

Appendices

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Appendix 1

End User GHG Inventories for England, Scotland, Wales and Northern Ireland: 1990, 2003-2007

Table A1: By Source and End User GHG Inventories for England, 1990 and 2003 to 2007 (kt CO₂-e)

By Source GHG Inventory

ENGLAND		kt CO ₂ Equivalent					
Code	Sector	1990	2003	2004	2005	2006	2007
1	Commercial	10,396	17,039	16,811	16,297	15,388	15,360
2	Domestic	63,952	73,363	74,776	71,979	68,888	65,885
3	Public Service	11,073	8,761	9,547	9,405	8,982	8,289
4	Rail Transport	1,912	1,820	1,853	1,913	1,944	1,975
5	Road Transport	92,906	99,244	100,180	100,491	100,530	101,269
6	Water Transport	2,600	2,515	2,449	2,827	3,808	3,411
7	Air Transport Support	248	377	403	426	430	436
8	Military Transport (Air & Water)	4,534	2,436	2,511	2,415	2,380	3,028
9	Industry Iron & Steel	14,045	12,449	12,315	12,218	12,835	12,856
10	Industry Other Combustion	48,681	44,488	42,614	42,947	41,114	39,358
11	Industry Other Processes	59,553	24,887	24,022	22,729	21,552	22,433
12	Agriculture	38,377	31,747	31,887	31,153	30,226	29,644
13	LULUCF	5,737	3,675	3,368	3,178	3,157	3,143
14	Miscellaneous	740	1	1	1	1	1
15	Exports	-	-	-	-	-	-
16	Aviation TOL Domestic	283	341	375	410	384	346
17	Aviation TOL International	-	-	-	-	-	-
18	Aviation Cruise Domestic	458	735	799	887	860	800
19	Aviation Cruise International	-	-	-	-	-	-
20	Water Transport International	-	-	-	-	-	-
21	Waste	41,665	19,786	18,425	18,133	18,033	17,986
100	Coke production	2,260	1,805	1,825	2,032	1,948	2,383
101	Coal production	16,562	5,087	4,586	3,619	3,323	2,320
102	Gas production	7,555	5,232	5,133	5,058	4,725	4,376
103	Electricity production	173,989	141,342	140,167	141,841	144,096	146,943
104	Oil production	12,719	15,524	14,451	15,171	12,435	11,571
105	SSF production	605	45	54	47	67	72
106	Town gas production	-	-	-	-	-	-

End User GHG Inventory

kt CO ₂ Equivalent					
1990	2003	2004	2005	2006	2007
53,005	55,153	55,622	54,919	55,255	54,800
138,462	131,058	133,524	129,944	128,283	123,860
26,306	17,750	18,626	18,443	18,224	17,388
3,573	3,500	3,582	3,653	3,721	3,750
111,777	125,324	125,575	126,014	122,288	123,393
3,099	3,139	3,028	3,502	4,585	4,111
292	464	492	521	511	519
5,449	3,074	3,144	3,025	2,893	3,687
21,143	15,867	15,737	15,616	16,481	16,720
114,796	92,282	91,390	93,280	91,661	89,421
61,559	26,986	26,081	24,787	23,350	24,182
41,307	33,885	34,100	33,304	32,309	31,580
5,737	3,675	3,368	3,178	3,157	3,143
740	1	1	1	1	1
41	1,004	411	429	571	1,187
340	431	471	514	467	422
-	-	-	-	-	-
551	928	1,002	1,112	1,046	975
-	-	-	-	-	-
-	-	-	-	-	-
41,665	19,786	18,425	18,133	18,033	17,986
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-

Table A2: By Source and End User GHG Inventories for Scotland, 1990 and 2003 to 2007 (kt CO₂-e)

By Source GHG Inventory

SCOTLAND		kt CO ₂ Equivalent					
Code	Sector	1990	2003	2004	2005	2006	2007
1	Commercial	1,067	1,717	1,705	1,654	1,567	1,552
2	Domestic	7,756	7,771	7,845	7,590	7,408	7,204
3	Public Service	1,238	857	939	933	888	808
4	Rail Transport	222	230	245	248	254	262
5	Road Transport	9,243	9,738	9,848	9,912	10,034	10,249
6	Water Transport	959	751	714	785	966	871
7	Air Transport Support	43	58	58	61	65	67
8	Military Transport (Air & Water)	466	232	239	228	224	285
9	Industry Iron & Steel	3,326	55	59	58	62	67
10	Industry Other Combustion	5,469	4,985	4,825	5,237	4,997	4,597
11	Industry Other Processes	2,263	1,627	1,658	1,459	1,513	1,462
12	Agriculture	9,722	8,446	8,310	8,121	8,013	7,694
13	LULUCF	- 2,518	- 4,193	- 4,599	- 4,581	- 4,451	- 4,440
14	Miscellaneous	22	0	0	0	0	0
15	Exports	-	-	-	-	-	-
16	Aviation TOL Domestic	103	168	173	185	173	164
17	Aviation TOL International	-	-	-	-	-	-
18	Aviation Cruise Domestic	219	436	460	497	484	456
19	Aviation Cruise International	-	-	-	-	-	-
20	Water Transport International	-	-	-	-	-	-
21	Waste	5,745	2,571	2,492	2,490	2,624	2,643
100	Coke production	522	-	-	-	-	-
101	Coal production	646	94	101	117	115	104
102	Gas production	804	950	829	873	821	721
103	Electricity production	14,961	17,655	15,824	14,271	18,903	15,620
104	Oil production	5,656	4,428	4,566	5,081	4,037	4,147
105	SSF production	-	-	-	-	-	-
106	Town gas production	-	-	-	-	-	-

End User GHG Inventory

kt CO ₂ Equivalent					
1990	2003	2004	2005	2006	2007
3,607	4,772	4,393	4,262	4,676	4,339
14,944	13,695	13,111	12,715	13,364	12,473
2,543	1,811	1,775	1,747	1,844	1,663
352	390	397	398	419	417
11,119	12,297	12,344	12,429	12,205	12,488
1,143	937	883	972	1,163	1,050
51	71	71	75	77	80
560	293	300	286	272	347
4,224	83	77	73	84	83
10,542	9,776	9,115	8,753	9,228	8,488
2,421	1,813	1,843	1,637	1,669	1,612
10,123	8,899	8,727	8,521	8,423	8,054
- 2,518	- 4,193	- 4,599	- 4,581	- 4,451	- 4,440
22	0	0	0	0	0
-	-	-	-	-	-
124	212	217	232	210	200
-	-	-	-	-	-
264	551	577	624	589	556
-	-	-	-	-	-
-	-	-	-	-	-
5,745	2,571	2,492	2,490	2,624	2,643
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-

Table A3: By Source and End User GHG Inventories for Wales, 1990 and 2003 to 2007 (kt CO₂-e)

WALES		By Source GHG Inventory					
Code	Sector	kt CO ₂ Equivalent					
		1990	2003	2004	2005	2006	2007
1	Commercial	618	811	799	801	750	737
2	Domestic	4,630	4,831	4,919	4,651	4,479	4,219
3	Public Service	768	431	469	473	448	409
4	Rail Transport	205	185	223	224	235	236
5	Road Transport	5,644	5,918	6,034	6,058	6,128	6,228
6	Water Transport	432	357	388	427	539	484
7	Air Transport Support	4	5	5	4	5	5
8	Military Transport (Air & Water)	225	110	114	108	105	128
9	Industry Iron & Steel	8,270	6,903	7,157	6,739	7,295	7,072
10	Industry Other Combustion	4,399	3,105	3,468	3,239	2,910	2,657
11	Industry Other Processes	2,127	1,680	1,684	1,452	1,746	1,740
12	Agriculture	6,719	6,115	6,019	6,025	5,747	5,424
13	Land Use, Land Use Change and Forestry	- 237	- 191	- 231	- 226	- 193	- 198
14	Miscellaneous	0	0	0	0	0	0
15	Exports	-	-	-	-	-	-
16	Aviation TOL Domestic	1	6	5	4	4	5
17	Aviation TOL International	-	-	-	-	-	-
18	Aviation Cruise Domestic	1	12	10	9	12	13
19	Aviation Cruise International	-	-	-	-	-	-
20	Water Transport International	-	-	-	-	-	-
21	Waste	2,918	1,376	1,353	1,361	1,311	1,309
100	Coke production	1,300	664	724	845	872	1,130
101	Coal production	1,537	436	393	487	481	355
102	Gas production	339	255	286	300	287	340
103	Electricity production	11,347	10,794	13,290	12,406	13,869	11,317
104	Oil production	3,626	3,191	3,429	3,588	3,150	3,203
105	SSF production	117	1	1	1	1	2
106	Town gas production	-	-	-	-	-	-

