



# Review of UK and DA Climate Change Action Plans

Task 55 of the 2010 UK / DA GHG Inventory Improvement Programme



**Report for DECC, Welsh  
Assembly Government, the  
Scottish Government and the  
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for Northern Ireland**

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# Executive Summary

This report summarises a review of recent UK and Devolved Administration (DA) Government climate change policy documents, to identify: (i) key policies and policy areas where impacts of policies upon activity data and emission factors are expected to be reflected in overall emission inventory data, and (ii) new policy-specific data mechanisms (e.g. to track policy implementation) that may become useful in the future development of inventory methodologies at the UK and/or DA level.

The review focuses on the energy, industrial process and waste sectors of the GHG inventory, where AEA Group is the current contracted inventory agency for GHG inventory compilation. Separate contracts and improvement programmes are in place for agriculture and land use, land use change and forestry inventory sectors.

The review has looked in detail at recent top-level policy documents from UK and DA Governments, including:

- **UK:** Low Carbon Transition Plan, Low Carbon Transport, Delivering the Low Carbon Transition Plan;
- **Wales:** Climate Change Strategy for Wales: Delivery Plan for Emission Reduction, Renewable Energy Route-map for Wales;
- **Scotland:** Low Carbon Scotland: The Draft Report on Proposals and Policies, Zero Waste Plan, Scottish Building Standards (website), Public Bodies Climate Change Duties, Energy Assistance Package.

This review has highlighted a range of possible options for future inventory improvement research, based on the available information on policy implementation and new data mechanisms that are expected to be implemented to track policies. These research options have been taken forward for further discussion as part of the 2011 to 2012 UK and DA GHG inventory improvement programme.

In many cases, the systems of policy monitoring and reporting are still under development, and hence there are many areas where the detail of what can be achieved through further research of these information sources is not clear. However, the emission sources identified as the highest priorities for further research to augment current data and inventory methods are:

- **Waste.** New DA reporting mechanisms could inform the development of DA-specific models using available policy data (e.g. Scottish Zero Waste Plan, WAG policy on biodegradable waste targets);
- **Energy Supply and Industry.** The REPI dataset (England and Wales IPPC sites only) includes site-specific energy data (including electricity data) that could be used to improve the level of sector resolution for estimates from all regulated industrial sites in Wales;
- **All energy sectors.** The Low Carbon Transition Plan has a wide range of targets and performance indicators that could provide useful data for specific sectors;
- **Business, Energy Supply and Industry.** Climate Change Levy Information may provide site-specific energy use data for a wide range of sites in industrial and commercial sectors;
- **Business and Public.** Energy Performance Certificates and Display Energy Certificates for building energy use could be used directly to inform energy use estimates by fuel, by sector, by location, or to improve the energy mapping methodology currently used in the sub-national energy statistics analysis;
- **Public.** FReM (Treasury public sector energy reporting system) sustainability reporting for the public sector may become a useful new dataset to inform public energy and emissions data.

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# 1 Introduction

## 1.1 Background

In order to track progress on the implementation of measures targeting reductions in emissions of CO<sub>2</sub>e from each of the constituent countries of the UK, qualitative or quantitative monitoring and assessment of policies and measures is needed. The potential for the Devolved Administration (DA) Greenhouse Gas (GHG) inventories to reflect the impact of GHG mitigation policies and measures is dependent upon the source data and compilation methods available for use in the inventory.

DA emission inventory estimates for many sources are based on top-down UK data and assumptions to estimate the DA share of total emissions, due primarily to the scarcity of local data to inform bottom-up emission estimates; as a consequence, the inventories for Scotland, Wales, England and Northern Ireland are not sensitive to local policy actions for all sources. The development of UK and DA climate change policy may lead to the generation of new datasets that will augment current information and enable more accurate and sensitive emission inventories to be derived. The potential for improvements to the DA inventories will be dependent on:

- the scope, detail and format of any new information derived from the new policy monitoring mechanisms; and
- whether the new data can be assimilated into existing inventory compilation methods or provide a new model or method to develop inventory estimates.

### 1.1.1 Criteria for Inventory Improvement Options

The use of any new data for the purposes of inventory improvement needs to consider:

- the impact of the new data on inventory activity data, which may require action by stakeholders other than the policy analysts and the inventory agency (for example, the integration of new energy data into DECC's existing systems of national and sub-national energy data collection and reporting);
- whether the new data provides comprehensive new information for the DA (or UK) emission estimates for the source sector(s), or just provides a sub-set of the overall data needs, and hence could only be used to inform de-minimis data or as a quality checking function (for example, if emissions data from a sample of industry sites become available, but do not cover all such sites within that sector);
- whether the new data enables new estimates to be made across the full time series of data (i.e. back to 1990), or whether its use would require a step-change in emission estimation methodology part-way through the time series (which is not ideal but is sometimes implemented, such as the use of EU Emissions Trading System (EUETS) data from 2005 onwards within the derivation of the UK and DA inventories);
- where data are available to inform estimates in one DA, are the equivalent data also available for the other DAs, or would the use of the data require an inconsistent inventory methodology between DAs (which again is not ideal but is not an absolute barrier to using new data for just one DA – each instance would need to be considered on its own merits);
- how does the new data compare against current data used in the inventory, and where they show large differences what other information are available to test the veracity of the new data, i.e. is there enough evidence to show that the new dataset is more accurate than the current dataset;
- do the new data provide information on local emission factors or source-specific assumptions that could be applicable to emission sources in other regions and sectors?

The UK and DA GHG inventory work programme underpins statutory requirements of reporting for UK and DA legislation; the inventories have been developed to report emission trends by source sector, using estimation methods that are in accordance with international guidelines and best practice from the Intergovernmental Panel on Climate Change (IPCC). Maintaining consistent calculation methods within a sector and across a time-series are core principles of inventory compilation, and this must be taken into account where new data are considered for use to improve the inventory to meet the (secondary) purpose of satisfying policy-reporting objectives.

DA inventories are not required to be reported internationally and hence are not governed directly by the IPCC Guidelines, as the UK GHG inventory is; however, the DA inventories are required by law to

follow international reporting standards where practicable (e.g. Climate Change (Scotland) Act 2009 s.17(3) and s.19). The quality assurance system that underpins the UK (and DA) inventory currently ensures that IPCC methods are consistently applied, but many of the current DA inventory methods rely heavily on assumptions and proxy data to estimate the DA share of the UK inventory total. This is not ideal for the purposes of tracking progress against national GHG reduction targets, and hence a more detailed dataset is needed.

