TEES VALLEY JOINT STRATEGY UNIT

NORTH & SOUTH TEES INDUSTRIAL DEVELOPMENT FRAMEWORK

November 2009
FSE97402A.2170

Prepared by
Parsons Brinckerhoff Ltd & Genecon
Manchester Technology Centre
Oxford Road
Manchester
M1 7ED

Prepared for
Tees Valley Joint Strategy Unit
Melrose House, Melrose Street,
Middlesbrough
TS1 2XF

GENECON
ECONOMIC AND SPATIAL REGENERATION
Joseph's Well, Hanover Walk, Leeds LS3 1AB
Tel 0113 2452200 Fax 0113 2450110
www.genecon.co.uk

Report Title	**:**	**North & South Tees Industrial Development Framework**
Report Status	**:**	**Version 2**
Job No	**:**	**FSE97402A**
Date	**:**	**November 2009**
Prepared by	**:**	**Daniel Dufton, Mark Reynolds, Ben Pretty..**
Checked by	**:**	**Sarah Claxton .....**
Approved by	**:**	**Paul Noble .....**

CONTENTS

EXECUTIVE SUMMARY

North South Tees is home to a hugely important and diverse mix of industrial operations and support services. Contributing significant economic benefits at all levels, it is made up of a collection of clusters of strategic national significance and globally important scale.

A framework to maximise future industrial development in the North South Tees area has been created. Constraints to and opportunities for development have been identified and analysed. The most important elements of the framework are summarised below:

1) *There are enormous opportunities for the area to benefit from investment within the bulk chemicals, waste, energy, steel and advanced engineering sectors. In addition, the capture, transmission and storage of carbon dioxide from existing and future operations presents both a means of managing emissions and a 'unique selling point' for the area.*

2) *The adopted strategy must protect and support existing manufacturing operations in addition to delivering investment in technologies of the future in the priority sectors above. Without the support for existing operations, future investment opportunities may be lost.*

3) *A team to lead the development and delivery of the strategy is required. Intense and sustained efforts to promote the area, attract target sectors and overcome constraints are the critical functions of the team.*

4) *The needs of future strategic projects such as improvement of physical infrastructure and services provision must be designed and delivered to help attract the sectors identified in (1) above.*

5) *Opportunities for private sector investment are inherently linked to effective public sector intervention as described in sections 1-4 above.*

The chances of continued industrial success for North South Tees will be greatly increased by immediate and simultaneous implementation of the proposals stated in 1-4 above. This will involve a new level of cooperation between all parts of the public and private sectors.

PROJECT BRIEFING

INTRODUCTION

A prime objective of Tees Valley and One North East is to support and develop world class process, energy, steel and port industries. The North South Tees Industrial Development Framework project was conceived to understand how this ambitious goal can be achieved. The project aims to understand when investments may be made, where they should be targeted, what constraints exist and how these may be mitigated.

This involved assessment of assets and infrastructure focussing on land, energy, utilities (including pipelines and product storage cavities), flood risk, contamination, health and safety consultation zones, ecology, transportation and logistics. Data collected has been imported to a Geographic Information System (GIS) which accompanies this and the stage 1 reports.

The findings of this study are fundamental to the long term economic development of the study area, the Tees Valley, the region and the area's contribution to national economic prosperity.

The North South Tees area offers enormous potential for continued industrial success but public sector support is critical to maximise the wide ranging opportunities as the constraints will not be addressed alone by the existing private sector community of land owners and operators.

BACKGROUND

The study area, which includes some 9,000 hectares of land, is dominated by the lower reaches of the River Tees estuary.

Land within the study area includes active and available industrial land (of all classes), active and available port/wharf related land, active and disused landfills, protected sites/areas of ecological significance and minor residential/agricultural areas. It has a rich and diverse history of manufacturing-related development starting from rapid growth in the early 19th century (during the industrial revolution) following the sequential discovery of conveniently located natural resources such as iron, coal, salt/brine and finally, in the 1960s, North Sea oil.

In addition to public utilities, the rail and road network and the port, a significant proportion of the study area's private infrastructure was installed by large companies (some of which has now been acquired by other corporations) such as ICI, British Steel and Phillips Petroleum.

The study area can be divided into the following key zones:

- Wilton
- South Tees (Corus, Teesport and the South Bank area)
- Billingham
- North Tees/Seal Sands (from Port Clarence up to the Conoco refinery)
- Greatham and Graythorp.

The earlier model for the Tees Cluster of advantaged feedstocks (North Sea oil and gas) and world leading delivery (ICI) has largely disappeared. However, the cluster maintains a range of desirable assets for future development such as physical infrastructure, energy and heat, integrated assets and technology, logistics, workforce (skills), hazard management capability, a supportive local community and effective, close-knit networks. There is also a high degree of integration of certain existing operations provides both pros and cons.

Benefits of the existing operations in North South Tees include:

- Significant GVA/GDP/tax revenue;
- Employment for the industry itself and significant indirect employment in the supply chain, utilities and support services.

Given current economic and market conditions any strategy needs to be two pronged – (i) Survival and safeguarding key assets in the short term and (ii) a longer term vision and delivery plan which gives a strategic direction for the area to maximise national and regional economic benefits.

CONSTRAINTS AND LAYOUT ASSESSMENT

In order to assess constraints and opportunities, work has been undertaken to identify potential future 'sector' and 'business' opportunities. These have been tested through two alternative development scenarios as follows:

A. a negative weighted growth path which assumes a mix of nine project concepts in addition to confirmed investments and the continuation of existing trends in current industrial activity;

B. a positive weighted growth path which assumes a mix of seventeen project concepts in addition to confirmed investments and the continuation of existing trends in current industrial activity.

The project concepts include a range of activities including renewable, fossil fuel and nuclear energy generation (with one example including carbon capture and storage (CCS) and associated development of carbon dioxide transmission infrastructure), energy from waste, an eco park, a papermill, bulk import, heavy crude oil processing and expansion of Teesport (the Northern Gateway container terminal).

The stage 1 report series assess specific constraints and concluded that the following groups are the most important:

Physical Constraints	**Other Constraints**
Private land ownership	World demand levels / economic conditions
Land condition	Access to finance and markets
Electricity grid	Non strategic sites for owning companies
Access to pipelines	Leadership role and coordination
Health & safety consultation zones	Information
Flood risk	World demand levels / economic conditions
Services costs (e.g. energy)	Access to finance and markets
Protected habitats sites	

In order to assess where in the study area new developments should be located, a database of over 70 project concepts has been developed based on market opportunities and including physical needs (energy, utilities, logistics and land) and location drivers. This exercise served to highlight key strategic sites and also how a strategic layout could work best through grouping processes and technologies to obtain synergistic benefits. From this database and the location drivers, coupled with existing operations, a land use plan has been developed (Appendix 2).

PROPOSED INTERVENTION

Following analysis of Stage 1 constraints and opportunities, a series of linked proposed public sector intervention projects have been identified and are classified in four categories as follows:

1) Develop and deliver ten 'sector development plans' (SDPs) for North South Tees where specific opportunities have been identified. It is intended that each SDP will articulate market analysis, identify sub sectors of importance to North South Tees, carry out analysis of existing operations and possible investments, obtain buy-in from agencies and authorities and develop an action plan of organisations to target, marketing strategy and objectives. The ten sectors selected are offshore wind, marine, oil and gas fabrication and decommissioning, port-related, carbon capture and storage network, power generation, bulk chemicals, biotechnology, biofuels, waste/resource recovery and steel. Collectively, there is an opportunity to implement a programme of initiatives across industry sectors which taken as a whole would demonstrate transitioning an entire industrial area to low carbon operation, creating a Low Carbon Industrial Transition Economic Area (LCITEA). A number of the key sectors interact as shown in the Figure 1.1 below.

2) Review and improve leadership, governance and coordination. There is considered to be a need for a dedicated 'executive' leadership function, to drive through initiatives, deal with conflicts and issues as they arise, represent stakeholders if required and to provide clarity on roles and responsibilities in relation to items i – xi below. Moreover, given the numerous agencies and authorities with stakeholder interests in the study area, a strategic task force is recommended to improve coordination and present a 'joined up' message to private sector operators and potential investors. The functions that are required are described below:

i. Ownership and coordination of sector development plans;
ii. Ongoing strategic intelligence to assist with key decision making and lobbying. Coordination of spatial development and the study area strategic spatial plan
iii. Provision of available sites for development;
iv. Provision of knowledge & expertise to operators, investors and developers to 'de-risk' projects in relation to a range of issues e.g. grant access, electrical connection);
v. Coordination of funding arrangements for off site infrastructure;
vi. Support to key existing operations and development projects to assist the private sector to achieve its objectives;
vii. Coordination, negotiation and communication between landowners, operators and agencies to identify mutually beneficial opportunities and resolve issues.
viii. Promotion, branding and lobbying. An extremely important function to improve the image of the study area, this should be allied to the sector development plans.
ix. A medium to long term plan to clear redundant sites;
x. Agreement of individual private sector contributions by industry to a Low Carbon Industrial Transition Economic Area.

These functions will need to be considered as part of the review of the staffing arrangements for Tees Valley Unlimited.

3) Local Energy and Site Infrastructure Proposals. These five related projects include:

i. Improving availability of key wayleave corridors either through investment or influence to provide access to pipeline corridors for key operators and investors;
ii. Exploring options for integrating energy use, especially at North Tees / Seal Sands
iii. Development of district heat networks
iv. Site Energy Optimisation, through provision of specialist external expertise (where required) to assist industry in optimising energy production and use.
v. Influencing service costs in order to obtain competitive rates through assistance to operators and/or service providers by financial influence or lobbying.

4) Transport and Logistics. These projects include:

i. North South Tees Roads - review and monitoring of local road network and monitoring/coordination of public and private sector investments;
ii. Development of a River Management Database as a strategic tool to de-risk capital dredging, if and when required;
iii. North South Tees Rail Interventions – including formation of a rail users group to identify opportunities for increased use of rail sidings and rail heads and to assess connectivity.

This programme of implementation, combined with the critical project development work of CPI and the skills and expertise of the advanced engineering sector, aims for long term economic re-positioning, drawing on existing strengths and linking to new sector opportunities. The potential outcomes and benefits of the framework are considered to include the delivery of national and regional economic and climate change policy objectives and securing improvements to the physical environment.

Assessment of interventions in terms of urgency and importance indicates the following high priorities:

- Agree and implement the overarching leadership and coordination function including developing a clear and consistent message – with effective engagement with regional and national bodies;
- Specific support to key development projects;
- Agree the land use planning protocol – protect the key sites and coordinate infrastructure improvements;
- Compile sector development plans for bulk chemicals, steel, carbon capture and storage, offshore wind and oil/gas/marine decommissioning.

Figure 1.1 – Sector Interaction

SECTION 1

INTRODUCTION

1 INTRODUCTION

1.1 Purpose of the Report

1.1.1 The North and South Tees Industrial Development Framework Project was commissioned by the Tees Valley Joint Strategy Unit (TVJSU) and its partners in December 2008. Stage 1b of this project consisted of a general 'audit' of the area to understand its existing asset base, infrastructure provision and sector specific issues, which culminated in the preparation of a series of technical/physical constraints reports by Parsons Brinckerhoff (PB) – see Section 8.

1.1.2 This report seeks to build upon the key findings of Stage 1b to identify opportunities for the study area and the key challenges/constraints that will need to be addressed if current strengths can be safeguarded and investment prospects realised. Analysis of opportunities and constraints has been carried out to identify key priority projects and interventions that could make a difference in this strategically important area. These projects are described in detail along with the wider benefits and potential outcomes of such interventions.

1.2 Context

1.2.1 The study area is located largely at the estuary of the River Tees. It includes some 9,000 hectares of land used for a range of purposes including industrial, port/wharf related, active and disused landfill, protected sites/areas of ecological significance and minor residential/agricultural. It has developed into a rich and diverse manufacturing 'hot spot' since the Industrial Revolution due to the readily available supply of natural resources in the local area but since the discovery of North Sea oil in the 1960s, it has become renowned for its expertise and critical mass within the chemical and petrochemical processing sector.

1.2.2 For the purposes of this project, the study area has been divided into the following key areas:

- Wilton;
- South Tees (Corus, Teesport and the South Bank area);
- Billingham;
- North Tees/Seal Sands (from Port Clarence up to the Conoco refinery); and,
- Greatham and Graythorp.

The Stage 1b reports prepared by the PB team[1] collectively establish the key issues, constraints and challenges facing the study area. This Development Framework considers the potential sector growth opportunities in greater detail and the priority interventions that are required to support future economic growth.

[1] The Stage 1b Reports comprise the following: Asset Report 1 – potential land contamination and mitigation, public and private utilities, water courses, water depths, cavities and pipelines; Asset Report 2 – archaeology; Asset Report 3 – flood risk; Asset Report 4 – health and safety; Asset Report 5 – Electrical Asset Report; Transportation Report (roads, rail and logistics); and Energy Report – see also Section 8.

1.3 Report Structure

1.3.1 This report is presented in the following sections:

Section 2: sets out the rationale for intervention in the study area;

Section 3: identifies the strategic opportunities presented by the area;

Section 4: introduces the approach to the strategic framework including the area's proposed zones and layout

Section 5: presents the key intervention projects

Section 6: identifies the potential outputs and impacts of the above projects; and,

Section 7: discusses delivery and recommended 'next steps'.

SECTION 2

RATIONALE FOR INTERVENTION

2 RATIONALE FOR INTERVENTION

2.1 Introduction

2.1.1 The North and South Tees study area is home to a range of key clusters in the chemical sector including refining, petrochemicals, speciality and fine chemicals, plastics, biotechnology and pharmaceuticals. These are all united to a greater or lesser extent by their reliance on chemistry and all fall under the wider 'chemical' or 'process' industry sector. The study area is also renowned for its contribution to national and global steel markets given that it is home to Corus plants such as Teesside Cast Products and Teesside Beam Mill (now owned by the Tata Steel Group).

2.1.2 Founded on the basis of a business model to exploit locally available advantaged feedstocks (coal, oil and gas) via ICI and British Steel, the operations within the North South Tees Study area face new challenges following gradual denationalisation and/or divestment by large corporations and also the current economic downturn. Safeguarding existing activity is considered critical both to protect existing economic contribution, but perhaps more importantly to enable challenges for the study area, such as focussing upon securing a sustainable and competitive future through transition to the growth of new sectors, to be given the best chance of succeeding.

2.1.3 This section sets out the rationale for public sector intervention within the study area, in terms of its strategic importance to the region and beyond and in light of the current challenges and threats that it faces. It also considers the equity and policy rationale for intervention, highlighting the sub-regional importance of economic activity within the North and South Tees area.

2.2 The Importance of Manufacturing Industry in North South Tees

2.2.1 In the North East region, c.40,000 people are employed directly within the process industries, most of them on Tees Valley, with a further 280,000 employed indirectly through the supply chain[2]. Generating sales in excess of £10bn per annum[3], which represents over 25% of the region's GDP (Gross Domestic Product), the North-East process industry based on Tees Valley is a key driver of not only the regional, but also the national economy.

2.2.2 Based on 2007 data, there were 200 chemical, pharmaceutical, speciality and biotechnology companies in the region providing one-fifth of the UK's production capacity for the process industries overall. Furthermore, the North East region is home to 58% of the UK's petrochemical industry, 35% of its pharmaceutical industry and a major proportion of its speciality chemical sector. The petrochemicals presence in the Tees Valley area is the largest integrated chemical complex in the UK in terms of manufacturing capacity and the second largest in Western Europe after Rotterdam. The area is also home to Europe's largest hydrogen network and Teesport is the largest chemical handling port in the UK[4].

2.2.3 At the UK level, the chemical and chemical-using industries are critical to the UK economy, contributing over 60% of the UK's total GDP. These industries have an annual turnover in excess of £700bn and directly employ over 2.2m people[5]. The

[2] http://www.tcetoday.com – Institution of Chemical Engineers – Feb 2009 Issue
[3] NEPIC – North East Process Industry Cluster data from http://www.nepic.co.uk/
[4] http://www.northeastengland.co.uk/home/inward-investment/key-sectors/chemicals-and-process-industries/facts-and-figures.aspx - ONE Inward Investment Website
[5] Chemistry Innovation Knowledge Transfer Network – April 2009 newsletter

chemical process industry sector is now the UK's highest exporter with exports totalling c.£30bn and is the only manufacturing sector with a positive trade gap[6]. As the key driver of this industry nationally, the process industries at Tees Valley therefore play a critical role within the national economy.

2.2.4 Table 2.1 below highlights some of the major investments that have been made in the Tees Valley process industry in recent years, which highlights the commitment from major international companies to the Tees Valley:

Table 2.1: Major Recent Investments in Tees Valley Process Industry

Ensus – largest wheat-based bioethanol plant in Europe	£250m
Sabic – low density polyethylene plant and aromatics refurbishment	£200m
BOC – UK's largest hydrogen plant supply H2 and steam to Huntsman	£100m
Biofuels Corporation – world's largest biodiesel facility	£80m
Avecia Biologics – new manufacturing/lab facilities, Billingham	£70m
Huntsman Tioxide – upgrade Billingham and Greatham works	£65m
Sembcorp – new wood burning power unit, Wilton	£60m

[Source – Tees Valley City Region Development Programme, 2006]

2.2.5 In addition to the above a £2bn crude oil processing plant is planned within the study area to process heavy crude oil, which would represent one of the largest single investments in the process industry in the UK in the last twenty years. The plant will be one of Europe's largest hydrogen plants and could 'kick-start' the development of a significant hydrogen economy.

2.2.6 The study area is home to the Wilton Centre, which is the largest process industrial research centre in Western Europe in a complex totalling 500,000 sq ft. The centre accommodates 40 businesses, many of which are global leaders and all of which are involved in innovation, research and product development in the process industries. The Centre for Process Innovation (CPI), established by O-NE to stimulate and drive innovation within the process industries, is also located within the Wilton Centre and has strong links with the region's universities. CPI is the home of the £6.5m National Industrial Biotechnology Facility, the National Particulates Network, Renew and the Low Carbon Energy Development Centre. Also, the National Skills Academy for the Process Industries, an employer-led centre of excellence, is based at Teesside University and provides world-class opportunities for both new entrants and existing workers in the sector to learn new skills.

2.2.7 The attraction of inward investment is considered critical to enhancing regional competitiveness and as such is a key objective within the 2006-2016 Regional Economic Strategy (RES) for the North East. Tees Valley and its 'cluster' of process-related industries play a key role in achieving this, through serving as a 'magnet' for inward investment due to the existing economic asset base and infrastructure provision. Tees Valley is home to a range of large multinational process businesses, a sample of which is identified below:

[6] NEPIC Directory 2009-10

- ***Sembcorp*** – Singaporean provider of utility solutions to meet the needs of the chemical and petrochemical sectors;
- ***Sabic*** – Saudi Arabian manufacturer of petrochemicals – one of the world's five largest;
- ***Ineos*** - UK based global chemical manufacturer - world's third largest chemical company;
- ***Huntsman*** – US based global chemical manufacturer; and,
- ***Dow*** – US based global chemical manufacturer.

2.2.8 The presence of these large multinational companies within the process industry sector in Tees Valley reinforces the strategic role of this area and its economic asset base to both the regional and national economies. It is evident that the process industries are a key driver of the UK economy and that the Tees Valley 'cluster' is the key driver of these process industries.

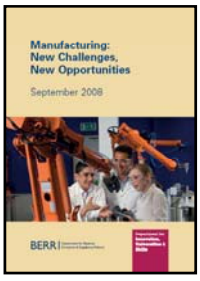
2.2.9 In addition to the process industry sector, the value of the local steel industry (i.e. Corus) to the local, regional and national economies must be recognised. It is estimated that Corus' Tees Valley operations directly employ circa 2,000 employees on Tees Valley with a further circa 2,800 indirect and induced jobs supported via the supply chain[7]. This underpins the significant importance of this sector/business operation to the study area and beyond.

2.3 Economic Development Policy Rationale

2.3.1 The extent to which public sector policy objectives reflect the importance of the Tees Valley and its processing/manufacturing base are important factors when considering intervention. This section explores the relevant current policy documents at national, regional, sub-regional and local levels to identify alignment with intervention in this study area[8].

2.3.2 In its report "Building Britain's Future – New Industry New Jobs", April 2009, the Government sees as national priorities the development of three sectors which are the key to the future economic development of the Tees Valley – the low carbon, digital and industrial biotechnology sectors.

<u>Manufacturing: New Challenges, New Opportunities (September 2008)</u>



Developed by the Department for Business, Enterprise and Regulatory Reform – BERR (now the Department for Business, Innovation and Skills – BIS), this strategy builds upon the 2002 Manufacturing Strategy to set out an ambitious new vision for a "*globally competitive manufacturing sector that leads the world in capturing higher value components of the global value chain, while consolidating areas of existing comparative advantage, including activities within high technology manufacturing*". It recognises that manufacturing is 'central to our economic success' through creating wealth and sustaining jobs. It identifies that manufacturers face significant challenges in the short term due to the current economic downturn and in the longer term due to intensified processes of globalisation. However, it recognises the significant opportunities that longer term changes in the global

[7] *Extracted from a 'Socio-economic analysis of North East Industrial Carbon Emissions' prepared by GENECON for O-NE in May 2009.*
[8] *No relevant economic development / regeneration strategy appears to be available for Hartlepool/ Middlesbrough Councils*

economy may offer in new and growing markets, which the UK is well placed to exploit given its global connections, flexible labour force and 'light touch' regulatory environment.

2.3.3 The strategy identifies the critical importance of manufacturing in that it contributes over £150 billion per annum to the economy, accounts for over half of the UK's exports and 13% of its GDP, and is the world's sixth largest manufacturer by output. It also recognises that the chemicals and plastics industries are a significant 'British manufacturing success story', due to a substantial net trade surplus and continued significant inward investment. It states that BERR has invested almost £50m over the past five years in new plants in the basic chemical industry in the north-west and in Tees Valley to help ensure the future of these key clusters.

2.3.4 The strategy identifies five inter-related dynamics that have been and that will continue to be critical in reshaping global manufacturing and that UK manufacturers must therefore respond to. These are set out below:

- Increasing prevalence and complexity of global value chains;
- Accelerated pace of technology exploitation;
- Growing importance of investment in intangibles such as R&D;
- Increased recognition of importance of investment in people and skills; and
- Move to a lower carbon economy.

2.3.5 The strategy focuses support on helping UK manufacturers to meet these challenges and seize the new opportunities they are creating. The proposals within this Development Framework fully support the need to address the above challenges within the study area, including addressing physical, sectoral growth and leadership/governance issues.

Meeting the Energy Challenge – A White Paper on Energy

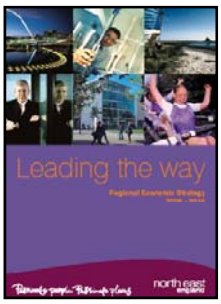
The White Paper, prepared by the Government in May 2007, provides the framework for action that will address the key challenges identified by the 'Energy Review'[9] - namely the need to work closely with other countries to tackle climate change and enhance the safety of the nation's future energy supply. These core objectives need to be considered against the increasing need for additional energy provision - to counteract the closure programme for many coal and nuclear power stations but also increased energy demand as the economy grows.

2.3.6 The White Paper identifies that "*urgent and ambitious action is required at home and abroad*" to save energy, develop cleaner energy supplies and secure reliable energy supplies. The White Paper recognises that the UK has some of the richest renewable resources in Europe, particularly in relation to wind and that their effective 'capture' can contribute strongly to the key objectives set out above. As a result, the UK Government has set a target of increasing renewable electricity generation to 10% of total generation by 2010 and 20% by 2020 - the latter of which also meets the European Council agreed target of a 20% renewable share of overall EU energy consumption by 2020.

[9] *The Energy Challenge - dti Energy Review, July 2006*

2.3.7 To place this in context, by 2006 the total electricity consumed that was supplied from renewable sources in the UK was approximately 4%. This figure will continue to rise over the coming years with projected renewable capacity increases but there are significant challenges in meeting this target. The White Paper recognises that "*the emerging technologies, like offshore wind and biomass, that we will rely on for the next phase of renewable electricity deployment, are proving more expensive than anticipated*". The White Paper highlights that other mechanisms beyond the current Renewables Obligation[10] will be needed to achieve the UK government's 20% aspiration, recognising the costs and risks associated with technology development. The key messages from the White Paper are clear - the UK needs to set ambitious targets for renewable energy supply, but the challenges are significant and will require government intervention to assist the private sector. This has implications for the study area in that there are several opportunities to provide additional energy from renewable sources to support the objectives of this White Paper. These potential opportunities are discussed further in Section 3.

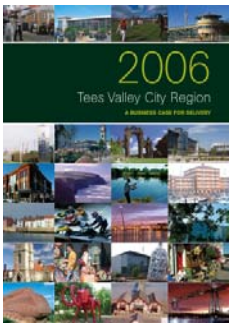
"Leading the Way" – the Regional Economic Strategy - 2006-2016



Prepared by O-NE, this key strategy document sets out the regional economic objectives and priorities for the 10 year period to 2016 for the North East region. Within this document, three 'pillars' of 'industrial opportunity', 'energy and the environment' and 'process industries' are recognised as high value and growing industries within which the region could achieve a global competitive advantage in the future.

In relation to 'energy and the environment', development of the region's renewable energy capabilities, particularly in relation to wind power generation and other micro-renewable generation technologies is a key objective. In terms of the 'process industries', the existing business and infrastructure asset base, including the hydrogen economy, bio-processing and nanoparticles and advanced functional materials are recognised as considerable opportunities. Growth of the provision of appropriate and high quality sites, business premises, ICT connectivity and transport infrastructure is a key objective.

