

The Environmental Considerations of Sustainable Economic Growth (ECOSEG)

A final report to the North West Development
Agency and its Partners

Stage 2 – Overview Report

24 December 2008

Contents

1: Introduction	1
2: Key points from individual Theme reports.....	8
3: Summary messages from Stage 2	16

Contact: Assen Gasharov Tel: 020 7307 7163 email: agasharov@sqwenergy.com

Approved by: Simon Pringle Date: 24/12/2008
Managing Director

1: Introduction

Purpose

- 1.1 In April 2008, SQW Consulting was appointed by the North West Development Agency (NWDA) and regional partners to undertake a two-stage study looking at the environmental considerations of sustainable economic growth in the North West of England ('ECOSEG').
- 1.2 The first stage of the ECOSEG study was focused on preparing, and reviewing, the inventory of *existing* data and intelligence relating to the sustainable growth and development of the region over the next 10-15 years. A separate Stage 1 report summarises the current capacity of the region's various natural and man-made systems to sustain current economic and other human activity. It also explores the interrelationships between these systems and projected higher future demand on them in the light of the region's ambitions for sustainable economic growth. (Copies of the Stage 1 report are available from Rebecca Riley, The Regional Intelligence Unit, North West Development Agency (01925 400 100))
- 1.3 The second stage of the ECOSEG study, which this document relates to, sought to explore in greater detail four key environmental infrastructures, identified through the Stage 1 work as being key to the region's forward development. The four chosen infrastructures were:
 - Energy
 - Water
 - Waste
 - Transport.
- 1.4 In characterising these infrastructures in greater depth, this report is based on reviewing that secondary data and information currently available. Extensive evidence has been gathered to describe the infrastructures. However, certain gaps remain, particularly in terms of characterising the inventories of what are rapidly moving domains. Therefore, this report is produced as a collation and analysis of evidence at this point in time, which should be updated and refreshed on a regular basis.
- 1.5 This Stage 2 report is supported by a separate Stage 1 report which, as a precursor to this document, sets out in the width and breadth of the inventory of existing data and intelligence relating to the sustainable growth and development of the region of the next 10-15 years. **Copies of the Stage 1 report are available from Rebecca Riley, The Regional Intelligence Unit, North West Development Agency (01925 400 100).**

Objectives of the Stage 2 work

- 1.6 Within the context of the ECOSEG study overall, the specific objectives for the Stage 2 work were fivefold, namely to:

- create an inventory of the physical assets for each of four types of infrastructure in the North West region, and understanding their overall condition
- establish the past trends and future projections of demand on the critical infrastructure in relation to planned regional economic growth, wherever this was possible
- explore the environmental considerations regarding the use and future development of critical infrastructure in the region
- identify any infrastructure capacity constraints vis-à-vis both economic growth and environmental sustainability
- where relevant, look at the associated greenhouse gas (GHG) emissions and, in particular Carbon Dioxide (CO₂).

Scope of Stage 2 activity

- 1.7 As highlighted above, Stage 2 was intended to develop the breadth of the preceding Stage 1 work by analysing in detail four infrastructure themes, identified by Stage 1 work as key to ongoing development of the region.
- 1.8 The time horizons for the Stage 2 analysis were parameterised broadly as (i) recent trends and developments since 2000 and (ii) future outlook to 2021 which is the timeframe of the Regional Economic and Spatial Strategies. In practice, each of the four themes revealed their own specific timeframes with interim milestones (e.g. 2010, 2015, etc.), and sometimes extended planning horizons, as far as to 2035. These were taken into account when reviewing and analysing related information.
- 1.9 As with Stage 1, the emphasis in undertaking Stage 2 was one of mapping evidence, intelligence, and knowledge relating to the infrastructures on a consistent and ordered basis to inform future policy making and choices. Stage 2, like Stage 1, was not about making recommendations on infrastructure issues and challenges.

The overarching policy context for the ECOSEG study

Current developments

- 1.10 ECOSEG was commissioned at a time of a major regional policy transformation. The current principal strategy guiding economic development across the North West over the next twenty years is the **Regional Economy Strategy (RES) 2006**. It articulates the overarching vision for the region as *'a dynamic, sustainable international economy which competes on the basis of knowledge, advanced technology and an excellent quality of life for all'*. The vision is underpinned by three core objectives, namely to: (a) improve productivity and grow the market; (b) **create conditions for sustainable growth**; and (c) grow the size and capability of the workforce.
- 1.11 The ECOSEG research relates directly to the second objective, which is to improve the knowledge and understanding of the different infrastructures and environmental systems (natural and man-made) which underpin economic growth. This objective addresses themes

such as transport infrastructure (roads, airports, and ports), land redevelopment (brownfield), housing, utilities infrastructure (waste and water), energy supply, and the physical environment in general (natural and built).

