2010 Emission Projections

Reasons for Change Paper

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Executive Summary

As part of the National Atmospheric Emission Inventory (NAEI) work carried out for Defra by AEA, projections of UK emissions are compiled to enable comparisons with international commitments under the National Emissions Ceilings Directive and the UNECE Gothenburg Protocol to be made. Projections have been compiled for the four National Emissions Ceiling Directive (NECD) pollutants (nitrogen oxides (NO_x), sulphur dioxide (SO_2), non-methane volatile organic compounds (NMVOCs), and ammonia (NH_3). This paper discusses the changes made to update the emission projections since the previous projections for 2010 were published (Wagner et al 2008).

The latest emission projections are based on:

- the Department of Energy and Climate Change (DECC) Updated Energy Projections 38 (UEP38) energy forecasts published in July 2009;
- the Department for Transport (DfT) 2009 traffic forecasts and Transport Research Laboratory (TRL) emission factors (NO_x and PM_{10});
- North Wyke Research, BAU (III) preliminary agricultural projections (October 2008); and
- The 2008 emission estimates for each source sector from the NAEI.

This short paper provides an update of the policies included in the 2010 NECD projections (UEP38) and a summary of the changes to the 2009 NECD projections (UEP37). The 2010 NECD projections were developed on the same basis as the 2009 NECD projections.
2010 NECD projections include the impacts of policies and measures announced up to and including those in the Low Carbon Transition Plan. They do not include policies that are still under consideration. The main changes from UEP37 to UEP38 were revised policy appraisals, revised fossil fuel price assumptions, updated population growth figures, updated carbon prices and changes in demand by final user, including falling grid demand due to the recession.

This set of emission projections was compiled in April 2010, and is referred to as UEP38 (2008). The energy trends that have been used to underpin the emission projections reported here are taken from the UEP38 "central, central, central" scenario, which refers to central fuel and carbon prices, central economic growth forecasts and central policy impacts.

Table 0.1 The UK's emissions in 2008 (as reported in 2009 NECD submission[1]) and targets for 2010 that the UK is committed to.

Pollutant	Emissions in 2008 (ktonnes)	Gothenburg Protocol target in 2010 (ktonnes)	NECD Emissions ceiling target in 2010 (ktonnes)	Reduction required between 2008 and 2010 Emissions ceiling target
NO_x	1,403	1,181	1,167	17%
SO_2	512	625	585	N/A
NMVOCs	942	1,200	1,200	N/A
NH_3	282	297	297	N/A

The UEP38 (2008) emission projections show that the UK is likely to meet the NECD targets in 2010 for all pollutants (Table 1.2).

[1] Covering the United Kingdom and Gibraltar

Table 0.2. Predicted emissions for those sectors covered under the NECD using DECC's UEP38 energy projections (Ktonnes).

Projected Year	2010
NO_x	1,132
SO_x	372
NMVOC	774
NH_3	291

1 Introduction

SUMMARY OF THE AIR QUALITY PROJECTIONS METHOD & KEY DATA SOURCES

The 2009 NECD projections are referred to as UEP37 (2007) and are based on:

- DECC UEP37 energy forecasts
- DfT's 2008 traffic forecasts.
- The inventory baseline is the 2009 NAEI Inventory (2007).

The 2010 NECD projections are referred to as UEP38 (2008) and are based on:

- DECC UEP38 energy forecasts
- November 2009 traffic forecasts from DfT.
- The inventory baseline is the 2010 NAEI Inventory (2008).

Table 1.1 Projection definitions

Projection dataset	Date of DECC Energy Forecast publication	NAEI emission starting point	DECC energy forecasts, scenario used	Road transport data source and key assumptions
UEP37 (2007)	April 2009	2007	UEP37 central polices, central growth and central prices	Based on DfT's April 2009 Basecase traffic forecasts, and TRL's NOx and PM_{10} emission factors.
UEP38 (2008)	July 2009	2008	UEP38 central polices, central growth and central prices	Based on DfT's April 2009 Basecase traffic forecasts, and TRL's updated emission factors for all NECD Pollutants, including speed related emission factors.

2 Main reasons for change

This section outlines the main reason for change between the 2009 NECD projections based on UEP37 and the 2010 NECD projections based on UEP38.

Information on the general assumptions and methodologies used for the "with measures" projections scenario can be found in Wagner et al, 2008.

The NECD projections are based on the DECC UEP forecast and the NAEI database used to generate the NAEI historical emissions (see Table 1.1). Thus, changes between the 2009 and 2010 NECD projections will be driven by changes in the underlying baseline data and the changes in the DECC energy forecast figures.