End User GHG Inventory					
kt CO ₂ Equivalent					
1990	2003	2004	2005	2006	2007
1,837	3,219	2,872	2,826	3,067	2,861
7,770	8,443	8,049	7,691	7,892	7,221
1,452	1,396	1,297	1,283	1,366	1,250
300	311	345	344	362	357
6,791	7,476	7,566	7,598	7,456	7,590
515	446	480	529	649	583
4	6	6	5	6	5
270	139	143	135	128	156
11,267	9,036	9,290	8,832	9,685	9,244
8,967	5,185	5,297	5,392	4,995	4,727
2,257	1,824	1,827	1,590	1,876	1,861
7,086	6,519	6,383	6,371	6,108	5,749
- 237	- 191	- 231	- 226	- 193	- 198
0	0	0	0	0	0
-	-	-	-	-	-
1	7	6	5	5	6
-	-	-	-	-	-
2	15	13	12	14	16
-	-	-	-	-	-
-	-	-	-	-	-
2,918	1,376	1,353	1,361	1,311	1,309
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-

Table A4: By Source and End User GHG Inventories for Northern Ireland, 1990 and 2003 to 2007 (kt CO₂-e)

NORTHERN IRELAND		kt CO ₂ Equivalent					
Code	Sector	1990	2003	2004	2005	2006	2007
1	Commercial	146	265	321	343	322	322
2	Domestic	4,967	3,908	3,893	3,796	3,945	3,678
3	Public Service	490	125	156	200	191	178
4	Rail Transport	31	32	38	39	39	50
5	Road Transport	3,279	4,668	4,610	4,642	4,751	4,855
6	Water Transport	154	149	151	173	233	204
7	Air Transport Support	8	9	9	9	10	10
8	Military Transport (Air & Water)	112	65	67	65	65	82
9	Industry Iron & Steel	-	-	-	-	-	-
10	Industry Other Combustion	1,513	884	891	979	925	874
11	Industry Other Processes	1,391	625	637	913	955	1,034
12	Agriculture	5,574	5,528	5,404	5,282	5,248	5,068
13	Land Use, Land Use Change and Forestry	- 28	- 290	- 281	- 281	- 295	- 285
14	Miscellaneous	0	0	0	0	0	0
15	Exports	-	-	-	-	-	-
16	Aviation TOL Domestic	34	51	57	65	68	61
17	Aviation TOL International	-	-	-	-	-	-
18	Aviation Cruise Domestic	74	124	131	143	145	150
19	Aviation Cruise International	-	-	-	-	-	-
20	Water Transport International	-	-	-	-	-	-
21	Waste	1,647	792	763	797	815	835
100	Coke production	-	-	-	-	-	-
101	Coal production	-	-	-	-	-	-
102	Gas production	-	-	-	-	-	-
103	Electricity production	5,493	4,956	4,822	5,335	5,725	4,658
104	Oil production	-	-	-	-	-	-
105	SSF production	-	-	-	-	-	-
106	Town gas production	-	-	-	-	-	-

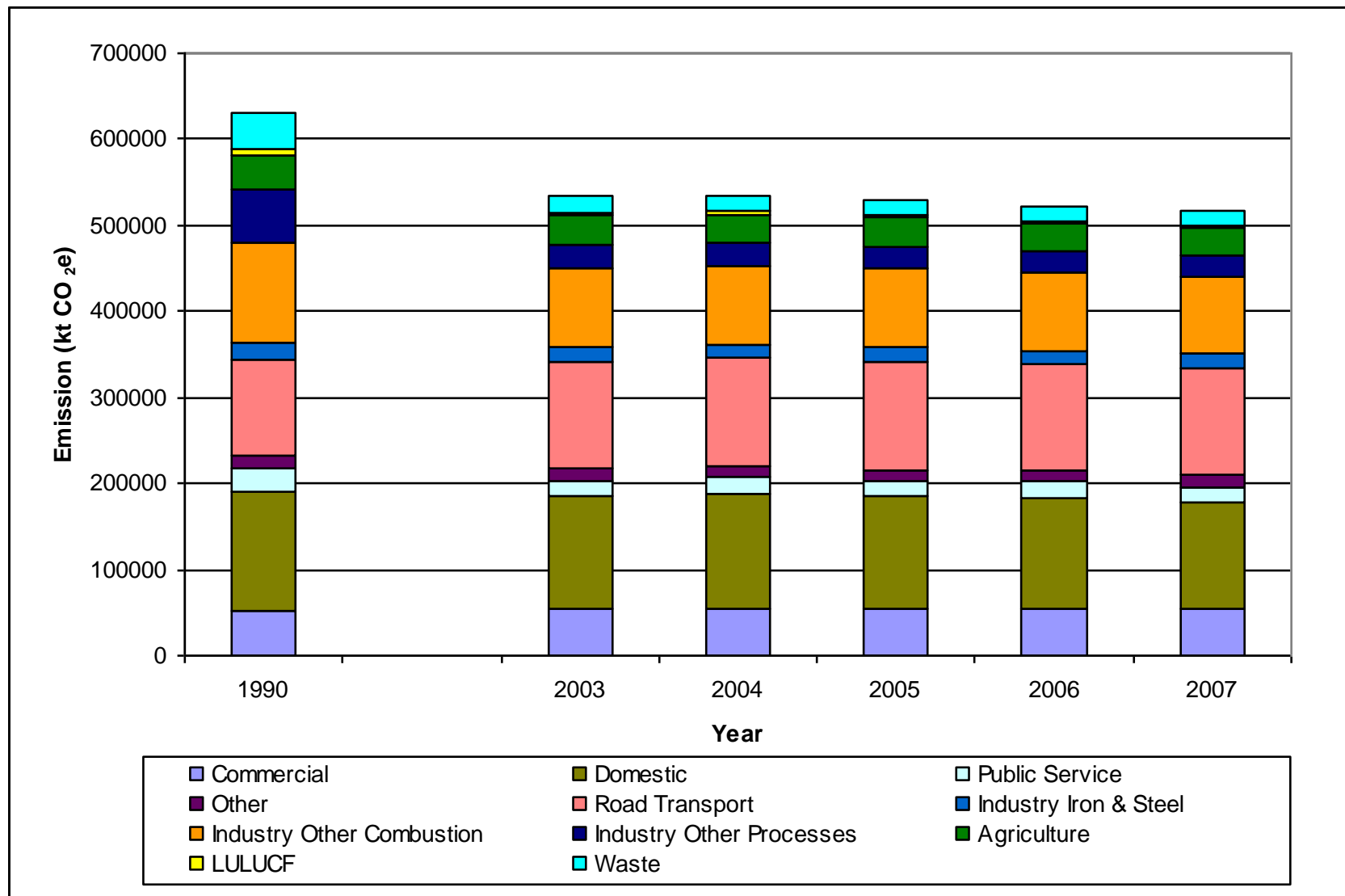
		kt CO ₂ Equivalent					
1990	2003	2004	2005	2006	2007		
1,060	1,277	1,234	1,241	1,222	1,081		
8,135	6,857	6,597	6,464	6,603	5,975		
1,432	622	593	624	613	534		
97	97	100	99	100	105		
3,943	5,887	5,772	5,814	5,772	5,908		
183	186	187	215	280	246		
10	11	10	11	12	12		
135	82	84	81	79	100		
-	-	-	-	-	-		
3,279	2,780	2,601	2,549	2,720	2,812		
1,467	697	709	996	1,032	1,106		
6,102	5,947	5,784	5,641	5,586	5,348		
- 28	- 290	- 281	- 281	- 295	- 285		
0	0	0	0	0	0		
-	874	1,058	1,331	1,148	724		
41	64	71	82	83	74		
-	-	-	-	-	-		
89	157	165	180	176	183		
-	-	-	-	-	-		
-	-	-	-	-	-		
1,647	792	763	797	815	835		
-	-	-	-	-	-		
-	-	-	-	-	-		
-	-	-	-	-	-		
-	-	-	-	-	-		
-	-	-	-	-	-		
-	-	-	-	-	-		
-	-	-	-	-	-		
-	-	-	-	-	-		

Table A5: By Source and End User GHG Inventories for Offshore Sources, 1990 and 2003 to 2007 (kt CO₂-e)