1.12 Alongside the RES, the **Regional Spatial Strategy** (RSS) was published in final form in September 2008. The ECOSEG study, given its timescale, relied mainly on the draft RSS released in January 2006 and its Examination in Public (EIP). The vision in the RSS is that *‘by 2021, we will see a region that has acted to deliver sustainable development, leading to a higher quality of life for all, and reduced social, economic, and environmental disparities. Development will be seen in a global context, and the region will contribute to the reduction of carbon dioxide and other greenhouse gas emissions’*. In environmental terms, the key issues for the region identified by the RSS are threefold, namely to:

- Make best use of land and infrastructure and management resources effectively and prudently
- Reduce emissions and adapt to climate change
- deal with dereliction, improve air and water quality, manage the fabric of towns and cities and sensitive coastal and rural landscapes, protect wildlife, increase tree cover, and find more sustainable ways of dealing with waste.

1.13 These key issues and the environmental imperative they constitute are pronounced in the final RSS document. The need to contribute to the reduction of carbon dioxide and other greenhouse gas emissions is now part of the overarching vision, and Policy DP1 sets out some further spatial planning principles including:

- promoting sustainable communities
- promoting sustainable economic development
- making the best use of existing resources and infrastructure
- managing travel demand, reducing the need to travel, and increasing accessibility
- marrying opportunity and need
- promoting environmental quality
- mainstreaming rural issues.

1.14 Housing growth is a central theme in the RSS, and an important decision was to set the annual and total new housing provision to 2021 as minimum levels (23,111 per annum and 416,000 in total). This entails a potentially higher increase, which in turn would have implications on, among other things, the demand on resources and environmental sustainability. In addition, Second Round Housing Growth Points were announced in July 2008, which set out aspirational housing growth levels between 2008/09 and 2016/17 for the North West. These are concentrated in a belt from Liverpool to Manchester, parts of Lancashire, West Cheshire and Carlisle, and point towards almost 30,000 additional dwellings, which represents a significant uplift on RSS allocations for some parts of the region.

- 1.15 A wider review of the main regional strategies, and their linkages to environmental sustainability in terms of objectives and targets, is provided in Annex A

Future developments

- 1.16 The **Review of Sub-National Economic Development and Regeneration¹** (SNR) in England, published in July 2007 and responded to by government in November 2008, sets out the framework for future economic development policy across the regions. The review reinforces the case for growth of those high value-added, knowledge-intensive activities in which UK firms have a comparative advantage, including sectors such as the creative industries, financial and professional services, and biotechnology. To meet the challenges facing the national economy, the SNR has committed the Government to a number of key structural reforms that will have a profound effect on how economic development and regeneration priorities are decided upon and delivered.
- 1.17 At the regional level, strategic intervention will be streamlined through the introduction of integrated regional strategies, which will bring together formerly separate plans for economic and spatial development. RDAs are to be given a greater say in the distribution of funding in each region, including structural fund resources for the 2007-2013 period. Strategy development will be guided by a single over-arching growth objective (based on GVA per head). However, SNR says that the region's ambitions must be delivered in an environmentally and socially sustainable way (SNR para 6.8a). Crucially, SRSs will need to identify key economic policy areas and priorities which take account of constraints on carbon emissions (such as those proposed in the Climate Change Bill), and tackle spatial concentrations of deprivation.
- 1.18 The reforms are based on the principle that the delivery of economic development and sustainable growth should occur at 'the most appropriate' spatial level, starting from the bottom-up. Therefore, whilst the RDAs' role will become more tightly focused on defining strategy at the regional scale, delivery will be delegated where appropriate, which will require strengthening of the local authority role in economic development.
- 1.19 Work is now underway to start to bring the RES and the RSS into a Single Regional Strategy (SRS). The ECOSEG Stage 1 and Stage 2 reports will be important sources of evidence on which the SRS will draw.