For general assumption on the methodology and assumptions used to derive the NAEI projections see chapter 3.1 in Wagner et al, 2008.

The next section summarised the main changes between the underlying UEP37 and UEP38 energy data provided by DECC.

2.1 MAIN CHANGES IN ASSUMPTIONS BETWEEN DECC UEP37 AND UEP38

The UEP38 energy forecast includes the full package of proposals and policies set out in the UK Low Carbon Transition Plan (DECC 2008). The detailed scenario assumption can be found in section 2.

B) UPDATE OF POLICY CHANGES INCLUDED IN THE EMISSIONS PROJECTIONS

The July 2009 projections include existing policies as in the UEP37 and additional policies listed in the UK Low Carbon Transition Plan (DECC 2008). Further detailed information on the policies can be found in table A1.

Table 2.1 outlines the policy included in UEP38 and UEP37.

Table 2.1 Low Carbon Transition Plan (additional policy) included in the UEP38 scenario projections

Sector	Policy in UEP37	Additional policy in UEP38
Main Policy	- 2007 Energy White Paper	- 2009 UK Low Carbon Transition Plan
Residential	- EEC1[2] and EEC2[3] - Building Regulations - Warm Zone and fuel poverty programmes	- Domestic Energy Efficiency package - Zero Carbon Homes - CERT uplift - Better Billing and Metering - Product Policy - Community Energy Saving Programme - Renewable Heat Incentive
Business/Public Sector	- Building Regulations - Carbon Trust Measures - Climate Change Agreements - Revolving loan (e.g. Salix)	- Carbon Reduction Commitment - Energy Performance of Buildings Directive - Product Policy - Smart Meters for SMEs - Loans for SMEs - Loans to public sector - Renewable Heat Incentive (business, public and industry)
Industry	- Building Regulations - Carbon Trust Measures	- CCS demonstration plant (Energy Industry) - Renewable Energy Strategy
Transport	- Renewable Transport Fuel Obligation savings (5% volume) - EU Voluntary Agreements on new car CO_2	- EU new car average fuel efficiency standards - Low carbon emission buses - SAFED training for bus drivers

[2] Energy Efficiency Commitment period (EEC1: 2002-2005)
[3] Energy Efficiency Commitment period (EEC2 2005-2008)

3 EMISSION PROJECTION RESULTS BY POLLUTANT

The 2010 NECD projections for NOx, SO2, NMVOCs and NH3 are presented here by NFR Codes. The 2010 NECD projections using UEP 38 and the 2008 NAEI (UEP38 (2008)) results are compared with the 2009 NECD projections using DECC's UEP37 and the 2007 NAEI (UEP37 (2007)). The Reasons for change column flags whether a change is driven by changes to the NAEI baseline or the DECC energy forecast.

Nitrogen Oxides

Table 3.1. NOx emission estimates for 2008[4] and projected emissions using DECC's UEP37 and the 2007 NAEI and UEP 38 and the 2008 NAEI for those NFR sectors covered under the NECD (ktonnes).

NFR Code	NFR Name	2008	2010 (UEP37 (2007))	2010 (UEP 38 (2008))	2010 Comparison (% change from UEP37 (2007) to UEP 38 (2008)	Reasons for Change
1 A 1	1 A 1 Energy industries (Combustion in power plants & Energy Production)	353	334	327	-2%	NAEI baseline: Updates on the fuel used in power stations from DUKES
1 A 2	1 A 2 Manufacturing Industries and Construction (Combustion in industry including Mobile):	220	219	202	-8%	NAEI baseline: Emissions from sinter plant were moved from 1A2a to 2C1. Activity data for off-road vehicles decreases as a result of the change from use of 2007 data as a baseline to use of 2008 data. Changes to baseline emission factors reduce emission projections for cement and ammonia production. Changes to baseline activity data and emission factors increases projected emissions for coal-fired lime kilns. DECC UEP data: Increased use of coal and, in particular, gas by autogenerators. AEA Projections: Revisions to methods for combining DECC & NAEI data to produce projected activity data leading to a reduction in emissions.
1 A 3 b	1 A 3 b Road Transport;	NA	NA	NA	0%	
1 A 3 b i	1 A 3 b i R.T., Passenger cars	172	113	113	0%	No Change
1 A 3 b ii	1 A 3 b ii R.T., Light duty vehicles	55	41	41	0%	No Change
1 A 3 b iii	1 A 3 b iii R.T., Heavy duty vehicles	223	177	177	0%	No Change
1 A 3 b iv	1 A 3 b iv R.T., Mopeds & Motorcycles	1	2	2	0%	No Change
1 A 3 b v	1 A 3 b v R.T., Gasoline evaporation	NA	NA	NA		
1 A 3 b vi	1 A 3 b vi R.T., Automobile tyre and brake wear	NA	NA	NA		

