Strategic Environmental Assessment/Sustainability Appraisal of the Regional Economic Strategy

Cover Note

The attached document provides a summary of the application of the Regional Economy Environment input Output (REEIO) model to the draft Regional Economic Strategy. The REEIO model is a tool which allows an understanding of the nature of the balance between the goals of sustainable development (wealth creation, social inclusion and environmental sustainability) in alternative policies and patterns of development. It focuses on:

- Waste management – highlighting links between economic growth and waste arisings, import/export balance and disposal methods.
- Water demand – looking at demand from both sectors and households plus regional water balance.
- Energy – looking at energy demand and basic profile of supply.
- Transport – mainly looking at energy and emissions.

Importantly, it also considers emissions to air, generating inventories for common pollutants, CO_2 and other greenhouse gases.

The model has been used to consider the environmental impacts of following the three economic scenarios developed by the Yorkshire Future's Regional Economic Model, which provides a "best guess" forecast of how the economy will perform in the future based on national level assumptions. It is the differing sectoral patterns of growth, as well as the rate of growth, that determine the relative environmental impact of each scenario.

Scenario A	a policy neutral, or base case that reflects longer-term structural trends and assumes that these will continue
Scenario B	a trend-based projection that reflects the recent upturn in the economy and the assumption that this, rather than the trends seen over a longer time period continue
Scenario C	an 'aspirational' scenario that includes the assumption that productivity levels in service sectors improve to match those of better performing regions.

The draft RES meanwhile takes a risk-based approach to dealing with higher and lower growth scenarios than expected over the economic cycle, with the options for development determined by taking the following into account:

- The available evidence base.
- Consultation and partner input.
- The need for integration and to fulfill the key purposes of the RES.
- What the *most likely* growth prediction for the region is considered to be based on economic modelling.

Option 1 (Do Minimum) considers the continued application of the current RES with continuation of the region's economic and social trends.

Option 2 (Sustainable Economic Development) recognises the principles of sustainable economic growth, based on maximising the positive impact of economic development on the lives of the region's people and on achieving long term environmental benefits in tandem with economic growth wherever possible. This option reflects the importance of integration and the wider purpose of the RES as well as the need to improve economic success.

Option 3 (Maximise short-/medium-term GDP) focuses on maximising regional GDP in the short to medium term and adopts a "trickle down" approach.

It is important to stress that Options 1 and 3 above are potential alternatives that have been discounted, for example due to likely undesirable social or environmental consequences, but allow comparison of the actual draft RES against other possibilities.

The results of applying the REEIO model to the three Scenarios (A, B and C) are described in the attached document. Whilst it does not provide any firm answers on what the outcomes of following any particular path of economic growth will be, it does give us projections of what key environmental trends may be under various growth scenarios.

Our conclusions are that, although the current model application does not relate directly to the options for growth set out in the draft RES, REEIO will be a useful tool for looking at the environmental impacts of achieving RES targets through assessing the environmental effects of potential interventions on the environment and on greenhouse gas emissions in particular, and for developing scenarios for future reviews of the RES. It may prove to be a key tool in *how* we implement the RES once adopted.

As a result, Yorkshire Forward will look to use REEIO as one of a range of means of reporting on progress on the RES and in future RES development. This will necessitate close working both across our own organisation and with partners including Yorkshire Futures and the Environment Agency.

REGIONAL ECONOMIC STRATEGY FOR YORKSHIRE & THE HUMBER

Overview of Environmental Implications

This note summarises the results of assessing the potential implications of the economic scenarios represented in the RES on key environmental pressures using the REEIO model. The version of REEIO used in this study was prepared in November 2004. It incorporated the baseline economic forecasts from Cambridge Econometrics published in Regional Economic Prospects, July 2004 and the data on key environmental pressures collected and analysed through the REWARD programme. As a general rule, timeseries data were not available for the environmental data with data instead limited to a single year (1998/9).

