

Glasgow and the Clyde Valley Strategic Development Plan

Proposed Plan

Background Report 06

Greenhouse Gas Audit and Scenarios

June 2011

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The GCVSDPA also expresses its gratitude to the METREX professional network of European metropolitan regions and in particular to its Secretary-General, Roger Read, for his vision and his sterling efforts to raise the profile of climate change in Spatial Planning and through GRIP and professional analysis to create a rigorous process integrating a multitude of relevant stakeholders into the process.

The GCVSDPA must also acknowledge and record its gratitude to the many stakeholders – public, private, ‘third sector’ - who willingly gave of their valuable time in undertaking the process of generating GRIP mitigation scenarios.

1. Purpose of this Background Report

- 1.1 In common with other strategic themes being examined in the Main Issues Report (MIR) of the Strategic Development Plan (SDP), background reports are being published in which are set out much of the underlying evidence and detailed analysis pertaining to such themes. These reports are being published for the sake of transparency and to enable stakeholders to understand the strategic relevance of these themes in the long-term planning process.

2. Introduction

- 2.1 From the United Nations' 1992 Rio Conference and the Kyoto Accord of 1997, the issue of addressing climate change has risen in awareness to become a global issue requiring global solutions. The issue is now widely quoted as being more significant to the future security of our World than the dangers posed by international terrorism.
- 2.2 The primary focus is upon reducing levels of emitted greenhouse gases which are seen as contributing to the general rise in global temperatures through the human-enhanced atmospheric greenhouse effect. Some scientists estimate that at current emissions levels, the world's climate will reach a tipping point twenty years beyond which irreversible climatic impacts will occur.
- 2.3 Consequently the United Nations Environment Programme (UNEP) and the World Meteorological Organisation (WMO) established the Inter-governmental Panel on Climate Change (IPCC), a scientific body open to all members of UNEP and WMO. The IPCC provides rigorous and balanced scientific information to global decision-makers on the issue of Climate Change. It publishes annually its Assessment Reports and periodically thematic Special Reports. It is largely this body of work that underlies the need to set reduction targets for greenhouse gas emissions, an approach now widely adopted across the globe.
- 2.4 Such targets have now become the keystone of governmental approaches world-wide. The most widely adopted target is that of 80/50 – an 80% reduction in emissions by 2050, based upon 1990 levels.
- 2.5 These national policy developments complement the Commission of the European Communities (2007). An Energy Policy for Europe which seeks to achieve a 20% reduction in greenhouse gas emissions by developed countries compared to 1990 levels by 2020. The EC also recognises that once a new international commitment exists post-Copenhagen 2009 that Europe will need to increase the target to a 30% reduction by 2020 and 60-80% by 2050. The EU Energy Policy also seeks to secure Europe's energy supply, stimulate the economy through technological development and secure more jobs for its citizens. The Policy package extends beyond targets to strengthening the Emissions Trading Scheme, setting binding commitments to

develop Renewable Energy, developing Carbon Capture and Storage, and developing Energy Efficiency Action Plans.

- 2.6 At the UK level, the UK Climate Change Bill was introduced in November 2007 to the House of Lords and gained Royal Assent on 26 November 2008. The 2050 target in the Act is now an 80% reduction by 2050, revised up from a 60% target by 2050 in the Draft Bill. The Act allowed for the formal establishment of the Committee on Climate Change. On 1 December 2008, the Committee released its first report, *Building a low-carbon economy - the UK's contribution to tackling climate change*, recommending carbon budgets for each of the five-year periods: 2008 to 2012, 2013 to 2017 and 2018 to 2022.

3. The Scottish Context

- 3.1 On 29 January 2008 the Scottish Government published the Draft Climate Change (Scotland) Bill for consultation. The legislation aimed to achieve 3% year on year greenhouse gas emissions reductions and proposed a long-term target to reduce Scotland's greenhouse gas emissions by 80% by 2050 compared to 1990 levels.
- 3.2 The Scottish Government duly published the Climate Change (Scotland) Act 2009.
- 3.3 The Act contains a legal framework for a 80% reduction in the emissions by 2050 and an interim 42% reduction by 2020. It will include all six Kyoto Protocol Greenhouse Gases (GHG) : Carbon Dioxide, Methane, Nitrous Oxide, Hydrofluorocarbons, Perfluorocarbons, and Sulphur Hexafluoride. The legislation requires annual reporting of performance regarding emissions targets, and places an obligation on all public authorities to include provision within their respective functions to help meet these targets.
- 3.4 It should also be recognised that, following the Scottish Parliament's agreement in December 2007 to a Legislative Consent Motion, most of the provisions of the UK Act also extend to Scotland.
- 3.5 This 80/50 target is therefore in line with the IPCC's recommendations and the European Parliament's high-end reduction target to limit global temperature increases to 2 degrees Celsius.
- 3.6 A key piece of government policy was also published in 2007 Scottish Planning Policy 6 (SPP 6): Renewable Energy, since replaced by a revision of all Scottish Planning Policy documents into a single document in 2009. This document outlines Scottish Ministers' target of generating 50% of Scotland's electricity from renewable sources by 2020 and 11% of heat demand from such sources.
- 3.7 The Scottish Government in September 2008 published a document setting out their approach to energy policy (Scottish Government, 2008) In October 2008, the Scottish Government and Forum for Renewable Energy in Scotland published the *Framework for the Development and Deployment of Renewables in Scotland*, the proposed

framework was published to contribute to the Scottish element of the UK National Action Plan for renewable energy.

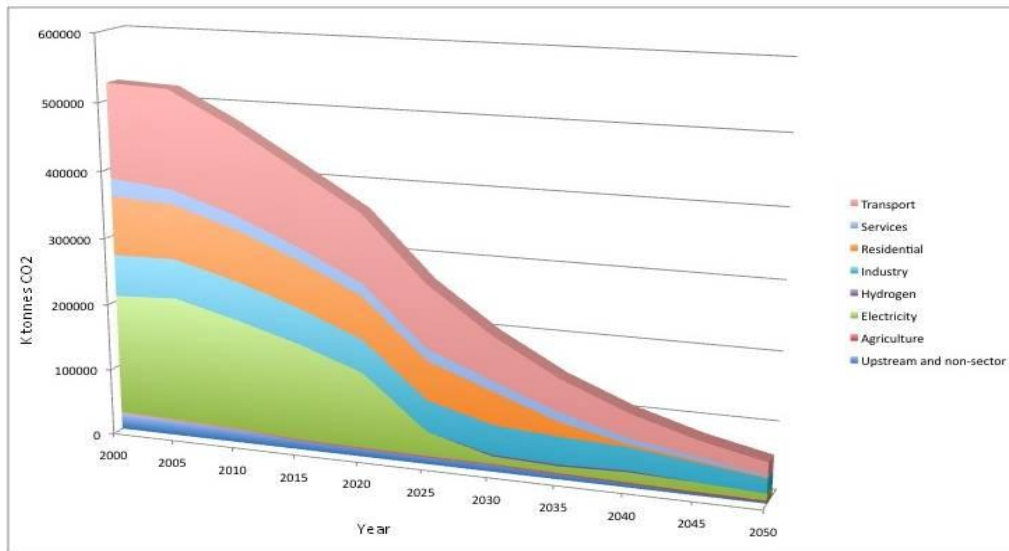
- 3.8 The Scottish Government has also published in 2008 Planning Advice Note 84 (PAN 84) detailing a methodology for calculating reduced carbon emissions in the context of producing development plans and assessing planning applications. In 2007, the Scottish Government published *A Low Carbon Building Standards Strategy for Scotland* which was drawn up by an expert panel who were appointed to recommend measures to improve energy performance of houses and buildings in Scotland and set out recommendations for future building regulations.
- 3.9 At the local government level, the need to address climate change has been identified and has resulted in January 2007 in all 32 local authorities in Scotland signing Scotland's Climate Change Declaration. The declaration expresses Scotland's local authorities' intent and it outlines a commitment to take action against climate change. Various actions are outlined including reducing greenhouse gas emissions through their own operations, identifying measurable targets and timescales, incorporating adaptation measures into plans and encouraging local communities to take adaptation and mitigation action.
- 3.10 In essence, the Scottish Government has sought to establish a legislative and policy framework for the long-term reduction of Scotland's greenhouse gas emissions, and a transition from an economy dominated by carbon consumption to a low-carbon economy positioned for sustainable growth. The GCV Strategic Development Plan (SDP) is being prepared within this Scottish-wide context and must reflect the provisions of that framework in its own Development Vision and Strategy.