Tees Valley City Region Business Case for Delivery (updated Sept 2006)



Prepared by the TVJSU in response to the Northern Way Growth Strategy, this Plan seeks to enhance the economic performance of the Tees Valley. It recognises that the Tees Valley economy is based upon three principal components – the petrochemical cluster at Wilton, Billingham and Seal Sands, the Redcar Steel

[10] *The Renewables Obligation is a mechanism whereby those energy providers delivering renewable sources of supply take a share of a financial subsidy, provided by others paying a 'penalty payment' for each MWh not generated from non-renewable sources*

Complex (Corus) and Teesport. The Plan sets out a range of economic challenges facing the sub-region – some of which are identified below:

- to continue the rise in employment in the Tees Valley;
- to encourage manufacturing industry to innovate and improve its productivity;
- to increase the stock of firms in the Tees Valley;

2.3.8 To address these challenges, the Plan sets out a forward strategy based upon its existing economic strengths, some of which are outlined below:

- developing further the world class chemicals industry;
- realising the potential for an energy economy based on renewable energy and hydrogen;
- building on infrastructure/expertise in resource management including industrial symbiosis and technologies that convert waste into secondary raw material and energy; and,
- developing the port and the potential for the river as an economic asset.

2.3.9 The Plan recognises the critical importance of the chemical sector to the Tees Valley and suggests that in order to remain competitive, support is needed where there are strategic investments and opportunities for integration with competitive energy/waste investment which will benefit both. Utility provision and skills development are both seen as 'critical' factors which could determine the future competitiveness of this sector in Tees Valley.

2.3.10 In terms of the energy potential of the area, the Plan recognises the close relationship between the chemical and energy sectors, given that both use the same feedstock and energy is a major cost in the production of petrochemicals. It seeks to develop Tees Valley into a world class centre for low carbon and alternative energies, based upon developing the potential industries related to hydrogen, biomass, biofuels, carbon capture and storage and others such as the manufacture of wind turbines.

2.3.11 There is clear alignment between the content of this North & South Tees Development Framework and the aims and objectives of the Development Plan. The need for support to target priority RES sectors in the sub-region, to promote its longer-term competitiveness and to adopt a transition to a low carbon economy are key elements of the Framework (see section 3-7).

<u>Regeneration Strategy for Stockton Borough 2007-2012</u>

Developed by Stockton-on-Tees Borough Council, this Strategy sets out a comprehensive vision for the regeneration of the Borough, which incorporates a large part of the study area. It identifies key ambitions for the Borough, including the maximisation of key economic assets such as the river and port, major employment development around the Tees and the promotion of the chemical and logistics sectors as key growth sectors.

2.3.12 It seeks to re-establish the chemical industries as a cluster on the North Bank of the Tees, which it also sees as having the potential as a location to accommodate renewable energy industries including biofuels, hydrogen, wind and waste recovery/recycling. It recognises the need to identify sufficient development land

suitable for speciality chemicals/petrochemicals use, particularly at Billingham, North Tees and Seal Sands in the medium-term. It seeks to support projects with the potential to extend the availability of major feedstocks, improve the competitive energy supplies and provide more integrated infrastructure for the North Tees chemicals cluster. It also seeks to encourage investment in workforce skills, particularly to graduate/technician level, to improve the skills base of the Borough's process industries and to attract more young people to the Borough.

Redcar and Cleveland Regeneration Masterplan (Draft) 2009

2.3.13 Currently in preparation, this Masterplan will set out a strategic vision and objectives for the future delivery of regeneration in the Borough of Redcar and Cleveland. Of particular relevance to this study, the economic strategy recognises the critical importance of the South Tees area to the wider industrial and economic infrastructure of the Tees Valley and North East region. In terms of promoting 'industrial excellence', three principal drivers within the South Tees area are identified including:

- ***Traditional industries*** – opportunities to build on some of the Borough's core economic assets through expansion and/or diversification of activity related to the port, steel and petrochemicals;
- ***Renewable energies*** – building on the range of initiatives currently underway and planned relating to energy generation and recycling and the opportunity to expand this sector within the economy; and
- ***Creating opportunities for business development and growth*** – limited site availability has been reported in the South Tees area as large parts of the area are in the ownership of a small number of landowners. Initiatives to increase access to land for development will support industry expansion and diversification.

2.3.14 The need for the establishment of an 'industrial taskforce' to oversee the area's future development and growth in accordance with a single vision is promoted, with the objectives of:

- establishing land use zoning within the South Tees area, to effectively plan and accommodate different uses within the area;
- public sector acquisition and remediation of land to support the delivery of zoning proposals; and,
- financial measures to stimulate investment as part of a 'Special Investment Zone' to create jobs and generate investor interest.

2.3.15 Specifically in relation to the petrochemicals sector, the strategy seeks to support ongoing activity by partners to achieve the vision that *"by 2024 South Tees will be known throughout the UK as an engine room of the industrial economy, with major facilities for the Ports, Petrochemicals and Power Generation sectors."*

The Coastal Arc – a Strategy for the Tees Valley (updated 2006/08)

2.3.16 Developed by Hartlepool Borough Council, Redcar & Cleveland Borough Council and O-NE, this strategy seeks to promote a range of initiatives to strengthen the coastal economy and achieve the 'renaissance, revival and regeneration' of the Tees Valley coast. The strategy recognises the importance of Teesport to the area and identifies that there remain a number of underused or derelict sites within South Tees which can be brought into productive use. It suggests that a strategic investment and regeneration programme is needed to redevelop these sites, to realise industrial opportunities and support the growth of the chemicals and new energy economy.

Summary

2.3.17 Public sector intervention within the study area, particularly within the key sectors, would support and promote current policy objectives at all levels. The process and energy-related industries are both recognised as key 'pillars' of opportunity within the RES and the value of the Tees cluster to the region in respect of these is identified. The strategic alignment of the Development Framework proposals with the current policy agenda therefore provides the underlying basis for ongoing public sector investment in the study area.

2.4 Equity and Competitiveness Rationale

2.4.1 In addition to the overriding strategic importance of the study area, there is also a compelling equity and competitiveness case for public sector intervention within the North and South Tees area, which comprises parts of the following four Local Authority (LA) areas:

- Stockton-on-Tees;
- Redcar and Cleveland;
- Hartlepool; and,
- Middlesbrough.

Competitiveness and Economic Performance

2.4.2 Competitiveness measures are increasingly used as key indicators of the economic position and performance of an area. According to the most recent 2008 Huggins' Competitiveness Index[11], all four of these authorities are within the 30% least competitive of authorities nationally, and Redcar & Cleveland and Hartlepool are both within the 5% least competitive nationally.

2.4.3 Gross Value Added (GVA) is also used as an indicator of economic performance and productivity and according to data from the Office for National Statistics (ONS), the GVA per head in the Tees Valley and Durham sub-region is £13,368, compared with £14,968 across the North East and £19,413 nationally (2006 data via ONS). This demonstrates the relative underperformance of the sub-region compared with the wider region and nationally.

Equity and Distributional Importance

2.4.4 The 2007 Index of Multiple Deprivation (IMD) is a widely accepted and up-to-date measure of deprivation, developed by the Department for Communities and Local Government (DCLG) to rank all Super Output Areas (SOAs) and Boroughs in terms of their relative deprivation based upon seven key domains[12]. An analysis of these rankings illustrates that, overall, the four boroughs are all within the 30% most deprived of the 354 boroughs nationally[13]. Furthermore, Middlesbrough is ranked as the 9th most deprived borough nationally. At the SOA level, 25% of the SOAs overall within the Tees Valley are within the 10% most deprived of SOAs nationally, indicating signs of significant relative deprivation. In Middlesbrough, nearly half of the SOAs are within the 10% most deprived nationally, and over a third are within

[11] The Huggins' UK Competitiveness Index has been designed as an integrated measure of competitiveness focusing on both the development and sustainability of businesses and the economic welfare of individuals and is published by Robert Huggins Associates.
[12] The seven IMD domains include the following: employment; income; crime, living environment; health and disability; education, skills and training; barriers to housing and services
[13] Based upon the rank of average score

Hartlepool. Furthermore, the IMD indicates that there are particular issues with employment and health deprivation at the SOA level, particularly in Hartlepool, Middlesbrough and Redcar & Cleveland.

2.4.5 There is an average unemployment rate across the four authorities of over 6%, compared with just over 5% regionally and slightly over 4% nationally[14]. At the onset of the 'credit crunch' the increase in unemployment in these areas was initially less than at regional and national levels, possibly due to the inherent lack of a local service sector economy base to be affected, however, once recession conditions developed, unemployment rates increased rapidly.

2.4.6 An available skilled workforce is a key determinant of local economic success and it is apparent that there is a skills deficiency within the four authorities. Data sources suggest that 15.5% of the working age population within the four authorities have no formal qualifications, compared with 13.8% regionally and 13.1% nationally. Furthermore, only 20.4% of the working age population is educated to NVQ4+ (degree or equivalent), compared with 24.3% regionally and 28.1% nationally[15].

2.4.7 It is evident that the study area is faced with a range of socio-economic or 'equity' and 'competitiveness' related challenges which it must seek to overcome if it is to enhance its economic position and performance. It currently has particular issues in relation to competitiveness, productivity, unemployment, deprivation and skills, as outlined above, and these must be addressed if it is to support regional growth and GVA objectives in line with the RES. The provision of new, or safeguarding of existing employment opportunities in the study area, will be critical to supporting local socio-economic conditions in the short-term. In the longer term, a transition to growth in low carbon sectors, for which the study area is well placed would assist in offsetting the risks associated with globalisation and access to cheaper feedstocks.

2.5 Current Challenges and Constraints

2.5.1 The sections above highlight the compelling case for public sector support to promote sustainability and growth. However, as briefly outlined within section 2.1, operations within North South Tees face new challenges and is also constrained and threatened by a range of key factors, as set out below.

Competitiveness and the Recent Economic Downturn

2.5.2 The Tees Valley process industries initially developed and became successful on the basis of a business model which exploited locally available advantaged feedstocks (coal, salt, oil and gas) which were processed via ICI's integrated arrangements at Wilton and Billingham. Increased processes of globalisation and associated international competitiveness have diminished the competitive advantage that Tees Valley once had in relation to 'advantaged feedstocks', and locations such as the Middle East are now becoming increasingly competitive due to their lower extraction and production costs.

2.5.3 A more recent approach to future competitiveness focuses principally upon the potential of the existing steam cracker[16] and associated businesses, in addition to the development of two key areas – green technology and recycling. However, the consultation process identified common acknowledgement amongst key stakeholders that this approach could be under critical threat in the current economic climate. Key

[14] Based upon Claimant Count data as a proportion of the resident working age population as at May 2009 (ONS via NOMIS).
[15] Annual Population Survey (2007) via NOMIS
[16] 'cracking' is the process whereby complex organic molecules such as heavy hydrocarbons are broken down into simple molecules by the breaking of carbon-carbon bonds.

operations within the study area produce at the upstream end of a complex supply chain within the UK and it underpins the provision of significant levels of GVA, employment and skills.

2.5.4 However, many operations are satellite plants owned by companies with larger operations located elsewhere in the UK/world and recently there have been several potential closures of businesses announced within key industry sectors in the study area. These may have been partly exacerbated by the recent economic downturn, whilst others are undoubtedly due to wider strategic rationalisation. Some of these closures/job cuts in and around the study area are identified in the text box below:

- Croda – in June 2009, it was confirmed that around 100 jobs are at risk after Croda announced that it is to close its Wilton operation. This was prompted by the announcement by Dow Chemical Company that it intends to close its ethylene oxide and glycol production facility at Wilton (which employs a further 55 staff), as Croda relies upon the Dow operation for its core raw material;
- Invista Textiles – in April 2009 it was announced that this plant would be closing within the year, with the potential loss of all 300 jobs;
- Dow Chemical Company – in March 2009, it announced that it was reducing by 29 its workforce at its sites in Middlesbrough and Billingham;
- Lundbeck Pharmaceuticals Ltd – closure of Seal Sands site announced in March 2008 with the loss of 65 jobs;
- Elementis Chromium – closure of Eaglesciffe site announced in April 2009, with loss of 138 jobs;
- Petroplus – announced the potential sale or closure of its refinery on Teesside in February 2009 with the possible loss of up to 200 jobs;
- Sabic – announced the closure of two Teesside plants in July 2008, with loss of c.180 employees;
- Corus – announced in May 2009 that it would be closing its Teesside Cast Products plant on Teesside with the potential loss of c.2000 employees. As at the end of June 2009, it was in discussions with potential buyers of the plant in an attempt to safeguard the jobs, although these had not reached any definitive decisions. In June 2009, Corus announced the cut of a further 2,000 jobs across the UK, including 428 in Teesside.
- Artenius - in July 2009, Spanish group La Seda de Barcelona, parent company of Artenius, announced the shutdown of its 500,000 tonne/year purified terephthalic acid (PTA) plant at Wilton.

2.5.5 Available information indicates that the above closures/job cuts are a result of increased global competition, falling demand levels and worsening economic conditions. It is estimated that between December 2008 and May 2009, there were a total of c.1,000 jobs lost in the engineering and chemicals sectors in the Tees Valley[17]. In addition to the direct loss of these jobs, there are concerns over the threat to the cluster and its wider supply chain posed by these closures/cuts (i.e. the supply chain is only as strong as the weakest link). Moreover, it has been estimated that there have already been up to 45,000 job losses in the chemicals sector globally during the recent economic downturn and that the competitive threat from producers in feedstock-rich parts of the world or those with enhanced market access is significant. It is recognised that in addition to more isolated production locations, which will generally be the first casualties of the economic downturn (particularly

[17] http://www.nebusiness.co.uk/business-news/latest-business-news/2009/05/20/engineering-and-chemicals-job-losses-on-the-rise-51140-23670658/ - *NE Business Journal.*

where the recession has exposed inherent competitiveness issues), clusters are also threatened in the current economic climate[18].

Governance and Co-ordination Issues and Challenges

2.5.6 Consultations have identified a key recurring theme relating to the need for leadership and co-ordination within the study area. This in itself is a key challenge and constraint but it also has critical implications in relation to potentially addressing the issues outlined above.

2.5.7 In addition to the major private sector operators within the Tees Valley Cluster, there are numerous other active public sector organisations and bodies in the sub-region and beyond with a vested interest in enhancing the competitiveness of the process industries at Tees Valley. Examples of such are identified below:

- Tees Valley Unlimited - a public/private partnership with specific responsibility for enhancing the economic performance of the Tees Valley City Region; and,
- TVJSU - responsible for strategic planning, data and forecasting and the preparation of the sub-regional economic development strategy;
- Tees Valley Regeneration – regeneration company which is seeking to secure the sustainable economic and business-led regeneration of the Tees Valley;
- One North-East - identifies the process industries as one of the region's three 'pillars' of industrial opportunity;
- North East Process Industry Cluster (NEPIC) - represents approximately 500 process-industry related businesses in the region;
- Centre for Process Innovation (CPI) – a public sector organisation which seeks to develop products, processes, services and businesses in the process and manufacturing sectors in the North East.

2.5.8 As stated above, a common message emerging from many of those consulted relates to the need for a more co-ordinated approach in a number of key areas such as forward strategy, funding support, services provision and spatial land use planning. At present there is no designated 'leader' for North South Tees to bring together the relevant organisations to work in collaboration with one and 'champion', the area taking ownership for progress the key issues (see also Section 5).

Constraints

2.5.9 As part of Stage 1b of this project, PB has assessed a range of infrastructure parameters in order to assess constraints for existing and potential future operations in the study area. These constraints and opportunities are summarised in the tables below. While all opportunities and interventions are considered worthy of further assessment, due to the wide ranging brief and the need to focus on a selected number of interventions, not all opportunities have been presented in more detail in section 5 below (those marked in italics are taken forward as part of the proposed intervention projects for the framework, those marked **, though still important have not been taken forward directly as part of this report).

[18] *ICIS News – 13th March 2009*

Table 2.1 Stage 1b Asset Constraints

Task Reference	Workstream	Issue	Constraint	Potential Intervention / Opportunity
3	Land	Landbanking	Private sector unwilling or unable to release land when projects requiring land arise	*Public sector acquire land, options or wield influence to achieve joined up thinking and benefit all parties*
3	Land	Landbanking	Landbank: private sector unwilling or unable to release land when projects requiring land arise	Consider permitted development as opposed to land allocation in LDF. This could discourage inappropriate land banking and attract unambiguous investors**
3	Land	Landbanking	Landbank: private sector unwilling or unable to release land when projects requiring land arise	*Change specific land allocations*
4	Land quality	Perception of significant contamination issues through both reclamation processes and subsequent development.	Lower interest in sites due to concern over potentially high/unknown remediation costs	Undertake detailed desk based exercise for potential development sites, collating existing reports and knowledge and rank sites according to likely clean up costs - target higher cost sites with SI and RA. Opportunity for pre-development remediation to de-risk sites and make more attractive.**
4	Land quality	Perception of significant contamination issues through both reclamation processes and subsequent development.	Potentially inconsistent and conservative approach from regulators/consultants/funders	Working group with LA's and EA to agree consistent approach to risk assessment and remedial requirements.**
4	Land quality	Remediation required	Cost	Remediation by use of local soil treatment facilities (e.g. Augean)/hub sites - benefit of local facilities - and recent introduction of new waste guidance enabling swifter process**
4	Land quality	Geotechnical Issues	Soft ground (alluvium), construction through foundry slag deposits, soil gas, UXO	Provision of advice and information to project developers - link to land quality workshop**

Table 2.1 Stage 1b Asset Constraints (Continued)

Task Reference	Workstream	Issue	Constraint	Potential Intervention / Opportunity
5-11, 13-15	Infrastructure	Public / private funding of infrastructure	Lack of understanding and/or consistency and perceived or actual disproportionate allocation of off site infrastructure funding	*Various potential funding models (e.g. Community Infrastructure Levy , CIL) see section 7 of this report*
5 and 6	Public utilities	Provision of specific utilities for specific projects	The study area's existing facilities are well served by industrial utility infrastructure and capacity is not generally a problem. For new developments in certain areas of the study area, new connections to foul sewer and medium pressure gas supplies may be required over significant distances owing to the layout of the network	
5 and 6	Public utilities	General	Ground conditions, lead in times, distance from network	*GIS will enable qualitative information to be provided to potential developers*
5 and 6	Public utilities	Electricity Grid	Lackenby and Grangetown Sub Station capacity (66kV) when development scenarios are modelled	Upgrades likely - options depend on utility upgrade works on forthcoming grid connections. Detailed recommendations presented in Electrical Connections report.
5 and 6	Public utilities	Electricity Grid	lack of understanding of processes and issues in relation to connection agreements with NG	*Identify individual to act as a central liaison with regional NG and NEDL representatives*
10 and 11	Pipelines and cavities	land ownership and wayleaves	land ownership preventing strategic new wayleaves	*deliver purchase of land where required*
10 and 11	Pipelines and cavities	redundant assets	existing pipeline infrastructure not used but held in case needed in future - thereby taking up capacity	*rationalise pipeline network by freeing up redundant assets (this may involve incentivisation to encourage owning companies to stop holding onto perceived 'strategic' assets)*
10 and 11	Pipelines and cavities	strategic networks		*support development or maintenance of strategic networks - e.g. CO_2, Syngas, Hydrogen, Steam.*
10 and 11	Pipelines and cavities	commercial and security issues	a complete dataset is unavailable	*ensure a single organisation understands current network*

Table 2.2 Stage 1b Energy Constraints

Task Reference	workstream	Issue	Constraint	Potential Intervention / Opportunity
7	Energy	Lack of integration at Seal Sands	There are limited interconnections between sites in the North Tees Seal Sands area. This acts as a constraint on the potential for sharing steam/hot water.	*Current discussions between individual companies are most likely to result in bilateral commercial arrangements. The public sector could play a role in facilitating a wider discussion on creating an accessible steam network for this area.*
7	Energy	Energy Supply at Wilton	The structure of energy supply on the Wilton site, while providing integration, limits flexibility in energy supplies to and from individual operators.	*A structure that maximises the benefits for the area as a whole will be a key part of a successful steam network on the North Tees, and could also be applied to other parts of the study area.*
7	Energy	Power Station Design to encourage steam supply	Electricity power stations are usually designed to maximise electrical output and do not necessarily make allowances for future CHP operation. This can act as a barrier to development of heat supply networks - either through the cost of adapting existing plant or through reluctance to allow for CHP in the design phase if identified heat customers are not in place	*Early dialogue with developers and assistance in identifying heat customers should help in maximising development of CHP rather than electricity-only generation.*
7	Energy	Reducing use of natural gas for hydrogen production	Syngas would need to be of sufficient purity and pricing may restrict this opportunity	*Investigate opportunity to use waste gasifiers to produce syngas for feedstock rather than power generation*

Table 2.3 Stage 1b Transport and Logistics Constraints

Task Reference	Workstream	Issue	Constraint	Potential Intervention / Opportunity
13-15	Transport and logistics	Facilities for handling and storage of dry bulk materials	Limited, especially north of the river	Assess projects and sites to improve this situation
13-15	Transport and logistics	Limited rail connectivity	Although the area has an extensive rail network, several areas within the study area, particularly South Tees, have limited rail link connections.	*Three extensive areas of under-utilised rail sidings exist in the study area at Billingham / Haverton Hill, Corus Lackenby and to a lesser extent Wilton. With demand for space in the Tees Valley area, particularly South Tees, these areas could be utilised more efficiently*
13-15	Transport and logistics	limited rail connectivity		*A number of potential new railheads could open up in the study area over coming years, including the SITA Energy from Waste site at Billingham, the Greenergy hub in Seal Sands and the Northern Gateway terminal in South Tees. These are well-placed to provide additional capacity and in turn feed into greater use of the region's rail network.*
13-15	Transport and logistics		Transporting large containers between Tees Valley and the wider rail network is presently constrained by the limited W8 gauge clearance on the three routes to the ECML. A number of structures prevent Hi-Cube containers being efficiently and competitively transported along these routes.	*Gauge-clearance on the routes between Tees Valley and the ECML is presently being examined to GRIP4 stage by Network Rail and partners. This is expected to identify a preferred option by March 2010. Key stakeholders in the area should continue to promote this intervention*
13-15	Transport and logistics		The lack of gauge clearance on the ECML means that Hi-Cube containers, which are becoming increasingly common for deep-sea container traffic, cannot be transported by rail in an economical or efficient way.	*JSU and local stakeholders should support gauge clearance to at least W10 on the ECML north of Doncaster. When complete this would support the use of the ECML as a diversionary route for W10 gauge freight in line with Strategic Freight Network objectives.*
13-15	Transport and logistics		A frequent constraint identified by local stakeholders is the difficulty in obtaining information regarding rail opportunities, e.g. appropriate contacts for rail are unknown by businesses.	*Formation of a Rail Users Working Group, which should include not just local industry and governmental but also rail operator and infrastructure representatives, with a view to seeking a more co-ordinated approach to rail investment and help identify potential rail opportunities.*
13-15	Transport and logistics		Number of shipping lines stopping at Teesport	To further increase the competitiveness of Teesport, the need to attract more container shipping lines into the region is recognised. Encouraging more shipping lines will help to promote Teesport as an attractive alternative to other UK ports**
13-15	Transport and logistics		Up to date understanding of development projects and their impact on the road network	*Bi-annual review of Penelope Model*

Table 2.3 Stage 1b Transport and Logistics Constraints (continued)

Task Reference	Workstream	Issue	Constraint	Potential Intervention / Opportunity
15	Wharfage / river transport	Dredging	Complexities including sampling, testing, disposal options, consents, permits, stakeholder consultation, environmental 'windows'	*Develop Environmental database - water quality, sediment contamination, fish tracking, underwater piling noise, etc and impacts on environment as supporting evidence for any future river work*
15	Wharfage / river transport	River frontage asset condition		*Undertake River Frontage / Load Capacity Survey - no publicly available data*
15	Wharfage / river transport	Dredging		*Desk Based Unexploded Ordnance Survey*
15	Wharfage / river transport	Ship decommissioning	Time to prepare dry dock	*Assist Able with installation of Dry Dock Gates now that the Cofferdam is in place (part of decommissioning Sector Development Plan)*

Table 2.4 Stage 1b Health, Safety, Environmental and External Constraints

ref	Workstream	Issue	Constraint	Potential Intervention / Opportunity
12	Archaeology	Listed buildings Kirkleatham, and Billingham Phosphate silo - identified development areas	Conservation statement/appraisal required as part of any planning application.	Tees Archaeology is well respected and knowledgeable and would provide good advice to developers**.
12	Archaeology	Sites where non-listed features maybe considered of significant importance e.g. West Coatham medieval settlement	Archaeological evaluation likely to be required e.g. surveys	Early discussions with Tees Archaeology/LA officers would enable works to be planned as efficiently as possible**.
	Ecology	Designated areas	SSSIs, SPAs and surrounding areas	*Coordination of stakeholders interests*
17	Health and safety	HSE view of risk associated with new developments	Initial screening of many of the development projects results in an "advise against" prediction. This would further liaison with HSE on a development specific basis.	*Project team to liaise with HSE over opportunity to pass sites for a selection of activities in advance of plans for specific development.*
16	Flood risk	Flood zones	Much of the study area is in flood zones 2 and 3a/3b - this presents a potential constraint for the type of development possible. Default requirement for SSFRA and consideration of alternative locations	PB recommends a workshop with the EA to address the following issues (i) Private sector funding contributions and mechanism, (ii) EA funding of flood defence maintenance and new flood defences, (iii) Timing and scope of future modelling studies including details of how new information and data can be provided and used, (iv) Clarification of planning procedures in relation to flood risk **/***
	External	North Sea Gas	production rates uncertain	*Assess likely future trends and incorporate into strategic framework (part of chemicals / energy sector development plan)*
	External	Crude Oil Supply	gradual decline	*Enhanced recovery through CO2 injection (part of chemicals / energy sector development plan)*
	External	UK govt policy for Carbon Capture	Initial £1bn Treasury funded competition aimed at post combustion technology only, now expanded to 4 projects both pre and post combustion	*Lobbying to benefit projects within the study area*
	External	Electricity Supply Licence Regime	The direct supply of electricity between companies on different sites requires a relatively burdensome supply licence. This acts as a discouragement to the development of local electricity supply between local industry.	*Options to simplify the regulatory regime should be investigated (part of energy sector development plan).*

**** it should be noted that strategic flood risk assessments are underway for the local authorities in the area (e.g. Stockton borough Council). As these studies become available, it is important that the North South Tees GIS database is updated to ensure that flood constraints an opportunities e.g. relating to improved data collection and funding of defences) are understood and accounted for.*

2.6 Summary

2.6.1 As presented in this section above, the study area and operators/investors within it face a range of challenges and constraints which will limit future economic growth and development potential. These range from the physical issues noted above to other external factors such as lower cost production in other parts of the world (e.g. Middle East), current world demand levels, the unique structure of the Tees Cluster following the major ICI divestments (including the issue of foreign ownership of certain operations which are important to the study area but perhaps less strategic to the owning company) and services costs relative to other European locations.

