

INDICATORS FOR MONITORING PROGRESS TOWARDS MEETING CARBON BUDGETS

Overview

On 12th October 2009, the Committee on Climate Change (CCC) produced its first annual progress report to Parliament, required under the Climate Change Act, on progress towards meeting carbon budgets.

This note provides further information on the monitoring approach adopted by the Committee which will better enable us in future years to assess emission trends.

In order to make a judgement about whether the UK is on track to meet its climate goals in a transparent and evidenced based way, we have developed a set of indicators against which progress can be judged.

This paper is designed to provide background and more information on the issues considered in developing our indicator set. Specifically, this paper provides:

- Background on use of indicators in planning and performance management
- The Committee's rationale and criteria for an indicator framework
- A survey of existing climate change mitigation indicators
- A recap of the CCC indicator framework and more detail on its application to each sector
- The data sources we will use for monitoring purposes

Date: March 2010

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1. BACKGROUND: USE OF INDICATORS IN PLANNING AND PERFORMANCE MANAGEMENT

Performance management is used in many different contexts as a tool for driving improvement. Performance information is used to establish progress towards achieving goals. It should help decision-making, identify areas for further analysis or action and support planning and target-setting.

Performance indicators are widely used in the private sector. For example, financial metrics estimated from accounting data have long been used to measure performance. However concerns that these measures were too narrow in focus led to development of 'balanced scorecards'¹. These typically include metrics relating to customer satisfaction, innovation and learning, stakeholder engagement etc. and provide a more comprehensive view of a business and its progress towards achieving strategic objectives now and in the future.

The balanced scorecard approach is well suited to public sector organisations too, where the lack of financial metrics like sales, share prices etc. mean that many financial indicators are inappropriate. Moreover, the aims of government are wider than those of private organisations who are generally less focused on improving welfare in a wider sense². It is therefore common for Government bodies to look at a range of indicators covering inputs, outputs and outcomes. Input and output measures are also combined to produce efficiency measures³.

Performance evaluation can be problematic if it relies on short-term indicators and, as a consequence decisions do not take into account beneficial, but longer term, measures⁴. Indicators can also be misleading where they are not clearly related to goals, and some have argued that indicators stifle innovation⁵. It goes without saying that performance evaluation is only as reliable as the performance indicators upon which it depends.

HM Government's Choosing the Right FABRIC⁶ provides guidance to government departments, setting out the properties of a good system, i.e. that it is Focused, Appropriate, Balanced, Robust, Integrated and Cost Effective. A number of frameworks and tools exist, but any effective performance management requires:

- systematically deciding and communicating what needs to be done (aims, objectives, priorities)
- a plan for ensuring that it happens (improvement, action or service plans)
- some means of assessing if this has been achieved (performance measures)
- information reaching the right people at the right time (performance reporting) so decisions are made and actions taken⁷.

¹ Kaplan and Norton (1996) *Balanced Scorecard, The: Translating Strategy into Action*

² Schacter, Institute on Governance (2002) *Not a Tool Kit: Practitioner's Guide to Measuring the Performance of Public Programs*

³ Schacter, Institute on Governance (1999) *Means... Ends... Indicators: Performance Measurement in the Public Sector*

⁴ Drury (2003) *Management Accounting for Business Decisions*

⁵ De Bruijn (2007) *Managing Performance in the Public Sector*

⁶ HM Treasury, Cabinet Office, National Audit Office, Audit Commission, Office For National Statistics (2001) *Choosing the Right FABRIC: A framework for performance information*

⁷ Improvement and Development Agency (2006) *A manager's guide to performance management*

These steps are set out in more detail in Table 1⁸.

Table 1: Key steps in developing a performance management framework

Where are we now?	Clarify the context and issues
Where do we need to be?	Identify what changes must be made over the period of the service plan in order to achieve objectives in the near term and the long term. Identify external factors that may affect delivery or cost of the service.
How do we get there?	Set out the detailed action plan, with clear indications of what needs to be done and by when. This should include: <ul style="list-style-type: none"> targeted outputs which are SMART (specific, measurable, achievable, realistic and time-bound) completion deadline or milestone
How do we know we are there?	Identify the measures for success. These should be focused on things that really matter and for which: <ul style="list-style-type: none"> a positive effect on the outcome is achievable within the timescale under consideration there is enough predictability in the area of performance for measurement to be meaningful it's possible to monitor progress without disproportionate cost <p>Identify tolerances if required; these may be tighter for key areas or looser where variation is expected or does not pose a major risk to the overarching priorities. Variation may occur due to external factors, with tolerances adjusted accordingly.</p> <p>Set out arrangements for monitoring progress including:</p> <ul style="list-style-type: none"> The mechanisms for monitoring and reporting What will be reported When information will be reported and how frequently

The Committee has arrived at its indicator framework using these principles. The next section discusses our approach in more detail, setting out the context, rationale and criteria we have applied.

⁸ Adapted from Improvement and Development Agency (2005) *Performance Management, Measurement & Information Service Planning Guidance*

2. CCC'S INDICATOR FRAMEWORK: CONTEXT, RATIONALE AND CRITERIA

In December 2008 the CCC recommended Interim and Intended carbon budgets for the period 2008-2012, 2013-2017 and 2018-2022. The Government legislated budgets in May 2009, in line with the Interim budget advice, and set its strategy to meet them, the UK Low Carbon Transition Plan, in June 2009. The Climate Change Act requires that the CCC reports annually on progress towards meeting carbon budgets.

At one level the CCC task is straightforward – simply comparing actual emissions with the budgets set by Government. Provisional emissions data – headline totals for CO₂ and other greenhouse gases (GHGs) – for 2008 were available in March 2009, although final figures and a breakdown by source sector will only become available in February 2010, and a break down by end-use sector in March 2010.

But we also need to look ahead to future budget periods and indeed the longer term – policies to reduce emissions will generally take time to implement and have an effect. There is also an important feedback between current progress and future action: if progress is slower than anticipated to date, this implies more concerted effort is required in future.

Thus we need to consider the whole causal chain leading to emissions: **inputs and outputs as well as outcomes**. Inputs may take the form of resources (monetary, human etc.), or enablers such as legislative changes. Outputs include uptake of technologies or behavioural measures. Taking the power sector as an example, reducing emissions from this sector (our desired **outcome**) requires that the emissions intensity of power generation falls, which requires that new low-carbon generating capacity is built (the key **output**). This depends on investment by energy companies, which in turn will depend on the right policy framework (regulation, incentives etc.) being in place (the **inputs**).

Inputs and outputs are not ends in themselves; rather they give us early signals of emissions levels: inputs predict outputs, which in turn predict outcomes. This implies assumptions about cause and effect which may not hold true in practice (for example, insulation of homes may not deliver the emissions savings expected due to comfort taking and other rebound effects, as well as modelling uncertainty around the savings estimates) and it is important to bear this in mind when assessing progress. Nonetheless, indicators based on inputs and outputs enable us to assess whether the UK is on track to meeting future emissions reduction targets based on metrics that are available now.

While carbon budgets apply to the economy as a whole, it is useful and necessary to break emissions down to their **constituent parts**. Because the casual chain described above differs across sectors it is necessary to consider each in turn: power, buildings, industry and transport (recognising the linkages between the power sector and those sectors which use the electricity produced), as well as the non-energy sectors: agriculture and waste. We can go further and consider the various factors which contribute in each sector: for example, vehicle emissions may be reduced via reduced mileage, improved fuel efficiency or lower carbon intensity of fuel. By considering these factors separately we can identify where progress is being made and where more action is required.

Carbon budgets effectively define a trajectory for UK GHG emissions in the period to 2022. We need to set out what this means for each sector in terms of an indicative emissions trajectory. And we need to set out what needs to be done and by when in order to achieve that trajectory, including underlying trajectories for the uptake of technologies and behavioural measures, and milestones for the development of policy which supports this uptake.

Contextual factors are also important. Changes in overall emissions have multiple causes⁹: economic growth, population growth, fossil fuel price changes, exogenous changes in behaviour, as well as policy

⁹ The Kaya identity (Kaya, 1990; Yamaji *et al.*, 1991), for example, states that $F = P * (G / P) * (E / G) * (F / E) = P * g * e * f$

activity. We need to understand all of these to establish whether the UK is on track. This can also help us to separate real progress in decarbonising the economy from wider changes which may have less permanence: for example, emissions reductions due simply to economic downturn may be reversed as the economy recovers.

