	Natural gas, fuel oil, gas oil and process gases
INEOS Manufacturing Scotland Limited	PPC/A/1013141	Oil Refinery	Yes	yes	13	Boilers, Gas Turbines and Flares/Incinerators	Fuel oil, natural gas and process gases
Superglass Insulation Limited	PPC/E/20021	Manufacture of glass fibre	Yes	No	2	Drying Processes	Natural gas, fuel oil, gas oil and process gases
UPM-Kymmene (UK) limited	PPC/E/20002	Paper and Pulp manufacturer	Yes			Boilers	Natural gas, wood, coal, fuel oil
William Grant and Sons Distillers Limited	PPC-A-1003144	Distillery	Yes	Yes	5	Boilers and Gas Turbines	Gas oil and natural gas

**Table A7.8 Process Information collected (Northern Ireland)**

Operator	Reference	Brief description of process	Carbon from combustion	Carbon from processes	Number of combustion plant	Combustion Processes Information	Fuel Information
<b>Northern Ireland</b>							
Dale Farm	P0094/05A	Processing of milk into skimmed milk powder or cheese. Treating and processing milk	Yes	Possibly	12	Boilers, Drying Processes	Natural gas and fuel oil
Investa UK Textiles	P129/06A	Lycra/textiles production	Yes	No	3	Boilers	Coal, fuel oil
Moy Park Limited	P0080/05A	Poultry processing	yes	possibly	9	Boilers	Fuel oil and LPG
Quinn Glass	P0053/04A	Manufacture of glass containers for the food and beverage industries.	yes	Possibly	1	Drying Processes	Fuel oil and gas oil

## A7.5 Results

This work has led, together with other information, to changes in the interpretation of site-specific carbon emissions data for all regions of the UK, leading to significant revisions to point source data available for use in UK, DA and local inventories. Below is an analysis of the impact of changes made by region, emission source, and fuel categories.

### A7.5.1 Regional Emissions

Total carbon emissions, and changes in emissions between the data set available last year, and the current data set are shown below.

**Table A7.9 Total Carbon Emissions by DA**

Region	Year	Data last year, ktonnes	Data this year, ktonnes	Net change, ktonnes
England	2005	58,568	58,376	-192
	2006	58,878	58,600	-278
	2007	59,846	59,574	-272
	2008	56,652	56,393	-259
Scotland	2005	7,147	7,097	-50
	2006	8,292	8,206	-86
	2007	7,280	7,221	-58
	2008	6,892	6,812	-80
Wales	2005	7,799	7,768	-31
	2006	8,104	8,085	-18
	2007	7,668	7,668	0
	2008	8,136	8,134	-3
Northern Ireland	2005	1,796	1,794	-3
	2006	1,917	1,914	-3
	2007	1,652	1,649	-3
	2008	1,631	1,626	-5

The underlying points data have been revised in many ways including changes in the allocation of emissions to emission source categories and fuel allocations. Those types of reallocations will not affect the net emissions, so the data in this table instead only show the impact of new data added to the points data set, or data removed, for example if found to be duplicating emissions included elsewhere. Because of the fact that carbon emissions data are available from numerous reporting mechanisms including EU ETS, IPPC, and the EEMS system for oil & gas terminals, there is considerable duplication of emissions in the raw data sets. While some of the duplication is easy to identify and remove, in other cases it is not because of differences in scope between the emissions data reported in each system or even because it is not always readily apparent that installations in the different data sets refer to the same plant. The identification and removal of potential duplication of emissions has therefore been an ongoing process for a few years, whereas there are few new data to add. This explains why there is a net decrease in emissions for all regions and all years, with the sole exception of Wales in 2007 where emissions remained unchanged.

The net reductions are most significant for England and Scotland. The figures for Wales and Northern Ireland are small both in absolute terms but also in terms of % changes, being < 0.5% in all years. The percentage change in England is also about 0.5% each year, whereas the change in Scotland is slightly higher at ~ 1%.

## A7.5.1 Sector Emissions

A summary of sector emissions are given in the tables below, by DA. This does not include all of the numerous source sectors included in the points data, but highlights the largest changes. For this reason the net changes will not sum to the same figures given in the previous section.