[4] The 2008 base year estimates are based on last years inventory submitted to the NECD on the 31st December 2009

NFR Code	NFR Name	2008	2010 (UEP37 (2007))	2010 (UEP 38 (2008))	2010 Comparison (% change from UEP37 (2007) to UEP 38 (2008)	Reasons for Change
1 A 3 b vii	1 A 3 b vii R.T., Automobile road abrasion	NA	NA	NA		
1 A 3 a,c,d,e	1 A 3 a,c,d,e Non-road transport	169	143	74	-48%	NAEI baseline: Bottom-up shipping study by Entec (2010) based on vessel movements for domestic shipping yields changes in fuel consumption. New methodology for reconciling with DUKES total shipping fuels to estimate international shipping fuel consumption: DUKES (national navigation+int. bunkers) minus Entec (domestic+fishing)-naval
1 A 4	1 A 4 Other sectors (Commercial, residential , agriculture and fishing stationary and mobile combustion)	166	153	155	1%	No major change
1 A 5	1 A 5 Other	30	23	29	28%	NAEI baseline: New activity drivers have been used to rescale fuel use levels for past years from 2003 onwards, increasing emissions.
1 B	1 B Fugitive emissions (Fugitive emissions from fuels);	2	2	2	1%	No major change
2	2 Industrial Processes;	10	2	8	322%	NAEI baseline: Revision to the EF for LPG combustion. Emissions from sinter plant were moved from 1A2a to 2C1. DECC UEP data: large increase in fuel use in UEP38 in Iron and Steel sector (coal, coke, gas)
3	3 Solvent and other product use;	NA	NA	NA		
4	4 Agriculture;	NA	NA	NA		
4 B	4 B Animal husbandry and manure management	NA	NA	NA		
4 B 1 a	4 B 1 a Cattle Dairy	NA	NA	NA		
4 B 1 b	4 B 1 b Cattle Non-Dairy	NA	NA	NA		
4 B 2	4 B 2 Buffalo	NA	NA	NA		
4 B 3	4 B 3 Sheep	NA	NA	NA		
4 B 4	4 B 4 Goats	NA	NA	NA		
4 B 5	4 B 5 Camels and Llamas	NA	NA	NA		
4 B 6	4 B 6 Horses	NA	NA	NA		
4 B 7	4 B 7 Mules and asses	NA	NA	NA		
4 B 8	4 B 8 Swine	NA	NA	NA		
4 B 9	4 B 9 Poultry	NA	NA	NA		
4 B 13	4 B 13 Other	NA	NA	NA		
4 D	4 D Plant production and agricultural soils	NA	NA	NA		
4 F,G	4 F,G Field burning and other agriculture	NA	NA	NA		
6	6 Waste;	2	2	2	-2%	NAEI Baseline: changes in chemical waste incineration is due to emission factors being calculated from the available data in the Pollution Inventory (Environment Agency)
7 A	7 A Other (included in National Total for Entire Territory)	0	0	0	0%	No Change

NFR Code	NFR Name	2008	2010 (UEP37 (2007))	2010 (UEP 38 (2008))	2010 Comparison (% change from UEP37 (2007) to UEP 38 (2008)	Reasons for Change
NATIONAL TOTAL	**National Total for the entire territory**	**1403**	**1210**	**1132**	-6%	

Sulphur dioxide

Table 3.2. SO_x emission estimates for 2008[5] and projected emissions using DECC's UEP37 and the 2007 NAEI and UEP 38 and the 2008 NAEI for those NFR sectors covered under the NECD (ktonnes).