2.6.2 The previous model for key parts of the Tees Cluster of advantaged feedstocks (North Sea oil and gas) and world leading delivery (ICI) has disappeared, however, historic and ongoing development of the cluster provides a range of desirable features for the future such as physical infrastructure, integrated assets and technology, logistics, workforce (skills), a supportive local community and an effective, close-knit network. So, given the current economic climate, why should the existing industry be supported?

- the operations within the study area are generally at the upstream end of the supply chain and therefore provide many base products to other process industries within the region and beyond. This provides significant GVA/GDP/tax revenue and skills that need support to prevent the possibility of migration abroad. Replacement of these key industries, assets and skills in the event of their loss would be difficult and must be considered unlikely.

- without support, enormous opportunities would be lost. Existing industries form a critical mass without which many future investments would not happen. With the right interventions (see sections 3 and 5 below) and given the significant advantages of the sub region, there is potential to develop the existing operations within the study area and use the excellent process engineering skills base to continue to innovate and develop new technologies. Strategically, there is considered to be a real opportunity to demonstrate the transition of an industrial area containing many existing and future industry sectors to low carbon operation. This could create long term sustainability within industry with associated GVA, GDP, employment and social benefits.

SECTION 3

STRATEGIC SECTOR OPPORTUNITIES

3 STRATEGIC SECTOR OPPORTUNITIES

3.1 Introduction

3.1.1 The previous section has set out the importance of the concentration of businesses within the study area to the regional economy, and also the challenges they currently face. This section considers the opportunities within the study area for the growth of several key employment sectors, describing the nature of the opportunities within each sector and explaining why the strengths of the study area could support growth in these areas. Further details for each sector are presented within Appendix 1 to this report.

3.2 Offshore Wind

3.2.1 The need to reduce the reliance on carbon based energy fuels has been a strong focus of international debate over the last 15-20 years, for environmental reasons but also in consideration of the 'security of supply'.

3.2.2 Over the last 10 years, as the UK has developed its recognition for a balanced energy portfolio and the Crown Estate has undertaken licensing rounds for offshore wind in UK waters. In 2001, Round 1 allocated 14 lease options totalling just over 1GW of generating capacity (equivalent to approximately 500 turbines). Each lease term was for 22 years, including decommissioning. The Tees Offshore windfarm, under development by EDF, is the only one in the immediate vicinity of the Tees. Round 2, in 2003, allocated 15 leases, of up to 50 years, for a total of 7.2GW. The third round is expected to be awarded in late 2009 covering 9 zones totalling 25GW. One of these major zones lies off the North east coast, with two more within approximately 150 miles of the Tees. If the Tees can position itself as a supply base for these developments, it will have the opportunity to create a new industry sector with a horizon of at least 50 years. It has been estimated by the Carbon Trust that the offshore wind sector could create 40,000 – 70,000 jobs in the UK by 2020[19].

3.2.3 The study area is considered to have a number of attributes that make it attractive for supporting the growth of the UK offshore wind sector, as set out below:

- proximity to the Round 3 Offshore Wind Programme sites in the North Sea and its high and constant wind speeds and shallow waters;
- availability of land adjacent to deep water for the manufacture of turbines/towers and their export to offshore construction sites;
- availability of skills within the heavy engineering sector to support the manufacturing process; and
- good accessibility to strategic road and rail network for logistics purposes.

3.2.4 The development of offshore wind technology is therefore considered to be a significant opportunity for the study area and would fully support the current policy agenda at both national and regional levels. It would provide a form of renewable energy to meet the energy requirements of not only the study area, but the wider UK domestic and industrial economy.

[19] Carbon Trust, “Offshore Wind – big challenge, big opportunity”

3.3 Decommissioning / Fabrication Activities in Marine and Oil / Gas Sectors

3.3.1 In 2003 the first of thirteen US navy 'ghost ships' arrived at the Able TERRC (Teesside Environmental Reclamation and Recycling Centre) facility. In 2009, the former French aircraft carrier the Clemenceau arrived. Able had identified an opportunity to decommission these vessels under controlled conditions, utilising a dry dock facilities and skilled workforce. Whilst a contentious industry, the availability of the necessary land and resources make this a strong opportunity for this site. It has been estimated that globally up to 200 single-hulled tankers need to be disposed of by 2015 and that the market is worth up to £3 billion. The TERRC facility is well-placed to deliver this opportunity.

3.3.2 The North East has been a centre of excellence for supporting the North Sea oil and gas industry since its beginnings in the 1970s. As the industry has become more global, and moved from a largely shallow water / surface based rig based operation towards deeper water exploited by seabed wellheads, manifolds and pipelines, specialists in the subsea technology industry have developed in the region, but much of the mainstream fabrication type work has moved to regions of the world, such as the far east, with lower overheads. It was hoped that the £300 million Sea Dragon project would mark resurgence in the mainstream industry. However, this has recently been lost to Singapore. However, the opportunity remains, whilst the oil and gas industry remains, to further strengthen the subsea technology sector, through local organisations such as CTC and Wilton Engineering.

3.3.3 Whilst the mainstream oil and gas industry is no longer considered a significant opportunity in the region, decommissioning must be identified as a future opportunity. As the North Sea fields come towards the end of their operating lives, there is a requirement to decommission the structures and infrastructure. This may have some of the contentious issues surrounding vessel decommissioning, but could be considered the 'unbuilding' of the structures that were traditionally built in the region and, through careful decommissioning, recycling, and disposal, the region could develop a high value world-class industry. BERR anticipates that decommissioning will peak around 2018, but carry on until 2035 and beyond in a market worth £20Bn.

3.4 Port Related Opportunities

3.4.1 As the third largest port overall and the largest chemical-handling port in the UK and given its location at the heart of the study area, the port makes a significant contribution to the economic prosperity of the sub region, either in port centric and logistics or the import, handling, storage and export of bulk goods.

3.4.2 Currently owned by PD Ports, Teesport has developed proposals for the Northern Gateway – a new deep sea container terminal on the south side of the River Tees seeking to open up additional opportunities for global trade. Costing in the region of £300m PD Ports propose to handle up to 1.5m containers (twenty foot equivalent units), create 1,000m of new riverside quay and create up to 5,000 jobs within the Tees Valley. PD Ports received formal planning approval for its proposals in February 2008.

3.4.3 The port sector comprises a number of sub sectors, including roll-on/roll-off (ro/ro), lift-on/lift-off (lo-lo), cars, containers, port-centric 'retail-based' distribution, steel, dry bulk, liquid bulk and power generation (potential for biomass feedstocks to be imported via the port). The Northern Gateway proposals seek to promote 'port-centric' uses whereby the port would be used to import/export goods for solely storage and distribution purposes.

3.4.4 In addition to the Northern Gateway proposals, there is a continued opportunity for more 'port-related' uses whereby the port could be used to support other sectors within the study area thereby support higher 'value' advanced manufacturing and processing activity.

3.4.5 If the Northern Gateway proposals proceed, it is possible that there could be a conflict of riverside uses, between bulk storage and distribution and the needs of the other industries such as manufacturing and energy for access to riverside sites. A key role for the public sector is to prevent 'port-use' conflicts, through the use of strategic land use planning policy, to ensure that the port and its surrounding riverside frontage can support a balanced and mixed range of uses and requirements.

3.5 Carbon Capture and Storage

The area's location provides access to North Sea carbon dioxide storage options, as well as a number of significant carbon dioxide emitters. This could provide a critical mass of activity to justify the significant investment needed for carbon capture and storage infrastructure.

3.5.1 Proposals for a carbon capture and storage network have already been put forward within the study area. This would require a transmission pipeline to transport CO_2 to the North Sea. If it is sized/located appropriately, other major CO_2 producers in the area could make use of the system, delivering long term benefits in terms of reduced environmental taxation. Carbon taxation costs are likely to become increasingly important to a number of major energy generators and users in the future and the development of a CO_2 collection and storage network would be of significant benefit to the area.

3.5.2 Both the UK and EU have recently signalled increased level of support for carbon capture, both through grant support to a number of projects and the allocation of allowances under the EU Emissions Trading Scheme. The UK Government's Low Carbon Industrial Strategy mentions Tees Valley as a possible location for a carbon capture and storage cluster, along with the potential for 30,000 – 60,000 UK jobs in the sector by 2030.

3.6 Power Generation and Export

3.6.1 The UK electricity market can be considered as national in scale. Although interconnectors provide some capability for imports and exports from/to other countries, this capacity is small in relation to overall UK demand. The UK will therefore continue to require electricity generating capacity to meet the vast majority of its own needs.

3.6.2 UK electricity demand has grown almost continuously since 1970. There have been brief reductions or pauses in demand growth at times of recession or high energy prices, however the historical trend implies that electricity demand will continue to grow in the future, despite any short term reduction due to current economic conditions.

3.6.3 In addition to the new capacity to meet future demand growth, the coming decade will require significant replacement capacity to be built – approximately 25% of existing UK generating capacity is due for closure by 2020, representing around 20 GW of capacity, including the existing Hartlepool nuclear power station which has a capacity of just over 1 GW. The combination of growing demand and the closure of older stations means that significant new power station capacity will need to be built in the

UK over the period of this study. This is reflected in the current number of power station proposals in the study area.

3.6.4 The type and size of power station built to provide this new capacity (e.g. what fuel is used) will be driven by both regulatory and fuel supply factors. The regulatory regime uses mechanisms such as the Renewables Obligation (RO) and the EU Emissions Trading Scheme (ETS) to incentivise low carbon electricity generation. It is likely that such incentives will be in place over the study period and that they will impact on the type of power stations developed, encouraging renewables, nuclear and carbon capture power plants.

3.7 Bulk Chemicals

3.7.1 For the purposes of this study, bulk chemicals refers to chemicals made in large volumes that are normally processed further by others to produce finished goods. This includes polymers, plastics and chemical intermediates such as aromatics and ethylene oxide[20]. These materials are typically produced from derivatives of crude oil. Bulk chemicals are a major part of any industrial economy, with products from the sector being used in almost every industry, from automobiles and construction to textiles and consumer goods. As noted in Section 2.1, it has been estimated that chemical-using industries represent 60% of the UK's GDP.

3.7.2 By its nature, the chemical industry is heavily integrated with its supply chain, both upstream and downstream. Plants often group together to share services and facilitate transfer of materials produced at one site and used by another. Economies of scale have driven the market in the UK (and elsewhere) to locate onto a few large sites such as Tees Valley which feed bulk chemicals into the wider economy at a national and international level. This co-location can be as a cluster or as a more integrated single site. The difference between clustering and integration is an important one:

- a cluster can be defined as a group of businesses who co-locate to share products and services but without interdependency, i.e. if one member of the cluster is removed the others are not critically affected. An example might be a steam network with several steam suppliers and numerous customers; and,
- a fully integrated site has much higher levels of interdependency, which can provide extra benefits but also means that the removal of one operation or plant from the site can have a critical effect on other parts.

3.7.3 Wilton under ICI was an integrated site which worked because it had single ownership that could operate the various plants for the good of the site as a whole. Wilton today can be described as somewhere between an integrated site and a cluster, with fragmented ownership meaning it is potentially vulnerable to the closure of key plant units.

3.7.4 Facilities such as the Tees Valley chemical sites clearly play a key role in the UK economy. However, many of the materials it produces could be made and supplied abroad. Should this happen, other UK producers up and down the supply chain would be disadvantaged compared to their overseas competitors, further weakening the overall supply chain. While it is to the benefit of the UK economy to retain a strong chemicals sector, the global market in which the sector operates does not necessarily take this into account when choosing what products to manufacture and where to produce them.

[20] Fine and speciality chemicals and pharmaceuticals share a number of the same characteristics, although they are somewhat less dependent on the co-location described here for bulk chemicals.

3.7.5 As some materials in the supply chain are more readily shipped long distances than others, the typical pattern of production is therefore to locate the initial process stages close to the source of feedstock[21], up to the stage where it makes practical and economic sense to locate subsequent processing stages closer to the end use.

3.7.6 The position of this "cut-off point" can change over time, e.g. in the case of nylon production where the shift in downstream markets to the Far East made production at Wilton less viable. Changing feedstock availability can be a critical factor, as in the case of ethylene production where cheap ethane feedstock in the Middle East has put production elsewhere at a disadvantage. Indeed, the availability of "advantaged feedstock" is one of the key drivers in the competitiveness of most bulk chemical plants.

3.7.7 The shift from growth to recession over the past year has significantly impacted global bulk chemical production and, as in earlier recessions, it was affected early as downstream industries began destocking. With new plants in the Middle East and Asia coming on-stream in 2009, there is likely to be significant over-capacity for many products for a number of years to come. This will put additional pressure on marginal or less efficient plants and, importantly, on their cluster neighbours who rely on them to supply materials or purchase products.

3.7.8 There is an argument, however, that over-capacity will also put pressure on shipping and logistics costs and that this will lead to a more regional / less global chemicals market. In any event, production sites need to maximise their competitiveness, whether versus regional or global competitors, as part of a focus on survival through a period of weak demand, volatile oil prices and tight credit markets[22].

3.7.9 As noted above, feedstocks are a major element in overall cost and with oil prices likely to rise over the longer term, alternative sources are likely to become more viable and eventually provide a competitive advantage. Such alternatives may include:

- "Reverse cracking" of waste plastics to supply fresh feedstock. Further R&D would be required to develop this process;
- Heavy oil upgrading which would use lower value crude oil from the North Sea and elsewhere and produce feedstocks such as naphtha and hydrogen;
- Gasification of coal to produce syngas[23] for use as a building block for new feedstocks. Coal gasification is a proven process, underground gasification may be possible in future (avoids mining, allows access to hard-to-reach coal reserves);
- Gasification/pyrolysis of waste to produce syngas;
- Use of biomass to produce bio-derived feedstocks such as ethanol.

3.7.10 Energy costs are also likely to remain a significant cost element in chemical production and these will continue to be driven by oil and gas prices and national/regional electricity markets. Energy integration within cluster sites will continue to be an important means to minimise these costs. At the European level, the cost of emitting carbon dioxide will become more significant as the EU Emissions Trading Scheme develops. Areas such as Tees Valley that have potential access to carbon capture and storage for power generators and processing activities may be able to use this as a competitive advantage over other sites within Europe (see also

[21] *e.g. naphtha or natural gas*
[22] *http://www.icis.com/blogs/chemicals-and-the-economy/2008/10/budgeting-for-survival.html*
[23] *Syngas is an abbreviation for 'synthesis gas' which is a gaseous mixture comprising carbon monoxide, carbon dioxide and hydrogen. It is combustible and often used as a fuel source or as an intermediate for the production of other chemicals.*

section 3.5 above). The impact compared to sites outside Europe is not yet clear – this will depend on how environmental policy develops in these areas.

3.8 Biotechnology

3.8.1 The term "biotechnology" can be used to mean a number of different things. For the purpose of this study, it is used to refer to the use of biological processes such as fermentation to manufacture chemicals and materials. In other words, it does not include the use of biological materials in chemical processes – which have been considered elsewhere in the biofuels and chemicals sections. Biotechnology therefore provides alternatives to petrochemical production routes. Biotechnology is well established in industries such as pharmaceuticals and brewing. There are more recent developments, however, in "industrial biotechnology" that are starting to provide opportunities in other areas. Examples include the use of immobilised enzymes as catalysts (replacing costly precious metals), production of butanol by fermentation and the production of biopolymers such as polylactic acid (PLA).

3.8.2 In areas such as biopolymers, biotechnology products are competing with products derived from petrochemicals which often have lower production costs. This tends to restrict biopolymers to niche markets where properties such as biodegradability are important. In the longer term, as technology develops, biotechnology products are likely to become more competitive. It has been estimated, for example, that biopolymer production in the EU could be several million tonnes annually by 2020 (although this would still represent only a few percent of total polymer production). Rising oil prices may result in this estimated production rate being significantly exceeded.

3.8.3 In the UK, the current industrial biotechnology market is estimated to be worth £1.8 billion annually, with the potential to grow to £ 4 – 12 billion by 2025 . The UK government recently identified the sector as one of four manufacturing areas where the UK has particular strengths and opportunities for future growth and is seeking to fund further demonstration facilities.

3.9 Biofuels

3.9.1 In recent years, production of alternative (lower CO_2 emission) fuels for transport has focussed on biofuels - liquid fuels derived from biological materials. The most common are biodiesel which is a substitute for fossil diesel and ethanol which replaces petrol. These fuels have an advantage over other alternative fuels such as hydrogen in that they can readily be used in the existing vehicle fleet and fuel infrastructure.

3.9.2 Biodiesel is a general term for biologically-derived diesel substitutes. "First generation" biodiesel is currently produced on a commercial scale from vegetable oils such as rapeseed, soybean and palm oils. Recycled oils such as used cooking oil are also used, although the quantities available are relatively small. "Second generation" biodiesel typically refers to fuel produced from other biomass using a different process and is a chemically different material to first generation fuel. Second generation biodiesel is currently in the demonstration phase.

3.9.3 Transport fuel is a global market, with crude and refined fuels widely traded internationally. The same is true of biofuels where both feedstocks (e.g. vegetable oils and wheat) and the biofuels themselves are global commodities. In 2008/9, 2.8% of all road transport fuel supplied in the UK was biofuel. This represents approximately 1,200 million litres, of which 84% biodiesel and 16% ethanol. At least 70% of biofuel was imported, mainly ethanol from Brazil and biodiesel from the USA.

3.9.4 EU Directive 2009/28/EU requires that, by 2020, at least 10% of all transport fuels used in each EU member state come from renewable sources. In the UK, the Renewable Transport Fuels Obligation (RTFO) requires suppliers of fossil fuels to ensure that a specified percentage of the road fuels they supply in the UK is made up of renewable fuels. The target for 2008-9 was 2.5% by volume, rising to 3.5% by 2010/11. The RTFO is currently focussed on this relatively short term target, but may in time become the UK's mechanism for meeting the EU's 2020 target.

3.9.5 It appears likely that demand for sustainable biofuels in the UK and the rest of the EU will grow, driven by climate change policies and security of supply issues. The UK Government's recent low carbon transport strategy emphasises that sustainability will be a key factor in future levels of support through the RTFO (or other mechanisms). Local feedstock production in the UK/EU can more readily meet high sustainability criteria as well as providing more stable and secure supplies compared to purchasing on the volatile world markets. These factors can be expected to favour local biofuel production and it is likely that UK produced biofuels will have a significant role to play in meeting UK demand.

3.10 Waste / Resource Recovery

3.10.1 The waste market in the UK is developing quickly as a result of legislative drivers. Waste legislation within the member states of the European Union has developed as a result of the Waste Framework Directive and the Hazardous Waste Directive. Further legislation to improve the management of waste has come through the Landfill Directive, the Integrated Pollution Prevention and Control Directive and the Waste Incineration Directive.

3.10.2 The Landfill Directive set targets for diverting municipal biodegradable waste from landfill. Local authorities face fiscal penalties for failing to meet these targets. The combined result of these drivers is the rapid development of regional strategies for increased recycling, treatment and recovery of municipal and commercial waste. The increase in the cost of landfill is also driving the private sector to assess alternative treatment and disposal routes for commercial and industrial waste. More 'merchant' facilities are being developed as treatment technologies become increasingly commercially competitive with the cost of landfilling.

3.10.3 Investment in infrastructure to treat waste is required across the UK and current opportunities for development on Tees Valley exist. The Tees Valley Joint Minerals and Waste Development Plan identified that additional capacity is required primarily in recycling infrastructure for municipal waste and for treatment (recovery) of C&I waste. This capacity gap may lend itself to the development of an eco park with a combination of various recycling and recovery technologies for example steam autoclaving and anaerobic digestion.

3.11 Steel

3.11.1 Once a major player in European and world steel making, in recent years Corus has shrunk in terms of production capacity. The recession and falling demand in the automotive and construction markets has had a clear impact on the steel industry and Corus, owned by the Indian Group Tata, has cut production in Europe and particularly the UK.

3.11.2 Recent announcements of potential job losses relate to the Redcar blast furnace and steel works (TCP). The Lackenby Beam Mill, the Hartlepool Pipe and Tubes Mill and Skinningrove Works are also expected to be affected by over 400 redundancies – although this is not related to the TCP issue.

3.11.3 There is a need to understand the long term future for all of the Corus/TCP operations in the Tees Valley and to understand how the public sector can help to improve the competitiveness of the steel industry in the Tees Valley. There are a number of potential opportunities for steel production in the Tees Valley going forward, such as low carbon emission steel, either relating to improvements and additions to the existing operations or the development of new facilities for making steel using different processes. It should be noted that the development of new facilities is likely to be more difficult if existing operations are shut down. In any case, it is imperative that future developments take place within the context of a strategic plan for the Tees Valley steel industry which is consistent with how the current Corus situation develops.

3.12 Industrial Symbiosis

3.12.1 Though not a sector as such, there are considered to be good opportunities to be grasped through 'industrial symbiosis' which can be defined as sharing of information, services, utilities and by-product resources among one or more industrial operators in order to add value, reduce costs and improve environmental performance. Taken to its extreme in the chemical industry, the result is a heavily integrated supply chain, both upstream and downstream where plants are integrated to share services and facilitate transfer of materials produced at one site and used by another. While this integration can result in economies of scale, the downsides of integration are a potential 'domino' effect in times of stress/downturn. Flexible arrangements that add value and/or reduce cost but that can easily be reversed or adapted (i.e. clustering rather than integration, see 3.7.2 above) are therefore favourable to add overall strength to the North South Tees area.

3.12.2 Given the presence of significant operations within the study area in the petrochemicals, chemicals, biofuels, biotechnology and waste sectors, opportunities exist to use excess products or utilities of these existing operations of which there is a significant quantity, to benefit adjacent operations or incoming industries. This approach is already embedded in the study area but the extent and success varies from site to site.

3.12.3 The more symbiotic relationships that develop, the more added value can be delivered which in turn improves the cost base and environmental performance of the North South Tees area. Several examples of this exist in the study area already such as the John Baarda tomato growing operation in Billingham:

John Baarda Ltd, a tomato grower from Yorkshire teamed up with Terra Nitrogen, a Teesside chemicals company, and Sainsbury's to grow tomatoes all year round. The impact is a reduction in their own emissions and the emissions from importing tomatoes to the UK in the winter. Terra Nitrogen began looking at alternative ways of utilising its bi-products in 2004. The result was a joint initiative with a tomato farmer to grow over 300 thousand tomato plants using the CO2 and steam from Terra Nitrogen's nearby manufacturing site. In January 2006 the largest greenhouse complex to be built in the UK yielded its first tomato harvest. The greenhouse is anticipated to use upwards of 12,500 tonnes of Terra's CO2, which is generated during the manufacture of ammonia. It will significantly reduce Terra Nitrogen's emissions, as the gas could otherwise have been vented into the atmosphere. The CO2 being produced is manufactured to the most stringent of controls as it is already supplied into the fizzy drink sector and as such meets the high standards of the food industry.

The greenhouse is heated and lit sufficiently throughout the winter months to produce tomatoes all year round providing the first ever UK over-wintered tomatoes to Sainsbury's supermarket shelves. The new production site has also brought new jobs to the local community. During winter, tomatoes are normally imported from Spain, so as well as the environmental improvements this offers to Terra Nitrogen, it will also have the added benefit of removing 250,000 food miles from the tomato. The project is a real boost for British agriculture and supports the fresh produce industry as a whole.

3.12.4 Other potential opportunities in the North South Tees study area include the following:

- District (space) Heating (DH) and district hot water. The general consensus is that connection to industrial processes is preferred, after this integration into new pre-construction DH developments (i.e. not retrofit) would be preferred, then retrofitting of municipal buildings (leisure centres, swimming pools, government buildings etc.) would be considered and then finally retrofitting domestic buildings may be considered;
- Food cultivation/production in greenhouses – further opportunities for development in the model of the Growhow/John Baarda arrangement on land adjacent to major industry involving fruit, vegetables and flowers;
- Biotechnology relevant to local industry (e.g. production of feedstock/use of products such as enzymes for ethanol);
- Fermentation processes - production of biochemical products;
- "Intensified" algae cultivation and processing using heat and carbon dioxide;
- Anaerobic digestion to produce biogas;
- Waste sterilization using steam autoclaving ;
- Sewerage treatment – displacement of natural gas used in fired driers;
- Pre-heating of process streams to either displace other heating fuel or to improve handling characteristics;
- Heat for drying process products;
- Absorption cooling;
- Electricity generation using low temperature heat e.g. using Organic Rankine Cycle.

3.13 Summary

3.13.1 The above analysis demonstrates the range of potential sector opportunities for economic growth that exist within the study area. These opportunities reflect the core historical strengths of the study area and how they can built upon, to promote the area's long term economic sustainability through the transition to value added and low carbon technology.

3.13.2 As noted in section 2.4 above, the Tees has significant potential across the low carbon agenda. There are opportunities to implement a programme of initiatives across industry sectors which, taken as a whole, would demonstrate transitioning an industrial area (containing numerous sectors) to low carbon operation. This could result in creation of an "Industrial Transition" Low Carbon Economic Area. This is different to how the government has presented Low Carbon Economic Areas (LCEAs) to date, which have focussed on particular technology sectors, however there is a strong case to be made for this concept within North South Tees given:

- the need for the entire industrial economy to move to low carbon operation over the longer term;
- the diverse range of industry in the North South Tees which makes it an ideal candidate to demonstrate how to make this transition.

The Industrial Transition LCEA would need to incorporate a number of low carbon technologies such as CCS but the key principle is about the transformation of industries across all sectors. This would fit well with a "Centre of Excellence" concept, providing a new image for the area and offers a way to build on the wide range of the study area's strengths.