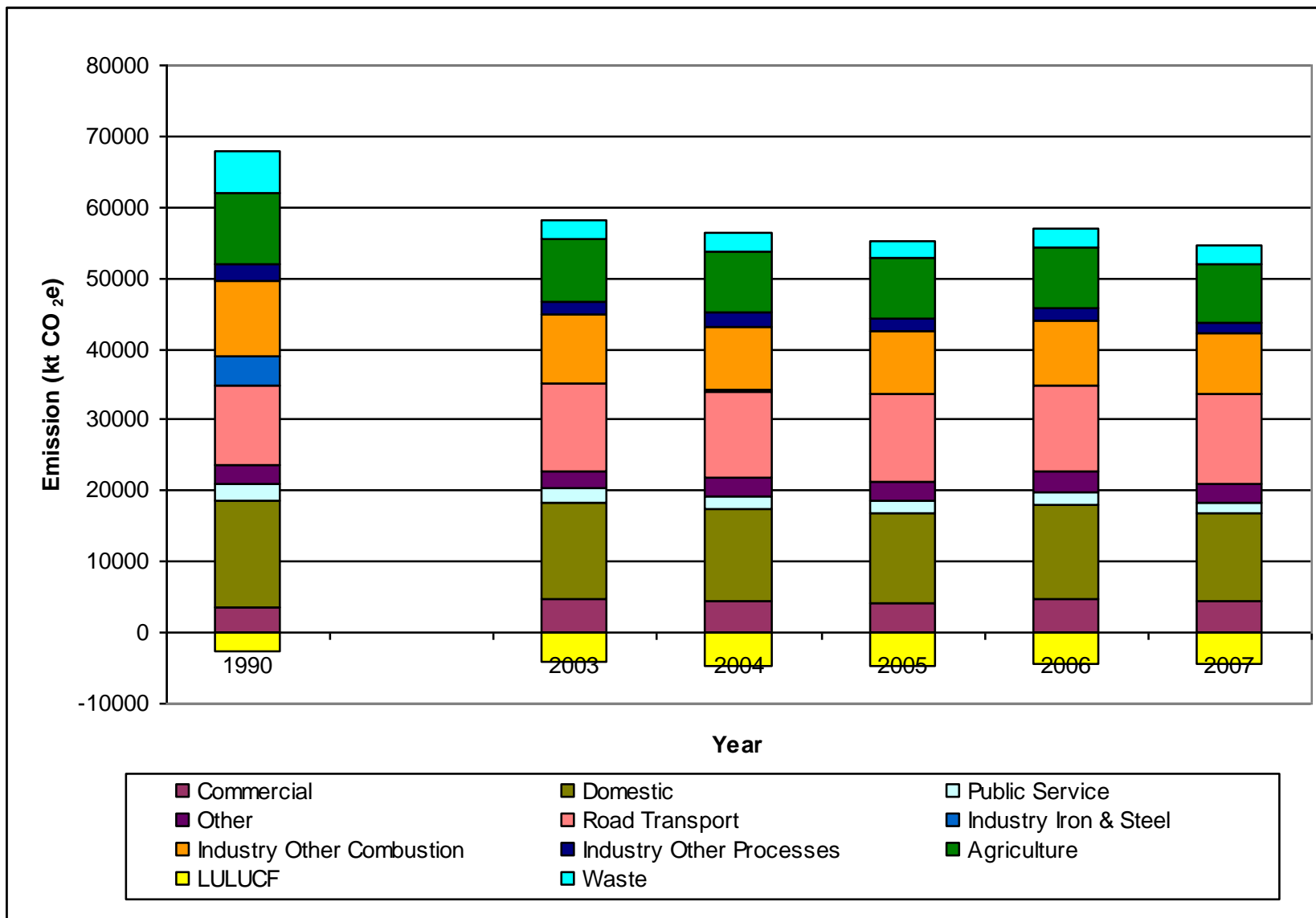
(All offshore emission sources are re-allocated to the four DA inventories, within the End User GHG inventories.)

UNALLOCATED		By Source GHG Inventory						End User GHG Inventory							
Code	Sector	kt CO ₂ Equivalent						kt CO ₂ Equivalent							
		1990		2003	2004	2005	2006	2007	1990		2003	2004	2005	2006	2007
1	Commercial	-		-	-	-	-	-	-		-	-	-	-	-
2	Domestic	-		-	-	-	-	-	-		-	-	-	-	-
3	Public Service	-		-	-	-	-	-	-		-	-	-	-	-
4	Rail Transport	-		-	-	-	-	-	-		-	-	-	-	-
5	Road Transport	-		-	-	-	-	-	-		-	-	-	-	-
6	Water Transport	-		-	-	-	-	-	-		-	-	-	-	-
7	Air Transport Support	-		-	-	-	-	-	-		-	-	-	-	-
8	Military Transport (Air & Water)	-		-	-	-	-	-	-		-	-	-	-	-
9	Industry Iron & Steel	-		-	-	-	-	-	-		-	-	-	-	-
10	Industry Other Combustion	-		-	-	-	-	-	-		-	-	-	-	-
11	Industry Other Processes	-		-	-	-	-	-	-		-	-	-	-	-
12	Agriculture	-		-	-	-	-	-	-		-	-	-	-	-
13	Land Use, Land Use Change and Forestry	-		-	-	-	-	-	-		-	-	-	-	-
14	Miscellaneous	-		-	-	-	-	-	-		-	-	-	-	-
15	Exports	-		-	-	-	-	-	-		-	-	-	-	-
16	Aviation TOL Domestic	-		-	-	-	-	-	-		-	-	-	-	-
17	Aviation TOL International	-		-	-	-	-	-	-		-	-	-	-	-
18	Aviation Cruise Domestic	-		-	-	-	-	-	-		-	-	-	-	-
19	Aviation Cruise International	-		-	-	-	-	-	-		-	-	-	-	-
20	Water Transport International	-		-	-	-	-	-	-		-	-	-	-	-
21	Waste	-		-	-	-	-	-	-		-	-	-	-	-
100	Coke production	-		-	-	-	-	-	-		-	-	-	-	-
101	Coal production	-		-	-	-	-	-	-		-	-	-	-	-
102	Gas production	868		634	643	636	659	650	-		-	-	-	-	-
103	Electricity production	-		-	-	-	-	-	-		-	-	-	-	-
104	Oil production	14,376		18,735	18,745	18,089	16,122	17,017	-		-	-	-	-	-
105	SSF production	-		-	-	-	-	-	-		-	-	-	-	-
106	Town gas production	-		-	-	-	-	-	-		-	-	-	-	-

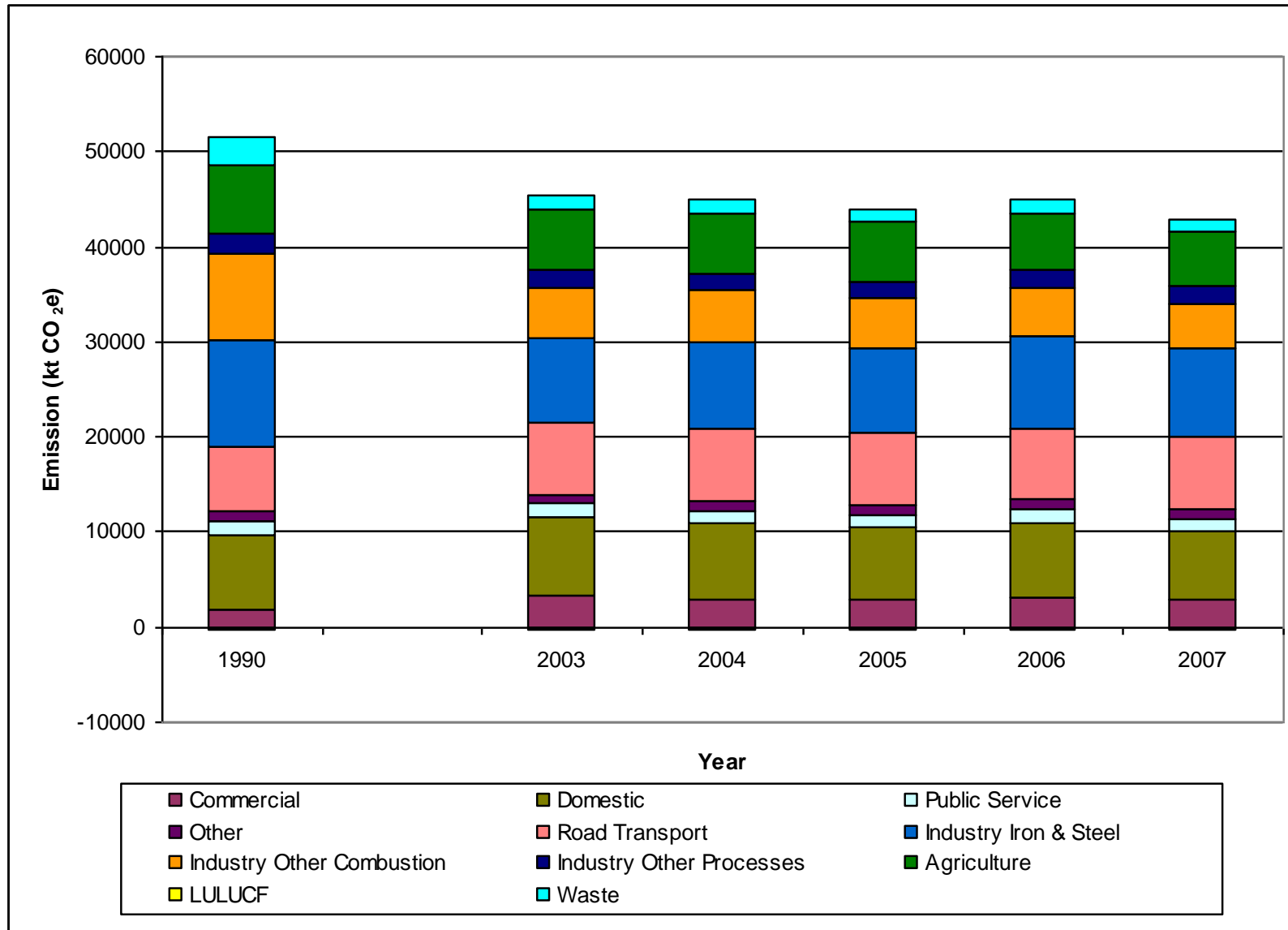
Graph A1: End User GHG Inventory for England, 1990 and 2003 to 2007