For the reasons above, any indicator framework should include indicators from across the hierarchy of contributing factors – inputs, outputs and outcomes. With this in mind, we first considered what climate change mitigation indicators currently exist.

3. EXISTING CLIMATE CHANGE INDICATORS

A range of climate change mitigation indicators exist at the UK, regional and local, as well as EU level. The following provides a brief summary.

Government PSAs

Public Service Agreements (PSAs) set out the key outcomes that Government wants to achieve in the next spending period. PSA 27 sets out Government's aim to 'Lead the global effort to avoid dangerous climate change' and is underpinned by six outcome-focused indicators (Table 2). Two – UK greenhouse gas and CO₂ emissions, and Greenhouse gas and CO₂ intensity of the UK economy – are the most relevant to the Committee's task to monitor progress towards decarbonisation, although published with a lag.

Table 2: Indicators underpinning PSA 27

Indicator	Detail	Source and Frequency	Relevance to CCC monitoring
Global CO ₂ emissions to 2050	Baseline fossil fuel forecast from IEA	IEA ETP; annual (July)	Forward looking, although forecasts may be inaccurate. Moreover, indicator is not specific to the UK and only applies to fossil fuels: excludes land use change and other Kyoto GHGs. Thus not directly relevant for monitoring progress in meeting UK carbon budgets.
Proportion of areas with sustainable abstraction of water		Environment Agency; annual	Reflects impacts of climate change rather than progress reducing emissions.
Size of the global carbon market	CDM/JI volumes, EU ETS volumes, Units traded in other markets, Coverage of markets in tonnes, Emissions reductions mandated	Point Carbon; annual	Not specific to UK, implications for meeting UK carbon budgets unclear (budgets are set on a net carbon account basis thus credit purchase could in theory undermine long term path to decarbonisation in the UK).
Total UK greenhouse and CO ₂ emissions		UK emissions inventory; annual (15 month lag)	Clearly relevant to current carbon budget; however changes in emissions have multiple causes (e.g. change in growth, energy intensity or carbon intensity) of which only some will lead to sustainable reductions.
Greenhouse gas and CO ₂ intensity of the UK economy	Emissions per unit of GDP	UK emissions inventory and UK economic data; (15 month lag)	Clearly relevant to carbon budgets, captures progress towards decarbonisation at a high level.
Proportion of emissions reductions from new policies below shadow price of carbon (SPC)		HMG impact assessments, annual	Provides a measure of cost-benefit, includes information on and assessment of success of policy actions. However, SPC value is uncertain; moreover indicator doesn't reflect importance of some measures on longer term path to decarbonisation, or scope for early roll-out to reduce future costs.

Source: http://www.hm-treasury.gov.uk/d/pbr_csr07_psa27.pdf

Departmental Strategic Objectives

Government PSAs are underpinned by Departmental Strategic Objectives (DSOs). These have their own indicators which include some of the drivers of emissions, for example proportion of electricity from renewable sources, average new car CO₂ emissions and annual energy saving from domestic appliance design. The lead department for PSA 27 is DECC¹⁰ supported by Defra¹¹, DfT¹², CLG, DfID, FCO and HMT. Many of these indicators are relevant for monitoring the causal chain and as such will feature in or overlap with our indicator set. However, they are not comprehensive across the full range of drivers of emissions.

Other Government monitoring data

Other government indicator sets monitor changes in factors relevant to climate change. Examples are the Government's Sustainable Development Indicators¹³ (which include proportion of electricity generated by renewable sources, household energy consumption and car-kilometres travelled per year) and the UK Energy Sector Indicators published by DECC¹⁴ (including for example capacity of renewable sources for electricity generation, SAP rating of the housing stock, and average new car CO₂ emissions). A full list of the climate change-related indicators from these sets is at Annex A. However, these monitoring frameworks are not related directly to carbon budgets and do not include definitions of success which are designed to be consistent with meeting budgets

Local Government Indicators

The National Indicator set for English Local Authorities (LAs) contains some relevant indicators although at an aggregate level they largely duplicate indicators from Defra's sustainability set¹⁵. One (NI 185) provides new information insofar as it relates specifically to emissions from LA operations. However, the National Indicator set is for England only and there is a lack of consistency in the data available for the Devolved Administrations which would enable an aggregate national picture to be formed.

Other indicator sets: regional government

Some regional government bodies use indicator sets. For example the North West Climate Change partnership (led by the Northwest Regional Development Agency) monitors progress against nine indicators covering inputs (e.g. research effort for low carbon technologies, carbon capture and climate-change mitigation and adaptation) and outputs (e.g. number of microgeneration installations) as well as outcomes¹⁶. However, there is a lack of consistency in the data available for different regions.

¹⁰ see DECC (2009) *Annual Report and Resource Accounts 2008-09* for information on DECC's DSOs

¹¹ see Defra (2009) *Departmental Report 2009* for information on Defra's DSOs

¹² see DfT (2009) *Annual Report and Resource Accounts 2008-09* for information on DfT's DSOs

¹³ See <http://www.defra.gov.uk/sustainable/government/progress/index.htm>

¹⁴ See <http://www.decc.gov.uk/en/content/cms/statistics/publications/indicators/indicators.aspx>

¹⁵ See <http://www.communities.gov.uk/publications/localgovernment/indicatorsdefinitions>

¹⁶ Northwest Climate Change Partnership (2008) *NORTHWEST CLIMATE CHANGE ACTION PLAN Progress Report by the Northwest Climate Change Partnership 2008*

Indicators used by the European Commission

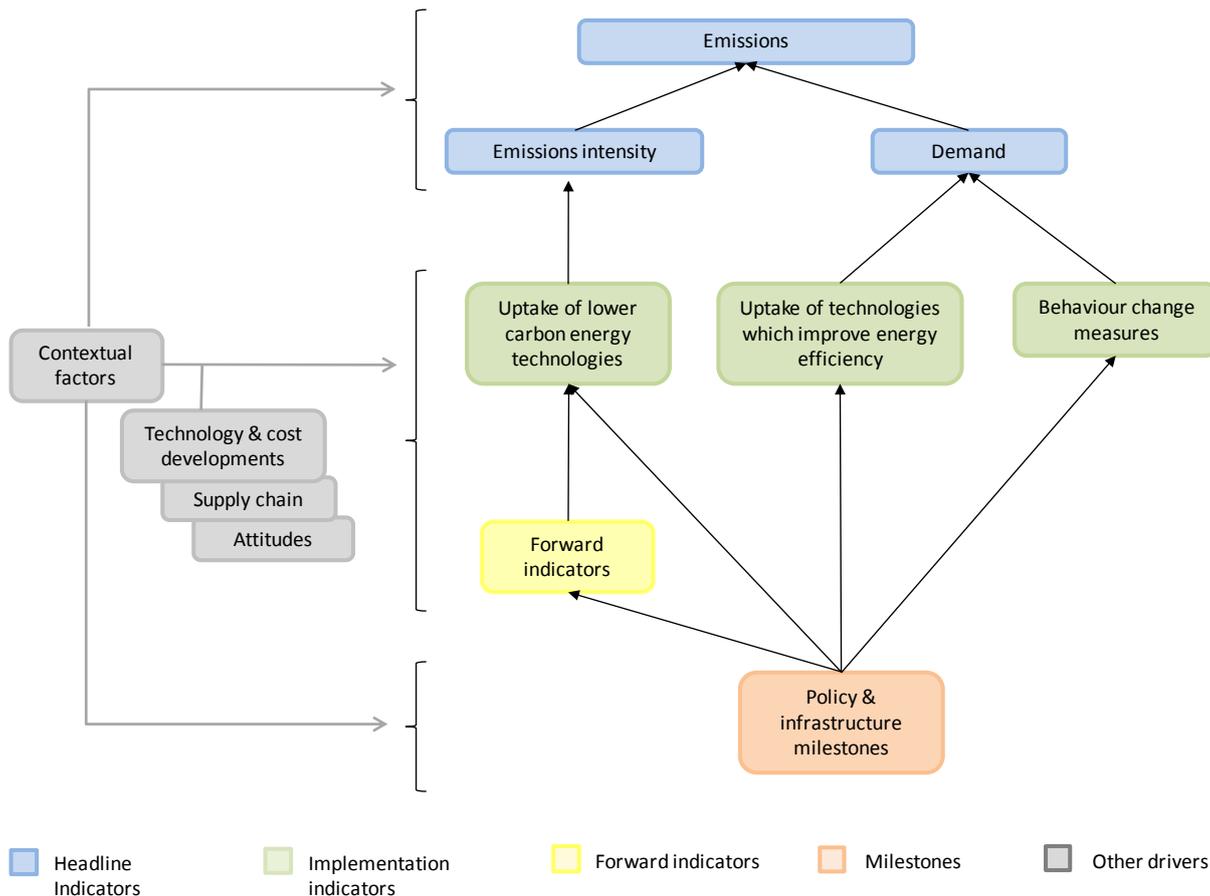
The European Commission publish a range of indicators – both for the EU as whole and the individual member states – largely derived from GHG or CO₂ emission statistics. Whilst they capture a wider range of emissions and provide greater sectoral detail than the emissions indicators underpinning the UK's PSA 27, these indicators suffer from the same publication lags. The data used for these indicators do not go beyond the level of detail available in the National Accounts Emissions Inventory.