The benefit of this approach for North South Tees is not just environmental - it also has strong commercial benefits, principally associated with reduced costs. The reduction in operational costs, through mechanisms such as efficiency savings, sharing heat and power and the adoption of CCS technology would give the area a unique advantage to the power generation and manufacturing/process sector, helping to offset the lower feedstock and production costs experienced elsewhere.

SECTION 4

STRATEGIC ANALYSIS

4 STRATEGIC ANALYSIS

4.1 Constraints Assessment

4.1.1 A key element of the analysis has been to assess potential future 'capacity' needs of economic growth, against the constraints identified in the previous technical analysis. To achieve this, two private sector investment scenarios were compiled based on 30 known/potential business investment decisions in the 0-10 year timeframe[24]. These are summarised below:

1. a negative weighted growth path which assumes only nine project concepts, in addition to confirmed investments and the continuation of existing trends in current industrial activity. This also takes into account known facility closures; and,
2. a positive weighted growth path which assumes seventeen project concepts come forward in addition to confirmed investments and the continuation of existing trends in current industrial activity.

4.1.2 The projects identified within these scenarios reflect a range of potential private sector investments including renewable, fossil fuel and nuclear energy generation (with one example including carbon capture and storage and associated development of carbon dioxide transmission infrastructure), energy from waste, eco park resource recovery activities, a recycled paper mill, bulk import, crude oil processing and expansion of Teesport (the Northern Gateway container terminal).

4.1.3 The results of the technical constraints assessments were presented in the Stage 1b reports (see section 8) and summarised in section 2.5 above.

4.2 Spatial Analysis

4.2.1 Using the client supplied '0-10 year' development scenarios, the sector opportunities described in section 3 and the strengths of the study area, PB developed a database of projects which included both the 30 investment decisions referred to above in addition to a further 43 more aspirational or speculative 'project concepts'. The purpose of this exercise was to evaluate (i) what a future sector mix could look like in the next 15 years in the study area and (ii) where they could be located and/or clustered within the study area taking into account the physical needs of the different concepts (i.e. energy, utilities, logistics and land). It should be noted that the resulting database, which is appended to this report as Appendix 3, only includes new development, i.e. in addition to existing operations.

4.2.2 The following principles and assumptions were applied during this process:

- the project concepts database is a 'what if?' type approach and therefore is inherently optimistic about the future. The objective was to attempt to 'fit everything in' on the proposed layout. Given that a number of future operations could logically locate in more than one site within the study area, inter-changeability of the project concept locations is a key principle in developing a possible layout for the area;
- geographic clustering to achieve economies of scale;

[24] These have been provided by the client team, principally TVR, based on their discussions with a range of private sector partners.

- certain key sites lend themselves to several different project concepts – this serves to emphasize the importance of these strategic sites; and,

The proposed layout (Appendix 2) presents a strategic clustering' approach to the study area layout in which both existing operations and future project concepts could reside - this highlights potential themes in each sub area of North South Tees.

The layout, which also includes green space areas, is likely to be of use to the local planning authorities as they prepare their local development frameworks.

4.3 Findings

4.3.1 The key issues emerging from this analysis, to inform the projects/initiatives set out in the following sections, include the following:

- mapping of the project concepts has identified land requirements and other infrastructure requirements within the study area. The resultant land use plan identifies key sites for particular uses which should be safeguarded through negotiation with land owners and/or the statutory planning process. The land use plan is illustrated in Appendix 2;
- in the process of mapping out the possible concepts, a grouping of technologies to obtain synergistic benefit occurs e.g. heat for biomass drying, CHP/biomass for a process that requires heat and steam (e.g. Tioxide), Ecopark concentration with logistics and enzymes with bioethanol. However, this is only possible if (a) long term strategic industrial planning and implementation is carried out, and (b) the public sector takes a lead in facilitating cooperation and encouragement of synergistic benefits;
- there are clearly a number of different models to deliver the strategy that accompanies the vision (see section 7), however, there is a role for the public sector to lead in facilitating partnership for the synergistic benefit of the clusters or supporting lead organisations from the private sector in delivering strategies that benefit multiple parties.

SECTION 5

EMERGING INTERVENTIONS

5 EMERGING INTERVENTIONS

5.1 Introduction

5.1.1 This section sets out the interventions that have emerged from an analysis of the broad sector opportunities, the private sector investment scenarios and the physical constraints in the previous sections.

5.1.2 Detailed 'proformas' for each of the projects/interventions have been developed and these are attached in full within Appendix 1. The proformas outline the following in relation to each of the identified projects:

1. Project title, location and description;
2. Rationale and opportunity;
3. Anticipated outcomes/costs;
4. Proposed delivery/funding/phasing;
5. Potential risks; and,
6. Next steps.

5.1.3 The emerging projects/interventions have been classified into four categories as presented below, with further information contained within Appendix 1

5.1.4 The four categories are:

1. Develop and deliver sector development plans (SDP1-10) for sectors identified in Section 3;
2. North South Tees Framework ownership and delivery (NST1-12);
3. Local energy and site infrastructure (E&I 1-5);
4. Transportation and logistics (T&L1-4).

5.1.5 The proposed interventions are listed below:

Table 5.1 Proposed Intervention Projects – Sector Development Plans

Sector Development Plans (SDP):
1: Develop and deliver N/S Tees-specific off shore wind opportunity - including feasibility study into removing overhead power cables crossing river (SABIC-South Bank) by putting in underground crossing
2: Develop and deliver (plus support existing efforts) opportunities in Decommissioning / Fabrication in marine and oil/gas sectors
3: Develop and Deliver N/S Tees Opportunity: Port Related Opportunities
4: Develop and Deliver Carbon Capture and Storage Network
5: Develop and Deliver Power Generation
6: Develop and Deliver N/S Tees Opportunity: Bulk Chemical Industry
7: Develop and Deliver N/S Tees Opportunity: Biotechnology Opportunity
8: Develop and Deliver N/S Tees Opportunity: Biofuels
9: Develop and Deliver N/S Tees Opportunity: Waste/Resource Recovery Opportunity
10: Develop and Deliver N/S Tees Opportunity: Steel

Table 5.2 Proposed Intervention Projects – Framework Ownership and Delivery

North South Tees Framework Ownership and Delivery (NST)
(1) overall governance / structure of task force and executive team
(2) ownership and coordination of the sector development plans - to be developed in parallel with a Low Carbon Industrial Transition Economic Area
(3) ownership of study area spatial plan
(4) lead on public sector land availability strategy
(5) provision of knowledge and expertise
(6) funding off-site infrastructure (section 106 agreements, JIDA)
(7) promotion / branding / marketing of North South Tees Low Carbon Industrial Transition Economic Area (LCITEA)
(8) Support to key development projects
(9) Coordination and communication between landowners and operators and Public sector (e.g. Tees Manufacturing Group) and maximise industrial symbiosis (see also e.g. E&I 2-4). Use of account management approach to company assistance
(10) Lobbying on issues such as Dow EO - Croda, UK Ethylene Grid Optimisation, decommissioning of Royal Navy Ships, setting up of LCITEA, network rail improvements and attraction of shipping lines
(11) clearance of redundant assets
(12) use existing information to identify and agree individual company contributions to low Carbon transition plan

Table 5.3 Proposed Intervention Projects – Local Energy and Site Infrastructure (E&I)

Local Energy and Site Infrastructure Proposals: (E&I)
(1) Improve Availability of Key wayleave Corridors
(2) Options for Integrating Energy Use
(3) Action plan to develop District heat network(s) at Wilton and Billingham
(4) Site Energy Optimisation
(5) Influencing Service Costs

Table 5.4 Proposed Intervention Projects – Transportation and Logistics

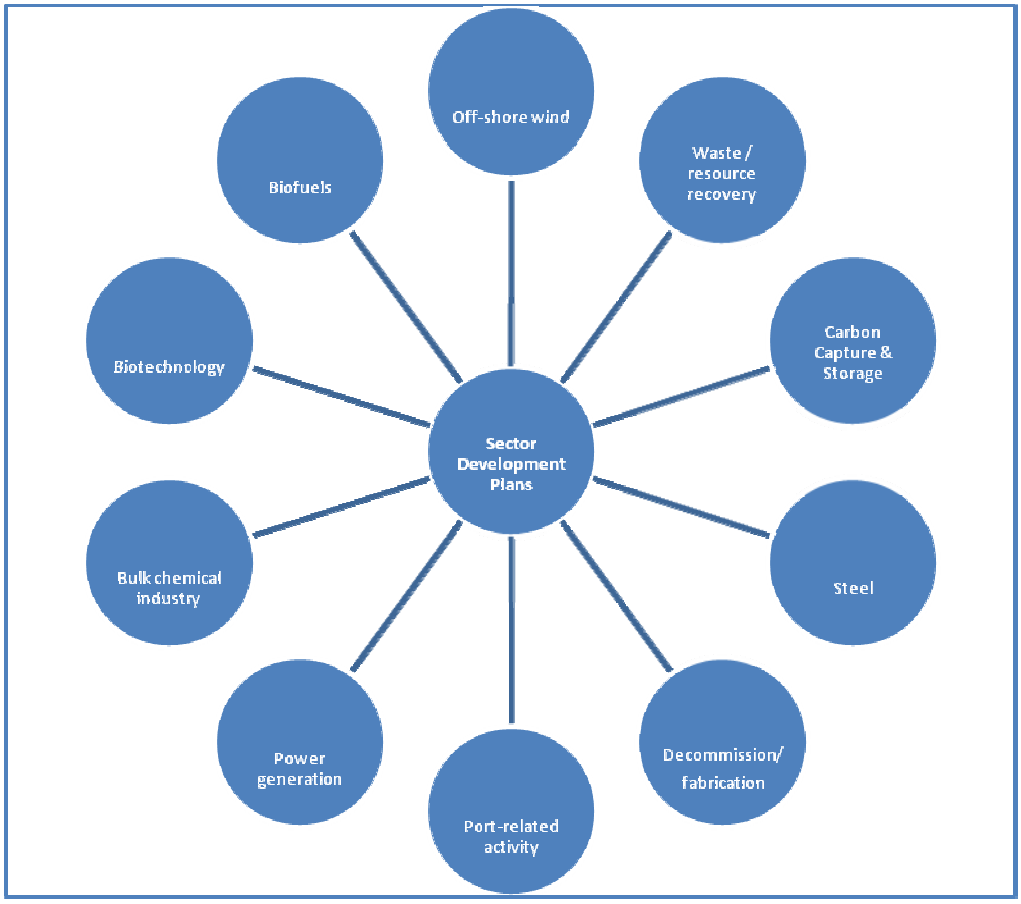
Transportation and Logistics (T&L)
(1) North South Tees Roads - review and monitoring of local road network and monitoring/coordination of public and private sector investments;
(2) Development of a River Management Database as a strategic tool to de-risk capital dredging, if and when required;
(3) North South Tees Rail Interventions – including formation of a rail users group to identify opportunities for increased use of rail sidings and rail heads and to assess connectivity.

5.2 Sector Development Plans (SDPs)

5.2.1 Section 3 has identified a range of potential sector growth opportunities which could be supported by public sector intervention. In order to progress these opportunities and promote their realisation, the preparation and delivery of a series of sector development plans has emerged as a key intervention. These will seek to identify key strengths and elements of competitive advantage that currently exist within the sectors in the study area and to outline potential long term growth opportunities. They

will consider how specific growth could be achieved in each of the sectors and set out a clear forward strategy for developing and promoting the sector opportunities. The sectors are outlined in Figure 5.1 below:

Figure 5.1 Sector Development Plans



5.2.2 The sector development plans will set out actions to 'guide' and promote the growth of the individual sectors. It will be important to ensure that the plans attract 'buy-in' from the respective local authorities and that they are in agreement over their content, aims/objectives and the actions emerging. The plans will not only serve as 'toolkits' for the public sector to inform its sector development activity, but will also be used as strategic marketing material to promote the sector opportunities of the North and South Tees area to potential private sector investors. Having such plans in place could assist in enhancing investor confidence in the area through demonstrating specific sector focus and commitment by the public sector. It will be important for a suitably experienced individual or team to take ownership of the preparation and delivery of the plans and this is discussed further below.

5.2.3 The sector development plans will include:

a Market analysis

b Identification of sub sectors to target

c Analysis of existing operations and their barriers, opportunities

d Constraints and interventions to assist with new investments

e Plan to obtain 'buy-in' from relevant agencies and authorities

f Action plan of organisations to target, message to convey and objectives set.

The sector development plans, along with sector summaries, are presented in Appendix 1A.

5.3 North South Tees Framework Ownership and Delivery

5.3.1 The above sections have identified a range of sector and site specific opportunities for public sector intervention within the study area. In addition to these, a range of more generic 'area-wide' opportunities have been identified which could address some of the key issues and challenges outlined in Section 2. These relate to the overall governance and ownership of this Development Framework and the structure and mechanism for its proposed delivery. There is a clear need for co-ordination of the key actions emerging from the Framework and for this to be set within a robust partnership structure, to ensure that necessary priority is given to the North and South Tees study area and that the impact of any public sector investment is maximised.

5.3.2 Within this 'framework ownership and delivery' project a number of key issues/actions for consideration have been developed, as set out below and described in full in Appendix 1B:

Overall Governance Structure

5.3.3 The key issue for this Development Framework is the need to identify and secure a dedicated individual/team to promote the successful delivery of the emerging projects and interventions. Tees Valley Unlimited (TVU) is the sub-regional partnership for the Tees Valley and has a high level 'leadership' Board, supported by a second tier Executive Board which is supported by specific themed sub-boards. The recommendation of this study is that a leadership team is developed to take forward the projects in North South Tees. The team would need to have an executive (delivery) function and a task force (co-ordination) role – see Appendix 1.

Ownership of Sector Development Plans

5.3.4 As the sector development plans are developed and delivered it is important that a high degree of coordination is maintained in order to review relative progress and achieve a 'joined up' approach

Study Area Spatial Plan

5.3.5 The lack of a holistic approach to strategic land use planning within the study area is considered to have contributed to the 'site-wide' fragmented and disjointed land ownership issue described above and in further detail within section 2. Given the currently emerging Local Development Frameworks (LDFs) as the core planning policy documents for each of the authorities, there appears to be a strategic opportunity for the public sector partners to develop a site-wide land use plan for the study area which correlates with the land use designations within these LDF documents. This would promote a more holistic approach to the long term spatial planning of the study area and would ensure that there are no conflicts between the land uses proposed as part of this study and those within the emerging planning policy frameworks.

5.3.6 A key output from the Framework is therefore the study area layout which sets out the key areas sites and the use categories that they should be retained for. This

approach requires the local authorities to endorse the plan and agree a mechanism through which any proposals or planning applications that impact on the site study area (either within it, or within a zone that could impact one of the constraints such as potential Health and Safety Zone, flood risk, contamination or European designated sites) are notified to the North South Tees team within the TVU for comment. This will require a memorandum of understanding to be drafted and agreed between TVU and the local authorities, which ensures that inappropriate development that could impact on the key sites is discussed and the way forward agreed at the TVU level. In addition, monitoring of development of the opportunities in terms of actual and predicted demand for services and land will be important as this will allow adjustment of priorities if required and if competing/conflicting demands are present.

Public Sector Land Availability Strategy

5.3.7 Section 1 identified the fragmented land ownerships across the study area as being a significant constraint to potential land development opportunities. A multitude of land ownerships has arisen as a result of a series of ad hoc transactions within the area. A significant opportunity for the public sector is therefore to undertake a review of land availability. This could enable a clear strategy for industrial development within the study area to be pursued by the public sector partners. Given the potential issues around land contamination identified within Section 2, this could also provide the public sector with the opportunity to undertake remediation works to enable 'clean' and 'ready' sites to be brought forward for development.

Provision of Knowledge and Expertise

5.3.8 It is envisaged that the new 'Head of North and South Tees' and supporting team would be the key point of contact for promoting economic development and inward investment within the study area. The knowledge and experience of the head and the team in relation to the study area and its individual sites will therefore be critical in this process, particularly in terms of engaging with the private sector and other public sector agencies.

5.3.9 The team will be supported by a network of technical experts that will be able to liaise with the various permitting bodies e.g. National Grid, Environment Agency and be able to proactively support developments through the various procedural requirements and therefore de-risking projects.

Funding of Off-Site Infrastructure

5.3.10 The Framework has identified a number of investments that would enhance the capacity of the service infrastructure system - such as upgrades to the strategic network (e.g. grid connections, gas supply, water & sewerage etc). It is challenging to secure upfront investment from the utility companies to provide this, without confirmation of end users and their requirements, which often leads to delays in upgrading works and discourages investment. The public sector should consider a proactive response to this - there are investment models in operation which have enabled the public sector to create a special purpose vehicle which negotiates with service providers to ensure that an upfront investment to address constraints results in a receipt to the public sector through a share of the subsequent connection fee and income. A joint vehicle could be created which also addresses the highway and transport constraints identified by the TVJSU and set out in the proposals for the 'Joint Infrastructure Development Allocation' (JIDA).

5.3.11 Moreover, the purpose of this intervention is to ensure that where separate projects exist that rely on common infrastructure improvements, developments are not held up

by the need for the first development to improve off site infrastructure with a disproportionately high burden of the overall cost. This links to the planning process and the assessment of community contributions that result. The current project-by-project approach can lead to frustration for both developers and service providers when capacity is limited or new investment is needed that may not be justified for a single project. The 'Head of North South Tees' would operate as a 'single voice' for the area allowing better planning of service provision and coordination of projects to optimise costs and timing. In order to fulfil this role, the 'Head of North South Tees' will need to secure buy-in from both project developers and service providers such as National Grid Transco and NWL, in addition to specialist skills and expertise (e.g. in relation to grid connections – see above).

Promotion, Branding and Image of North-South Tees

5.3.12 The new 'North South Tees' team will need to champion a brand for the area to promote it as a destination for industrial development and increase its ability to attract inward investment. Other industrial clusters such as Rotterdam are marketed more extensively and it is considered that the North-South Tees area would benefit from such activity at regional, national and global levels.

5.3.13 The Tees Valley Green Infrastructure Strategy, 2008, must be part of this initiative as its implementation will support the overall development of the study area and will have a particularly positive impact for North South Tees.

Support to Key Development Projects

5.3.14 A critical role for the public sector is to work alongside and support the private sector to achieve its objectives, particularly in the current economic downturn. The public sector cannot directly fund the private sector, but it can support its activities by working closely with interests to ensure that constraints are known, fully researched and mitigation proposals in place, prior to planning applications being submitted. The study area, in particular the river and shore line, has a number of significantly important environmental designations and future major development proposals (Able UK, heavy crude upgrader, river dredging) could face significant time delays if issues are not brought forward early and in full discussion with planning and environmental bodies. The role of the co-ordination body will therefore be to proactively consider these issues and work with the private sector and regulatory bodies at an advanced stage - so as projects are not unduly delayed at the planning stage.

Co-ordination between Landowners/Operators

5.3.15 A key task for the new 'Head of North and South Tees' will be to develop effective relationships with the key businesses and partner organisations in the study area to enable a process of collaborative working. This could further enhance the potential success of the delivery of the Framework and of the study area itself.

Lobbying

5.3.16 A number of issues would benefit from lobbying, these are defined in Appendix 1B although this list is not exhaustive.

Clearance of Redundant Sites

5.3.17 An issue for land availability and the image of the study area, options for clearing redundant assets held by private companies should be explored recognising the fact that some of the sites in the study area have significant process plant awaiting

demolition and that such an exercise would cost several millions of pounds per site. Given the number of sites with significant liabilities which have lain dormant for many years, some in ideal development locations, that public sector intervention will be needed to drive the clearance of these sites as this activity will not happen without it.

Low Carbon Industrial Transition Economic Area (LCITEA)

5.3.18 The UK Government recognises that the shift to a low carbon economy represents a huge industrial opportunity for the UK.

5.3.19 The UK Low Carbon Transition Plan, a comprehensive plan to move the UK onto a permanent low carbon footing and to maximise economic opportunities, growth and jobs, plots how the UK will meet the cut in emissions set out in the budget of 34% on 1990 levels by 2020.

5.3.20 The Transition Plan is the most systematic response to climate change of any major developed economy, and sets the standard for others in the run up to crucial global climate talks in Copenhagen in December.

5.3.21 The UK Low Carbon Industrial Strategy, published alongside, sets out a series of active government interventions to support industries critical to tackling climate change. It puts workers and businesses in the UK at the forefront of massive global opportunity by targeting key industries and regions where the UK has competitive or commercial advantage, including offshore wind, marine power and carbon capture and storage.

5.3.22 The Tees Valley area is well positioned to meet this challenge. It is recommended that consultations are held with all operators to understand where initiatives could be supported to achieve low carbon operation and to identify individual emission targets.

5.3.23 Individual targets could then be combined to create an objective for the whole area to effectively become a recognised Low Carbon Economic Area.

5.4 Local Energy and Site Infrastructure Proposals (E&I)

5.4.1 Sections 2 and 3 of this report identify a range of issues and opportunities in relation to the local infrastructure of the study area, particularly in relation to the supply, distribution and integration of electricity and heat. Some of these relate to future growth and expansion opportunities due to the increasingly important role of renewable and alternative energy supplies, and emerging sector-related projects from these have been identified above. Other opportunities and associated emerging projects relating to the existing infrastructural and asset base are set out below with full details provided as Appendix 1C.

Improve Availability of Key Wayleave Corridors

5.4.2 The improved availability of pipeline space within existing corridors could provide an element of de-risking to projects such as the IGCC and future CO_2 and steam networks. It could also provide additional flexibility on location for new projects i.e. they would not be constrained to choose a particular location because of a lack of pipeline availability elsewhere. This project therefore aims to improve the pipeline network within and beyond the study area in terms of use charges and availability / capacity for moving products between locations e.g. hydrogen, syngas, carbon dioxide, other bulk gases/liquids. The public sector could purchase corridors or

pipeline 'bundles' and ensure availability to new projects in a strategic manner or it could develop agreements or options with owners of redundant pipelines to guarantee their availability for future projects. A key outcome of this would be the removal of pipeline availability as a constraint to project development which could assist in the strategic development of an area-wide CO_2 CCS network in particular. The principles of this project should be extended beyond the key issue of pipelines to all way leaves that influence site costs such as cables.

Options for Integrating Energy Use

5.4.3 Across parts of the study area, particularly in Seal Sands/North Tees, there is little integration between steam users and steam generators with some sites being net producers at times and net consumers at other times. This project therefore proposes the implementation of a steam supply network to connect producers and users allowing steam assets to be used more optimally and energy costs to be reduced. It is important to ensure that it is not dependent upon a single producer/user, that new entrants can connect to the network once it is in place and that smaller plants can participate at competitive rates. The role of the public sector in this project could range from facilitating discussions with the private sector businesses who then implement the physical works, to establishing a public sector-led Energy Service Company (ESCO) to implement the works. The key outcome of this project would be the establishment of a steam network to reduce the energy costs of new and existing businesses, which could then be used as a model for industrial collaboration elsewhere in the study area.

Action Plan to Develop District Heat Networks Study Area-wide starting at Wilton and Billingham

5.4.4 Many of the industrial sites in the study area produce "low grade" heat as a by-product of their activities (in the form of hot water or low pressure steam) and this heat typically has limited use on site and is dumped, either to the atmosphere via cooling towers or to the river in cooling water. This low grade heat could be used for space heating/hot water provision for commercial and domestic buildings, cooling/chilling using absorption chillers, low temperature heating to greenhouses etc.

5.4.5 This project proposes the development of an action plan to establish one or more heat networks to use spare heat from industry to supply local commercial, industrial and domestic users of low grade heat. This could use heat that is currently wasted to provide useful energy to existing and future users in the study area which could provide income to the heat producers, result in lower energy costs for existing users of heat, improve the overall energy efficiency of the study area through reduced greenhouse gas emissions and provide a 'USP' for the study area to both attract future investment and to demonstrate the green credentials of the study area.

Site Energy Optimisation

5.4.6 This project involves optimisation of on-site waste heat through a review of operational practices and computer control systems (such as SCADA) as a zero-capital approach to reducing energy use and waste and evaluating the use of remaining spare low pressure steam/hot water to generate electricity using Organic Rankine Cycle (ORC) technology.

5.4.7 ORC uses low temperature heat resources to vaporise a low boiling point fluid which drives a generator. This allows lower temperatures to be used than those required to generate using a conventional steam power cycle. The project for the public sector is to:

- encourage companies to consider use of the technology and whether it could help reduce their energy costs; and,
- potentially assist in setting-up a demonstration unit at one site, if project is viable for the private sector.

5.4.8 Such a system could potentially reduce electricity costs for industrial sites and the project requires initial discussions with potential plants to identify levels of interest before potentially commissioning feasibility work and a pilot demonstration project.

Influencing Service Costs (Energy, Utilities)

5.4.9 The study area contains a number of international chemicals process complexes with significant infrastructure. Costs for energy and other services often represent a major element in manufacturing costs and can be a differentiator between international locations, as higher service costs can impact on both costs for existing businesses and on location selection for new businesses. This project therefore proposes to use public sector influence to encourage/assist service providers to offer more competitive long term rates to operators through the following:

- encouraging supply contracts provided to process plant operators to be competitive; and,
- assisting service providers to offer more competitive rates when needed e.g. via tax breaks on energy costs when UK prices peak compared to elsewhere.

5.4.10 More competitive service costs in the area would benefit both existing and future operations. In addition, mechanisms to shield prices from the volatility of UK energy markets would be useful in providing more certain long term costs for operators.

5.5 Transportation and Logistics

5.5.1 Key transport related interventions relating to road, rail and river dredging and frontage and are described in Appendix 1D.

5.5.2 In general terms the study area is well served from a transportation and logistics point of view. A logistics workshop was held as part of the Stage 1 report and interestingly, many of the issues raised as needing improvement were similar to those raised in relation to other workstreams, namely leadership, ownership, coordination, delivery and image. This is of particular importance in relation to the coordination of funding of off site infrastructure and section 106 agreements. There is considered to be a real opportunity to improve the way in which developer contributions are managed so that the process does not delay or deter investment and that it is 'joined up'.