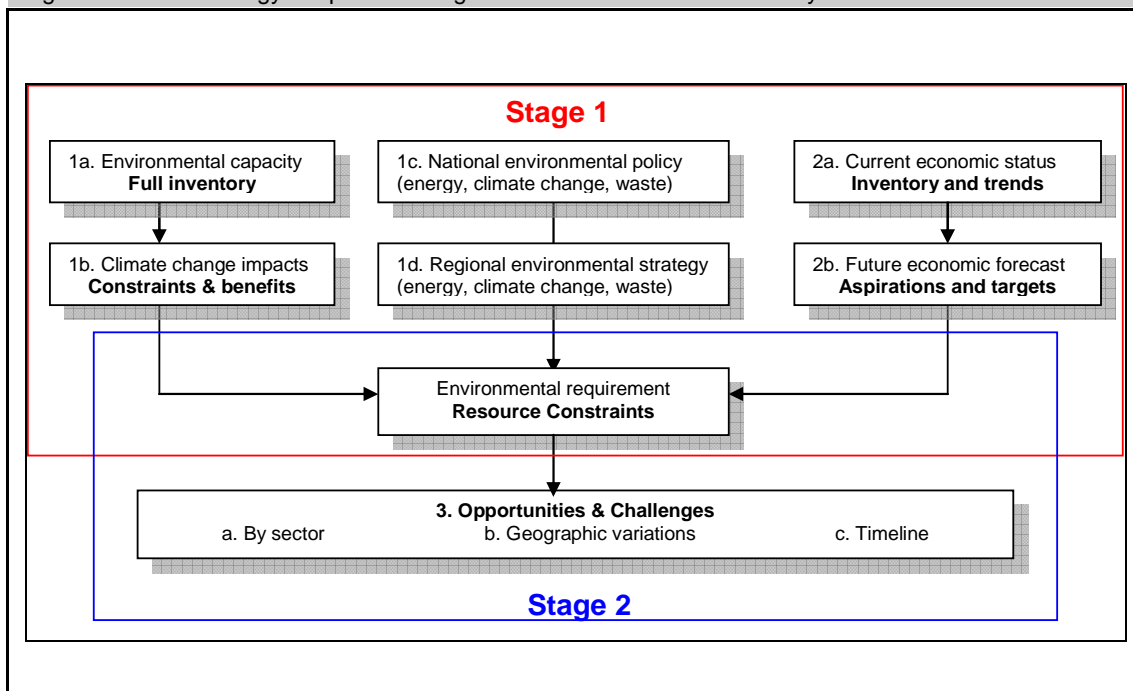
Methodology

- 1.20 The methodology used in Stage 2 linked seamlessly to that used in Stage 1, but sought to deepen the analysis by focusing on the four chosen infrastructure themes. The inter-relationship between Stage 1 and Stage 2 is presented in Figure 1-1. Specifically, Stage 2 involved the following tasks:
- data and information gathering
 - review, prioritisation and collation of data and information

¹ *Review of sub-national economic development and regeneration*, HM Treasury (July 2007). Available at www.hm-treasury.gov.uk/media/9/5/subnational_econ_review170707.pdf

- analysis of past, current and future regional requirements and trends
- detailed liaison with the research teams of other ongoing consultancy assignments, and key stakeholders (including through two workshops).

Figure 1-1: Methodology adopted for Stages 1 and 2 of the ECOSEG study



Source: SQW

- 1.21 All four thematic reports – on Energy, Water, Waste, and Transport - are based on reviews of secondary data and the information currently available. Extensive evidence has been gathered to describe the various parameters defined for each theme (see individual reports for more detail). Certain gaps were identified and remained open due to difficulties with accessing data and information from e.g. private entities. This was particularly the case in updating the inventories of some types of infrastructure, and is an area where which further research and collaborative work with private service providers is suggested. The reports produced by Stage 2 will undoubtedly benefit from regular update and progressive widening of scope.
- 1.22 Whilst the Stage 2 work recognised and sought to explore the complex and strong interactions within and across the four themes wherever possible, this was a secondary consideration to the prime task of characterising each of the infrastructure themes in their own right. Developing a fuller understanding of cross-theme issues could be progressed usefully as further work.

Sources of information

- 1.23 A wide range and variety of sources have been used to produce the emerging findings in the four Stage 2 theme reports. In line with scope, only secondary data and information have been reviewed, and a detailed list of the sources is provided in the Annexes to each Theme report. The categories of data/information and their sources can be summarised broadly as follows:

- ‘raw’ statistical data and information from official sources – datasets, time-series, tables, maps, etc. These are often unqualified and extensive in content and require screening and scoping, structuring, prioritisation and analysis
- commissioned research – completed studies and reports (to be complemented later on by on-going research). This information source is typically focused on a theme or group of themes, qualified and with analysis and results provided
- regional policy and strategy documents - these provide a mixture of selected evidence and regional priorities, objectives and targets.

1.24 Several recently conducted studies relate to the ECOSEG Stage 2 work, and the wider relationship of critical infrastructure and the environment. These studies include:

- the North West Infrastructure Study (by EKOS)
- the Cost of Green Infrastructure (by SURF/ARUP)
- the Appropriate Assessment of the Draft RSS for the North West (by Scott Wilson)
- the Habitats Regulations Assessment of the RSS for the North West Consolidated Report (by Scott Wilson).

1.25 These studies identify potential impacts on the landscape, air and water quality, protected areas (such as European sites), and other areas. Summaries of their findings have been provided in each theme report.

A word on the REEIO model

1.26 Both Stages 1 and 2 make extensive use of the Regional Economy-Environment Input-Output model (REEIO) version 3.0, updated outputs of which were produced for the North West in July 2008. The model establishes a 2005 baseline and defines a ‘business-as-usual’ scenario through to 2020 which is based on the following:

- the Local Economy Forecasting Model developed by Cambridge Econometrics and the Warwick institute for Employment Research
- Cambridge Econometrics’ view of the prospects for the UK and regional economies, as published in *Regional Economic Prospects, July 2007*
- region-specific environmental data and trends as published in SCPnet’s *Overview of REEIO Update, April 2008* and Cambridge Econometrics *UK Energy & Environment Report, February 2008*.

1.27 REEIO’s July 2008 outputs were based on GVA and population growth levels reflecting the North West Regional Intelligence Unit’s (NWRIU’s) long-term forecast of 2.15% growth in GVA and 0.3% population growth per annum.

