

**ANALYSIS OF ENERGY SYSTEM CHANGES TO REDUCE CO2 EMISSIONS IN
2010 FOR UNITED KINGDOM**

**National Technical University of Athens
Primes Ver. 2 Energy Model**

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Level of Carbon Value (in Eur'90/ton of Carbon)	0	1	2	5	10	20	40	70	110	160	220	290	370	460	560	700	900
DECOMPOSITION OF CO2 EMISSIONS REDUCTION (ktn of CO2 avoided in target year)																	
Industrial Sectors - Metals																	
Total CO2 emissions reduction	0	-48	-381	-545	-877	-1232	-2001	-2943	-4036	-5006	-5748	-6760	-9335	-10830	-12225	-13437	-14681
Structural change and behavioural effects	0	-22	-45	-112	-223	-440	-864	-1451	-2165	-2850	-3067	-3398	-3670	-3874	-4300	-4786	-5322
Technological improvement	0	-2	-5	-13	-26	-49	-92	-153	-233	-344	-595	-915	-2680	-3861	-4549	-5017	-5536
Energy saving in heat uses	0	-1	-2	-3	-5	-10	-21	-30	-43	-61	-153	-366	-440	-554	-625	-672	-817
Specific Industrial processes	0	-2	-5	-11	-20	-37	-70	-112	-176	-265	-413	-488	-2139	-3146	-3736	-4141	-4518
Electrical Equipment	0	0	2	1	-1	-2	0	-11	-15	-18	-29	-60	-101	-161	-189	-204	-200
Change of fuel mix	0	-8	-12	-39	-84	-153	-247	-372	-453	-509	-589	-605	-777	-764	-751	-721	-693
Change of emission factor of electricity and steam (supply effect)	0	-16	-319	-380	-544	-590	-798	-967	-1185	-1304	-1497	-1842	-2208	-2332	-2625	-2912	-3130
Industrial Sectors - Chemicals																	
Total CO2 emissions reduction	0	-29	-575	-710	-1017	-1146	-1563	-2283	-2933	-3340	-4595	-5664	-6151	-6937	-7604	-8175	-8777
Structural change and behavioural effects	0	2	20	-4	-54	-105	-133	-334	-415	-554	-603	-705	-778	-911	-1083	-1278	-1552
Technological improvement	0	-2	-4	-19	-40	-78	-155	-276	-431	-533	-694	-800	-923	-1546	-1729	-1886	-2010
Energy saving in heat uses	0	0	0	-3	-7	-13	-25	-47	-73	-93	-121	-136	-151	-211	-236	-254	-270
Specific Industrial processes	0	-2	-3	-15	-30	-58	-117	-201	-313	-385	-507	-590	-691	-1233	-1378	-1513	-1619
Electrical Equipment	0	0	0	-1	-3	-7	-14	-28	-45	-55	-66	-74	-80	-103	-115	-119	-121
Change of fuel mix	0	0	0	0	0	0	0	-11	-18	-18	-18	-7	-7	0	0	0	-17
Change of emission factor of electricity and steam (supply effect)	0	-28	-591	-688	-923	-963	-1274	-1662	-2068	-2234	-3279	-4151	-4444	-4480	-4793	-5011	-5197
Industrial Sectors - Materials																	
Total CO2 emissions reduction	0	-31	-513	-631	-899	-1027	-1445	-1996	-2594	-3015	-4102	-5199	-5863	-6432	-7205	-8096	-8918
Structural change and behavioural effects	0	-2	1	-11	-35	-69	-123	-245	-362	-500	-631	-745	-846	-953	-1032	-1108	-1198
Technological improvement	0	-3	-6	-17	-33	-63	-119	-204	-317	-425	-660	-967	-1197	-1528	-1894	-2469	-2999
Energy saving in heat uses	0	-1	-2	-5	-10	-20	-39	-69	-112	-158	-236	-309	-395	-509	-615	-727	-810
Specific Industrial processes	0	-1	-3	-7	-14	-26	-48	-79	-119	-161	-264	-451	-551	-701	-939	-1353	-1721
Electrical Equipment	0	-1	-1	-5	-9	-17	-32	-56	-86	-106	-161	-208	-252	-318	-340	-388	-467
Change of fuel mix	0	-2	-5	-12	-22	-40	-68	-98	-124	-145	-161	-173	-183	-195	-203	-204	-213
Change of emission factor of electricity and steam (supply effect)	0	-25	-504	-591	-809	-854	-1135	-1449	-1791	-1944	-2650	-3313	-3637	-3755	-4076	-4315	-4509
Industrial Sectors - Others																	
Total CO2 emissions reduction	0	-75	-1433	-1743	-2485	-2765	-3807	-5177	-6717	-7821	-10783	-13826	-16292	-17848	-19839	-21614	-23231
Structural change and behavioural effects	0	-1	3	-9	-33	-67	-117	-243	-364	-517	-674	-834	-1002	-1177	-1346	-1550	-1823
Technological improvement	0	-3	4	-37	-101	-195	-348	-720	-1163	-1661	-2738	-3856	-5188	-6239	-7099	-7892	-8570
Energy saving in heat uses	0	-13	-41	-59	-75	-146	-334	-471	-775	-1077	-1499	-1843	-2325	-2942	-3593	-4223	-4797
Specific Industrial processes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electrical Equipment	0	11	44	21	-26	-49	-14	-248	-388	-584	-1239	-2013	-2863	-3297	-3506	-3668	-3773
Change of fuel mix	0	-1	-2	-4	-8	-14	-24	-35	-45	-53	-60	-70	-74	-74	-76	-78	-84
Change of emission factor of electricity and steam (supply effect)	0	-70	-1439	-1692	-2343	-2488	-3319	-4179	-5144	-5589	-7311	-9066	-10027	-10358	-11317	-12094	-12754
Industrial Sectors - Total																	
Total CO2 emissions reduction	0	-183	-2902	-3629	-5277	-6170	-8815	-12401	-16279	-19181	-25228	-31448	-37641	-42048	-46873	-51322	-55607
Structural change and behavioural effects	0	-23	-20	-136	-345	-682	-1237	-2273	-3305	-4421	-4975	-5682	-6297	-6915	-7761	-8722	-9895
Technological improvement	0	-10	-10	-87	-200	-386	-713	-1353	-2145	-2964	-4687	-6538	-9988	-13174	-15271	-17264	-19114
Energy saving in heat uses	0	-15	-45	-71	-97	-189	-418	-617	-1003	-1389	-2008	-2654	-3311	-4216	-5069	-5877	-6694
Specific Industrial processes	0	-5	-11	-33	-63	-122	-235	-392	-608	-811	-1184	-1530	-3381	-5080	-6053	-7007	-7859
Electrical Equipment	0	10	46	16	-40	-75	-60	-343	-534	-764	-1496	-2354	-3296	-3878	-4149	-4379	-4561
Change of fuel mix	0	-11	-18	-55	-114	-207	-339	-516	-640	-725	-828	-856	-1041	-1032	-1030	-1004	-1008
Change of emission factor of electricity and steam (supply effect)	0	-139	-2853	-3351	-4618	-4895	-6526	-8258	-10189	-11071	-14737	-18372	-20316	-20926	-22811	-24332	-25590