5.5.3 Many of the key developments that could take place within the study area in the next 5-20 years (see Appendix C) – including recently commissioned projects such as the Ensus and Sabic LDPE new facilities - have a significant impact on the local road infrastructure. The proposed North South Tees roads project is concerned with assessing predicted road use and development (as was undertaken in the Stage 1 transportation work) and ensuring that opportunities for improvement are not missed and constraints are understood within the context of the wider transport initiatives in Tees Valley.

5.5.4 The proposed North South Tees rail project involves the setting up of a rail users group to improve working arrangements. A frequent constraint identified by local stakeholders is the difficulty in obtaining information regarding rail opportunities, e.g. appropriate contacts for rail are unknown or difficult to get a positive response from by businesses. This also affects proposals for funding towards rail service or infrastructure improvements. As such, there is frustration from some stakeholders that the opportunities for greater rail use are not available. This intervention seeks to manage this constraint. The rail interventions also propose lobbying with regards to gauge enhancements to/from and on the East Coast Main Line and assessing the feasibility of increased rail connectivity and rail sidings.

5.5.5 Finally, a strategic dredging and river frontage plan is proposed. Essentially, this involves the public sector collating information relating to dredging and where necessary, funding surveys to de-risk potential developments.

SECTION 6

LONG TERM ECONOMIC BENEFITS

6 LONG TERM ECONOMIC BENEFITS

6.1 Introduction

6.1.1 This section presents the potential long term economic benefits that could be achieved through investment by the public sector in North South Tees, to address the competitiveness challenges identified in earlier sections. At this stage, a majority of the emerging interventions are strategic and 'high level' in nature with an emphasis on sector development strategy and co-ordination. It is anticipated that direct investment projects, which lead to direct and indirect outputs, will emerge in due course.

6.1.2 The interventions emerging represent a set of strategic actions focusing upon transforming the structure of the local economy, rather than a set of site-by-site direct investments generating employment outputs. This strategic approach responds to current issues, in terms of identifying new opportunities for the study area in light of the current economic downturn, and continuing loss of 'satellite' plants in the area. This strategic approach seeks to identify opportunities for the study area to transform itself to support the increasingly important low carbon and renewable energy agendas.

6.1.3 The following sections therefore outline the key 'outcomes' that could arise from the implementation of the projects and interventions identified within this Framework.

6.2 Potential Outcomes and Benefits

6.2.1 The interventions offer the potential to 'make a difference' in the study area through both enhancing existing economic activity and also providing opportunities for economic growth and diversification. The traditional economic base of the study area is facing critical challenges brought on by increased global competition, which are magnified in the current economic climate. This Framework has been developed in response to this and portrays a clear message that the Tees Valley is being 'proactive' in considering a forward strategy now rather than further down the line when it is arguably too late. This Framework could assist in enhancing confidence in the area amongst both the public and private sectors which is likely to be critical to its long term economic success.

Addressing Strategic Issues and Challenges

6.2.2 The key element of the rationale for public sector intervention is the need to address a number of fundamental issues. The implementation of this Framework, combined with the asset-based work that has been undertaken as part of the previous Stage 1b commission, has the potential to enhance confidence within the private sector that key issues are recognised and are being addressed. The principal elements of this are:

- addressing strategic land availability through proactive negotiation with third parties;
- resolving issues of energy costs and the monopoly position of energy supply; and
- the co-ordination of a strategy and an Implementation Plan that will provide focus and direction for the growth of existing and new industry within the North South Tees.

Establishing the Role and Function of North South Tees

6.2.3 The interventions seek to both enhance existing economic activity and to create new opportunities for economic growth and diversification. The traditional bulk chemical and steel industries within the study area that represent the core activity need to move through a transition process to enable the 'value' in the area to support the growth of low carbon environmental technology, with power generation, manufacturing and the recovery of resources/recycling. The opportunity is for sector diversification which could achieve this move, particularly through the preparation and implementation of the actions within the sector development plans. These 'forward looking' strategies seek to identify optimum areas and opportunities for sector growth, promoting a shift towards a broad low carbon economy for North South Tees.

6.2.4 The Framework identifies the potential for newly emerging and innovative areas such as those related to the renewable energy and waste processing sectors. This could enable the study area to develop a niche in such market places, thereby providing it with a significant competitive advantage over other areas. The low carbon agenda is gaining increasing prominence at regional, national and EU levels and a focus upon the growth of such key sectors could reinforce the Tees Valley's position as a leader in such developments. This has obvious image benefits for the region.

Capitalising Upon the Existing Economic Asset Base

6.2.5 The development of this Framework and the emerging interventions fully recognises the existing economic asset base and the need to capitalise upon this resource. The asset base provides wide and leading edge experience in technology, power generation and processing.

6.2.6 The sector development plans propose the use of existing assets, skills and acknowledged experience to 'transform' the area into a low carbon economic activity zone. The proposals seek to adopt skills and knowledge which is already present in the immediate area, to take advantage of the existing employment base and develop it to service low carbon activity and processes. The Framework is therefore not seeking to make North South Tees something radically different - the assets relate to the river, the feedstocks and the power generation knowledge. The sector development plans set out the need to nurture this into sustainable long term economic growth.

6.2.7 This promotes a sustainable and more efficient long term economic outcome for the area. It also enables a niche to be developed through a unique branding opportunity which could enhance the area's ability to attract inward investment going forward.

Delivering Economic Policy Objectives

6.2.8 As identified in section 2.3 of this report, there is a compelling policy rationale supporting the economic growth and long term sustainability of the Tees Valley. This recognises the importance of manufacturing to the UK economy and also the strategic importance of the area as a cluster of activity within the petrochemical and steel sectors to underpin the wider manufacturing economy. It seeks to support this industrial cluster through building upon existing assets through either expansion and/or diversification towards the 'higher value' end of the productivity cycle.

6.2.9 Policy also identifies new opportunities within the Tees Valley and the study area in particular, to build upon emerging sectors such as those related to renewable energy and waste processing. The RES identifies 'Energy and the Environment' and the 'Process Industries' as key 'pillars' of industrial opportunity within the North East

region and the projects emerging from this Framework have the potential to fully support and promote these within the North and South Tees study area.

6.2.10 The strategic alignment of this Development Framework with the current policy agenda is therefore clearly defined and provides strong rationale for ongoing public sector investment in the area to deliver the strategic objectives.

Enhancing the Socio-Economic 'Fabric'

6.2.11 As identified within section 2.4, the study area is characterised by a range of equity and competitiveness challenges which undermine performance. Low productivity, competitiveness and skills and high levels of unemployment and deprivation are all characteristics of the area. The projects and initiatives being proposed seek to address these issues, primarily through the safeguarding of employment in the short-medium term and also through the creation of new employment opportunities in the medium-longer term.

6.2.12 The local industry base is becoming increasingly less competitive. The projects in the Framework focus upon a transition in the local economy towards the low carbon agenda which could offer the potential to provide high quality employment opportunities with a related skills and training provision. This will support and enhance the competitiveness of the local economy, through an approach which builds upon existing skills and assets and therefore has less risk than a radical shift in employment activity.

6.2.13 There is a recognition that the socio-economic challenges of the area relate to far more than solely unemployment and skill related issues. However, the long term spatial planning and strategic economic focus of the emerging projects/interventions could promote a 'step change' in the local economy over time which could assist in overcoming some of these issues.

Improving the Physical Environment

6.2.14 Much of the study area is characterised by an underutilised, derelict, potentially polluted and aesthetically displeasing physical environment, resulting from the heavy industrial uses that have dominated the landscape for many years. It is recognised that this is common in such industrial areas, given the association with petrochemicals and steel. However, the initiatives proposed in this Framework present an opportunity to enhance the physical attributes of the environment through the following:

- securing underutilised and derelict land to bring it back into effective use;
- seeking to attract inward investment and new businesses;
- promoting a shift towards more 'green' sectors focusing upon the low carbon agenda;
- creating energy efficiencies and enhanced integration to reduce usage and emissions; and,
- supporting the development of a carbon capture and storage (CCS) transmission network.

These are all key activities in 'transforming' North South Tees. Whilst it is a manufacturing location, the quality of the local environment requires investment to support wider image and branding activity.

SECTION 7

DELIVERY AND IMPLEMENTATION

7 IMPLEMENTING THE FRAMEWORK

7.1 Introduction

7.1.1 The principles underpinning the Framework reflect a long term approach to re-shaping the economic activity within North South Tees. This draws on existing strengths and assets, with a refocus on low carbon activities that provide opportunities for long term economic sustainability.

7.2 Delivering the Transition

7.2.1 The primary challenge to achieving the transition set out in this Framework is to establish a basis for the long term stewardship of North South Tees. This has been discussed widely with consultees and the client team and has emerged as a key issue to address – at all levels there is recognition that the complex nature of the activity within North South Tees, together with its national and regional importance, requires focused resources to manage relationships, effect long term proactive planning and champion the area. The creation of a figurehead/leadership post, with appropriate revenue resource and the requirements for that have been set out in previous sections, with the proposition that at this stage, the post would be within the Tees Valley Unlimited structure. This may change in due course, subject to the evolving requirements for that coordination activity.

7.2.2 Whilst there are immediate tasks that partners are progressing, such as securing land for development in the study area and working closely with Corus and other key businesses in the area, other interventions will follow from the preparation of the sector development plans. These action plans are a key task to progress in the short term to establish the area's opportunities to develop the key sectors (e.g. offshore wind, bulk chemicals, steel) in addition to a strong CCS proposition which is also considered high priority.

7.2.3 In terms of proactively addressing infrastructure constraints, the TVJSU is already considering a forward funding mechanism for strategic highway works across the Tees Valley – the Joint Infrastructure Development Allocation. There is the opportunity for this to be extended to address the service infrastructure capacity constraints identified and included within the project schedules – there are models which have been used elsewhere which enable the public sector (subject to capital investment resource availability) to forward fund strategic infrastructure provision in partnership with the private sector (e.g. utility companies) and secure future receipts based on connection charges and use tariffs. This provides the necessary infrastructure upfront, demonstrating to the private sector the forward thinking approach of the public sector and also enhancing the relative competitiveness of the Tees Valley as a location for economic activity.

7.2.4 There are a number of interventions identified at this stage which will require mainstream RDA and regional funding to achieve, in particular relating to land availability and the ongoing discussions with Corus regarding their future trading position and its considerable land asset. There is also the need for ongoing regional commitment and support to the development of a CCS proposition in North South Tees – the area is well placed to respond to the potential 'pilot' funding that could be available from national and European governments with clear benefits to the local economy and to the attractiveness of the Tees Valley as an investment location.

7.2.5 The interventions summarised in section 5 have been ranked in terms of:

- urgency – how quickly they need to happen in order to capitalise on the opportunity, and;
- importance – how important is the intervention to making the opportunity a reality

and grouped them into their geographic range - local/regional, national, European or global. The results of this exercise are displayed in the figures below and provide an indication of the relative priority of the interventions.

Figure 7.1 Local Interventions

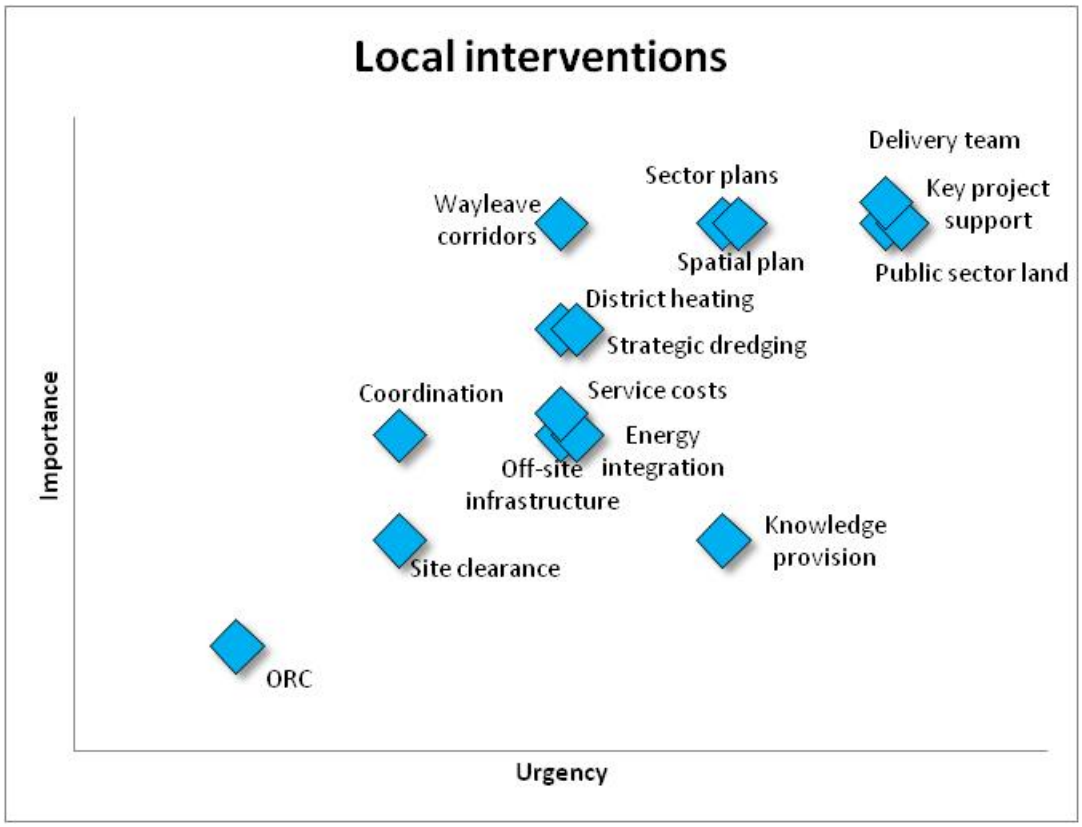


Figure 7.2 European/National Interventions

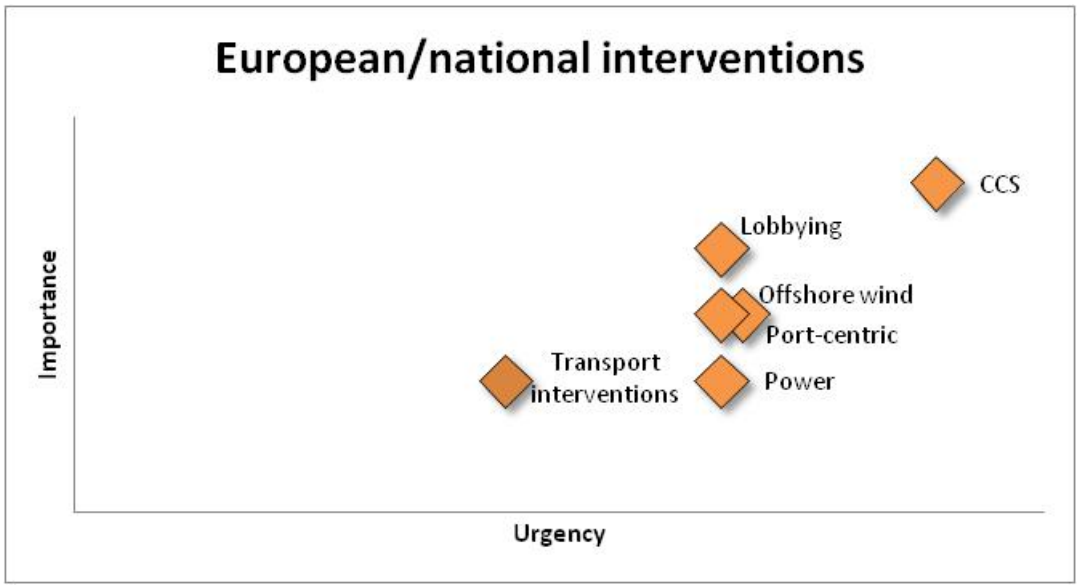
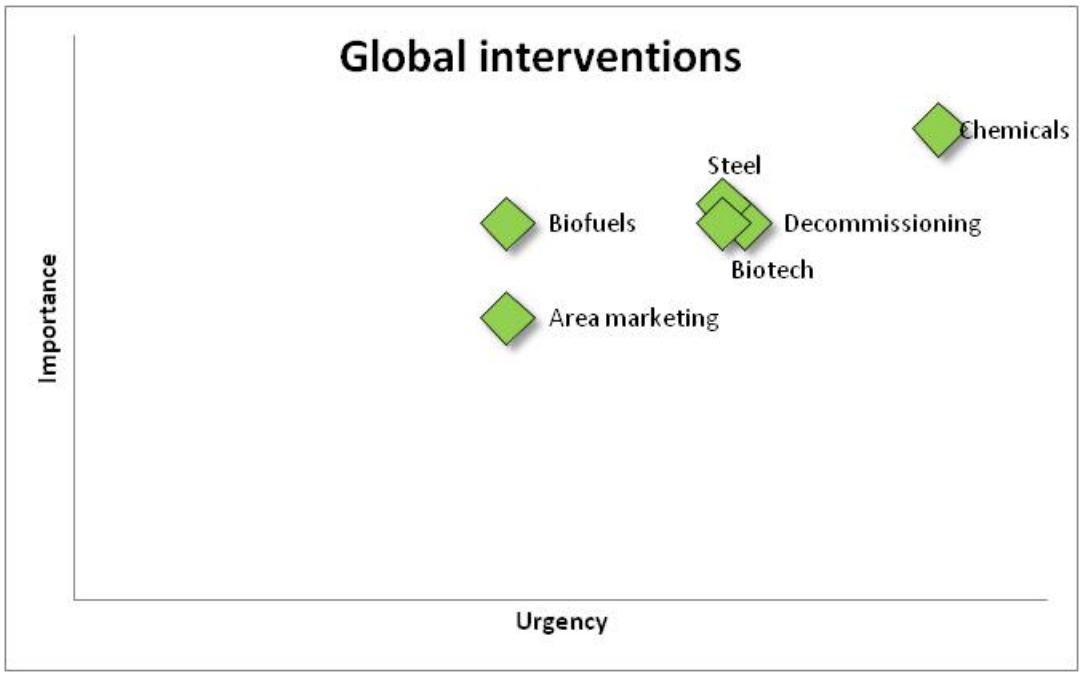


Figure 7.3 Global Interventions



7.2.6 There are tasks identified and discussed above which will require resource in the short term and some of this is already subject to discussions between the parties. Moving forward, the specific projects and the scale of potential public sector resource and intervention will emerge from the completion of the sector development plans.

7.2.7 For example, the region is working closely with government and the private sector to ensure that the North East is well placed for a significant share of the benefits from the offshore wind sector – the opportunities/implications of this for North South Tees will emerge but clearly the history, experience and the heavy manufacturing base of the river places it strongly for securing investment. The sector development plan in that context could identify the need for land assembly to provide large riverside sites for tower and foundation manufacture. In that scenario, it would then be appropriate to consider how the public sector might intervene to best effect – for example, the establishment of a land acquisition and ownership vehicle, perhaps in conjunction with a private sector partner.

7.2.8 There are a range of tried and tested mechanisms such as the public sector company model, the Joint Venture, the Local Asset Backed Vehicle, together with emerging models such as Tax Increment Financing (Tif) which could all have a role in the varying activities that will undoubtedly emerge across the study area. The key principle when considering this has to be that 'form follows function' – the starting point needs to be clear on what is required and to avoid establishing new mechanisms unless they have a specific and identifiable role.

7.2.9 Given the nature of North South Tees, with a number of large private sector interests in key strategic locations, then there is likely to be pressure for the public sector to intervene directly to support individual businesses, particularly as part of a recovery plan or to kick start new market activity. The partners need to be cautious in terms of state aid implications and draw on specialist advice that is available from within the RDA and acknowledged legal experts within the region on this issue.

7.3 Priority and Phasing

7.3.1 The Framework contains a range of activity which represents a long term set of interventions for North South Tees while further more detailed projects will emerge from the sector development plans in due course. In terms of priority in the short term – the next year – the following are considered to be the key issues to progress:

- Maintain momentum with the private sector that has been mobilised through this work – seek opportunities to have regular events to report progress, seek opinions to build upon existing trusted working relationships with all sectors of the area's economy;
- Discuss and agree with the partners the format of the leadership post and support team, including role, objectives, performance targets and the structure within which that will reside and be responsible to including a detailed job specification for the Director and remit for the team;
- Appoint the 'Head of North South Tees' and the support team
- Continue discussions in relation to land availability
- Progress the sector development plans – with priority given at this stage to offshore wind, decommissioning, the bulk chemicals sector, steel and CCS
- Prepare a business plan for North South Tees – to provide a flexible management tool which identifies the key tasks, the scale and phasing of receipts and which can be adopted as the blueprint for securing financial commitment from partners.

The purpose of the above is to provide guidance, at this stage, on the key tasks to progress. These will undoubtedly change with events and higher priorities may emerge. However, the challenge is to ensure that momentum is not lost from the transition agenda that is set out within this Framework. The focus on a leadership and governance structure that recognises the critical importance of North South Tees and that has the commitment and backing to address the issues identified is the key recommendation.

SECTION 8

STAGE 1B REPORT REFERENCES

8 STAGE 1B REPORT REFERENCES

Archaeology Report June 2009

Asset Report (General) November 2009

Asset Report (Electrical) October 2009

Energy Report July 2009

Flood Risk Assessment September 2009

Health and Safety Report September 2009

Transportation Report November 2009

APPENDIX 1 – PROPOSED INTERVENTION PROJECTS

CONTENTS

APPENDIX 1A

PROPOSED INTERVENTION PROJECTS – SECTOR DEVELOPMENT PLANS

TEES VALLEY JOINT STRATEGY UNIT

NORTH AND SOUTH TEES INDUSTRIAL DEVELOPMENT FRAMEWORK

SECTOR 1 - OFF SHORE WIND

SECTOR OPPORTUNITY

1) Off Shore Wind

The need to reduce the reliance on carbon based energy fuels has been a strong focus of international debate over the last 15-20 years, for environmental reasons but also in consideration of the 'security of supply'. Carbon based fuels present a finite supply in a limited number of locations and nations are increasingly focused on how to develop renewable sources of energy production that they can to a certain extent control, without the need to rely on often unstable third parties. Offshore wind technology has emerged as a potential opportunity by which this may be achieved and Europe is well advanced in this field, currently providing 60% of the total global wind capacity of 94GW. However, the offshore market only contributes 1GW of this with the UK and Denmark leading the way, contributing 37% each to the global offshore wind capacity. It is forecasted that by 2012, European offshore wind capacity will have increased from 1GW in 2007 to 7.4GW, with broadly an additional 4GW being provided through the UK[1]. Furthermore, the European offshore market has a number of 'strong drivers', including the planning and environmental constraints associated with onshore development but also the steadier, stronger wind flows. This contrasts strongly with the US for example, where offshore is a non-market, largely as a result of onshore land availability.

Hence, over the last 10 years, as the UK has developed its recognition for a balanced energy portfolio, the Crown Estate has undertaken licensing rounds for offshore wind in UK waters. In 2001, Round 1 allocated 14 lease options totalling just over 1GW of generating capacity (equivalent to approximately 500 turbines). Each lease term was for 22 years, including decommissioning. The Tees Offshore windfarm, under development by EDF, is the only one in the immediate vicinity of the Tees. Round 2, in 2003, allocated 15 leases, of up to 50 years, for a total of 7.2GW. The third round is expected to be awarded in late 2009 covering 9 zones totalling 25GW. One of these major zones lies off the North east coast, with two more within approximately 150 miles of the Tees. If the Tees can position itself as a supply base for these developments, it will have the opportunity to create a new industry sector with a horizon of at least 50 years. It has been estimated by the UK Government that the offshore wind sector could create 40,000 – 70,000 jobs in the UK by 2020.

The study area is considered to have a number of attributes that make it attractive for supporting the growth of the UK offshore wind sector, as set out below:

- access to steel from the Corus plants – the key material for use in the construction of the tubular turbine towers;
- proximity to the North Sea and its high and constant wind speeds and shallow waters;
- availability of land adjacent to deep water for the manufacture of turbines/towers and their export to offshore construction sites;
- availability of skills within the heavy engineering sector to support the manufacturing process;
- good accessibility to strategic road and rail network for logistics purposes; and,
- proximity to the Round 3 Offshore Wind Programme sites.

The development of offshore wind technology is therefore considered to be a significant opportunity for the study area and would fully support the current policy agenda at both national and regional levels. It would provide a form of renewable energy to meet the energy requirements of not only the study area, but the wider UK domestic and industrial economy.

SECTOR DEVELOPMENT PLAN 1

[1] *Economic Appraisal of O-NE investment in turbine blade testing facilities at NAREC, Blyth, GENECON (October 2008)*

Off Shore Wind

1) Project name

Develop and Deliver North South Tees Off shore wind opportunity

2) Project location

North South Tees Study Area – Riverside Sites
Other sites in Tees Valley (e.g. Hartlepool for assembly, Darlington for advanced engineering).

3) Description of project

This project will see development and delivery of a detailed action plan to maximise the opportunity presented by the planned increased capacity in off shore wind electricity generation. The scale and timing of this capacity increase will depend on a number of factors, however, it has been estimated that the opportunity represents a total UK investment as high as £75bn although it is recognised that significant barriers exist which need to be overcome to encourage investment.

Of this sum, it has been estimated by the Carbon Trust that £3.8bn – £5.1bn is required in new factories required to overcome bottlenecks in the medium term while an integrated innovation and manufacturing strategy could create up to 70,000 jobs and £8bn in annual revenues for the UK by 2020.