Overview of the RES economic scenarios

Three economic scenarios are provided:

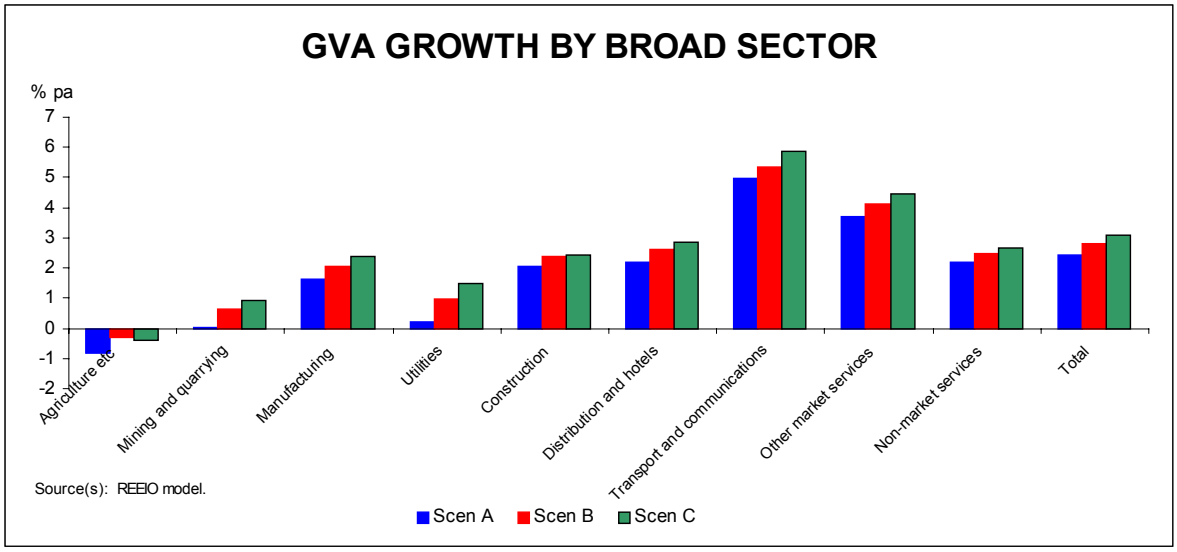
Scenario A (trend)	a policy neutral, or base case that reflects longer-term structural trends and assumes that these will continue
Scenario B	a trend-based projection, but one that reflects the recent upturn in the economy and the assumption that this, rather than the trends seen over a longer time period continue
Scenario C (transformational)	an 'aspirational' scenario that includes the assumption that productivity levels in service sectors improve to match those of better performing regions.

It is the differing sectoral pattern of growth, as well as the rate of growth, that will determine the relative environmental impact of each scenario.

Economic outcome

Under the scenarios, long-term growth in the Y&H economy averages between 2¼-2½% pa and just over 3% pa. In each scenario the strongest growth is in transport & communications (5-6% pa) followed by financial & business services (3.75-4½% pa). Growth in manufacturing is expected to be among the weakest in the economy in all scenarios.

Comparing Scenario C and B, Scenario C has stronger growth in all sectors. The strongest additional growth is projected in some of the manufacturing industries (eg textiles and clothing & leather - though output here is still expected to contract, basic metals and metal goods,. Within services the strongest additional growth is in communications and financial services as well as miscellaneous (mainly leisure-related) services.