NFR Code	NFR Name	2008	2010 (UEP37 (2007))	2010 (UEP 38 (2008))	2010 Comparison (% change from UEP37 (2007) to UEP 38 (2008)	Reasons for Change
1 A 1	1 A 1 Energy industries (Combustion in power plants & Energy Production)	290	220	217	-1%	NAEI Baseline: The minor updates in DUKES for the fuel used in power stations e.g. coal and natural gas
1 A 2	1 A 2 Manufacturing Industries and Construction (Combustion in industry including Mobile):	76	84	81	-3%	NAEI Baseline: Emissions from sinter plant were moved from 1A2a to 2C1. Activity data for off-road vehicles decreases as a result of the change from use of 2007 data as a baseline to use of 2008 data. Changes to baseline emission factors reduce emission projections for cement kilns. Changes to baseline activity data and emission factors increases projected emissions for both coke and coal-fired lime kilns. DECC UEP data: Increased use of coal by autogenerators.
1 A 3 b	1 A 3 b Road Transport;	1	2	1	-50%	See individual sectors
1 A 3 b i	1 A 3 b i R.T., Passenger cars	1	2	1	-52%	NAEI Baseline: TRL fuel consumption speed related function integrated in NAEI calculations
1 A 3 b ii	1 A 3 b ii R.T., Light duty vehicles	0	0	0	-37%	NAEI Baseline: TRL fuel consumption speed related function integrated in NAEI calculations
1 A 3 b iii	1 A 3 b iii R.T., Heavy duty vehicles	0	0	0	-44%	NAEI Baseline: Average miles per gallon (fuel efficiency data) as provided by DfT continue to be used but now in conjunction with the new TRL speed related functions to define the variation in fuel consumption with speed
1 A 3 b iv	1 A 3 b iv R.T., Mopeds & Motorcycles	0	0	0	-64%	NAEI Baseline: TRL fuel consumption speed related function integrated in NAEI calculations
1 A 3 b v	1 A 3 b v R.T., Gasoline evaporation	NA	NA	NA		
1 A 3 b vi	1 A 3 b vi R.T., Automobile tyre and brake wear	NA	NA	NA		
1 A 3 b vii	1 A 3 b vii R.T., Automobile road abrasion	NA	NA	NA		

[5] The 2008 base year estimates are based on last years inventory submitted to the NECD on the 31st December 2009

NFR Code	NFR Name	2008	2010 (UEP37 (2007))	2010 (UEP 38 (2008))	2010 Comparison (% change from UEP37 (2007) to UEP 38 (2008)	Reasons for Change
1 A 3 a,c,d,e	1 A 3 a,c,d,e Non-road transport	56	35	16	-55%	NAEI baseline: Bottom-up shipping study by Entec (2010) based on vessel movements for domestic shipping yields changes in fuel consumption. New methodology for reconciling with DUKES total shipping fuels to estimate international shipping fuel consumption: DUKES (national navigation+int. bunkers) minus Entec (domestic+fishing)-naval
1 A 4	1 A 4 Other sectors (Commercial, residential , agriculture and fishing stationary and mobile combustion)	33	19	18	-3%	No major change
1 A 5	1 A 5 Other	6	5	6	26%	NAEI baseline: New activity drivers have been used to rescale fuel use levels
1 B	1 B Fugitive emissions (Fugitive emissions from fuels);	11	8	8	9%	No major change
2	2 Industrial Processes;	38	17	23	36%	NAEI baseline: Revision to the EF for LPG combustion. Emissions from sinter plant were moved from 1A2a to 2C1. DECC UEP data: large increase in fuel use in UEP38 in Iron and Steel sector (coal, coke, gas) AEA Projections: Revisions to methods for combining DECC & NAEI data to produce projected activity data leading to a reduction in emissions.
3	3 Solvent and other product use;	NA	NA	NA		
4	4 Agriculture;	NA	NA	NA		
4 B	4 B Animal husbandry and manure management	NA	NA	NA		
4 B 1 a	4 B 1 a Cattle Dairy	NA	NA	NA		
4 B 1 b	4 B 1 b Cattle Non-Dairy	NA	NA	NA		
4 B 2	4 B 2 Buffalo	NA	NA	NA		
4 B 3	4 B 3 Sheep	NA	NA	NA		
4 B 4	4 B 4 Goats	NA	NA	NA		
4 B 5	4 B 5 Camels and Llamas	NA	NA	NA		
4 B 6	4 B 6 Horses	NA	NA	NA		
4 B 7	4 B 7 Mules and asses	NA	NA	NA		
4 B 8	4 B 8 Swine	NA	NA	NA		
4 B 9	4 B 9 Poultry	NA	NA	NA		

NFR Code	NFR Name	2008	2010 (UEP37 (2007))	2010 (UEP 38 (2008))	2010 Comparison (% change from UEP37 (2007) to UEP 38 (2008)	Reasons for Change
4 B 13	4 B 13 Other	NA	NA	NA		
4 D	4 D Plant production and agricultural soils	NA	NA	NA		
4 F,G	4 F,G Field burning and other agriculture	NA	NA	NA		
6	6 Waste;	1	1	1	0%	No Change
7 A	7 A Other (included in National Total for Entire Territory)	NA	NA	NA		
NATIONAL TOTAL	**National Total for the entire territory**	512	390	372	-5%	

Non methane volatile organic compounds (NMVOC)

Table 3.3. NMVOC emission estimates for 2008[6] and projected emissions using DECC's UEP37 and the 2007 NAEI and UEP 38 and the 2008 NAEI for those NFR sectors covered under the NECD (ktonnes).