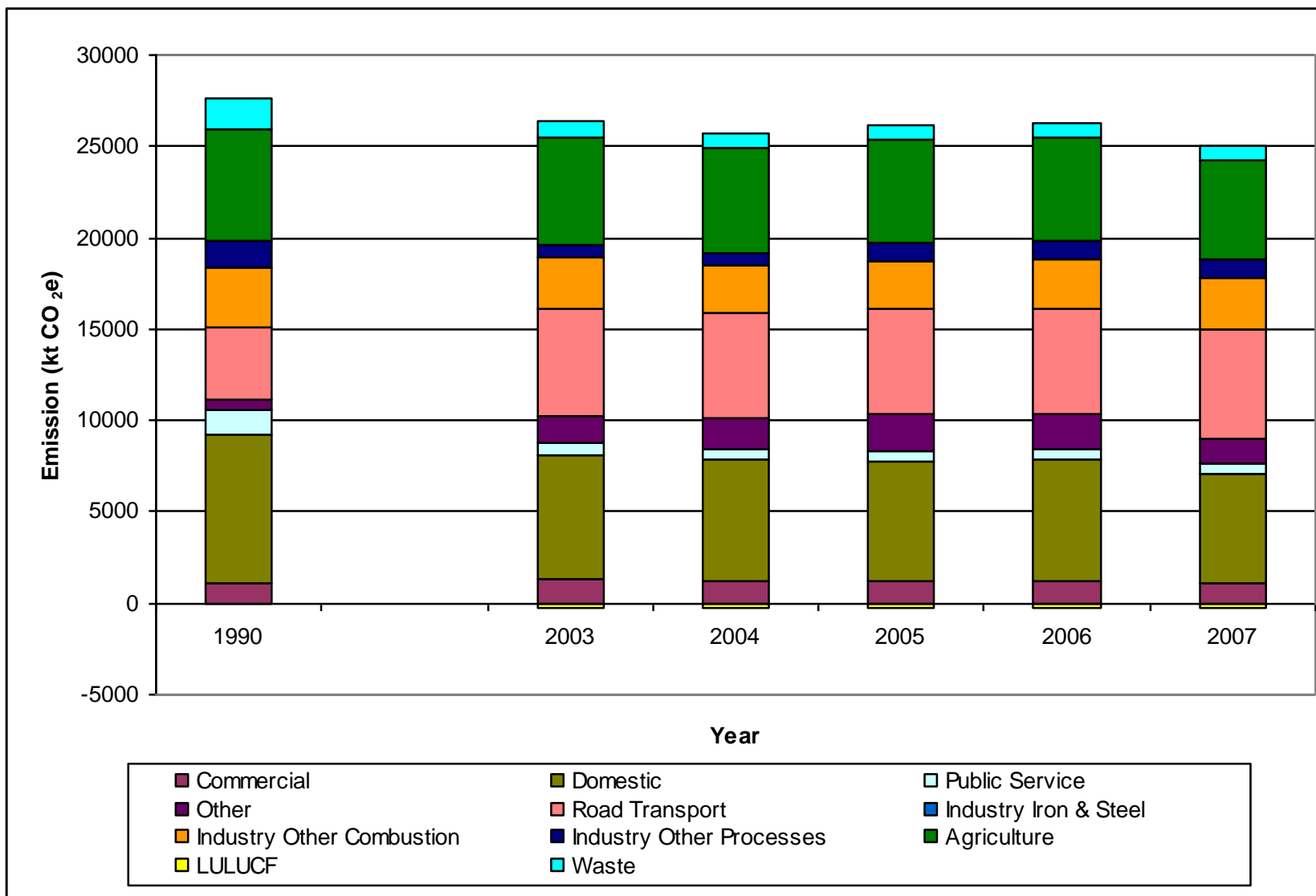
Graph A2: End User GHG Inventory for Scotland, 1990 and 2003 to 2007



Graph A3: End User GHG Inventory for Wales, 1990 and 2003 to 2007



Graph A4: End User GHG Inventory for Northern Ireland, 1990 and 2003 to 2007



Appendix 2

End User Model Sensitivity Analysis to Non-electricity Fuel Assumptions

A2.1 INTRODUCTION

To function completely and re-distribute the energy generation / transformation industry emissions to the point of consumption within the UK, the end user calculator requires the following data inputs to supplement the available by source emissions inventory data:

- Electricity consumption by end-user sector for each DA
- Electricity transfers between DAs
- Fuel transfers from refineries between DAs
- Fuel transfers from gas producers between DAs
- Fuel transfers from coal producers between DAs
- Fuel transfers from other solid fuel producers between DAs

Note that there are very few source data to track DA imports/exports of any fuels other than electricity, for which data are published by DECC from 2003 onwards. Therefore to compile the DA end-user inventories, assumptions have to be made to estimate the regional production and consumption of refined / secondary fuels, and currently a UK-average approach is taken. End-use consumption of refined oils, gas and solid fuels can be estimated from the DA by source GHGI data, but it is the uncertainty in regional production statistics that inhibits the accuracy of the DA End User inventory data.

In the current version of the model, the disaggregation of the non-electricity fuels has been simplified to deliver a UK-wide distribution of emissions from the energy sector, which discounts any DA-specific features of energy sector fuel mix, plant design, efficiency, abatement and utilisation.

In previous versions of the model, the study team adopted a different approach, to try to determine whether estimates of inter-DA transfers of oil, coal and gas could be developed to provide a more DA-specific picture of these non-electricity energy sectors, and thereby derive more accurate DA End User inventories.

Various approaches were adopted, to develop “defensible” approaches to filling the data gap of non-electricity energy transfers between DAs. Inevitably a series of end user outputs was derived, each dependent on the assumptions used to develop “dummy” input data on DA imports-exports.

In order to illustrate the overall sensitivity of the DA end users model to the approach used for the non-electricity fuels (which represent around 25% of the total energy sector emissions to be disaggregated across end user sectors within the model), the results from an earlier version of the model are presented here.

A2.2 “VERSION E” DATA INPUTS AND OUTPUTS

The “version E” of the DA End Users model adopted a DA-specific approach to the disaggregation of the non-electricity energy sector emissions. In deriving “dummy” data for DA imports-exports of refined fuels, the following assumptions were made:

- 1) Emissions from offshore source of the upstream oil and gas industry were allocated to the DAs according to the year-specific distribution of CO₂ emissions from refineries.
- 2) For each energy sector, estimates of imports between DAs were estimated based on the origin DA share of the UK total consumption (in energy terms) of the fuels aligned with that energy sector. For example, to meet the energy needs of coal use in Northern Ireland, exports (estimated in energy terms at this stage) to meet that total demand in Northern Ireland were assumed to arise from England, Scotland and Wales relative to their own share of the UK overall consumption of coal and anthracite.

A series of calculation loops was written into the model code, to implement these assumptions, and the model was run for each year and gas. The results are summarised below.

Table A2.2 Summary of “Version E” DA End User Model Outputs, Compared to “Version G” (the latest model)

VERSION E END USERS

Uses assumptions to create DA Energy Transfers for Non-Electricity Fuels

Data	Year					
	1990	2003	2004	2005	2006	2007
Sum of England (End User)	629,335	532,842	533,471	528,754	521,315	514,627
Sum of Scotland (End User)	66,258	55,075	52,890	52,086	53,551	51,332
Sum of Wales (End User)	52,374	46,164	45,758	44,950	45,809	43,958
Sum of Northern Ireland (End User)	25,896	23,540	22,830	23,011	23,479	22,790
Sum of Bunkerland (End User)	-	-	-	-	-	-

VERSION G END USERS

Adopts a UK-wide emissions disaggregation approach for Non-electricity Fuels

Data	Year					
	1990	2003	2004	2005	2006	2007
Sum of England (End User)	629,801	533,301	534,167	529,947	522,265	515,938
Sum of Scotland (End User)	65,269	53,978	51,722	50,633	52,396	50,052
Sum of Wales (End User)	51,201	45,207	44,695	43,749	44,726	42,738
Sum of Northern Ireland (End User)	27,592	25,167	24,389	24,512	24,800	24,036
Sum of Bunkerland (End User)	-	-	-	-	-	-

Version E / Version G	1990	2003	2004	2005	2006	2007
England	99.9%	99.9%	99.9%	99.8%	99.8%	99.7%
Scotland	101.5%	102.0%	102.3%	102.9%	102.2%	102.6%
Wales	102.3%	102.1%	102.4%	102.7%	102.4%	102.9%
Northern Ireland	93.9%	93.5%	93.6%	93.9%	94.7%	94.8%

The version E delivers emissions that are much lower (6-7%) in Northern Ireland, slightly lower in England and 2-3% higher in Wales and Scotland.

1990-2007 Trends Comparison	Version E	Version G
England	-18.2%	-18.1%
Scotland	-22.5%	-23.3%
Wales	-16.1%	-16.5%
Northern Ireland	-12.0%	-12.9%

The reported emissions trends in % terms are very close between the two models. Northern Ireland reports a lesser emission reduction in Version E.

