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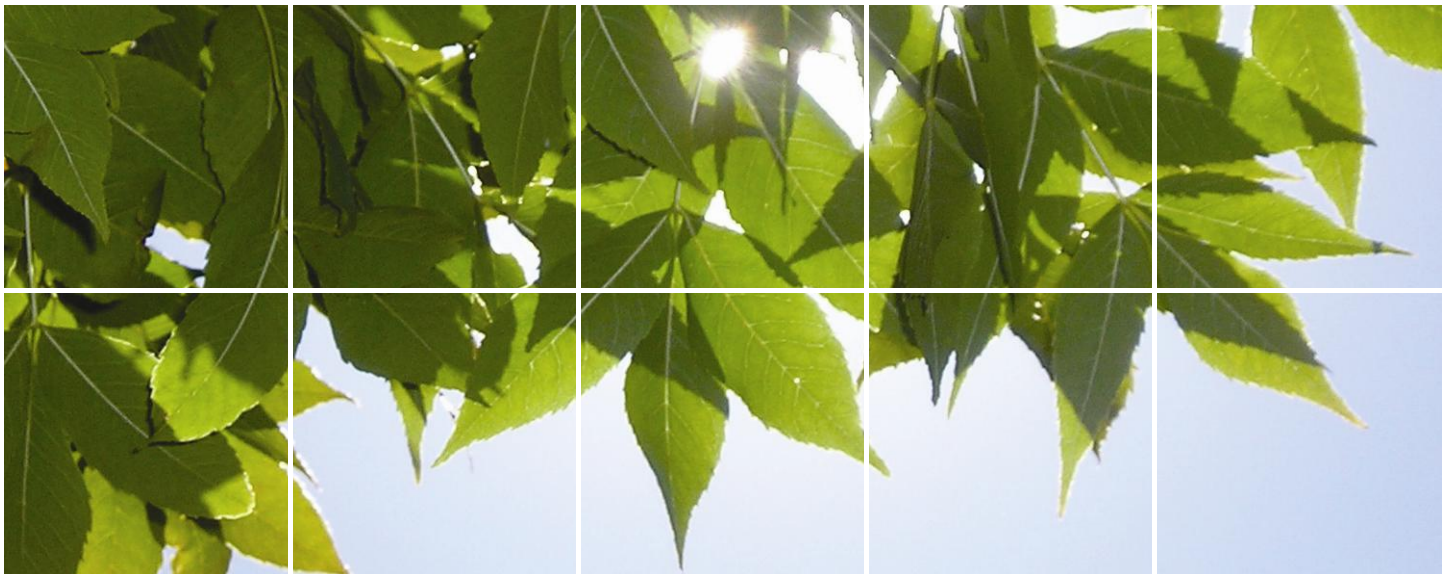

The DA GHG Inventory Improvement Programme 2009-2010

Wales Public Sector Scoping Study

Report to the Department of Energy and Climate Change, the Welsh Assembly Government, the Scottish Government and the Northern Ireland Department of the Environment

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Executive Summary

E.S. 1. Background: GHG Inventory Improvement

The demands on the Devolved Administration (DA) Greenhouse Gas (GHG) inventory have increased greatly in the last few years. At its inception, the DA inventory was designed to provide an estimate of total GHG emissions according to DA. The DA inventory presents emission estimates at a similar level of sector detail to that used in the UK GHG inventory, but many of the sector estimates are associated with high uncertainty as there is limited data available to underpin the DA estimates.

The expectations of the DA inventory are changing. The inventory is now being used to assess progress towards sector-specific GHG emission reduction targets; hence more accurate sector estimates are needed. These increasing expectations are being driven by the evolution of climate change policies at the devolved level of Government.

WAG has identified the public sector as a key sector for delivering the climate change policy through the obligations under the One Wales Commitment and subsequent Climate Change Strategy. The public sector will be expected to lead by example in targeting reductions in GHG emissions. The WAG climate strategy indicates that all of the public sector in Wales should be working towards 3% annual reductions in greenhouse gas emissions and this may require public bodies to target reductions in the operation of their own estates and within wider related activities, perhaps including transport and procurement.

AEA, on behalf of DECC, SG, WAG and DoENI conducted a review in 2009 of the GHG Inventories for Scotland, Wales, England and Northern Ireland. This review highlighted that energy and emissions data for small-scale combustion sectors (including the public sector) need be improved at DA level in order to enable these inventory data to be accurate and useful to WAG, SG and DoENI to monitor progress against devolved emission reduction targets.

The main actions identified for improving public sector emissions data were:

- Review a range of public sector reporting systems to identify whether data reporting from different organisations may be brought together to develop a consistent picture of public sector fuel use. **This is the main action of this study**, and may lead to improvements across several sectors, not just the public sector, depending on the data sources identified.
    - Energy balance tables from the Digest of UK Energy Statistics (DUKES) underpin the compilation of the UK Inventory. Equivalent energy data for the DAs do not exist.
- Revise energy supplier reporting requirements, aiming to obtain greater detail on sector-specific AND geographically-referenced fuel use information.
    - Sector- and geographically-referenced energy data would greatly improve the information for the DECC sub-national energy statistics which underpin DA GHG inventories and Local Authority CO_2 estimates.
    - Commercial confidentiality issues need to be addressed to allow more detailed fuel use data to be generated; it appears that such data are not likely to become available to DECC or to the GHG Inventory Agency in the near future.
- Review Local Authority (LA) energy and / or GHG emissions reporting.
    - Review existing commitments and mechanisms of GHG and energy reporting from LAs across the UK to explore data availability and usefulness.
    - Consider future options to implement new, consistent, comprehensive reporting mechanisms across the UK, or amend existing systems to derive better data and enable local tracking of policy actions.

E.S. 2. Climate Change and Sustainable Development Policies in Wales

The Welsh Assembly Government (WAG) has set clear and in some cases ambitious climate change goals through the One Wales Commitment and subsequent Climate Change Strategy. The '*One Wales: A Progressive Agenda for the Government of Wales (2007)*' report established aims for the Government and people of Wales to achieve reductions in CO_2 emissions from Wales, targeting a 3% annual reduction in carbon equivalent emissions in all areas of devolved competence by 2011 and delivering the Welsh share of the statutory UK targets required by the Climate Change Act. The 3% annual reduction includes all emissions from the non-traded sector as well as emissions associated electricity consumption in the end user inventory[1].

The One Wales commitment also outlined the intention of WAG to set specific sector targets for reductions in emissions from residential, public and transport sectors; furthermore, WAG is committed to work with heavy industry and power generation sectors to promote GHG emission reductions from these sectors. WAG has also reaffirmed the commitment to addressing Climate Change through One Wales: One Planet – a Consultation on a new Sustainable Development Scheme for Wales.

The One Wales Commitment and Climate Change Strategy have been designed to complement the requirements of the UK Climate Change Act, targeting an 80% reduction in GHG emissions by 2050.

The WAG Climate Change Strategy is the delivery mechanism for the overall and sector-specific targets that have been established for Wales; the Strategy sets out the detailed policy actions that are to be implemented by WAG, and the emissions reductions that are forecast to help Wales achieve the GHG reduction targets over prescribed timescales.

E.S. 3. DA GHG Inventory Compilation

The UK GHG inventory is based on UK statistics for activities producing GHG emissions, including: energy consumption, industrial production, waste, agriculture and land use change and forestry. It would be ideal to obtain a complete set of equivalent statistics for each constituent country of the UK to compile the DA inventories. However, detailed statistics are not available for all sources and for all constituent countries; for example there is no Wales energy balance that provides information on fuel use across different sectors (or overall) in Wales. To derive the DA inventories, therefore, it is necessary to disaggregate UK emissions into the four constituent countries, including Wales, using the best available proxy data or activity estimates to derive the DA share of UK emissions.

Where the required activity data is unavailable on a regional basis, a surrogate value may be used. For example, employment statistics or manufacturing output of a specific product, used as a surrogate for consumption data of a given fuel. **Annex 3** presents the approach to using drivers and proxy data in more detail, and information can also be found in the latest DA GHG inventory report.

The DA inventory reports emissions according to IPCC source category, for consistency and comparability with the reporting used in the national GHG inventory. The IPCC nomenclature does not have a public sector category. Emissions from the public sector source are reported under 1A4a Commercial/Institutional category, but this category does not solely contain emissions from the public sector. The category includes emissions from miscellaneous industrial and commercial combustion, the public service, and the stationary emissions from railways. The data that accompanies the DA inventories in the form of Excel Pivot Tables can be used to extract estimates of emissions solely associated with public sector combustion.

The transparency of reporting in the DA inventory is limited by the scope of reporting that DECC use in the Digest Of Energy Statistics which underpins much of the energy sector of the UK GHG inventory and then feeds through to the DA inventory. In DUKES (DECC, 2009), the fuel use reported under public administration is covered by the SIC categories (SIC, 2003) 75, 80, and 85. These are: 75, Public Administration and Defence; Compulsory Social Security; 80, Education; and 85, Health and Social Work. **Annex 3** presents the detailed approach to estimating and reporting emissions from the public sector and the sources and fuels that are used to estimate the emissions.

[1] http://www.airquality.co.uk/reports/cat07/0911120930_DA_End_Users_Report_2007_Issue_1.pdf

Public Sector GHG Emission Estimates

The DECC Regional Energy Statistics are the main data that are currently used to derive public sector emission estimates in the DAs. Over the last few years, DECC has developed energy consumption data to regional and local authority levels. DECC developed these data to reinforce the importance of local and regional decision-making in helping the UK achieve its national energy policy objectives. The available data include:

- Gas consumption data at regional and local authority level
- Electricity consumption data at regional and local authority level;
- Electricity and gas consumption data at middle layer super output area and intermediate geography zone (MLSOA/IGZ) and selected data at lower layer super output area (LLSOA);
- Road transport energy consumption at regional and local authority level;
- Other fuels at regional and local authority level.

The DECC Regional Energy Statistics do not provide a sector breakdown of non-domestic energy consumption; the public sector estimates are derived using a modelling approach that draws upon point source data from public sector sources (such as emission estimates from hospitals within the EU Emissions Trading Scheme) and local employment data for the public sector.

E.S. 4. Source Data Limitations

Accurate, policy-sensitive datasets are not currently available at DA-level (or in some cases at UK-level) for all of the sectors reported in the DA GHG inventory, including the public sector; uncertainties in the DA inventories are greater than those for the UK inventory, especially for small-scale non-regulated combustion sources, such as emission estimates for the domestic, public, commercial and small-scale industrial sectors. The main barrier to deriving more accurate DA inventories is the lack of detailed bottom-up data, especially on energy use in small-scale combustion sources; it is primarily the absence of DA-specific sector-specific energy consumption statistics that limits the accuracy and sensitivity of the Wales GHGI.

WAG is seeking to implement local policies to achieve GHG emission reductions and report progress against the targets set within the Climate Change Strategy, but the current lack of source data makes this aspiration to measure and track policy impacts impossible. There is an urgent need for more detailed Wales-specific data to be compiled annually from public sector bodies in order that the tracking of policy impacts and reporting against reduction targets can be achieved. The Wales GHGI is the primary reporting mechanism that will underpin the tracking of Wales GHG emissions against agreed targets, and therefore the compilation of more sensitive and accurate public sector emissions within that inventory is a high priority, but this cannot be achieved without new source data.

E.S. 5. Definition of Public Sector

This research has highlighted the need to clarify the definition of the public sector emission estimates in the DA inventory; a range of different scopes and definitions of “public sector” have been noted, depending on the purpose of reporting and the organisations involved (See **Section 1.4** for more details). From the inventory perspective, as well as for progress reporting against emission reduction targets, it is very important that definitions of public sector remain consistent across the time series of reporting in order to avoid introducing any bias in estimates of reductions or increases in emissions. For example if one year it is decided to include the DVLA within the Welsh public sector, it must remain in that sector rather than be excluded in following years.