Structure of this Report and the four Thematic Infrastructure reports

- 1.28 In the next Section, this overview report presents the key points for each infrastructure theme (taken from the individual theme reports) and summarises the main messages arising from the Stage 2 work as a whole. Each of the underpinning theme reports themselves follow a consistent format, as follows:
- Section 1: Introduction – presents the *scope* of the thematic report and summarises the *main issues, challenges and opportunities*
 - Section 2: Infrastructure Inventory – provides a detailed account of the *regional assets* and impact for the infrastructure in question against a range of indicators, as well as their distribution across the region (either sub-regionally or according to other appropriate spatial levels). This section also looks at the *policy and regulatory context* for the theme. Finally, it explores the *management and operation* concerning the infrastructure in terms of key players and development plans
 - Section 3: Supply and Demand – looks at the *recent supply and demand trends* relevant to each type of infrastructure, and then analyses various available *future forecasts* for the levels of utilisation of the assets and the services they provide
 - Section 4: Infrastructure issues, challenges and opportunities – explores aspects such as infrastructure *capacity constraints and bottlenecks*, regional challenges regarding *adequate service provision and future development*, as well as the opportunities that exist to *improve infrastructure performance* while also contributing to regional economic growth
 - Section 5: Conclusions - presents the key messages from the research and analysis.
- 1.29 Two separate annexes are attached to each theme report, providing details on sources of information accessed, and organisations/individuals approached.

Acknowledgements

- 1.30 In compiling this report, we have been dependent greatly on the guidance and inputs of the study's Steering Group. We would, in particular, like to thank Neil Cumberlidge (Government Office North West), Rebecca Riley, Mark Atherton and Ian Wray (North West Development Agency), John Thompson (Environment Agency), Michelle Young (Natural England) and Michael Gallagher (4NW) for their time and commitment.

2: Key points from individual Theme reports

Purpose

- 2.1 This section presents the headline messages emerging from each of the four detailed infrastructure theme reports. Sequentially, it focuses on Energy, Water, Waste, and Transport. The detailed scope of each of these themes is provided in the individual theme reports.

Energy

- 2.2 The North West region has a strong and diverse energy sector. It is a net exporter of energy, and hosts some of the largest and most significant facilities in the UK across fossil fuels (Fiddlers Ferry), nuclear (Heysham 1&2) and renewables (Burbo Bank and Barrow wind farms). The region has a total of 5.7 GW installed capacity.
- 2.3 The existing generation capacity, however, is aging and subject to a range of regulatory and business pressures. As a result, a number of plants will be decommissioned during the period to 2021. There is no clarity as to new, fossil-fuel plants in terms of their location, capacity, fuel base and development timescales. Decisions on nuclear investments in the North West are awaited.
- 2.4 Energy consumption has been growing over the last decade and one plausible scenario is that demand will continue to rise, across electricity and gas (and transport, which is outside the scope of this study). However, as a result of various policy interventions and business transformation, the Regional Economy Environment Input Output (REEIO) model offers an alternative scenario, which shows an overall decrease of energy demand (by 12% by 2020).
- 2.5 The regional electricity and gas infrastructures are broadly in good condition, and the service operators are making the necessary investments in maintenance. There is a list of infrastructure projects in the pipeline, which are intended to address the future demands on the networks from both capacity, and resilience/security perspectives.
- 2.6 The electricity network will experience a considerable degree of replacement and upgrading in the coming years. The network operators are anticipating (and planning for) a surge in the requirement for new generator connections, most notably from renewable sources, but also a range of new customers (of varying sizes) which will require new sub-station capacity. Whilst investment decisions will be made on financial grounds, there is the issue of infrastructure location and spatial viability, and consequently planning permission. High-demand areas, such as Manchester and Liverpool, may find it difficult to progress new sub-stations due to planning constraints. In order to mitigate these constraints, relevant planning bodies need to be made aware of proposals as early as possible, and negotiations initiated promptly to secure mutually agreeable outcomes.
- 2.7 The gas network will also see a range of upgrades, with new pipeline and connections built. An important consideration is that of gas storage, which may be required increasingly to help

meet future fluctuations in demand, especially peaks, as well as gas availability and price uncertainties. However, a second gas storage facility may take some time to be realised due to onerous planning procedures which have already resulted in a rejected proposal (at Fleetwood in Lancashire). Again, active and early communication with the planning authorities should facilitate significantly the process and result in a mutually beneficial outcome.

- 2.8 The region possesses a very good renewable energy resource base which presents excellent opportunities for economic growth and security of supply, as well as de-coupling economic output from carbon emissions. A range of technologies has the potential to be deployed on a large scale. However, offshore wind offers the greatest and most tangible real opportunity. An issue yet to be explored and addressed fully is the grid connection of renewables, particularly any offshore developments. This is technically feasible but costly. Currently, a north-to-south sea cable along the region's coast is seen as a future 'must' (source: stakeholder consultation), although it should be noted that planning and siting requirements, e.g. the 500-meter buffer zone for onshore wind around settlements, may significantly impact on what is a practical potential capacity for renewables).
- 2.9 The regional policy and strategy frameworks support the development of renewables. Sets of targets have been defined in the Sustainable Energy Strategy for the North West and the recently finalised Regional Spatial Strategy (RSS). These targets, along with a set of carbon emissions ones, are a good prerequisite for reinforcing sustainable economic growth in the region. The targets (at least 20% renewable electricity supply by 2020) are feasible but still challenging to achieve. Most emphasis is placed on 'region-wide' developments (e.g. offshore renewables) and in terms of sub-regional distribution. Lancashire is envisaged to deliver, relatively, the largest share.
- 2.10 Nuclear energy is another key area from which the region can benefit significantly. Whilst there is ample information about the current state of play of the nuclear sector in the North, little is available, currently, as to future directions and prospects.
- 2.11 Finally, in terms of carbon emissions, which is the main environmental impact arising from the energy infrastructure, the region has a large carbon footprint which, despite a down-trend in the early 2000s, has been increasing over the last few years. A strictly defined 'business as usual' scenario shows a continuing increase of carbon from energy, but an alternative model where policy developments are factored in shows that emissions could gradually subside by 2020. Even this more optimistic outlook would require extra effort in order to achieve the challenging regional targets by 2020.