ANALYSIS OF ENERGY SYSTEM CHANGES TO REDUCE CO2 EMISSIONS IN 2010 FOR UNITED KINGDOM

Level of Carbon Value (in Eur'90/ton of Carbon)	0	1	2	5	10	20	40	70	110	160	220	290	370	460	560	700	900	
DECOMPOSITION OF CO2 EMISSIONS REDUCTION (ktn of CO2 avoided in target year)																		
Services																		
Total CO2 emissions reduction	0	-289	-2988	-3693	-5432	-8739	-12390	-16676	-22279	-28568	-34935	-42640	-50867	-54965	-60068	-63564	-67179	
Structural change and behavioural effects	0	-96	-205	-347	-513	-926	-1545	-3028	-4546	-6460	-8600	-10382	-11330	-12560	-13340	-14250	-14958	
Technological improvement	0	-62	-156	-222	-451	-3064	-4462	-5504	-7669	-11725	-14955	-18526	-23675	-25395	-27453	-28758	-31067	
Space heating and cooling	0	-18	-51	-62	-162	-772	-1523	-2247	-4186	-7757	-9960	-11665	-14481	-14551	-16356	-17523	-18219	
Other heat uses (water heating, cooking, etc.)	0	-2	-4	-16	-46	-178	-310	-435	-572	-722	-1132	-1594	-1949	-2162	-2296	-2445	-2618	
Electric uses	0	-42	-101	-144	-244	-2113	-2629	-2822	-2911	-3246	-3863	-5267	-7246	-8682	-8801	-8790	-10230	
Change of fuel mix	0	0	-2	3	14	33	76	-311	-665	-217	211	228	272	-233	-975	-549	-175	
Change of emission factor of electricity and steam (supply effect)	0	-131	-2626	-3127	-4482	-4783	-6459	-7833	-9399	-10166	-11592	-13960	-16133	-16777	-18299	-20006	-20979	
Agriculture																		
Total CO2 emissions reduction	0	-3	-30	-37	-54	-80	-112	-155	-200	-271	-342	-428	-500	-542	-586	-626	-670	
Structural change and behavioural effects	0	-1	-3	-5	-7	-13	-22	-43	-64	-91	-122	-148	-165	-184	-197	-211	-222	
Technological improvement	0	0	-1	-1	-2	-18	-23	-30	-27	-64	-90	-133	-160	-174	-174	-180	-199	
Space heating and cooling	0	0	0	0	0	-2	-2	-5	1	-30	-49	-84	-98	-102	-98	-101	-103	
Other heat uses (water heating, cooking, etc.)	0	0	0	0	-1	-3	-5	-6	-8	-10	-12	-14	-18	-20	-23	-26	-36	
Electric uses	0	0	-1	-1	-2	-14	-17	-19	-20	-24	-29	-35	-44	-52	-53	-60	-60	
Change of fuel mix	0	0	0	0	-1	-1	-2	-4	-14	-15	-17	-11	-15	-17	-27	-30	-33	
Change of emission factor of electricity and steam (supply effect)	0	-1	-26	-31	-45	-48	-65	-78	-95	-100	-113	-136	-160	-168	-187	-204	-216	
Households																		
Total CO2 emissions reduction	0	-198	-2356	-2971	-4370	-5342	-8100	-12011	-16000	-20357	-25753	-31902	-39408	-45045	-51313	-60397	-64430	
Structural change and behavioural effects	0	-50	-170	-292	-478	-902	-1772	-2776	-4174	-5748	-7704	-9768	-11329	-12736	-14108	-15170	-16468	
Technological improvement	0	-35	-52	-123	-223	-412	-849	-2528	-3602	-5523	-7550	-9331	-12959	-16396	-19621	-25509	-27000	
Space heating	0	-6	-10	-25	-46	-90	-192	-401	-693	-1181	-1908	-2852	-5730	-8344	-10409	-11362	-11971	
Other heat uses (water heating, cooking, air conditioning)	0	-22	-34	-84	-158	-297	-601	-1971	-2687	-3967	-5095	-6680	-6084	-6515	-6898	-5776	-5869	
Electric appliances	0	-7	-8	-15	-19	-25	-55	-156	-223	-375	-547	-800	-1145	-1537	-2314	-8371	-9160	
Change of fuel mix	0	-9	-34	-55	-87	-159	-301	-443	-627	-800	-1022	-1255	-1410	-1573	-1665	-3576	-3782	
Change of emission factor of electricity and steam (supply effect)	0	-105	-2101	-2501	-3582	-3869	-5179	-6265	-7597	-8286	-9477	-11547	-13710	-14339	-15919	-16142	-17181	
Passenger Transport																		
Total CO2 emissions reduction	0	-92	-419	-700	-1214	-1980	-3522	-6865	-10964	-14387	-17697	-21521	-25487	-29723	-34910	-42995	-61896	
Structural change and behavioural effects	0	-26	-53	-130	-259	-513	-1011	-1714	-2789	-3829	-5108	-6420	-7895	-9454	-11181	-13736	-20403	
Technological improvement	0	-53	-106	-260	-511	-988	-1872	-4386	-7244	-9536	-11419	-13701	-15909	-18484	-21735	-27143	-39640	
Train transports	0	-6	-11	-26	-51	-94	-185	-349	-1102	-1391	-1639	-2059	-2173	-2262	-2283	-2307	-1887	
Aviation / Navigation	0	-45	-89	-221	-435	-842	-1580	-3835	-5802	-7554	-8890	-10209	-11368	-12374	-13191	-13882	-12906	
Road transports	0	-2	-5	-12	-25	-51	-108	-202	-341	-591	-890	-1433	-2367	-3848	-6261	-10953	-24847	
Change of fuel mix	0	0	0	0	0	-1	-2	-2	-2	-3	-4	-5	-7	-8	-9	-10	-11	
Change of emission factor of electricity and steam (supply effect)	0	-13	-260	-310	-443	-478	-638	-763	-928	-1019	-1165	-1394	-1677	-1778	-1985	-2107	-1843	
Goods Transport																		
Total CO2 emissions reduction	0	-27	-107	-192	-351	-617	-1183	-1963	-2914	-4779	-5448	-7378	-8054	-10881	-15224	-17693	-19939	
Structural change and behavioural effects	0	-16	-30	-80	-167	-344	-705	-1176	-1652	-2540	-2320	-827	-362	-987	-1691	-2555	-3082	
Technological improvement	0	-8	-16	-39	-79	-160	-327	-603	-1040	-2004	-2858	-6261	-7328	-9540	-13115	-14718	-16424	
Train transports	0	-3	-6	-14	-28	-52	-92	-135	-169	-433	-287	-575	-307	-601	-336	-627	-664	
Aviation / Navigation	0	0	0	-1	-1	-3	-6	-11	-18	-28	-43	-43	-73	-95	-232	-291	-490	
Road transports	0	-5	-10	-25	-50	-105	-229	-457	-852	-1543	-2528	-5643	-6947	-8843	-12548	-13800	-15270	
Change of fuel mix	0	0	0	0	-1	-2	-3	-5	-6	-8	-10	-12	-14	-15	-17	-19		
Change of emission factor of electricity and steam (supply effect)	0	-3	-61	-73	-104	-112	-150	-181	-218	-228	-261	-281	-352	-340	-403	-403	-415	
Final Energy Demand Sectors - Total																		
Total CO2 emissions reduction	0	-793	-8802	-11223	-16698	-22927	-34123	-50070	-68636	-87544	-109403	-135317	-161956	-183202	-208973	-236597	-269722	
Structural change and behavioural effects	0	-212	-480	-990	-1769	-3379	-6292	-11009	-16530	-23090	-28829	-33227	-37377	-42835	-48279	-54644	-65027	
Technological improvement	0	-168	-341	-733	-1467	-5027	-8246	-14404	-21728	-31816	-41559	-54490	-70018	-83163	-97370	-113573	-133444	
Change of fuel mix	0	-20	-54	-107	-188	-335	-569	-1278	-1953	-1767	-1669	-1908	-2213	-2876	-3720	-5185	-5027	
Change of emission factor of electricity and steam (supply effect)	0	-392	-7927	-9393	-13274	-14185	-19016	-23378	-28425	-30870	-37346	-45691	-52348	-54327	-59604	-63195	-66224	

ANALYSIS OF ENERGY SYSTEM CHANGES TO REDUCE CO2 EMISSIONS IN 2010 FOR UNITED KINGDOM

Level of Carbon Value (in Eur'90/ton of Carbon)	0	1	2	5	10	20	40	70	110	160	220	290	370	460	560	700	900	
DECOMPOSITION OF CO2 EMISSIONS REDUCTION (ktn of CO2 avoided in target year)																		
Electricity production																		
Total CO2 emissions reduction	0	-469	-7572	-8994	-12691	-15434	-19492	-24296	-30973	-35531	-43349	-55722	-67390	-73857	-82689	-93484	-99949	
Change of demand	0	-117	-423	-506	-510	-2393	-1998	-3109	-5548	-7974	-12103	-17928	-22838	-27355	-31167	-38507	-42082	
Production from non fossil fuels	0	-13	-81	-660	-649	-1832	-1927	-6395	-7080	-7800	-9072	-13014	-16469	-18977	-24689	-30003	-31876	
Large hydro	0	-1	-4	-32	-31	-88	-92	-285	-316	-345	-402	-567	-701	-803	-990	-1186	-1266	
Small renewables	0	-1	-3	-32	-32	-104	-111	-368	-473	-534	-563	-1001	-1443	-1658	-2103	-2562	-2754	
Biomass and waste	0	0	-2	-20	-19	-63	-106	-476	-641	-685	-833	-1301	-1773	-2104	-3007	-3613	-3688	
Nuclear energy	0	-12	-71	-577	-567	-1578	-1618	-5267	-5651	-6236	-7274	-10145	-12552	-14413	-18589	-22641	-24168	
Change of fossil fuel mix	0	-294	-6537	-7300	-10693	-11316	-13207	-13522	-16441	-19823	-23246	-24687	-28421	-27990	-25593	-23309	-21133	
Technological improvement of fossil fuel plants	0	-44	-531	-528	-838	108	-2361	-1270	-1905	67	1072	-93	338	465	-1241	-1665	-4858	
Steam production																		
Total CO2 emissions reduction	0	-30	-653	-740	-879	-863	-1087	-1916	-2661	-3026	-5949	-7741	-7642	-8138	-8634	-8916	-9365	
Change of demand	0	-4	-2	-20	-48	-95	-155	-389	-642	-929	-1191	-1450	-1749	-2318	-2757	-3188	-3783	
Production from non fossil fuels	0	-22	-30	-38	-66	-237	-690	-1098	-1195	-1537	-1456	-1008	-776	-704	-330	-333	-495	
Technological improvement of fossil fuel plants and change of fuel mix	0	-5	-621	-683	-766	-531	-242	-429	-824	-559	-3302	-5283	-5117	-5117	-5547	-5396	-5086	
Other Supply Sectors production																		
Total CO2 emissions reduction	0	-5	-43	-64	-67	-137	-303	-405	-597	-751	-1126	-1399	-1650	-1885	-2167	-2461	-2948	
Statistical Difference																		
	0	-10	-19	-42	-86	-160	-305	-477	-680	-878	-889	-955	-1350	-1584	-1799	-2020	-3389	
Avoided CO2 Emissions - As in Final Report																		
Total CO2 emissions reduction	0	-807	-8864	-11329	-16851	-23224	-34731	-50952	-69912	-89172	-111418	-137671	-164955	-186671	-212939	-241077	-276059	
In Final Energy Demand	0	-302	-598	-1533	-3207	-6783	-13846	-24306	-35635	-49790	-60985	-72826	-88229	-102713	-119339	-136074	-162195	
In Electricity and Steam Generation	0	-500	-8223	-9732	-13577	-16304	-20582	-26241	-33681	-38631	-49307	-63445	-75076	-82073	-91433	-102542	-110916	
In Other Energy Conversion Sectors	0	-5	-43	-64	-67	-137	-303	-405	-597	-751	-1126	-1399	-1650	-1885	-2167	-2461	-2948	