The sector development plan needs to identify and deliver the following:

1. SWOT analysis of Tees Valley in relation to the opportunity;
2. Ongoing market intelligence and discussions with key players (developers, turbine manufacturers, PD Ports etc.) to identify requirements and how these could be met;
3. A comprehensive list of organisations to target – developers, utilities, manufacturers, operators and a plan of how the business development campaign will take place;
4. Analysis of constraints and interventions required to remove these (see also accompanying sub project on electricity cable)
5. Buy-in and support from local, regional and national government and other key stakeholders (e.g. PD Ports)

4) Project rationale and opportunity

The rationale is summarised by the following SWOT analysis:

Strengths:

Sites of sufficient size and with sufficient river wharfage are available but will require development work to bring forward for development and this may require public sector assistance. The development work could include land quality assessment and, if necessary remediation, survey and strength assessment of wharfs and site preparation.
Deep water access to bring components in and out;
Local logistics / transport links are good (road and rail);
Well established skill base and in advanced engineering including oil & gas, marine, sub sea technology and civil engineering sectors;
Labour costs lower than mainland Northern Europe

Weaknesses:

Limited land immediately available;
Overhead clearance for sites upstream of SABIC – Teesport cable (see accompanying project);
Wharf availability and condition could be a constraint;
May not be Port's target sector;

Opportunities:

Focus on parts of the supply chain (e.g. Towers, Foundations, Assembly);
New sector, bring forward brownfield land into beneficial use (e.g. South Bank Wharf);

Transfer / development of existing engineering skills from declining sectors to new sectors;
Income for Tees Valley Economy (Port, GVA, etc);
Prestigious, green, industry, could be part of low carbon Tees Valley strategy;

Threats:

Offshore wind opportunity does not benefit UK as much as some expect
Offshore wind opportunity does not get delivered due to national issues (regulatory, grid, government incentives and RD&D required, investment related issues)
Competition from other regions that are ahead in terms of development (e.g. EEDA, NaREC)

5) Anticipated outputs and outcomes

Employment in the supply chain of a new, strategic energy sector
High quality skills
Brings redundant land back into use or replace declining industry
Attracts investment to the region

6) Estimated costs

Primary Cost:

Preparation of sector development plan, £50,000 study
Lobbying / marketing / coordinating efforts £25,000 / annum

Possible costs during implementation:

Remediation and Preparation of site(s) suitable for off shore wind related activities.
Remove cable and install under river (National Grid would 'own' this project).

7) Delivery mechanism, funding and phasing

The proposed strategic body for the area (see project framework ownership and delivery) should take this project forward. This would need to be in close collaboration with One North-East and any regional offshore wind strategy.

8) Potential risks

There is much uncertainty about how the off shore wind opportunity will develop due to technology costs, investment returns, regulatory barriers (planning, grid charges), government commitment. It is the role of the action plan to respond to the unfolding situation in the offshore wind supply chain and react in the best economic interests of North South Tees, taking into account the area's key strengths.

9) Next steps

Agree scope and resources for action plan development

OFF SHORE WIND SECTOR DEVELOPMENT PLAN SUPPLEMENT – Feasibility Study for overhead cable removal

1) Project name

Off shore wind Sector Development Plan: sub project : Feasibility Study into Removing overhead high voltage transmission line crossing Tees

2) Project location

River Tees between SABIC and Teesport

3) Description of project

The project consists of 'undergrounding' the 275 kV transmission line currently crossing the river.

- Link to North South Tees contribution to NE offshore wind strategy – which may need height constraint removed.

4) Project rationale and opportunity

The existing overhead line is a key part of the National Grid transmission system in the study area. It creates a height restriction, however, by preventing vessels or cargoes more than 61.3m in height from using the river upstream.

This creates a potential constraint for the use of upstream areas (e.g. the large Corus owned South Bank Wharf area) for the assembly of offshore wind turbines prior to installation offshore (and therefore the associated high-value component manufacturing that may co-locate with such facilities).

There is an opportunity to remove this constraint by undergrounding the transmission line (i.e. running it in a tunnel under the river).

This project seeks to carry out a feasibility study and develop an action plan to implement this diversion should the off shore wind opportunity provide sufficient justification.

5) Anticipated outputs and outcomes

The output is the removal of a potential height constraint on the river while the outcome is that a number of sites upstream of the cable are opened out to enable shipping out of vertically-assembled off shore wind turbines.

6) Estimated costs

The cost of an initial prefeasibility assessment is estimated at £ 10,000. This would identify indicative costs and feasibility in consultation with National Grid. A more detailed follow-on feasibility study is estimated at £25,000.

7) Delivery mechanism, funding and phasing

Delivery mechanism will need to be confirmed with National Grid who would need need to carry out the work to underground the cable.

Although National Grid funds infrastructure improvements to the network (costs of which are regulated and passed through to network users), it is unlikely that this project could be paid for in this way. Public sector funding would therefore be needed.

The timing of the work would need to fit in with other work on the transmission network (significant upgrades in this area are planned over the next 3-5 years) and so this may represent an opportunity in this regard.

8) Potential risks

- Putting this line underground and under the river may not be technically feasible;
- Capital costs are likely to be high and may be prohibitive;
- Need for higher vessels/cargoes upstream may not materialise;
- Possible timing of potential works (significant outage on transmission network) may be too late for offshore opportunity

9) Next steps

- Commission off shore wind sector development plan and feasibility study in parallel.
- Discuss feasibility with National Grid

TEES VALLEY JOINT STRATEGY UNIT

NORTH AND SOUTH TEES INDUSTRIAL DEVELOPMENT FRAMEWORK

SECTOR 2 – MARINE AND OIL/GAS DECOMMISSIONING AND FABRICATION

SECTOR OPPORTUNITY

2) Marine and Oil/Gas Decommissioning and Fabrication

In 2003, the first of thirteen US navy 'ghost ships' arrived at the Able TERRC (Teesside Environmental Reclamation and Recycling Centre) facility. In 2009, the former French aircraft carrier the Clemenceau arrived. Able identified an opportunity to decommission these vessels under controlled conditions, utilising their dry dock facilities and skilled workforce. Whilst a contentious industry, the availability of the necessary land and resources make this a strong opportunity for the region, with a long-term future as shipping fleets are continually being replaced and environmental regulations controlling the means of breaking getting ever tighter. It has been estimated that globally up to 200 single-hulled tankers need to be disposed of by 2015 and that the market is worth up to £3 billion. The TERRC facility is well-placed to deliver this opportunity given its world class facilities and reputation.

The North East has been a centre of excellence for supporting the North Sea oil and gas industry since its beginnings in the 1970s. As the industry has become more global, and moved from a largely shallow water / surface based rig based operation towards deeper water exploited by seabed wellheads, manifolds and pipelines, specialists in the subsea technology industry have developed in the region, but much of the mainstream fabrication type work has moved to regions of the world, such as the far east, with lower overheads. It was hoped that the £300 million Sea Dragon project would mark resurgence in the mainstream industry. However, this has recently been lost to Singapore. However, the opportunity remains, whilst the oil and gas industry remains, to further strengthen the subsea technology sector, through local organisations such as CTC and Wilton Engineering.

Whilst, as indicated above, the mainstream oil and gas industry is no longer considered a significant opportunity in the region, decommissioning must be identified as a future opportunity. As the North Sea fields come towards the end of their operating lives, there is a requirement to decommission the structures and infrastructure. This may have some of the contentious issues surrounding vessel decommissioning, but could be considered the 'unbuilding' of the structures that were traditionally built in the region and, through careful decommissioning, recycling, and disposal, the region could develop a high value world-class industry. BERR anticipates that decommissioning will peak around 2018, but carry on until 2035 and beyond in a market worth £20Bn.

SECTOR DEVELOPMENT PLAN 2
Marine and Oil/Gas Decommissioning and Fabrication

1) Project name

Develop and Deliver North South Tees Marine and Oil/Gas Decommissioning and Fabrication opportunity

2) Project location

North South Tees Study Area – Riverside/Estuary Sites

3) Description of project

This project will see development and delivery of a detailed action plan to maximise the opportunities presented by supporting the following:

- Companies specialising in fabrication and decommissioning work within the oil and gas engineering and marine sectors;
- Companies specialising in the sub sea technology sector (these companies may also be able to become part of the offshore wind supply chain).

In order to grasp:

- The longer term opportunities presented by large scale decommissioning of oil and gas structures;
- The opportunity presented by marine sector decommissioning i.e. vessels.

The sector development plan needs to identify and deliver the following:

6. SWOT analysis of Tees Valley in relation to the related opportunities and other potential competitor locations;
7. Ongoing market intelligence to assist in targeting key client countries and companies;
8. A plan of how the public sector can support business development for this activity – this links to the lobbying role in the framework and ownership project which considers lobbying of the national governments to assess the full social and environmental impact of ship decommissioning when contracts are awarded.
9. Support and expand on existing activities marketing the skills and high HSE standards of the area's decommissioning firms.
10. Analysis of constraints and interventions required to remove these. In this case, the key constraints link to dredged depths, dry dock gates and environmental / ecological consenting issues.
11. Buy-in and support from local, regional and national government and other key stakeholders (e.g. PD Ports).

4) Project rationale and opportunity

Several engineering companies with the study area have a great deal of experience in fabrication and decommissioning in the oil and gas and marine sectors and there are also specialist sub sea technology companies present.

The main opportunities relate to the estimated scale of the global market in oil and gas and marine decommissioning. BERR estimated that decommissioning will peak around 2018, but carry on until 2035 and beyond. The total opportunity has been estimated at £20Bn to 2030.

It has been estimated that globally up to 200 single-hulled tankers need to be disposed of by 2015 and that the market is worth up to £3 billion. This excludes the military sector, where Able UK see significant opportunities, depending on contract awards.

5) Anticipated outputs and outcomes

Employment in the supply chain of the decommissioning sector which is a long term opportunity;
Part of the North South Tees Environmental Technology Hub centred on low carbon transition of the

industrial area and resource recovery for beneficial use.

6) Estimated costs

Primary Cost:

Preparation of sector development plan, £50,000 study
Lobbying / marketing / coordinating efforts £25,000 / annum

Possible costs during implementation relate mainly to dredging – see profoma relating to dredging below (Appendix 1D, Transport and Logistics Interventions)

7) Delivery mechanism, funding and phasing

The proposed strategic body for the area (see project framework ownership and delivery) should take this project forward.

8) Potential risks

Key risks in relation to decommissioning activity include:

- The potentially contentious issues surrounding the hazardous decommissioning activity. The area is developing a reputation for practical but robust implementation of HSE regulations which should mitigate this risk. .
- Other areas of the world may offer lower cost decommissioning due to less stringent HSE standards, reducing the attractiveness of the study area to potential clients. The lobbying and marketing activities noted within the action plan above should be used to mitigate this risk

9) Next steps

Agree scope and resources for action plan development

TEES VALLEY JOINT STRATEGY UNIT

NORTH AND SOUTH TEES INDUSTRIAL DEVELOPMENT FRAMEWORK

SECTOR 3 – PORT AND LOGISTICS

SECTOR OPPORTUNITY

3) Port and Logistics

As the third largest port overall and the largest chemical-handling port in the UK and given its location at the heart of the study area, the port makes a significant contribution to the economic prosperity of the sub region, either in port centric and logistics or the import, handling, storage and export of bulk goods.

Currently owned by PD Ports, Teesport has developed proposals for the Northern Gateway – a new deep sea container terminal on the south side of the River Tees seeking to open up additional opportunities for global trade. Costing in the region of £300m PD Ports propose to handle up to 1.5m containers (twenty foot equivalent units), create 1,000m of new riverside quay and create up to 5,000 jobs within the Tees Valley. PD Ports received formal planning approval for its proposals in February 2008 and the first phase of works is scheduled to be completed by 2012.

The port sector comprises a number of sub sectors, including roll-on/roll-off (ro/ro), lift-on/lift-off (lo-lo), cars, containers, port-centric 'retail-based' distribution, steel, dry bulk, liquid bulk and power generation (potential for biomass feedstocks to be imported via the port). The Northern Gateway proposals seek to promote 'port-centric' uses whereby the port would be used to import/export goods for solely storage and distribution purposes.

In addition to the Northern Gateway proposals, there is a continued opportunity for more 'port-related' uses whereby the port could be used to support other sectors within the study area thereby support higher 'value' advanced manufacturing and processing activity.

If the Northern Gateway proposals proceed, it is possible that there could be a conflict of riverside uses, between bulk storage and distribution and the needs of the manufacturing/energyother industries such as manufacturing and energy for access to riverside sites. and it is considered that the development framework should support the port-related uses linked with the area's manufacturing and process industries. However, it is emphasised that the area presents the opportunity for both port-centric, port-related and manufacturing uses to operate in parallel. The principal opportunity A key role for the public sector is to prevent 'port-use' conflicts, through the use of strategic land use planning policy, to ensure that the port and its surrounding riverside frontage can support a balanced and mixed range of uses and requirements.

SECTOR DEVELOPMENT PLAN 3
Port and Logistics

1) Project name

Develop and Deliver North South Tees Port and Logistics Related Opportunity

2) Project location

North South Tees Study Area

3) Description of project

This project will see development and delivery of a detailed action plan to maximise the opportunities presented by port related development.

This sector represents a range of market groups including:

- the bulk markets of petrochemical related liquid bulk, iron and steel, coal, potash/salt, biomass and other dry bulk;
- the unitised markets of ferry traffic (Ro-Ro), cars and containers;
- port centric logistics and distribution operations.

Clearly, in the case of bulk materials, the opportunities fall within other sectors (e.g. bulk chemicals, steel, power generation) and therefore it is important that the needs of these other sectors are supported by the port for the overall benefit of the study area.

The plan should include identification of actions required to assist the port with delivery of increased opportunities / investments relating to increased Ro-Ro, containers and port centric distribution. This may relate to assistance with regards to facilitation of provision of land (providing a balance can be struck between the potentially conflicting demands of the different sectors), assistance with dredging projects (see project T&L 2) and assessing actions to attract more shipping lines to Teesport in the future.
Finally, in view of the proposed Low Carbon Industrial Transition Economic Area (LCITEA), the plan should also include an assessment of what action can be taken within this sector to support this initiative.

4) Project rationale and opportunity

The opportunities relating to import of bulk materials are articulated within the other relevant sector development plans (e.g. electricity generation for biomass, chemicals and steel).

For unitised markets and associated port centric distribution, PD Ports, through its work on the Northern Gateway and the recent Tesco / Asda developments has a detailed understanding of the potential for growth within these markets to handle import and export of goods through Teesport.

5) Anticipated outputs and outcomes

Employment in the supply chain of the Ports Sector.
Further development of the port, both as a sector in its own right through import and export and as provision of 1st class services to other key sectors within the study area.

6) Estimated costs

Primary Cost:

Preparation of sector development plan, £40,000 study
Lobbying / marketing / coordinating efforts £25,000 / annum

7) Delivery mechanism, funding and phasing
The proposed strategic body for the area (see project framework ownership and delivery) should take this project forward.
8) Potential risks
revenue loss from other sectors (e.g. steel, petrochemicals) will reduce the income and therefore investment potential for PD Ports; Necessary rail improvements are not delivered to the degree required to encourage increased flow of goods into Teesport; Comparative analysis of UK ports indicates that a range of factors relating to costs, location and the role of personnel involved in the decision making will influence the route of goods in and out of the UK. Although action can be taken to reduce the impact of some of the negative factors for Teesport, there is a risk that these factors will serve to limit the increase of goods being imported into Teesport.
9) Next steps
Agree scope and resources for action plan development

TEES VALLEY JOINT STRATEGY UNIT

NORTH AND SOUTH TEES INDUSTRIAL DEVELOPMENT FRAMEWORK

SECTOR 4 – CARBON CAPTURE AND STORAGE

SECTOR OPPORTUNITY

4) Carbon Capture & Storage

The area's location provides access to North Sea carbon dioxide storage options, as well as a number of significant carbon dioxide emitters. This who could provide a critical mass of activity to justify the significant investment needed for carbon capture and storage infrastructure.

Proposals for a carbon capture and storage network have already been put forward within the study area. This would require a transmission pipeline to transport CO_2 to the North Sea. If it is sized/located appropriately, other major CO_2 producers in the area could make use of the system, delivering long term benefits in terms of avoided carbon costs reduced environmental taxation. Carbon taxation costs are likely to become increasingly important to a number of major energy generators and users in the future and the development of a CO_2 collection and storage network would be of significant benefit to the area.

Both the UK and EU have recently signalled increased level of support for carbon capture, both through grant support to a number of projects and the allocation of allowances under the EU Emissions Trading Scheme. The UK Government's Low Carbon Industrial Strategy mentions Teesside as a possible location for a carbon capture and storage cluster, along with the potential for 30,000 – 60,000 UK jobs in the sector by 2030.

SECTOR DEVELOPMENT PLAN 4
Carbon Capture & Storage

1) Project name

Promote an area-wide Carbon Capture & Storage (CCS) network

2) Project location

North South Tees Study Area

3) Description of project

This project aims to promote a network for the capture and storage of carbon dioxide emissions from industry in the study area.

A CCS network for the study area firstly requires a principal operator to construct the core collection and transmission system to the 'storage' facility, currently envisaged to be an offshore location in the North Sea. At present, this core facility is proposed by Progressive Energy, linked to a new coal gas fired power station to be developed in the South Tees area. Progressive is working with regional parties and ONE to secure approval and resources through the EC and national government to construct the core plant and transmission pipeline.

The purpose of this project is as follows:

- ensure that there is full regional and local government and private sector support given to the Progressive proposal;
- consider the scale and location of a potential network that would feed into the core transmission system; and
- identify the steps that the public sector can lead on, to ensure that a future CCS system in the study area has maximum effect.

A network would require access for the major CO2 emitters on both the north and south sides of the Tees.

- Links to Energy and Infrastructure proposals (see below)

4) Project rationale and opportunity

There a number of major emitters of carbon dioxide within the study area. These include sites whose processess allow relatively straightforward capture of CO2 from exhaust gases (Corus, BOC, GrowHow, Air Products, Ensus). As climate change policy develops, and in particular under future phases of the EU Emissions Trading Scheme, the taxation associated with emitting CO2 is likely to become significant and impact on operational costs, potentially making Tees Valley 'unviable' for some businesses

The ability to capture and store CO2 would allow industry to avoid a significant proportion of these additional costs, therefore safeguarding employment costs and also contributing to a reduction in greenhouse gas emissions.

There is therefore an opportunity to develop a CCS network that would provide the study area with a major competitive advantage - to safeguard employment but also create a major use for attracting investment.

5) Anticipated outputs and outcomes

The outcomes of a CCS system being installed in the study area is significant. A separate high level analysis undertaken for ONE indicates that several thousand jobs could be at risk as a result of increased operational costs from carbon taxation possibly leading to closures or relocations. A CCS system would also be a significant piece of infrastructure for the region - which could attract new investment. The availability of a CCS ring main would provide a lower cost operating environment.

6) Estimated costs

The overall cost of a CCS network (including offshore pipeline and storage) is likely to be several hundred million pounds as a minimum. Significant public sector funding to the project is therefore likely to be outside the scope of local or regional bodies.

Local or regional public sector costs would relate to the facilitation and de-risking activities described below, possibly including pipeline corridor purchase as described the wayleave intervention (below).

An initial sum of £40,000 is estimated to prepare the Sector Development Plan.
Lobbying / marketing / coordinating efforts £25,000 / annum

7) Delivery mechanism, funding and phasing

A strategic public sector body for the area (Framework Ownership and Delivery Project) would be the most suitable mechanism to progress public sector involvement, although existing bodies such as the TVR/TVJSU can do so in the short term to avoid delay.

The project would need to have majority involvement from the private sector, either with a lead company (e,g, Progressive Energy) who would have other emitters as customers, or through a JV arrangement.

The role for the public sector would vary depending on the approach taken:

For the "lead company" model, public sector:

- helps to de-risk elements such as land availability, consents (see framework ownership and delivery intervention)
- ensures that the network is designed with sufficient capacity to allow for future expansion (i.e. it is a benefit to future inward investment, not just existing industry). This may require public sector investment in capacity e.g. pipes with additional capacity.
- facilitates discussions between lead company and other emitters in the area to get as much CO2 volume "signed up" as early as possible.
- lobbies UK Government for assistance under national/EU CCS support schemes.

For the "JV" model, public sector:

- leads initial set-up discussions, potentially participates in JV
- ensures access for future projects/developers
- carries out tasks under "lead company" above

CCS is a demonstration technology with a high level of political support at present. There are support programmes at national and EU level from which funding towards a network may be available. The UK Government has identified Teesside as a potential CCS cluster location.

First phase would be establishing an initial corridor on the South Tees for CO_2 transport from an IGCC plant to the coast. Subsequent phases would include making river crossings available to allow the CO_2 network to extend to the North Tees and Billingham.

8) Potential risks

Risks include:

- Capital investment requirements too high for private sector JV
- Issues with CCS technology increase costs or reduce capability, threatening viability of project
- Not all private sector sites willing to participate, reducing viability of project
- Teesside unable to gain support though UK/EU programmes

9) Next steps

1. Use existing work as a basis (e.g. by Renew, One, Progressive) to provide comprehensive support to the concept including confirming wider benefits of the CCS network on the regional economy;
2. Undertake pipeline network study to define participants, locations, CO2 volumes, network routes & capacities, costs etc.

TEES VALLEY JOINT STRATEGY UNIT

NORTH AND SOUTH TEES INDUSTRIAL DEVELOPMENT FRAMEWORK

SECTOR 5 – ENERGY GENERATION SECTOR

SECTOR OPPORTUNITY

5) Energy Market

ENERGY MARKET REVIEW

Introduction

In discussing energy production and demand it is necessary to distinguish between the different forms in which the energy is used. For this study, we have considered the two principal forms of relevance to the study area – electricity and heat. These are the forms which the energy consumers uses (as opposed to energy fuels such as gas, coal etc. which are used to generate electricity and/or heat).

Electricity is a form of energy which can be readily transmitted over large distances. It cannot currently be stored in large quantities so generation must be instantaneously matched to demand. The result is a national scale market with generators supplying electricity into the grid for transmission to users across the country.

In contrast, heat cannot be easily transferred over large distances. Heat supply is therefore a local market dependent on local supply and demand of the industries, businesses and residents who are present in the area.

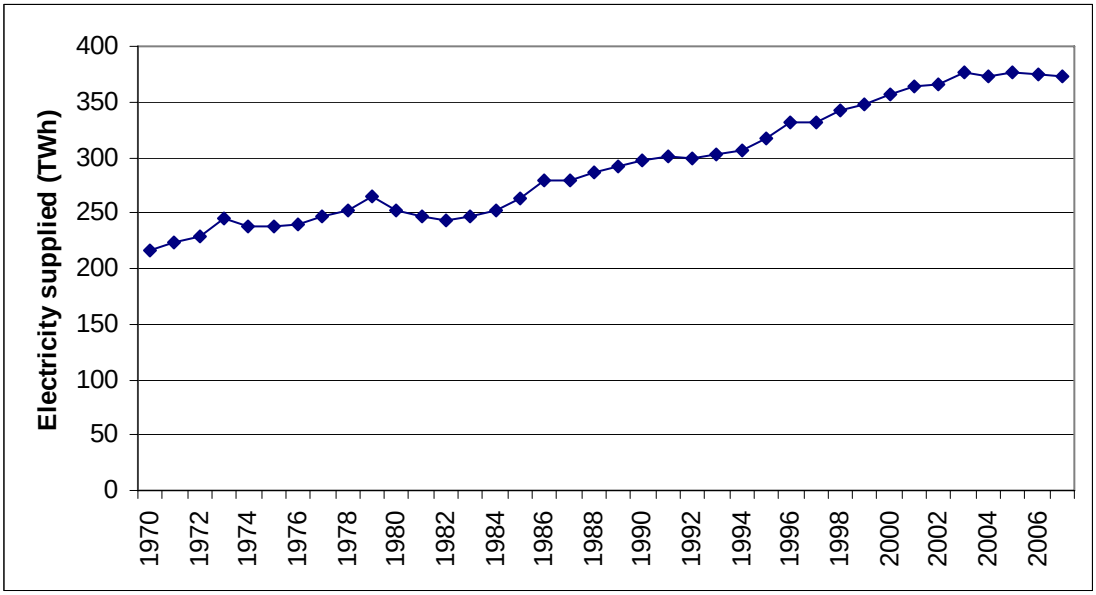
Electricity (but not heat) is therefore part of a wider market external to the study area. This review of energy market factors therefore concentrates on the electricity sector.

The UK electricity market – capacity and demand

As noted above, the UK electricity market can be considered as national in scale. Although interconnectors provide some capability for imports and exports from/to other countries, this capacity is small in relation to overall UK demand. The UK will therefore continue to require electricity generating capacity to meet the vast majority of its own needs.

UK electricity demand has grown almost continuously since 1970, as shown in Figure 1 below.

Figure 1: UK electricity demand since 1970[2]



There have been brief reductions or pauses in demand growth at times of recession or high energy prices, however the historical trend implies that electricity demand will continue to grow in the future, despite any short term reduction due to current economic conditions.

Independent studies also indicate that demand is likely to increase in future[3], although the level of increase is clearly subject to significant variation.

In addition to the new capacity to meet future demand growth, the coming decade will require significant replacement capacity to be built – approximately 25% of existing UK generating capacity is due for closure by 2020[4], representing around 20 GW of capacity. For reference, the existing Hartlepool nuclear power station has a capacity of just over 1 GW.

In summary, the combination of growing demand and the closure of older power stations means that significant new power station capacity will need to be built in the UK over the period of this study. This is reflected in the number of power station proposals in the study area.

Generation type & size

The type and size of power station built to provide this new capacity (e.g. what fuel is used) will be driven by both regulatory and fuel supply factors.

The regulatory regime uses mechanisms such as the Renewables Obligation (RO) and the EU Emissions Trading Scheme (ETS) to incentivise low carbon electricity generation.. It is likely that such incentives will be in place over the study period and that they will impact the type of power stations developed, encouraging renewables,

[2] From BERR, Digest of United Kingdom Energy Statistics, table 5.1.2, http://www.berr.gov.uk/whatwedo/energy/statistics/source/electricity/page18527.html
[3] e.g. BERR, "Energy Markets Outlook 2008", chapter 4; UKERC, "Pathways to a Low Carbon Economy", Nov 2008;
[4] From BERR, "Energy Markets Outlook 2008", chart 4.6

nuclear and carbon capture power plants. For example, recent changes to the RO have increased the incentive for biomass power generation, resulting in a significant increase in the number of biomass projects coming forward. It should be noted that both the RO and the ETS are market-based mechanisms and the level of subsidy available may vary in future as a result of market as well as policy factors. This will remain a risk to project revenues in future.