4. Emissions Mitigation – the UK and EU Implications

- 4.1 Whilst much of the debate and current political reaction around mitigation is based upon such targets, a wider understanding of the targets is necessary if strategy and policy is to appropriately targeted so as to have its necessary impact. Effectively, broad-based targets of this nature need to be further refined to reflect the relative contributions of different economic sectors.
- 4.2 Figure 1 is a least-cost energy Markal Model of the UK emissions by consuming sector, adopted by the UK's Climate Change Committee, and demonstrates how different sectors, based upon their percentage contribution to GHG emissions in the year 2000, need to reduce them by 2050. For example, road transport emissions must reduce by 90%, the Service sector by 97%, electricity generation by 90%, and the residential sector by 100%, if the 80% base target is to be met. Therefore it simply not a case of each sector making an 80% reduction or any one sector out-performing other sectors, it requires a targeted approach that reflects precisely how each sector proportionately must perform in mitigation terms. As a basis for this approach, regions within the UK must understand just how the different economic sectors contribution within the make-up of that region's emissions. It is essential

therefore that each region audits its emissions and why the audit process is fundamental to any strategy that seeks to address regional GHG mitigation.

Figure 1 - UK GHG Emissions – A Markal Model of Sector Reductions to 2050



Dr. Sebastian Carney, University of Manchester

UK Climate Change Committee

- 4.3 Figure 2 shifts the focus to the EU and an understanding of the significance of 1990 as the base date for emissions reduction targets. In the 20 year period between 1990 and 2010, the EU economies emitted 65 billion tonnes of CO2 or 3.25 billion tonnes per annum. If the EU is to meet the 80% global target by 2050, on a linear basis that would mean that in the 40 year period from 2010, these economies could only emit 83 billion tonnes in total or 2.07 per annum.
- 4.4 Figure 3 extends this thinking further to the next one hundred years of the EU economies to 2150. If the 80% reduction is achieved and the two degree Celsius change in global temperatures is to be contained, then emissions levels between 2050 and 2150 will require to be held steady at a total of 65 billion tonnes or 0.65 billion tonnes per annum in that century, the same level as emitted in the twenty year period between 1990 and 2010.
- 4.5 These analyses highlight the urgent need a) to reduce emissions levels by exemplifying the EU's in the context of those of current and immediate past years and how they project long-term and b) by emphasizing the effective differences between the contributions of different economic sectors. The next step is to understand the city-region picture.

Figure 2 - EU CO2 Emissions 1990-2006..2050

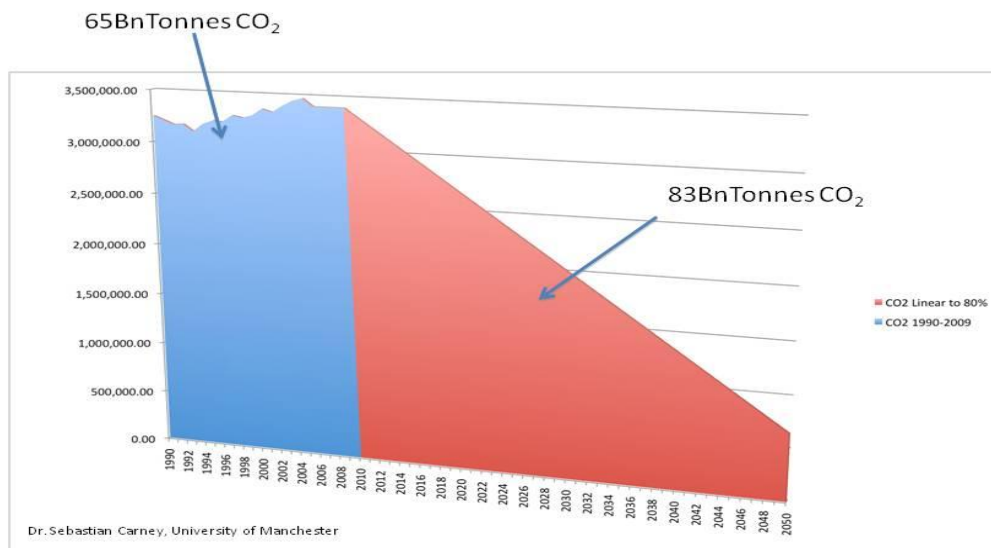
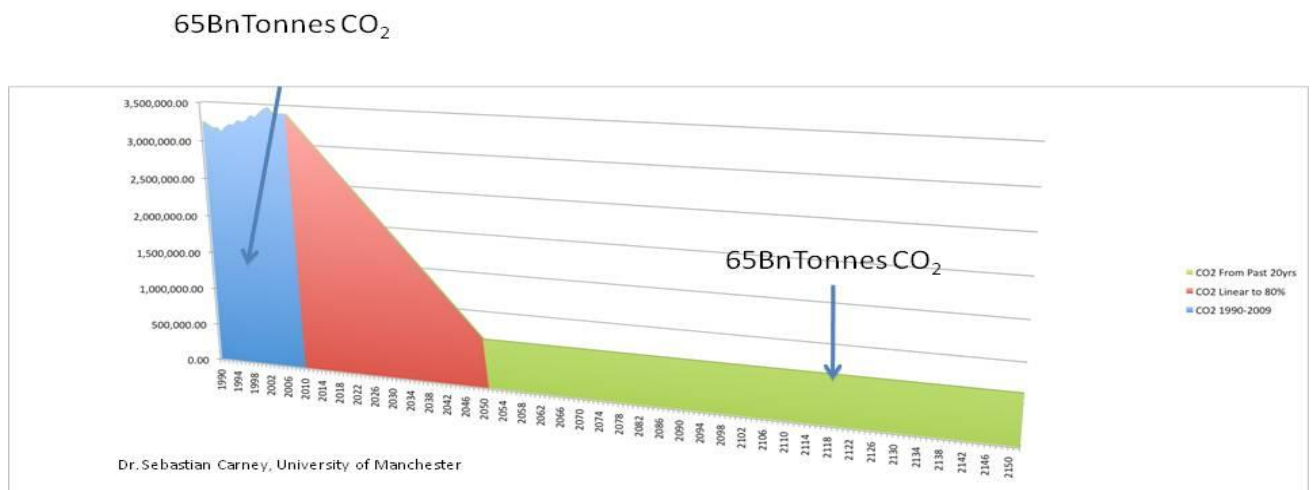


Figure 3 - EU CO2 Emissions up to 2150



5. Glasgow and the Clyde Valley (GCV) City-Region – the Strategic Planning Context

- 5.1 The GCV city-region already benefits from a coherent long-term planning strategy designed on sustainability principles. It looks twenty-five years ahead and is monitored annually whilst also being subject to five-yearly reviews. This strategy, first published in the Joint Structure Plan of 2000, was approved by the

Scottish Ministers in 2002 and was reviewed and brought up to date in 2006 and approved in 2007. Since that time, the Planning System in Scotland has undergone a fundamental shift from Structure Plans to broader more visionary Strategic Development Plans. The legislation allows for existing development strategy elements to be carried forward from the predecessor system and incorporated within the SDP where still relevant. Many of the key strategic elements of that GCV legacy have attained national priority status within the Scottish Government's own national planning framework and the strategy as a whole remains central to the continuing generational transformation of the city-region from its industrial past to a modern competitive metropolitan region.