The comparison of the two model approaches shown above indicates that for the DA-specific annual estimates of end user emissions, the model is very sensitive to the assumptions concerning the non-electricity fuels, with differences up to 7% in end user estimates derived for Northern Ireland, and also 2-3% differences in annual estimates for Scotland and Wales.

Note however that the systematic changes in data analysis across the time-series produce a much lesser impact upon reported emission TRENDS on an end user basis. The trend analysis over 1990-2007 is within 1% for all DAs, with the largest difference noted in Northern Ireland, which could be related to the fact that over that period Northern Ireland has gone through the most significant shift in non-electricity fuel use (with the development of a gas network, leading to significant fuel switching).

Appendix 3

DA End User Model: Screenshots of Calculation Sheets

A3.1 INTRODUCTION

The following pages show some of the detailed calculation sheets that are used within the end user model. Throughout these sheets, the data analysis presented is from calculations of CO₂ end user emissions in 2007.

The following sheets show:

- Activity Sums Matrix for the Energy Sectors
- Activity Sums Matrix for a sample of End User Sectors
- Emissions Matrix for the Energy Sectors
- Emissions Matrix for a sample of End User Sectors
- The Output sheet from the DA End Users model

Notes:

- Not all energy sectors are presented (there are missing columns for Town Gas, which are all zeros in 2007);
- For the non-electricity fuels, all of the activities and emissions within the matrices are grouped together in the “England” (E) columns, whilst for electricity the distribution of activities and emissions are DA-specific, and all columns are used;
- The top line of data in the emissions matrices presented, are the emissions from the solution to the Gaussian elimination to resolve the energy loops relationships and derive “final” emissions from each energy sector to be re-distributed across the end user sectors;
- The last two columns on the End User sector emissions matrix sample, represent the direct (i.e. by source) emissions and the end user emission totals respectively, for each sector and DA.

A3.1 Activity Sums Matrix: the Energy Sectors (2007, CO₂)

	Coke				Coal				Natural gas				Electricity				Oil				SSF				
	E	S	W	NI	U	E	S	W	NI	U	E	S	W	NI	U	E	S	W	NI	U	E	S	W	NI	
Coke	E	2.5307	0	0	0	0	180.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	W	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	U	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Coal	E	0	0	0	0	0	0.16	0	0	0	0	0	0	0	523.104	356.84	75.6819	0	0	0	0	0	0	0	
	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	W	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	U	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Natural gas	E	0	0	0	0	0	0	0	0	0	18.03	0	0	0	0	1392.07	898.69	32.2414	0	0	13.357	0	0	0	0
	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	W	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	U	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Electricity	E	0	0	0	0	0	1128	0	0	0	0	896.3	0	0	0	0	5634	5401	0	0	27.519	0	0	0	0
	S	0	0	0	0	0	134.1	0	0	0	0	73.39	0	0	0	0	0	0	0	0	2.5246	0	0	0	0
	W	0	0	0	0	0	54.71	0	0	0	0	126.7	0	0	0	0	0	0	0	1.5007	0	0	0	0	
	NI	0	0	0	0	0	20.14	0	0	0	0	54.82	0	0	0	0	1728	0	0	1.5965	0	0	0	0	
	U	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Oil	E	0	0	0	0	0	0	0	0	0	249.7	0	0	0	0	974.487	184.09	302.427	0	0	202.8	0	0	0	0
	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	W	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	U	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
SSF	E	0	0	0	0	0	7.198	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	W	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	U	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Town Gas	E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	W	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	U	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

A3.2 Activity Sums Matrix: sample of End User Sectors (2007, CO₂)

		Coke				Coal				Natural gas				Electricity				Oil				SSF								
		E	S	W	NI	U	E	S	W	NI	U	E	S	W	NI	U	E	S	W	NI	U	E	S	W	NI	U				
Commercial	E	0	0	0	0	0	0.168	0	0	0	0	178	0	0	0	0	68044.4	0	0	0	0	2.4922	0	0	0	0	0	0	0	0
	S	0	0	0	0	0	0.014	0	0	0	0	17.58	0	0	0	0	0	6448.4	0	0	0	0.1963	0	0	0	0	0	0	0	0
	W	0	0	0	0	0	0.015	0	0	0	0	8.422	0	0	0	0	0	0	3977.72	0	0	0.1649	0	0	0	0	0	0	0	0
	NI	0	0	0	0	0	0.016	0	0	0	0	2.751	0	0	0	0	0	0	0	1379.5	0	0.1114	0	0	0	0	0	0	0	0
	U	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Domestic	E	0.2427	0	0	0	0	11.64	0	0	0	0	1085	0	0	0	0	95276.3	0	0	0	0	68.416	0	0	0	0	4.143	0	0	0
	S	0.1426	0	0	0	0	3.555	0	0	0	0	110.6	0	0	0	0	0	11466	0	0	0	7.7107	0	0	0	0	2.435	0	0	0
	W	0.0265	0	0	0	0	2.113	0	0	0	0	60.44	0	0	0	0	0	0	5158	0	0	9.331	0	0	0	0	0.453	0	0	0
	NI	0.0314	0	0	0	0	3.037	0	0	0	0	3.784	0	0	0	0	0	0	0	3149.9	0	37.159	0	0	0	0	0.536	0	0	0
	U	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Public Service	E	0	0	0	0	0	3.304	0	0	0	0	151.5	0	0	0	0	15243.8	0	0	0	0	2.6614	0	0	0	0	0	0	0	0
	S	0	0	0	0	0	0.284	0	0	0	0	14.96	0	0	0	0	0	1928	0	0	0	0.1756	0	0	0	0	0	0	0	0
	W	0	0	0	0	0	0.304	0	0	0	0	7.168	0	0	0	0	0	0	1555.72	0	0	0.1741	0	0	0	0	0	0	0	0
	NI	0	0	0	0	0	0.318	0	0	0	0	2.342	0	0	0	0	0	0	0	632.51	0	0.401	0	0	0	0	0	0	0	0
	U	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rail Transport	E	0	0	0	0	0	0	0	0	0	0	0.076	0	0	0	0	2429.96	0	0	0	0	25.203	0	0	0	0	0	0	0	0
	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	244.65	0	0	0	3.3504	0	0	0	0	0	0	0	0
	W	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	141.73	0	0	3.0222	0	0	0	0	0	0	0	0
	NI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	83.659	0	0.6387	0	0	0	0	0	0	0	0
	U	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Road Transport	E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1467.7	0	0	0	0	0	0	0	0
	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	148.49	0	0	0	0	0	0	0	0
	W	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	90.364	0	0	0	0	0	0	0	0
	NI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	69.87	0	0	0	0	0	0	0	0
	U	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Industry Iron & Steel	E	45.523	0	0	0	0	0.016	0	0	0	0	12.53	0	0	0	0	2353.07	0	0	0	0	3.76	0	0	0	0	0	0	0	0
	S	0	0	0	0	0	0	0	0	0	0	1.29	0	0	0	0	0	31.347	0	0	0	0	0	0	0	0	0	0	0	0
	W	23.897	0	0	0	0	0.015	0	0	0	0	16.6	0	0	0	0	0	0	1626.04	0	0	0.1524	0	0	0	0	0	0	0	0
	NI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	U	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Industry Other Corr	E	1.1168	0	0	0	0	58.82	0	0	0	0	513.3	0	0	0	0	82186.1	0	0	0	0	112.21	0	0	0	0	0	0	0	0
	S	0.0456	0	0	0	0	3.641	0	0	0	0	63.54	0	0	0	0	0	8293	0	0	0	14.515	0	0	0	0	0	0	0	0
	W	0.1633	0	0	0	0	0.89	0	0	0	0	33.85	0	0	0	0	0	0	3423.4	0	0	11.907	0	0	0	0	0	0	0	0
	NI	0.0157	0	0	0	0	1.962	0	0	0	0	2.209	0	0	0	0	0	0	0	3302.5	0	8.6548	0	0	0	0	0	0	0	0
	U	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Industry Other Proc	E	1.2895	0	0	0	0	25.69	0	0	0	0	12.16	0	0	0	0	0	0	0	0	0	106.47	0	0	0	0	0	0	0	0
	S	0	0	0	0	0	1.939	0	0	0	0	0.014	0	0	0	0	0	0	0	0	0	9.6721	0	0	0	0	0	0	0	0
	W	0	0	0	0	0	2.879	0	0	0	0	0.021	0	0	0	0	0	0	0	0	0	7.6515	0	0	0	0	0	0	0	0
	NI	0	0	0	0	0	2.25	0	0	0	0	0.017	0	0	0	0	0	0	0	0	0	4.4462	0	0	0	0	0	0	0	0
	U	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Agriculture	E	0	0	0	0	0	0.074	0	0	0	0	5.136	0	0	0	0	2543.18	0	0	0	0	30.9	0	0	0	0	0	0	0	0
	S	0	0	0	0	0	0.015	0	0	0	0	1.017	0	0	0	0	0	503.77	0	0	0	9.5009	0	0	0	0	0	0	0	0
	W	0	0	0	0	0	0.013	0	0	0	0	0.865	0	0	0	0	0	0	428.501	0	0	6.4314	0	0	0	0	0	0	0	0
	NI	0	0	0	0	0	0.01	0	0	0	0	0.176	0	0	0	0	0	0	0	349.55	0	5.9733	0	0	0	0	0	0	0	0
	U	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