Fuel supply chains for gas, coal and nuclear power stations are well established and are likely to continue to support new power stations at about the current capacity of ~ 1 GW.

Biomass supply is less clear – the international market in wood fuel is relatively new and total volumes available are uncertain. In addition, handling costs for this low density fuel are relatively high. There may therefore be a limit in practice on the number of large (100's of MW) biomass plants that can be supplied. Smaller units (10's of MW) using indigenous fuel sources may be more typical of the size of plant developed in future.

Fuel for Energy from Waste (EfW) plants is also relatively costly to handle and supplies tend to be sourced on a regional level. This limits EfW plants to capacities in the 10's of MW range.

Why Teesside?

The study area has a number of attributes that, while not unique, make it an attractive location for new power stations:

- Fuel supply– the port provides ready access to coal, biomass and LPG imports, while North Sea pipelines provide gas and oil which, though declining, will continue to be available for many years. ConocoPhilips, for example, expects to continue to operate the refinery at Teesside for at least another 20 years.
- Electricity grid – although there are some specific constraints, the area has good grid connections at both the transmission and distribution levels.
- Land availability – the area has heavy industrial sites suitable for power station development.
- Carbon capture – the area's location provides access to North Sea carbon storage options, as well as a number of significant carbon dioxide emitters who could provide a critical mass to justify carbon capture and storage infrastructure.

Therefore, the mix of energy projects within the optimistic development scenarios are considered achievable over the timescales of the development framework assuming improved economic conditions compared to those at present.

In addition, the extended list of projects described in the project concept database should be viewed as demonstrating the area's potential for the purposes of strategic planning.

In summary, it is considered that there are significant opportunities for development of the energy. Specific interventions/projects that will assist with delivering these opportunities are described in the sector development plan proposal and as part of the Energy and Infrastructure intervention projects (see below).

SECTOR DEVELOPMENT PLAN 5
Energy Market

1) Project name

Sector Development Plan SDP5– Develop and Deliver North South Tees Electricity Generation Opportunity

2) Project location

North South Tees Study Area

3) Description of project

This project will see development and delivery of a detailed action plan to maximise the opportunity presented by new power station development.

There is already significant development in this sector within the study area, so this project is to focus on ensuring that constraints to future development are removed.

A number of constraints have been identified in the North South Tees study related to the capacity of the electricity grid to connect new generation or demand:

- 66 kV at Lackenby/Grangetown
- 11 kV at Seal Sands
- 275 kV across the wider NE region

Availability of suitable land plots in the right locations can also be a constraint. Land availability is dealt with under the Framework Ownership and Delivery project (see below).

The project therefore consists of:

1. Liaise with developers, National Grid and NEDL to fully understand constraints including those above;
2. Liaise with developers and Ofgem to identify “private wire” approaches to allow lower cost electricity supply to local industry (links to “Influencing Service Costs” intervention project).
3. Investigate funding options to make necessary network upgrades e.g. sharing of costs across multiple developers, or public investment followed by subsequent cost recovery.
4. Conduct an assessment of supply chain requirements for the power sector (including new build and nuclear decommissioning) to identify gaps and opportunities.
5. Develop an action plan in consultation with above parties. This will need to be flexible to adapt to new projects coming forward and others being withdrawn;
6. Implement initial action plan (likely to be coordination/follow-up of work by others);
7. On-going review and consultation and, if necessary, repeat stages 1-3

4) Project rationale and opportunity

There is expected to be a significant requirement for new power stations in the UK in the period to 2020, both to replace ageing stations that are expected to close and to meet increasing demand for electricity.

The study area has a number of attributes that, while not unique, make it an attractive location for new power stations:

- Fuel supply– the port provides ready access to coal, biomass and LNG imports, while North Sea pipelines provide gas and oil which, though declining, will continue to be available for many years. ConocoPhilips, for example, expects to continue to operate the refinery at Teesside for at least another 20 years;
- Electricity grid – although there are some specific constraints, the area has good grid connections at both the transmission and distribution levels;
- Land availability – the area has heavy industrial sites suitable for power station development; and,
- Carbon capture – the area’s location provides access to North Sea carbon storage options, as

well as a number of significant carbon dioxide emitters who could provide a critical mass to justify carbon capture and storage infrastructure.

These factors are reflected in the current level of developer interest in power station projects in the area.

Power station location is driven by primarily by fuel supply logistics and proximity to grid connection. Within the study area, likely areas of interest are:

- Large biomass/coal - south bank riverside locations for fuel import, e.g. South Bank Wharf
- Small biomass – locations near existing wharfs or trunk roads, close to distribution grid connections e.g. around Billingham, Wilton
- Gas – locations near existing gas network and transmission grid e.g. Seal Sands, Wilton
- Nuclear – the existing Hartlepool nuclear power station. The existing station is understood to be likely to continue operation until beyond 2020. The future use of this site is of high economic importance and must fit into this sector development plan, either as a new build nuclear station or as part of other economically beneficial use – given the strategic location and existing infrastructure/grid connection.

The potential level of new power station installation will require substantial supply chains in both the construction and O&M phases. There is a need to identify any gaps in local provision that could constrain projects, and what opportunities there may be local firms to supply goods and services.

5) Anticipated outputs and outcomes

Successful delivery of action plan removes constraints and leads to delivery of power projects in the study area.

Removal of constraints enhances reputation of the area as a place where projects can get built, attracting more projects in future and further building skills and experience.

6) Estimated costs

Preparation of sector development plan, £100,000 study
Lobbying / marketing / coordinating efforts £25,000 / annum
Allowance for specialist support (e.g. advice on gird capacity and connections) - up to £25,000 / yr – see also Framework Ownership and Delivery

7) Delivery mechanism, funding and phasing

The strategic body proposed under the Framework Ownership and Delivery project would be the most suitable mechanism to progress this project, which should begin as soon as possible.

8) Potential risks

Risks include:

- Developers and/or National Grid and NEDL unwilling to participate in co-ordinated action plan approach
- Changes to grid supply/demand profile (e.g. closure of major demand sites) make grid constraints more significant.

9) Next steps

1. Agree delivery body
2. Develop initial consultation approach

TEES VALLEY JOINT STRATEGY UNIT

NORTH AND SOUTH TEES INDUSTRIAL DEVELOPMENT FRAMEWORK

SECTOR 6 – CHEMICALS MARKET

SECTOR OPPORTUNITY

6) Chemical Market

BULK CHEMICALS MARKET REVIEW

Introduction

For the purposes of this market review, bulk chemicals refers to chemicals made in large volumes that are normally processed further by others to produce finished goods. This includes polymers, plastics and chemical intermediates such as aromatics and ethylene oxide[5]. These materials are typically produced from derivatives of crude oil.

Bulk chemicals are a major part of any industrial economy, with products from the sector being used in almost every industry, from automobiles and construction to textiles and consumer goods. It has been estimated that chemical-using industries represent 60% of the UK's GDP[6].

By its nature, the chemical industry is heavily integrated with its supply chain, both upstream and downstream. Plants often group together to share services and facilitate transfer of materials produced at one site and used by another. Economies of scale have driven the market in the UK (and elsewhere) to locate onto a few large sites such as Teesside which feed bulk chemicals into the wider economy at a national and international level. This co-location can be as a cluster or as a more integrated single site. The difference between clustering and integration is an important one:

- a cluster can be defined as a group of businesses who co-locate to share products and services but without interdependency, i.e. if one member of the cluster is removed the others are not critically affected. An example might be a steam network with several steam suppliers and numerous customers;
- a fully integrated site has much higher levels of interdependency, which can provide extra benefits but also means that the removal of one operation or plant from the site can have a critical effect on other parts.

Wilton under ICI was an integrated site which worked because it had single ownership who could operate the various plants for the good of the site as a whole. Wilton today can be described as somewhere between an integrated site and a cluster.

Facilities such as the Teesside chemical sites clearly play a key role in the UK economy. However, many of the materials it produces could be made and supplied abroad. Should this happen, other UK producers up and down the supply chain would be disadvantaged compared to their overseas competitors, further weakening the overall supply chain.

While it is to the benefit of the UK economy to retain a strong chemicals sector, the global market in which the sector operates does not necessarily take this into account when choosing what products to manufacture and where to produce them. The market and Teesside's position within it are discussed further below.

[5] Fine and speciality chemicals and pharmaceuticals share a number of the same characteristics, although they are somewhat less dependent on the co-location described here for bulk chemicals.

[6] Chemistry Innovation KTN - NEWSLETTER - April 09

The global marketplace

The market for bulk chemicals is global in nature, however some materials in the supply chain are more readily shipped long distances than others. The typical pattern of production is therefore to locate the initial process stages close to the source of feedstock[7], up to the stage where it makes practical and economic sense to locate subsequent processing stages closer to the end use.

The position of this "cut-off point" can change over time, e.g. in the case of nylon production where the shift in downstream markets to the Far East made production at Wilton less viable. Changing feedstock availability can be a critical factor, as in the case of ethylene production where cheap ethane feedstock in the Middle East has put production elsewhere at a disadvantage. Indeed, the availability of "advantaged feedstock" is one of the key drivers in the competitiveness of most bulk chemical plants.

The shift from growth to recession over the past year has significantly impacted global bulk chemical production and, as in earlier recessions, it was affected early as downstream industries began destocking. With new plants in the Middle East and Asia coming onstream in 2009, there is likely to be significant over-capacity for many products for a number of years to come. This will put additional pressure on marginal or less efficient plants and, importantly, on their cluster neighbours who rely on them to supply materials or purchase products.

There is an argument, however, that over-capacity will also put pressure on shipping and logistics costs and that this will lead to a more regional / less global chemicals market. In any event, production sites need to maximise their competitiveness, whether versus regional or global competitors, as part of a focus on survival through a period of weak demand, volatile oil prices and tight credit markets[8].

As noted above, feedstocks are a major element in overall cost and with oil prices likely to rise over the longer term, alternative sources are likely to become more viable and eventually provide a competitive advantage. Such alternatives may include:

- "Reverse cracking" of waste plastics to supply fresh feedstock. Further R&D would be required to develop this process;
- Heavy oil upgrading (e.g. the Sonhoe project) which would use lower value crude oil from the North Sea and elsewhere and produce feedstocks such as nahptha and hydrogen;
- Gasification of coal to produce syngas for use as a building block for new feedstocks. Coal gasification is a proven process, underground gasification may be possible in future (avoids mining, allows access to hard-to-reach coal reserves);
- Gasification/pyrolysis of waste to produce syngas;
- Use of biomass to produce bio-derived feedstocks such as ethanol.

Energy costs are also likely to remain a significant cost element in chemical production and these will continue to be driven by oil and gas prices and national/regional electricity markets. Energy integration within cluster sites will

[7] e.g. naphtha or natural gas
[8] http://www.icis.com/blogs/chemicals-and-the-economy/2008/10/budgeting-for-survival.html

continue to be an important means to minimise these costs. At the European level, the cost of emitting carbon dioxide will become more significant as the EU Emissions Trading Scheme develops. Areas like Teesside that have potential access to carbon capture and storage may be able to use this as a competitive advantage over other sites within Europe. The impact compared to sites outside Europe is not yet clear – this will depend on how environmental policy develops in these areas.

Why Teesside?

The Teesside area has a number of aspects that make it attractive as a base for on-going bulk chemical production:

- Good local access to UK and NW Europe markets;
- A strong foundation of existing operations, including a cracker that is competitive on a European level;
- Skills base in operations, services and R&D (e.g. new feedstock routes);
- Potential alternative feedstock sources available (heavy crude, waste, biomass, coal).

These aspects are not unique to the area, however, and do not constitute a competitive advantage compared to other European chemical clusters – they are simply the minimum requirements to allow Teesside to compete. Maintaining a critical mass of existing operations is key to retaining and developing the process industries for the future.

The pipeline of projects in the development scenarios and the project concept database are considered realistic opportunities for the Teesside area. This is dependent, however, on a number of actions where the public sector can assist:

- Maintaining the ethylene supply chain already in place (cracker and downstream plants);
- Supporting projects that may provide advantaged feedstocks (e.g. heavy oil upgrader, reverse cracking of waste plastics, bio-derived feedstocks);
- Supporting projects to reduce other manufacturing costs (e.g. a CO_2 network, improved energy integration).

SECTOR DEVELOPMENT PLAN 6
Chemical Market

1) Project name

Sector Development Plan SDP6 – Develop and Deliver North South Tees bulk chemicals opportunity

2) Project location

North South Tees Study Area

3) Description of project

This project is the development and delivery of a detailed action plan to maximise bulk chemical production opportunities in the study area. It will build off work already done by NEPIC and TVR.

The action plan will need to include consideration of the following:

- Market analysis of the sectors (olefins, ammonia, speciality) in which Teesside is involved. This needs to be national/regional/global in nature, as appropriate to each sector;
- Identification of key factors to attracting investment in each of the 3 sectors and how Tees can provide them;
- Identification of gaps/opportunities in the existing supply chain and barriers to exploiting them (including consultations with industry players who may be able to fill these gaps);
- Assessment of future feedstock supplies (e.g. North Sea oil and gas) and their impact on chemical production in the area;
- Actions to maintain a critical mass of existing industry in the olefins and ammonia supply chains, including support for development of alternative feedstocks and reduction in costs;
- Actions to attract ongoing/expanded investment in the speciality sector;
- Identification of organisations to target actively regarding future investment in both new and existing plant

4) Project rationale and opportunity

Bulk chemicals refers to chemicals made in large volumes that are normally processed further by others to produce finished goods. This includes polymers, plastics and chemical intermediates such as aromatics and ethylene oxide. These materials are typically produced from derivatives of crude oil. Bulk chemicals are a major part of any industrial economy, with products from the sector being used in almost every industry, from automobiles and construction to textiles and consumer goods. It has been estimated[9] that chemical-using industries represent 60% of the UK's GDP.

Facilities such as the Teesside chemical sites play a key role in the local, regional and UK economy. However, many of the materials it produces could be made and supplied abroad. Should this happen, other UK producers up and down the supply chain would be disadvantaged compared to their overseas competitors, further weakening the overall supply chain.

While it is of benefit of the UK economy to retain a strong chemicals sector, the multinational ownership of most of the sector does not necessarily take this into account when choosing what products to manufacture and where to produce them.

The opportunity for the bulk chemical sector is important because, while some existing operations may not stay in the study area in the medium term, protection of a core of existing operations will assist with the development of new technology in related process industries such as biotechnology, waste, biofuels and biorefineries. Other opportunities for the future include the following:

- Production, transmission and storage of hydrogen, syngas and natural gas;
- Close the supply chain gap to make use of propylene from SABIC;
- Downstream use of LDPE – e.g. forming into "billets",
- Polymers for future lightweight auto components – given new US auto fuel economy standards announced in May 09;
- Downstream use of products from Lucite – i.e. Acrylics related
- Further specialist mixtures and formulated products (multiple liquid processing units);

[9] Chemistry Innovation Knowledge Transfer Network – April 2009 newsletter

- EO related projects (upstream – EO grid – or more expansion of local use of EO in speciality plants – depending on outcome of ongoing consultations.

Current bulk chemicals production in the North South Tees area can be divided into:

- Olefins supply chain- cracking of oil derived feedstocks by SABIC for use in downstream ethylene (Dow/Croda) or acrylics (Ineos/Lucite) processing.
- Ammonia supply chain – production of ammonia from natural gas by Growhow for use in production of fertilisers (Growhow), acrylics (Ineos/Lucite) and polyurethane intermediates (Huntsman).
- Speciality –"stand-alone" production of titanium dioxide (Huntsman), speciality chemicals (Fine Organics, Dow etc.)

The olefins and ammonia supply chains tend to represent sites that rely on each other to supply raw materials or purchase products. The speciality sector represents sites that are more independent (e.g. do not purchase or sell key materials locally). This means the olefins and ammonia chains are less "mobile" in terms of relocating elsewhere – providing potential opportunities to fill supply chain gaps at Teesside - but also more vulnerable to the loss of local plants within the chain. By contrast, the speciality sector is less dependent on its immediate neighbours and therefore more able to choose its locations – Teesside is competing against a much wider range of locations to attract and retain businesses in this sector.

Physical constraints in the area (e.g. land, pipelines etc.) are dealt with in other intervention projects. There are a number of "market" constraints that apply to chemical production in the area, however, which this project will need to consider:

- Basic feedstocks (oil and natural gas) becoming increasingly costly compared to competitors outside Europe.
- Interdependency between sites in the olefins and ammonia supply chains – the loss of one weakens the others in the chain.
- Ageing assets that, while still competitive, may become less so in the future compared to newer facilities.

The study area has a number of aspects that make it attractive as a base for on-going bulk chemical production:

- Good local access to large UK and NW Europe markets;
- A strong foundation of existing operations, including a cracker that is competitive on a European level;
- Skills base in operations, services and R&D (e.g. new feedstock routes);
- Potential alternative feedstock sources available (heavy crude, waste, biomass, coal).

These aspects are not unique to the area, however, and do not constitute a competitive advantage compared to other European chemical clusters – they are simply the minimum requirements to allow Teesside to compete. Maintaining a critical mass of existing operations is key to retaining and developing the process industries for the future.

Costs of feedstock and energy are key elements in the competitiveness of most chemical production. With oil and gas prices likely to rise over the longer term, alternative sources are likely to become more viable and eventually provide a competitive advantage. Such alternatives may include:

- "Reverse cracking" of waste plastics to supply fresh feedstock. Further R&D would be required to develop this process;
- Heavy oil upgrading (e.g. the Sonhoe project) which would use lower value crude oil from the North Sea and elsewhere and produce feedstocks such as naphtha and hydrogen;
- Gasification of coal to produce syngas for use as a building block for new feedstocks. Coal gasification is a proven process, underground gasification may be possible in future (avoids mining, allows access to hard-to-reach coal reserves);
- Gasification/pyrolysis of waste to produce syngas;
- Use of biomass to produce bio-derived feedstocks such as ethanol

Energy costs are also likely to remain a significant cost element in chemical production and these will

continue to be driven by oil and gas prices and national/regional electricity markets. Energy integration within cluster sites such as Teesside will continue to be an important means to minimise these costs. At the European level, the cost of emitting carbon dioxide will become more significant as the EU Emissions Trading Scheme develops. Areas such as Teesside that have potential access to carbon capture and storage may be able to use this as a competitive advantage over other sites within Europe. The impact compared to sites outside Europe is not yet clear – this will depend on how environmental policy develops in these areas.

The opportunity (and challenge) for this intervention project is therefore to help maintain a critical mass of chemical production in the area and to support projects to provide advantaged feedstocks and/or lower costs. While this is perhaps most critical for the olefins supply chain, it will also support the ammonia supply chain and to a lesser extent the speciality sector.

5) Anticipated outputs and outcomes

Successful delivery of the action plan helps:

- maintain a critical mass of bulk chemical production in the study area;
- bring in new investment (attracted by the critical mass of existing operations) to fill gaps/extend the current supply chains, further strengthening existing operations;
- attract new investment to broaden the range of speciality producers in the area.

6) Estimated costs

Market analysis and action plan development - £ 100,000
Delivery - depends on implementation strategy
Lobbying / marketing / coordinating efforts £25,000 / annum
-

7) Delivery mechanism, funding and phasing

The proposed strategic body for the area could take this project forward. It can be considered a priority for the new “Head of North South Tees”. This would need to be in close collaboration with NEPIC/TVR. Alternatively, one of these bodies could lead the project.

8) Potential risks

These are risks that the action plan will not deliver the intended outcomes. They include:

- A long period of reduced demand in the global economy leads to further closure of existing plants that are currently “hanging on” until demand picks up;
- Rising feedstock costs reduce viability of existing plants/prevent investment in new plant;
- New investment goes to other locations;
- Multinational parent companies rationalise operations, leading to closure of otherwise profitable operations.

9) Next steps

- Agree scope and resources for action plan development

TEES VALLEY JOINT STRATEGY UNIT

NORTH AND SOUTH TEES INDUSTRIAL DEVELOPMENT FRAMEWORK

SECTOR 7 – BIOTECHNOLOGY MARKET

SECTOR OPPORTUNITY

7) Biotechnology Market

BIOTECHNOLOGY MARKET REVIEW

Introduction

The term "biotechnology" can be used to mean a number of different things. For the purpose of this section, we use it to refer to the use of biological *processes* such as fermentation to manufacture chemicals and materials. In other words, it does not include the use of biological *materials* in chemical processes – this is discussed elsewhere in the biofuels and chemicals sections. Biotechnology therefore provides alternatives to petrochemical production routes.

The biotechnology market

Biotechnology is of course well established in industries such as pharmaceuticals and brewing. There are more recent developments, however, in "industrial biotechnology" that are starting to provide opportunities in other areas. Examples include the use of immobilised enzymes as catalysts (replacing costly precious metals), production of butanol by fermentation and the production of biopolymers such as polylactic acid (PLA).

In areas such as biopolymers, biotechnology products are competing with products derived from pertrochemicals which often have lower production costs. This tends to restrict biopolymers to niche markets where properties such as biodegradability are important.

In the longer term, as technology develops, biotechnology products are likely to become more competitive. It has been estimated, for example, that biopolymer production in the EU could be several million tonnes annually by 2020[10] (although this would still represent only a few percent of total polymer production). Rising oil prices may result in this estimated production rate being significantly exceeded.

In the UK, the current industrial biotechnology market is estimated to be worth £1.8 billion annually, with the potential to grow to £ 4 – 12 billion by 2025[11]. The UK government recently identified the sector as one of four manufacturing areas where the UK has particular strengths and opportunities for future growth[12].

Why Teesside?

Biotechnology is a broad field and in some respects Teesside offers no particular benefits compared to other potential locations. There are a number of factors, however, where the area has advantages:

- Heat and carbon dioxide are available as by-products from other industries in the area. These are used as inputs by some biotechnology processes;
- A number of existing and future industries in the area make / may make use of biotechnology products (e.g. enzymes for ethanol production, algae-derived oils for biofuels);

[10] From "Techno-economic Feasibility of Large-scale Production of Bio-based Polymers in Europe", EC Joint Research Centre, 2005

[11] TCE magazine, June 2009, page 36

[12] "New industry, new jobs", April 2009, http://www.dius.gov.uk/~/media/publications/N/new_industry_new_jobs

- The National Industrial Biotechnology Facility (NIBF) at CPI Wilton provides a flexible development and scale-up facility for new biotechnology processes. While by no means guaranteeing that resulting production plants locate on Teesside, this facility builds on the scale-up and process demonstration skills of the area.

In summary, Teesside has a role to play in the growing biotechnology market by focussing on technologies which fit with the other strengths of the area. The projects outlined in the development scenarios and project concept database can be considered achievable in this context.

SECTOR DEVELOPMENT PLAN 7
Biotechnology Market

1) Project name

Sector Development Plan SDP7 – Develop and Deliver North South Tees biotechnology opportunity

2) Project location

North South Tees Study Area

3) Description of project

This project will see development and delivery of a detailed action plan to maximise the opportunity presented by the expected growth in the biotechnology sector.

The action plan needs to include the following:

- Detailed analysis of future market and the needs of existing and new producers, including how best to support existing biotechnology in the area such as Avecia. This should include consultation with industry both locally and outside the region.
- Assessment of which sub-sectors of the biotechnology market Tees should target.
- Identification of constraints in the area that may limit development of these sub-sectors and how to remove them.
- Identification and assessment of producers, developers and other organisations to target.

4) Project rationale and opportunity

Biotechnology offers alternatives to petrochemical production routes for chemicals and other materials and is well established in industries such as pharmaceuticals and brewing. There are more recent developments, however, in "industrial biotechnology" that are starting to provide opportunities in other areas. Examples include the use of immobilised enzymes as catalysts (replacing costly precious metals), production of butanol by fermentation and the production of biopolymers such as polylactic acid (PLA).

In areas such as biopolymers, biotechnology products are competing with products derived from petrochemicals which often have lower production costs. This tends to restrict biopolymers to niche markets where properties such as biodegradability are important. In the longer term, as technology develops, biotechnology products are likely to become more competitive. It has been estimated, for example, that biopolymer production in the EU could be several million tonnes annually by 2020[13] (although this would still represent only a few percent of total polymer production). Rising oil prices may result in this estimated production rate being significantly exceeded.

In the UK, the current industrial biotechnology market is estimated to be worth £1.8 billion annually, with the potential to grow to £ 4 – 12 billion by 2025[14]. The UK government recently identified the sector as one of four manufacturing areas where the UK has particular strengths and opportunities for future growth[15] and is seeking to fund further demonstration facilities.

Biotechnology is a broad field and in some respects Teesside offers no particular benefits compared to other potential locations. There are a number of factors, however, where the area has advantages:

- Heat and carbon dioxide are available as by-products from other industries in the area. These are used as inputs by some biotechnology processes;
- A number of existing and future industries in the area make / may make use of biotechnology products (e.g. enzymes for ethanol production, algae-derived oils for biofuels); and,
- The National Industrial Biotechnology Facility (NIBF) at CPI Wilton provides a flexible development and scale-up facility for new biotechnology processes. While by no means guaranteeing that resulting production plants locate on Teesside, this facility builds on the scale-up and process demonstration skills of the area.

[13] From "Techno-economic Feasibility of Large-scale Production of Bio-based Polymers in Europe", EC Joint Research Centre, 2005
[14] TCE magazine, June 2009, page 36
[15] "New industry, new jobs", April 2009, http://www.dius.gov.uk/~/media/publications/N/new_industry_new_jobs

In summary, Teesside has a role to play in the growing biotechnology market by focussing on technologies which fit with the other strengths of the area.

Depending on the specific processes involved, some biotechnology projects may need to co-locate with suppliers or customers (e.g. close to heat and CO_2 supplies). Others may be able to locate anywhere within the area.

5) Anticipated outputs and outcomes

Successful delivery of action plan leads to increased inward investment in biotechnology.

New plants help maintain the process industry critical mass in the area.