- 5.2 However, in preparing to look long-term to 2035, the Glasgow and the Clyde Valley Strategic Development Plan Authority (GCVSDPA) is conscious that that future will be influenced by emerging 'drivers of change' and that its development vision and strategy must reflect how these 'drivers' will shape the future. One of these 'drivers' is Climate Change mitigation – the reduction of GHG emissions in line with mandatory Scottish legislative and wider global targets - and its concomitant need within the SDP therefore to
- a) enable a transition to a low carbon sustainable growth economy
 - b) reduce the environmental and carbon 'footprint' of the city-region
 - c) enable the development and implementation of alternative non-carbon energies
 - d) improve the natural carbon storage capacity of the city-region
 - e) identify and prioritise action to meet these objectives
- 5.3 The GCVSDPA, since 2009 and its predecessor organisation, the Glasgow and the Clyde Valley Structure Plan Joint Committee (GCVSPJC) in 2007 and 2008, were the first public authorities in Scotland and amongst the first in the UK and Europe to adopt a comprehensive methodology addressing the issue of Climate Change mitigation and its implications for development strategies and public policy. That methodology was the GRIP (Greenhouse Gas Inventory Protocol) model developed by Dr. Sebastian Carney at the then Tyndall Institute for Climate Change at Manchester University in the UK. The GRIP approach has since been adopted extensively across the UK, the EU and the USA and farther abroad as a key tool in developing strategy for mitigation.
- 5.4 The GRIP model has three stages –
- 1) An audit of GHG emissions
 - 2) Scenario analysis of mitigation options
 - 3) A mitigation strategy
- 5.5 This Background Report is based substantially upon work carried out on behalf of the Authority by Dr. Carney and staff from Manchester University and the GCVSPJC/GCVSDPA since 2007.

6. The Emissions Audit 2005 – the GCV Baseline

- 6.1 In 2005, the GCV city-region emitted 15.3 million tonnes carbon dioxide (CO₂) equivalent (including all six GHG gases of the Kyoto Protocol). This figure compares with a Scottish total of 55.7 million tones and an UK total of 657 million tonnes. In per capita terms, this is equivalent to 8.8 tonnes as compared to the Scottish and UK averages of 10.9 million tonnes.
- 6.2 Emissions within the GRIP methodology relate to four primary categories – **energy** i.e. associated with the consumption, distribution and extraction of fuels; **waste** i.e. landfill and other treatment activities; **agriculture** i.e. soils and animals; and **industry** i.e. chemical reactions and manufacturing.
- 6.3 The Energy sector comprises 90% of regional GHG emissions and within that total, residential and services sectors (including commercial and business offices, hotels, etc.) are the most significant emitters, in combination with transport.

Table 1 - Glasgow and Clyde Valley City-region GHG Emissions Audit 2004-05

	Kt	Kt	Kt	Kt	Kt	Kt	Kt
Sector	CO2	CH4	N2O	HFC	PFC	SF6	Co2-e
Energy	12,825.0	40.5	0.3				13,771.60
<i>Residential</i>	<i>4,6681.0</i>	<i>1.53</i>	<i>0.11</i>				<i>4,734.23</i>
<i>Services</i>	<i>1,330.0</i>	<i>0.18</i>	<i>0.04</i>				<i>1,346.18</i>
<i>Industry</i>	<i>2,542.0</i>	<i>0.26</i>	<i>0.11</i>				<i>2,581.56</i>
<i>Energy Industry</i>	<i>486.0</i>	<i>0.06</i>	<i>0.02</i>				<i>493.46</i>
<i>Transport</i>	<i>3,395.0</i>	<i>0.07</i>	<i>0.03</i>				<i>3,405.77</i>
<i>Fugitive</i>	<i>404.0</i>	<i>38.40</i>	<i>0.00</i>				<i>1,210.00</i>
Industrial Processes	0.00	0.00	0.00	242.86	2.65	0.00	245.51
Waste	12.53	24.10	0.13				558.93
Agriculture		14.24	1.36				720.64
Total	12,837.5	78.84	1.80	242.86	2.65	0.00	15,296.68

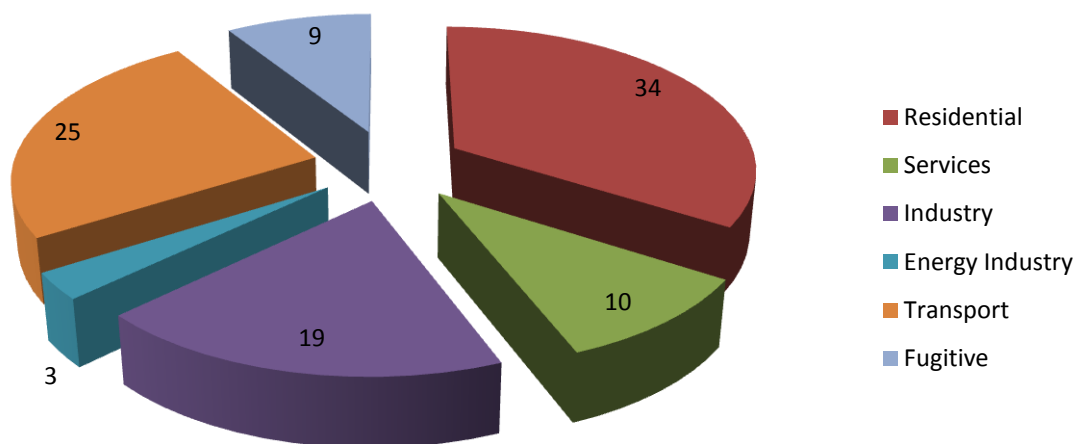
Basket of Six Kyoto Greenhouse Gases and CO₂ Equivalent

CO ₂ – Carbon Dioxide	= 1
CH ₄ – Methane	= 21
N ₂ O – Nitrous Oxide	= 310
HFC – Hydrofluorocarbons	= between 140 – 12,100
PFC – Perfluorocarbons	= between 6000 – 9,200
SF ₆ – Sulphur Hexafluoride	= 23,900

Source – GCV GRIP Audit – GCVSDPA/University of Manchester; InterMetrexPlus
http://www.gcvcore.gov.uk/downloads/GRIP_InterMETREXPlus.pdf

6.4 Figure 4 below illustrates how these key sectors – effectively comprising 69% of regional emissions - dominate the GCV GHG picture and how the remaining consumption sectors make up the remainder. As was highlighted in Figure 1, for such key sectors, the actual target for mitigation is not 80% by 2050, but ranges between 90% and 100% reduction. ‘De facto’, therefore, the regional target is somewhat greater than 80% given the dominance of these sectors in the GCV make-up.

Figure 4 – GCV City-region GHG Percentage Emissions from Energy 2004-05



7. Comparative Data from European metropolitan regions

7.1 As part of its overall approach to strategic development planning, the GCVSDPA and its predecessor organisation, the GCVSPJC, have consistently sought to benchmark its approach against European partner city-regions. A founding membership in 1996 of Metrex, the European Network of Metropolitan Regions, has enabled the successive bodies to carry out such benchmarking across a range of their planning activities. As an adjunct to its leadership of the InterMetrex project in the EU, supported by Interreg IV, the GCVSPJC/GCVSDPA developed the InterMetrexPlus pilot of GRIP which has been followed by the EU CO2 80/50 project, led by Hamburg and involving up to eighteen European city-regions, with GCV as one of the partners. The project has contracted the University of Manchester as the expert facilitator and the whole project is being sponsored by General Electric.

7.2 The EU CO2 project, through the GRIP methodology, has provided a common benchmark of GHG emissions across the project membership (Appendix A). The following graphs are derived from ‘Greenhouse Gas Emissions Inventories for 18 European Regions’ under EU CO2 80/50 Project Stage 1 published by University of Manchester, Metrex and MetropolRegion Hamburg 2009.