Water

- 2.12 The Environment Agency has classified the region as one of 'Low' water stress (EA, 2007). The fact that there is a single provider across most of the region, United Utilities, contributes to the flexibility to meet demand where and when it is needed. The sector is highly regulated by Ofwat and the Environment Agency, which determine to a large extent the standards to which the water company has to comply (dependent, for example, on the interpretation of EU Directives by the EA).

- 2.13 Total water resource use across the region was estimated by Defra/EA to be 3,003 million litres per day in 2005. The majority of this (53%) was water demand from public water supply, with the remainder being used for power stations (19%) and other water resource use (28%). The bulk of ‘other water resource use’ (25% of the total), is for water supply to three main industrial sectors – chemicals, food and drink, and wood/paper manufacture.
- 2.14 Overall, the capacity of the region to supply water is considered sufficient² to cope with current and predicted demand for the medium to long-terms up to 2035. This is assuming a level of investment in leakage control and additional resources, as well as take-up of water metering, occurs as per United Utilities’ draft Water Resources Management Plan. Planned resource support is particularly required for the Integrated Resource Zone, the largest of United Utilities’ four water resource zones. The region as a whole has relatively flexible supply routes, although the West Cumbria and Carlisle Resource Zones have less flexibility with regard to capacity for an additional major water user if one appears.
- 2.15 There is a degree of uncertainty, however, regarding water supply, stemming from two main issues:
- the interpretation by regional actors of the regulations relating to the ‘sustainability reductions’ required. The Environment Agency (EA) has indicated that the bulk of sustainability reductions are now known, with most driven by statutory drivers such as the Habitats Directive, and that it will use its powers to vary/revoke abstraction licences that are proven to damage the environment. In particular, the Habitats Regulations Assessment of the North West Regional Spatial Strategy indicates that current abstraction levels are already affecting adversely some sensitive sites in the region, and the projected regional housing growth could add to existing pressure on water resources
 - the impact of climate change on water availability and regularity, which is inherently uncertain.
- 2.16 There have also been particular problems raised associated with rising groundwater levels and low river flows in certain areas.
- 2.17 Additional water supply will be required in the Integrated and West Cumbria Resource Zones, and is planned through specific groundwater and water treatment works projects. Additionally, demand management measures are being planned by United Utilities, including compulsory customer metering and water efficiency measures, to ensure that the demand (plus increasing headroom into the future to account for the uncertain effects of climate change), remains lower than the available supply.
- 2.18 Specific supply infrastructure planned for the future in the region includes:
- a bi-directional pipeline between Merseyside and North Manchester, the ‘West to East’ link (due to be completed by 2011/12)
 - upgrade to Huntington Water Treatment Works (35.0 Ml/d after 2017/18)

² NB: Subject to provisions set out in Policy EM5 as well as various mitigation measures included in the final RSS as a result of the Habitats Regulation Assessment of the plan.

- a new groundwater scheme at South Egremont (5MI/d after 2014/15)
 - reinstatement of Southport groundwater boreholes and pipeline (22.5 MI/d after 2014/15)
 - reinstatement of Widnes groundwater boreholes and pipeline (19.0 MI/d after 2015/16)
 - reinstatement of Warrington groundwater boreholes and pipeline (7.0 MI/d after 2020/21).
- 2.19 Wastewater infrastructure, on the other hand, is more complex and more vulnerable to decisions on individual developments. Key bottlenecks are harder to predict and creating a comprehensive regional picture of the issues is constrained by a lack of full transparency of United Utilities' infrastructure audits.
- 2.20 Flooding is a further area of concern where the overall risk of flooding is gradually increasing (due to changes in the weather patterns) in combination with an ageing infrastructure – most sewers in the region (70%) are combined sewers responsible for waste as well as surface water.

Waste

- 2.21 There is significant capacity to deal with waste in the North West at present:
- Landfill capacity in the region is estimated at between 55m m³ and 63.5m m³ (based on two recent reports) – these figures relate to the end of 2006 and the end of 2007 respectively
 - The region's incineration capacity has increased significantly over recent years to an estimated 523,000 tonnes in 2005; this is set to increase further now that planning permission has been granted to INEOS Chlor Ltd to develop a £300 million combined heat and power (CHP) plant producing energy from waste (EfW) on their premises in Runcorn
 - There are also a number of a number of facilities for waste recycling and associated treatment methods.
- 2.22 Broadly, it is estimated that the total amount of waste generated in the North West in 2006 was in the order of 23 million tonnes. Breaking this down:
- The amount of municipal waste generated in 2005/06 measured some 4.4m tonnes, around a fifth of all waste
 - Commercial and industrial waste arisings, taken together, measured some 8.1m tonnes in 2006, 35% of all waste generated
 - Construction, demolition, and excavation (CD&E) waste is estimated to measure 10.4m tonnes in 2006, approximately 45% of all waste generated.