### 1.1.2 Inventory Sensitivity to Policy Actions

Where policy implementation leads to reductions in activity data (e.g. fuel use) which is reported within national (UK) statistics, the inventory will usually reflect those policy impacts within the UK and DA inventories as a whole. However, the sensitivity of the current UK and DA inventory methods is such that:

- **Policy-specific sensitivity.** Impacts of specific policies cannot be identified in isolation from other policies and drivers within a given source sector (in most cases). The potential for the inventory to quantify and report will be restricted by the overlapping nature of many related policies, e.g. energy efficiency packages and the limited nature of the data that will be available in terms of the fuel savings (and associated emissions) that can be attributed to specific measures;
- **DA Inventory methods.** For most emission sources, there is no “bottom-up” set of DA-specific activity data upon which to base the emission estimates, and hence many of the DA estimates are based on proxy data and assumptions. As a result, the data sensitivity to DA policy actions is poor for many source sectors, and emission reductions (whilst evident in the UK sector estimates) may be “smeared” across all of the DAs, rather than distinctly reflected in each DA inventory. For example, if new energy efficiency campaigns in Scotland affect the local energy use within the domestic sector, this policy impact will only partially be reflected in the Scottish GHGI. Domestic use of gas is locally referenced, and so the reduction in gas use will be reflected, and the same can be said for electricity use. However, the impacts on use of solid and liquid fuels will not be reflected in the Scottish inventory as the method currently uses a UK-wide mapping technique which may reflect the Scotland-specific housing stock but cannot track the local sales of oils and solid fuels in the sector.

The DA GHGI improvement programme seeks to incorporate new, more detailed source data to develop the inventory methods to better reflect the overall impacts of policies at the DA sector level; note, however, that the DA GHG inventories do not provide a mechanism to directly track policy-specific impacts. Monitoring and tracking impacts of specific policies is not directly possible through an inventory.

### 1.1.3 The UK and DA GHG Inventory Improvement Programme

The UK and DA GHG inventories are reviewed annually, with priorities for new research and method improvement agreed and commissioned via the National Inventory Steering Committee (NISC), managed by DECC and attended by the DA Government Climate Change policy leads.

The improvement programme seeks to review new data sources in order to enhance the accuracy and robustness of the inventories. The review of Climate Change Action Plans undertaken in this study has identified several new sources of data that may enable method improvements for the UK and DA inventories, and these are highlighted below.

The task objective is to identify new data sources and review the robustness of current DA GHG inventory data to tracking the mitigation options identified in each country's Climate Change action plan (or equivalent). The main aim of the review is to assess how sensitive the inventory is/ will be in tracking progress against policy actions on a year-by-year basis and over a longer (e.g. 10 year) period.

## 1.2 Study Approach

The study team has reviewed a wide range of UK and DA policy documents, to assess the DA inventory sensitivity for the main policy actions that are being implemented or are planned to be implemented. The documents / materials reviewed include:

- **UK:** Low Carbon Transition Plan, Low Carbon Transport, Delivering the Low Carbon Transition Plan;
- **Wales:** Climate Change Strategy for Wales: Delivery Plan for Emission Reduction, Renewable Energy Route-map for Wales;
- **Scotland:** Low Carbon Scotland: The Draft Report on Proposals and Policies, Scottish Rural Development Programme, Scottish Soil Framework, Zero Waste Plan, Scottish Building Standards (website), Public Bodies Climate Change Duties, Energy Assistance Package.

Further road transport related policy documents have also been reviewed as part of another GHGI improvement plan task. The report accompanying task 23 (Road Transport, Phase 2 UK/DA) gives further detail on road transport policies discussed in this document.

This brief report summarises the main findings of this review, and is intended to support the decision-making for the next phase of DA inventory improvement research. Note that the focus of this study is on the IPCC sectors of **Energy, Industrial Processes and Waste**, for which AEA is the contracted inventory agency. There are separate contractors that lead on the agriculture and Land Use, Land Use Change & Forestry (LULUCF) inventories, and hence these sectors are omitted from this report as they are responsible for separate inventory improvement programme contracts.

A more comprehensive assessment of the policies and measures is included within a supporting spreadsheet to this report, providing a summary of policies and measures within each National Communication sector, with comments to highlight inventory-specific issues for each policy. Within the main body of the report below, the information is presented aligned with geographical coverage of the policies reviewed. However, as an alternative approach, the report Annex presents the information by National Communication sector, together with some background to the inventory methodology and current source data (and limitations), and how the policy information may feed into the wider UK and DA inventory improvements on a sector-by-sector basis.



## 2 Study Findings

This section of the report gives a summary of the main study findings. The prioritisation of the literature review and investigation of options for inventory improvement has considered policies to be of greater significance for inventory improvements where:

- the policy is likely to generate new datasets which could be used in the inventory;
- the policy impacts will not be reflected in the DA inventory and it has highlighted an area of the inventory where improvement work could be prioritised; or
- the policy is likely to cause a significant reduction in emissions in one of the constituent countries but reductions are only likely to be observed at a national level.

### 2.1 UK Policies

The Low Carbon Transition Plan and associated Low Carbon Transport paper have been reviewed and the policies within the documents have been assessed with regard to the national and DA inventory. The main UK policies that may be useful in future inventory improvement research are summarised below.

#### 2.1.1 Policy Mechanisms that may Generate New Data

The following UK policies may provide new datasets or useful information which could be used within the national and DA GHG inventories.

- **Energy Supply/Energy Users:** *CRC Energy Efficiency Scheme*. DECC and the Devolved Administrations are looking to develop the current system of CRC reporting in order to explore whether better disaggregated (DA) data by sector could be delivered through CRC in Phase II of the scheme. The current CRC reporting system provides very little geographical referencing of energy use data by participants, and various options are being explored. The CRC only covers a limited scope of each sector and hence is limited in its usefulness for the inventory, as it will not provide comprehensive data for sites, sectors, localities/regions.
- **Energy Supply/Energy Users:** *the Renewable Heat Incentive and Feed in Tariffs (FITS)* are intended to include measures to monitor the progress of these policies on an annual basis. At present, the Sustainable Development Commission (SDC)<sup>1</sup> database provides some information. However, at this stage it is not possible to identify what sort of data will be available, and hence how useful this will be to the development of the UK and DA GHG inventories. The focus on development of a more decentralised electricity generation and heat delivery systems (including growth of renewables) in the UK will require a more detailed analysis of local energy demands and this is likely to prompt more detailed data for use in the inventories. Energy mapping tasks have recently been commissioned by the Scottish Government, for example.
- **Energy Supply/Energy Users:** *Smart metering*. It is intended to roll out smart meters to all domestic and non-domestic buildings. At present, there is some uncertainty in the split between industrial/ commercial and the domestic sector in the sub-national electricity consumption dataset. DECC and the Devolved Administrations are working to improve the sub-national energy consumption statistics. The policy is targeted at encouraging reductions in fuel consumption by users by increasing awareness and it should provide a useful data-source facilitating the quantification of energy consumption by properties. If this information is made available and also identifies whether the property is commercial, domestic or public - this could represent a very valuable data-source, particularly for the end-user inventory.
- **Business/Domestic/Public:** *Energy Performance Certificates (EPCs) and Display Energy Certificates (DECs)*. EPCs and DECs promote the improvement of the energy performance of buildings in England and Wales. Further research would be needed to assess what data are available from these policies and how they could be used to improve the inventory. These policies currently only cover England and Wales however.