Figure 5 – Per Capita Emissions across EU Metropolitan City-regions

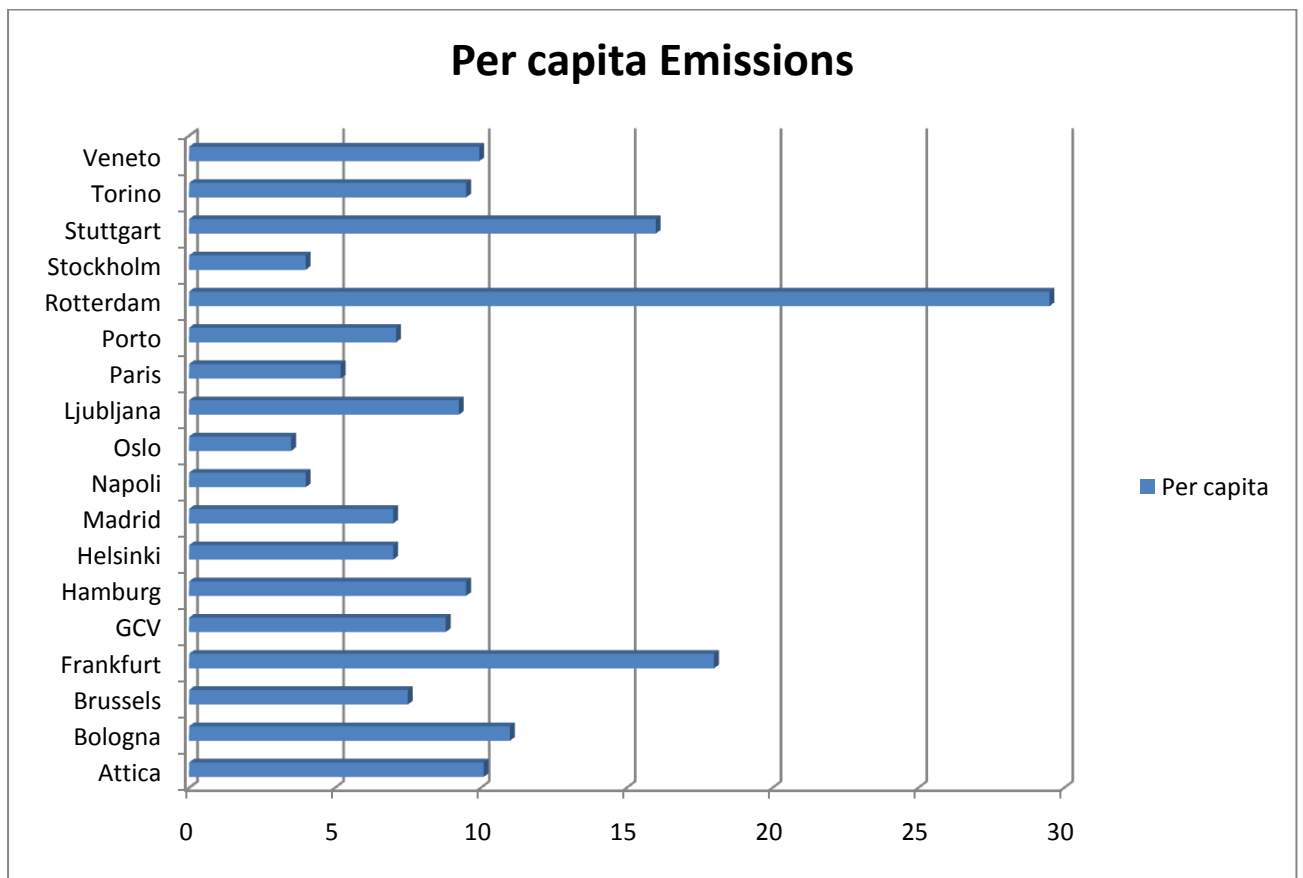


Figure 6 – Energy Sub-sector in relation to Total Emissions – EU Metropolitan Areas 2005

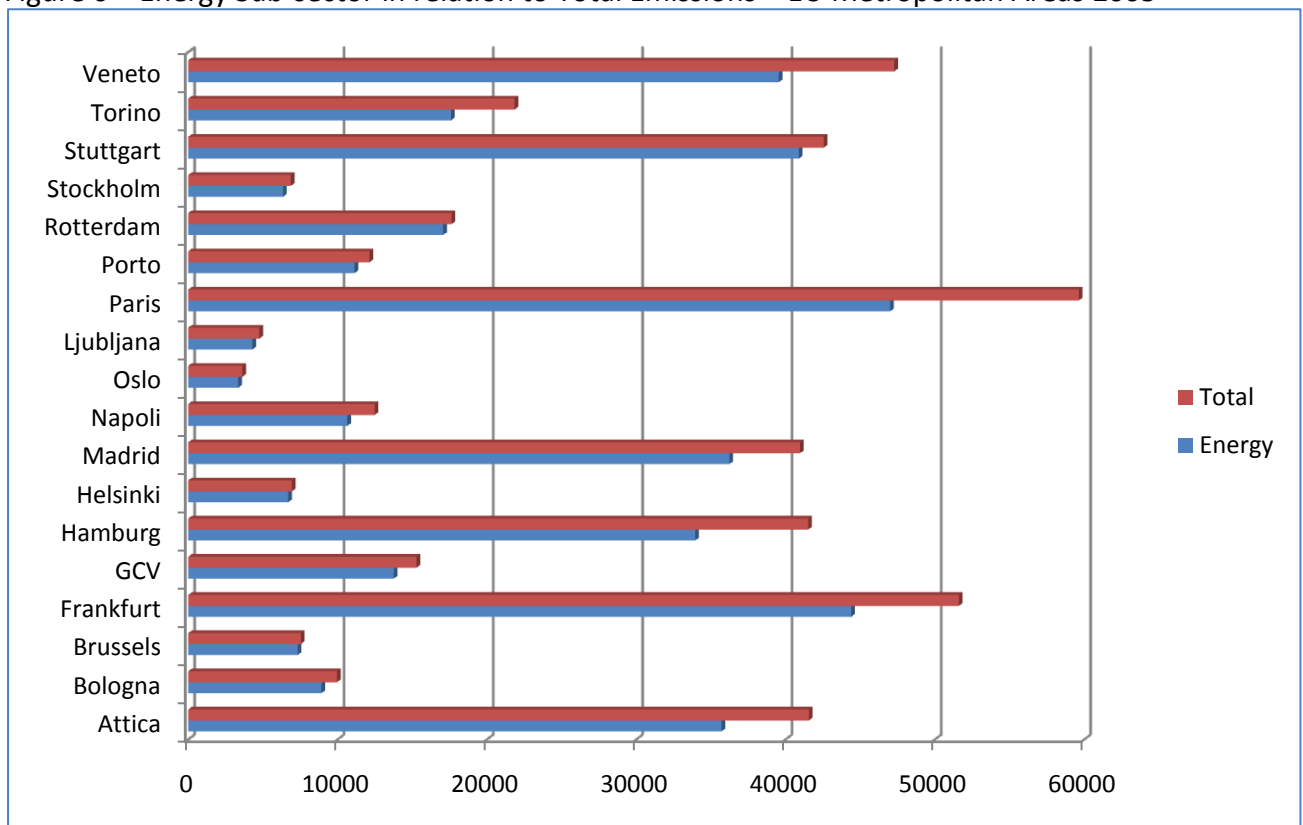


Figure 6 – Individual Sub-Sector Emissions within Energy – EU Metropolitan Areas 2005