In summary, existing climate change mitigation indicators tend to be high-level, focussing on emissions, and suffer from publication lags. While monitoring of some of the drivers of emissions is undertaken, this is not comprehensive in its coverage and is not linked to any notional trajectory consistent with meeting carbon budgets. Therefore, whilst providing some useful information, existing indicators are insufficient as a means of monitoring progress in meeting carbon budgets and longer term climate goals. On this basis, the Committee has developed its own indicator framework, to which we now turn.

4. THE CCC INDICATOR FRAMEWORK

The Committee’s framework for monitoring progress in meeting carbon budgets includes emissions, drivers of emissions, forward indicators for these drivers where appropriate, policy milestones, and contextual factors (Figure 1; a full description of indicator types is provided in Chapter 3 of the main report). The indicators will provide a basis for understanding whether emissions reductions are sustainable (i.e. through implementation of measures) and will provide the opportunity for early identification of slippage that could increase the risk of missing budgets.

Figure 1: The CCC indicator framework



As well as defining what indicators to monitor we have defined trajectories for these indicators against which to reflect evaluate progress. We have based our indicator trajectories on our Extended Ambition scenario (implicitly reflecting SMART principles): the feasible uptake of technologies and behavioural measures over time and the policy and other milestones which need to be achieved to drive that uptake and to put in place the right conditions for implementation of longer term measures.

Taken together, these trajectories are consistent with meeting carbon budgets. However, our Extended Ambition scenario is one of a number that could achieve the desired emissions reductions. It provides an indicative path rather than a definitive plan which cannot be deviated from. The priorities identified in our Extended Ambition are the function of a number of assumptions that may turn out to be different. For example, battery costs may fall more quickly or slowly than we envisage, consumers may be more or less willing to change their behaviour, etc.. As such, the balance of effort between measures and sectors could differ, so that some indicators are not met, whilst some others are overachieved. This could still on average constitute sufficient progress towards meeting carbon budgets. Our indicators would be useful, however, in highlighting situations where a sufficiently large number of measures are off track that we can no longer be confident that budgets will be achieved. There will also be some indicators for which underachievement is not acceptable given the importance in unlocking deep emissions cuts in the longer term. In addition, in

earlier years where initial volumes may be low for some measures, we are likely to see random fluctuations in uptake and need to avoid measuring and assessing these with spurious accuracy.

The Committee will therefore apply the framework in a pragmatic manner that allows for emission reductions to be lower in some cases and higher in other cases than currently envisaged, giving due consideration to the relative significance of each indicator.

In selecting indicators, we have considered a number of data quality issues – so that when making our assessment of progress we are clear about how robust the conclusions we can draw from them are. These include:

- Timeliness and frequency of collection/publication
- Size and representativeness of any sample used, including geographic coverage
- Reliability of the data (e.g. National Statistic vs. anecdotal evidence)

We have highlighted areas which would benefit from improved data collection.

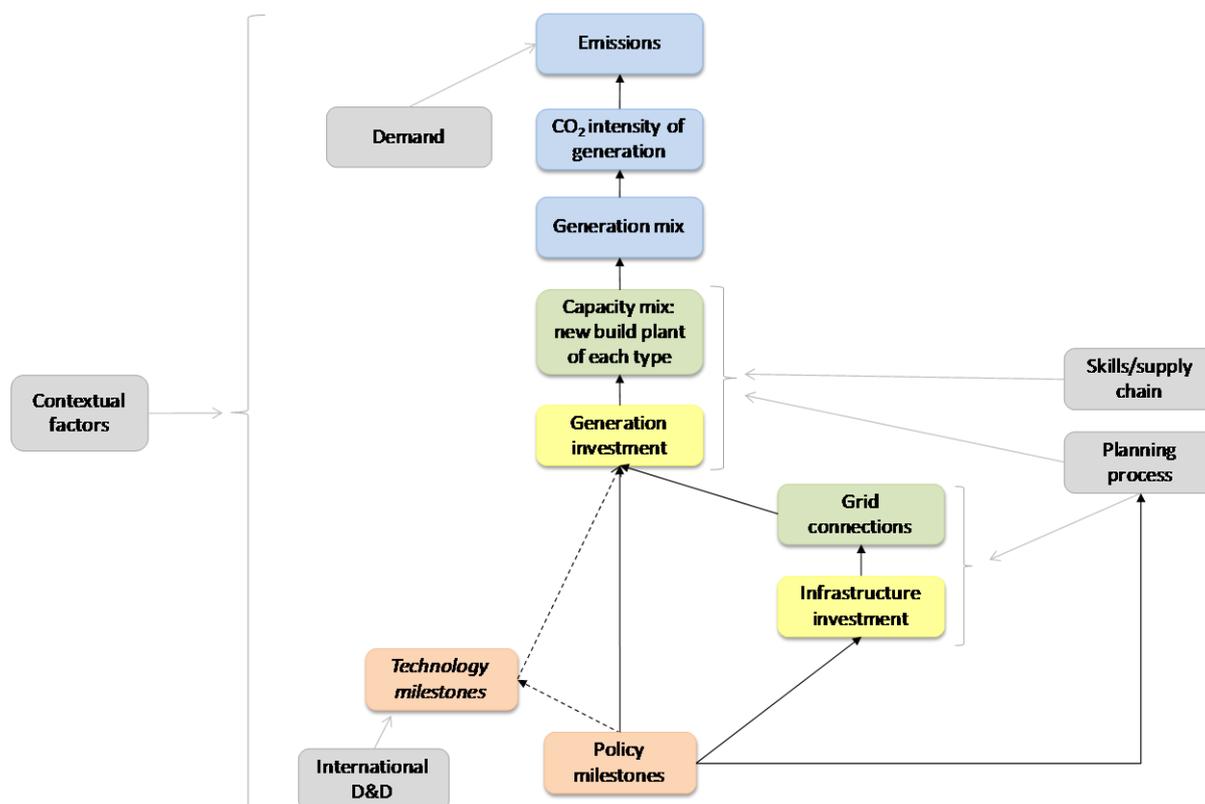
5. SECTORAL INDICATORS

We have applied our indicator framework to each sector of the economy.

Power sector

Figure 3 illustrates the key drivers of emissions from the power sector.

Figure 3: Key drivers of emissions from the power sector



- At the highest level, emissions are driven by demand from end users (which is dealt with in detail in the indicators for buildings and industry, but which for the power sector we track amongst our other drivers) and by the CO₂ intensity of generation.
- Installed low-carbon capacity is arguably more important for the power sector than emissions (which are capped for the first three budget periods within the EU ETS): in the long term generation will need to expand to supply the transport and heat sectors and therefore decarbonisation of the power sector is key, with significant progress needed by 2030.
- Emissions intensity is essentially a measure of the generation mix. However in the short term this will continue to be dominated by coal and gas, and to be affected by short run changes in fuel prices. Therefore while we will track current emissions intensity as a headline indicator for the power sector, we will also separately track generation by low carbon capacity.
- In the long term, the generation mix will depend on the capacity mix, which will in turn depend on the investments made in the first three budget periods. Given the lead times involved, delivery of our desired capacity mix in 2030 will require planning applications/decisions to be made, projects to move to the construction phase, etc., a number of years in advance. Supporting our headline indicators of emissions, emission intensity and low carbon generation, therefore, are indicators which describe the

investment required each year at each stage of the project cycle. This applies to both generation investment and infrastructure investment, with the former dependent to some extent on the latter.