<sup>1</sup> The Sustainable Development Commission was closed on the 31<sup>st</sup> March 2011.



### 2.1.2 Priority Policy Areas for Inventory Improvement

The following UK policies have highlighted areas of the inventory which are regarded as priorities for improvement, either to enable the inventory to show regional variations in emissions or for emissions reductions to be shown in the inventory at all.

- **Waste:** EU and UK-wide initiatives such as landfill tax are aimed at diverting waste from landfills. The impacts of these policies will not be felt at DA level unless DA-specific landfill models are developed that enable all local assumptions / factors to be considered in isolation, rather than relying on a composite UK model for the sector.
- **Energy Supply/Energy Users: CHP.** A range of UK and DA policies aim to promote this type of decentralised energy supply, as well as small scale renewable generation. These policies can be “problematic” for the inventory in so far as they do not map well onto the reporting format (by IPCC or NC sector, as they cut across many sources) and there are unclear definitions to segregate data for fuel use in many (usually small to medium-scale) power and heating units. This therefore means that tracking of emissions relating to these policies can be difficult. More work is needed here to explore the detail of additional reporting mechanisms that will be implemented through these policy measures.

## 2.2 Welsh Policies

During this project the WAG Climate Change Strategy Emissions Reduction Plan has been reviewed and the policies within the document have been assessed with regard to the national and DA inventory. The main Welsh policies that may be useful in future inventory improvement research are summarised below.

### 2.2.1 Policy Mechanisms that may Generate New Data

The following Welsh policies may provide new datasets or useful information which could be used within the national and DA GHG inventories.

- **Energy Supply/Energy Users: Increased biomass energy generation.** WAG has performed some interim analysis into the level of biomass energy generation currently being used. Biomass energy production is not currently included in the inventory as commodity balances for biomass do not exist below the national scale. If regional datasets were to be made available this may help with emissions mapping and regional emissions estimates.
- **Public Sector: Reducing the carbon footprint of Assembly Government estate, NHS and education services.** These actions have also been reviewed during a recent inventory scoping study on improving emissions estimates from the public sector<sup>2</sup>. These datasets can not currently be used directly within the inventory but with additional work to build on consistency of scope and reporting across the constituent countries could lead to significant improvement.

### 2.2.2 Priority Policy Areas for Inventory Improvement

The following Welsh policies have highlighted areas of the inventory which need improvement, either to enable the inventory to show regional variations in emissions or for emissions reductions to be shown in the inventory at all.

- **Energy Supply/Energy Users: Renewable energy policies (electricity).** The WAG Climate Change Strategy contains a number of policies relating to renewable energy generation. The DA End User emissions inventory now uses UK-wide electricity generation GHG per GWh factors so reductions in emissions due to electricity generated using renewable sources is in effect ‘spread’ across the whole of the UK; the end user GHG inventory approach reflects the functioning of the UK-wide electricity supply grid, and provides a more stable carbon intensity factor upon which to base policy appraisal.
- **Energy Supply/Energy Users: Renewable energy policies (heating).** CO<sub>2</sub> emissions due to the combustion of biomass are not included in the DA inventory. They are included as a memo item in the UK inventory as per international requirements. Currently, the commodity

<sup>2</sup> [http://uk-air.defra.gov.uk/reports/cat07/1006231328\\_Report\\_ED45322204\\_Issue\\_1\\_June2010.pdf](http://uk-air.defra.gov.uk/reports/cat07/1006231328_Report_ED45322204_Issue_1_June2010.pdf)

balance tables in the annual DECC publication *The Digest of UK Energy Statistics* (DUKES) which contain national biomass statistics does not provide sub-national biomass data.

- **Waste:** *Diversion of biodegradable waste from landfill to recycling, composting and anaerobic digestion.* The impacts of these policies will not be felt in the Welsh inventory level unless DA-specific landfill models are developed that enable all local assumptions / factors to be considered in isolation, rather than relying on a composite UK model for the sector.

## 2.3 Scottish Policies

The study team has reviewed a wide range of Scottish Government policy documents and other web-based materials, starting with the Scottish Government Report “Low Carbon Scotland: Draft on Proposals and Policies” and then working through supporting policy documents to identify specific actions and new ideas. The main Scottish policies that may be useful in future inventory improvement research are summarised below.

### 2.3.1 Policy Mechanisms that may Generate New Data

The following Scottish policies may provide new datasets or useful information which could be used within the national and DA GHG inventories.

- **Waste:** *Waste Data Strategy.* SEPA are scheduled to develop a Waste Data Strategy which aims to deliver high quality data on waste in Scotland during the period of 2011-2025. SEPA has recently launched a public consultation (21<sup>st</sup> March 2011) seeking views on the overall aims, vision and scope of the proposed strategy, the waste data requirements, issues, outcomes and timescales. [www.sepa.org.uk/waste/waste\\_data.aspx](http://www.sepa.org.uk/waste/waste_data.aspx). The future content of such a strategy could represent a new data source for the Scottish Inventory, depending upon on its content.
- **Waste:** *Waste Composition.* In 2008, the Scottish Government commissioned WRAP to undertake a macro level study of the composition of municipal waste collected by Local Authorities in Scotland. The final report was published in April 2010. <http://www.zerowastescotland.org.uk/document.rm?id=8938>. This report describes the composition of municipal solid waste in Scotland from the physical analysis of waste collected by a representative sample of local authorities; this dataset provides information that can be directly applied within a Scotland-specific waste model to replicate that used in the UK GHG inventory, but it must be noted that this only provides a recent snapshot of waste composition, and the historic data for waste disposals in Scotland may still need to rely on UK-average data. The impacts of Scottish waste policies and achievement of waste targets by councils and Scottish Government will not be reflected in the Scottish GHG inventory unless a Scotland-specific landfill model is developed to enable local assumptions / factors to be considered in isolation, rather than relying on a composite UK model for the sector.
- **Public Sector:** *Public sector duties.* The Energy Efficiency Action Plan commits to ensuring that public bodies commit to undertake the Carbon Trust's Carbon Management Programme if they have not already done so. This policy may represent a useful data-source for the inventory in terms of fuel consumption by public sector organisations. However, this is dependent on the nature and transparency of the quantification methodology adopted and availability of the information.