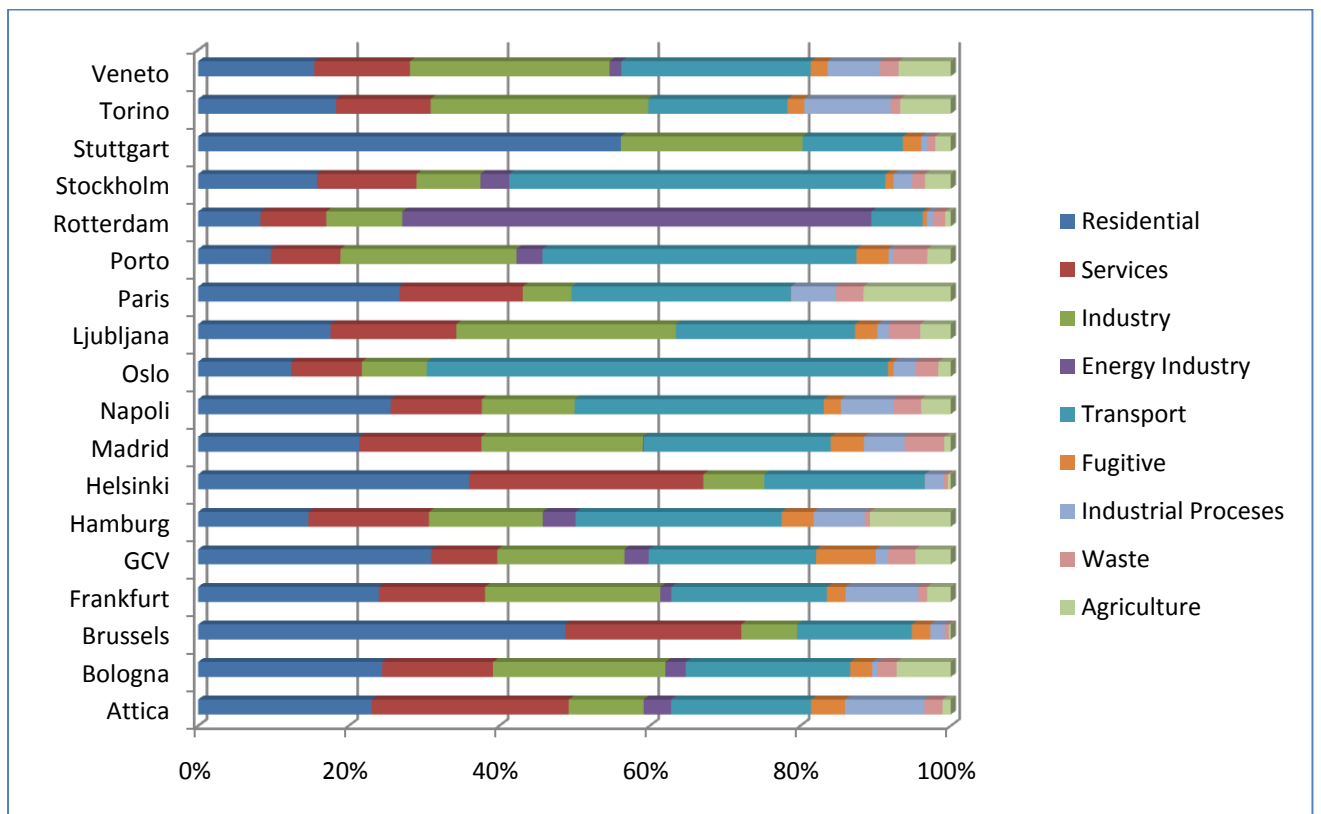
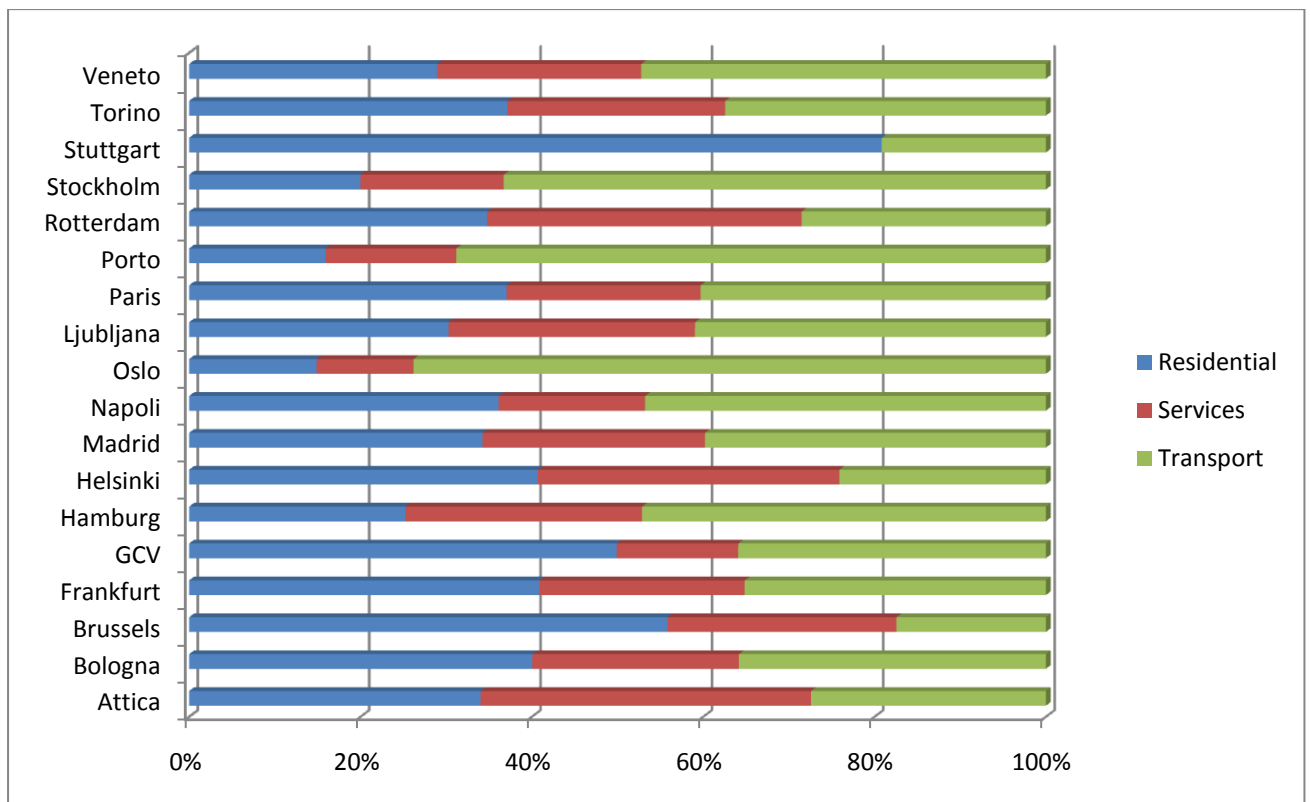


Figure 7 – Residential, Services and Transport Emissions – EU Metropolitan Areas 2005



- 7.3 Given the various factors which influence a city-region's scale of GHG emissions, in order to allow meaningful comparisons, a per capita figure is often computed. Figure 5 gives that comparison across the selected city-regions. From that figure, it is evident that the GCV area sits in and around the average of the eighteen city-regions. However, even per capita figures can be misleading and only give a broad guide to comparative figures. Rotterdam's figures, with four oil refineries supplying large areas of Europe, provides a significant set of exports to other countries and therefore are an example of how even per capita figures can be misleading.
- 7.4 What really informs the situation is the profile of activities that cause the emissions – nature and type of economy, the energy mix of fuels, technology, etc. The other Figures provide greater insight into the comparison. All city-regions (Figure 6) are dominated by the energy sub-sector to a greater or lesser degree; this being the primary source of emissions. In the GCV region, it is around the 90% figure, and reflects the low percentage share of the regional economy in waste, agriculture and industrial processing and the more recent focus upon a services-based economy.
- 7.5 Figure 6 illustrates the make-up of emissions within that energy sub-sector across the eighteen city-regions. What emerges is the dominance of residential and services (commercial properties) and transport within the sub-sector across the majority of the eighteen, reflecting the composition of most modern service-based metropolitan economies. Notable exceptions to this would be Rotterdam with its high figures for industrial processing; some of the North Italian cities with their high manufacturing figures, replicated in major German metropolises such as Stuttgart and Frankfurt.
- 7.6 Figure 7 isolates those emissions associated with the three dominant sub-sectors of energy conversion and consumption. The GCV area is one of the top three in terms of emissions from homes and residential properties reflecting the relatively poor quality of build in terms of insulation, heat-retention, double-glazing etc. Transport is the next largest proportion of GCV emissions and whilst producing a smaller proportion than some major EU city-regions e.g. Hamburg and particularly capital city-regions – e.g. Stockholm, Oslo - the GCV figure has to be viewed in the light of a much lower car-ownership rate, emphasising the reliance upon road transport currently inherent in the city-region.