- In order to drive and support this investment, a number of key policy milestones must be achieved around planning and regulation, transmission access arrangements, market structure and support for CCS. These are set out in detail in the main report.
- Other drivers for successful implementation include planning approval rates, the supply chain for both wind and nuclear and the availability of skilled staff, and international progress on CCS demonstration and deployment; we will monitor these alongside fuel prices – a key contextual factor that could affect all levels of this hierarchy.

Table 3 summarises our selected indicators for the power sector, together with the data sources which we will use for monitoring.

Table 3: Power sector indicators and data sources for monitoring

POWER	Data source	Frequency	Frequency & publication date	Coverage
Headline indicators				
Emissions intensity (g/kWh)	Estimated: CCC estimate based on provisional emissions data (see below) and generation data from DECC Energy Trends Final: Defra/DECC GHG conversion factors for company reporting	Annual	Estimated: March (3 month lag) Final: Autumn (approx 21 month lag)	UK
Total emissions (% change from 2007)	Provisional: emissions from major power producers available on request from DECC after publication of Energy Trends Final: Defra e-Digest Statistics	Annual	Provisional: March (3 month lag) Final: March (15 month lag)	UK
Generation (TWh)	DECC Energy Trends	Quarterly	March	UK
Wind				
Nuclear				
CCS				
Supporting indicators				
Transmission				
Agreement on incentives for anticipatory investment for Stage 1 reinforcements	Infrastructure Planning Commission (once set up) and ad-hoc (Ofgem, DECC, Distribution Network Operators, and public announcements)	Ongoing	-	UK
Implementation of enduring regime for accessing grid				
Transitional OFTO regime in place				
Enduring OFTO regime in place				
Grid reinforcement planning approval				
Grid reinforcement construction begins				
Grid reinforcements operational				
Tendering for first offshore connections under enduring OFTO regime				
Construction of first offshore connections under enduring OFTO regime begins				
First offshore connections under enduring OFTO regime operational				
Planning				
IPC set up and ready to receive applications	Public announcements by Government	Ongoing	-	UK
Market				
Review of current market arrangements	Public announcements by Government	Ongoing	-	

Table 3 continued

POWER		Data source	Frequency	Frequency & publication date	Coverage
Wind					
Generation (TWh)	Onshore Offshore	DECC Energy Trends	Quarterly	-	UK
Total capacity (GW)	Onshore Offshore	British Wind Energy Association (BWEA), UK Wind Energy Database (UKWED) developed by BWEA, Renewable Energy Database (RESTATS) developed by DECC	These are live databases that are regularly updated.	-	UK
Capacity entering construction (GW)	Onshore Offshore				
Capacity entering planning	Onshore Offshore				
Average planning period (months)					
Nuclear					
Regulatory Justification process		DECC	Ongoing	-	UK
Generic Design Assessment		Health and Safety Executive and Environment Agency			
National Policy Statement for nuclear (including Strategic Siting Assessment)		DECC			
Regulations for a Funded Decommissioning Programme in place		DECC and Nuclear Liabilities Financing Assurance Board (NLFAB)			
Entering planning		IPC			
Planning approval; site development and preliminary works begin		DECC and Regulators			
Construction begins		Public announcements, Government and operators			
Plant begins operation		DECC and Regulators			
CCS					
Front-End Engineering and Design (FEED) studies for competition contenders completed		DECC and public announcements*	Ongoing	-	UK
Announce competition winner					
Second demonstration competition					
Quantification of saline aquifer CO ₂ storage potential					
Review of technology and decision on framework for future support					
Strategic plan for infrastructure development					
Planning and authorisation approval, land acquisition, and storage site testing completed, construction commences					
Demonstrations operational					
First new full CCS plants supported via the 2016 mechanism					

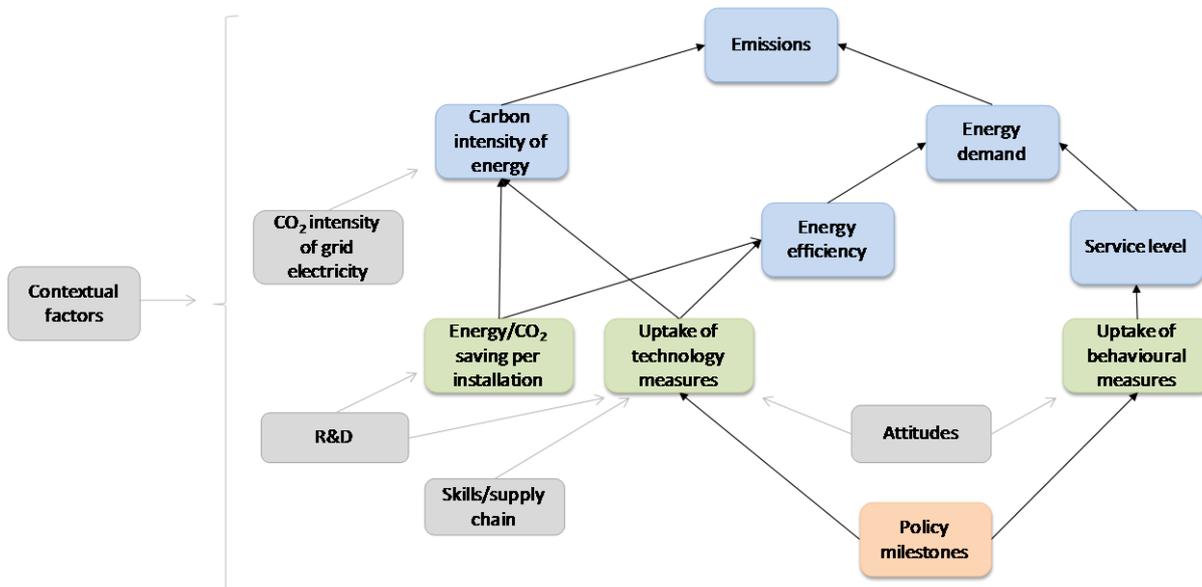
Table 3 continued

POWER	Data source	Frequency	Frequency & publication date	Coverage
Other drivers				
<i>Total demand (TWh)</i>	DECC Energy Trends	Quarterly	March	UK
<i>Coal and gas prices</i>	Anecdotal evidence from various sources including Ofgem, National Grid and DECC	Ongoing	-	UK
<i>Nuclear outages</i>	Annual company statements	Annual	March	UK
<i>Average wind load factors</i>	DECC, Energy Trends	Quarterly	March	UK
<i>Availability of offshore wind installation vessels, access to turbines</i>	Anecdotal evidence from BWEA, DECC and other relevant sources	Ongoing	-	UK
<i>Nuclear supply chain, availability of skilled staff</i>	Anecdotal evidence from various sources (e.g. Cogent Skills Council study)			
<i>International progress on CCS demonstration and deployment</i>	DECC and the International Energy Agency (IEA)			
<i>Planning approval rates and frequency of public inquiries to decisions of Infrastructure Planning Commission</i>	IPC			

*Some commercially sensitive issues (e.g. demonstration competition) may be provided to us on a confidential basis; we will use these in our assessment of progress but will not be able to publish them in our report.

Buildings and industry

Figure 2 illustrates the key drivers of emissions from buildings and industry



- At the highest level, emissions are driven by energy demand (consumption) and the carbon intensity of the energy consumed.
- Driving energy demand are service level (e.g. the temperature to which homes are heated) and energy efficiency. Both of these can be improved by the implementation of measures: behavioural measures such as turning heating down by 1°C can reduce the required service level, while technology measures such as insulation can improve energy efficiency, meaning less energy is required to provide a given service level. For the UK as whole, average energy efficiency will depend on both the level of uptake of these measures and the energy/CO₂ savings delivered by each one.
- Looking next at the carbon intensity of energy, this can be improved via the uptake of lower carbon energy sources such as renewable heat or microgeneration technologies¹⁷. Again, average carbon intensity will depend on both level of uptake of these technologies and on the CO₂ savings delivered by each one.
- Underpinning the uptake of both technology and behavioural measures is policy action. While some uptake will occur in the absence of policy action, it is clear that policy intervention will be required to achieve the levels set out in our Extended Ambition scenario.
- Other, external, drivers which may affect uptake of measures include public attitudes, the supply chain or R&D developments which affect availability/costs. R&D developments may also affect the CO₂ savings associated with a technology.
- Contextual factors relating to GDP, fuel prices and demographics will be important too, particularly for required service level s and uptake of measures.
- Our indicator set for buildings and industry draws on this hierarchy and includes trajectories, based on the Extended Ambition scenario, for emissions and energy consumption (demand) both overall and by sector¹⁸ (i.e. for residential buildings, public/commercial buildings and industry).