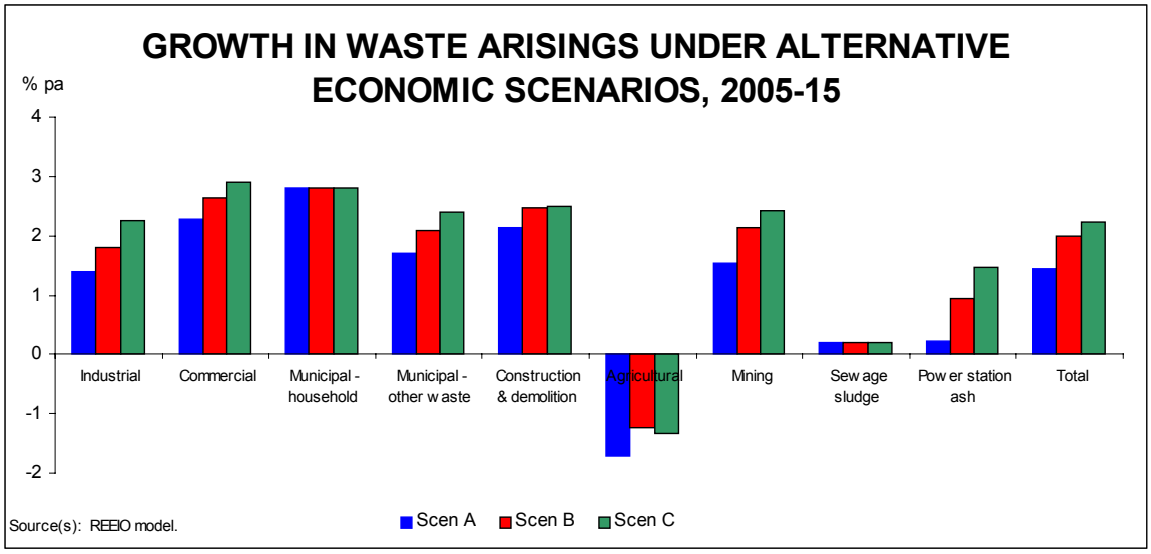
The assumptions for the future population growth in the region are the same for each scenario: the population is projected to rise by 0.2% pa over 2005-15 (by 2015 the population is almost 102,000 higher). The result of the population assumptions remaining the same within each scenario is that there is little (or in the case of waste, no) change in population-related environmental pressures.

Implications for waste

Waste arisings

There is little information with which to determine trends in waste characteristics of industry production, though there is information to inform possible trends on the type of inputs to production of different industries. The trends shown in the REEIO baseline take into account the changing sectoral pattern of production in the region and trends in the inputs to production process. No change is assumed in the additional efficiency with which the inputs are used.

In the scenarios waste arisings grow by between 1½% pa (Scenario A) and 2¼% pa (Scenario C). In each scenario household waste grows at around 2.8% pa on the assumption that per capita household waste increases at 2.6% pa. In Scenarios A and B household waste is the fastest-growing source of waste. In Scenario C the stronger growth in output from services means that commercial waste sees the strongest growth, at just under 3% pa.



The absolute increase in waste over the period is dominated by mining waste (accounting for three quarters of the increase) followed by construction and demolition waste. Despite the stronger growth prospects among services, and that commercial waste is expected to rise faster than industrial waste, the absolute increase in the former waste stream is only around 50-60% than of the increase in industrial waste.

Within the industrial and commercial waste streams, the strongest growth in each scenario is projected for hazardous waste, although the absolute increase in tonnage of hazardous waste is much smaller than that of inert or biodegradeable waste.

Waste management

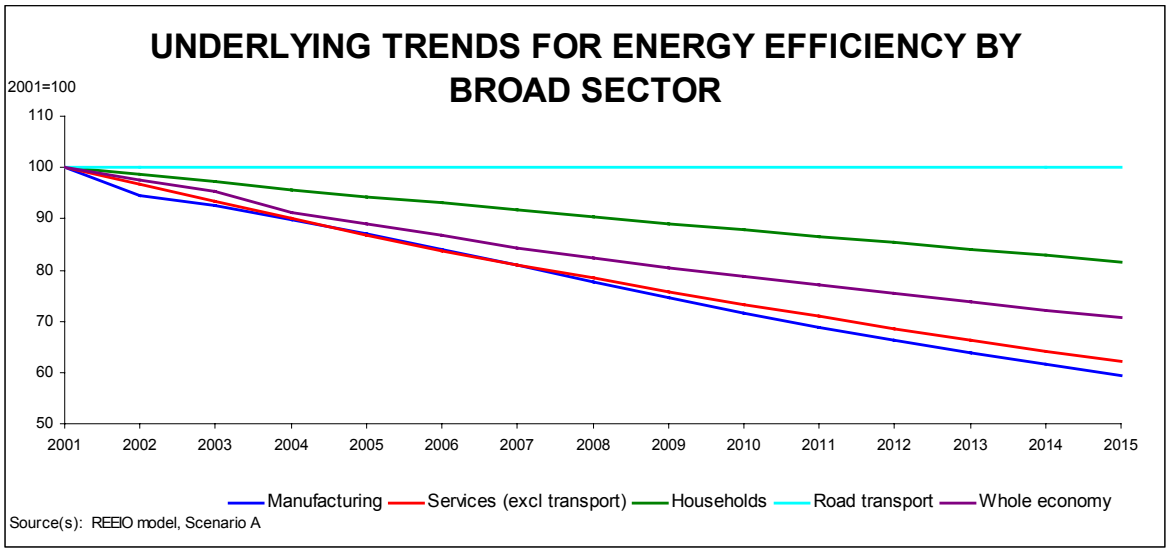
Without changes in the way waste is currently managed there is little variation in the pattern of waste management across the scenarios with increased waste entering each management route, with the exception of composting. The pattern of waste arisings described above would lead to large absolute increases in waste entering landfill, particularly inert landfill (this reflects that all mining waste in 1999 and that mining waste is projected to increase quite strongly, particularly in scenario C), and recovery processes other than thermal and recycling. The decline in waste entering composting routes in each scenario is a result of the importance of this route to biodegradable waste from agriculture, and the fact that agricultural waste is projected to decline alongside falling output in the sector.