ANALYSIS OF ENERGY SYSTEM CHANGES TO REDUCE CO2 EMISSIONS IN 2010 FOR UNITED KINGDOM

Level of Carbon Value (in Eur'90/ton of Carbon)	0	1	2	5	10	20	40	70	110	160	220	290	370	460	560	700	900	
DECOMPOSITION OF CO2 EMISSIONS REDUCTION (% contribution to avoid CO2 emissions in target year)																		
Industrial Sectors - Metals																		
Total CO2 emissions reduction	0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Structural change and behavioural effects	0	46.5	11.8	20.6	25.4	35.7	43.2	49.3	53.6	56.9	53.4	50.3	39.3	35.8	35.2	35.6	36.2	
Technological improvement	0	5.0	1.3	2.4	2.9	4.0	4.6	5.2	5.8	6.9	10.3	13.5	28.7	35.6	37.2	37.3	37.7	
Energy saving in heat uses	0	1.6	0.6	0.6	0.6	0.8	1.1	1.0	1.1	1.2	2.7	5.4	4.7	5.1	5.1	5.0	5.6	
Specific Industrial processes	0	4.4	1.2	2.0	2.2	3.0	3.5	3.8	4.4	5.3	7.2	7.2	22.9	29.0	30.6	30.8	30.8	
Electrical Equipment	0	-1.0	-0.5	-0.2	0.1	0.2	0.0	0.4	0.4	0.4	0.5	0.9	1.1	1.5	1.5	1.5	1.4	
Change of fuel mix	0	15.6	3.1	7.2	9.6	12.4	12.3	12.6	11.2	10.2	10.3	9.0	8.3	7.1	6.1	5.4	4.7	
Change of emission factor of electricity and steam (supply effect)	0	32.9	83.8	69.7	62.1	47.9	39.9	32.9	29.4	26.0	26.0	27.2	23.7	21.5	21.5	21.7	21.3	
Industrial Sectors - Chemicals																		
Total CO2 emissions reduction	0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Structural change and behavioural effects	0	-6.0	-3.5	0.5	5.3	9.1	8.5	14.6	14.1	16.6	13.1	12.4	12.6	13.1	14.2	15.6	17.7	
Technological improvement	0	7.5	0.6	2.7	3.9	6.8	9.9	12.1	14.7	16.0	15.1	14.1	15.0	22.3	22.7	23.1	22.9	
Energy saving in heat uses	0	1.1	0.1	0.4	0.7	1.1	1.6	2.1	2.5	2.8	2.6	2.4	2.5	3.0	3.1	3.1	3.1	
Specific Industrial processes	0	6.2	0.6	2.1	2.9	5.1	7.5	8.8	10.7	11.5	11.0	10.4	11.2	17.8	18.1	18.5	18.4	
Electrical Equipment	0	0.2	0.0	0.2	0.3	0.6	0.9	1.2	1.6	1.7	1.4	1.3	1.3	1.5	1.5	1.5	1.4	
Change of fuel mix	0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.6	0.5	0.4	0.1	0.1	0.0	0.0	0.0	0.2	
Change of emission factor of electricity and steam (supply effect)	0	98.5	102.8	96.8	90.8	84.0	81.5	72.8	70.5	66.9	71.4	73.3	72.2	64.6	63.0	61.3	59.2	
Industrial Sectors - Materials																		
Total CO2 emissions reduction	0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Structural change and behavioural effects	0	4.8	-0.3	1.8	3.9	6.8	8.5	12.3	13.9	16.6	15.4	14.3	14.4	14.8	14.3	13.7	13.4	
Technological improvement	0	8.9	1.1	2.8	3.7	6.1	8.2	10.2	12.2	14.1	16.1	18.6	20.4	23.8	26.3	30.5	33.6	
Energy saving in heat uses	0	2.9	0.4	0.9	1.1	1.9	2.7	3.4	4.3	5.2	5.7	5.9	6.7	7.9	8.5	9.0	9.1	
Specific Industrial processes	0	4.1	0.5	1.2	1.6	2.6	3.3	4.0	4.6	5.3	6.4	8.7	9.4	10.9	13.0	16.7	19.3	
Electrical Equipment	0	1.9	0.2	0.7	1.0	1.7	2.2	2.8	3.3	3.5	3.9	4.0	4.3	5.0	4.7	4.8	5.2	
Change of fuel mix	0	7.7	0.9	1.8	2.4	3.9	4.7	4.9	4.8	4.8	3.9	3.3	3.1	3.0	2.8	2.5	2.4	
Change of emission factor of electricity and steam (supply effect)	0	78.5	98.2	93.6	90.0	83.2	78.5	72.6	69.1	64.5	64.6	63.7	62.0	58.4	56.6	53.3	50.6	
Industrial Sectors - Others																		
Total CO2 emissions reduction	0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Structural change and behavioural effects	0	1.2	-0.2	0.5	1.3	2.4	3.1	4.7	5.4	6.6	6.3	6.0	6.2	6.6	6.8	7.2	7.8	
Technological improvement	0	3.6	-0.3	2.1	4.1	7.1	9.1	13.9	17.3	21.2	25.4	27.9	31.8	35.0	35.8	36.5	36.9	
Energy saving in heat uses	0	17.7	2.8	3.4	3.0	5.3	8.8	9.1	11.5	13.8	13.9	13.3	14.3	16.5	18.1	19.5	20.7	
Specific Industrial processes	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	0.0	0.0	
Electrical Equipment	0	-14.1	-3.1	-1.2	1.0	1.8	0.4	4.8	5.8	7.5	11.5	14.6	17.6	18.5	17.7	17.0	16.2	
Change of fuel mix	0	1.1	0.1	0.2	0.3	0.5	0.6	0.7	0.7	0.7	0.6	0.5	0.5	0.4	0.4	0.4	0.4	
Change of emission factor of electricity and steam (supply effect)	0	94.0	100.4	97.1	94.3	90.0	87.2	80.7	76.6	71.5	67.8	65.6	61.5	58.0	57.0	56.0	54.9	
Industrial Sectors - Total																		
Total CO2 emissions reduction	0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Structural change and behavioural effects	0	12.6	0.7	3.8	6.5	11.0	14.0	18.3	20.3	23.1	19.7	18.1	16.7	16.4	16.6	17.0	17.8	
Technological improvement	0	5.5	0.4	2.4	3.8	6.2	8.1	10.9	13.2	15.5	18.6	20.8	26.5	31.3	32.6	33.6	34.4	
Energy saving in heat uses	0	8.3	1.6	1.9	1.8	3.1	4.7	5.0	6.2	7.2	8.0	8.4	8.8	10.0	10.8	11.5	12.0	
Specific Industrial processes	0	2.8	0.4	0.9	1.2	2.0	2.7	3.2	3.7	4.2	4.7	4.9	9.0	12.1	12.9	13.7	14.1	
Electrical Equipment	0	-5.7	-1.6	-0.5	0.8	1.2	0.7	2.8	3.3	4.0	5.9	7.5	8.8	9.2	8.9	8.5	8.2	
Change of fuel mix	0	5.9	0.6	1.5	2.2	3.4	3.8	4.2	3.9	3.8	3.3	2.7	2.8	2.5	2.2	2.0	1.8	
Change of emission factor of electricity and steam (supply effect)	0	76.0	98.3	92.3	87.5	79.3	74.0	66.6	62.6	57.7	58.4	58.4	54.0	49.8	48.7	47.4	46.0	

ANALYSIS OF ENERGY SYSTEM CHANGES TO REDUCE CO2 EMISSIONS IN 2010 FOR UNITED KINGDOM

Level of Carbon Value (in Eur'90/ton of Carbon)	0	1	2	5	10	20	40	70	110	160	220	290	370	460	560	700	900	
DECOMPOSITION OF CO2 EMISSIONS REDUCTION (% contribution to avoid CO2 emissions in target year)																		
Services																		
Total CO2 emissions reduction	0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Structural change and behavioural effects	0	33.1	6.8	9.4	9.4	10.6	12.5	18.2	20.4	22.6	24.6	24.3	22.3	22.9	22.2	22.4	22.3	
Technological improvement	0	21.5	5.2	6.0	8.3	35.1	36.0	33.0	34.4	41.0	42.8	43.4	46.5	46.2	45.7	45.2	46.2	
Space heating and cooling	0	6.2	1.7	1.7	3.0	8.8	12.3	13.5	18.8	27.2	28.5	27.4	28.5	26.5	27.2	27.6	27.1	
Other heat uses (water heating, cooking, etc.)	0	0.7	0.1	0.4	0.8	2.0	2.5	2.6	2.5	3.2	3.7	3.8	3.9	3.8	3.8	3.8	3.9	
Electric uses	0	14.5	3.4	3.9	4.5	24.2	21.2	16.9	13.1	11.4	11.1	12.4	14.2	15.8	14.7	13.8	15.2	
Change of fuel mix	0	0.2	0.1	-0.1	-0.3	-0.4	-0.6	1.9	3.0	0.8	-0.6	-0.5	-0.5	0.4	1.6	0.9	0.3	
Change of emission factor of electricity and steam (supply effect)	0	45.2	87.9	84.7	82.5	54.7	52.1	47.0	42.2	35.6	33.2	32.7	31.7	30.5	30.5	31.5	31.2	
Agriculture																		
Total CO2 emissions reduction	0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Structural change and behavioural effects	0	39.5	8.6	12.1	12.9	15.9	19.7	27.5	32.2	33.7	35.6	34.5	33.0	33.9	33.7	33.7	33.2	
Technological improvement	0	14.8	3.8	3.4	3.5	22.6	20.8	19.7	13.7	23.6	26.3	31.1	32.0	32.1	29.8	28.8	29.7	
Space heating and cooling	0	3.8	1.1	0.0	-0.8	2.2	1.9	3.5	-0.3	11.0	14.4	19.6	19.5	18.7	16.8	16.1	15.3	
Other heat uses (water heating, cooking, etc.)	0	-0.2	-0.1	0.5	1.3	3.2	4.1	3.9	4.1	3.8	3.6	3.3	3.8	3.9	4.2	5.3		
Electric uses	0	11.3	2.8	2.9	3.0	17.2	14.8	12.3	9.8	8.7	8.4	8.2	8.9	9.5	9.1	8.5	9.0	
Change of fuel mix	0	3.1	0.6	1.1	1.3	1.6	1.9	2.3	6.8	5.6	5.0	2.5	2.9	3.1	4.7	4.8	4.9	
Change of emission factor of electricity and steam (supply effect)	0	42.6	87.0	83.4	82.4	59.9	57.6	50.5	47.3	37.1	33.0	31.8	32.0	30.9	31.9	32.6	32.3	
Households																		
Total CO2 emissions reduction	0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Structural change and behavioural effects	0	25.0	7.2	9.8	10.9	16.9	21.9	23.1	26.1	28.2	29.9	30.6	28.7	28.3	27.5	25.1	25.6	
Technological improvement	0	17.7	2.2	4.2	5.1	7.7	10.5	21.0	22.5	27.1	29.3	29.2	32.9	36.4	38.2	42.2	41.9	
Space heating	0	3.2	0.4	0.8	1.1	1.7	2.4	3.3	4.3	5.8	7.4	8.9	14.5	18.5	20.3	18.8	18.6	
Other heat uses (water heating, cooking, air conditioning)	0	11.2	1.4	2.8	3.6	5.6	7.4	16.4	16.8	19.5	19.8	17.8	15.4	14.5	13.4	9.6	9.1	
Electric appliances	0	3.3	0.3	0.5	0.4	0.5	0.7	1.3	1.4	1.8	2.1	2.5	2.9	3.4	4.5	13.9	14.2	
Change of fuel mix	0	4.5	1.4	1.8	2.0	3.0	3.7	3.7	3.9	3.9	4.0	3.9	3.6	3.5	3.2	5.9	5.9	
Change of emission factor of electricity and steam (supply effect)	0	52.8	89.1	84.2	82.0	72.4	63.9	52.2	47.5	40.7	36.8	36.2	34.8	31.8	31.0	26.7	26.7	
Passenger Transports																		
Total CO2 emissions reduction	0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Structural change and behavioural effects	0	28.4	12.6	18.6	21.4	25.9	28.7	25.0	25.4	26.6	28.9	29.8	31.0	31.8	32.0	31.9	33.0	
Technological improvement	0	57.5	25.2	37.1	42.1	49.9	53.2	63.9	66.1	66.3	64.5	63.7	62.4	62.2	62.3	63.1	64.0	
Train transports	0	6.2	2.7	3.7	4.2	4.8	5.3	5.1	10.0	9.7	9.3	9.6	8.5	7.6	6.5	5.4	3.0	
Aviation / Navigation	0	48.7	21.4	31.6	35.9	42.5	44.8	55.9	52.9	52.5	50.2	47.4	44.6	41.6	37.8	32.3	20.9	
Road transports	0	2.7	1.1	1.8	2.1	2.6	3.1	2.9	3.1	4.1	5.0	6.7	9.3	12.9	17.9	25.5	40.1	
Change of fuel mix	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	0.0	0.0	
Change of emission factor of electricity and steam (supply effect)	0	14.1	62.2	44.3	36.5	24.1	18.1	11.1	8.5	7.1	6.6	6.5	6.6	6.0	5.7	4.9	3.0	
Goods Transports																		
Total CO2 emissions reduction	0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Structural change and behavioural effects	0	60.2	27.8	41.5	47.5	55.8	59.6	59.9	56.7	53.2	42.6	11.2	4.5	9.1	11.1	14.4	15.5	
Technological improvement	0	28.5	15.1	20.5	22.7	25.9	27.6	30.7	35.7	41.9	52.5	84.9	91.0	87.7	86.2	83.2	82.4	
Train transports	0	10.2	5.8	7.4	7.9	8.4	7.8	6.9	5.8	9.1	5.3	7.8	3.8	5.5	2.2	3.5	3.3	
Aviation / Navigation	0	0.5	0.3	0.4	0.4	0.5	0.5	0.6	0.6	0.6	0.8	0.6	0.9	0.9	1.5	1.6	2.5	
Road transports	0	17.8	9.0	12.8	14.3	17.0	19.3	23.3	29.2	32.3	46.4	76.5	86.3	81.3	82.4	78.0	76.6	
Change of fuel mix	0	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
Change of emission factor of electricity and steam (supply effect)	0	11.2	57.0	37.8	29.7	18.2	12.7	9.2	7.5	4.8	4.8	3.8	4.4	3.1	2.6	2.3	2.1	
Final Energy Demand Sectors - Total																		
Total CO2 emissions reduction	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Structural change and behavioural effects	0	26.8	5.5	8.8	10.6	14.7	18.4	22.0	24.1	26.4	26.4	24.6	23.1	23.4	23.1	23.1	24.1	
Technological improvement	0	21.2	3.9	6.5	8.8	21.9	24.2	28.8	31.7	36.3	38.0	40.3	43.2	45.4	46.6	48.0	49.5	
Change of fuel mix	0	2.6	0.6	1.0	1.1	1.5	1.7	2.6	2.8	2.0	1.5	1.4	1.4	1.6	1.8	2.2	1.9	
Change of emission factor of electricity and steam (supply effect)	0	49.4	90.1	83.7	79.5	61.9	55.7	46.7	41.4	35.3	34.1	33.8	32.3	29.7	28.5	26.7	24.6	