¹⁷ CO₂ intensity of electricity supplied to buildings and industry by major power producers is also important; we treat this as an external driver for end user emissions based on our target trajectory for the power sector.

¹⁸ excluding savings from renewable heat, due to uncertainty around the precise technologies that will be taken up and in which sectors.

- For residential buildings, where relatively good data exist, we also include indicators on the uptake of key energy efficiency measures: loft insulation, cavity wall and solid wall insulation, condensing boilers and efficient appliances^{19, 20}. We set out in the main report a number of key policy milestones which must be achieved in order to drive this uptake and these milestones complete our supporting indicators for the residential sector. Among our other driver for the residential sector, we include a number of key demographic factors which are likely to influence both required service levels and uptake of measures. These include age profile, household size and ownership type (particularly due to split incentives in the private rented sector), and appliance ownership.
- For non-residential buildings and industry, lack of data is a real issue. We do not therefore include uptake of specific measures in our indicator set, although we do recommend that all public buildings covered by the CRC realise all cost-effective emissions reduction potential by 2018 and include this as an indicator. More generally, however, we focus on policy development with regard to SMEs and to EPCs and DECs²¹. For both non-residential buildings and industry, we will monitor emissions and fuel consumption by sub-sector amongst our other drivers²². Along with GVA by sub-sector, this will help us to understand the relative contribution of, for example, public and commercial buildings and to understand any underlying reasons for aggregate emissions changes (e.g. structural changes in the industrial sector).
- Finally we include an indicator on total penetration of renewable heat, based on our Extended Ambition scenario and underpinned by successful operation of the Renewable Heat Incentive, but do not include trajectories for the uptake of renewable heat technologies. This is due both to uncertainty around the precise technologies that will be taken up and in which sectors, and to a current lack of robust data in this area. Where possible, however, we will monitor uptake of different renewable heat technologies amongst our other drivers. We will also monitor costs of these technologies, in particular cost reductions which might bring the technology closer to mass-market penetration.

Table 4 summarises our selected indicators for buildings and industry, together with the data sources which we will use for monitoring.

¹⁹ We will track average SAP rating, which measures the energy performance of homes based on theoretical annual energy use for space and water heating, pumps/fans and lighting; however it is not possible to set out in advance, based on the Extended Ambition scenario, what the trajectory for this would be, hence its inclusion as an 'other driver' and not an implementation indicator.

²⁰ We will also track implementation of behavioural measures amongst our other drivers but a lack of data on these measures prevents us from monitoring them against a detailed trajectory.

²¹ We recommend a government decision by 2010 on roll-out of EPCs and DECs. Following this decision, monitoring of implementation against a feasible trajectory could begin. The purpose of roll-out would initially be to improve the evidence base for the non-residential sector rather than to achieve emissions reductions, although these may follow as a result, particularly if all non-residential buildings were required to have a minimum EPC rating of F or higher.

²² We do not set our trajectories for these as, while we are confident that our Extended Ambition scenario reflects the right order of magnitude of emissions reduction potential, the sub-sectoral detail is more uncertain.

Table 4: Indicators for buildings and industry and data sources for monitoring

BUILDINGS AND INDUSTRY		Main source(s)	Frequency & publication date	Coverage	Additional source(s)	Frequency & pub. date	Notes
All buildings and industry[†]							
Headline indicators							
CO ₂ emissions (% change on 2007)	direct	Provisional: DECC Energy Trends (March) Final: Defra e-Digest Statistics	Annual Provisional: March (3 month lag) Final: March (15 month lag)	UK			National Statistic. Provisional data available on a source basis only; sectoral categories used for provisional data not directly comparable with CCC definitions (to be resolved with DECC).
	indirect [‡]	Estimated: CCC estimate based on electricity consumption and gCO ₂ /KWh of generation Final: Defra e-Digest Statistics	Annual Estimated: March (3 month lag) Final: March (15 month lag)	UK			Estimate: indicative only Final: National Statistic
Final energy consumption (% change on 2007)	non-electricity	DECC Energy Trends	Quarterly March (3 month lag)	UK			National Statistic. Sectoral categories used not directly comparable with CCC definitions.
	electricity*	DECC Energy Trends	Quarterly March (3 month lag)	UK			National Statistic. Sectoral categories used not directly comparable with CCC definitions.
Residential buildings[†]							
Headline indicators							
CO ₂ emissions (indicative minimum % change on 2007)	direct	Provisional: DECC Energy Trends (March) Final: Defra e-Digest Statistics	Annual Provisional: March (3 month lag) Final: March (15 month lag)	UK	-	-	National Statistic. Provisional data available on a source basis only.
	indirect [‡]	Estimated: CCC estimate based on electricity consumption and gCO ₂ /KWh of generation Final: Defra e-Digest Statistics	Annual Estimated: March (3 month lag) Final: March (15 month lag)	UK	-	-	Estimate: indicative only Final: National Statistic
Final energy consumption (indicative minimum % change on 2007)	non-electricity	DECC Energy Trends	Quarterly March (3 month lag)	UK	-	-	National Statistic
	electricity*	DECC Energy Trends	Quarterly March (3 month lag)	UK	-	-	National Statistic

[†] according to UEP source classification

[‡] resulting from centrally-produced electricity which is then consumed by end users; there is hence overlap between these emissions and those from the power sector

*centrally produced

Table 4 continued

BUILDINGS AND INDUSTRY	Main source(s)	Frequency & publication date	Coverage	Additional source(s)	Frequency & pub. date	Notes
Residential buildings ctd.						
Supporting indicators						
Uptake of Solid Wall insulation (million homes, total additional installations on 2007 levels)	CERT Monitoring Data / English House Survey	Quarterly March (3 month lag) / Annual (results based on 2-year rolling average) January (9 month lag)	GB / England	Smaller government schemes / INCA and NIA (trade associations) / DA equivalents to EHS	Ad hoc / ad hoc / intermittent	There is currently a lack of data on overall uptake: CERT does not represent the whole market, while the EHS provides an estimate of the total market but due to sample size cannot accurately measure annual changes in current low volumes. However these are the best available sources. Trade associations can also provide estimates of total market size by surveying members. However it is anticipated that data quality will improve if the Supplier Obligation drives increased uptake.
Uptake of Loft insulation (<= 100mm) (total additional installations on 2007 levels, millions)	CERT Monitoring Data	Quarterly March (3 month lag)	GB	DECC Energy Consumption in the UK	Annual July (31 month lag)	CERT captures most activity (other schemes offer loft insulation, but overall contribution is small). CERT monitoring data includes number of installations but not depth of insulation. A breakdown by depth is available in Energy Consumption in the UK but with a 31 month lag (these are BRE estimates based on the EHS, scaled up to the UK).
Uptake of Loft insulation (>100mm) (total additional installations on 2007 levels, millions)						
Uptake of Cavity wall insulation (million homes, total additional installations on 2007 levels)	CERT Monitoring Data	Quarterly March (3 month lag)	GB	DECC Energy Consumption in the UK	Annual July (31 month lag)	CERT captures most activity (other schemes offer loft insulation, but overall contribution is small).
Uptake of Energy efficient boilers (million homes, total additional installations on 2007 levels)	Heating & Hot Water Industry Council sales data supplied to DECC	Monthly Data can be supplied to CCC by DECC on ad hoc basis	UK	-	-	
Uptake of Energy efficient appliances - Cold A++ rated (% of stock)	Market Transformation Programme database	Live database. Data can be supplied on ad hoc basis	UK	-	-	
Uptake of Energy efficient appliances - Wet A+ Rated (% of stock)						
Every house offered whole-house energy audit	DECC	Ongoing	UK	-	-	
Heat and Energy Saving Strategy finalised	DECC	Ongoing	UK	-	-	Now the Home Energy Management Strategy. Complemented by DA action.
New financing mechanism pilots operate and are evaluated	DECC	Ongoing	England	-	-	
New financing mechanism budgeted and legislation in place if necessary	DECC	Ongoing	Dependent on legislation	-	-	
Post CERT delivery framework legislation in place	DECC	Ongoing	GB	-	-	separate NI mechanism