In addition to the potential new data sources outlined above, the Scottish Government has outlined a new reporting framework which will use a number of key indicators to provide a qualitative indication of progress on the implementation of energy efficiency initiatives (under the Energy Efficiency Action Plan). The aim of this is to provide supportive information to the headline target. The detail of these indicators is not yet clear. It may be that qualitative data will not be directly useful to inform inventory estimates, but nevertheless the energy efficiency policy area is a very high priority for improvement, as it cuts across so many sectors with high emissions under the Scottish Government's domain, covering by source and end user inventories. Hence this is a high priority for a “watching brief” on the development of the energy efficiency action plan indicators; the AEA team is in periodic contact with the Scottish Government EEAP team, should any new data become available for either inventory or mapping applications.

### 2.3.2 Priority Policy Areas for Inventory Improvement

The following Scottish policies have highlighted areas of the inventory which need improvement, either to enable the inventory to show regional variations in emissions or for emissions reductions to be shown in the inventory at all.

- **Waste: Zero Waste Plan.** The current DA GHGI methodology is only able to disaggregate emissions from waste disposal to the relevant country by using the total amount of waste disposed in that country. Currently there is no method to take into account waste segregation, disposal best practice or abatement below a national level. The UK model has undergone an overhaul in the last inventory cycle, and some improvements to consider DA-specific waste composition data have been built into the UK model, but more work is needed to develop a DA-specific model to improve the landfill emission estimates and take consideration of the methane capture and oxidation measures (flares, engines) in Scottish landfills.

## 2.4 English Policies

Within the UK Low Carbon Transition Plan there are a number of England-specific policies. In the accompanying spreadsheet, these have been separated as 'Policies affecting England' in the first column. No England-specific policies were identified as high priorities for action with the energy, industrial process or waste sectors.

### 3 Summary and Recommendations

There are a wide range of new policy initiatives at all levels of Government in the UK aimed at achieving GHG emissions reductions through all sorts of different policy levers and across all sectors. This short study has enabled the inventory team at AEA to do an initial review of several of the key UK and DA climate change policy documents to identify the most likely source sectors and policy areas where inventory improvements may be achieved through the use of new data from policy research, tracking or annual / periodic reporting mechanisms. This supplements the annual review of the DA GHGI data sources, and is part of the UK and DA GHG Inventory Improvement Programme.

There are a number of policy mechanisms and new reporting systems that we have reviewed, and below there is a series of recommendations for DECC and the DAs to consider within future inventory improvement work.

In many cases, the systems of policy monitoring and reporting are still under development, and hence there are many areas where the detail of what can be achieved through further research of these information sources is not clear. In all cases outlined below, we expect that there are useful data to either:

- inform national and sub-national energy statistics (and hence feed into inventory estimates);
- directly inform local / regional / national emission estimates; or
- as a supplementary dataset to improve current estimation methods (e.g. energy mapping work, revisions of underlying assumptions to estimate the DA share of UK emission totals).

The emission sources identified as the highest priorities for further research to augment current data and inventory methods are:

- **Waste.** New DA reporting mechanisms could inform the development of DA-specific models using available policy data (e.g. Scottish Zero Waste Plan, WAG policy on biodegradable waste targets);
- **Energy Supply and Industry.** The REPI dataset (England and Wales IPPC sites only) has been analysed in a scoping study by AEA, and there is site-specific energy data (including electricity data) that could be used to improve the level of sector resolution for estimates from all regulated industrial sites in Wales, including many sites in the non-traded sector. The access to electricity data is especially pertinent in Wales where the WAG targets include estimates of end user emissions from electricity use by traded and non-traded industrial sites;
- **All energy sectors.** The Low Carbon Transition Plan has a wide range of targets and performance indicators that could provide useful data for specific sectors. (More detail is included for each sector in the report annex). The scope and detail and reporting system for these indicators needs further review to assess its usefulness and links to inventory data;
- **Business, Energy Supply and Industry.** Climate Change Levy Information is expected to provide site-specific energy use data for a wide range of sites in industrial and commercial sectors. Access to the data may be limited due to commercial confidentiality, however;
- **Business and Public.** Energy Performance Certificates and Display Energy Certificates for building energy use could be used directly to inform energy use estimates by fuel, by sector, by location, or to improve the energy mapping methodology currently used in the sub-national energy statistics analysis;
- **Public.** FReM (Treasury public sector energy reporting system) sustainability reporting for the public sector is a new data resource that may be very useful for energy and inventory work, depending on its scope and the level of detail in the annual carbon reports by public sector organisations, but the benefits of accessing these data are unclear at present.

As a “second tier” of options and data sources, the following is a list of policies and (developing) datasets which are expected to be useful in future inventory development, but either are not at a stage to be directly useful yet, or they are aimed at policy areas (e.g. development of renewable energy resources) that are not likely to be directly useful for significant inventory improvements but

may lead to the generation of useful research and data (e.g. they infer a need for better energy mapping for the purposes of policy appraisal):

- SG efficiency indicators and supporting datasets. (*For example, the Scottish Government Building Standards team are commissioning new databases to collate available data on Scottish building stock, including a database of Display Energy Certificates. These databases will in time provide a Scotland-specific dataset to improve the energy mapping work that underpins sub-national energy use estimates.*)
- WAG climate change indicators and Renewable Energy Route-map indicators
- CRC data.
- Green Deal information.
- Renewable Heat Incentive, Renewables Obligation Targets, WAG Renewable Energy Route-map Indicators, and all impacts on data from RESTATS and within DUKES
- Any rail and shipping information arising from policy work. (*None has been explicitly identified, but transport policies are evident that cite the need for greater rail electrification, for example, which infers greater focus on the rail sector energy data in future.*)

# ANNEX: Summaries by NC Sector

## Transport

The range of transport policies at UK and DA level tend to fall into several broad categories or themes, and some of these lead to ideas for future work in the DA GHGI development. None of the policies can be tracked in isolation, as regards their specific contribution to emission reductions that are evident within the DA inventory total. Using current inventory methods, DA emission estimates in the road transport and aviation sector are (in general) sensitive to local policy actions and changes in transport choices by the public, whereas the rail and shipping methods are more basic and less sensitive to local policy actions and tend to be dependent on UK data and trends.

For more information on road transport policies and their impact on the UK/DA inventories, see the report accompanying task 23 of the GHGI Improvement Programme.