ANALYSIS OF ENERGY SYSTEM CHANGES TO REDUCE CO2 EMISSIONS IN 2010 FOR UNITED KINGDOM

Level of Carbon Value (in Eur'90/ton of Carbon)	0	1	2	5	10	20	40	70	110	160	220	290	370	460	560	700	900	
DECOMPOSITION OF CO2 EMISSIONS REDUCTION (% contribution to avoid CO2 emissions in target year)																		
Electricity production																		
Total CO2 emissions reduction	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Change of demand	0	25.1	5.6	5.6	4.0	15.5	10.2	12.8	17.9	22.4	27.9	32.2	33.9	37.0	37.7	41.2	42.1	42.1
Production from non fossil fuels	0	2.8	1.1	7.3	5.1	11.9	9.9	26.3	22.9	22.0	20.9	23.4	24.4	25.7	29.9	32.1	31.9	31.9
Large hydro	0	0.1	0.1	0.4	0.2	0.6	0.5	1.2	1.0	1.0	0.9	1.0	1.0	1.1	1.2	1.3	1.3	1.3
Small renewables	0	0.1	0.0	0.4	0.3	0.7	0.6	1.5	1.5	1.5	1.3	1.8	2.1	2.2	2.5	2.7	2.8	2.8
Biomass and waste	0	0.1	0.0	0.2	0.1	0.4	0.5	2.0	2.1	1.9	1.9	2.3	2.6	2.8	3.6	3.9	3.7	3.7
Nuclear energy	0	2.5	0.9	6.4	4.5	10.2	8.3	21.7	18.2	17.6	16.8	18.2	18.6	19.5	22.5	24.2	24.2	24.2
Change of fossil fuel mix	0	62.8	86.3	81.2	84.3	73.3	67.8	55.7	53.1	55.8	53.6	44.3	42.2	37.9	31.0	24.9	21.1	21.1
Technological improvement of fossil fuel plants	0	9.4	7.0	5.9	6.6	-0.7	12.1	5.2	6.2	-0.2	-2.5	0.2	-0.5	-0.6	1.5	1.8	4.9	4.9
Steam production																		
Total CO2 emissions reduction	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Change of demand	0	11.7	0.4	2.7	5.4	11.0	14.2	20.3	24.1	30.7	20.0	18.7	22.9	28.5	31.9	35.8	40.4	40.4
Production from non fossil fuels	0	72.3	4.6	5.1	7.5	27.4	63.5	57.3	44.9	50.8	24.5	13.0	10.2	8.7	3.8	3.7	5.3	5.3
Technological improvement of fossil fuel plants and change of fuel mix	0	16.0	95.0	92.2	87.1	61.5	22.3	22.4	31.0	18.5	55.5	68.2	67.0	62.9	64.2	60.5	54.3	54.3
Other Supply Sectors production																		
Total CO2 emissions reduction	0	0.6	0.5	0.6	0.4	0.6	0.9	0.8	0.9	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.1
Statistical Difference																		
Total CO2 emissions reduction	0	1.2	0.2	0.4	0.5	0.7	0.9	0.9	1.0	1.0	0.8	0.7	0.8	0.8	0.8	0.8	1.2	1.2
Avoided CO2 Emissions - As in Final Report																		
Total CO2 emissions reduction	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
In Final Energy Demand	0	37.5	6.7	13.5	19.0	29.2	39.9	47.7	51.0	55.8	54.7	52.9	53.5	55.0	56.0	56.4	58.8	58.8
In Electricity and Steam Generation	0	62.0	92.8	85.9	80.6	70.2	59.3	51.5	48.2	43.3	44.3	46.1	45.5	44.0	42.9	42.5	40.2	40.2
In Other Energy Conversion Sectors	0	0.6	0.5	0.6	0.4	0.6	0.9	0.8	0.9	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.1

ANALYSIS OF ENERGY SYSTEM CHANGES TO REDUCE CO2 EMISSIONS IN 2010 FOR UNITED KINGDOM

Level of Carbon Value (in Eur'90/ton of Carbon)	0	1	2	5	10	20	40	70	110	160	220	290	370	460	560	700	900
Heavy Industry																	
Specific energy Consumption of Process Technology (toe per tn of output)																	
Iron and Steel	0.446	0.446	0.446	0.446	0.446	0.445	0.445	0.444	0.443	0.441	0.439	0.441	0.391	0.364	0.349	0.336	0.324
Basic aluminium	1.101	1.101	1.100	1.100	1.100	1.100	1.097	1.100	1.103	1.108	1.109	1.109	1.109	1.090	1.072	1.023	0.885
Other processing of non ferrous	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.025	0.025	0.025	0.025	0.026	0.025	0.024	0.023	0.023	0.022
Chemicals	0.227	0.227	0.227	0.227	0.226	0.225	0.224	0.220	0.218	0.215	0.211	0.207	0.202	0.189	0.182	0.176	0.169
Cement Production	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.051	0.051	0.051	0.050	0.049	0.049	0.049	0.048	0.044
Glass basic processing	0.130	0.130	0.129	0.129	0.129	0.129	0.129	0.129	0.128	0.128	0.126	0.123	0.122	0.120	0.109	0.101	0.096
Pulp and Paper	0.083	0.083	0.083	0.083	0.083	0.083	0.082	0.082	0.082	0.081	0.080	0.079	0.078	0.075	0.073	0.070	0.067
Structural Change in basic processing (%)																	
Electric steelworks	36.8	36.9	37.1	37.3	37.6	38.4	40.1	41.9	44.7	47.1	46.9	47.8	50.5	52.9	56.8	61.4	66.2
Aluminium recycling	77.6	77.6	77.5	77.6	77.8	78.1	78.1	79.5	80.3	81.5	81.5	81.4	81.4	79.6	78.1	77.2	78.6
Glass recycling	38.9	38.9	38.9	38.9	38.9	39.0	39.1	39.3	39.5	39.8	39.7	39.0	39.0	39.2	39.5	40.1	41.0
Paper recycling	89.9	89.9	89.9	89.9	89.9	89.9	89.9	90.0	90.0	90.1	90.1	90.2	90.2	90.2	90.3	90.4	90.5
Fuel Mix																	
electrotechnologies																	
% of mechanical processing in chemistry	85.2	85.3	85.5	85.6	85.6	86.0	87.1	87.3	87.5	87.4	88.9	90.7	91.8	92.4	92.7	93.3	93.8
% of electric furnaces non ferrous	61.0	61.0	61.0	61.1	61.3	61.6	62.0	63.4	64.6	66.2	66.7	66.1	64.8	62.4	60.9	60.4	62.7
% of mechanical processing glass production	20.3	20.3	20.4	20.4	20.4	20.5	20.8	20.8	21.2	21.4	21.6	21.6	22.0	22.4	22.7	23.7	24.7
% of mechanical processing in paper and pulp	68.0	68.0	68.0	68.0	67.9	67.9	67.6	67.4	66.8	66.3	65.2	64.6	64.5	64.8	65.1	65.4	65.8
% of heat pumps in specific heat uses	2.8	2.8	2.8	2.9	3.1	3.4	4.0	5.1	7.0	9.3	17.8	30.5	53.4	60.2	64.7	68.5	72.3
natural gas directly substituting other fossil fuels (% in specific uses)	58.3	58.3	58.4	58.6	58.9	59.4	60.1	61.8	62.5	63.0	63.2	63.2	63.4	63.3	63.0	63.0	63.0
market share of steam (% in industrial demand)	23.0	23.0	23.0	23.0	23.0	23.1	23.2	23.3	23.5	23.7	23.8	24.0	24.6	24.7	25.0	25.3	25.6
Contribution of CHP for industrial Steam Production (%)	89.9	89.7	89.9	89.8	89.9	89.7	89.1	87.2	87.3	86.7	86.4	86.0	84.8	84.9	85.0	84.4	82.9
Equipment efficiency of electrical and cross-cutting technologies (index)																	
Industrial Furnaces																	
Process Furnaces	100	100.0	100.0	100.1	100.2	100.3	100.6	101.0	101.5	101.9	102.8	103.5	104.1	105.0	105.6	107.2	108.7
Electric Furnaces	100	100.0	100.0	100.1	100.1	100.3	100.5	100.8	101.2	101.9	102.7	105.4	111.1	114.8	118.2	120.0	125.1
Industrial Motors, Air Compressors, Lighting, etc.																	
Motor Drives	100	100.0	100.0	100.1	100.1	100.2	100.3	100.5	100.8	101.0	101.6	102.1	102.4	103.4	105.5	106.9	107.9
Air Compressors	100	100.0	100.0	100.1	100.3	100.5	100.9	101.6	102.5	103.0	104.2	105.0	106.5	108.0	108.9	109.7	110.6
Lighting	100	100.0	100.1	100.3	100.5	101.0	101.9	103.3	105.0	106.2	109.6	114.5	123.8	138.1	144.6	149.2	153.0
Electric Equipment in Households																	
Refrigerators	100	100.0	100.0	100.1	100.1	100.2	100.4	100.9	101.3	101.9	102.6	103.2	103.8	104.3	104.8	106.5	121.9
Washing machines	100	100.1	100.1	100.2	100.2	100.3	100.7	101.6	102.2	103.3	104.3	105.2	106.1	106.8	107.4	107.9	112.1
Lighting	100	100.0	100.0	100.0	100.0	100.0	100.4	100.5	101.2	102.1	104.1	107.3	111.5	122.0	476.6	483.1	
TV and similar	100	100.0	100.0	100.0	100.0	100.0	100.1	100.2	100.3	100.5	100.8	101.0	101.3	101.5	101.8	102.0	102.3
Water heating	100	100.1	100.2	100.3	100.6	101.2	102.4	108.3	111.7	118.4	125.1	129.0	131.5	133.1	134.3	135.9	136.5
Air Conditioning	100	100.0	100.1	100.1	100.1	100.0	100.1	100.5	100.7	101.5	102.7	104.5	106.6	118.2	134.4	158.1	150.6
Electric Equipment in Tertiary																	
Offices	100	100.2	100.5	100.7	101.7	128.3	134.4	135.3	135.7	137.3	141.5	155.6	186.2	217.1	225.2	230.6	273.4
Agriculture	100	100.1	100.2	100.2	100.5	105.4	106.7	107.3	107.6	108.6	110.1	112.4	118.4	122.4	124.0	125.3	128.4