8. Emissions Mitigation in GCV – Scenario Results

- 8.1 The three key sectors of residential and commercial property and of transport therefore set the context for addressing the emissions issue in the GCV area. Reducing regional GHG emissions in these key sectors to levels between 90% and 100% by 2050 (Figure 1) will require 'inter alia' some fundamental shifts in the nature of energy generation and consumption and similar shifts in the nature of capital investment in non- and low-carbon technologies.
- 8.2 It is likely that a package of measures will be required to achieve the necessary reductions in emissions. In order to assess the balance of measures likely to be required, the next stage in the GRIP model is the formulation and testing of scenarios

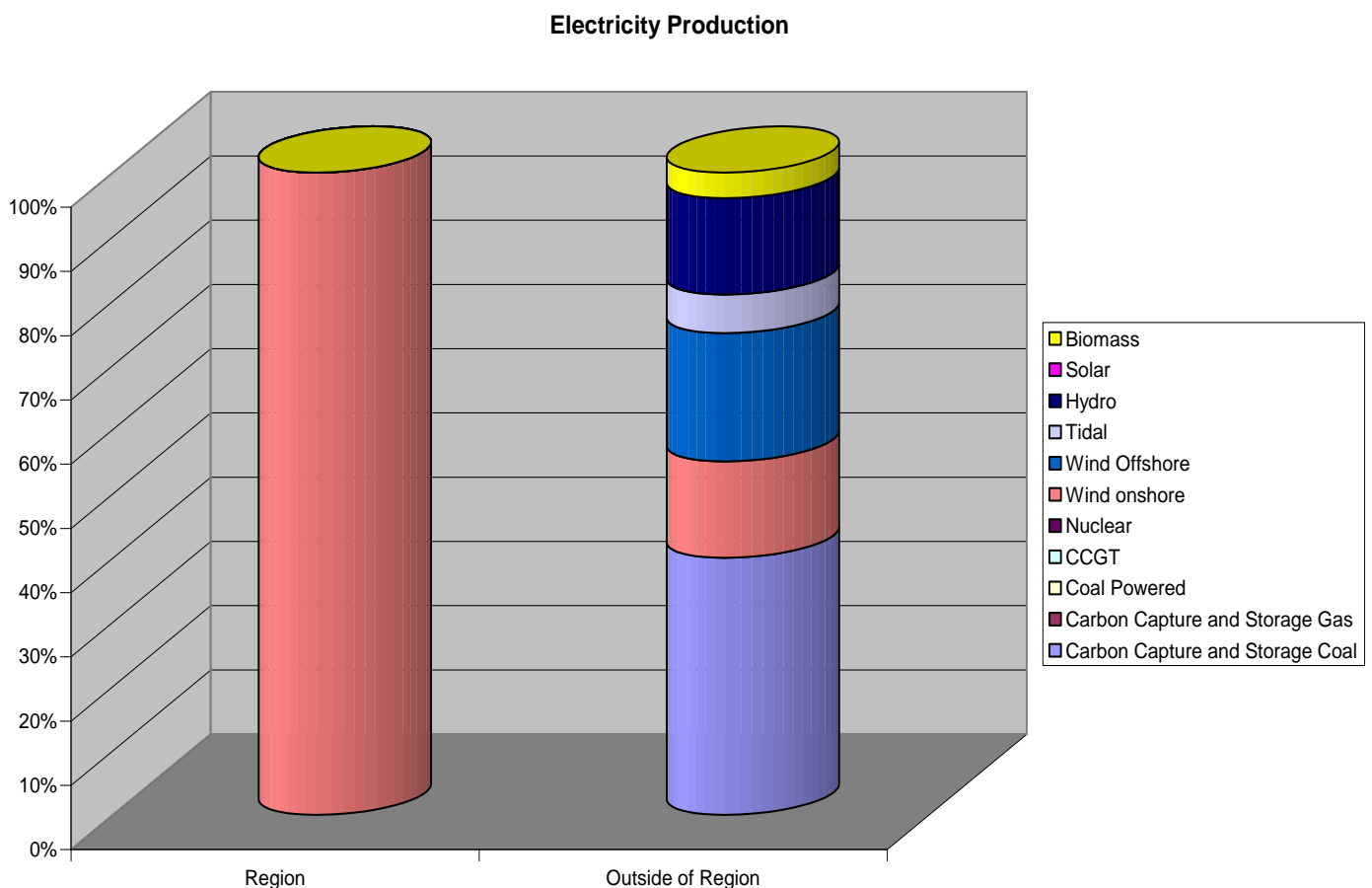
of different packages of specific actions. This section of the Report summarises the various scenario workshops held in the GCV area and what range of actions were evaluated and to what effect.

- 8.3 Workshops were held in two diets - in 2008 (www.gcvcore.gov.uk/downloads/GRIP_InterMETREXPlus.pdf) and in 2010. Participating bodies are listed in Appendix B.
- 8.4 Scenarios are effectively group processes whereby stakeholders are challenged to reach a group consensus on mitigation actions – both qualitative and quantitative – whilst inputting their own personal quantitative perspectives on energy changes into the GRIP computer model with the aim of reaching an 80% reduction in emissions by 2050. There are six basic factors requiring consideration in this work –
- Demographic change (non-restricted)
 - Economic structure (non-restricted)
 - Annual average economic growth (non-restricted)
 - Percentage change in energy demand by sector relative to the base year (restricted to a 100% decrease and 300% increase)
 - Fuel composition in percentage splits for each sector (non-restricted)
 - Secondary energy-generating technologies and percentage splits (non-restricted)
- 8.5 The results of the 2008 diet of scenarios are set out in the following publication (www.gcvcore.gov.uk/downloads/GRIP_InterMETREXPlus.pdf). It is not therefore intended to reproduce these in this Background Report and readers are directed to the publication itself. Only the broad outcomes of that diet are involved in this commentary alongside those of the 2010 diet. As a result, readers should direct their attention to the diagrams on pages 21, 23 and 25 (Electricity Source Grid and Emissions Change 2000 – 2050).
- 8.6 The equivalent diagrams for the 2010 diet are shown below in Figures 9 to 12. These ten diagrams together illustrate the basic results of the scenarios in terms of the basic actions needed to meet the generic 80% target by 2050 and the change that needs to take place by sector.
- 8.7 The focus of this Background Report is to draw conclusions from the various scenario workshops and not to describe the extensive detail emerging from each workshop. Emerging from the scenario process are a number of basic themes which either provide a strategic context or which directly go to shape the Strategic Development Strategy.
- 8.8 These themes are set out below in bullet-point form -