DA / UK	Policy Type	Comment
UK and DA	Specify vehicle standards or promote specific schemes to upgrade the vehicle fleet to increase the use of lower carbon vehicle alternatives.	There are several policies that seek to implement new emissions targets for vehicles (e.g. EU directives), plus a few grants schemes etc aimed at specific sections of the fleet (e.g. public sector, buses, electric vehicles)  All of these will be reflected in the DA inventories by virtue of the vkm data according to vehicle type combined with the local registration data which will reflect the composition of the DA fleet, providing that (i) there is updated research available to inform the vehicle-type fuel efficiency data within the (UK) model, and (ii) that the vkm and registration data are provided at a level of detail that enables the identification of the use of lower-carbon vehicle technologies. Overall reductions in fuel use will be picked up in national energy stats and hence feed through to the UK GHGI.
UK and DA	Uptake of biofuels to either 5% or 10%	The current method assumes a UK-wide average for biofuel uptake, Therefore, if WAG or SG decided to go for 10% locally (rather than 5% nationally) this wouldn't be reflected in the inventory as it stands – the effect would be smeared across the UK.
SG and WAG	Freight efficiency. Help reduce waste journeys and get freight onto rail.	Where these efforts lead to reduced vkm data for HGVs and LGVs, then the effects will be directly accounted for in the DA inventories. <i>However, this does highlight a key weakness in the DA dataset with regard to <b>rail fuel use and freight activity</b>, which is currently poor and relies on a very limited gas oil dataset, with assumptions from periodic rail industry consultation to assess DA shares of UK activity.</i>
All	Better planning, behaviour change, better info, etc	Much of these policy messages are aimed at promoting public transport and getting more people on bikes, on foot, out of cars.  In the main, the effects will be shown locally in the inventories due to lower vkm data for road vehicles.  <i>As above the main weakness is likely to be the poor standard of <b>rail emissions data</b>.</i>
WAG	Rail electrification	Where this leads to lower road transport activity, then the reduced vkm data for Wales will ensure that the effects are shown in the inventory. Where it leads to

		<p>more rail use and lower gas oil use on the railway, this might be seen in the Wales inventory, but it is unlikely due to the poor sensitivity to local fuel use data in this sector.</p> <p>The end user estimates for rail are also based on very rough assumptions about the DA share of rail activity.</p> <p><i>There is significant scope for improvement here, but note that the overall significance of the rail sector emissions is quite low.</i></p>
UK	Fuel duty	<p>This should lead to reduced vkm data for all DAs, and the level of impact should be reflected in the DA inventories.</p>
All	Aviation	<p>We haven't really come across anything specific to aviation (probably EUETS Phase III is the over-riding issue on the horizon here).</p> <p>Note that the aviation inventory method is very detailed and is based on local data, so we would anticipate that aviation-specific policies like third runways etc would be reflected directly in the DA inventories.</p>
All	Shipping	<p>Similarly for shipping, very little is evident, but the inventory method is simplistic and would need to be overhauled to provide any great degree of policy sensitivity. The UK method has just been revised to determine more "bottom-up" national estimates. It may be possible to use that Entec research to determine a better DA split for the shipping data, but unless this is done annually there will be no tracking of policy actions, just a better baseline and assumption of UK trends applied to that.</p>



## Waste

The current landfill model and DA method relies upon UK-wide assumptions and factors, and the DA estimates are generated using a simple approach to apply annual data on MSW disposal to landfill. There is significant scope for improvement of the method, but nothing has been done in recent years, as we knew that the UK model was under review and indeed it has just been overhauled for the 1990-2009 dataset, for which we provided the contractor with the new range of DA data (e.g. waste composition studies) to integrate into the model.

More work is needed, though, to co-ordinate research from the regulatory agencies and generate better DA estimates that account for differences in application of methane capture and oxidation technologies (e.g. flares, engines).

Note that the waste sector is not “waste in leads to emissions out” for a specific year – it is a decay model to reflect the fact that waste degrades and releases methane over time, so improvements in activity data from 2011 will not lead to better estimates for 2011, 2012...but might help to improve the forecasts of emissions in 2020 and later.

The key policy types that we have identified in this review and a summary of their possible usefulness in the improvement programme are:

- **EU and UK-wide initiatives to use regulatory and economic instruments** (i.e. landfill tax) to (i) manage the industry as a whole to promote better landfill technology and management, and (ii) divert waste (or specific waste streams such as biodegradable waste) from landfills by promoting recycling etc.
  - ➔ *The impacts of these policies will feed through the current UK model over time, provided that annual data on waste composition and disposals to landfill are maintained and reported from across the UK. It is unclear whether such mechanisms are inferred by the new policies, but it is likely that they do not affect the existing systems. The need to generate reports to show that the UK achieves specific targets may however provide some additional annual detail that could be used in the model. The impacts of these policies will not be felt at DA level unless DA-specific landfill models are developed that enable all local assumptions / factors to be considered in isolation, rather than relying on a composite UK model for the sector.*
- **Scotland Zero Waste Plan.** The plan covers a wide range of initiatives and sets out a series of targets, against which progress from 2011 must be monitored. The type of targets indicated in the plan do indicate that data on specific waste streams and activities will have to be collected and reported, either on an annual or periodic basis (there are targets for 2010, 2013, 2020 and 2025), and these could be used to generate a more accurate landfill model for Scotland to cover future data.
  - ➔ *The impacts of these policies will feed through the current UK model over time, provided that annual data on waste composition and disposals to landfill are maintained and reported from across the UK. The need to generate reports to show that Scotland achieves specific targets is likely to provide some additional annual detail that could be used in the model. The impacts of these policies will not be felt in the Scottish inventory level unless DA-specific landfill models are developed that enable all local assumptions / factors to be considered in isolation, rather than relying on a composite UK model for the sector.*
- **CC Strategy for Wales WW1 and WW2.** The strategy has a couple of waste-specific policies, one of which is quite vague, but the policy on diversion of biodegradable waste from landfill indicates that there will be a need to monitor waste fate and the development of solutions like anaerobic digestion. If these data will be collated annually, then they could be used to improve the (currently UK) model.
  - ➔ *The impacts of these policies will feed through the current UK model over time, provided that annual data on waste composition and disposals to landfill are maintained and reported from across the UK. The need to generate reports to show that Wales achieves specific targets is likely to provide some additional annual detail that could be used in the model. The impacts of these policies will not be felt in the Welsh inventory level unless DA-specific landfill models are developed that enable all local assumptions / factors to be considered in isolation, rather than relying on a composite UK model for the sector.*

## Energy

There are several themes that are useful to consider within the Energy Supply policies (and related energy efficiency policies, which act across many sectors) and how they match up to inventory reporting formats, data and methods.

### Major Power Producers and Heavy Industry

Generally dealt with via UK-wide policies (EUETS), and are well regulated, with (usually) high quality point source data. There are ongoing improvement areas here for the inventory (e.g. EUETS – DUKES data matching for several fuels and sectors) but nothing new that arises from UK policy, other than a look-ahead to the extension of EUETS in Phase III. This is the subject of an ongoing short study, within which only limited new data from DECC has come to light. There is some scope for further work, but nothing to require a fundamental change in the inventory data sources or methods.

Work to address future analysis to cover new technologies (such as CCS) will need to be developed for the UK GHGI.