Table 4 continued

BUILDINGS AND INDUSTRY	Main source(s)	Frequency & publication date	Coverage	Additional source(s)	Frequency & pub. date	Notes
Residential buildings ctd.						
Other drivers						
<i>Average SAP rating</i>	DECC Energy Consumption in the UK	Annual July (19 month lag)	UK	Energy Savings Trust / DCLG research	Ad hoc	
<i>Implementation of behavioural measures</i>	DEFRA Social Research	Ongoing	UK	Ongoing research and literature review	Ongoing	DEFRA Social Research and other groups (e.g. UEA's LCIC) are currently conducting ongoing studies that CCC will follow in addition to any new studies.
<i>Population (by age)</i>	ONS Population Statistics	Annual Dec (12 month lag)	UK	-	-	
<i>Number of households (by type - building and occupants)</i>	CLG Household estimates & projections	Last update: Nov 2009 Next update: 2011	UK	-	-	
<i>Household disposable income</i>	ONS	Quarterly March (3 month lag)	UK	-	-	
<i>Electricity and gas prices</i>	DECC quarterly energy prices	Quarterly March (3 month lag)	UK	ONS monthly fuel RPI	Monthly (1 month lag)	
<i>Appliance ownership</i>	Market Transformation Programme	Ongoing	UK	-	-	These data are collected by the MTP; latest estimates are published in Energy Consumption in the UK and are also available from the MTP's online 'what-if' tool.

Non-residential buildings[†]							
Headline indicators							
CO ₂ emissions (indicative minimum % change on 2007)	direct	Provisional: DECC Energy Trends (March) Final: Defra e-Digest Statistics	Annual Provisional: March (3 month lag) Final: March (15 month lag)	UK	-	-	National Statistic. Provisional data available on a source basis only; sectoral categories used for provisional data not directly comparable with CCC definitions.
	indirect [‡]	Estimated: CCC estimate as above Final: Defra e-Digest Statistics	Annual Estimated: March (3 month lag) Final: March (15 month lag)	UK	-	-	Estimate: indicative only Final: National Statistic
Final energy consumption (indicative minimum % change on 2007)	non-electricity	DECC Energy Trends	Quarterly March (3 month lag)	UK	-	-	National Statistic. Sectoral categories used for provisional data not directly comparable with CCC definitions
	electricity*	DECC Energy Trends	Quarterly March (3 month lag)	UK	-	-	National Statistic. Sectoral categories used for provisional data not directly comparable with CCC definitions.

[†] according to UEP source classification

[‡] resulting from centrally-produced electricity which is then consumed by end users; there is hence overlap between these emissions and those from the power sector

*centrally produced

Table 4 continued

BUILDINGS AND INDUSTRY	Main source(s)	Frequency & publication date	Coverage	Additional source(s)	Frequency & pub. date	Notes
Non-residential buildings [†] ctd.						
Supporting indicators						
Develop policy on SMEs	DECC	Ongoing	UK	-	-	
Government decision on the following recommendations for EPCs and DECs:	CLG / Scottish Government / Northern Ireland Assembly	Ongoing	England & Wales	-	-	
• All non-residential buildings to have EPC						
• All non-residential buildings to have minimum EPC rating of F or higher						
• Roll out of DECs to non-public buildings						
All public buildings covered by CRC to realise all cost effective emissions reduction potential	Environment Agency	Ongoing	UK	-	-	
Other drivers						
<i>Emissions and fuel consumption by subsector</i>	DECC Energy Consumption in the UK	Annual July (19 month lag)	UK	-	-	
<i>GVA for each subsector vs. GDP</i>	ONS detailed data	Annual August (20 month lag)	UK	ONS high level data	Quarterly March (3 month lag)	
<i>Electricity and gas prices</i>	DECC quarterly energy prices	Quarterly March (3 month lag)	UK	-	-	

Industry[†]							
Headline indicators							
CO ₂ emissions (indicative minimum % change on 2007)	direct	Provisional: DECC Energy Trends (March) Final: Defra e-Digest Statistics	Annual Provisional: March (3 month lag) Final: March (15 month lag)	UK	-	-	National Statistic. Provisional data available on a source basis only; sectoral categories used for provisional data not directly comparable with CCC definitions.
	indirect [‡]	Estimated: CCC estimate as above Final: Defra e-Digest Statistics	Annual Estimated: March (3 month lag) Final: March (15 month lag)	UK	-	-	Estimate: indicative only Final: National Statistic
Final energy consumption (indicative minimum % change on 2007)	non-electricity	DECC Energy Trends	Quarterly March (3 month lag)	UK	-	-	National Statistic. Sectoral categories used for provisional data not directly comparable with CCC definitions.
	electricity*	DECC Energy Trends	Quarterly March (3 month lag)	UK			National Statistic. Sectoral categories used for provisional data not directly comparable with CCC definitions.

[†] according to UEP source classification

[‡] resulting from centrally-produced electricity which is then consumed by end users; there is hence overlap between these emissions and those from the power sector