- 2.23 The high-level REEIO model projections of future trends in waste generation (2005 to 2020) are significantly higher than what one would reasonably expect, judging by the direction of recent data trends in the North West (this is especially true for C&I waste and to a lesser extent municipal waste). This is mainly due to the model's underlying assumptions, which present one possible scenario; – arguably, scenarios that are more realistic could be modelled, using the detailed regional data that are available.
- 2.24 Related to this, REEIO model projections of future trends in waste management contrast significantly with what regional data trends suggest. REEIO has been run to a setting that places emphasis on landfill as a means of waste management, and other waste management options have been played down. This is unrealistic given the operation of the Landfill Allowance Trading Scheme (LATS) and the landfill tax escalator. A more reasonable and accurate assessment could be made on the basis of local information.
- 2.25 Environment Agency data from 2006 suggested that the North West's non-hazardous landfill sites have a shorter lifespan (which could be as low as 5.6 years) than all other regions, with the exceptions of London and the East of England. However, more recent evidence presented in the Theme Report for Waste suggests that there is sufficient landfill capacity in the region to satisfy landfill requirements well into the foreseeable future (at least until 2020) and probably until a point in time when technology and infrastructure has been developed to such an advanced stage that very little waste is sent for disposal anyway. In the report, we provide the reasons behind this assertion.
- 2.26 There is demand for, and significant opportunities to, develop more recycling and recovery facilities in the region. If these are taken up, more waste could be diverted from landfill as well as reducing the large export market of recyclables from the region (which can generate further revenue for the North West). Some of the wider opportunities arising from waste also include the potential to develop specific revenue-generating economic activities (such as specialist waste processing) and the overall improvements of business competitiveness through higher resource efficiency. However, in developing the sustainable and competitive waste infrastructure that the region needs, a number of barriers and challenges need to be overcome. These include issues around planning permissions and their timely resolution, and providing the right mix of incentives and regulations to ensure the market responds to the waste agenda.
- 2.27 Throughout, it should be borne in mind that waste collection, waste planning and waste disposal are essentially local issues determined by local authorities. It is they who issue planning permissions and decide on the location of new waste management facilities, hence there is only so much that can be achieved at a regional level at present.
- 2.28 Future policies and actions around waste should be guided by the well-established waste hierarchy: waste prevention, re-use, recycle/composts, and energy recovery. Only after all these options have been exhausted (in the order outlined) should waste be sent to landfill disposal. It is already in evidence that much is being done, at all levels, to help lower the amounts of waste generated and achieve the right balance in waste management.
- 2.29 The key report '*Nationally, regionally and sub-regionally significant waste management facilities*' produced for 4NW (2008) provides recommendations on the broad locations for

waste management facilities across the region. These will need to be taken forward in future planning decisions for the development of waste management facilities in the North West.

Transport

- 2.30 The key messages from the Theme Report on the transport infrastructure are as follows:

Road Transport

- 2.31 In 2006, there were 57bn vehicle kms travelled by road across the North West, on a road network that covers over 37,000 kms. Since 1996, the volume of traffic on the region's major roads (measured in vehicle kilometres) has increased by 16% (compared to a national average of 15%). Major routes, such as the M60, M56, M6 and M62, already experience severe congestion and 'stress'³ – and this is expected to worsen considerably through to 2026 if current patterns continue.
- 2.32 Given the high negative environmental impact of current road use, combined with congestion issues, the key challenge in managing road transport is better management of road use, and securing significant shifts in the regional population's mind toward more sustainable patterns and modes of road transport. The implications of possible road charging in Greater Manchester will need to be watched closely, both in establishing a precedent and in terms of resulting pressures on other modes of transport.

Rail Transport

- 2.33 The main rail lines running through the North West include the West Coast Main Line, North West Urban line and the North West Rural Line. The total number of rail journeys increased by 20% between 1999/2000 and 2004/05, with growth concentrated at the Manchester and Liverpool hubs. Manchester's stations now account for about 23m journeys p.a., with the second highest number in Liverpool (20 million). Rush hour demand already exceeds capacity on many of these trains.
- 2.34 Capacity issues on the current rail network are a significant concern for economic growth, especially if any modal shift towards more sustainable travel is achieved. The importance of Manchester, Liverpool, Preston, Crewe, and Chester is expected to grow in the future, and so interventions need to focus on these nodes and connections between them.

Ports

- 2.35 In 2003, the North West's ports handled 45m tonnes of cargo, equivalent to about 8% of total UK port traffic, with 70% handled at Liverpool, now owned by Peel Ports. Of this, 21m tonnes were distributed inland from the ports by road or rail, and the remaining tonnage (mainly petroleum) was processed within the port area. Planned expansion projects, including the post-Panamax container terminal facility at the Port of Liverpool, will enable the region to increase capacity and remain competitive as larger container ships become standard on world trade routes.