### Decentralising and decarbonising energy supplies

There are a wide range of UK and DA policies that aim to promote either:

- A more decentralised energy supply sector (e.g. promoting more district heating, uptake of CHP); and/or
- Decarbonisation of the power and heat supply in the UK, through growth in use of renewables and technologies to maximise local opportunities for waste-derived heat and so on.

These are “problematic” for the inventory in as much as they do not map well onto the reporting format (by IPCC or NC sector, as they cut across many sources) and there are unclear definitions to segregate data for fuel use in many (usually small to medium-scale) power and heating units. The GHGI format does not require a detailed understanding of the detail and transparency of data that are available (from DECC, e.g. within DUKES and Energy Trends) covering:

- Autogeneration
- CHP (“good quality”)
- Heat generation (and in which industry)
- Industrial fuel use

The GHGI doesn’t need to distinguish between these related (and over-lapping, in terms of definitions and allocations) uses of energy. In essence, we just need to avoid double-counting and try to ensure that where possible the energy use is allocated to the right sector and that we apply the right emission factor.

Note also that the proposals to develop more decentralised power and heat supplies are more than likely to be aimed at “off-gas-grid” areas, where the dominant fuels are oils and solid fuels, and hence where (i) the carbon saving opportunities are greatest, and (ii) the combustion units are more likely to be adaptable or replaceable with biomass-fired units (this is a gross generalisation, but it is worth noting). These are exactly the fuel uses and allocations (to sector and to location) that are most difficult for the inventory to track, as we have to adopt a top-down modelling approach which means that the emission estimates are not sensitive to local actions.

This is therefore an opportunity. To implement these decentralisation and development of renewable energy policies, the baseline information will need to be developed in order to identify the energy demand. There is already some progress evident on this, through recent heat mapping work by DECC and Scottish Government, but access to new datasets to perform this mapping is essential or we just go round in circles with historic mapping data and assumptions on heat demand.

More work is needed here to explore the detail of additional reporting mechanisms that will be implemented through these policy measures:

**Renewables Obligation Targets:** The Renewables Obligation is the principal financial support scheme for renewable electricity in the UK and is aimed at stimulating the deployment of renewable energy in order to work toward climate change targets for 2020. OFGEM will be responsible for monitoring the implementation of the scheme, including the issuing of Renewable Obligation Certificates (ROC), assessing compliance and monitoring implementation. There is a requirement to

report on the implementation of the scheme on an annual basis, and the information compiled during the regulation of the scheme may provide a new data-source that could/ should be considered during the compilation of the UK and DA Inventories.

**The Renewable Heat Incentive:** The RHI is designed to encourage the generation of renewable forms of heat and will provide support to a wide range of renewable technologies in the domestic, commercial/ public and industrial sectors across the UK. The development of the scheme has included the metering of renewable heat, which is likely to occur over a wide geographical areas. The requirement for metering may provide a new data-source for consideration within the UK and DA inventories, however, at present it is difficult to ascertain the precise content of such metering and it's availability for inclusion. The value of the data may also be dependent on the capacity to separate domestic, commercial/ public and industrial sectors.

**The Scottish Government Heat Networks and District Heating Scheme:** There is likely to be increased investment in the Aberdeen District Heating Scheme and some small businesses in Scotland with respect to the installation of renewable heating systems. The loan scheme has also recently been opened for expressions of interest. A new heat map tool is also due to be released at the end of March to assist local authorities in the development of local heat strategies. The scheme offers the potential for using some data on where schemes are in place or are planned, that could be used to tweak the current mapping approach for the oils and solid fuels. However, this is a long shot and dependent upon the nature of the data available. Furthermore, the sector allocation would also hard to achieve.

**Welsh Assembly Government Renewable Energy Route-map:** The Renewable energy route map includes 50 specific measures aimed at outlining how Wales will achieve self sufficiency in terms of electricity, but also contribute to the UK's energy security objectives. By its nature, many of the measures included in the map will require to be monitored either directly or indirectly via the grant schemes, and consequently, these may provide a valuable source of information for consideration within the UK and DA inventory compilation process. However, until the outputs of such monitoring mechanisms become available it is difficult to ascertain how valuable they may be.

### **Energy Efficiency (EE) Policies**

The implementation of EE policies tends to cut across several sectors, and the same limitations apply regarding inventory data, methods and sensitivity whether we're talking about the public sector, commercial, industry or domestic.

Note that for metered fuels, ongoing work by DECC is seeking to improve the data matching of meters to sectors and locations, but this is likely to be a longer-term improvement to the sub-national data and hence DA inventories.

Current fuel use data are thus:

#### ***Gas Data***

- Sub-national DECC gas data are evidently inconsistent with the DUKES UK data for the domestic and non-domestic data.
- Local gas data excludes certain high-consuming sites, which limits data quality for DA GHGI, as we need to make assumptions.
- Sector allocation of gas use (even at UK level) is questionable. The domestic sector allocation is derived on an annual threshold basis and is thought to include many small commercial operators. At DA level, the allocation of gas use to public, commercial etc is uncertain due to lack of data.
- Overall, though, the data for a DA should be accurate, but not at the sector level. This is because the "consumption in Scotland" can be quite accurately monitored from DECC data (albeit noting some inconsistencies where assumptions have to be made to align "GB sub-national" data to Northern Ireland gas and DUKES UK gas totals).
- Therefore DA EE policies will show up reductions in gas use overall, but not accurately by sector.
- At present it appears that the Scottish Government indicators designed to monitor the implementation of EE initiatives are likely to be qualitative in nature rather than providing quantitative data that could be used directly to supplement the GHG Inventory. However, the nature of the indicators may evolve as more information becomes available. At present the

potential for using these indicators to supplement the DA inventory seems to be limited, but this conclusion may change when information becomes available.

### **Oil and Solid Fuel Data**

- As outlined above, the DA allocations and the sector allocations are uncertain due to the series of assumptions that have to be made in the mapping process.
  - Unlike with gas, we can't even say that the data are accurate at the DA level, as there is no meter data to help underpin regional (non-sector-specific) fuel use data.
  - The UK level data for small-scale sources is known to be uncertain.
  - A Scottish indicative heat demand map has been produced by the Scottish Government and a new heat map tool is due to be released at the end of March 2011 to assist Scottish local authorities in the development of local heat strategies. The base heat map has been developed in GIS, thus enabling the layering of relevant information. Although the content of the map is indicative, this combined with the implementation of local heat strategies could provide a useful source of information to the DA inventories. This will however require further assessment.
- ➔ It will be useful to maintain a watching brief on the development of specific research/indicators and any sector-specific or heat demand analysis that arises within the DAs, to ascertain whether inventory improvements are achievable.