A3.5 DA End User Model Output (2007, CO₂)

<i>Units are ktonnes carbon dioxide GWP</i>		Devolved Administration Point Source GHG Inventories					Devolved Administration End User GHG Inventories				
		England (Point source)	Scotland (Point source)	Wales (Point source)	Northern Ireland (Point source)	Bunkerland (Point source)	England (End User)	Scotland (End User)	Wales (End User)	Northern Ireland (End User)	Bunkerland (End User)
101	Coke production	2333	0	1112	0	0					
102	Coal production	133	0	5	0	0					
103	Gas production	611	434	16	0	630					
104	Electricity production	145936	15509	11268	4640	0					
105	Oil production	11333	4042	3176	0	15729					
106	SSF production	71	0	2	0	0					
107	Town gas production	0	0	0	0	0					
1	Commercial	9376	919	446	151	0	47592	3613	2507	887	0
2	Domestic	62941	6876	4017	3509	0	118122	11869	6868	5724	0
3	Public Service	8262	806	407	177	0	16946	1621	1218	521	0
4	Rail Transport	1770	235	212	45	0	3488	384	328	98	0
5	Road Transport	100115	10135	6158	4804	0	121064	12255	7448	5801	0
6	Water Transport	3384	865	480	202	0	4047	1034	574	242	0
7	Air Transport Support	386	59	4	9	0	464	71	5	11	0
8	Military Transport (Air & Water)	2997	282	127	82	0	3622	341	154	99	0
9	Industry Iron & Steel	12677	66	6984	0	0	16262	80	8997	0	0
10	Industry Other Combustion	39185	4576	2647	867	0	87223	8282	4620	2748	0
11	Industry Other Processes	18255	1355	1623	996	0	19857	1494	1733	1060	0
12	Agriculture	2477	724	499	431	0	4344	1070	813	702	0
	Land Use, Land Use Change and										
13	Forestry	3124	-4452	-201	-286	0	3124	-4452	-201	-286	0
14	Miscellaneous	0	0	0	0	0	0	0	0	0	0
15	Exports	0	0	0	0	0	1156	0	0	706	0
16	TOL Domestic	343	162	5	60	0	414	196	6	73	0
17	TOL International	0	0	0	0	0	0	0	0	0	0
18	Cruise Domestic	792	452	13	149	0	958	547	16	180	0
19	Cruise International	0	0	0	0	0	0	0	0	0	0
20	Water Transport International	0	0	0	0	0	0	0	0	0	0
21	Waste	410	18	13	6	0	410	18	13	6	0
	Sub total	426911	43065	39011	15842	16359	449093	38424	35098	18573	0
	Total					541189					541189

Appendix 4

Energy Sector End User Breakdown: Electricity and Non-Electricity Data

Table A4.1.1 Estimated End-user Emissions (Electricity only), England (kt CO₂-e)

		Year					
	End Use Sector	1990	2003	2004	2005	2006	2007
1	Commercial	41,482	37,626	38,351	38,123	39,451	39,043
2	Domestic	67,014	53,533	54,681	54,036	55,725	54,669
3	Public Service	13,644	8,547	8,646	8,579	8,838	8,747
4	Rail Transport	1,353	1,261	1,315	1,312	1,406	1,394
5	Road Transport	-	-	-	-	-	-
6	Water Transport	-	-	-	-	-	-
7	Air Transport Support	-	-	-	-	-	-
8	Military Transport (Air & Water)	-	-	-	-	-	-
9	Industry Iron & Steel	4,470	1,499	1,459	1,222	1,566	1,350
10	Industry Other Combustion	59,240	44,408	45,492	46,746	47,497	47,158
11	Industry Other Processes	-	-	-	-	-	-
12	Agriculture	2,341	1,478	1,593	1,555	1,592	1,459
13	Land Use, Land Use Change and Forestry	-	-	-	-	-	-
14	Miscellaneous	-	-	-	-	-	-
15	Exports	41	1,004	411	429	571	1,187
16	Domestic aviation Take-off and Landing	-	-	-	-	-	-
17	International aviation Take-off and Landing	-	-	-	-	-	-
18	Domestic aviation cruise	-	-	-	-	-	-
19	International aviation cruise	-	-	-	-	-	-
20	Water Transport International	-	-	-	-	-	-
21	Waste	-	-	-	-	-	-
	Total (Electricity)	189,586	149,357	151,948	152,002	156,647	155,007

Note that these data are only the **additional emission estimates** from the re-distribution of the electricity energy sector emissions calculated within the end user model. The data above do not include the *by source* emission inventory estimates for each sector.

Table A4.1.2 Estimated End-user Emissions (all non-Electricity fuels), England (kt CO₂-e)

	End Use Sector	Year					
		1990	2003	2004	2005	2006	2007
1	Commercial	1,128	488	460	500	416	397
2	Domestic	7,496	4,162	4,066	3,930	3,670	3,307
3	Public Service	1,589	442	434	458	404	353
4	Rail Transport	308	419	414	429	371	380
5	Road Transport	18,871	26,079	25,394	25,524	21,758	22,124
6	Water Transport	500	624	579	675	777	700
7	Air Transport Support	44	86	89	95	81	83
8	Military Transport (Air & Water)	915	638	633	610	512	659
9	Industry Iron & Steel	2,628	1,918	1,964	2,176	2,079	2,514
10	Industry Other Combustion	6,875	3,386	3,284	3,586	3,050	2,905
11	Industry Other Processes	2,006	2,099	2,059	2,058	1,798	1,749
12	Agriculture	588	659	619	596	491	476
13	Land Use, Land Use Change and Forestry	-	-	-	-	-	-
14	Miscellaneous	-	-	-	-	-	-
15	Exports	-	-	-	-	-	-
16	Domestic aviation Take-off and Landing	57	90	95	104	83	76
17	International aviation Take-off and Landing	-	-	-	-	-	-
18	Domestic aviation cruise	93	193	203	225	186	175
19	International aviation cruise	-	-	-	-	-	-
20	Water Transport International	-	-	-	-	-	-
21	Waste	-	-	-	-	-	-
	Total (all non-Electricity)	43,097	41,284	40,292	40,965	35,676	35,898

Note that these data are only the **additional emission estimates** from the re-distribution of the non-electricity energy sector emissions calculated within the end user model. The data above do not include the *by source* emission inventory estimates for each sector.

Table A4.2.1 Estimated End-user Emissions (Electricity only), Scotland (kt CO₂-e)

		Year					
	End Use Sector	1990	2003	2004	2005	2006	2007
1	Commercial	2,418	3,006	2,642	2,561	3,069	2,748
2	Domestic	5,979	5,407	4,777	4,682	5,537	4,886
3	Public Service	1,121	906	793	769	918	822
4	Rail Transport	90	107	96	94	116	104
5	Road Transport	-	-	-	-	-	-
6	Water Transport	-	-	-	-	-	-
7	Air Transport Support	-	-	-	-	-	-
8	Military Transport (Air & Water)	-	-	-	-	-	-
9	Industry Iron & Steel	264	25	15	13	19	13
10	Industry Other Combustion	4,319	4,331	3,847	3,043	3,843	3,534
11	Industry Other Processes	-	-	-	-	-	-
12	Agriculture	226	255	231	218	261	215
13	Land Use, Land Use Change and Forestry	-	-	-	-	-	-
14	Miscellaneous	-	-	-	-	-	-
15	Exports	-	-	-	-	-	-
16	Domestic aviation Take-off and Landing	-	-	-	-	-	-
17	International aviation Take-off and Landing	-	-	-	-	-	-
18	Domestic aviation cruise	-	-	-	-	-	-
19	International aviation cruise	-	-	-	-	-	-
20	Water Transport International	-	-	-	-	-	-
21	Waste	-	-	-	-	-	-
	Total (Electricity)	14,418	14,038	12,403	11,380	13,763	12,322

Note that these data are only the **additional emission estimates** from the re-distribution of the electricity energy sector emissions calculated within the end user model. The data above do not include the *by source* emission inventory estimates for each sector.