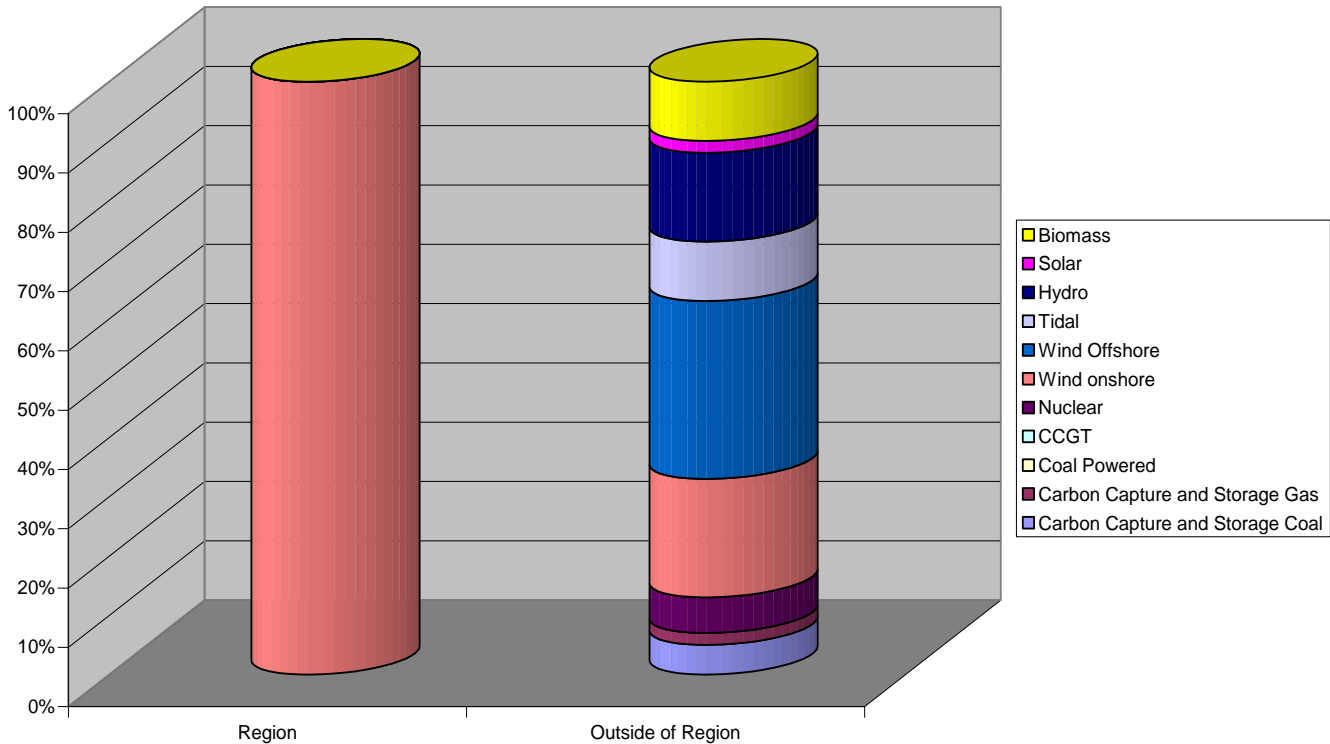
- 'de-carbonisation' of energy sources, particularly the Electricity Grid (Figures 9 & 10)
- 'de-carbonisation' of energy consumption (Figures 11 & 12)
- Carbon capture and storage (at point of energy generation) (Figures 9 & 10)
- Localised energy grids based on Combined Heat and Power (CHP)
- Substitution of renewable 'green energies' for fossil-fuels (Figures 9 & 10)
- Major development of 'Offshore' Wind (Figures 9 & 10)
- Investment in domestic insulation and new energy-efficient technologies
- Incentives to invest in energy efficiency improvements
- Investment in 'Smart' technologies
- New vehicular fuels, modal shift and demand management (Figures 11 & 12)

8.9 Despite these substantive step-changes in energy generation and in the nature of consumption, the fact that none of the first diet of scenarios achieved the generic 80% reduction, let alone the 90% or 100% reduction necessary to achieve sectoral change in the key emitting sectors, is a clear signal of the step-change that will be necessary in the energy sub-sector.