### **Electricity Data**

- Similar to gas data in that the overall electricity use by DA is reasonably well known (for recent years at least, not historically – the 1990 data are poor).
  - The sector resolution of electricity data is more uncertain, but there is scope for developing the **End Users** dataset to make slightly more use of the available DUKES data. This needs to start with the UK end users model, though. Some progress has already been made on this, notably to improve the tracking of emissions from autogenerated electricity use.
  - The improvement of the end users estimates is a high priority for WAG due to the nature of the WAG targets. Use of CRC data (see below) is one option to consider.
- ➔ There are some specific policies that will require better electricity data, e.g. the WAG policy on electrification of the rail network, and these may provide baseline studies that will enable an improvement to current estimates, but it is not clear.

### **Other Fuels**

- Industry-specific fuels (e.g. OPG, COG, BFG) are generally covered through the large industrial sectors of the inventory. There is some need to review coke use by different sites – mainly in England and Wales – and to conduct ongoing data reconciliation work on DUKES and EUETS. These will affect all DAs, but there is nothing policy-specific here.

Opportunities for improvement identified through this policy review include:

- **CRC Data** may in time provide much more information on fuel use by sector, which would improve the DUKES Commodity Balance tables, which would then feed into the DA GHGI improvements. In particular, this could greatly improve the information on electricity use within sectors such as public and commercial. AEA has been involved in recent discussions with the EA and DECC teams that lead CRC (as part of a related study). Apparently a new dataset from the Agency will shortly become available to provide initial data on sector allocations of electricity. Limitations of CRC are uncertainties over scope of coverage of a sector, and also limited scope of coverage of energy use within data from scheme participants, and therefore it may only be useful as a de-minimis and to identify / improve current assumptions regarding sector-specific fuel choice and energy intensities.
- **Scottish Government EE targets / indicators and WAG Climate Change Indicators.** (As outlined in text above.)

## Industry

The inventory methods to estimate emissions from industry cover both combustion-derived emissions and process emissions (e.g. from decarbonisation from chemical feedstocks). Key data sources are generally well documented, available annually and with a high degree of sector and geographical resolution for the most highly emitting sites.

For the **traded** sites, there is no new data or method improvement recommended for the by source DA GHG inventory, although more work is still needed to progress the resolution of data inconsistencies between EUETS and DUKES.

There is, however, some scope for the improvement of the End Users inventory, which is important for WAG, as the Wales targets include electricity use by traded and non-traded sites.

- The REPI dataset (England and Wales IPPC sites only) has been analysed in a scoping study by AEA, and there is site-specific electricity data that could be used to improve the level of sector resolution for all regulated industrial sites in Wales. This dataset still omits the smaller (IPPC Part B and below) sites, however, but it is a big step forward and does include an estimated 24% of the non-traded fuel use in 1A1 and 1A2 in Wales, as well as providing full coverage of the traded sector. We currently only have 2009 data and there are clear mis-reports evident for some sectors, but the 2010 dataset will become available in spring/summer 2011 and further research here is recommended.

Other options to consider from the recent review of policy documents include:

**Renewable Heat Incentive:** Use of data from this policy to inform the current energy use at industrial sites, where baseline (site- or sector-specific) studies may be generated. These could be directly useful for specific sites, or they may just be useful to help inform the assumptions on sector-specific fuel choices and energy intensities, to improve current mapping work. The policy should provide some data on investments in new technologies, but it is unclear what level of detail on specific schemes will become available, or whether any annual reporting of case studies (or all activities) will provide new data for consideration either directly in the inventory or (more likely) within DUKES and sub-national energy data from DECC.

**Climate Change Levy certificates:** The use of a certification scheme to manage exemptions from the CCL may provide a new resource of energy use data by site or by sector that could be geographically referenced, or could be considered within DUKES and DECC sub-national energy stats. This might be a long shot as the CCA data is usually shrouded in commercial confidentiality, but it nevertheless could be explored further.

**LCTP Supporting Indicator: Improvement to energy efficiency of industrial activity processes.** It is unclear to what level of detail these indicators will be derived / published, but there may be scope for working with the DECC team responsible to identify any datasets that they may be using and generating. There's a risk this may be circular if they're just using inventory data and national sector production stats! It seems unlikely that DA-level GHGI benefits could be reaped here, though.

**Carbon Trust Activities:** It may be possible to place a new "voluntary" obligation on the Carbon Trust to ensure that some of its main reporting activities provide actual data on energy use and emissions that could be of use in developing bottom-up energy stats and/or emission estimates. There is nothing specific within the policy documentation to indicate this would be the case, but the impacts of the CT work has been quantified within the LCTP, so we presume that there must be quantitative analysis behind the data that could be of some use, even if it was limited to specific sectors.

**Display Energy Certificates:** Possibly not a significant policy for this sector, but access to buildings energy certificates such as DECs or EPCs may be useful to support current mapping work.



## Residential

As noted above for energy efficiency policies, the tracking of many policies in the domestic sector via the inventories is not straightforward and in many cases may not be possible. In general a reduction in fuel use should be reflected within DUKES, but the regional variations in uptake of a specific policy (and resultant energy savings) may not be represented. The method for mapping domestic fuel use within Great Britain makes use of available data from DECC and BRE. Source data from DECC provides high-resolution information on gas and electricity use in GB. For fuel data in the residential sector:

- Gas use data by sector (even for domestic) are somewhat uncertain, but overall gas use data by DA are more reliable, so policies that lead to gas reductions WILL appear in the DA inventories but not necessarily assigned to the correct sector.
- As outlined in the energy sector, oil and solid fuel use data are yet more uncertain due to the use of mapping approaches and relying on DA-specific factors (e.g. Housing Condition Survey information on the stock of dwellings by DA etc) to assess the likely share of the UK domestic total. The high variations year-to-year (and frequent revisions) to the DECC UK energy stats for domestic coal use (for example) also indicate the high level of uncertainty in current estimates, even within the UK GHGI.
- Domestic DA electricity data are generally regarded as being of good quality though, as the tariff structure of the market enables easy identification of domestic consumers, and the geographical referencing is also high.

As regards the current DA GHGI method and policy-sensitivity, insulation and energy efficiency measures adopted in DAs (e.g. EPCs, Low Carbon Building Regs) would only be reflected in the GHG Inventory if they resulted in reductions in domestic gas consumption and electricity use reported in meter data provided to DECC by energy suppliers, whilst changes in allocations to oils and solid fuels would be dependent on surveys to pick up improvements to housing stock. Over time this should work through into the inventory, but it is not a direct, accurate link and uses UK-wide assumptions where DA-specific data are missing.

Furthermore, the sensitivity of the inventory estimates to local changes in the housing stock is limited, as several steps in the calculations rely on periodic surveys and extrapolation of discontinuous datasets on housing standards, fuel types etc.