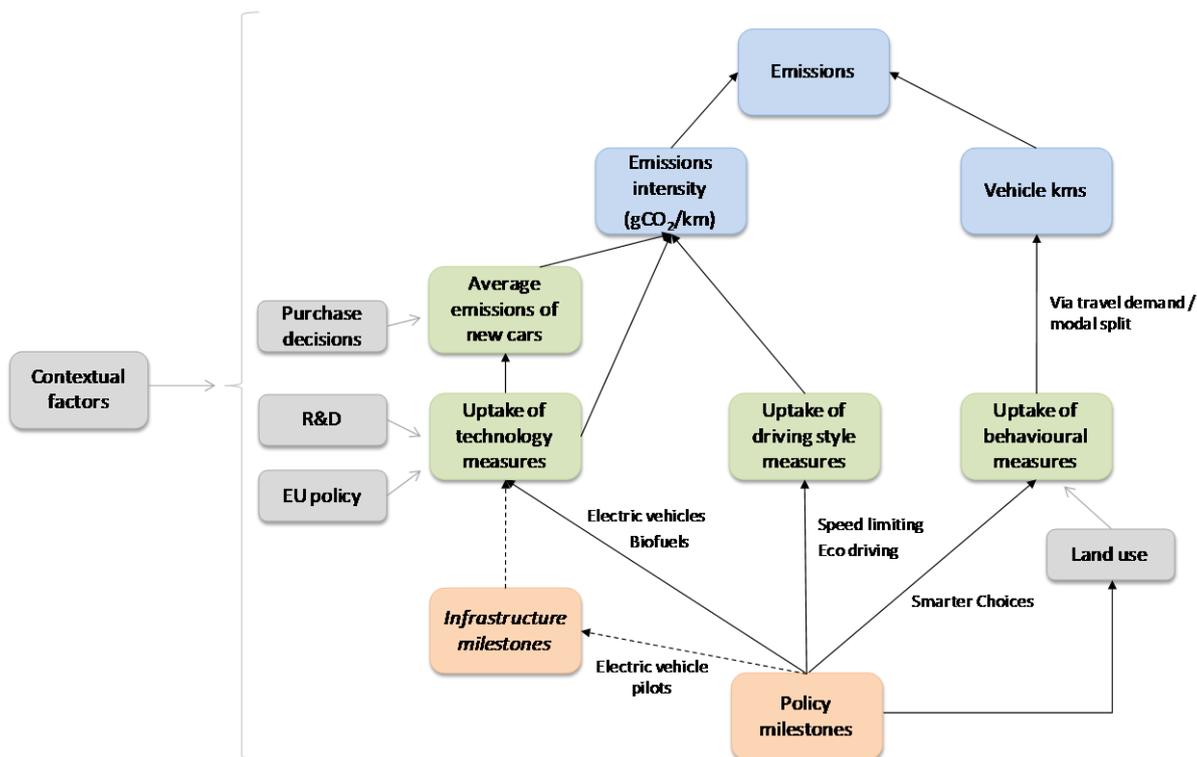
*centrally produced

Table 4 continued

BUILDINGS AND INDUSTRY	Main source(s)	Frequency & publication date	Coverage	Additional source(s)	Frequency & pub. date	Notes
Industry ctd.						
Other drivers						
<i>Emissions and fuel consumption by subsector</i>	DECC Energy Consumption in the UK – Industrial Tables 4.6	Annual July (7 month lag)	UK	-	-	
<i>GVA for each sub-sector vs. GDP</i>	ONS detailed data	Annual August (20 month lag)	UK	ONS high level data	Quarterly March (3 month lag)	
<i>Electricity and gas prices</i>	DECC quarterly energy statistics	Quarterly March (3 month lag)	UK	-	-	
Renewable heat						
Headline indicators						
Renewable heat penetration	-	-	-	-	-	No adequate data source exists at present but this penetration will be tracked in the future as part of government assessment of their progress in meeting their target of 12% renewable heat in 2020.
Supporting indicators						
Renewable Heat Incentive in operation	DECC	Ongoing	GB	-	-	
Other drivers						
<i>Uptake and costs of renewable heat technologies (biomass boilers, solar thermal, ground source and air source heat pumps, district heating)</i>	Low Carbon Buildings Programme / Trade bodies / Market research	Ongoing	UK	-	-	The uptake of individual renewable heat technologies is not currently tracked comprehensively. Information on grants awarded under the LCBP gives a limited indication of take-up. In the absence of better data, which should become available in line with government policy to promote renewable heat uptake, CCC will consult with relevant trade bodies for anecdotal estimates of take-up.

Transport

Figure 3 illustrates the key drivers of emissions from road transport.



- At the highest level, total emissions are driven by vehicle kilometres and by the emissions intensity of vehicle travel (gCO_2/km); we include all three as headline indicators²³, against trajectories set out in our Extended Ambition scenario.
- Driving the trajectory for emissions intensity in this scenario is a combination of supply side and demand side factors. On the supply side are the average emissions of new vehicles entering the fleet, which we include as a separate indicator for cars²⁴, and which depends in turn on the take-up of technology measures. We do not attempt to prescribe a particular mix of technologies in our indicator set. We do however set out trajectories for the uptake of electric cars, based on our Extended Ambition scenario and aimed at achieving critical mass of vehicles in the first three budget periods in order to provide the option for possible roll-out in the 2020s²⁵. We also include penetration of biofuels, consistent with proposals in the Gallagher Review²⁶.

²³ For cars. For vans and HGVs we include emissions and emissions intensity as headline indicators but include vehicle/tonne kilometres amongst our other drivers only. This is because our Extended Ambition scenario does not currently include any demand-side measures for vans and HGV and is based simply on business-as-usual demand projections. We aim to set out trajectories for van and HGV kilometres following new work on freight for our 2010 progress report.

²⁴ We aim to include indicators for new van and HGV emissions as the available monitoring data improves.

²⁵ We focus on electric vehicles based on current evidence which suggests they are the most economically attractive option for sector decarbonisation. Other options exist, but remain at an earlier stage of development. These include hydrogen fuel cells and we will track progress in this technology as part of our wider monitoring.

²⁶ In addition to uptake of specific technologies, other purchase decisions may impact the average emissions intensity of new vehicles, including the proportion of new cars purchased that are the most efficient in class and the size mix of new cars purchased (i.e. the balance of small / medium / large cars); we will track these amongst our other drivers but do not set out trajectories for them.

- Our analysis has suggested that electric car uptake will be driven both by pilot projects and cost reductions. We include policy milestones around the delivery of pilot projects, which should include a range of charging infrastructure options and be supported by any necessary planning and regulatory changes (e.g. to facilitate installation of on-street charging points). Costs²⁷ are included amongst our other drivers, alongside developments in battery technology and availability of electric cars on the market. All of these factors will inform the Committee on how close the technology is to becoming a mass-market option; all of them too will be influenced by EU policy and in particular the modalities agreed for the EU's new car emissions, which we include in addition.
- Returning to our trajectory for emissions intensity, driving this on the demand side is the uptake of behavioural measures which lead to more fuel-efficient driving styles; we include indicators for speed limiting, and for the number of drivers trained in eco-driving which underpins the emissions savings included in the Extended Ambition scenario.
- Behavioural measures can impact too on the demand for vehicle travel: Smarter Choices for example can reduce vehicle kilometres by reducing total demand for travel (e.g. through home working) and/or by encouraging modal shift²⁸. However, given the incomplete evidence base on emissions reductions from Smarter Choices, our indicators focus on policy milestones around further piloting rather than wide-spread implementation. We include a policy milestone too for development of an integrated land use planning and transport strategy, given the influence of land use on travel demand and choices. We include some specific aspects of land use (ratio of parking spaces to new dwellings and proportion of retail development in town centre / edge of centre locations) amongst our other drivers.
- As part of our wider monitoring exercise, we will also track a number of contextual factors such as fuel prices which could affect demand for travel, modal split and/or the uptake of various technologies. The Committee will account for these factors when making their judgment about whether progress is on track.

Table 5 summarises our selected indicators for road transport, together with the data sources which we will use for monitoring.

²⁷ Primarily battery costs as these are the main cost component.

²⁸ The trajectory for vehicle kilometres underpinning the savings from Smarter Choices included in our Extended Ambition scenario could be achieved by either of these impacts. We do not therefore set out a trajectory for modal split but will monitor this amongst our other drivers.

Table 5: Indicators for road transport and data sources for monitoring

ROAD TRANSPORT		Data source	Frequency & publication date	Coverage	Notes
Headline indicators					
Direct emissions (% reduction on 2007)	Total	Provisional: DECC Energy Trends (March)	Provisional: Annual - March (3 month lag) Final: Annual - March (15 month lag)	UK	National Statistic
	Car	Final: Defra e-Digest Statistics			
	Van				
	HGV				
gCO ₂ /km (carbon intensity of a vehicle kilometre)	Car	CCC calculation based on emissions and vehicle-km data	-	UK	
	Van				
	HGV				
Vehicle kilometres		Provisional: DfT Road Traffic and Congestion in Great Britain Final: DfT Transport Statistics Great Britain	Provisional: Quarterly (1 month lag) Final: Annual - November (11 month lag)	GB	GB data is National Statistic. This will be scaled to obtain an estimate for the UK.
Supporting indicators					
Vehicle technology					
New vehicle gCO ₂ /km	Car	SMMT	Annual - March (3 month lag)	UK	National Statistic
New electric cars registered each year		SMMT	Annual - March (3 month lag)	UK	National Statistic
Stock of electric cars in vehicle fleet / number delivered through pilots		SMMT / DfT	On request	UK / GB	National Statistic
Biofuels					
Penetration of biofuels (by volume)		Monthly bulletin: Hydrocarbon Oils (available on ONS website)	Monthly (1 month lag)	UK	National Statistic
Decision on whether RTFO target can be met sustainably		Government announcement	2011/12	UK	
Demand side measures					
Proportion of drivers exceeding 70mph		DfT Transport Statistics Great Britain	Annual - November (11 month lag)	GB	
Total number of car drivers who have undergone eco driving training		Data collected through enquiry to DfT, Energy Saving Trust, Driving Standards Agency	Ad hoc	UK	Relies on ad hoc queries. Level of training provided for driving test is limited compared to EST training.
Smarter Choices – demonstration in a city and development plan for roll out if successful, demonstration in rural areas and demonstration targeting longer journeys		DfT	Ongoing	UK	
Smarter Choices – phased roll out to towns		DfT	Ongoing	UK	
Development of integrated planning and transport strategy		Monitoring of policy with CLG	Ongoing	Separate for England & Wales, Scotland and NI	