NFR Code	NFR Name	2008	2010 (UEP37 (2007))	2010 (UEP 38 (2008))	2010 Comparison (% change from UEP37 (2007) to UEP 38 (2008)	Reasons for Change
1 A 1	1 A 1 Energy industries (Combustion in power plants & Energy Production)	5	5	4	-20%	NAEI Baseline: Increased emissions in municipal solid waste incineration in power stations has resulted from a change in the emission factor (due to changes in data from the Pollution Inventory)
1 A 2	1 A 2 Manufacturing Industries and Construction (Combustion in industry including Mobile):	23	23	21	-8%	DECC UEP data: Fuel use revised downwards due to economic downturn
1 A 3 b	1 A 3 b Road Transport;	132	77	64	-16%	See individual sectors
1 A 3 b i	1 A 3 b i R.T., Passenger cars	102	47	37	-22%	NAEI Baseline: TRL fuel consumption speed related function integrated in NAEI calculations
1 A 3 b ii	1 A 3 b ii R.T., Light duty vehicles	7	7	7	0%	No changes
1 A 3 b iii	1 A 3 b iii R.T., Heavy duty vehicles	7	5	5	0%	No changes
1 A 3 b iv	1 A 3 b iv R.T., Mopeds & Motorcycles	6	5.25	5.29	1%	NAEI Baseline: TRL fuel consumption speed related function integrated in NAEI calculations
1 A 3 b v	1 A 3 b v R.T., Gasoline evaporation	10	13	10	-19%	NAEI Baseline: A different trip length is assumed in the evaporative emission calculations and the new TRL speed related emission factors and degradation method as published by DfT in 2009 were used
1 A 3 b vi	1 A 3 b vi R.T., Automobile tyre and brake wear	NA	NA	NA		
1 A 3 b vii	1 A 3 b vii R.T., Automobile road abrasion	NA	NA	NA		
1 A 3 a,c,d,e	1 A 3 a,c,d,e Non-road transport	11	10	6	-35%	NAEI baseline: Bottom-up shipping study by Entec (2010) based on vessel movements for domestic shipping yields changes in fuel consumption. New methodology for reconciling with DUKES total shipping fuels to estimate international shipping fuel consumption: DUKES (national navigation+int. bunkers) minus Entec (domestic+fishing)-naval
1 A 4	1 A 4 Other sectors (Commercial, residential , agriculture and fishing stationary and mobile combustion)	63	49	53	9%	DECC UEP data: Service sector fuel use revised upwards in response to the inclusion of revised policy appraisals now included within the energy model

[6] The 2008 base year estimates are based on last years inventory submitted to the NECD on the 31st December 2009

NFR Code	NFR Name	2008	2010 (UEP37 (2007))	2010 (UEP 38 (2008))	2010 Comparison (% change from UEP37 (2007) to UEP 38 (2008)	Reasons for Change
1 A 5	1 A 5 Other	2	2	2	39%	NAEI baseline: New activity drivers have been used to rescale fuel use levels
1 B	1 B Fugitive emissions (Fugitive emissions from fuels);	186	170	160	-6%	DECC UEP data: Coke production and iron and steel (flaring) revised down to account for plant closures due to the economic downturn
2	2 Industrial Processes;	111	106	109	2%	No major changes
3	3 Solvent and other product use;	391	356	336	-6%	NAEI Baseline: Updates in ink sold and emission factors in the ink printing sector, as well as updated data on solvent use and recent plant closures which has led to a reduction in emissions, Updates to projected Paint EFs
4	4 Agriculture;	NA	NA	NA		
4 B	4 B Animal husbandry and manure management	NA	NA	NA		
4 B 1 a	4 B 1 a Cattle Dairy	NA	NA	NA		
4 B 1 b	4 B 1 b Cattle Non-Dairy	NA	NA	NA		
4 B 2	4 B 2 Buffalo	NA	NA	NA		
4 B 3	4 B 3 Sheep	NA	NA	NA		
4 B 4	4 B 4 Goats	NA	NA	NA		
4 B 5	4 B 5 Camels and Llamas	NA	NA	NA		
4 B 6	4 B 6 Horses	NA	NA	NA		
4 B 7	4 B 7 Mules and asses	NA	NA	NA		
4 B 8	4 B 8 Swine	NA	NA	NA		
4 B 9	4 B 9 Poultry	NA	NA	NA		
4 B 13	4 B 13 Other	NA	NA	NA		
4 D	4 D Plant production and agricultural soils	NA	NA	NA		
4 F,G	4 F,G Field burning and other agriculture	NA	NA	NA		
6	6 Waste;	18	18	18	0%	
7 A	7 A Other (included in National Total for Entire Territory)	NA	NA	NA		
NATIONAL TOTAL	**National Total for the entire territory**	942	814	774	-5%	

Ammonia

Table 3.4. NH3 emission estimates for 2008[7] and projected emissions using DECC's UEP37 and the 2007 NAEI and UEP 38 and the 2008 NAEI for those NFR sectors covered under the NECD (ktonnes).