The review of policy measures does indicate a handful of potential new data sources that could be explored for future inventory method improvements, presented as “probably” and “possibly” (useful):

### “Probably”

**LCTP Indicators** – There are a whole raft of relevant indicators within the LCTP (domestic CO<sub>2</sub> by fuel type, change of heating in homes, EE of homes), and it really depends on how these are developed and reported as to whether they become useful new datasets for use in deriving energy and emission estimates, and whether the data will become available at any level of regional disaggregation and will cover all the UK.

- ➔ This warrants specific investigation to determine what data will become available from LCTP indicators, how frequently and to what level of detail.

**Enhanced EPCs** may offer a potential new data-source to enable the development of the domestic sector emission estimates.

**Green Deal / Green Investment Bank** – Provides support for district heating, universal standards for the rented sector, financial incentives (FITs, RHI, pay as you save), support and advice, and Smart meters. Perhaps some of the financial mechanisms may require some data to track the cost-effectiveness. Needs to be reviewed when the policy starts (2012).

**“Possibly”**

**Renewable Heat Incentive** – May generate records on current housing stock that could be used to improve mapping data for local and DA data.

**(All) Low Carbon Building Regs** – May provide new data on housing stock, but more likely this will feed in gradually via BRE models and HCS data.

**WAG Arbed** – A scheme to develop domestic EE impacts starting in the social housing sector may provide some baseline data for specific areas and housing types.

**WAG Supporting Community Scale Energy Generation** – to look at energy demand at community level to identify opportunities for local generation. This may generate some heat mapping data.



## Public, Business (Commercial)

Familiar inventory constraints apply here, due to a lack of detailed energy data – see comments on Energy Sector and Residential regarding data quality for gas, oils, solid fuels and electricity. As with other energy sectors, the sensitivity of the estimates at DA level are limited due to the mapping approach used and series of (often UK-wide) assumptions and factors applied to derive DA sector estimates.

In the Public and Business sectors, the data quality for electricity is not as good as for the domestic sector (as it is the domestic-specific tariffs that make the electricity allocation high quality for that sector – this doesn't apply here and energy suppliers only provide limited customer information to DECC).

Therefore there is a need for better sector-specific DA data for electricity also.

However, there are quite a number of new data developments that have arisen from recent policy developments and from documents reviewed here, including:

(Both sectors are included in the scope of building standards regulations, renewable heat incentive, energy performance of buildings directive.)

### PUBLIC SECTOR

- **Display Energy Certificates.** These are a recent development with all buildings that are available to the public (in England and Wales only) needing to register for certificates that show their energy performance. The AEA team has had sight of these data, which appear to have estimated annual building CO<sub>2</sub> emissions.
  - ➔ It would be very useful to be able to review this dataset in more detail to determine the scope, coverage and completeness of the data. It may not provide annual updates, but it would be a useful bottom-up dataset to test the DUKES fuel allocations, even though it only covers E&W.
- **CRC Energy Use Data.** As described in the energy annex. The AEA team has conducted an analysis of the electricity data in the CRC registration dataset, and this has given an insight into the coverage of the data. It is expected to be a useful dataset to help improve national fuel use estimates (especially electricity data) for many sectors, but only the public sector data can be geographically referenced. The first annual dataset becomes available from July 2011, and DECC and the Environment Agency are working to develop CRC reporting.
- **HM Treasury Financial Reporting Manual (FReM): PUBLIC SECTOR ANNUAL REPORTS: SUSTAINABILITY REPORTING.** The system of Treasury reporting from the public sector has been modified to include estimates of energy use and GHG emissions. The system was trialled in 2010-11, with Carbon account formats developed. We understand that this reporting will be rolled out further in 2011-12.
  - ➔ It would be extremely useful to be able to review a sample of the FReM data, to see how useful it might be, as it may be more comprehensive than other data sources such as CRC. There may be complexities and difficulties to deal with, such as the detail of reporting by sources (e.g. whether the FReM data covers energy use and emissions from buildings, vehicle fleets, Public-Private Partnerships and so on). It may be that the data can inform UK energy data for the public sector, Depending on the format of the data (level of aggregation in the reporting) it might also be useful for DA-level inventory work.
- **Scottish Government Public Sector Energy Performance Certificates.** All large public buildings are currently required to have their energy performance assessed and publicly display their rating, to promote improved energy performance of buildings and reduce carbon emissions. EPCs are estimates of the potential energy efficiencies of buildings - they do not account for behavioural influences (e.g. use of excessive heating with windows open). The intention is to promote energy efficiency, however, the certificates provide no direct quantitative assessment of actual fuel consumption and associated emissions.

- **SG Public Sector Duties.** The public sector, including the Scottish Government itself, must become a leader in the adoption of low carbon, energy efficient technology and practice. Being able to accurately measure and monitor the energy consumption and emissions from their estate is a vital first step for many organisations in reducing both. The Energy Efficiency Action Plan commits to ensuring that public bodies commit to undertake the Carbon Trust's Carbon Management Programme if they have not already done so.
- **WAG Climate Change Strategy.** Includes public sector policies including: reducing carbon footprint of WAG estate, NHS and education services, all of which will require some quantitative measures, perhaps building on DEC's and CRC above.
- ➔ Further work on WAG Climate Change Strategy indicators is recommended, and the AEA team are scheduled to become involved with that process.
- **LCTP.** Public sector loans may generate new data on schemes in the public sector, but this is not expected to provide a new dataset.

## BUSINESS (COMMERCIAL)

- **LCTP Reducing Emissions in Business.** The policy aims to reduce overall business emissions and energy consumption, improving energy efficiency of non-domestic buildings and reducing the carbon intensity of the fuel mix used by firms. It is proposed that the energy efficiency of buildings will be monitored using Display Energy Certificates and the Energy Performance Certificate register, both of which could provide a useful dataset to either directly improve emissions estimates by sector by DA, or to provide new data to improve the accuracy of the mapping work that is currently conducted. We understand that DEC's are only used in England and Wales, however.
- **Building standards, RHI, Carbon Trust, CRC, CCAs and Climate Change Levy.** (These are all covered within the industry and energy annexes.)
- **Green Deal** (covered in Residential sector)
- **Scottish Government.** There are a range of measures to support business activities to mitigate emissions, ranging from building standards, EE advice to businesses, CCAs and the CCL. There may be data available via the CCL, but this needs to be explored for all UK sites.
- **WAG.** There are a range of policies within the Climate Change Strategy, although none are likely to generate new data that are directly useful for the inventory, unless suitable indicators are derived. Several are aimed at providing more advice and support to industry to make better choices and to ensure that the right skills are available within the economy (e.g. Carbon Trust funding), but there are two policies that may lead to new research and data; there is a policy to promote use of waste heat / CHP, and to improve EE and uptake of renewables, which infers that more research into heat mapping will be needed, and this could help improve the inventory. In addition, there is a specific commitment with targets for the growth of renewables capacity, which may lead to annual reporting of data useful in energy and emissions analysis.