It is also important that where differences in the definition of public sector exist between different reporting mechanisms that this difference is clearly stated so that clarity in reporting is maintained and so that inaccurate comparisons are not made.

The inventory has a specific definition of public sector emissions which uses the definition in the Digest of UK Energy statistics (DUKES[2]). This definition deems that Public Administration includes those organisations that are in standard industrial classification (SIC) group 75 (Public Administration and Defence; Compulsory Social Security), 80 (Education) and 85 (Health and Social Work). This

[2] http://stats.berr.gov.uk/energystats/dukes08.pdf

therefore includes all of the public sector activities (UK, WAG, LA, prisons, NHS trusts etc), rather than just those that are under the control of WAG. Note also that the inventory definition covers fuel use in public sector buildings, but does not include: (i) emissions from public sector vehicle fleets or commuting (these are included within the "Transport" sector in the inventory), (ii) emissions from waste disposal or incineration conducted by public sector bodies (emissions from public sector operated landfills or waste incinerators – e.g. hospital incinerators - are reported under "Waste disposal" in the inventory), (iii) emissions from "upstream" activities that supply public bodies such as commercial services or construction / development initiatives under PPP/PFI.

The definition of public sector differs within other studies; for example, WAG is currently conducting a carbon footprinting study of Welsh public sector activities, the scope of which excludes non-devolved public bodies, such as the DVLA. It is recommended that the inventory agency be kept informed of the footprint study progress, and gain access to new data for inventory compilation, to maximise the usefulness of new data and ensure consistency between inventory and footprinting study data.

E.S. 6. New Sources of Data

This review has identified potential sources of data that with further research could improve the accuracy of the emissions estimate for the sector. The approach taken to identifying these sources of data is set out in **Chapter 2** and the review is presented in **Chapters 3 and 4**. The information that we have identified and reviewed includes data from programmes and studies undertaken by local authorities, institutes of higher education and the National Health Service. Some of these sources of information provide energy and emissions data that are directly applicable to the Welsh DA GHG inventory, but in order to be useful for DA inventory work the data must be comprehensive, covering all public sector emission sources in Wales. Other datasets have been researched that provide information that could improve the estimates of emissions in the other constituent countries of the DA inventory, and hence indirectly could improve the accuracy of the Wales GHG inventory.

As part of this scoping study, a questionnaire (see **Annex 5**) was developed and sent to Local Authorities in Wales via the Welsh Air Quality Forum which is managed by WAG and AEA. The objective was to obtain an insight into the system they are currently using for monitoring and reporting energy and emissions data.

One example of good practice for energy recording and reporting is that of NHS Wales. Their energy reporting system has been developed over many years and the level of reporting would be ideal for use in the DA GHG inventory. Another example of data that could become useful for the inventory is reporting under the CRC Energy Efficiency Scheme. Reporting through this scheme has not yet started; it is unclear as to the scope, format and data quality that will become available once the scheme is operational, and it is anticipated that data quality will be variable in the initial stages of CRC implementation. Data analysis will be needed to explore the usefulness of the CRC data once it becomes available. Through consultation with the Environment Agency, the regulator for the scheme, it is apparent that a high percentage of Local Authorities in Wales (but not all of them) are expected to report under CRC, and hence the data may well be very useful to provide at least a useful quality check for energy data estimates for the public sector. Note that the CRC data will not necessarily provide good geographical referencing of energy use, as the reporting system is designed to enable companies / organisations to report one submission to the scheme to cover multiple site. As a consequence, the data transparency (e.g. to enable analysis of energy use and emissions in the CRC for sites in Wales) will be very limited. (This may not be a problem for public sector reporting.)

Energy and emissions data from sources such as NHS Wales and the CRC Energy Efficiency Scheme only form part of the public sector story, and in order to ensure that inventory emissions estimates are complete and representative of the Wales public sector, similar quality data (detailed to enable full understanding of the reporting scope) would be needed across all of the public sector. For accurate, comprehensive reporting across the inventory time-series, one consistent data compilation methodology must be used for the sector. Where bottom up data exist for only one part of the sector, the inventory method must take a top-down approach to ensure that there are no gaps or double-counts in the accounting of energy and emissions; in this instance, the available bottom-up data may provide a useful quality checking function for the inventory, but that is all.

Table ES. 1 gives a brief summary of the data that have been reviewed during this scoping study. It contains descriptions of the scope, coverage and limitations of each data set and the work which would be needed in order to be able to use it during inventory compilation.

E.S. 7. Conclusion and Recommendations

The study team has reviewed energy and emissions reporting from across the Wales public sector, to assess the usefulness of available data for emission inventory compilation, as we seek to improve the data accuracy and sensitivity for public sector reporting. The key criteria to assess data usefulness in emissions inventory compilation and for energy and emissions policy target tracking include:

- Geographical coverage / relevance to WAG targets;
- Clear definition that activities fall within the WAG target for the "public sector";
- Detailed scope and reporting of emission sources, i.e. data reported separately for different sources such as energy use (by fuel) in buildings, transport, waste etc.
- High level of data accuracy, using a consistent data compilation and reporting method across years and across different public sector organisations;
- Data available across a required time-series, e.g. to include data from the WAG baseline years (2006 to 2011) and then into the future to enable annual data tracking;

Several of the reviewed datasets could be directly useful within a wider system of comprehensive public sector data reporting in future inventory work. Other datasets may be useful in future as part of inventory quality checking, but would need significant development in terms of consistency of scope and reporting across organisations to become more directly useful for the inventory.

The NHS Wales energy data reporting provides information that could be directly useful in inventory compilation; the scope of NHS reporting matches well with the inventory definition of "public sector", and is detailed enough to enable specific data to be used in isolation if needed. The reporting system has been working for many years, with clear operator guidance and a well-defined reporting structure. *The NHS system is an example of best practice for public sector reporting, noting that several years of developing experience across energy and environmental management within organisations is an essential part of delivering good quality, consistent data. The development of similar systems such as NI 185 for England (see **Chapter 4**) and the EU ETS has shown that it takes time for a reporting system to deliver consistent, reliable data. The development of reporting systems to deliver good quality public sector data will require several years of investment in systems, training and guidance.*

Other data that have been identified as potentially useful in the inventory compilation process, subject to further development / clarification of data scope and quality include:

- **The CRC Energy Efficiency Scheme.** Reporting does not commence until 2011. The scheme is not expected to provide comprehensive coverage of the Wales public sector (e.g. not all Local Authorities are expected to report), and there are uncertainties regarding the geographical referencing of CRC data. These factors will limit the usefulness of the CRC data. Until CRC reporting commences, future data availability is unclear and CRC data quality, completeness and usefulness cannot be assessed. *Once reporting commences, CRC data should be reviewed to assess its usefulness in inventory and target-tracking applications.*

- **Local Authorities (LAs) and Local Supply Boards**. A range of examples of energy and emissions reporting by local public organisations have been reviewed. Whilst in some cases the reports provide valuable information, there appears to be no consistent scope or method of reporting across Wales. The lack of a structured and consistent requirement or guidance for LAs to report their GHG emissions limits the usefulness of existing data. *A more consistent and complete reporting system needs to be implemented to improve data usefulness for inventory compilation and tracking of progress against energy and emissions policy targets*.

The scoping study has identified some useful data and derived recommendations for development of data reporting mechanisms, but the study has not identified a complete, consistent dataset that can be used in the short term to improve the current inventory estimation method. The data that are currently available are not comprehensive, consistent or detailed enough to be used within the inventory, and hence the current top-down method will need to be retained until bottom-up data from across the Wales public sector become available. It is recommended that DECC and the DA Governments review current energy data reporting systems and develop a programme to deliver country-specific energy balances derived on an annual basis. Improvements should initially focus on improving data collection in sectors where SG and WAG are targeting GHG emission reductions, such as transport, residential and public sectors.

Table ES. 1. Summary of the main Wales public sector datasets reviewed during this scoping study

Data set/ Report	Data owner	Scope	Coverage	Significant exclusions/ limitations. Differences from GHG inventory	Work needed to make data useable in GHG inventory	How could it be used?
Carbon Reduction Commitment (CRC) Energy Efficiency Scheme	Environment Agency	Reporting energy consumption and CO_2 emissions from organisations and companies that meet the CRC criteria. Typically SMEs, public bodies, institutions.	All of UK.	Transport excluded. First CRC reporting year is 2011. DA GHGI reports from 1990. WAG targets use 2006-2011 baseline. Data can be aggregated to company / organisation level. Won't get "Wales" data in all cases. May not be a problem for public sector. Not comprehensive scope of reporting. (e.g. not all Wales LAs in CRC). Wales-based UK public bodies may not be logged as Wales public sector.	Data quality and reporting scope would need to be assessed. More geographically-referenced reporting is needed. If unable to determine CRC emissions for Wales, then the data will always be uncertain, e.g. where organisations have HQ outside of Wales. Even then, CRC will not provide comprehensive data coverage. Would need additional data for larger and smaller sites.	Initially as a quality check only. If data reporting scope can be clarified and geographically-referenced reporting ensured, then the CRC could be a directly useful data source for tracking energy and emissions data within Wales, for many sectors, not just the public sector, when used in conjunction with other data such as EUETS.
NHS Wales	NHS Wales	Reporting energy consumption from NHS Health Boards and Trusts.	All of NHS Wales – except Ambulance Trust.	Transport excluded. Only covers one part of the Wales public sector. The NHS data does go back over several years and therefore would cover the years for WAG target-setting, but not the whole Wales GHGI.	Further work needed to fully assess the data usefulness. Would need to be supplemented by many other similar datasets to cover the remaining public sector sources.	If other data were available to a similar level of quality, these data would be directly useful in GHGI compilation and for tracking progress. Currently the NHS data are an example of "best practice" for public sector bodies to follow.
University of Wales, CRC	University of Wales, CRC	Reporting energy consumption from Welsh Universities.	University of Wales estates.	Currently developing energy data collection methods. Any data collected will be recent, possibly not early enough for Welsh baseline year. Only covers one part of the Wales public sector.	Data quality will need to be assessed. This would need to be one of many datasets used to complete GHG inventory public sector emissions data.	Unclear until data reporting is established.
Local Service Boards (LSBs)	Individual LSBs	Carbon footprint including emissions from buildings, collating energy consumption data.	LSBs cover all of Wales, however not all of them are producing carbon footprints.	This is still a developing area. Not all LSBs are collecting and reporting this data. There are no specific guidelines for what should be included; LSBs may choose slightly different scope of emissions.	A consistent reporting scope and annual data reporting method across all LSBs would need to be established. Data quality would need to be assessed. Depending on the LSB data scope, additional public sector data may be required to provide a complete inventory.	The LSB reporting mechanism has the potential to enable reporting against all manner of public sector targets, including energy use and GHG emissions. Could underpin future public sector emission estimates.
Local Authority (LA) data	Individual LAs/WAG	Various, depending on reporting mechanism used.	Various, depending on reporting mechanism used.	Inconsistent reporting mechanisms are used by different LAs, with no agreed scope of data reporting or system to collate the information in a consistent manner. Currently the data are too fragmented and variable in scope to be useful. It is difficult to assess the data quality, as there is no comparability.	A consistent data collection method needs to be developed and tested over a number of years. Data quality would need to be assessed. Depending on the LA data scope, additional public sector data may be required to provide a complete inventory.	If a consistent methodology could be developed similar to NI 185 or the Carbon Trust reporting tool, data collected could be used for quality checking. Depending on reporting scope and data quality, these data could provide a key dataset for future inventories.