NFR Code	NFR Name	2008	2010 (UEP37 (2007))	2010 (UEP 38 (2008))	2010 Comparison (% change from UEP37 (2007) to UEP 38 (2008)	Reasons for Change
1 A 1	1 A 1 Energy industries (Combustion in power plants & Energy Production)	1	1	1	13%	No major changes
1 A 2	1 A 2 Manufacturing Industries and Construction (Combustion in industry including Mobile):	1	0	0	-11%	NAEI Baseline: Updated DUKES values for wood combustion in industry and the correction to the coal use in non-decarbonising lime production.
1 A 3 b	1 A 3 b Road Transport;	12	10	10	0%	
1 A 3 b i	1 A 3 b i R.T., Passenger cars	12	9	9	0%	No change
1 A 3 b ii	1 A 3 b ii R.T., Light duty vehicles	0	0	0	0%	No change
1 A 3 b iii	1 A 3 b iii R.T., Heavy duty vehicles	0	0	0	0%	No change
1 A 3 b iv	1 A 3 b iv R.T., Mopeds & Motorcycles	0	0	0	0%	No change
1 A 3 b v	1 A 3 b v R.T., Gasoline evaporation	NA	NA	NA		
1 A 3 b vi	1 A 3 b vi R.T., Automobile tyre and brake wear	NA	NA	NA		
1 A 3 b vii	1 A 3 b vii R.T., Automobile road abrasion	NA	NA	NA		
1 A 3 a,c,d,e	1 A 3 a,c,d,e Non-road transport	NA	0	NA		
1 A 4	1 A 4 Other sectors (Commercial, residential , agriculture and fishing stationary and mobile combustion)	2	1	1	0%	
1 A 5	1 A 5 Other	0	NA	0		
1 B	1 B Fugitive emissions (Fugitive emissions from fuels);	0	0	0	-12%	No major changes
2	2 Industrial Processes;	4	4	4	-1%	No major changes
3	3 Solvent and other product use;	1	1	1	0%	No major changes
4	4 Agriculture;	248	484	261	-46%	
4 B	4 B Animal husbandry and manure management	NA	221	NA		
4 B 1 a	4 B 1 a Cattle Dairy	70	75	75	0%	No change
4 B 1 b	4 B 1 b Cattle Non-Dairy	62	59	59	0%	No change
4 B 2	4 B 2 Buffalo	NA	NA	NA		
4 B 3	4 B 3 Sheep	11	12	12	0%	No change
4 B 4	4 B 4 Goats	NA	NA	NA		
4 B 5	4 B 5 Camels and Llamas	NA	NA	NA		
4 B 6	4 B 6 Horses	5	5	5	0%	No change

[7] The 2008 base year estimates are based on last years inventory submitted to the NECD on the 31st December 2009

NFR Code	NFR Name	2008	2010 (UEP37 (2007))	2010 (UEP 38 (2008))	2010 Comparison (% change from UEP37 (2007) to UEP 38 (2008)	Reasons for Change
4 B 7	4 B 7 Mules and asses	NA	NA	NA		
4 B 8	4 B 8 Swine	20	20	20	0%	No change
4 B 9	4 B 9 Poultry	31	34	34	0%	No change
4 B 13	4 B 13 Other	18	17	18	5%	NAEI baseline: Change in baseline value from 2007 to 2008
4 D	4 D Plant production and agricultural soils	32	41	38	-7%	No major change
4 F,G	4 F,G Field burning and other agriculture	1	1	1	0%	No change
6	6 Waste;	12	9	12	38%	NAEI Baseline: Updates for waste burnt and capacity of chemical waste incineration plants.
7 A	7 A Other (included in National Total for Entire Territory)	0	0	0	7%	No major change
NATIONAL TOTAL	**National Total for the entire territory**	282	289	291	0%	No major change