Implications for energy demand

The assumptions for the trends in energy efficiency by sector are maintained in each scenario. The variation in projections is therefore the result of the change in sectoral growth prospects.

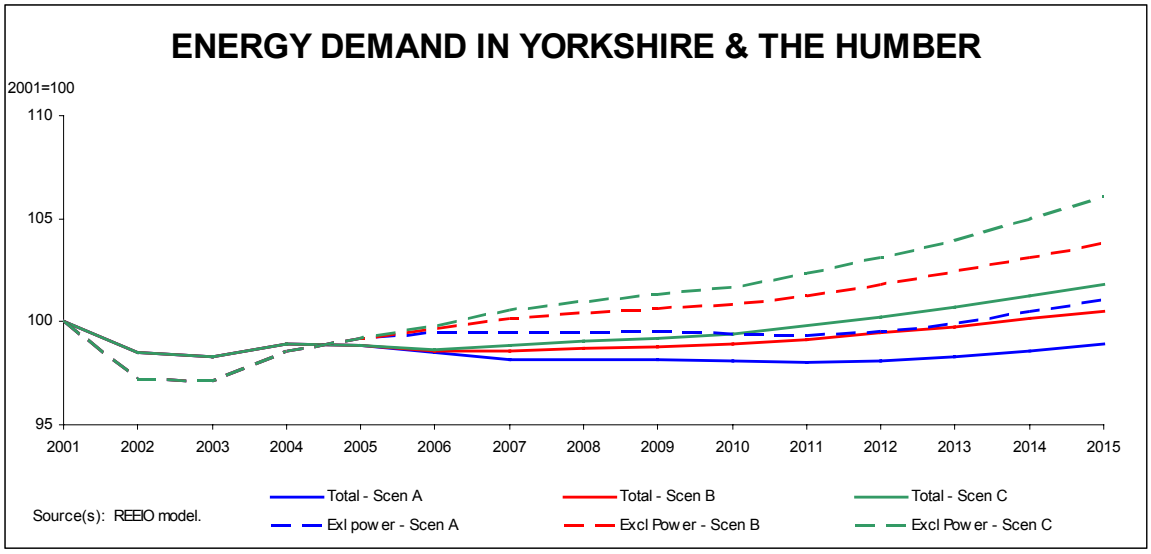
In the main, the trends are derived from expectations for national trends for detailed industries that were developed by Cambridge Econometrics. The most rapid gains in energy efficiency (energy use per unit of output) are projected for manufacturing, and particularly for the energy-intensive industries. These trends include an assessment of the impact of Climate Change Agreements. Manufacturing is assumed to achieve efficiencies of 3¼-4¼% pa (however savings in basic metals, a major user of energy are thought only likely to average only 3% pa). Services, which are typically less energy-intensive are thought likely to achieve improvements, at around 3½% pa. For energy use in households REEIO incorporates CE's

national trend of a rate of saving of around 1.5% pa in relation to household income growth. Demand for transport demand (measured by passenger and freight tonne kilometres) increases at the same rate as GVA. The baseline assumptions maintained in the three scenarios is for no change in modal split or in energy efficiency of vehicles.