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1 Introduction

1.1 Background

1.1.1 GHG Inventories for Scotland, Wales, England and Northern Ireland

AEA, under contract to the Department of Energy and Climate Change (DECC) and the Governments of the Devolved Administrations (DAs), produces annual inventories of greenhouse gas (GHG) emissions from all anthropogenic sources for the constituent countries of the UK: England, Scotland, Wales and Northern Ireland. These inventories are calculated and reported in a manner consistent with the time-series of emissions and overall estimation methodology of the UK GHG inventory, which is the primary mechanism by which the UK's progress towards its Kyoto Protocol reduction targets is assessed.

The GHG inventories for England, Scotland, Wales and Northern Ireland provide a mechanism for the devolved governments to fulfil increasing reporting and policy development demands, as climate change and energy policy come under greater focus at all levels of UK Government.

Currently there is a strong focus on the development of regional climate policy, and this is likely to continue into the medium term. This in turn is driving the demand for accurate estimates of emissions in high sectoral detail in addition to the current and continuing need for regionally accurate estimates of total GHG emissions. To help meet these new needs, AEA last year conducted a review of the DA inventories, on behalf of the Department of Energy and Climate Change (DECC), the Scottish Government (SG), the Welsh Assembly Government (WAG) and the Northern Ireland Department of the Environment (NIDoE). During this review we identified that the underlying data used to estimate emissions from public sector combustion could be improved, in order to enhance the suitability of these emissions for WAG to use to monitor progress against targets.

This review of all relevant DA public sector data would be a large task. We have therefore started with one of the DAs, Wales. This DA is particularly relevant as it has a specific public sector GHG mitigation target (see Section 1.1.3).

1.1.2 Climate Change and Sustainable Development Policies in the DAs

The climate change policy agenda has been changing rapidly at Devolved Administration Government level within the UK in the last year, with significant new challenges to data management and reporting now developing through new legislation, strategy documents and policy instruments. The Climate Change (Scotland) Act (2009), the One Wales Commitment and associated Welsh Strategy (2008), and the Northern Ireland Executive's Programme for Government (2008-11), outline each of the Devolved Administrations' aims, objectives and duties in reducing GHG emissions.

Each of the devolved Governments tailors their climate change policy legislation and policies to target their specific local and regional priorities. The development of end user GHG inventories enables better interrogation of the impacts of energy efficiency policies, as these impact upon both primary and secondary fuel use within the UK and DAs. The development of end user inventories provides a different picture of consumption patterns within the UK, compared to the production-based data presented in the recent "by source" inventory report, "*Greenhouse Gas Inventories for England, Scotland, Wales and Northern Ireland 1990-2007*" (AEA, 2009).

1.1.3 Climate Change and Sustainable Development Policies in Wales

The Welsh Assembly Government has set clear and in some cases ambitious climate change goals. The '*One Wales: A Progressive Agenda for the Government of Wales (2007)*' established aims for the Government and people of Wales to achieve reductions in CO_2 emissions from Wales, targeting a 3% annual reduction in carbon equivalent emissions in all areas of devolved competence by 2011 and delivering the Welsh share of the statutory UK targets required by the Climate Change Act. The 3%

annual reduction includes all emissions from the non-traded sector as well as emissions associated electricity consumption in the end user inventory[3].

The One Wales commitment also outlined the intention of the Welsh Assembly Government to set specific **sector targets for reductions in emissions from residential, public and transport sectors**; and a further commitment to work with heavy industry and power generation sectors to promote reductions in emissions of GHG from these sectors. The Welsh Assembly Government has also reaffirmed the commitment to addressing Climate Change through One Wales: One Planet – a Consultation on a new Sustainable Development Scheme for Wales.

The One Wales Commitment and Climate Change Strategy have been designed to compliment the requirements of the UK Climate Change Act, targeting an 80% reduction in emissions of CO_2 eq. by 2050. In contrast to the Scottish Climate Change Bill, through the One Wales Commitment and Climate Change Strategy The Welsh Assembly Government outline their intend to focus on the levers 'at their disposal' for reducing emissions, specifies sector targets for residential, public and transport sectors, waste, agriculture and land use, and business emissions. The approach proposed establishes a minimum reduction in emission over a ten year period relative to the sector's contribution to baseline emissions, consistent with delivering annual reductions of 3% overall. The Climate Change Strategy outlines the proposed scope of the Welsh Emissions Account and identifies the Welsh GHG Inventory as the main data source to set the baseline and measure progress. The strategy places numerous key requirements on the inventory and includes the development of a comprehensive and robust set of GHG baseline emissions for 2006 to 2010 for each of the sectors specified.

The Wales Climate Change Strategy will be published in autumn 2010. It will:

- set out how WAG will deliver our One Wales commitments;
- sets targets for reduction in emissions and outline action needed for adaptation to the impact of climate change.

Further details are available at

http://wales.gov.uk/about/programmeforgovernment/1wales/sustainableenvironment/?lang=en

1.2 Reasons for this Scoping Study

1.2.1 Findings of the DA GHG Inventory Review

The review of GHG Inventories for Scotland, Wales, England and Northern Ireland conducted by AEA on behalf of DECC, SG, WAG and NIDoE found energy and emissions data for public sector combustion could be improved, in order to enhance the suitability of these emissions for WAG to use to monitor progress against targets.

The main actions identified for improving public sector emissions data were:

- Review a range of public sector reporting systems to identify whether data reporting from different organisations may be brought together to develop a consistent picture of public sector fuel use. **This is the main action of this study**, and may lead to improvements across several sectors, not just the public sector, depending on the data sources identified.
    - Energy balance tables from the Digest of UK Energy Statistics (DUKES) underpin the compilation of the UK Inventory. Equivalent energy data for the DAs do not exist.
- Revise energy supplier reporting requirements, aiming to obtain greater detail on sector-specific AND geographically-referenced fuel use information.
    - Sector- and geographically-referenced energy data would greatly improve the information for the DECC sub-national energy statistics which underpin DA GHG inventories and Local Authority CO_2 estimates.
    - Commercial confidentiality issues need to be addressed to allow more detailed fuel use data to be generated; it appears that such data are not likely to become available to DECC or to the GHG Inventory Agency in the near future.

[3] http://www.airquality.co.uk/reports/cat07/0911120930_DA_End_Users_Report_2007_Issue_1.pdf

- Review Local Authority (LA) energy and / or GHG emissions reporting.
    - Review existing commitments and mechanisms of GHG and energy reporting from LAs across the UK to explore data availability and usefulness.
    - Consider future options to implement new, consistent, comprehensive reporting mechanisms across the UK, or amend existing systems to derive better data and enable local tracking of policy actions.

This scoping study provides a summary of the public sector energy and emissions data that are currently available through various reporting mechanisms and provides recommendations for improving these with a view to improving the accuracy of the public sector emissions in the DA GHG inventories.

1.2.2 Focus on the Wales GHG Inventory

To review all relevant DA public sector data would be a large task and hence this scoping study is focussed on the Wales public sector inventory; reviewing available data in Wales is particularly important given that WAG is seeking to establish a series of sector-specific GHG mitigation targets, including one for the public sector (see Section 1.1.3).

Limiting the study to data in Wales impacts upon the usefulness of the study findings to improve the DA GHG inventory estimates in the short term; further work will be needed to take forward the study findings and research other data across England, Scotland and Northern Ireland. Wherever possible, the study outputs will be used within DA inventory compilation, initially as a quality checking function.

1.3 Objectives of this Scoping Study

This scoping study has analysed the available fuel use data reported by public sector bodies in Wales, to develop a better understanding of the scope and completeness of reporting by the public sector, and to determine whether further work (across the UK) could lead to significant improvements in the accuracy and sensitivity of the public sector inventory data.

This study has reviewed public sector energy and emissions reporting mechanisms including energy data reported by LAs and from other public sector bodies. Available data sets have been assessed for data quality; coverage; reporting frequency and availability. This will allow assessment of their suitability for use within sector reporting calculations and allocations, for both DA GHG inventory compilation and quality checking.

1.4 Scope and Definition of the Public Sector

During the course of this scoping study it has been noted that the definitions of public sector differ depending on the purpose of reporting and the organisations involved. It is very important that definitions of public sector remain consistent across the time series of reporting in order to avoid introducing any bias in estimates of reductions or increases in emissions. For example if one year it is decided to include the DVLA within the Welsh public sector, it must remain in that sector rather than be excluded in following years.

It is also important that where differences in the definition of public sector exist between different reporting mechanisms that this difference is clearly stated so that clarity in reporting is maintained and so that inaccurate comparisons are not made.

1.4.1 WAG and Local Government Definitions of the Public Sector

WAG is currently undertaking a footprinting study of the public sector in Wales. This is in order to establish a baseline estimate of GHG emissions to then monitor annual reductions against the 3% target. As part of this footprinting study, WAG is looking at how a baseline could currently be calculated, how this could be improved and what should and should not be included. There are several differences between the emissions that will be included in the 3% target and the GHG inventory.

WAG is seeking to establish a baseline which will include direct emissions that result from activities each public sector organisation controls plus emissions from the use of electricity. In order to do this, WAG needs a tool that enables them to collect this data from the public sector. This would then enable them to estimate a public sector baseline for Wales. It is envisaged that any tool that allows the collection of such data will also help the organisation report against its CRC targets.

The organisations included in the footprinting study consist of WAG, LAs, NHS Wales and approximately 30 Assembly Government Sponsored Bodies (AGSBs). A full list of these bodies can be found in Appendix 2

One reason for a difference between the GHG inventory and the Welsh footprinting study is that public sector data in the inventory includes UK public bodies operating in Wales e.g. HMRC, DWP, DVLA. The Welsh footprinting study will not cover these organisations so this would cause an underestimate when compared with the inventory emissions data.

Another reason is that the Welsh footprinting study proposes to include transport emissions occurring in the public sector whereas the GHG inventory includes all transport emissions in a separate sector regardless of the type of organisations using the transport. This is due to the strict international reporting requirements and guidelines the inventory must conform with.

1.4.2 GHG Inventory Definition of the Public Sector

UK emissions from the “public sector” within the greenhouse gas inventory are calculated based on the fuels allocated to the Public Administration sector in the Commodity Balance tables in Digest of UK Energy statistics (http://stats.berr.gov.uk/energystats/dukes08.pdf). “Public sector” includes all of the public sector activities (UK, WAG, LA, prisons, NHS trusts etc). The commodity balance tables in DUKES are derived from reported fuel use by these different organisations. The "public sector" reported fuel use (and hence emissions) exclude any transport-related activities and hence is mainly emissions from direct fuel use (and electricity use) within public sector buildings.

Table 1E on page 24 of the Digest of UK Energy statistics indicates that Public Administration includes those organisations that are in standard industrial classification group 75 (Public Administration and Defence; Compulsory Social Security), 80 (Education) and 85 (Health and Social Work). The following link shows what is covered (See pages 159-166):
http://www.statistics.gov.uk/methods_quality/sic/downloads/UK_SIC_Vol1(2003).pdf

Details of the disaggregation method to estimate the DA-specific public sector emissions are outlined within the recent Greenhouse Gas Inventories for England, Scotland, Wales and Northern Ireland: 1990 – 2007 report. In summary:

- Public sector emissions in Wales from consumption of petroleum fuels and solid fuels are based on the DECC estimates of oil and coal use at regional and national level, consistent with the data published as Regional Energy Statistics.
- Public sector emissions in Wales from consumption of gas are based on analysis of limited point source data (e.g. from some large institutions that report to EUETS) supplemented by information from energy mapping grid studies, which use data on employment distributions and fuel intensity.
- Public sector emissions in Wales from consumption of electricity have been considered for the first time within the (ongoing) development of an end user inventory. The disaggregation of UK electricity use to the DAs is based on regional economic indicator data for the sector.

2 Review of the Wales Public Sector Inventory Method

Chapter 1 explained the background to this study. This chapter sets out the method and data sets used to derive emissions from the public sector in the current DA GHG inventory, analyses and presents the current limitations of the data with respect to the policy demands on that data. It then summarises the data reviewed during this research, and analyses how these data might help to improve the accuracy and transparency of the current public sector DA GHG inventory.