³ Daily traffic flow as a proportion of daily capacity

- 2.36 The development of post-Panamax facilities at Liverpool will create significant opportunities for the region – which could be boosted further by the development of the Liverpool ‘SuperPort’ concept that integrates port, airports, intermodal terminals, and distribution centres. However, any further expansion of port tonnage will have knock-on consequences for road traffic volumes, which will create accessibility issues, especially on the M6, M57, M58, M62, and A5036.

Airports

- 2.37 Manchester Airport currently handles over 20m terminal passengers p.a. to a range of international destinations (including trans-Atlantic). Liverpool John Lennon Airport handles approximately 5.5m passengers p.a, and Blackpool currently handles around 500,000 passengers p.a. Data suggest that there are not currently capacity issues at any of the region’s main airports, and the development of Carlisle airport would provide additional capacity in the north of the region.
- 2.38 Airports are considered to be a major opportunity for international trade and travel for the region. Whilst capacity is not expected to be a constraint, accessibility issues will need to be addressed in order to enable this – and the knock-on environmental impact will be the hardest challenge to manage.

Waterways

- 2.39 British Waterways North West are responsible for over 200 miles of waterways, over 600 bridges, 250 locks, 40 aqueducts, and six tunnels. Some of these are going to be upgraded in an effort to revitalise this infrastructure and the services it provides, mainly in the areas of tourism and recreation.

In the round

- 2.40 In terms of environmental impact, transport’s relative share of regional carbon emissions was 32% in 2005, which is projected to increase to 39% by 2020 (NB: road transport alone, as reported in ECOSEG Stage 1 Report, accounted for 24% of CO₂ in 2005). In terms of absolute emissions, it is likely that the levels will increase by some 13% in 2020 (AEA Energy & Environment 2008), although the recent REEIO model scenario suggests a possibility of no increase. The majority of transport emissions (73%) going forward will continue to be from road transport. Transport uses are also responsible for two thirds of emissions of another greenhouse gas – (nitrous oxide (N₂O)). Transport is also responsible for approximately two-thirds of all carbon monoxide (CO), half of the nitrogen oxides (NO_x) and PM10 black smoke, and 60% of Volatile Organic Compounds (VOCs) pollution across the region. In all cases, the levels of pollution generated by transport are project to rise considerably by 2020.2
- 2.41 All transport modes also cause considerable noise pollution, especially along the motorways and major roads, which is particularly acute in the southern, more urbanised part of the region.

- 2.42 With regional population growth expected to be sustained at around 0.3% per annum by 2020 and the Regional Spatial Strategy (RSS 2008) envisaging at least 416,000 new dwellings to be added (net) to the region's stock by 2021 transport and its impacts are likely to aggravate. The State of the North West Environment 2007 Report by the Environment Agency (May 2008) highlights that *'plans for around half a million new houses in the North West will add to the problem [of increased air pollution from car use] – especially when these homeowners bring their cars on to the roads'*.
- 2.43 The RSS housing growth projections also show that most new dwellings will be built in the southern, urbanised part of the region – particularly in Greater Manchester and Liverpool (and the corridor in between), which could compound localised issues of air pollution, congestion and noise in these areas.

3: Summary messages from Stage 2

- 3.1 Drawing on the details of the four underpinning theme reports, Table 3-1 presents the key headline messages flowing from the Stage 2 review of the infrastructures.
- 3.2 The assessment in the table is deliberately high-level, and is presented on a Red-Amber-Green scoring basis, where green denotes a positive/healthy position and red represents a cause for concern. The table reports on four key aspects of the Stage 2 work, as follows:
- **Evidence** – this relates to the availability, quality, level of detail, and accessibility of evidence relevant to each of the infrastructure themes. Whilst, in general, evidence for each of the four themes is plentiful and there is a prevailing opinion among stakeholders that the themes are generally well-researched and understood, a number of gaps were identified and issues encountered. Two issues should, however, be flagged:
 - Important and specific infrastructure inventory and condition information held at a corporate level by some private sector entities was not accessible, given commercial sensitivities. In some key areas, this has meant that the Stage 2 work has had to rely on higher-level data and information, which does not always fully reveal the issues and challenges regarding the different types of critical infrastructure, especially at a small spatial scale. This was most pertinent to the Energy and Water themes, where utility companies were only able to share a limited amount of information. Developing protocols to enable more fulsome disclosure, whilst fully recognising the commercial imperatives, should be explored.
 - There is, at present, too much variation and inconsistency in the input assumptions that are being made to the various regional growth models and forecast. The development of a Single Integrated Regional Strategy presents an important opportunity to move to a more consistent basis for modelling future economic growth and the supply of/demands on regional environmental capacity.
 - **Current inventory** – this covers the current composition and capacity of different infrastructure types to support the region’s economic and social needs. It summarises and qualifies the existing infrastructure challenges and opportunities, such as age, amortisation, necessity to upgrade, cost of maintenance and environmental impact. It also takes account of aspects such as spare capacity and scope to delivering a better and value-creating service
 - **Future supply and demand** – this assesses the scenarios generated for future infrastructure supply and demand relating to the specific infrastructure and whether there is a capacity gap. In particular, it reflects the question of scale, type and location of facilities required in the light of likely shifts in the region’s business base and housing markets