Reference

A Wagner, T Wiley, T P Murrells, N R Passant, G Thistlethwaite, Y Li, J Norris, P J Coleman, C Walker, R A Stewart, J Jackson, M Pierce (2008) UK Emission Projections of Air Quality Pollutants to 2020, AEA Technology, arwell , Oxfordshire, http://www.airquality.co.uk/reports/cat07/1011100847_2007_Emission_Projections_Report_June09_v1.pdf

DECC (2009) UK LOW CARBON TRANSITION PLAN EMISSIONS PROJECTIONS, DECC

Appendix

Table A1: Main changes in the DECC Energy Forecasts UEP37 and UEP38

Section	UEP 37	Updated Carbon Projections Paper (UEP38)	Changes
General Assumptions			
Policies	The April 2009 projections included re-estimates of carbon savings from existing policies. It also included an initial assessment of the possible impact of the policies set out in the consultation on the UK renewable energy strategy.	Latest projections are based on revised estimates of the impact of the full package of proposals and policies set out in the UK Low Carbon Transition Plan.	
Fossil Fuel Scenario	April 2009 projections were based on the same fossil fuel projections as November 2008 (UEP32).	Revised set of fossil fuel price assumptions.	
Projections	Project out to 2025; covers the Carbon budget period on year by year basis	Projections present emissions in the three carbon budgets 2008-12, 2013-2017, 2018-2022	
Baseline Projections and revised key assumptions			
Units	Presented in Carbon dioxide	Presented in Carbon dioxide	
Oil Prices $/bbl (2008 prices) 2020	Low price of $45/bbl, high price $95/bbl and high-high price of $150/bbl central price £70/bbl in 2020 - consistent with the Energy Group Market Analysts	New fossil fuel prices published in May 2009 reflect changes over the last year in global oil markets. Low price of $46/bbl, high price $97/bbl and high-high price of $153/bbl central price £72/bbl in 2020	Updated oil price assumptions are higher than those in previous UEP37
Economic Growth	Growth assumptions up to 2011are those published by HM Treasury in Budget 2009. Longer term assumptions are based on internal modelling assumptions but broadly consistent with HMT's latest assessment of economic prospects, as set out in Budget 2009.	SAME AS UEP 37	Growth Assumptions remain unchanged from the projections published in April 2009.

Section	UEP 37	Updated Carbon Projections Paper (UEP38)	Changes
Population		Reflect updated figures published for England by Department for Communities & Local Government in March 2009 combined with the latest available from the Devolved Administrations of Scotland, Wales and Northern Ireland	
EU ETS	Revision to carbon price assumptions from €25 to €34/tonne of CO2 in 2020 (2005 prices)	Carbon price assumed by DECC € per tonne CO2 2010: Low prices: 17, central prices 20, high prices 25 2015: Low prices: 18, central prices 32, high prices 40 2020: Low prices: 25, central prices 34, high prices 43	Have assumed UEP37 used same carbon price as UEP32
Headline UK emissions carbon dioxide projections	April 2009 central assumption (MTCO2e): 1990 – 776, 2007 – 633, 2010 – 601, 2015 – 556, 2020 - 508	July 2009 central assumption assumption (MTCO2e): 1990 – 776, 2007 – 611, 2010 – 594, 2015 – 544, 2020 – 596	Reduction in UK emissions in 2020 compared to UEP37, differences arise from revisions to fuel prices, re-estimation of existing policy savings, addition of further policy savings and number of other revisions,
Net UK Carbon Account Traded and Non-Traded Emissions Projections			
Net UK Carbon Account Traded and Non-Traded Emissions Projections	Based on 2006 inventory	Updated projections include changes to fossil fuel prices, revised non-carbon dioxide GHG projections, revised modelling on car ownership and CHP projections and refined estimates of the impact on some existing Climate Change	Overall the projections are lower in all budget periods by 35MTCO2 in the first, 57 MTC02 in the second and 63 MTC02 in the third. Inventory change provides significantly lower projected