Figures 9 and 10 – Electricity Source Grid 2050

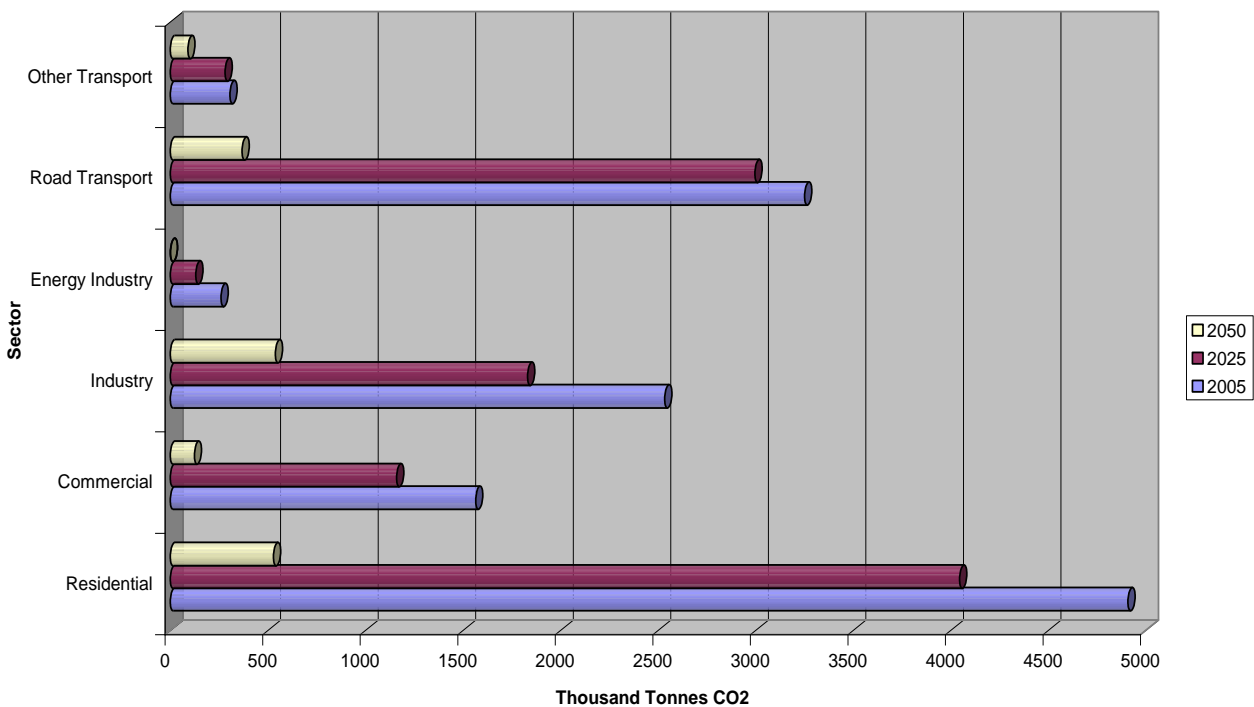


Electricity Production

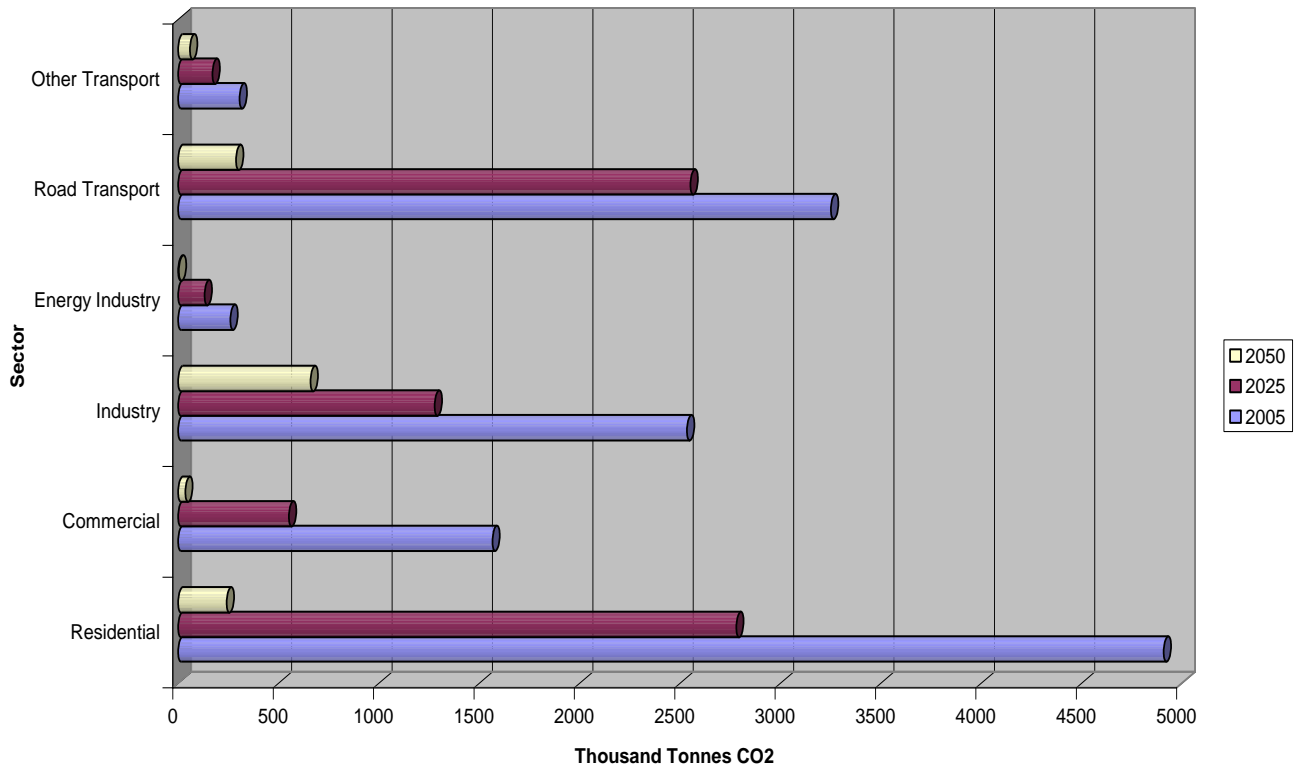


Figures 11 and 12 – Emissions Change 2005 – 2050

Emissions Change



Emissions Change



Implications for the GCV Strategic Development Plan

- 9.1 Land-use strategy, by its nature, is limited to the use of land and therefore is limited in the direct effect it can have on a wide variety of measures which will be part of the action package necessary to deliver the emissions mitigation agenda – e.g. technological investment and change, energy efficiency and internal changes to domestic and commercial properties, micro-generation, etc.
- 9.2 However, strategic development planning can influence the future geography of development and the connectivity of development. In addition, through its statutory role and its need to integrate a wide variety of stakeholders into long-term thinking and planning, it has the opportunity to raise the profile on integrated mitigation action.
- 9.3 In terms of the new strategic development plan, mitigation is a key ‘driver’. The Main Issues Report highlights the challenges facing the Glasgow and the Clyde Valley area in seeking to develop a sustainable future and to meet the climate change mitigation targets now enshrined in law in Scotland.
- 9.4 The fundamental aim of the GCVSDPA is the creation of sustainable economic growth through a development model which reflects the mitigation requirements of

paragraph 8.8 of this Report. Effectively this entails a development model based on a 'compact city' public transport dominated low-carbon footprint approach comprising

- land recycling (the 'brownfield' issue)
- communities regeneration and renewal including opportunities for alternative energy developments
- economic development on sustainable locations based on key economic growth sectors and a 'role and function' locational approach
- long-term growth on selected sustainable locations
- intensified focus on Glasgow City Centre and a network of other town and related centres as the foci for economic activity, community regeneration and development
- integration between development and public transport networks
- connectivity based on public transport networks and modes
- environmental recovery and enhancement
- opportunities for alternative renewable energy generation and integration

9.5 Such a strategic model is built upon sustainability principles and addresses mitigation through a primary focus on reducing the distance needed for travel and by focusing development on locations accessible by mass-transit modes. The additional focus on regeneration and renewal provides opportunities for the integration of alternative energy power stations e.g. CHP, Biomass.

9.6 The focus on the existing built-up areas reinforces the need for the investment in the existing urban fabric and a major thrust to 'retro-fit' energy efficiency into all residential and commercial property. Whilst the SDP has little direct ability to influence necessary investment by developers and home-owners, the essential focus on the existing urban fabric reinforces the investment message for all involved.

9.7 Whilst public transport accessibility and mass transit investment are essential if transport mitigation targets are to be met, in themselves they simply provide the opportunity for modal shift to more sustainable modes. Modelling of such provision however suggests that, on its own the 'carrot' aspect of modal choice is insufficient to effect the levels of change required and that a 'stick' component will also be necessary. The development strategy therefore sends a clear message to the Regional Transport Authority and to the Scottish Government that the National and Regional Transport Strategies need address the issue of demand management.

Conclusions

10.1 Greenhouse gas emissions reductions and mitigation strategy requires an integrated corporate approach across all sectors of society. The SDP strategic planning process focuses on spatial development planning, which, whilst able to influence the future long-term geography and shape of the city-region, is limited in its direct impact on short-term emissions reductions.

- 10.2 However, the GCVSDPA, through its adoption of the GRIP process, has established a baseline understanding of the city-region's emissions profile and has facilitated a corporate integrated approach to identifying a range of scenarios that could become the basis of a mitigation strategy. The key targets for such a strategy would be the existing urban fabric – its residential and commercial properties – and the transport infrastructure. Together, these comprise some two-thirds of the city-region's emissions.
- 10.3 The proposed strategic development strategy is built around a vision of the city-region's future geography which addresses these key emissions sectors, whilst at the same time, providing a wider strategic context for action and investment by Government, the development and investment industries and by the private owner and homeowner alike.

Appendix A – EU CO2 80/50 Project Partners

In alphabetic order

Attica, including the city of Athens, Greece

Bologna Province, including the city of Bologna, Italy

Bruxelles-Capital Region, including the city of Brussels, Belgium

Frankfurt/Rhein-Main, including the city of Frankfurt, Germany

Glasgow and the Clyde Valley, including the city of Glasgow, Scotland, UK

Hamburg, including the Free City of Hamburg, Germany - Project Leader

Helsinki Metropolitan Area, including the city of Helsinki, Finland

Comunidad de Madrid, including the city of Madrid, Spain

Naples Province, including the city of Napoli, Italy

Oslo Metropolitan Region, including the city of Oslo, Norway

Osrednjeslovenska Regija, including the city of Ljubljana, Slovenia

Ile de France, including the city of Paris, France

Metropolitan Area of Porto, including the city of Porto, Portugal

Rotterdam, The Netherlands

Stockholm Region, including the city of Stockholm, Sweden

Verband Region Stuttgart, including the city of Stuttgart, Germany

Torino Province, including the city of Turin, Italy

Regione del Veneto, including the cities of Padua, Venice and Treviso, Italy

Appendix B - Stakeholder organisations involved in GCVSDPA scenario workshops

Local Authorities

East Dunbartonshire Council
East Renfrewshire Council
Glasgow City Council
Inverclyde Council
North Lanarkshire Council
Renfrewshire Council
South Lanarkshire Council
West Dunbartonshire Council

Related Organisations

Glasgow Centre for Population Health

Government Agencies/Organisations

The Scottish Government Built Environment Division
Forestry Commission Scotland
Scottish Natural Heritage
Scottish Environment Protection Agency
Communities Scotland

Economic Organisations

Scottish Enterprise
Scottish Property Federation
Glasgow Chamber of Commerce
Visit Scotland

Transport and Utilities

BAA Glasgow
Strathclyde Partnership for Transport
Transport Scotland
Network Rail
Scottish Water

Education

Glasgow University

Private Companies

Tesco Stores



GLASGOW and
the CLYDE VALLEY
strategic development
planning authority

Glasgow and the Clyde Valley Strategic Development Planning Authority

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