Table A4.2.2 Estimated End-user Emissions (all non-Electricity fuels), Scotland (kt CO₂-e)

	End Use Sector	Year					
		1990	2003	2004	2005	2006	2007
1	Commercial	123	49	46	47	41	38
2	Domestic	1,209	517	488	443	418	382
3	Public Service	185	47	44	44	39	33
4	Rail Transport	40	53	55	56	49	51
5	Road Transport	1,876	2,559	2,496	2,517	2,171	2,238
6	Water Transport	184	186	169	187	197	179
7	Air Transport Support	8	13	13	14	12	13
8	Military Transport (Air & Water)	94	61	60	58	48	62
9	Industry Iron & Steel	634	2	2	2	3	3
10	Industry Other Combustion	754	459	442	473	388	357
11	Industry Other Processes	158	186	185	178	156	150
12	Agriculture	175	198	186	182	150	145
13	Land Use, Land Use Change and Forestry	-	-	-	-	-	-
14	Miscellaneous	-	-	-	-	-	-
15	Exports	-	-	-	-	-	-
16	Domestic aviation Take-off and Landing	21	44	44	47	37	36
17	International aviation Take-off and Landing	-	-	-	-	-	-
18	Domestic aviation cruise	45	115	117	126	105	100
19	International aviation cruise	-	-	-	-	-	-
20	Water Transport International	-	-	-	-	-	-
21	Waste	-	-	-	-	-	-
	Total (all non-Electricity)	5,504	4,490	4,346	4,375	3,814	3,787

Note that these data are only the **additional emission estimates** from the re-distribution of the non-electricity energy sector emissions calculated within the end user model. The data above do not include the *by source* emission inventory estimates for each sector.

Table A4.3.1 Estimated End-user Emissions (Electricity only), Wales (kt CO₂-e)

		Year					
	End Use Sector	1990	2003	2004	2005	2006	2007
1	Commercial	1,151	2,385	2,049	2,000	2,296	2,104
2	Domestic	2,585	3,260	2,780	2,705	3,104	2,729
3	Public Service	565	941	805	786	898	823
4	Rail Transport	58	83	72	69	82	75
5	Road Transport	-	-	-	-	-	-
6	Water Transport	-	-	-	-	-	-
7	Air Transport Support	-	-	-	-	-	-
8	Military Transport (Air & Water)	-	-	-	-	-	-
9	Industry Iron & Steel	1,454	1,101	1,012	926	1,240	860
10	Industry Other Combustion	3,874	1,764	1,504	1,820	1,813	1,811
11	Industry Other Processes	-	-	-	-	-	-
12	Agriculture	247	268	236	222	260	227
13	Land Use, Land Use Change and Forestry	-	-	-	-	-	-
14	Miscellaneous	-	-	-	-	-	-
15	Exports	-	-	-	-	-	-
16	Domestic aviation Take-off and Landing	-	-	-	-	-	-
17	International aviation Take-off and Landing	-	-	-	-	-	-
18	Domestic aviation cruise	-	-	-	-	-	-
19	International aviation cruise	-	-	-	-	-	-
20	Water Transport International	-	-	-	-	-	-
21	Waste	-	-	-	-	-	-
	Total (Electricity)	9,934	9,801	8,457	8,527	9,693	8,629

Note that these data are only the **additional emission estimates** from the re-distribution of the electricity energy sector emissions calculated within the end user model. The data above do not include the *by source* emission inventory estimates for each sector.

Table A4.3.2 Estimated End-user Emissions (all non-Electricity fuels), Wales (kt CO₂-e)

	End Use Sector	Year					
		1990	2003	2004	2005	2006	2007
1	Commercial	69	24	23	26	21	20
2	Domestic	555	353	350	334	309	274
3	Public Service	118	25	23	24	20	18
4	Rail Transport	37	43	50	50	45	46
5	Road Transport	1,147	1,557	1,532	1,541	1,328	1,362
6	Water Transport	83	89	92	102	110	99
7	Air Transport Support	1	1	1	1	1	1
8	Military Transport (Air & Water)	45	29	29	27	23	28
9	Industry Iron & Steel	1,543	1,032	1,122	1,167	1,149	1,312
10	Industry Other Combustion	694	317	324	333	272	258
11	Industry Other Processes	130	144	143	138	129	121
12	Agriculture	120	136	127	124	102	99
13	Land Use, Land Use Change and Forestry	-	-	-	-	-	-
14	Miscellaneous	-	-	-	-	-	-
15	Exports	-	-	-	-	-	-
16	Domestic aviation Take-off and Landing	0	1	1	1	1	1
17	International aviation Take-off and Landing	-	-	-	-	-	-
18	Domestic aviation cruise	0	3	3	2	3	3
19	International aviation cruise	-	-	-	-	-	-
20	Water Transport International	-	-	-	-	-	-
21	Waste	-	-	-	-	-	-
	Total (all non-Electricity)	4,543	3,753	3,820	3,871	3,512	3,641

Note that these data are only the **additional emission estimates** from the re-distribution of the non-electricity energy sector emissions calculated within the end user model. The data above do not include the *by source* emission inventory estimates for each sector.

Table A4.4.1 Estimated End-user Emissions (Electricity only), N Ireland (kt CO₂-e)

		Year					
	End Use Sector	1990	2003	2004	2005	2006	2007
1	Commercial	892	1,006	905	887	893	751
2	Domestic	2,570	2,220	1,974	1,952	2,014	1,715
3	Public Service	851	485	425	409	409	344
4	Rail Transport	60	58	53	51	54	46
5	Road Transport	-	-	-	-	-	-
6	Water Transport	-	-	-	-	-	-
7	Air Transport Support	-	-	-	-	-	-
8	Military Transport (Air & Water)	-	-	-	-	-	-
9	Industry Iron & Steel	-	-	-	-	-	-
10	Industry Other Combustion	1,517	1,718	1,535	1,385	1,650	1,799
11	Industry Other Processes	-	-	-	-	-	-
12	Agriculture	422	297	267	245	245	190
13	Land Use, Land Use Change and Forestry	-	-	-	-	-	-
14	Miscellaneous	-	-	-	-	-	-
15	Exports	-	874	1,058	1,331	1,148	724
16	Domestic aviation Take-off and Landing	-	-	-	-	-	-
17	International aviation Take-off and Landing	-	-	-	-	-	-
18	Domestic aviation cruise	-	-	-	-	-	-
19	International aviation cruise	-	-	-	-	-	-
20	Water Transport International	-	-	-	-	-	-
21	Waste	-	-	-	-	-	-
	Total (Electricity)	6,312	6,658	6,217	6,261	6,413	5,569

Note that these data are only the **additional emission estimates** from the re-distribution of the electricity energy sector emissions calculated within the end user model. The data above do not include the *by source* emission inventory estimates for each sector.

Table A4.4.2 Estimated End-user Emissions (all non-Electricity fuels), N Ireland (kt CO₂-e)

		Year					
	End Use Sector	1990	2003	2004	2005	2006	2007
1	Commercial	22	6	8	11	8	7
2	Domestic	597	728	730	716	644	582
3	Public Service	90	12	11	15	13	11
4	Rail Transport	6	7	9	9	7	10
5	Road Transport	664	1,219	1,161	1,172	1,021	1,053
6	Water Transport	30	37	36	41	47	42
7	Air Transport Support	1	2	2	2	2	2
8	Military Transport (Air & Water)	23	17	17	16	14	18
9	Industry Iron & Steel	-	-	-	-	-	-
10	Industry Other Combustion	249	178	175	185	145	140
11	Industry Other Processes	77	73	72	83	77	72
12	Agriculture	107	121	114	114	93	90
13	Land Use, Land Use Change and Forestry	-	-	-	-	-	-
14	Miscellaneous	-	-	-	-	-	-
15	Exports	-	-	-	-	-	-
16	Domestic aviation Take-off and Landing	7	13	14	17	15	13
17	International aviation Take-off and Landing	-	-	-	-	-	-
18	Domestic aviation cruise	15	33	33	36	31	33
19	International aviation cruise	-	-	-	-	-	-
20	Water Transport International	-	-	-	-	-	-
21	Waste	-	-	-	-	-	-
	Total (all non-Electricity)	1,888	2,447	2,382	2,417	2,118	2,073

Note that these data are only the **additional emission estimates** from the re-distribution of the non-electricity energy sector emissions calculated within the end user model. The data above do not include the *by source* emission inventory estimates for each sector.

Figure A4.5.1 Comparison of DA GHG Emissions from Electricity Generation and Consumption (kt CO₂-e)