ANALYSIS OF ENERGY SYSTEM CHANGES TO REDUCE CO2 EMISSIONS IN 2010 FOR UNITED KINGDOM

Level of Carbon Value (in Eur'90/ton of Carbon)	0	1	2	5	10	20	40	70	110	160	220	290	370	460	560	700	900
Low enthalpy heat uses (index)																	
Industrial heat uses	100	100.0	100.1	100.1	100.2	100.4	100.8	101.5	102.6	104.1	106.2	108.2	112.6	118.3	121.0	123.4	125.8
Buildings (thermal integrity, efficiency of heat generation)																	
Houses																	
efficiency of heat generation	100	100.0	100.0	100.0	100.1	100.1	100.3	100.7	101.2	102.0	103.2	104.9	110.6	116.0	122.0	125.2	127.8
thermal integrity	100	100.0	100.1	100.1	100.2	100.4	100.8	101.3	102.0	102.8	103.8	104.9	105.9	106.9	107.8	108.7	109.6
Offices																	
efficiency of heat generation	100	100.1	100.1	100.3	100.9	102.0	105.2	109.2	115.1	126.3	133.5	140.1	148.5	152.7	157.4	162.0	166.5
thermal integrity	100	100.0	100.1	100.2	100.2	100.4	100.8	101.5	102.3	103.4	104.7	106.0	106.9	107.9	108.7	109.6	110.4
Agriculture																	
efficiency of heat generation	100	100.0	100.0	100.1	100.4	100.8	102.2	103.9	105.4	110.4	115.4	122.2	126.6	128.3	129.8	131.4	132.8
thermal integrity	100	100.0	100.1	100.2	100.3	100.5	100.8	101.6	102.5	103.6	105.0	106.2	107.2	108.2	109.1	109.9	110.7
Transports																	
Passenger Cars (efficiency index)	100	100.0	100.0	100.0	100.0	100.1	100.1	100.2	100.3	100.6	100.8	101.4	102.3	104.0	107.1	114.3	144.7
Trucks (efficiency index)	100	100.0	100.0	100.1	100.1	100.2	100.5	101.1	102.0	103.7	106.3	114.7	118.6	125.1	140.4	147.2	155.6
Transport modes for passengers (% of transport activity)																	
Passenger Cars	79.7	79.7	79.7	79.8	79.8	79.8	79.8	79.9	79.3	79.1	79.0	78.9	78.4	78.0	78.1	79.1	86.3
Train transport	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	6.7	7.1	7.4	7.6	7.8	8.0	8.1	7.8	5.2
Transport modes for goods (% of transport activity)																	
Train transport	12.6	12.6	12.6	12.6	12.6	12.8	13.0	13.3	13.6	14.9	13.7	13.3	11.9	12.8	11.5	12.8	12.6
Renewables in Final Energy (%)																	
Biomass	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.8	0.9	0.9	1.0	1.1	1.1	1.2	1.4
Solar energy	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Power Generation																	
Fuel Mix in Thermal (electricity from gas over thermal production)	77.2	77.3	80.4	80.8	82.2	83.0	84.3	84.0	85.5	87.4	89.8	91.0	93.6	93.7	93.2	92.5	91.8
Contribution of Nuclear (% over total production)	20.8	20.8	20.9	20.9	20.9	21.0	20.6	21.8	21.4	21.7	22.3	23.2	24.1	25.1	27.2	29.6	30.7
Renewables (as % over total production)	2.8	2.8	2.8	3.0	3.0	3.4	3.9	4.7	5.4	5.4	5.5	6.6	7.5	7.9	8.9	9.6	9.8
hydro of utilities (as % over total production)	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.3	1.3	1.4	1.4	1.5	1.6
hydro of other generators (as % over total production)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1
biomass (as % over total production)	0.7	0.7	0.7	0.7	0.7	0.8	1.3	2.0	2.4	2.4	2.6	3.0	3.4	3.7	4.4	4.7	4.7
wind energy and other renewables (as % over total production)	0.9	0.9	0.9	1.2	1.2	1.4	1.4	1.5	1.8	1.9	1.7	2.3	2.7	2.8	3.0	3.2	3.4
CHP indicators																	
Steam/electricity ratio from CHP	1.20	1.21	1.22	1.21	1.23	1.23	1.38	1.12	1.20	1.29	1.32	1.21	1.17	1.16	0.99	0.93	0.98
% of electricity from CHP	16.6	16.5	16.4	16.5	16.2	16.4	14.5	17.7	16.6	15.5	15.2	16.9	17.6	17.8	21.2	23.2	22.1
% of steam from chp	63.4	63.4	63.4	63.4	63.4	63.4	63.4	63.4	63.4	63.4	63.4	63.4	62.8	63.0	63.4	63.4	63.4
Implications for other policies																	
Import dependency (percent)	1.4	1.4	0.9	0.6	0.6	-0.3	-1.5	-3.4	-5.5	-7.7	-10.2	-14.3	-18.6	-23.1	-29.3	-36.4	-37.0
Market Liberalisation (% of utilities production)	72.4	72.8	75.5	75.6	76.3	78.3	77.9	78.5	80.3	82.4	82.0	80.5	79.0	79.3	77.4	74.6	73.7

ANALYSIS OF ENERGY SYSTEM CHANGES TO REDUCE CO2 EMISSIONS IN 2010 FOR UNITED KINGDOM

Level of Carbon Value (in Eur'90/ton of Carbon)	0	1	2	5	10	20	40	70	110	160	220	290	370	460	560	700	900	
ADDITIONAL SYSTEM COSTS INCLUDING CARBON VALUE (mio Eur'90)																		
Total area in the marginal cost abatement curve as % of GDP	0 0.00%	1 0.00%	9 0.00%	16 0.00%	44 0.00%	108 0.01%	338 0.03%	824 0.07%	1583 0.13%	2546 0.22%	3881 0.33%	5718 0.48%	7901 0.67%	9855 0.83%	12482 1.05%	16421 1.39%	23418 1.98%	
COST ANALYSIS BY SECTOR																		
Industrial Sectors - Metals																		
Average cost of Sectoral Production excluding Carbon Value																		
Eur'90 per tn of output	490	490	490	490	490	491	491	492	492	492	491	490	485	482	482	481	479	
% change from Baseline	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.4	0.5	0.4	0.1	0.0	-1.1	-1.6	-1.6	-1.9	-2.3	
Average cost of Sectoral Production including Carbon Value																		
Eur'90 per tn of output	490	490	491	492	494	498	504	515	527	542	557	575	581	594	608	628	653	
% change from Baseline	0.0	0.1	0.1	0.4	0.8	1.5	2.9	5.0	7.6	10.5	13.7	17.2	18.6	21.2	24.1	28.1	33.3	
Structure of costs (%)																		
Non energy costs	77.6	77.6	77.6	77.4	77.2	76.8	76.1	74.9	73.6	72.1	70.2	68.2	67.5	66.2	64.9	63.2	61.3	
Technology and fuel costs	22.4	22.3	22.3	22.2	22.1	21.8	21.3	20.7	19.8	18.8	17.9	17.1	15.9	15.0	14.4	13.4	12.0	
Carbon value cost	0.0	0.1	0.1	0.4	0.7	1.4	2.7	4.5	6.6	9.1	12.0	14.8	16.6	18.8	20.7	23.4	26.7	
Industrial Sectors - Chemicals																		
Average cost of Sectoral Production excluding Carbon Value																		
Eur'90 per tn of output	418	418	418	418	418	418	417	417	417	416	416	416	415	415	415	415	414	
% change from Baseline	0.0	0.0	-0.1	-0.1	-0.1	-0.1	-0.3	-0.2	-0.4	-0.6	-0.6	-0.5	-0.7	-0.8	-0.7	-0.8	-1.0	
Average cost of Sectoral Production including Carbon Value																		
Eur'90 per tn of output	418	418	418	418	419	419	420	422	424	426	429	432	435	438	441	445	450	
% change from Baseline	0.0	0.0	0.0	0.0	0.1	0.3	0.4	1.0	1.4	1.9	2.6	3.4	3.9	4.6	5.4	6.4	7.7	
Structure of costs (%)																		
Non energy costs	83.0	83.0	83.1	83.0	82.9	82.8	82.7	82.3	82.0	81.6	81.1	80.5	80.0	79.6	79.0	78.3	77.5	
Technology and fuel costs	17.0	16.9	16.9	16.9	16.9	16.8	16.5	16.5	16.2	15.9	15.9	15.8	15.5	15.3	15.2	14.9	14.5	
Carbon value cost	0.0	0.0	0.0	0.1	0.2	0.4	0.7	1.2	1.8	2.5	3.1	3.7	4.5	5.2	5.8	6.8	8.1	
Industrial Sectors - Materials																		
Average cost of Sectoral Production excluding Carbon Value																		
Eur'90 per tn of output	491	491	491	491	491	491	491	493	493	494	495	492	490	490	491	491	490	
% change from Baseline	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.4	0.5	0.7	0.8	0.2	-0.1	-0.1	0.0	-0.1	-0.1	
Average cost of Sectoral Production including Carbon Value																		
Eur'90 per tn of output	491	491	491	491	492	493	495	500	504	510	515	517	521	528	534	542	552	
% change from Baseline	0.0	0.0	0.0	0.1	0.3	0.5	0.9	1.8	2.7	3.8	5.0	5.3	6.2	7.5	8.8	10.4	12.5	
Structure of costs (%)																		
Non energy costs	91.3	91.3	91.3	91.2	91.1	91.0	90.7	90.2	89.7	89.0	88.3	87.4	86.6	85.6	84.7	83.7	82.3	
Technology and fuel costs	8.7	8.7	8.7	8.7	8.7	8.6	8.4	8.4	8.2	8.0	7.8	7.7	7.4	7.3	7.2	6.9	6.5	
Carbon value cost	0.0	0.0	0.0	0.1	0.2	0.4	0.8	1.4	2.1	3.0	3.9	4.9	6.0	7.1	8.1	9.4	11.2	
Industrial Sectors - Others																		
Average cost of Sectoral Production excluding Carbon Value																		
Eur'90 per tn of output	2830	2830	2829	2830	2830	2830	2829	2830	2830	2830	2830	2831	2831	2831	2832	2833	2833	
% change from Baseline	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	0.1	0.1	0.1	0.1	
Average cost of Sectoral Production including Carbon Value																		
Eur'90 per tn of output	2830	2830	2830	2830	2831	2831	2833	2836	2839	2843	2847	2851	2855	2861	2866	2873	2883	
% change from Baseline	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.3	1.5	1.9		
Structure of costs (%)																		
Non energy costs	98.7	98.7	98.7	98.7	98.7	98.7	98.6	98.5	98.4	98.3	98.2	98.0	97.9	97.7	97.5	97.3	97.0	
Technology and fuel costs	1.3	1.3	1.3	1.3	1.3	1.3	1.2	1.3	1.3	1.3	1.3	1.3	1.2	1.3	1.3	1.3	1.3	
Carbon value cost	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.3	0.4	0.6	0.7	0.9	1.0	1.2	1.4	1.7	