2.1 Current Method for Estimating Public Sector Emissions in the DA GHG inventory

There are two approaches to reporting the emissions from the DAs; emissions can be estimated according to source or end user (see **Section 1.1.2**). The description of the method below refers to the approach taken to estimate emissions by source. The data reviewed as part of this study could potentially help improve the accuracy of the emissions estimated using both approaches.

2.1.1 General Approach: the use of Drivers and Proxy Data

The UK GHG inventory is based on UK statistics for activities producing greenhouse gas emissions. These include fuel consumption, industrial production, agriculture and land use change and forestry. In principle, it would be ideal to obtain a complete set of equivalent statistics for each constituent country to compile each inventory. Such a set of statistics is not available for all sources and for all constituent countries and hence it is necessary to disaggregate UK emissions into the four constituent countries, including Wales, by an estimation procedure.

Where the required activity is unavailable on a regional basis, a surrogate value may be used. For example, employment statistics or manufacturing output of a specific product, used as a surrogate for consumption data of a given fuel. **Annex 3** presents the approach to using drivers and proxy data in more detail, and information be found in the latest DA GHG inventory report also.

2.1.2 Reporting and Estimating Emissions from the Public Sector

The DA inventory reports emissions according to IPCC source category, for consistency and comparability with the reporting used in the national GHG inventory. The IPCC nomenclature does not have a public sector category. Emissions from the public sector source are reported under 1A4a Commercial/Institutional category, but this category does not solely contain emissions from the public sector. The category includes emissions from miscellaneous industrial and commercial combustion, the public service, and the stationary emissions from railways. The data that accompanies that DA inventories in the form of Excel Pivot Tables can be used to extract estimates of emissions solely associated with public sector combustion.

The transparency of reporting in the DA inventory is limited by the reporting that DECC use in the Digest Of Energy Statistics which underpins much of the energy sector of the UK GHG inventory and then feeds through to the DA inventory. In DUKES (DECC, 2009), the fuel use reported under public administration is covered by the SIC categories (SIC, 2003) 75, 80, and 85. These are: 75, Public Administration and Defence; Compulsory Social Security; 80, Education; and 85, Health and Social Work. **Annex 3** presents the detailed approach to estimating and reporting emissions from the public sector and the sources and fuels that are used to estimate the emissions.

The DECC Regional Energy Statistics are the main data that are currently used to derive public sector emission estimates in the DAs. Over the last few years, DECC has developed energy consumption data to regional and local authority levels. DECC developed these data to reinforce the importance of local and regional decision-making in helping the UK achieve its national energy policy objectives. The data sets available are:

- Gas consumption data at regional and local authority level
- Electricity consumption data at regional and local authority level;

- Electricity and gas consumption data at middle layer super output area and intermediate geography zone (MLSOA/IGZ) and selected data at lower layer super output area (LLSOA);
- Road transport energy consumption at regional and local authority level;
- Other fuels at regional and local authority level.

The method of estimating local and regional allocations of **public sector**, **commercial and industrial** fuels benefits from the good quality datasets available to estimate fuel use in major point source sites, including sites that report annual emissions to either EU ETS or to environmental regulators under IPPC. These data provide a very significant proportion of the sector fuel use allocations, and although the data processing is a very resource-intensive operation, it nevertheless provides good quality output data.

The remaining fuel use for **industrial, commercial and public sectors** are then allocated across the local authorities (and then aggregated up to DA totals) based on employment and sector economic indicators, and assumptions of fuel use per employee or per unit production. These methods provide a reasonable estimate of the regional split of UK data, but are subject to uncertainty and are not sensitive to local changes in practice or site-specific improvements in energy efficiency.

The following data sets are used:

- Office of National Statistics Inter-Departmental Business Register (IDBR) which provides data on employment at business unit level by Standard Industrial Classification (SIC) code; and
- DECC Energy Consumption in the UK data on industrial and commercial sector fuel usage.

The SIC codes in the IDBR database are matched with the DECC energy datasets in order to calculate total employment by DECC energy sector. From this, the fuel intensity per employee is calculated for each SIC code, and these intensities are then applied to employment distributions across the UK to make maps of fuel use.

2.2 Limitations of the DA GHGI Methodology: Tracking Progress and WAG Policy Development

2.2.1 Policy Expectations: More Accurate and Transparent Reporting

The demands on the DA inventory have increased greatly in the last few years. At its inception, the DA inventory was designed to provide an estimate of total GHG emissions according to DA. It also reported emissions in a similar level of sector detail to that used in national reporting, although many of these sectoral estimates were associated with considerable uncertainties as there was limited data available to underpin the estimates.

The expectations of the DA inventory are changing. The inventory is now being used to judge progress towards specific targets, and hence more accurate sectoral estimates are required. These increasing expectations are being driven by demanding climate change policies, which are summarised in **Section 1.1.2**. There is an increasing requirement for the inventory to be more sensitive to measures which aim to reduce GHG emissions in a variety of ways. If these different methods of GHG reduction are to be traced by the inventory, the compilation mechanism will need to become more complex. This is for the most part dependant on the availability of suitable data.

WAG has identified the public sector as a key sector for delivering the climate change policy through the obligations under the One Wales Commitment and subsequent Climate Change Strategy. The public sector will be expected to lead by example in targeting reductions in GHG emissions. The WAG climate strategy indicates that all of the public sector in Wales should be working towards 3% annual reductions in greenhouse gas emissions. This may require public bodies to target reductions in the operation of their own estates and within wider related activities, perhaps including transport and procurement.

2.2.2 Data Limitations

Accurate, policy-sensitive datasets are not currently available at DA-level (or in some cases at UK-level) for all of the sectors reported in the DA GHG inventory, including the public sector; uncertainties in the DA inventories are greater than those for the UK inventory, especially for small-scale non-

regulated combustion sources, such as emission estimates for the domestic, public, commercial and small-scale industrial sectors. The main barrier to deriving more accurate DA inventories is the lack of detailed bottom-up data, especially on energy use in small-scale combustion sources; it is primarily the absence of DA-specific sector-specific energy consumption statistics that limits the accuracy and sensitivity of the Wales GHGI.

WAG is seeking to implement local policies to achieve GHG emission reductions and report progress against the targets set within the Climate Change Strategy, but the current lack of source data makes this aspiration to measure and track policy impacts impossible. There is an urgent need for more detailed Wales-specific data to be compiled annually from public sector bodies in order that the tracking of policy impacts and reporting against reduction targets can be achieved. The Wales GHGI is the primary reporting mechanism that will underpin the tracking of Wales GHG emissions against agreed targets, and therefore the compilation of more sensitive and accurate public sector emissions within that inventory is a high priority, but this cannot be achieved without new source data.

Data on solid and liquid fuels are sourced (by DECC) from annual surveys of fuel suppliers: refiners, colliers and others. The accuracy of source sector allocations from these data is much more uncertain. *Note, however, that emissions from gas use in 2006 made up 95% of the emissions in sector 1A4a (Public & Commercial).*

Note also that many DA GHGI estimation methods where DA-specific annual source data are not available (such as energy statistics, but also in other sectors such as Land Use Change and Forestry) rely on periodic research rather than annual data. For example, the energy modelling work that underpins the DECC Regional Energy Statistics relies on a rolling programme of sector research over a period of years; not all sector estimates are revised annually due to resource limitations. This reliance on non-annualised information as part of the data compilation creates inertia in annual changes within inventory data, which further limits the data sensitivity to local policy impacts. Access to new sources of annual bottom-up data would remove this reliance and improve the data sensitivity, enabling more accurate reporting against annual DA targets.

It is recommended that DECC and the DA Governments review current energy data reporting systems and identify a programme to develop country-specific energy balances that can be derived on an annual basis. Improvements should focus on improving data collection in key sectors where SG and WAG are targeting GHG emission reductions, such as transport, residential and public sectors.

2.2.3 Sources of New Data

As outlined in **Section 2.1.2**, public sector inventory estimates are based on DECC regional energy statistics, which draw upon regional proxy data including GVA and population statistics. The limited source data leads to estimates that are subject to significant uncertainties.

This review has identified potential sources of data that with further research could improve the accuracy of the emissions estimate for the sector. The approach taken to identifying these sources of data has been to use the knowledge of the DA inventory team and through discussions with the each of the DA project officers in each of the DAs. The data we have indentified includes data from programmes and studies undertaken by local authorities, higher education and the National Health Service. Some of these data would provide data directly applicable to the Welsh DA GHG inventory. Other data sets would improve the estimates of emissions in the other constituent countries of the DA inventory, and hence indirectly could improve the accuracy of the Welsh DA inventory.

Details provided by additional resources are explored in **Chapter 3**, and a summary of data and reports reviewed is given in **Appendix 4**. Further research is needed to assess the scope for using some or all of these resources, and / or recommending improvements / changes to the scope, detail and format of annual or periodic reporting mechanisms across the public sector, to best develop future data.

3 Other GHG Data Sources for the Wales Public Sector

Chapter 2 summarises the method used to estimate the emissions from the public sector in the DA GHG inventory, and the sources of data that were identified for review which may help improve the accuracy of the emission estimates. This chapter reviews each of these sources, and considers how relevant the data are, and how easy it might be to utilise the data in the DA GHG inventory for Wales. There is a summary table of this data review in **Table 3-1** at the end of this chapter. **Chapter 4** considers data sources that might be useful from the rest of the UK.

3.1 CRC Energy Efficiency Scheme

3.1.1 Background to the CRC

The CRC Energy Efficiency Scheme[4] (formerly known as the Carbon Reduction Commitment and in this document referred to as CRC) is the UK's mandatory climate change and energy saving scheme, which starts in April 2010.

The scheme is designed to tackle CO_2 emissions not already covered by Climate Change Agreements (CCAs) and the EU Emissions Trading Scheme (EU ETS). Organisations are eligible for CRC if they (and their subsidiaries) have at least one half-hourly electricity meter (HHM) settled on the half-hourly market. They qualify as participants if their total half-hourly electricity consumption exceeded 6,000 megawatt-hours (MWh) during 2008.

Although eligibility for CRC is judged using electricity consumption, the annual reports will take into account consumption of other fuels as well, as long as this consumption is not included in EU ETS or CCA submissions.

Participating organisations are required to report their emissions annually using a reporting system developed by the EA. Although it is not a requirement to report all energy source data, organisations are required to maintain an evidence pack and audit trail for the data reported.

The scheme will publish a performance league table on an annual basis which will provide a reputational driver towards better performance and will provide penalties plus “naming and shaming” for non-compliance.

3.1.2 WAG reporting under the CRC

All UK central Government departments and Devolved Administrations must participate in CRC regardless of the amount of electricity they consume – these are referred to as “mandated participants”. However if they wish they can voluntarily disaggregate any part of their structure including wholly owned or controlled companies regardless of size or legal status and these would then be required to participate in the scheme on a mandatory basis.

A start has been made in putting together emissions data for the WAG estate but the data set is incomplete and therefore inconclusive. However it appears that the WAG Admin Estate (PLSE), DE&T, and the DE&T Transport and Strategic Regeneration estate have by far the biggest emissions.

Within WAG, CRC reporting should be the responsibility of Director Generals (DGs) and a reporting template for all offices is currently being developed. Work has been done to check that meter reading data held by WAG, the EA and energy suppliers is consistent and consumption data for individual sites is now known.

The management structure and personnel within WAG as parent organisation will be used for registration purposes under the CRC this includes WAG’s main business address and contact details for administration and invoicing purposes. As main parent organisation WAG will be required to make information disclosure.

[4] http://www.environment-agency.gov.uk/business/topics/pollution/98263.aspx

It should be noted that WAG is going through a process of transition and consolidation across its various operations and estates. To that end offices are being merged to enable more intensive use of fewer buildings and functions consolidated.