Section	UEP 37	Updated Carbon Projections Paper (UEP38)	Changes
		Programme Policy and estimated savings from the proposed Renewable Energy Strategy. Projections have been re-based to 2007 inventory	emissions of methane CH4 gas from transport, together with small increases in emissions of CH4 and N2O from agriculture due to changes in carbon emission factors and methodology.
Climate Change Mitigation Policies included in the emissions projections			
Policies included in the emissions projections announced in CCP 2000 and 2006, and more recent policies	Residential Sector: EEC 1 and 2 Building Regulations Warm Front and fuel poverty programmes Business/Public Sector: Building Regulations Carbon Trust Measures Climate Change Agreements Revolving loan Industry: Building Regulations Carbon Trust Measures Energy Industry Renewables Obligation Transport: RTFO savings (5% volume) EU Voluntary Agreements	Additional Policies Residential Sector: Domestic Energy Efficiency package Zero Carbon Homes CERT uplift Better Billing and Metering Product Policy Community Energy Saving Prog. Renewable Heat Incentive Business/Public Sector: Carbon Reduction Commitment Energy Performance of Buildings Directive Product Policy Smart Meters for SMEs Loans for SMEs Loans to public sector Renewable Heat Incentive (business, public and industry) Energy Industry CCS demonstration plant Renewable Energy Strategy Transport: EU new car average fuel efficiency standards Low carbon emission buses SAFED training for bus drivers	Since April 2009 estimated savings attributed to various policies have been revised. Policies are split by traded and non-traded. The July 2009 projections include existing policies in the baseline and the additional policies in the UK Low Carbon Transition Plan.

Section	UEP 37	Updated Carbon Projections Paper (UEP38)	Changes
Final Energy Demand Results			
Energy demanded by final user updated projection with central fossil fuel prices and central policy and central growth		Total final energy demand is projected to fall by 8 percent from 155 million tonnes of oil equivalent in 2007 to 145 Mtoe in 2020.	The largest contributions are from gas and petroleum which fall by 9 Mtoe and 8 Mtoe respectively. Renewable final energy demand increases from 1 Mtoe to 11 Mtoe, about one third is from transport fuels.
Trends per sector		Domestic sector is projected to decrease by 19% between 2007 and 2020. Driven by energy efficiency measures Declining trend in industrial demand is accelerated by economic recession with demand projected to fall by 15% between 2007 and 2010 Transport fuel is projected to increase from 2010 after a slight fall following high prices and economic recession.	
Electricity Generation			
Key Power Station Assumptions		Renewables Energy Strategy delivers higher level of electricity supply by 2020, equivalent to 37% of major power producers power supply and around 30% of total electricity supply. Assumed four CCS demonstrations plants proceed as part of a larger overall increase in new coal .Assumed proven in 2020 and all convert within 5 years. An assumption that one new nuclear station of around 1.6GW is operating in 2020, and then there will be a new one each year.	

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Electricity Supply by Source	.	The projections reflect an initial increase in CCGT capacity, followed by an increase in renewables New CCS (and non CCS) coal with CCGT provide the flexibility to meet increases in demand due to the larger proportion of intermittent capacity.	
Grid		The demand on the grid falls due to the recession, there is not a full recovery due to the downward pressure from measures, a significant increase in the generation of electricity from new CHP plants and the high projected level of electricity prices in the long term,	
Coal generation		The combination of fossil fuel prices and carbon prices results in coal having a competitive position against gas, the share of coal remains steady but gas falls,	
Gas Generation		In the longer term lower amounts of electricity from gas, partially due to the significant increase in generation from new gas CHP plants. Gas retains a third of capacity in 2020 despite only being less than a quarter of generation – this is to be a back up due to the intermittency of renewables.	

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Nuclear		Nuclear generation falls in the medium term as existing plants are closed, but from 2020 onwards generation from nuclear increases as new plants a are constructed.	
Renewables	The pre-renewable strategy carbon intensity is 414gCO2k/WH in 2020	There is a switch from gas to renewables. Renewables should rise to 33 GW with reduction in coal, nuclear and oil The Renewable Energy Strategy provides carbon intensity of 309 gCO2/kWH in 2020 .	
Combined Heat and Power (CHP)	April Projection: 2010 (7.1 GW), 2015 (9.1 GW), 2020 (12.1 GW). Current projections based on improved modelling and data. CHP uptake will be slow, in the longer term other sectors will respond to price signal and take up,	Updated projections: 2010 (6.2 GW), 2015 (10.3 GW), 2020 (15.5 GW). Projections based on improved modelling and data that incorporates behavioural aspects of the decision making process, estimates of economic viability and a probabilistic view of industry attitudes towards risk.	Differences result from a economic conditions and uncertainties in commissioning periods of large CHP units in the energy industries sector where the major use of these will be re-gasification of liquefied natural gas imported from abroad. In longer term as market becomes saturated, other sectors respond to price signal and expand take-up.
Oil Refineries	Emissions from refineries 2010 (16.1 MtCO2e), 2015 (16.5 MtCO2e), 2020 (17.0 MtCO2e)	Emissions from refineries 2010 (16.4 MtCO2e), 2015 (16.8 MtCO2e), 2020 (17.3 MtCO2e)	The current projections are similar to those previously published, as the increased energy consumption balances decreased throughput. Crude quality may decrease over period there is no evidence this affects energy use and the effect has been ignored.