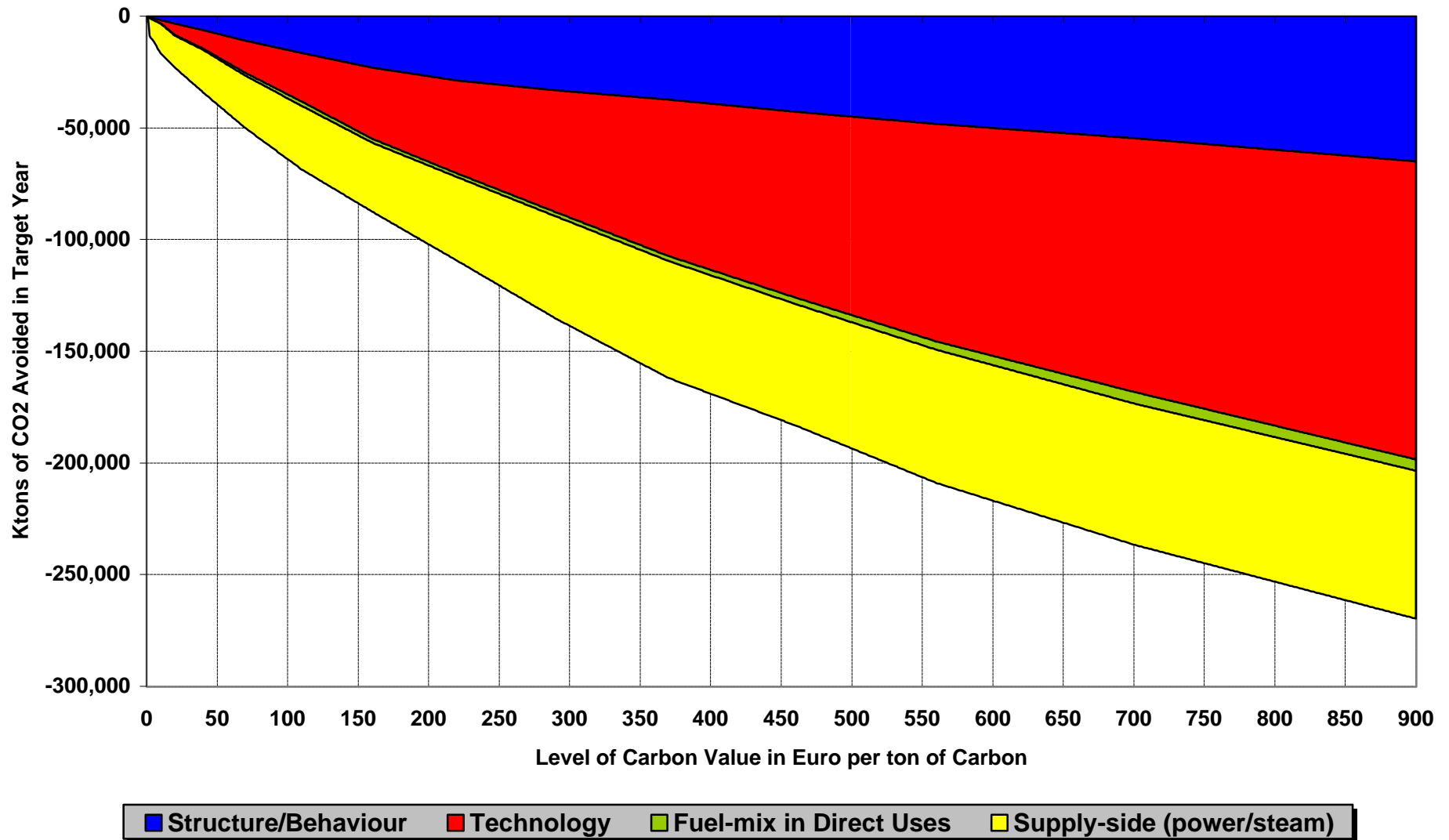
ANALYSIS OF ENERGY SYSTEM CHANGES TO REDUCE CO2 EMISSIONS IN 2010 FOR UNITED KINGDOM

Level of Carbon Value (in Eur'90/ton of Carbon)	0	1	2	5	10	20	40	70	110	160	220	290	370	460	560	700	900
Services																	
Average cost of Energy Service excluding Carbon Value																	
Eur'90 per unit of energy service	4057	4057	4058	4059	4059	4045	4039	4045	4036	4036	4046	4055	4052	4063	4068	4087	4160
% change from Baseline	0.0	0.0	0.0	0.1	0.1	-0.3	-0.4	-0.3	-0.5	-0.5	-0.3	0.0	-0.1	0.2	0.3	0.7	2.5
Average cost of Energy Service including Carbon Value																	
Eur'90 per unit of energy service	4057	4058	4061	4064	4069	4064	4077	4110	4132	4169	4220	4265	4291	4345	4385	4461	4610
% change from Baseline	0.0	0.0	0.1	0.2	0.3	0.2	0.5	1.3	1.9	2.8	4.0	5.1	5.8	7.1	8.1	10.0	13.6
Structure of costs (%)																	
Non energy costs	68.3	68.3	68.3	68.2	68.1	68.3	68.1	67.5	67.1	66.5	65.7	65.0	64.5	63.7	63.1	62.0	60.0
Technology and fuel costs	31.7	31.7	31.7	31.7	31.6	31.3	31.0	30.9	30.5	30.3	30.2	30.1	29.9	29.8	29.7	29.7	30.3
Carbon value cost	0.0	0.0	0.1	0.1	0.2	0.5	0.9	1.6	2.3	3.2	4.1	4.9	5.6	6.5	7.2	8.4	9.8
Agriculture																	
Average cost of Energy Service excluding Carbon Value																	
Eur'90 per unit of energy service	5174	5175	5176	5177	5177	5164	5160	5170	5173	5166	5176	5186	5184	5197	5212	5236	5301
% change from Baseline	0.0	0.0	0.0	0.1	0.1	-0.2	-0.3	-0.1	0.0	-0.1	0.0	0.2	0.2	0.4	0.7	1.2	2.5
Average cost of Energy Service including Carbon Value																	
Eur'90 per unit of energy service	5174	5176	5179	5184	5190	5190	5212	5258	5309	5356	5428	5499	5562	5653	5748	5884	6101
% change from Baseline	0.0	0.0	0.1	0.2	0.3	0.3	0.7	1.6	2.6	3.5	4.9	6.3	7.5	9.3	11.1	13.7	17.9
Structure of costs (%)																	
Non energy costs	82.9	82.8	82.8	82.7	82.6	82.5	82.2	81.5	80.7	80.0	78.9	77.9	77.0	75.8	74.6	72.9	70.5
Technology and fuel costs	17.1	17.1	17.2	17.1	17.1	17.0	16.8	16.9	16.8	16.5	16.5	16.5	16.2	16.1	16.1	16.1	16.4
Carbon value cost	0.0	0.0	0.1	0.1	0.3	0.5	1.0	1.7	2.6	3.5	4.6	5.7	6.8	8.1	9.3	11.0	13.1
Households																	
Average cost of Energy Service excluding Carbon Value																	
Eur'90 per unit of energy service	287	287	288	288	287	287	287	286	284	282	282	282	279	278	277	275	281
% change from Baseline	0.0	0.0	0.1	0.1	0.0	0.0	-0.1	-0.7	-1.1	-1.8	-2.0	-2.0	-2.9	-3.4	-3.5	-4.4	-2.3
Average cost of Energy Service including Carbon Value																	
Eur'90 per unit of energy service	287	288	288	289	289	291	294	297	302	307	314	322	328	335	342	348	370
% change from Baseline	0.0	0.1	0.2	0.4	0.6	1.2	2.3	3.4	5.0	6.8	9.3	12.2	14.0	16.5	19.2	21.0	28.8
Structure of costs (%)																	
Non energy costs	26.2	26.1	26.1	26.0	26.0	25.8	25.4	25.1	24.6	24.0	23.3	22.5	22.0	21.5	21.0	20.7	19.6
Technology and fuel costs	73.8	73.8	73.8	73.7	73.4	73.0	72.3	71.1	69.6	67.9	66.3	64.9	63.2	61.4	60.0	58.3	56.3
Carbon value cost	0.0	0.1	0.1	0.3	0.6	1.2	2.3	3.9	5.8	8.0	10.4	12.6	14.8	17.0	19.0	21.0	24.2
Passenger Transports																	
Average cost of Energy Service excluding Carbon Value																	
Eur'90 per 1000 passenger-km	170	170	170	170	170	170	170	170	169	169	169	168	168	168	168	170	186
% change from Baseline	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	-0.5	-0.7	-0.8	-0.9	-1.2	-1.4	-1.2	-0.1	9.4
Average cost of Energy Service including Carbon Value																	
Eur'90 per 1000 passenger-km	170	170	170	170	170	171	171	172	173	174	176	178	180	182	185	189	206
% change from Baseline	0.0	0.0	0.1	0.1	0.2	0.5	0.9	1.4	1.9	2.6	3.6	4.8	5.8	7.1	8.7	11.3	20.9
Structure of costs (%)																	
Non energy costs	11.7	11.7	11.7	11.7	11.7	11.7	11.6	11.5	11.6	11.5	11.4	11.3	11.2	11.1	10.9	10.5	8.8
Technology and fuel costs	88.3	88.2	88.2	88.2	88.1	87.9	87.5	86.9	86.1	85.2	84.3	83.3	82.1	81.0	80.1	79.3	81.7
Carbon value cost	0.0	0.0	0.0	0.1	0.2	0.5	0.9	1.5	2.3	3.2	4.3	5.5	6.7	7.9	9.1	10.2	9.5
Goods Transports																	
Average cost of Energy Service excluding Carbon Value																	
Eur'90 per 1000 tonne-km	121	121	121	121	121	121	120	120	119	118	117	117	116	114	110	107	105
% change from Baseline	0.0	0.0	0.0	-0.1	-0.1	-0.3	-0.6	-1.1	-1.6	-2.9	-3.2	-3.6	-4.0	-6.0	-9.2	-11.4	-13.5
Average cost of Energy Service including Carbon Value																	
Eur'90 per 1000 tonne-km	121	121	121	121	121	122	122	123	124	125	127	129	132	133	131	131	134
% change from Baseline	0.0	0.0	0.1	0.1	0.3	0.5	1.0	1.7	2.6	3.1	5.0	6.8	9.3	9.5	7.8	8.6	10.7
Structure of costs (%)																	
Non energy costs	35.7	35.7	35.7	35.7	35.7	35.6	35.5	35.3	35.0	35.0	34.2	33.0	32.0	31.9	32.7	32.5	31.8
Technology and fuel costs	64.3	64.2	64.2	64.1	63.9	63.6	62.9	62.0	60.8	59.2	58.0	57.3	55.9	53.9	51.6	49.2	46.3
Carbon value cost	0.0	0.0	0.1	0.2	0.4	0.8	1.6	2.7	4.2	5.8	7.8	9.8	12.1	14.1	15.7	18.4	21.9