A schematic diagram is being used as a tool to filter organisations affiliated to WAG to determine eligibility for participation in CRC. It seeks to determine the legal status of the individual entities using a set of criteria which seeks to determine legal accountability under the CRC. Information is provided on half hourly meter readings across the estate followed by more detailed information on the energy consumption of each sector across the estates.

Although eligibility for CRC is judged using electricity consumption, the annual reports will take into account consumption of other fuels as well. Currently, consumption data for others fuels is not reported in a centralised system for WAG so some work is still needed for the first reporting period.

3.1.3 Scope of Reporting

In Wales there are 106 CRC participants, 30 of which are classified as public sector organisations. This would be a relatively small number of organisations to request data from if it were deemed necessary.

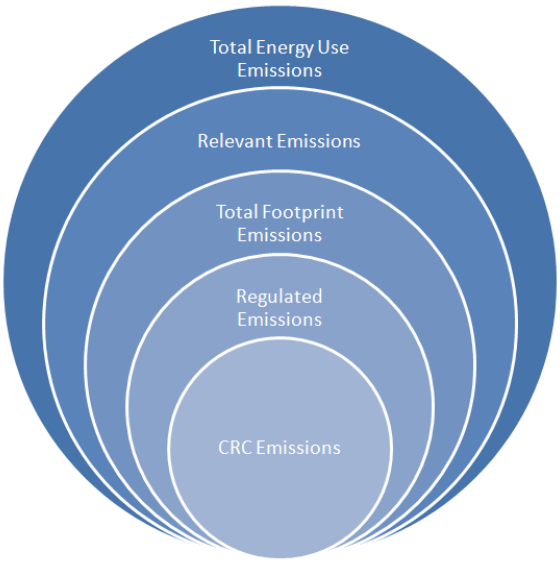
Organisations reporting to CRC will only be required to report one set of energy data rather than reporting separately for each building or subsidiary organisation. This means that geographical referencing would be difficult for larger companies and there won't necessarily be a separate annual report for each DA for those companies which spread across the UK. However, this is likely to only be an issue for private sector; for Wales we know that most public sector organisations are separate from their English counterparts. The only possible exception to this rule is the Environment Agency.

A list of public body organisations that need further investigation to determine whether they are CRC eligible has been prepared. Data is incomplete or inconclusive for these organisations and further vetting and research is required to determine their status.

There is also a list of 23 assembly government sponsored bodies (AGSBs) which may be eligible for participation in CRC in their own right. In addition, there are organisations whose status (eligibility) may have changed since the baseline year 2008.

Out of a total of 22 LAs, it is expected that 17 of them will be part of CRC. The remaining 5 are likely to have been required to report their electricity consumption during the qualification stage of CRC. Local authorities in particular have a critical role to play in reducing their emissions which is already recognised in national performance indicator EEF/002 (for more information on EEF/002, see Section 3.5).

There is also separate LA reporting, see **Section 3.5** for more details. The figure below shows the boundary of CRC reporting with respect to the boundaries of other types of emissions reporting.



The following things are required for a CRC footprint report:

- Preparation – gather energy/fuel supply data
- Report on all non-excluded supplies
- Demonstrates 90% regulated emissions
- Enter the data via the Registry

3.1.4 Usefulness of CRC Data for the Wales Public Sector

Of the 30 public sector organisations reporting to CRC, it is not clear at this stage what proportion of public sector organisations this represents.

The first reporting of CRC data will be in July 2011, reporting on emissions during the 2010-2011 financial year. The DA GHGI has a baseline of 1990 so there will be an issue of how to calculate public sector data for previous years. The DA GHGI also reports emissions in calendar years rather than financial years; it is not yet known whether quarterly data will be available.

Organisations are obliged to report to CRC with 95% accuracy and to maintain an evidence pack for the figures which are reported. However, it is not clear what quality checks will be applied to the data used. The DA GHGI would require consistent methodology to be applied to all public sector reporting.

In addition, the scheme will cover fix point CO_2 emissions only and will exclude transport emissions. Transport emissions is likely to be an important energy user in at least some of the estates, however this will not be shown in WAG's CRC reporting and is not needed for the DA GHG inventory data.

3.1.5 Recommendations

With the start of the CRC in April of this year it will be important for WAG to be able to achieve data granularity across its various estates in order to assess the performance of its individual sectors. The performance of individual agencies and organisations must be separated out for assessment so that improvements and remedial actions can be targeted where they will do the most good.

In its present configuration there is concern that carbon accounting under the CRC is slanted towards urban environments and fails to take account of the unique situation and practices of the rural sector. There is a need for the CRC be equally effective in gauging the carbon footprint of rural and urban estates which come under the DA.

Given that current WAG policy is to consolidate its operations across fewer estates and to make more intensive use of fewer buildings, provisions are being made to ensure that new buildings meet highest building standards for energy efficiency. WAG should develop a set of criteria as part of an overall framework which specifies the sustainability requirements of buildings within its estates. This could be aided by the use of a green lease toolkit.

It could be possible to develop a method of reporting for those public sector bodies which will report to the CRC. WAG could collect data from the evidence packs to feed into the GHG inventory. However, initially this would need to be on an experimental basis or as part of a quality checking exercise in order to monitor the data quality of collected data. It will also be useful for attributing fuel use to public sector bodies.

3.2 NHS Data Reporting System in Wales

3.2.1 Scope of Reporting

The NHS Estate in Wales is managed by Welsh Health Estates. Since April 2002, information on the condition and performance of the NHS estate in Wales has been collected in the on-line Estates and Facilities Performance Management System (EFPMS). Each year, Welsh Health Estates publishes the Estate Condition and Performance Report, which is based on annual estate data returns for the financial year submitted to the EFPMS. The report includes summary data and useful contextual explanation of trends in the energy performance of the estate, including:

- Primary energy consumption for each NHS Trust
- Carbon dioxide emissions for each NHS Trust
- Net energy consumption for each hospital

If access to the raw data in the EFPMS were granted, it would be a very useful source of information on energy consumption and carbon emissions for the NHS in Wales over the period from 2002 onwards.

3.2.2 Usefulness of the NHS Data Reporting System

Over recent years, the structure of the NHS in Wales has undergone a number of changes, which could impact on the ability to make direct comparisons between years. The most recent and major restructure occurred in October 2009 and involved the replacement of seven NHS Trusts with six Health Boards. Prior to 01 October 2009, the NHS Trusts in Wales were:

- Abertawe Bro Morgannwg University NHS Trust
- Cardiff and Vale NHS Trust
- Cwm Taf NHS Trust
- Gwent Healthcare NHS Trust
- Hywel Dda NHS Trust
- North Wales NHS Trust
- North West Wales NHS Trust
- Powys Teaching Health Board
- Velindre NHS Trust
- Welsh Ambulance Services NHS Trust

On 01 October 2009, these were restructured as:

- Health Boards
    - Abertawe Bro Morgannwg University Health Board
    - Aneurin Bevan Health Board
    - Betsi Cadwaladr University Health Board
    - Cardiff & Vale University Health Board
    - Cwm Taf Health Board
    - Hywel Dda Health Board
    - Powys Teaching Health Board
- NHS Trusts
    - Velindre NHS Trust
    - Welsh Ambulance Services NHS Trust

The EFPMS also collects information on waste, transport and water consumption. However the report highlights a number of data quality issues:

> *"Concerning data on environmental issues dealing with waste, transport and water, during the eight year reporting period there have been significant changes to the definitions for waste and transport which preclude making direct performance comparisons or the possibility of identifying meaningful trends. For waste, the definitions have improved considerably and work is ongoing to review the transport data to incorporate wider travel considerations in future."*

Furthermore:

> *"The reporting of transport information remains variable with gaps in much of the required data from several Trusts. A few Trusts failed to submit any of the required data."*

With regard to the DA GHG inventory, it would not be important to report public sector transport information however as that would be included in a separate sector.

3.2.3 Recommendations

The EFPMS is an example of a consistent annual reporting system that captures detailed information on the energy performance from a number of organisations. It could be used as an example of good practice reporting for other public sector institutions.

The EFPMS is comparable to the Department of Health Estates Return Information Collection (ERIC) system for England. NHS Scotland also has a similar web-based information system that could provide useful energy data.

3.3 University of Wales

The universities in Wales will participate in the Carbon Reduction Commitment (CRC) Energy Efficiency Scheme, where they meet the qualification threshold - those that have at least one half hourly electricity meter and an annual half hourly metered electricity supply of at least 6,000 MWh in 2008.

Each university will register and participate in CRC individually. There are currently no plans to collate energy data across the University of Wales. However, it is understood from our correspondence with Cardiff University that the Higher Education Funding Council for Wales may set benchmarks for Welsh universities in future.

Cardiff University is currently working towards attainment of the Carbon Trust Standard, which would require them to have energy data over a three year period. Other universities in Wales may also be working towards attainment of the Carbon Trust Standard.

3.4 Local Service Boards

3.4.1 Scope of Reporting

Local Service Boards (LSBs) are leadership groups responsible for ensuring that all the public services in their area work together to improve delivery for citizens. The Boards work as teams of senior officers from the organisations responsible for local service delivery. LSBs are not separate and formal institutions. They should not therefore be seen as distinct delivery mechanisms in themselves.

Each of the twenty two local authority areas in Wales has an LSB. There is no prescription over membership of LSBs and areas have developed their approach based on their local circumstances and the priorities being tackled. A typical LSB would include senior figures from the local authority, the local health board, the local NHS trust, the relevant police force, the relevant fire and rescue service, the Welsh Assembly Government and the local county voluntary council.

A number of LSB, such as Carmarthenshire and Gwynedd, have recently worked with the Carbon Trust to complete a Carbon Management Plan for LSB partners, establishing a Carbon Footprint for each organisation and setting targets for reduction. Through correspondence with Carmarthenshire LSB, it is understood that the emissions scope of the carbon footprint covers the non-domestic building stock for the base year 2005/06. Carmarthenshire LSB is now measuring this carbon footprint annually, starting from 2009/10, but do not have data for the intervening years.

Each organisation in the LSB collects the energy data and calculates the carbon footprint for their organisation individually. Only the headline figures and targets are collated by Carmarthenshire LSB. There are targets for:

- Reduction in carbon emissions from buildings

- Reduction in waste to landfill
- Reduction in business mileage
- Reduction in fleet mileage
- Commitment to using Fair Trade products

3.4.2 Usefulness of Data from Local Service Boards

To date, only a few LSBs have measured the carbon footprints of their member organisations. This is partly because many of the LSBs are relatively new bodies; six were set up as a pilot in 2007, the remaining sixteen were set up in 2009. The collection of information on energy use by LSBs is currently inconsistent.

Environmental data collection by LSBs is not centrally coordinated. Environmental data collected by LSBs is of variable scope and detail because:

- There is a different level of development of data reporting systems and experience of energy managers within LSBs;
- The organisational coverage of LSBs is not consistent;
- The scope of reporting of energy and emissions data across LSBs is not consistent and there is no central guidance regarding data collection and reporting.

3.5 Local Authority Data and Reporting

As part of this scoping study, a questionnaire (see **Annex 5**) was developed and sent to Local Authorities in Wales via the Welsh Air Quality Forum. The objective was to obtain an insight into the system they are currently using for monitoring and reporting energy and emissions data. The following paragraphs give a summary of the responses supplied.

3.5.1 Local Authority Reporting: Energy, Emissions, Indicators

Most respondents indicated that the scope of their reporting covers all building stocks including domestic council owned buildings and non-domestic buildings. They also report on emissions from transportation and business travel; however it does not appear that they report on staff commuting.