ROAD TRANSPORT	Data source	Frequency & publication date	Coverage	Notes
Other drivers				
Fuel pump prices	DfT	As required	UK	Calculated by DfT
Fuel duty	HMRC website: Hydrocarbon oils: Duty Rates	As required	UK	
New car sales that are best in class	SMMT	On request	UK	Relies on ad hoc request to SMMT
Proportion of small/medium/large cars	SMMT	On request	UK	Relies on ad hoc request to SMMT
Proportion of hybrids	SMMT	On request	UK	Relies on ad hoc request to SMMT
Uptake of non-powertrain measures	SMMT	On request	UK	Relies on ad hoc request to SMMT
Van and HGV vehicle- / tonne-kms	Provisional: DfT Road Traffic and Congestion in GB Final: DfT Transport Statistics GB	Provisional: Quarterly (1 month lag) Final: Annual - November (11 month lag)	GB	GB data is National Statistic. This will be scaled to obtain an estimate for the UK.
Petrol/diesel consumption	DECC Energy Trends (March)	Quarterly - March (3 month lag)	UK	National Statistic
Modal split	Provisional: DfT Road Traffic and Congestion in GB Final: DfT Transport Statistics GB	Provisional: Quarterly (1 month lag) Final: Annual - November (11 month lag)	GB	GB data is National Statistic. This will be scaled to obtain an estimate for the UK.
Average speed of drivers exceeding 70 mph	DfT Transport Statistics GB	Annual - November (11 month lag)	GB	
Agreement of modalities for reaching EU target of 95 gCO ₂ /km and related penalties	Monitoring of policy developments	Ongoing	-	
New car gCO ₂ /km in EU	European Commission: <i>Monitoring the CO₂ emissions from new passenger cars in the EU</i>	Annual - January (13 month lag)	EU	Alternative source: European Federation for Transport and Environment: <i>Reducing CO₂ Emissions from New Cars</i> published annually – September (9 month lag)
New van and HGV gCO ₂ /km	Not yet collected	-	-	Data under development by SMMT. Access to data will rely on ad hoc request to SMMT
Number of EV car models on the market	SMMT	On request	UK	Relies on ad hoc request to SMMT
Developments in battery and hydrogen fuel cell technology	Research	Ongoing	UK	
Battery costs	Research	Ongoing	UK	
Successful conclusion of EU work / development of accounting system for indirect land use change and sustainability	Monitoring of policy developments	Ongoing	-	
Number of households	CLG Household estimates and projections	Last update: November 2009 Next update: 2011	UK	
Car ownership per household	DfT Transport Statistics GB	Annual - November (11 month lag)	GB	
Cost of car travel vs. cost public transport	DfT Transport Trends: Changes in relative costs of transport	Annual - February (2 month lag) (underlying data on request)	GB	Underlying data must be requested
Funding allocated to and population covered by Smarter Choices	DfT, independent transport specialists	Ad hoc	UK	Relies on ad hoc queries to DfT and transport specialists.
Proportion of new retail floorspace in town centre/edge of centre locations	CLG	Ad hoc	England	CLG published historical data in 2009 but no plans to update regularly.
Ratio of parking spaces to new dwellings	Research / ad hoc requests to LAs	Ongoing / ad hoc	UK	Data may be held by LAs but access may be difficult.

ANNEX A: GOVERNMENT SUSTAINABLE DEVELOPMENT INDICATORS AND UK ENERGY SECTOR INDICATORS RELATED TO CLIMATE CHANGE

Government Sustainable Development Indicators

Indicators	Details
Greenhouse gas emissions	
Greenhouse gas emissions	Greenhouse gas and CO ₂ emissions, and emissions associated with UK consumption
Carbon dioxide emissions by end user	CO ₂ emissions from industry, domestic, transport sectors (excluding international aviation and shipping)
Aviation and shipping emissions	Greenhouse gases from UK-based international aviation and shipping fuel bunkers
Electricity generation	
Renewable energy	Renewable electricity generated as a percentage of total electricity
Electricity generation	Electricity generated, fossil fuel used in generation, CO ₂ , NO _x and SO ₂ emissions by electricity generators and GDP
Carbon dioxide and other emissions	
Household energy use	Domestic CO ₂ emissions, domestic energy consumption and household spending
Road transport	CO ₂ , NO _x , PM ₁₀ emissions and GDP
Private cars	Private car CO ₂ emissions, car-kilometres and household spending
Road freight	Heavy Goods Vehicle (HGV) CO ₂ emissions, kilometres, tonnes and Gross Domestic Product
Manufacturing sector	Manufacturing sector CO ₂ , NO _x , SO ₂ , PM ₁₀ emissions and output
Service sector	Service sector CO ₂ , NO _x emissions and output
Public sector	Public sector CO ₂ , NO _x emissions and output
Resource use	
Resource use	Domestic Material Consumption and GDP
Energy supply	UK indigenous energy production and gross inland energy consumption
Contextual indicators	
Economic output	Gross Domestic Product
Productivity	UK output per worker
Demography	Population and population of working age
Households and dwellings	Households, single person households and dwelling stock
Mobility and access	
Mobility and access	Number of trips per person by mode and distance travelled per person per year by broad trip purpose
Getting to school	Percentage of journeys to school by mode

UK Energy Sector Indicators

Low carbon key indicator

Greenhouse gas and carbon dioxide emissions

Low carbon supporting indicators

(Data published at end July for previous calendar year except where indicated.)

1. Total carbon dioxide emissions by sector
2. Final energy consumption by sector (provisional)
3. Carbon intensity, Carbon dioxide emissions per unit of GDP (provisional)
4. Energy ratio in G8 countries

5. Share of fuels contributing to primary energy supply; fossil fuel dependency (provisional)
6. Proportion of electricity generated by renewables
7. CHP capacity for electricity generation
8. Energy intensity (provisional)
9. Energy intensities for road passengers, road freight and air (provisional)
10. Specific energy consumption for households (2004)
11. Average new car CO₂ emissions (2006)

Relevant background indicators

(see next page)

Data published at end July for previous calendar year except where indicated.

E1 Energy in the Economy; Investment and Productivity

E1.4 Research and Development by the energy industries (2006)

RELIABLE SUPPLIES OF ENERGYE2 Resources

E2.8 Capacity of renewable sources for electricity generation

E2.9 Nuclear generation capacity

E3 Energy Diversity

E3.2 Shares of fuels contributing to primary energy supply; fossil fuel dependency (provisional)

E3.4 Shares electricity generated from different fuels

E3.6 Proportion of electricity generated by renewable

E3.7 Electricity generation from renewable sources, excluding large-scale hydro

INDUSTRIAL AND BUSINESS COMPETITIVENESSE6 Fuel Prices

E6.1 Fuel price indices for the industrial sector

E6.2 Petrol and Diesel prices (Q2 2008)

E6.3 Fuel price indices for the domestic sector

ENVIRONMENTAL OBJECTIVESE10 Conversion Efficiencies

10.1 Ratio of final to primary energy consumption (provisional)

10.2 Ratio of fuel use for electricity generation to electricity used by final users

10.3 Gas flared per tonne or oil produced

E11 Energy Use Indicators

E11.1 The energy ratio (provisional)

E11.2 Final energy consumption by sector (provisional)

E11.3 Industrial energy consumption and output (provisional)

E11.4 Energy intensity of the iron and steel industry

E11.5 Energy intensity of the chemicals industry

E11.6 Energy intensity of the food, drink and tobacco industry

E11.7 Energy intensity of the minerals industry

E11.8 Transport energy consumption by type of transport

E11.9 Energy consumption and distance travelled by road passengers (provisional)

E11.10 Energy consumption and distance travelled by road freight

E11.11 Average new car CO₂ emissions (2006)

E11.12 Car use per person

E11.13 Domestic energy consumption

E11.14 Domestic energy consumption by final use (2006)

E11.15 SAP rating of housing stock (2006)

E11.16 Ownership of central heating by type (2006)

E11.17 Thermal efficiency of housing stock (2006)

- E11.18 Specific energy consumption for households (2004)
 - E11.19 Ownership and depth of loft insulation (2006)
 - E11.20 Electricity consumption by household domestic appliance by broad type (2006)
 - E11.21 Percentage of households owning refrigeration appliances (2006)
 - E11.22 Percentage of households owning domestic washing and drying appliances (2006)
 - E11.23 Energy efficiency of new cold appliances (2006)
 - E11.24 Service sector energy consumption and output (provisional)
 - E11.25 Final energy use and value added by public administration (provisional)
 - E11.26 Final energy use and value added by commercial and other services (provisional)
- Table E11.1 Industrial energy use by sector

E12 Energy and the Environment

- E12.1 Emissions of greenhouse gas
- E12.3 Carbon dioxide emissions on an IPCC basis and measurement towards targets (provisional)
- E12.4 Carbon dioxide emissions by UNECE source (provisional)
- E12.5 Carbon dioxide emissions by fuel (provisional)
- E12.6 Power station emissions of carbon dioxide (provisional)
- E12.7 Carbon dioxide emissions per unit of GDP (provisional)
- E12.8 Carbon dioxide emissions per head for G8 countries (2005, quintennial)
- E12.13 Nitrogen oxides emissions by source (2006)
- E12.14 Road transport emissions of nitrogen oxides (2006)