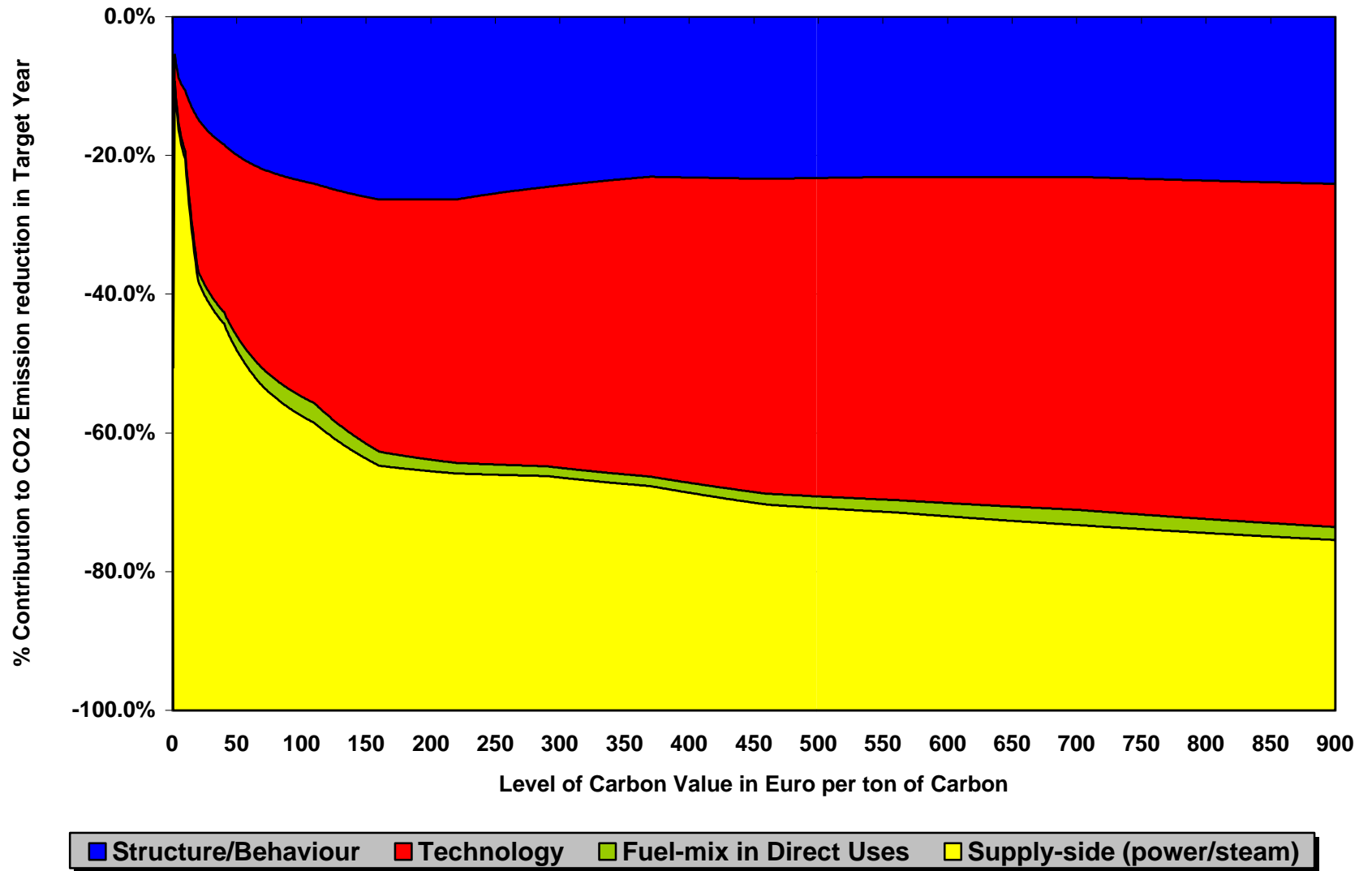
ANALYSIS OF ENERGY SYSTEM CHANGES TO REDUCE CO2 EMISSIONS IN 2010 FOR UNITED KINGDOM

Level of Carbon Value (in Eur'90/ton of Carbon)	0	1	2	5	10	20	40	70	110	160	220	290	370	460	560	700	900	
Electricity and Steam production																		
Average cost of production excluding Carbon Value																		
mEur'90 per kWh+kWhth	43	43	43	44	44	44	44	44	44	45	45	46	47	47	48	49	50	
% change from Baseline	0.0	0.0	0.0	0.2	0.5	0.2	0.7	1.2	1.8	2.8	4.4	6.2	8.1	9.0	11.1	11.8	15.4	
Average cost of production including Carbon Value																		
mEur'90 per kWh+kWhth	43	44	44	44	44	45	47	49	53	57	61	66	71	76	82	89	100	
% change from Baseline	0.0	0.2	0.5	1.2	2.3	3.9	8.1	13.8	21.0	30.4	40.8	51.4	62.7	75.6	88.7	104.4	131.1	
Structure of costs (%)																		
Annual Capital cost	28.1	28.0	28.0	27.8	27.7	27.3	26.4	25.3	24.2	22.6	21.1	20.7	20.3	19.2	18.9	18.3	17.0	
O & M costs	18.0	17.9	17.9	17.8	17.6	17.3	16.8	16.0	15.2	14.3	13.4	12.9	12.3	11.7	11.2	10.7	10.0	
Transm. \$ Distr. Costs	28.8	28.7	28.7	28.5	28.2	27.7	26.9	25.5	24.0	22.4	20.8	19.2	17.7	16.5	15.1	13.4	12.1	
Fuel Costs	25.1	25.1	25.2	25.1	24.8	24.2	23.2	22.1	20.8	19.4	18.8	17.4	16.0	14.8	13.6	12.3	10.9	
Carbon value costs	0.0	0.2	0.5	0.9	1.8	3.5	6.8	11.1	15.8	21.2	25.9	29.8	33.6	37.9	41.1	45.3	50.0	
Investment expenditure for Electricity and Steam production																		
000mio Eur'90 spent in 1995 to 2010	50513	50392	49765	49921	49887	48673	49774	49654	49493	47813	46653	48836	49857	48555	50156	48894	50347	
% change from Baseline	0.0	-0.2	-1.5	-1.2	-1.2	-3.6	-1.5	-1.7	-2.0	-5.3	-7.6	-3.3	-1.3	-3.9	-0.7	-3.2	-0.3	
Investment expenditure per KWh produced in 2010																		
mEur'90 per kWh+kWhth	79.6	79.5	78.7	79.2	79.6	79.1	82.4	85.3	89.5	91.7	96.5	110.8	124.2	133.6	152.7	172.0	206.0	
% change from Baseline	0.0	-0.1	-1.1	-0.4	0.0	-0.6	3.6	7.2	12.4	15.3	21.3	39.2	56.1	68.0	91.9	116.1	158.9	
Electricity tariffs (mEur'90 per kWh - includes effect of carbon value for electricity production)																		
Sectoral Average	56	57	57	57	58	59	61	64	67	72	78	86	93	97	105	115	129	
Industry	42	42	42	42	43	44	49	49	53	57	62	68	76	81	90	99	113	
Tertiary	62	63	63	63	64	64	65	69	72	78	86	94	101	106	113	123	139	
Households	67	67	68	68	68	70	71	74	77	81	87	96	103	107	115	124	139	
Transports	47	47	48	48	49	51	53	57	62	67	73	81	88	93	101	110	124	
Others	48	48	48	49	50	51	53	57	60	64	69	77	84	89	97	106	120	
Electricity tariffs (% change from Baseline)																		
Sectoral Average	0.0	0.3	0.7	1.4	2.3	4.0	7.8	12.8	18.7	26.8	38.5	51.5	64.1	72.8	86.4	103.0	128.7	
Industry	0.0	0.0	-0.7	0.2	2.4	4.8	16.0	17.9	26.1	36.4	48.8	63.2	81.1	94.3	114.4	137.8	170.6	
Tertiary	0.0	0.5	1.0	1.6	1.9	3.0	3.8	10.4	15.5	24.7	37.5	50.5	61.5	69.2	81.4	97.6	122.1	
Households	0.0	0.3	1.3	1.8	2.4	4.2	6.0	10.9	15.9	21.1	30.8	43.1	53.7	60.5	71.7	85.9	107.6	
Transports	0.0	0.4	1.5	2.8	4.7	8.1	13.9	21.2	31.4	42.5	56.4	73.1	88.7	99.1	115.2	134.6	165.2	
Others	0.0	0.4	1.7	2.9	4.6	7.8	12.2	18.9	26.7	34.7	45.8	60.9	76.7	87.2	103.2	121.8	151.1	