In most cases the reports are prepared under the requirement of and within the framework of the 'National Strategic Indicator Changing Energy Use and Carbon Dioxide Emissions' EEF/S/002/01-001(EEF/002). Only one organisation from the responses we received will fall below the CRC threshold while the others have indicated that they will be reporting to the CRC as a legal obligation. At the present time organisations are providing data returns under some or all of the National Indicators below:

- National Strategic Indicator EEF/002a (NS18a) (NSPI19) for % reduction in carbon emissions in the council's non-domestic public stock,
- WAG National Strategic Indicator EEF/002bi (NS18bi) for percentage reduction in energy use in the housing stock,
- WAG National Strategic Indicator EEF/002bii (NS18bii) for percentage reduction in carbon dioxide emissions in the housing stock.

On the question of how the organisations gathered their data on energy use and GHG emissions respondents indicated a number of sources. These varied between the different organisations but were predominantly derived from the following sources:

- supplier invoices and energy bills (submitted monthly, quarterly and annually),
- direct meter readings,
- fuel cards, business travel financial claim forms and from staff submissions in the case of business mileage.

In some instances, site managers are asked to return meter readings monthly to help validate invoices or to assist in the resolution of account queries.

It appears that organisations are using a range of tools in their energy reporting and monitoring system. These tools range from bespoke in-house solutions to specialty software including:

- Systemslink Energy Manager computer package,
- TEAM Sigma monitoring and targeting software,
- I-prophets digital energy online system,
- Carbon Trust spreadsheets and own spreadsheets,
- Commercial database package - TEAM Energy Accounting,
- In house bespoke spreadsheets and monitoring systems.

3.5.2 Limitations of Existing Reporting Mechanisms and Suggestions for Improvement

Although there appears to be a standard reporting format across all authorities, respondents reported numerous difficulties in data reporting on energy and GHG emissions. These include problems with the data quality of floor areas, and a lack of reliable data from suppliers. Other problems include accuracy of data held especially in regards to buildings where the portfolio may be changing and difficulty in getting meter readings from all sites each month.

Problems are also reported with the frequency with which Defra updates its carbon conversion figures. It was also noted that the CRC will be using different conversion figures from Defra and WAG's National Performance Indicators.

Suggestions to improve the current system include standardising the way GHG data is collected so that accurate comparisons can be made between authorities. Respondents also suggested that problems with data collection should be brainstormed with other local authorities.

While it is believed that the CRC Energy Efficiency Scheme will standardise the approach for many organisations it was also suggested that the WAG performance indicators should be dropped or made to mirror the CRC reporting process to prevent duplication.

3.5.3 Performance Measurement Framework for Welsh Local Authorities - National Strategic Indicators

The performance measurement framework has been in place since 2005, recent consultation has resulted in a set of indicators becoming statutory for 2010-11. These are the National Strategic Indicators.

The National Strategic Indicators are collected by each local authority and reported in their Improvement Plans. Local authorities are legally obliged to collect and publish data for the National Strategic Indicators, under the Local Government (Best Value Performance Indicator) (Wales) Order 2005.

Three performance indicators relate to energy efficiency. From 2005/06 to 2007/08 the energy efficiency performance indicators were:

- EEF/001a Percentage change in carbon dioxide emissions in the non domestic public stock
- EEF/001bi Percentage change in energy use in the housing stock
- EEF/001bii Percentage change in carbon dioxide emissions in the housing stock

From 2008/09 EEF/001 was replaced with EEF/002. The energy efficiency performance indicators are now:

- EEF/002a Percentage reduction in carbon dioxide emissions in the non domestic public building stock
- EEF/002bi Percentage reduction in energy use in the housing stock
- EEF/002bii Percentage reduction in carbon dioxide emissions in the housing stock

Data on the National Strategic Indicators is publicly available through the Local Government Data Unit Wales website. The data quality appears to be quite poor with many missing entries.

3.6 Display Energy Certificates (DECs)

Since October 2008 DECs are required to be displayed in all public buildings with a total useful floor area of over 1,000 m^2. They show the actual energy usage of a building, the Operational Rating and help the public to see the energy efficiency of the building.

It might be possible for the data collected through this scheme to be used for inventory purposes. However more investigation would be needed into how this would be collected and what data would be available for use.

3.7 Other Reports Reviewed

3.7.1 Sustainable Development in Government Wales 2009

A report entitled "Sustainable Development in Government Wales 2009" was produced for WAG which addressed the Sustainable Development Commission assessment of the performance of the Welsh Assembly Government administrative estate operations against its Green Dragon targets. The assessment shows that the picture is mixed in regards to the data analyzed for 2008 – 2009 with very good progress being made in some areas such as waste and renewable electricity, while insufficient progress is being made in others such as emissions from road vehicles.

The report does not provide bottom up data on carbon foot printing within the public sector but instead report on progress against objectives within the various categories against the 2006/7 baseline.

3.7.2 Sustainable Operations on the Government Estate (SOGE)

The current SOGE framework applies to the UK based operations of all central government departments and their executive agencies (EAs). SOGE targets apply to operations on the government estate and gives targets for carbon reduction and adoption of sustainable environmental technologies. New data on energy use by public bodies have not been found from this source.

SOGE will require departments to show an actual reduction in carbon emission such as in the more efficient use of office space and in the way buildings are used and constructed. Departments are urged to seek every opportunity to improve energy efficiency on their estate. A full sustainability appraisal must be completed when an office is to be relocated.

3.7.3 One Planet Wales

One Planet Wales looks at ways in which the nation could live and prosper on the resources of 'one planet', in an ecologically sustainable economy. It looks at the prospects for Wales up to the year 2050, and calls for the transformation of all sectors to embrace low impact activities with high value added performance. It links these prospects to the bigger picture – global climate change, resource efficiency, and the overall 'footprint' of human activity.

One Planet Wales focuses on eight key activity sectors namely, food, shelter, transport, products, services, public, energy and waste. It provides an agenda for integrated asset management for each sector and a business case for reinvestment for innovation, with the ambition for full-scale industrial evolution across supply and demand sides.

3.7.4 Ecological Footprint of the Public Sector in Wales

The Welsh Assembly Government (WAG) has commissioned this study by Arup to improve its understanding of the ecological footprint impact of Welsh public sector in line with its commitment to reduce the ecological footprint of Welsh residents to sustainable levels within one generation. The study utilises data derived from sector expenditure and on site energy consumption from seven key public sector categories falling within the public sector. Expenditure profile data was not available for the emergency services and Assembly Government Sponsored Bodies (AGSBs).

The results of the study showed that the carbon footprint of the Welsh public sector was around 4.8 million tonnes of emissions equating to around 12% of Wales consumption based carbon emission. Analysis of the data showed that consumption of products and services accounted for 72% of the carbon footprint from the sector suggesting that this is the area in which most effort at carbon reduction should be focused.

The results belie the fact that there was wide variation between the different public sector bodies in terms of their carbon footprint. WAG offices generated 90% of their carbon footprint through procurement while the carbon consumption of local authorities is dominated by energy consumption. There is also wide variation in the amount of direct data available from the various public sector bodies. While good data was available for some offices it was necessary to make assumptions for some offices based on the staff population.

3.7.5 Green Dragon

Green Dragon is a stepped Standard recognising effective environmental management. The Standard offers an environmental management system relevant to the specific needs of companies and organisations and rewards actions taken to achieve environmental improvements.

Within the Green Dragon Standard there are five levels, with each step contributing towards achievement of the International and European environmental standards ISO 14001 and EMAS. During the appraisal and audit processes for the Green Dragon Standard, there is an evaluation of costs as well as environmental performance - this means that at each stage the company or organisation will have an outline environmental management system that relates to its bottom line.

- 170 organisations in Wales have registered. Some are public sector, but not all.
- Level 3 and above requires CO_2 data collection through energy consumption and transport under direct control of the organisation.

3.8 Summary of Available Data

Table 3-1 provides a summary of the information in this chapter. It summarises the data owner, scope and coverage of the data, significant exclusions and limitations, differences in the procedures for estimating and reporting compared to the current DA GHG inventory, and summarises work needed to make the data useable in GHG inventory and how the data might be used.

Table 3-1 Summary of the main Wales public sector datasets reviewed during this scoping study

Data set/ Report	Data owner	Scope	Coverage	Significant exclusions/ limitations. Differences from GHG inventory	Work needed to make data useable in GHG inventory	How could it be used?
Carbon Reduction Commitment (CRC) Energy Efficiency Scheme	Environment Agency	Reporting energy consumption and CO_2 emissions from organisations and companies that meet the CRC criteria. Typically SMEs, public bodies, institutions.	All of UK.	Transport excluded. First CRC reporting year is 2011. DA GHGI reports from 1990. WAG targets use 2006-2011 baseline. Data can be aggregated to company / organisation level. Won't get "Wales" data in all cases. May not be a problem for public sector. Not comprehensive scope of reporting. (e.g. not all Wales LAs in CRC). Wales-based UK public bodies may not be logged as Wales public sector.	Data quality and reporting scope needs to be assessed. More geographically-referenced reporting is needed. If unable to determine CRC emissions for Wales, then the data will be uncertain, e.g. where organisations have HQ outside of Wales. CRC will not provide comprehensive data coverage, and hence additional data are needed for non-CRC sites.	Initially as a quality check only. If data reporting scope can be clarified and geographically-referenced reporting ensured, then the CRC could be a directly useful data source for tracking energy and emissions data within Wales, for many sectors, not just the public sector, when used in conjunction with other data such as EUETS.
NHS Wales	NHS Wales	Reporting energy consumption from NHS Health Boards and Trusts.	All of NHS Wales – except Ambulance Trust.	Transport excluded. Only covers one part of the Wales public sector. The NHS data does go back over several years and therefore would cover the years for WAG target-setting, but not the whole Wales GHGI.	Further work needed to fully assess the data usefulness. Would need to be supplemented by many other similar datasets to cover the remaining public sector sources.	If other data were available to a similar level of quality, these data would be directly useful in GHGI compilation and for tracking progress. Currently the NHS data are an example of "best practice" for public sector bodies to follow.
University of Wales, CRC	University of Wales, CRC	Reporting energy consumption from Welsh Universities.	University of Wales estates.	Currently developing energy data collection methods. Any data collected will be recent, and unlikely to cover data for the WAG baseline. Only covers one part of the Wales public sector.	Data quality needs to be assessed. Additional data would be needed to deliver a complete public sector GHG inventory.	Unclear until data reporting is established.
Local Service Boards (LSBs)	Individual LSBs	Carbon footprint including emissions from buildings, collating energy consumption data.	LSBs cover all of Wales, however not all of them are producing carbon footprints.	This is still a developing area. Not all LSBs are collecting and reporting this data. There are no specific guidelines for what should be included; LSBs may choose slightly different scope of emissions.	A consistent reporting scope and annual data reporting method across all LSBs needs to be established. Data quality needs to be assessed. Depending on the LSB data scope, additional data may be needed to provide a complete public sector inventory.	The LSB reporting mechanism has the potential to enable reporting against all manner of public sector targets, including energy use and GHG emissions. Could underpin future public sector emission estimates.
Local Authority (LA) data	Individual LAs/WAG	Various, depending on reporting mechanism used.	Various, depending on reporting mechanism used.	Inconsistent reporting mechanisms are used by different LAs, with no agreed scope of data reporting or system to collate the information in a consistent manner. Currently the data are too fragmented and variable in scope to be useful. It is difficult to assess the data quality, as there is no comparability.	A consistent data collection method needs to be developed and tested over a number of years. Data quality would need to be assessed. Depending on the LA data scope, additional public sector data may be required to provide a complete inventory.	If a consistent methodology could be developed similar to NI 185 or the Carbon Trust reporting tool, data collected could be used for quality checking. Depending on reporting scope and data quality, these data could provide a key dataset for future inventories.

4 Public Sector Reporting Across the UK

Chapter 3 has summarised the data sources that we expect to be directly relevant for Wales. Other countries within the UK have many similar reporting requirements to Wales. Some of these, where it could be useful to adapt this information for national reporting, are summarised in this chapter.