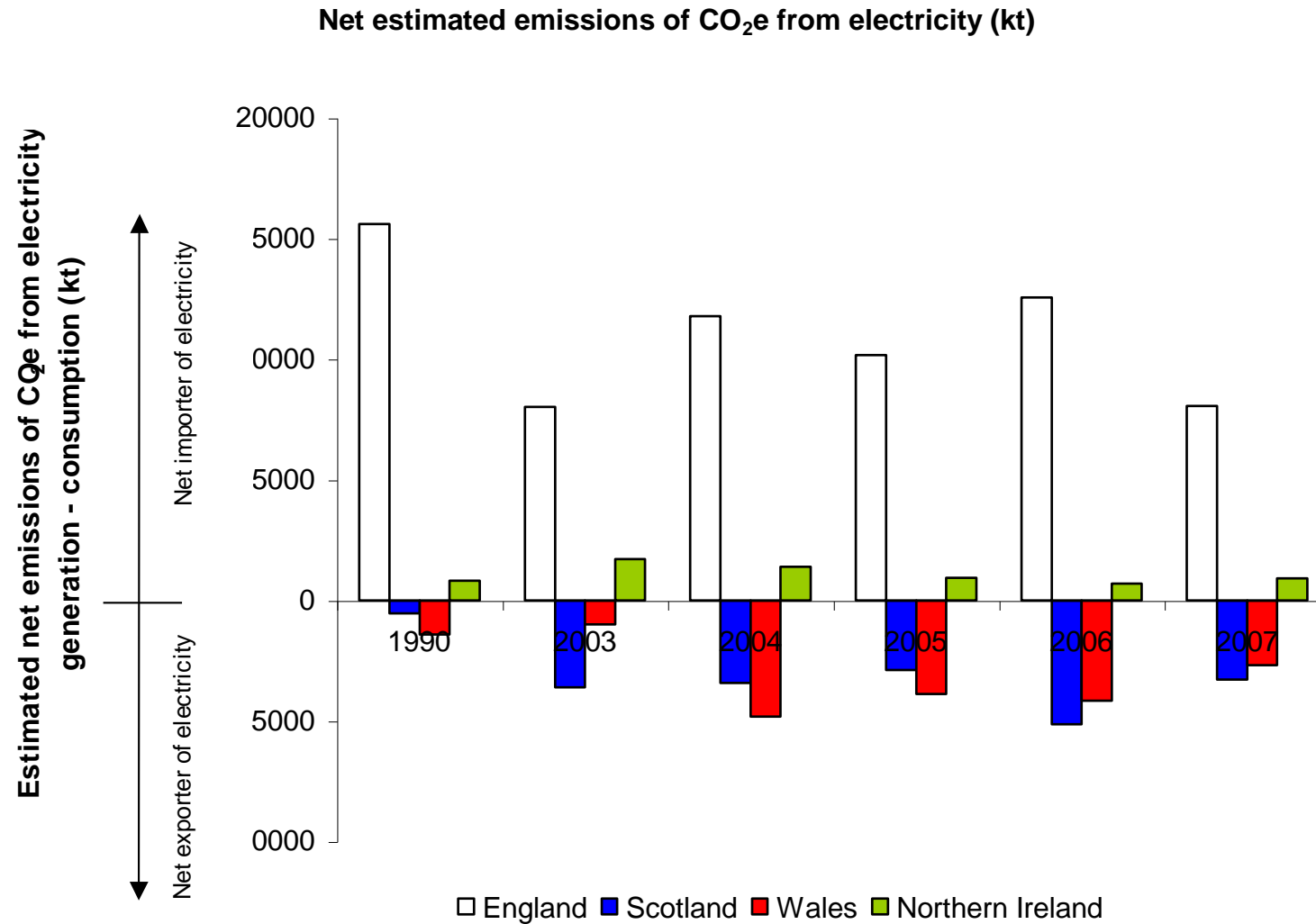


Table A4.5.1 Comparison of DA GHG Emissions from Electricity Generation and Consumption (kt CO₂-e)

GHGI	Electricity	Year					
		1990	2003	2004	2005	2006	2007
End User	England	189,586	149,357	151,948	152,002	156,647	155,007
End User	Scotland	14,418	14,038	12,403	11,380	13,763	12,322
End User	Wales	9,934	9,801	8,457	8,527	9,693	8,629
End User	Northern Ireland	6,312	6,658	6,217	6,261	6,413	5,569
By Source	England	173,989	141,342	140,167	141,841	144,096	146,943
By Source	Scotland	14,961	17,655	15,824	14,271	18,903	15,620
By Source	Wales	11,347	10,794	13,290	12,406	13,869	11,317
By Source	Northern Ireland	5,493	4,956	4,822	5,335	5,725	4,658
	End User MINUS By source						
	England	15,597	8,014	11,781	10,161	12,551	8,064
	Scotland	-543	-3,617	-3,421	-2,891	-5,140	-3,298
	Wales	-1,413	-993	-4,833	-3,879	-4,175	-2,687
	Northern Ireland	819	1,702	1,395	926	688	911

Figure A4.5.2 Comparison of DA GHG Emissions from Non-electricity Fuel Generation and Consumption (kt CO₂-e)

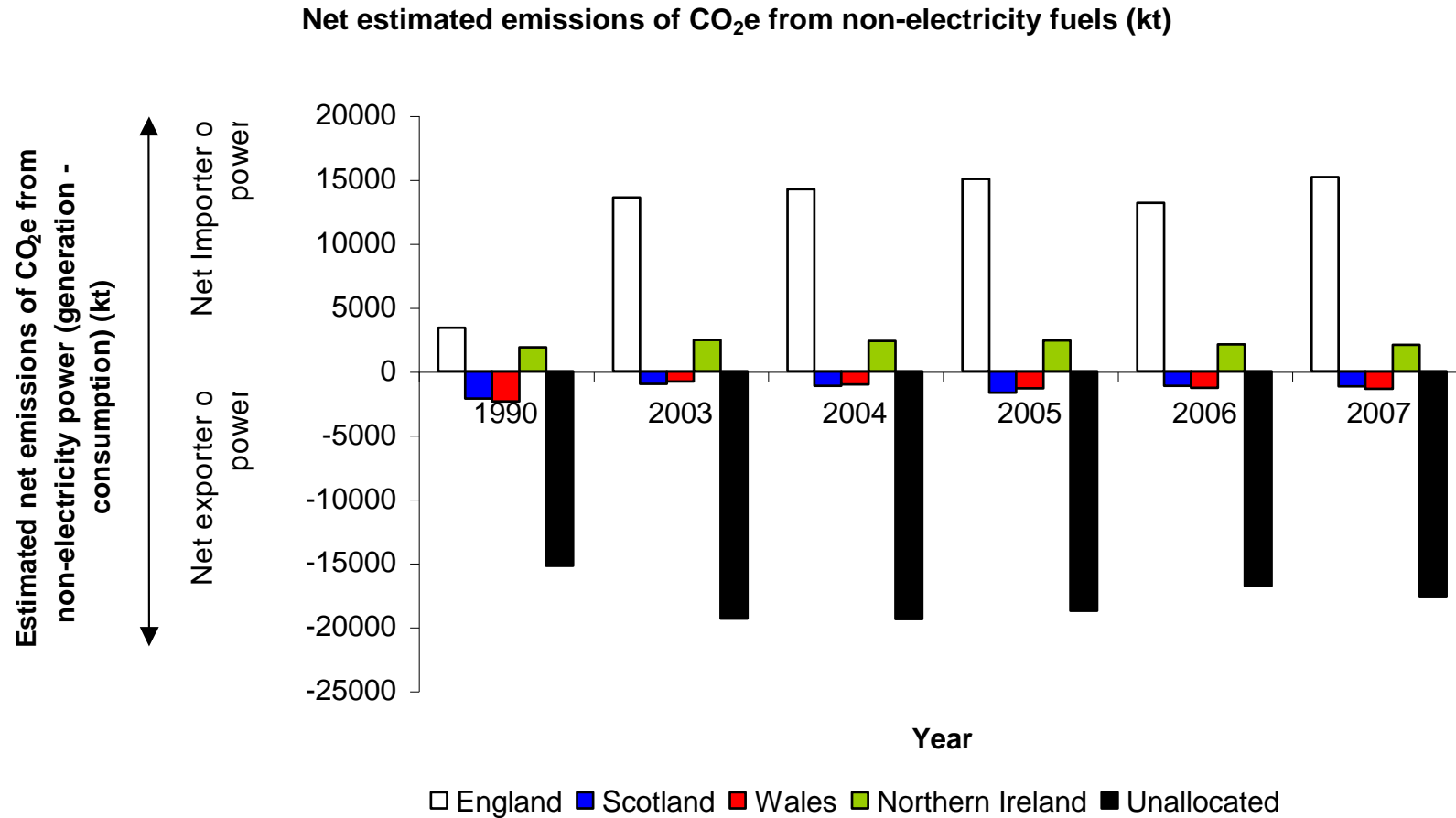


Table A4.5.2 Comparison of DA GHG Emissions from Generation and Consumption of Non-electricity Fuels (kt CO₂-e)

GHGI	Non-Electricity Fuels	Year					
		1990	2003	2004	2005	2006	2007
End User	England	43,097	41,284	40,292	40,965	35,676	35,898
End User	Scotland	5,504	4,490	4,346	4,375	3,814	3,787
End User	Wales	4,543	3,753	3,820	3,871	3,512	3,641
End User	Northern Ireland	1,888	2,447	2,382	2,417	2,118	2,073
End User	Unallocated	-	-	-	-	-	-
By Source							
By Source	England	39,702	27,693	26,048	25,928	22,499	20,721
By Source	Scotland	7,627	5,473	5,495	6,072	4,973	4,972
By Source	Wales	6,919	4,546	4,832	5,221	4,791	5,030
By Source	Northern Ireland	-	-	-	-	-	-
By Source	Unallocated	15,244	19,369	19,388	18,725	16,781	17,667
End User MINUS By source							
	England	3,396	13,591	14,244	15,037	13,177	15,177
	Scotland	-2,123	-983	-1,148	-1,696	-1,159	-1,184
	Wales	-2,376	-792	-1,012	-1,351	-1,279	-1,389
	Northern Ireland	1,888	2,447	2,382	2,417	2,118	2,073
	Unallocated	-15,244	-19,369	-19,388	-18,725	-16,781	-17,667