The REEIO results show growth in total energy demand to range from flat in Scenario A to growth of ½% pa in Scenario C. However, the overall demand for energy in Yorkshire & the Humber depends greatly on the prospects for power generation as this activity accounts for perhaps 45% of total energy demand. Power generation is dominated by a small number of large plants whose production of electricity is largely unrelated to the demand for power from within the region. Decisions to extend or curb power generation within Yorkshire & the Humber therefore bear little or no relation to economic activity within the region and so projections for the scale of power generation, the type of fuel used and the associated emissions to air require a completely separate analysis of the factors driving these decisions. Indeed, consideration of the demands for energy when power generation is excluded perhaps gives a better indication of the underlying impact of the region's economic growth. The REEIO model provides a separate module into which plant-specific assumptions for power generation, including the prospect of additional renewables generation, can be entered, but we have not sought to develop such assumptions for future power generation in the region in these scenarios, and we assume instead that activity at power plants remains unchanged through the forecast.

The long-term growth in overall energy demand (excluding that from power stations) lies within a range of 0-½% pa. In each scenario the demand for energy from industry and commerce is projected to decline and that from households and from transport to increase. As a result, by 2015 demand for energy from both households and transport is projected to exceed that from manufacturing in each scenario.

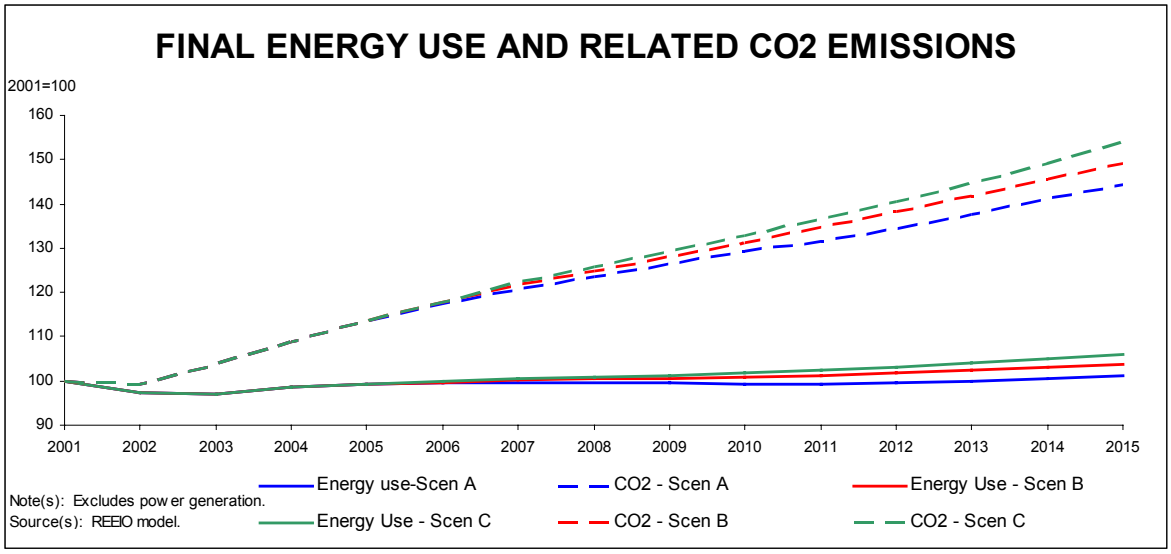


Household energy demand rises by between 0.8-0.9% pa in the scenarios - with what little variation there is across the scenarios the effect of stronger growth in average household incomes. The demand for energy from transport rises in line with economic growth (2¼-3% pa depending on scenarios).

The effect of the stronger economic growth in manufacturing in Scenario C compared to Scenario A is to reduce the rate at which the sector's energy demands fall from -2¼% pa to not quite -1½% pa. In the case of services, the effect of the pattern of stronger growth in Scenario C is to remove much of the fall in energy demand by the sector projected in Scenario A. The rate of growth (actually decline) moves from almost -1% pa in Scenario A to only -0.3% pa in Scenario C.