4.1 National Indicators in England

Since 2008, English LAs have been reporting to a new single set of 198 national indicators under a new performance framework. The indicators cover a wide range of subjects from childcare to crime rates to adult participation in sport. The indicators NI185 and NI186 relate to carbon emissions.

4.1.1 NI 185

NI185 is a measure of CO_2 reduction from Local Authority operations. NI 185 is coupled with NI 194 in a spreadsheet which calculates air quality (AQ) pollutant emissions alongside CO_2 emissions, the spreadsheet is completed by LAs for reporting to DECC. This spreadsheet tool was developed from the Carbon Trust carbon management tool to give a consistent method of reporting and in order to maintain the link between GHG and AQ pollutant emissions.

Through experience from working with this tool, it has useful outputs but would benefit from a trial period for LAs to report. In order to be used to its potential and for ease of reporting an online method for reporting should also be developed. For some LAs there are many thousands of data points within these spreadsheets which could be assessed more quickly and reliably using an online tool.

4.1.2 NI 186

NI186 is a measure of per capita CO_2 emissions in the LA area. The emissions data are prepared by AEA on behalf of DECC using a nationally consistent method as a subsector of the national inventory. Emissions in NI 186 are not separated out into public and private sector.

4.1.3 Impetus Report: Local Area Agreements

Pilkington Energy Efficiency Trust commissioned a study during 2008 by Impetus Consulting called Local Area Agreements: progress towards local leadership on climate change mitigation. As part of this work a steering group of stakeholders was set up to explore the use of NI 186 in England.

This study looks at the impact that National Indicator NI186 is having within the Local Authorities LAs. A representative sample of 25 LAs was chosen across England out of a possible pool of 152 LAs. Latest indications are that about two thirds of all LAs in England have adopted NI 186 as a priority indicator in their Local area agreements. However there are substantial variations in uptake across the regions. The report suggests that LAs that agree to the inclusion of NI186 in Local Area Agreements has a lot to do with those councils achieving a higher level of project delivery experience. Although many LAs have opted in to NI186 there are various issues that have arisen that have prevented them from performing to the ideal standard. The report found that in many instances these include misunderstandings and misconceptions about the scheme.

4.2 National Indicators in Scotland

Scotland has a group of forty-five National Indicators used to track progress towards the achievement of the Scottish National Outcomes. One of these is to “Reduce Overall Ecological Footprint” of Local Authorities.

This indicator aims to reduce the overall ecological footprint of Scotland by setting targets for reduction within LAs. The footprints look at all aspects of the LA including energy consumption, waste and transport. It is aimed at LA areas rather than the public sector or LA own estate footprint.

4.3 Northern Ireland Public Sector Energy Campaign

In Northern Ireland, the Department of Finance and Personnel publish annual reports on the energy performance of buildings occupied by the Northern Ireland public sector. The Northern Ireland Government strategy document "First Steps towards Sustainability" published in 2006 seeks to secure a 25% reduction in GHG emissions in Northern Ireland by 2025, compared to 1990 levels. The PSEC report provides an annual tracking of energy use in public sector buildings and hence is a very useful dataset for consideration within the GHG inventory compilation. The emissions data are presented by fuel within the report. Further work is needed to explore the scope and coverage of the report; currently the data reported by DFP are used as a quality check in the GHG inventory compilation process.

4.4 Total Place

Total Place is an initiative run by CLG to create a pilot programme to test new approaches to efficient use of resources and service improvement in local areas. The current economic climate will place severe pressure on managers to look for savings and efficiencies to cut down expenses and resource use within their organisations. This work will map money flowing from central and local bodies and make links between services, to identify where public money can be spent more effectively. Total Place is currently concerned with economic efficiency rather than fuel efficiency. However, if it proves to be successful, it might be possible in future to expand the scope of the programme in order to tackle fuel consumption and GHG emissions. It is also currently only aimed at England but could possibly be developed to encompass the whole of the UK.

4.5 NHS Energy Reporting Across the UK

As the scoping study has been focused on Wales, it has already touched upon the energy reporting systems used by NHS Wales. NHS Scotland also has a similar method of reporting energy consumption. Emissions are calculated based on known energy consumption data from the annual returns by Boards to HFS via the eMART (Health Facilities Scotland Environment Monitoring and Reporting Tool) data system. The available dataset for this sector begins in 1989. During the analysis, the bottom-up consumption data is compared to that estimated from the top-down I-O (Input-Output) analysis, to confirm the validity of the top-down data.

Estates Return Information Collection (ERIC) is the main central data collection for estates and facilities services from the NHS (England) containing information dating back to 1999/2000. This information is used for supporting policy development and strategic investment planning in the Department of Health for the NHS estate. ERIC data is also used by other organisations such as the Healthcare Commission and National Audit Office. It might also be possible for the GHGI team to request this data for emissions inventory purposes.

Health and Social Care in Northern Ireland (HSC NI) is split into five regional health trusts. Environmental reporting is completed by each of the health trusts. How this reporting would contribute to the GHG inventory would need to be investigated further.

4.6 Summary

Each constituent country of the UK has an approach to collecting data that is used to assess progress towards local GHG mitigation targets. Some of these approaches might be useful for WAG to consider, as they may provide a detailed source of data. However, the boundaries of the approaches mean that the coverage of the public sector is incomplete, or not transparent, and so most of the approaches have limited potential to enhance the accuracy of the estimates of emissions from the whole public sector. The NI185 indicator requires detailed energy use data from the own estate of a local authority, but the coverage is not the full public sector. NI186 is generated on behalf of LAs, using data that is already partially included in the DA GHG inventory. Other initiatives such as Total Place may provide detailed data about local services, but not the full public sector. The NHS energy data reporting in particular would contain all the information needed for compilation of the DA GHG inventory for that part of the public sector.

5 Conclusions and Recommendations

The study team has reviewed energy and emissions reporting from across the Wales public sector, to assess the usefulness of available data for emission inventory compilation, as we seek to improve the data accuracy and sensitivity for public sector reporting. The key criteria to assess data usefulness in emissions inventory compilation and for energy and emissions policy target tracking include:

- Geographical coverage / relevance to WAG targets;
- Clear definition that activities fall within the WAG target for the "public sector";
- Detailed scope and reporting of emission sources, i.e. data reported separately for different sources such as energy use (by fuel) in buildings, transport, waste etc.
- High level of data accuracy, using a consistent data compilation and reporting method across years and across different public sector organisations;
- Data available across a required time-series, e.g. to include data from the WAG baseline years (2006 to 2011) and then into the future to enable annual data tracking;

Several of the reviewed datasets could be directly useful within a wider system of comprehensive public sector data reporting in future inventory work. Other datasets may be useful in future as part of inventory quality checking, but would need significant development in terms of consistency of scope and reporting across organisations to become more directly useful for the inventory.

The NHS Wales energy data reporting provides information that could be directly useful in inventory compilation; the scope of NHS reporting matches well with the inventory definition of "public sector", and is detailed enough to enable specific data to be used in isolation if needed. The reporting system has been working for many years, with clear operator guidance and a well-defined reporting structure. *The NHS system is an example of best practice for public sector reporting, noting that several years of developing experience across energy and environmental management within organisations is an essential part of delivering good quality, consistent data. The development of similar systems such as NI 185 for England and the EU ETS has shown that it takes time for a reporting system to deliver consistent, reliable data. The development of reporting systems to deliver good quality public sector data will require several years of investment in systems, training and guidance.*

Other data that have been identified as potentially useful in the inventory compilation process, subject to further development / clarification of data scope and quality include:

- **The CRC Energy Efficiency Scheme.** Reporting does not commence until 2011. The scheme is not expected to provide comprehensive coverage of the Wales public sector (e.g. not all Local Authorities are expected to report), and there are uncertainties regarding the geographical referencing of CRC data. These factors will limit the usefulness of the CRC data. Until CRC reporting commences, future data availability is unclear and CRC data quality, completeness and usefulness cannot be assessed. *Once reporting commences, CRC data should be reviewed to assess its usefulness in inventory and target-tracking applications.*

- **Local Authorities (LAs) and Local Supply Boards**. A range of examples of energy and emissions reporting by local public organisations have been reviewed. Whilst in some cases the reports provide valuable information, there appears to be no consistent scope or method of reporting across Wales. The lack of a structured and consistent requirement or guidance for LAs to report their GHG emissions limits the usefulness of existing data. *A more consistent and complete reporting system needs to be implemented to improve data usefulness for inventory compilation and tracking of progress against energy and emissions policy targets.*

The scoping study has identified some useful data and derived recommendations for development of data reporting mechanisms, but the study has not identified a complete, consistent dataset that can be used in the short term to improve the current inventory estimation method. The data that are currently available are not comprehensive, consistent or detailed enough to be used within the inventory, and hence the current top-down method will need to be retained until bottom-up data from across the Wales public sector become available. It is recommended that DECC and the DA Governments review current energy data reporting systems and develop a programme to deliver country-specific energy balances derived on an annual basis. Improvements should initially focus on improving data collection in sectors where SG and WAG are targeting GHG emission reductions, such as transport, residential and public sectors.

6 Acknowledgements

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NHS Wales:	Eric Thomas
EA Wales:	Richard Griffiths Darren Turner Brian Jones
Cardiff University:	John Newton, Assistant Director of Finance
Carmarthenshire LSB:	Owen Jones
The Welsh Air Quality Forum	
LA contacts:	Steve Keating Andy Williams Peter Oates Roger Alsop Helen Burkhalter Matthew Lane Candido Choo Yin Michael Jenkins Oliver Matthews
Welsh LGA	Craig Mitchell
Scottish Government:	Marina Curran

Appendices

Appendix 1: Glossary

Appendix 2: Assembly Government Sponsored Bodies (AGSBs)

Appendix 3: Detailed approach to estimating emissions from each Devolved Administration

Appendix 4: Bibliography

Appendix 5: Questionnaire to LAs

Appendix 1 – Glossary

Acronyms and Definitions

ABI	Annual Business Inquiry
ATOC	Association of Train Operating Companies
ATM	Air Traffic Movement
BAU	Business as usual
BERR	(UK) Department for Business, Enterprise & Regulatory Reform
BMW	Biodegradable Municipal Waste
CBA	Cost-Benefit Analysis
CCA	Climate Change Agreement
CCGT	Combined Cycle Gas Turbine
CCL	Climate Change Levy
CDM	Clean Development Mechanism (of the Kyoto Protocol)
CHP	Combined Heat and Power
CRC	Carbon Reduction Commitment
DA	Devolved Administration
DA GHGI	Devolved Administration Greenhouse gas inventory
DECC	(UK) Department of Energy & Climate Change
DEFRA	(UK) Department of Environment, Food and Rural Affairs
DUKES	Digest of UK Energy Statistics
EE	Energy Efficiency
EU ETS	European Union Emissions Trading Scheme
EUMM	European Union Monitoring Mechanism
EWP	Energy White Paper
FGD	Flue gas desulphurisation
GHG	Greenhouse gases
GHGI	Greenhouse gas inventory
GWh	Giga Watt Hour (unit of energy)
GWP	Global Warming Potential (radiative forcing rating of a GHG, relative to CO_2 = 1)
HECA	Home Energy Conservation Act
IAG	Inter-Departmental Analysts Group
IGER	Institute of Grasslands and Environmental Research (now North Wyke Research)
IPPC	Integrated Pollution Prevention and Control
IPCC	Intergovernmental Panel on Climate Change
ISR	Inventory of Statutory Releases (the DoE's inventory of annual emissions from IPPC regulated industry in NI)
ktC	Kilo tonne of carbon
ktC-e	Kilo tonne of carbon-equivalent (amount of a GHG having accounted for GWP)
LA-IPPC	Local Authority Integrated Pollution Prevention and Control