**Table A7.10 Sector Split of Carbon Emissions for England**

Sector	Year	Net change, ktonnes
Gas distribution	2005	+39
	2006	+45
	2007	+35
	2008	+35
Iron & Steel Combustion	2005	-35
	2006	-34
	2007	-38
	2008	-40
Oil production	2005	-403
	2006	-364
	2007	-340
	2008	-343
Other industrial combustion	2005	-247
	2006	-323
	2007	-261
	2008	-288
Power stations	2005	+56
	2006	+85
	2007	+66
	2008	+66
Ammonia production	2005	-19
	2006	-18
	2007	-22
	2008	-66
Clinical waste incineration	2005	+24
	2006	+25
	2007	+27
	2008	+29
Gas production	2005	+379
	2006	+288
	2007	+270
	2008	+284

The largest change for England is the transfer of emissions from source categories that included emissions from both oil terminals and gas terminals to separate categories for each. This was a change made to the UK inventory and is also therefore present in the points data. It is shown in the table by the large decrease in oil production and a slightly smaller increase in gas production due to transfer of emissions from one to the other, plus a slight decrease in overall emissions due to revisions to the interpretation of PI, EU ETS & EEMS data. The other major change for England is a reduction in emissions from other industrial combustion due to revisions in the interpretation of EU ETS and PI data, principally for chemical industry sites.

**Table A7.11 Sector Split of Carbon Emissions for Scotland**

Sector	Year	Net change, ktonnnes
Oil production	2005	-417
	2006	-396
	2007	-326
	2008	-328
Other industrial combustion	2005	-49
	2006	-28
	2007	-60
	2008	-94
Refineries	2005	0
	2006	0
	2007	0
	2008	+39
Gas production	2005	+417
	2006	+339
	2007	+326
	2008	+300

As with England, the data for Scotland are impacted by the change in reporting for oil and gas terminals, with a small reduction in overall emissions from terminals due to revisions in the interpretation of SPRI, EUETS and EEMS data. As with England, there are also reductions in the emissions from other industrial combustion, again mostly relating to reinterpretation of IPPC and EU ETS data for chemical industry sites, including the Fife Ethylene plant that was studied as part of this work.

**Table A7.12 Sector Split of Carbon Emissions for Wales**

Sector	Year	Net change, ktonnnes
Iron & steel combustion	2005	+8
	2006	+13
	2007	+14
	2008	+12
Oil production	2005	-20
	2006	-20
	2007	-19
	2008	-17
Other industrial combustion	2005	-36
	2006	-28
	2007	-9
	2008	-14
Gas production	2005	+20
	2006	+20
	2007	+19
	2008	+17

Figures for Wales are also impacted by the change in reporting for oil and gas terminals, although there is no net change in emissions in this case. Reductions in emissions from other industrial combustion and increased emissions from iron & steel combustion result from reinterpretation of EU ETS and PI data including the Celsa sites studied as part of this work.

**Table A7.13 SectorSplit of Carbon Emissions for Northern Ireland**

Sector	Year	Net change, ktonnnes
Other industrial combustion	2005	-6
	2006	-6
	2007	-6
	2008	-7
Glass production	2005	+3
	2006	+3
	2007	+3
	2008	+3

Reductions in emissions from other industrial combustion and increased emissions from glass production result from reinterpretation of EU ETS and ISR data including the Quinn Glass sites studied as part of this work.

## A7.5.1 Emissions by Fuel Type

A summary of emissions by fuel are given in Table 3.6-Table 3.9. This does not include all of the numerous reallocations in the points data, but highlights the largest changes.

**Table A7.14 Carbon Emissions by Fuel Type for England**

Fuel	Year	Net change, ktonnnes
Coke	2005	-37
	2006	-39
	2007	-41
	2008	-42
Fuel oil	2005	-27
	2006	+51
	2007	+23
	2008	+28
Gas oil	2005	-27
	2006	-22
	2007	-15
	2008	-1
LPG	2005	-606
	2006	-55
	2007	0
	2008	0
Natural gas	2005	-168
	2006	-220
	2007	-202
	2008	-237
OPG	2005	+563
	2006	+23
	2007	+19
	2008	+13
Petroleum coke	2005	+87
	2006	+38
	2007	+55
	2008	+33
Process gases	2005	+70
	2006	+71
	2007	+101
	2008	+75
Unknown	2005	-57
	2006	-80
	2007	-70
	2008	-29