Implications for emissions to air

The growth in total (energy-related) emissions to air is projected to be just over 1% pa in Scenario A, rising to 1½% pa in Scenario C although the pattern of the growth between particulates does not vary greatly between scenarios. The volume of emissions is dominated by carbon dioxide, however in each scenario there is stronger growth for carbon monoxide (CO) and VOCs for which road transport is the principle source. Total GHG emissions (in terms of tonnes of CO2 equivalent) is projected to grow a little slower than total emissions, at between 0.9-1.3% pa). Growth is stronger among HFCs, PFCs and SF6, although the increases are small in comparison to the projected increases in direct CO2 emissions. Emissions of CO2 are projected to rise more rapidly that energy use. This reflects the increasing importance of road transport in overall energy demand that is expected, and the fact that road fuels are more CO2-intensive than natural gas (which is more important to non-transport energy demand).

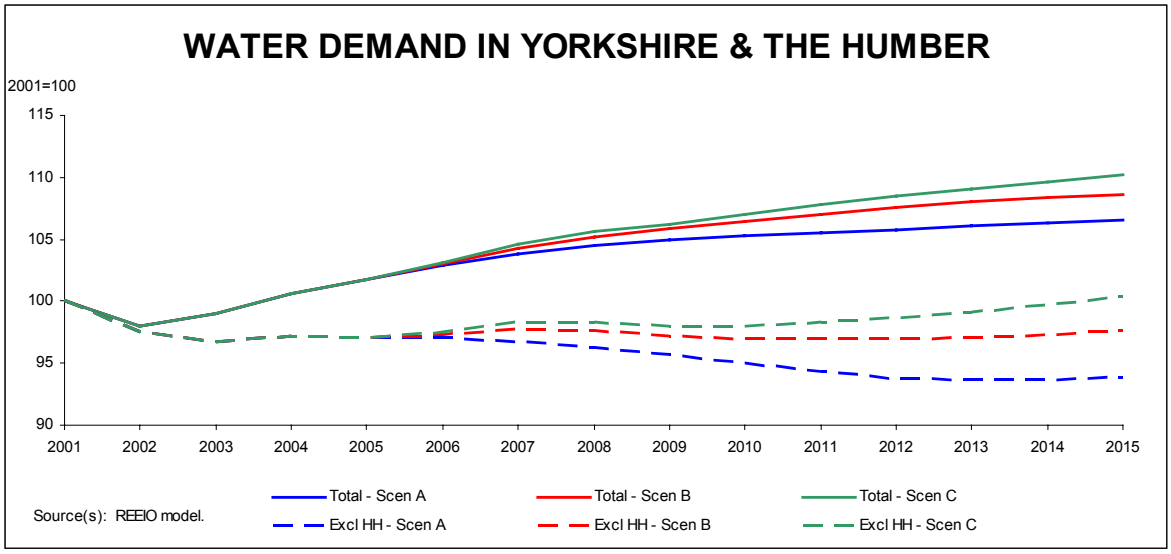


Implications for water use

There is little by way of comprehensive data in water use in the region. The baseline data in REEIO makes use of estimates of water demand by sector from a national survey. Data for water use by households is constructed from returns to Ofwat in which per capita water use by metered and unmetered households are distinguished. These data indicate that almost half of water use comes from households, with manufacturing accounting for a further 40% of the identified total. Services account for a comparatively small proportion of overall water use.

Water-intensity, like energy-intensity, is generally higher in manufacturing industries, with some particularly water-intensive. The baseline trends for water efficiency in REEIO have future gains in efficient use of water being greater in these sectors.

In the scenarios the growth in water demand rises by ½-¾% pa. The strongest growth is projected to come from households, with demand rising by around 1¼% pa. However, the demand for water from households does not vary between scenarios as the population projections are the same in each case. In Scenario A, the weakest economic scenario, the prospects for industry growth are insufficient to overturn the effects of the underlying trends in water efficiency. Demand by manufacturing and services is projected to fall by -0.1% pa and -0.2% pa respectively. The additional growth assumed in Scenarios B and C is sufficient to lead to rising demand for water in both manufacturing and services, with the growth from manufacturing stronger. In scenario C, the strongest growth scenario, the demand for water from manufacturing rises by ¾% pa while that from services rises by just under ½% pa.


WATER DEMAND IN YORKSHIRE & THE HUMBER
2001=100
115
110
105
100
95
90
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
Total - Scen A
Total - Scen B
Total - Scen C
Excl HH - Scen A
Excl HH - Scen B
Excl HH - Scen C
Source(s): REEIO model.