LPG	Liquefied petroleum gas
MACC	Marginal Abatement Cost Curves
MPP	Major Power Producers (i.e. power station operators)
MSW	Municipal Solid Waste
NAEI	National Air Emissions Inventory
NAP	National Allocation Plan (of the EU-ETS)
NFFO	Non Fossil Fuel Obligation
NI	Northern Ireland
NIE	Northern Ireland Electricity
NIHE	Northern Ireland Housing Executive
NIS	National Inventory System
NISC	National Inventory Steering Committee
OCGT	Open Cycle Gas Turbine
OFMDFM	Office of the First Minister and Deputy First Minister
ONS	Office for National Statistics
ORR	Office of Rail Regulation
PAMs	Policies and Measures
RDP	Rural Development Programme
RE	Renewable Energy
RTFO	Renewable Transport Fuels Obligation
SAC	Scottish Agricultural College
SG	Scottish Government
UEP	Updated Energy Projection (UK energy forecasts produced by DECC)
UKCCP	UK Climate Change Programme
UNFCCC	United Nations Framework Convention on Climate Change
WAG	Welsh Assembly Government
WML	Waste Management Licensing

Appendix 2 – Assembly Government Sponsored Bodies (AGSBs)

Executive

Countryside Council for Wales
National Museum Wales
National Library Wales
Welsh Language Board
Sports Council for Wales
Arts Council for Wales
Royal Commission for Ancient and Historical Monuments of Wales
Higher Education Funding Council for Wales
Care Council for Wales

Advisory (treated as Executive)

Local Boundary Commission

Co-sponsored Body

Environment Agency Wales

Advisory

Agricultural Dwelling House Advisory Committee
Hill Farming Advisory Sub-Committee
Independent Appeal Panel for farmers
Welsh Scientific Advisory Committee
Welsh Therapies Advisory Committee
Welsh Medical Committee
Welsh Optometric Committee
Welsh Dental Committee
Welsh Nursing and Midwifery Committee
Welsh Pharmaceutical Committee
Welsh Committee for Professional Development of Pharmacists
Welsh Industrial Development Advisory Board
Advisory Panel on substance misuse
Agricultural Wages Committee
All Wales Medicines Strategy Group

Tribunals

Valuations Tribunal
Registered Inspectors Appeals Tribunal
Mental Health Review Tribunal for Wales
Agricultural Land Tribunal
Rent Assessment Panel for Wales

Appendix 3 – Detailed approach to estimating emissions from each DA

General approach - the use of drivers and proxy data

For most sources in the UK inventory, the emission of a pollutant from a source is calculated from the general equation:

$$E = Ae \qquad \text{[Equation 1]}$$

where

E	=	Emission of pollutant (tonnes)
A	=	Activity (unit activity)
e	=	Emission Factor (tonnes pollutant/unit activity)

The activity unit may be fuel combustion (tonnes), or production of product (tonnes) or numbers of animals.

A modified equation is used in the compilation of the Devolved Administration GHG inventories:

$$E_i = \frac{d_i Ae}{\sum_{j=1}^{5} d_j} \qquad \text{[Equation 2]}$$

where

E_i = Emission (in tonnes) from either England (1), Scotland (2), Wales (3), Northern Ireland (4) or "Unallocated" (5)

d_i = A driver representing the contribution of the region to UK emissions

i = 1, 2, 3, 4, 5

The driver, d_i can be any one of:

1. The value of the activity data for the region. [For example, consumption of specific fuels or industrial production figures for the region.]
2. The fraction of the UK activity in the region.
3. The value of a surrogate activity data statistic in the region. Where the required activity is unavailable on a regional basis, a surrogate value may be used. [For example, employment statistics or manufacturing output of a specific product, used as a surrogate for consumption data of a given fuel.]
4. In cases where the emissions are derived from a complex model, the driver will be the actual emission for the region calculated from the model.

The modified equation [2] ensures that the sum of the emissions from England, Scotland, Wales and Northern Ireland, plus any "unallocated" (i.e. offshore) emissions, equals the total UK emission reported within the national inventory.

Where the driver is fuel consumption, then the sum of the drivers should add up to the UK consumption. However, in practice this may not be the case if the data are taken from different sources or may be based on the financial rather than the calendar year. The estimation procedure removes such discrepancies.

Thus the compilation of the greenhouse gas inventories for the constituent countries of the UK reduces to the estimation of a set of drivers, each appropriate to emissions from a specific source. In compiling the 2007 inventories, over 130 drivers have been calculated.

Estimating and reporting emissions from the public sector

Reporting

The table below show the reporting of emission from the public sector in the current DA inventory, and the sources of information used to provide the activity data -the fuels consumed. The data available in 1900 (see **Table A1a**) was more limited that the data available now (see **Table A1b**).

Table A1a (Base Year – 1990)

IPCC Category	NAEI Sources	Activity: Fuel Consumption	1990
Commercial & Institutional	Miscellaneous industrial / commercial combustion Public service	Coal	DECC Regional energy statistics
		SSF	DECC Regional energy statistics
		Natural gas	Commercial Sales, DECC.
		Landfill gas	Landfill methane emissions
		Sewage gas	Sewage methane recovered
		fuel oil, gas oil	DECC Regional energy statistics
		MSW	As MSW incinerators
		Burning oil	DECC Regional energy statistics
	Railways (Stationary)	fuel oil, burning oil, coal	Regional oil consumption, DECC
		Natural gas	Assumed as all England

Table A1b (1995; 1998 to 2007)

IPCC Category	NAEI Sources	Activity: Fuel Consumption	Data Sources / Comments
Commercial & Institutional	Miscellaneous industrial / commercial combustion Public service	Coal	DECC Regional energy statistics, analysis of point source data and energy modelling data
		SSF	DECC Regional energy statistics
		Natural gas	Natural gas consumed, Transco (now UK National Grid), Phoenix, Firmus
		Landfill gas	Landfill methane emissions
		Sewage gas	Sewage methane recovered
		fuel oil, gas oil	DECC Regional energy statistics, analysis of point source data and energy modelling data
		MSW	As MSW incinerators
		Burning oil	DECC Regional energy statistics
	Railways (Stationary)	fuel oil, burning oil, coal	Regional gas oil consumption, Network Rail (GB) and Translink (NI)
		Natural gas	Assumed as all England

Method used to estimate emissions from the public sector

Emissions estimates for the source categories “public administration” have previously been based on regional proxy activity data including Gross Value Added (GVA), as a broad indicator of economic activity across the DAs, or regional employment statistics. Similar to the source categories for small-scale industry and the domestic sector, there is very little detailed solid or liquid fuel use data for these sectors and hence the estimates are subject to greater error than well-documented sectors such as the energy-intensive industries.

The DECC regional energy statistics (DECC, 2008b), provide estimates of fuel use by Local Authority for each of these sectors, split by solid fuel types and “oil”. These data are estimates that are based on (i) local electricity and gas meter data, and (ii) modelled estimates of the distribution of solid and liquid fuels using proxy data, concessionary coal data and information on smoke control zones. The estimation methodology has been developed for the latest inventory cycle and now follows a similar method to that described for other industrial combustion (see Section 1.3.2 of the latest DA GHG inventory report). For gas oil, coal and gas, the available point source emissions data and fuel use data from EUETS and the pollution inventories have been analysed to allocate emissions to the DAs. The remaining emissions are allocated to the DAs using the energy modelling approach consistent with the DECC regional energy statistics.

Regional gas sales data for the commercial sector were previously reported by DTI (1992), but for later years (1995 to date) UK National Grid has provided data for regional gas use in the 73-732 MWh range. The UK National Grid source provides the closest data available for commercial and institutional consumers, but the total is lower than UK data reported by DECC (2008a). This data is used to distribute miscellaneous and public service gas use in GB.

Natural gas use data for Northern Ireland are supplied by Phoenix Gas for 1999 onwards (Phoenix Gas, 2008), with a new supplier, Firmus Energy, also providing sales data for 2005 onwards (Firmus Energy, 2008). The commercial consumption is used as an estimate for Northern Ireland miscellaneous and public service gas consumption. A more detailed split of gas use across the domestic, commercial and industrial sectors in Northern Ireland in 2005 has previously been provided by Phoenix Gas (Phoenix Gas, 2007).

Stationary combustion by the railway sector is classified as a commercial source. Consumption of burning oil, fuel oil, and coke is relatively insignificant, and has therefore been allocated according to the diesel oil driver used for locomotives. Natural gas consumption for electricity generation refers to the London Underground (Lotts Road power station – closed in 2001).

DECC (2008a) reports a small amount of solid waste (municipal, industrial & hospital) consumption for energy production in the commercial and miscellaneous sectors. Little is known about the distribution of these installations, but the emissions have been distributed using the split derived for MSW incinerators.

Appendix 4 – Bibliography

The following reports, publications, web sites and data sets have been reviewed during this scoping study although not all of them have been referenced in the main section of the report.

Carbon Trust Studies/ Schemes

CRC Information: http://www.decc.gov.uk/en/content/cms/what_we_do/lc_uk/crc/crc.aspx
http://www.environment-agency.gov.uk/business/topics/pollution/98263.aspx

Ecological Footprint of the Public Sector in Wales – Arup

Energy Use and Carbon Emissions from the Higher Education Sector (2005)

Green Dragon: WAG, Green Dragon Standard Environmental Report 2008 -2009
http://www.groundworkinwales.org.uk/greendragon/index.html

Higher Education Funding Council for England database

Local Area Agreements: progress towards local leadership on climate change mitigation – Impetus

LA information: http://www.dataunitwales.gov.uk/NPI.asp?cat=289
http://www.scotland.gov.uk/About/scotPerforms/indicators

NHS: THE NHS ESTATE IN WALES: Estate Condition and Performance Report 2008/09
NHS energy management in Wales, (2005/2006)
NHS Energy Efficiency in Wales (Wales Audit Office)
NHS Wales Estate and Facilities Performance Management system (EFPMS)
Central Energy Efficiency Reporting in the NHS
NHS Scotland Annual National Environmental Report

One Wales: One Planet, a new Sustainable Development Scheme for Wales

ONS regional trends: http://www.statistics.gov.uk/regionaltrends40/

Reporting under Defra National Indicator 185 - Percentage CO_2 reduction from LA operations

Scottish Climate Change Declaration Annual Reports from Local Authorities

Scottish Government Environmental Performance Annual Reports

SDiG report 2008 (Sustainable Development in Government)

SDiG report (Wales)

Sector review of UK higher education energy consumption (Ward et al., 2008)

SOGE report (Sustainable Operations on the Government Estate)

Total Place http://www.localleadership.gov.uk/totalplace/

Welsh Declaration on Climate Change and Energy Efficiency

Appendix 5 – Questionnaire to LAs

Questionnaire

As the Wales Climate Change Strategy requires annual reporting on progress against sector-specific emission reduction targets; we're looking to get an insight into the reporting of energy and /or GHG emissions reporting within the public sector in Wales. Your help in completing the questions below is very much appreciated.

1. Who leads on reporting energy and/or GHG emissions from within your organisation? (Can you please provide names and contact details.)

2. Do you know what the scope of reporting covers? E.g. own estate emissions, community-wide emissions, does it include estimates of emissions from energy use in buildings, transport, off-road machinery, business travel?

3. How are the data compiled? E.g. financial / admin systems? Periodic or annual surveys / returns from site managers?

4. Will your organisation be reporting energy and emissions under the Carbon Reduction Commitment? What other reporting mechanisms do you use / submit data to? E.g. National Indicators? Specific organisational reporting commitments?

5. What are your experiences of data reporting on energy and GHG emissions? Have you used any specific tools / spreadsheets / online systems / guidance? What are the main problems and do you have any suggestions for information / tools that could be developed to make the process easier and more consistent between organisations?

Please send your replies to or if you have any queries please contact Nicola.brophy@aeat.co.uk

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