The table illustrates that there are far more significant changes to fuel allocations than to emission source categories. This is perhaps to be expected since the source categories that most processes should be allocated to are not in doubt and changes are usually limited to revisions due the reinterpretation of the possibility of duplication in the EU ETS, EEMS & IPPC datasets. Fuel allocations are much more uncertain, both within the EU ETS where fuel names are given but are not always named in a transparent manner, and within IPPC datasets where fuels are not given and must be estimated using expert judgements. The knowledge used to allocate EUETS data and IPPC emissions to fuels is growing steadily through studies such as this one, and leads to significant improvements to the quality of points data each year. The main features of the changes for England are a big reallocation

from LPG to OPG in 2005, and decreased emissions for natural gas, while emissions from use of process-related gases increased. The quantity of emissions which could not be allocated to any fuel also decreased. Many of the reallocations relate to chemical and oil & gas related sites.

**Table A7.15 Carbon Emissions by Fuel Type for Scotland**

Fuel	Year	Net change, ktonnnes
Coal	2005	-11
	2006	-13
	2007	-9
	2008	0
Fuel oil	2005	-17
	2006	0
	2007	0
	2008	0
Gas oil	2005	-13
	2006	-16
	2007	-11
	2008	-11
Natural gas	2005	-15
	2006	-34
	2007	-45
	2008	-48
OPG	2005	-3
	2006	-1
	2007	-11
	2008	-31
Petroleum coke	2005	+1
	2006	-8
	2007	+1
	2008	0
Flared gases	2005	-108
	2006	-132
	2007	-112
	2008	-110
Process gases	2005	+140
	2006	+165
	2007	+152
	2008	+171
Unknown	2005	-41
	2006	-50
	2007	-14
	2008	-9

There are a large number of changes for Scotland as well although the size of the net changes are generally smaller. As with England there are decreases to natural gas with process gas increasing but here there is also a reallocation away from flared gases to process gas. As with England, emissions where the fuel is unknown have decreased. Many of the reallocations relate to chemical and oil & gas related sites.

**Table A7.16 Carbon Emissions by Fuel Type for Wales**

<b>Fuel</b>	<b>Year</b>	<b>Net change, ktonnnes</b>
Coal	2005	-1
	2006	+5
	2007	+4
	2008	+3
Coke	2005	-4
	2006	-4
	2007	-5
	2008	0
Natural gas	2005	-7
	2006	+4
	2007	+8
	2008	-3
Petroleum coke	2005	+7
	2006	+1
	2007	+3
	2008	+47
Unknown	2005	-23
	2006	-21
	2007	-3
	2008	-52

Changes for Wales are more modest, the main one being a reduction in the emissions that cannot be allocated to a fuel, a substantial part of that being reallocated to petroleum coke.

**Table A7.17 Carbon Emissions by Fuel Type for Northern Ireland**

<b>Sector</b>	<b>Year</b>	<b>Net change, ktonnnes</b>
Coal	2005	-4
	2006	-1
	2007	+8
	2008	0
Fuel oil	2005	-10
	2006	+5
	2007	+7
	2008	+11
Natural gas	2005	-9
	2006	-10
	2007	-10
	2008	-16
Petroleum coke	2005	+7
	2006	+3
	2007	-3
	2008	0

Northern Ireland also sees relatively few reallocations although there has been some switching from natural gas to fuel oil for a few processes including the Moy Park site studied in this work.

## **A7.6 Conclusions**

Information gathered during the industrial task sector improvements program 2010-2011 together with other information gathered during the point source data collection has led to changes in the interpretation of site-specific carbon emissions data for all regions of the UK. This has led to significant revisions to point source data available for use in UK, DA and local inventories through additional understanding of processes, reporting of emissions and fuel use. Fuel allocations are still uncertain due to reporting within the EUETS where fuel names are not transparent, and within IPPC datasets where fuel-specific details are not provided and must be estimated using expert judgement. The review of process information has helped provide more transparency for many processes and to revise the previous assumptions for the sites considered.

## **A7.7 Acknowledgements and References**

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