- **Environmental impacts** – this presents a summary assessment of the relationship between planned economic growth and its compatibility with the regional environmental assets (current and future). It aims to qualify the challenges and opportunities arising from the future management and development of infrastructure on the region’s environment
- 3.3 **Sub-regional variations** – this highlights the scale and intensity of sub-regional differences in terms of supply and demand and in particular any prominent challenges and opportunities regarding the four types of infrastructure. Note that these variations are only provided as commentary; they are not formally ‘RAG scored’.
- 3.4 Overall, there is a complex picture emerging in terms of the interplay between sustainable economic growth and environmental considerations. There are a wide range of challenges and opportunities that need to be addressed, and each type of infrastructure reviewed features specific characteristics. It is also important to stress that the assessments provided in Table 3-1 are largely quantitative, flowing from the hard evidence presented in each of the accompanying theme reports, but there is also a qualitative overlay to the assessments incorporating the ‘practitioner’ views of both expert study consultees, and the Project’s Steering Group.
- 3.5 Crucially, the assessment should not be viewed as a definitive set of answers; rather it is a device to summarise the evidence, to thread in qualitative views, and to start to raise some of the tricky tensions within, and across, the four infrastructure themes. Going forward, building on the foundations that ECOSEG has laid, further work will be needed to broaden, deepen and refresh the assessments.

Perceived opportunities

- 3.6 In closing this brief summary, it is worthwhile revisiting the opportunities highlighted in the underpinning Theme reports. As we seek to deliver genuinely sustainable economic growth, four key opportunities are evident:
- *Renewable energy* – renewables play an important role in the effort of decoupling economic growth and carbon emissions. Maximising the uptake of renewables delivers a number of objectives from contributing to meeting the demand, increasing security of supply, diversifying the portfolio, utilising local/regional resources and developing a whole sector of the economy. The North West is rich in renewable energy resources, including offshore wind, biomass and tidal. Waste-to-energy is another potential opportunity
 - *Housing* – while housing can be considered a challenge, it also presents an opportunity in terms of regeneration, improving the overall stock performance through high-standard new homes, locating new housing strategically to both minimise environmental impact and stimulate economic growth, enhancing quality of life and the region’s attractiveness
 - *Waste* – while waste too is typically considered a problem, it could also be an opportunity, as it is essentially a resource that can be utilised. Recycling is a growth

area in most other regions and internationally, and the North West has some particular strengths to play to and much of the solid waste (municipal and industrial) can also be recycled. Waste-to-energy is a further opportunity that can address two problems at the same time

Table 3-1: Summary view of the Stage 2 assessment of the four critical infrastructures

Theme	Evidence	Current inventory	Future supply and demand	Environmental impacts	Sub-regional variation
Energy	Extensive but some key information & documents are not publicly available	Adequate, in reasonably good condition, though ageing and reaching capacity	Infrastructure is expected to be upgraded and extended; supply & demand will be balanced; good opportunities especially around renewables, possibly nuclear	Potentially negative but opportunity to reverse this – subject to policy, investment and market conditions	Integrated network, but large variations regarding growing demand (urban areas), opportunities for renewables and new grid capacity needs
Water	Good, but with some gaps and largely provided from one main source	Adequate and diligently managed; well integrated and generally flexible	Remains balanced and flexible, but potential issues with some facilities, new housing, and responsibility for surface water. Take-up of household metering appears optimistic	Limited negative environmental impacts from water infrastructure - subject to the full implementation of policy objectives and investment plans	Limited relevance in relation to supply. Moderate variation in relation to wastewater; Marked variation with regard to surface water (flooding)
Waste	Comprehensive and current, but complex to synthesise for definitive answers	Adequate but reaching capacity Major score for deploying modern methods for waste treatment and processing	Supply aligned with demand, but subject to applying better management methods; certain economic opportunities (recycling/recovery)	Potentially negative but opportunity to mitigate through fuller regulation, policy, and behaviour - subject to the full implementation of policy objectives and investment plans	Inherently high-level of variation due to localised management and planning arrangements for waste matters. Future sub-regional concentrations of waste recycling and recovery facilities
Transport	Varied and ample but not always relevant to study scope (i.e. environmental considerations following from the transport infrastructure)	Well-developed, but not managed optimally, and bottlenecks an increasingly common experience	Supply and demand balance is at risk unless management is improved (peaks, hot-spots and modes); much higher demand is expected	Likely to be negative with regard to air pollution, noise, stress, etc. Opportunity to reverse this subject to management and behaviour	High variation re: demand, stress, bottlenecks and environmental impacts (mainly urbanised areas in the south)

Source: SQW Consulting

- *Environmental Goods and Services (EGS)* – this comprises a range of sectors, technologies, and activities. The definition itself implies that these sectors contribute to sustainable development through increasing resource efficient, minimising pollution and damage and delivering high value added (which is an element of decoupling carbon from growth). EGS include sectors such as water, waste, and air quality and are therefore directly relevant to the scope of this study.