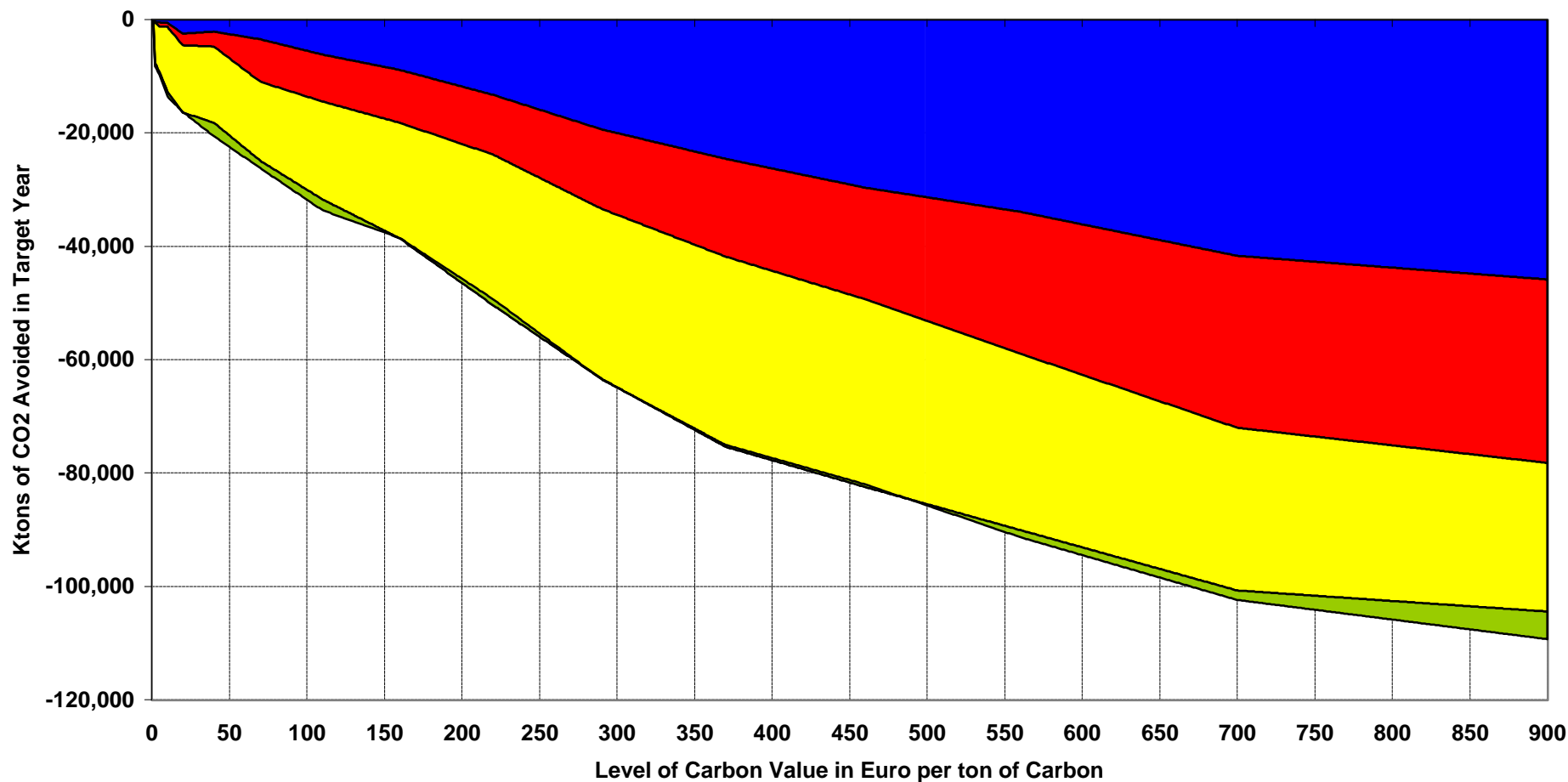
UNITED KINGDOM: CO2 Emission Reduction - Decomposition



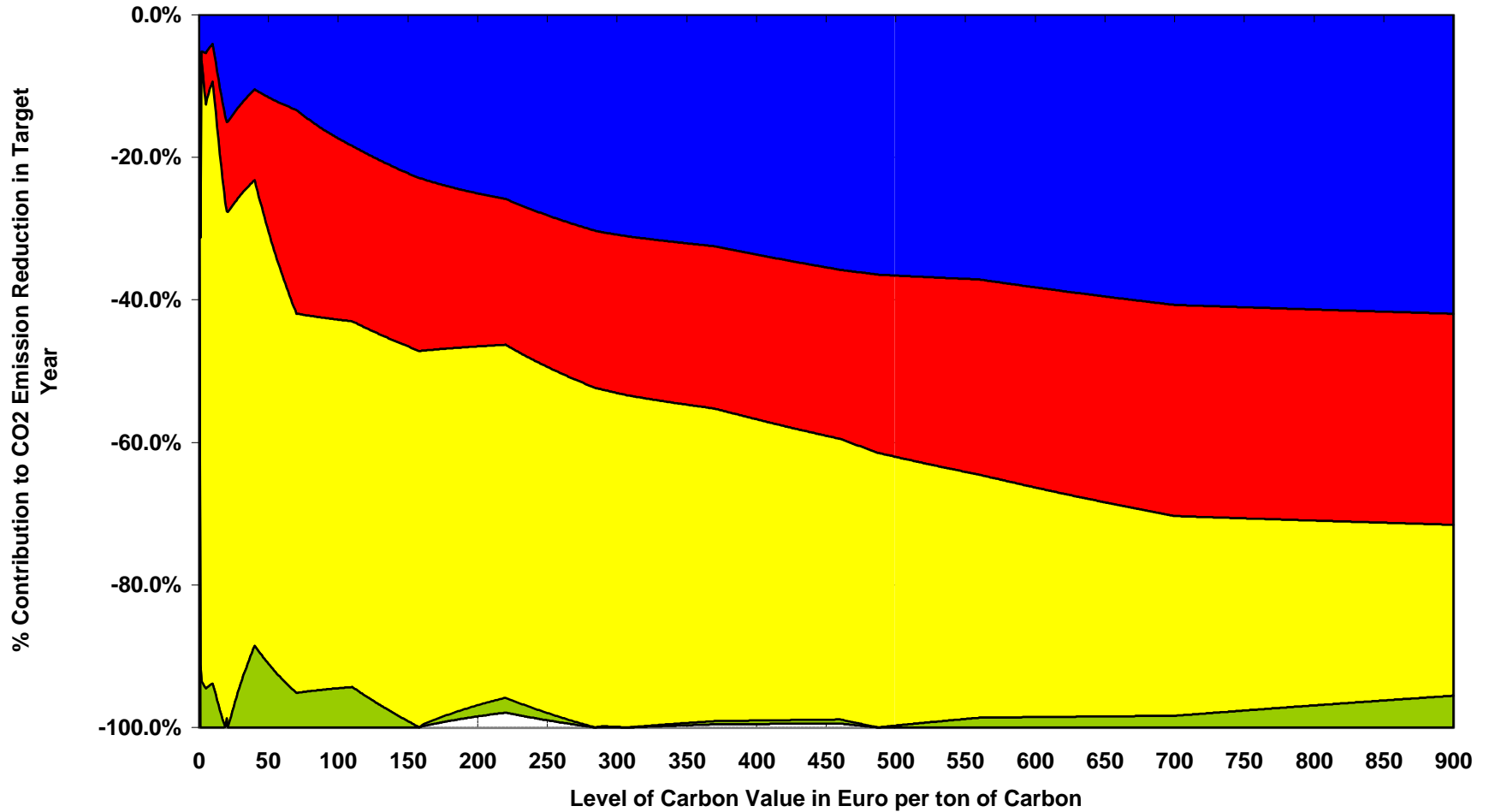
UNITED KINGDOM: CO2 Emission Reduction - Decomposition in Percentage



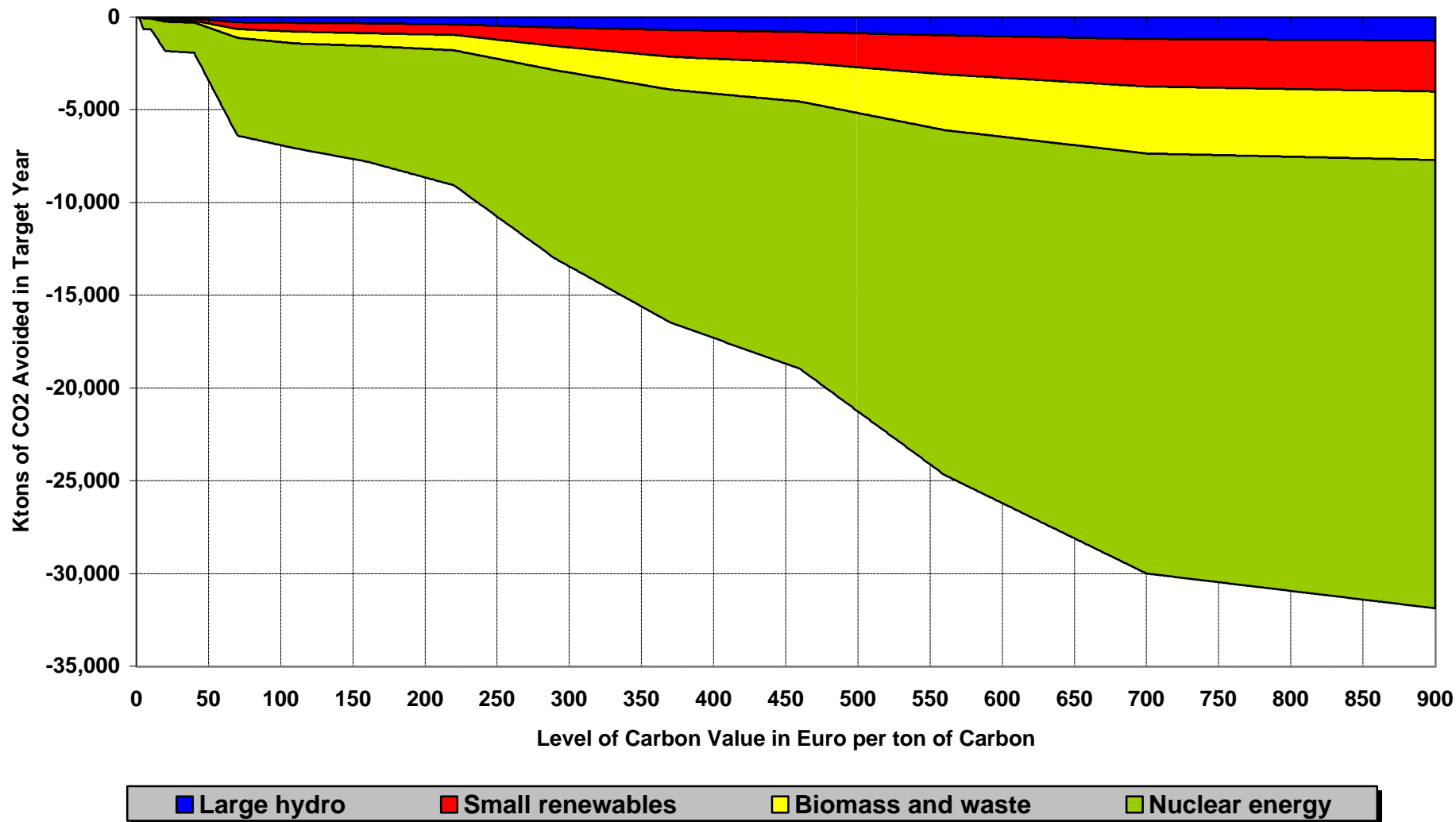
UNITED KINGDOM: CO2 Emission Reduction in Power and Steam Generation - Decomposition



UNITED KINGDOM: CO2 Emission Reduction in Power and Steam Generation - Decomposition in %



UNITED KINGDOM: CO2 Emission Reduction - Contribution of Non-Fossil Fuel in Power and Steam



UNITED KINGDOM: CO2 Emission Reduction - Contribution of Non-Fossil Fuel in Power and Steam - in %