6) Estimated costs

Primary Cost:

Preparation of sector development plan - £50,000 study
Implementation - annual cost depends on delivery mechanism.
Lobbying / marketing / coordinating efforts - £25,000/annum

7) Delivery mechanism, funding and phasing

A strategic public sector body for the area (Framework Ownership and Delivery) would be the most suitable mechanism to progress the action plan, although existing bodies such as TVR/TVJSU can do so in the short term to avoid delay.

8) Potential risks

Risks include:

- Biotechnology market does not develop as expected (e.g. oil prices are low, making biotech alternatives less viable), resulting in reduced opportunity for North South Tees
- Other locations within the UK are considered more favourable by developers, reducing investment in North South Tees

9) Next steps

3. Develop sector action plan
4. Define delivery mechanism

TEES VALLEY JOINT STRATEGY UNIT

NORTH AND SOUTH TEES INDUSTRIAL DEVELOPMENT FRAMEWORK

SECTOR 8 – BIOFUEL MARKET

SECTOR OPPORTUNITY

8) Biofuels Market

BIOFUELS MARKET REVIEW

Introduction

In recent years, production of alternative (lower CO_2 emission) fuels for transport has focussed on biofuels - liquid fuels derived from biological materials. The most common are biodiesel which is a substitute for fossil diesel and ethanol which replaces petrol. These fuels have an advantage over other alternative fuels such as hydrogen in that they can readily be used in the existing vehicle fleet and fuel infrastructure.

Biodiesel is a general term for biologically-derived diesel substitutes. “First generation” biodiesel is currently produced on a commercial scale from vegetable oils such as rapeseed, soybean and palm oils. Recycled oils such as used cooking oil are also used, although the quantities available are relatively small. “Second generation” biodiesel typically refers to fuel produced from other biomass using a different process[16], and is a chemically different material to first generation fuel. Second generation biodiesel is currently in the demonstration phase.

Ethanol is a specific molecule made by fermenting sugar. First generation ethanol is produced commercially using sugar or grain crops as feedstock. Second generation ethanol is made from cellulose or other non-food biomass which require more complex processing before being fermented. It is also currently at the demonstration stage.

Other alternative biofuels (e.g. butanol instead of ethanol, algae as a source of feedstock oil for biodiesel) are also being researched.

The biofuels market

Transport fuel is a global market, with crude and refined fuels widely traded internationally. The same is true of biofuels where both feedstocks (e.g. vegetable oils and wheat) and the biofuels themselves are global commodities.

In 2008/9, 2.8% of all road transport fuel supplied in the UK was biofuel. This represents approximately 1,200 million litres, of which 84% biodiesel and 16% ethanol. At least 70% of biofuel was imported, mainly ethanol from Brazil and biodiesel from the USA.

At the EU level, 2.6% of transport fuel was biofuel in 2007 (latest year for which data is available). Of this, 75% was biodiesel and 15% ethanol. Around 30% was imported from outside the EU.

The current biofuel market is driven by three interconnected factors – the price of crude oil, the price of the biomass feedstock and government incentives to encourage biofuel use:

- The volatility of crude oil prices in recent times is well known.
- The crude oil price also affects the price of feedstocks such as wheat and vegetable oils through their production costs. For example, rising oil prices in 2008 failed to make biofuel production more competitive because feedstock

[16] Gasification to produce syngas, followed by Fischer-Tropsch synthesis

prices had risen even more.

- EU Directive 2009/28/EU requires that, by 2020, at least 10% of all transport fuels used in each EU member state come from renewable sources. In the UK, the Renewable Transport Fuels Obligation (RTFO) requires suppliers of fossil fuels to ensure that a specified percentage of the road fuels they supply in the UK is made up of renewable fuels. The target for 2008-9 was 2.5% by volume, rising to 3.5% by 2010/11. The RTFO is currently focussed on this relatively short term target, but may in time become the UK's mechanism for meeting the EU's 2020 target

A fourth factor has also had a major impact on the biofuels market in the past 2-3 years, namely the question of the sustainability of feedstock supplies e.g. through competition for food crops - "food vs. fuel" - or habitat destruction to provide agricultural land. While the direct impact of biofuels on world markets for corn, wheat and other feedstocks may have been exaggerated, this has had an impact on the degree of support from government and the investment community. This has led to sustainability measures becoming a key requirement for future support at both EU and UK level. It has also increased the focus on 2nd generation biofuels which do not use food crops as feedstock.

These four factors have made recent biofuels markets uncertain. There have also been inconsistencies between subsidy regimes in different countries, e.g. the US production subsidy which allowed biodiesel sourced through the US to undercut European producers (the EU has recently introduced import tariffs to address this).

In the medium to long term, however, it appears likely that demand for sustainable biofuels in the UK and the rest of the EU will grow, driven by climate change policies and security of supply issues. Local feedstock production in the UK/EU can more readily meet high sustainability criteria as well as providing more stable and secure supplies compared to purchasing on the volatile world markets. These factors can be expected to favour local biofuel production and it is likely that UK produced biofuels will have a significant role to play in meeting UK demand.

Why Teesside?

The study area has a number of attributes that make it attractive for biofuel production:

- Access to bulk liquid import/export/storage through existing facilities (Vopak, Simon Storage etc.)
- Process industry expertise/services in general and existing biofuels knowledge, experience and learning in particular (Ensus, Biofuels Corporation, D1 Oils, NE Biofuels)
- Existing and proposed fuels infrastructure (Petroplus, Greenergy etc.)

The mix of projects described in the project concept database indicates the area's potential for biofuel development, assuming continued support through subsidy regimes such as the RTFO.

SECTOR DEVELOPMENT PLANS 8
Biofuel Market

1) Project name

Sector Development Plan SDP8 - Develop and Deliver North South Tees biofuels opportunity

2) Project location

North South Tees Study Area

3) Description of project

This project will see development and delivery of a detailed action plan to maximise the opportunity presented by the expected growth in the production of sustainable biofuels (both first and second generation).

The action plan needs to include the following:

- Detailed analysis of future market and the needs of existing and new producers.
- Assessment of which sub-sectors Tees should target within the existing strategy for biofuels development in the north east region.
- Identify producers, developers and other organisations to actively target for marketing of the areas.
- Specific constraints that need to be addressed to allow the opportunity to be delivered. These may include investment climate (biofuels are perceived as a "risky" sector), price volatility (both feedstock and products), availability of bulk storage etc.
- Close cooperation with existing North South Tees biofuels businesses to identify how further projects can be delivered.

A north east Regional Strategy for Transport Biofuels is already in place – the aim of this project is to build on this to identify and develop the specific opportunity within the North South Tees area. This will need to be done in collaboration with existing organisations such as NEPIC and North East Biofuels (NEB) who are active in delivering the regional strategy.

4) Project rationale and opportunity

Demand for sustainably produced biofuels in the UK and the rest of the EU appears likely to grow, driven by climate change policies and security of supply issues. Recent EU Directives mandate increasing use of biofuels, as does the UK Renewable Transport Fuels Obligation (RTFO).

The UK Government's recent low carbon transport strategy emphasises that sustainability will be a key factor in future levels of subsidy whether through the RTFO or other mechanisms. Local feedstock production in the UK/EU can more readily meet high sustainability criteria as well as providing more stable and secure supplies compared to purchasing feedstock on the volatile world markets. These factors can be expected to favour local biofuel production and it is likely that UK produced biofuels will have a significant role to play in meeting UK demand. This will require increased production capacity.

Biofuel production already takes place in the study area and, although the record of existing producers has been mixed, the strengths of the area in terms of process engineering, existing fuel infrastructure and bulk logistics make it a suitable location for future UK production.

The North South Tees study has identified the opportunity for a number of further biofuel facilities in the study area. These include 2nd generation ethanol and biodiesel plants, and a demonstration biorefinery. Facilities could be sited in a number of locations, however Seal Sands is considered a favourable location due to its existing infrastructure, in particular access to bulk liquid import, export and storage facilities. Wilton site would also be suitable given land and services availability at suitable commercially competitive rates.

5) Anticipated outputs and outcomes

Successful delivery of action plan leads to increased inward investment in biofuel production.

New plants help maintain the process industry critical mass in the area.

Delivery of the Regional Biofuels strategy is strengthened by enhanced development in the North South Tees area.

6) Estimated costs

Primary Cost:

Preparation of sector development plan £50,000
Lobbying / marketing / coordinating efforts - £25,000/yr

7) Delivery mechanism, funding and phasing

A strategic public sector body would be the most suitable mechanism to progress the action plan. An existing body such as NEPIC could do this, supported by the new North South Tees team described in the Framework Ownership and Delivery project.

Development of the action plan should begin as soon as possible.

8) Potential risks

Risks include:

- Biofuel market does not develop as expected (i.e.. does not grow), resulting in reduced opportunity for North South Tees. This could be due to, for example: reduced political support; expansion of other technologies such as electric vehicles; adverse movements in feedstocks and crude oil prices.
- Other locations within the UK are considered more favourable by developers, reducing investment in North South Tees
- Producers favour other European locations e.g. due to more favourable support mechanisms.
- Producers favour locations closer to source of feedstocks such as soybean or palm oil.

9) Next steps

1. Review existing Biofuels strategy for the north east and identify the scope for a more detailed sector plan for the North South Tees
2. Develop sector action plan for the area in coordination with existing regional strategy and organisations (NEPIC, Northeast Biofuels etc.)
3. Define delivery mechanism.

TEES VALLEY JOINT STRATEGY UNIT

NORTH AND SOUTH TEES INDUSTRIAL DEVELOPMENT FRAMEWORK

SECTOR 9 – WASTE/RESOURCES

SECTOR OPPORTUNITY

9) Waste/Resources

WASTE MARKET REVIEW

Introduction

The waste market in the UK is developing quickly as a result of legislative drivers. Waste legislation within the member states of the European Union has developed as a result of:

- Waste Framework Directive; and
- The Hazardous Waste Directive.

Further legislation to improve the management of waste has come through:

- The Landfill Directive;
- The Integrated Pollution Prevention; and Control Directive; and
- The Waste Incineration Directive.

Over recent years further Directives have been implemented into member states regulatory systems to improve the management of specific waste streams. These waste streams include:

- Directive on Batteries and Accumulators
- Directive on Packaging and Packaging Waste
- Directive on End of Life Vehicles (ELV)
- Directive on Waste Electrical & Electronic Equipment (WEEE)

The Landfill Directive set targets for diverting municipal biodegradable waste from landfill. Local authorities face fiscal penalties for failing to meet these targets. The combined result of these drivers is the rapid development of regional strategies for increased recycling, treatment and recovery of municipal and commercial waste. The increase in the cost of landfill is also driving the private sector to assess alternative treatment and disposal routes for commercial and industrial waste. More 'merchant' facilities are being developed as treatment technologies become increasingly commercially competitive with the cost of landfilling.

The Landfill Allowance Trading Scheme (LATS) is the Government's key measure to meet the demands of the European Landfill Directive. The Scheme commenced in April 2005. Tying in to targets of the Landfill Directive, LATS sets progressively tighter restrictions on the amount of Biodegradable Municipal Waste (BMW) that disposal authorities can landfill. Each council is set allowances on the amount of BMW they can send to landfill. Allowances are tradable between authorities, depending on supply and demand. Councils may potentially be fined for every tonne they landfill beyond their set allowances and any permits purchased.

This legislative impact combined with the threat of significant financial penalties for failing to meet targets has focused attention within Waste Disposal Authorities (WDAs) for the need to develop facilities for the collection, treatment and recovery of wastes. In particular, authorities are concerned regarding the target of 50% diversion of required 1995 levels of landfilled BMW by 2013. To meet targets, many local

authorities are developing new facilities, many in partnership with other authorities, involving collection and transfer, Material Recycling Facilities (MRFs), Mechanical Biological Treatment (MBT), Energy from Waste (EfW) and Advanced Thermal Treatment (ATT).

In the North East of England there is already significant infrastructure in place for the recycling and treatment of waste. The extended region (including Yorkshire) produces in excess of £4m tonnes of municipal waste each year. In 2006/7 26.4% of this waste was treated prior to landfilling or recycling. This figure would be expected to increase significantly with the long-term goal of all municipal waste being treated prior to landfill. The Tees Valley Joint Minerals and Waste Development Plan Documents estimates that municipal waste within the area will rise from 330,000 tpa in 2009/10 to 356,000 tpa in 2020/21. Over the same period Commercial and Industrial (C&I) waste is estimated to stay constant at 2.3m tpa.

Developing UK Waste infrastructure

There is particular onus at present on developing infrastructure to treat municipal waste. It is municipal waste that has attracted the most onerous legislative targets despite it being relatively small when compared to commercial and industrial waste. This is because it is easier to target as it is usually collected via one or two contracts with the local authority. C&I waste is collected by numerous dispersed waste operators and the composition of the waste is more difficult to predict. That, combined with the low price of landfill compared to treatment options, has meant that most C&I waste is still landfilled. This is rapidly changing with the escalating cost of landfill resulting from incremental increases in landfill tax.

Municipal waste collection infrastructure capacity is increasing as local authorities strive to meet recycling targets. This material needs to be stored/separated, depending on the type of collection employed, and then recycled. Composting of green waste (garden only) and kitchen waste is also increasing (although no municipalities in the North East are currently collecting food waste separately). Again local authorities are investing in collection infrastructure and new treatment facilities are required to process the waste. Green waste is generally processed in open windrow systems but kitchen waste (which comes under the control of the animal by-products order) requires treatment in enclosed systems such as in-vessel composters and anaerobic digestion facilities. There are opportunities for the mixing of municipal waste streams with waste from the commercial and industrial sector, particularly the food and drink industry, the hospitality industries and other significant sources of kitchen waste such as the education and health sectors.

Municipal waste that is not recycled or composted needs to be treated prior to landfill. In Teesside there is an existing incinerator in Billingham operated by SITA. This facility is currently being expanded to nearly 400,000 tonnes per annum capacity with plans for further expansion.

Merchant facilities are increasingly being developed to treat C&I waste. In particular, circa 40,000 tonne per annum modular systems utilising various technologies (primarily gasification/autoclave), are being developed across the UK.

Opportunities for Teesside

The waste sector is continually looking for development opportunities linked to both municipal and commercial and industrial waste.

Key opportunities are therefore likely to be linked to reprocessing of recyclates and subsequent manufacture using recyclates as a feedstock.

A feasibility study into establishing an Eco Park in the area has been undertaken and a number of opportunities identified.

There have been many examples of such schemes being proposed including the Sustainable Growth Park in Castleford and the Ince Resource Recovery Park in North West England. Key to these developments is the securing of waste through an 'anchor' contract. For Ince this would be municipal waste secured through a local authority contract. Urban Mines cite the lack of an anchor contract as a major reason for project failure. Until the issue of an anchor contract is resolved then the feasibility of such a development is in doubt.

Proposals for development of the "Prairies Site" on land currently owned by Corus have included a facility for autoclaving solid wastes, (alongside a potential "clean coal" gasifier and power station), thereby providing a possible anchor project. Scott Brothers have also produced initial proposals for resource-based projects at various sites.

In summary, while investment in infrastructure to treat waste is required across the UK current opportunities for development on Teesside appear to be adhoc in nature. The Tees Valley Joint Minerals and Waste Development Plan identified that additional capacity is required primarily in recycling infrastructure for municipal waste and for treatment (recovery) of C&I waste. This capacity gap may lend itself to the development of an eco park with a combination of recycling and recovery technologies.

Eco parks have proved difficult to establish without an anchor contract/tenant. In order to attract companies the benefits of co-location need to be clear. One potential attraction could be easing of planning and permitting requirements. This is particularly the case for the relatively smaller companies looking to build merchant gasification or autoclave facilities where the costs of carrying out planning and environmental impact assessments can be significant. Sites with good infrastructure connections will also be attractive. Traffic movements to facilities are often a major planning concern and costs of upgrading electrical network connections for thermal facilities can be prohibitive. Companies will view sites where such issues have been addressed favourably.A large energy from waste plant already exists in Teesside with plans for substantial expansion in capacity.,Opportunities for using heat from this facility are being considered and this should be encournage as plants that utilise combined heat and power are significantly more efficient than those that solely produce electricity. Indications are that new facilities in England will need to be future proofed in this regard.

A number of resources-based enterprises have already been developed or proposed in the Tees Valley, independently of any Eco Park proposals. These include pyrolysis, plastics reprocessing, hazardous waste treatment, paper recycling and

wood/biomass to energy. These need to be linked to the Industrial Development Strategy as a whole and assessed in terms of the availability of waste materials from within and outside of the region/sub-region; the opportunities created by logistics/transport links (e.g. the Port and railway links); and other assets, for example the availability of energy or water.

SECTOR DEVELOPMENT PLAN 9
Waste/Resources

1) Project name

Develop and Deliver North South Tees Waste / Resources Sector opportunity

2) Project location

North South Tees Study Area

3) Description of project

This project will see development and delivery of a detailed action plan to maximise the opportunities presented by the waste and resource recovery industry.

With close links to the chemical and biotechnology industries through technologies such as pyrolysis, gasification, plastics reprocessing, reverse cracking and anaerobic digestion, this action plan should be developed closely with those sector plans.

The plan should include:

- Review of the waste market, legislative drivers and the areas of the Market that may best benefit the North south Tees area;
- Measures to obtain buy in and support from relevant stakeholders;
- Identification of constraints and opportunities to overcome these;
- Analysis and dialogue with the existing operations and proposals to ensure they are supported, previous experience is shared and beneficial opportunities are identified;
- Identification of organisations to target in order to maximise the opportunity.

In terms of constraints, the study area is well placed to benefit from this opportunity in terms of infrastructure, logistics, transport, skills and a supportive local community. With a large and expanding energy from waste incinerator already in the study area and the securing of a long term anchor contract often critical to the funding of new waste facilities, a key barrier to delivering this opportunity is the question of if and when finance can be obtained. The action plan will need to work with existing and potential future developers to tackle this issue.

4) Project rationale and opportunity

A number of resources-based developments have already been developed or proposed in the study area using technologies such as steam autoclaving, composting, thermal desorption of soil, oil and solvent recovery, Anaerobic Digestion, Pyrolysis, plastics reprocessing, hazardous waste treatment, paper recycling and wood/biomass to energy.

As a result of a plethora of EU directives and UK legislation relating to waste management and the reduction of volumes of waste to landfill, there are opportunities for companies within the North South Tees study area to develop treatment, processing and/or separation facilities.

5) Anticipated outputs and outcomes

Employment in the supply chain of the waste sector.
Transfer of skills from the chemical sector.
Support to the industry hub in terms of heat, steam, infrastructure, pipelines.
Part of the programme for low carbon transition of the industrial area and resource recovery for beneficial use.

6) Estimated costs

Primary Cost:

Preparation of sector development plan, £50,000 study
Lobbying / marketing / coordinating efforts £25,000 / annum

7) Delivery mechanism, funding and phasing
The proposed strategic body for the area (see project framework ownership and delivery) should take this project forward.
8) Potential risks
Eco parks have proved difficult to establish without an anchor contract/tenant. Engineering, Project Management and Technology risks associated with relatively new technology and new build facilities; Financing of these schemes. Waste availability – municipal waste is often tied up in long term contracts with existing disposal conmpanies, limiting the scope for new entrants with higher risk technologies.
9) Next steps
Agree scope and resources for action plan development

TEES VALLEY JOINT STRATEGY UNIT

NORTH AND SOUTH TEES INDUSTRIAL DEVELOPMENT FRAMEWORK

SECTOR 10 – STEEL

SECTOR OPPORTUNITY

10) Steel

Once a major player in European and world steel making, in recent years Corus has shrunk in terms of production capacity. The recession and falling demand in the automotive and construction markets has had a clear impact on the steel industry and Corus, owned by the Indian Group Tata, has cut production in Europe and particularly the UK. Within the Tees Valley there are six major Corus operations:

a) Redcar blast furnace/steel works (Teesside Cast Products, TCP, a wholly owned subsidiary of Corus);
b) The coke ovens (Redcar and South Bank, TCP/Corus);
c) The deep water wharf (Corus);
d) The Lackenby beam mill which produces beams for construction (Corus);
e) The Hartlepool pipe and tubes mill (Corus); and,
f) The Skinningrove works (specialist steel, Corus)).

Recent announcements of potential job losses relate to the Redcar blast furnace and steel works (TCP). The Lackenby Beam Mill, the Hartlepool Pipe and Tubes Mill and Skinningrove Works are also expected to be affected by over 400 redundancies – although this is not related to the TCP issue.

The level of future recovery of steel demand is unknown, however, there is obviously a risk that the impact of the global recession will result in a longer term migration of manufacturing capacity away from the UK (and Europe in general) to lower cost locations which would, in the future, supply the markets that the UK (and in particular Tees Valley steel production) currently serves. The industry is extremely prone to changing global markets, particularly the blast furnace. The blast furnace appears to be profitable for most of the economic cycle but every time there is a world recession or a major surplus of steel, the fall in the price of steel results in the cost of production at Redcar exceeding the market price.

There is considered to be a need to understand the long term future for all of the Corus/TCP operations in the Tees Valley and to understand how the public sector can help to improve the competiveness of the steel industry in the Tees Valley. There are a number of potential opportunities for steel production in the Tees Valley going forward either relating to improvements and additions to the existing operations or the development of new facilities for making steel using different processes. It should be noted that the development of new facilities is likely to be more difficult if existing operations are shut down. In any case, it is imperative that future developments take place within the context of a strategic plan for the Tees Valley steel industry which is consistent with how the current Corus situation develops.

The following presents a provisional list of opportunities for both cost-base reduction techniques for the existing operations and longer term examples relating for example to low emission steel making:

- The Corus power station at Redcar currently discharges approximately 70 t/hr of steam once it has been used for electricity generation, representing an opportunity for it to be recovered for use by others;

- Corus Lackenby has existing steam boilers fired on natural gas or oil which we understand are due for replacement. There may be potential to supply steam from off-site sources (e.g. Wilton) as an alternative to replacing the boilers;

- The off-gas from the steelmaking process at Lackenby (“BOS gas”) is currently flared - although a relatively impure and low calorific value gas, there is potential to use this for heat generation;

- Various options to improve efficiency such relating to waste heat recovery and, for example, removal of CO_2 and recirculation of carbon monoxide;
- Development of an Electric Arc Furnace and a mini-mill;
- Investment in new (secondary) steel making facilities;
- Coal injection into the blast furnace; and,
- Research into Low Emission Steel Making, for example the ULCOS (ultra low carbon steel-making) initiative in which Corus participates. ULCOS aims to develop a process route for making steel with 50% CO2 reduction versus a modern blast furnace. Use of carbon capture and storage is one of the technology routes being examined.

SECTOR DEVELOPMENT PLAN
Steel

1) Project name

Develop and Deliver North South Tees Steel Opportunity

2) Project location

North South Tees Study Area - Corus Sites

3) Description of project

The project seeks to develop an action plan to maximise the future opportunities in steel manufacture in the study area.

Given the current uncertainties in relation to the Teesside Case Products business, it is recommended that this project be further developed on completion of the ongoing critical actions being carried out by the Corus Taskforce.

There is a need to understand the long term future for all the Corus/TCP operations in the Tees Valley and to understand how the public sector can help to improve the competiveness of the steel industry in the Tees Valley. However to do this there is a need to understand the global position of the Tees Valley operations in world markets and whether or not they have a sustainable future. Hence it is recommended that analysis assessing the strengths and weaknesses of the Teesside operations and their likely future is carried out. The results of this work would form a basis for planning for the future of steel in the Tees Valley for the next 10 years to develop likely scenarios for the future. This would include future opportunities in Steel making such as described in the sector plan above.

If the Redcar site were to close, it is understood that only half of the site (the Redcar Blast Furnace, Sinter Plant and BOS/Concast Plant) would go. Corus intend to keep operational the wharf, the Redcar Coke Ovens, increase coal imports through the wharf, and keep the areas for storage. It would therefore appear to be a case of only partial disposal. There would be a need to draw up a plan which identifies:

a) The areas which are surplus to requirements and which are to be retained.
b) Who is responsible for reclaiming the site and to what standard?
c) Whether or not the public sector need to intervene?
d) What alternative uses could be developed on the site?

It is important that in working this action plan, the objectives of maximising economic benefits to the Tees Valley economy and release of as much strategic land as possible are supported.

4) Project rationale and opportunity

The sub region and the heart of the study area has a long and successful history of steel making. While there are uncertainties in the approach going forward (see above), critical infrastructure, skills and experience will remain in the study area and it is important that plans are developed by this project to assess options going forward as to the potential opportunity in the context of the North South Tees Framework.

5) Anticipated outputs and outcomes

Development of a strategic plan for the steel industry in North South Tees taking into account where Tees sits opposite global steel markets and the physical Tees assets in relation to potential new opportunities.

6) Estimated costs

Primary Cost: £75,000 study
Lobbying / marketing / coordinating efforts £25,000 / annum

7) Delivery mechanism, funding and phasing

The proposed strategic body for the area (see project framework ownership and delivery) should take this project forward.
8) Potential risks
Loss of significant economic contribution to Tees valley economy of steel making and support industries Contamination or landbanking prevents strategic sites coming forward for development; Market forces act to close the TCP business and lack of available finance prevent use of strategic sites;
9) Next steps
Agree scope and resources for action plan development

APPENDIX 1B

PROPOSED INTERVENTION PROJECTS – FRAMEWORK OWNERSHIP AND DELIVERY

1) Project name

Framework ownership and delivery

2) Project location

Study area wide

3) Description of project

North and South Tees is a complex area, including a number of strategic bodies, local authorities and a diverse range of significant public and private sector interests. The purpose of the framework is to identify constraints, opportunities and investments that can enable the area to operative more effectively and also protect and develop its assets for the long term economic sustainability of the study area.

In this context, the Framework needs to identify how this approach can be co-ordinated and managed, to ensure that the impact of public sector investment is maximised and there are strong working relationships with key business interests.

This framework ownership and delivery intervention is therefore of critical importance in that it provides the key mechanism for delivery of many of the other recommended interventions. Inspection of the sub projects that make up this recommendation (numbered 1 to 12 below) indicates that framework ownership and delivery needs to have two overall functions:

(i) An executive function responsible for delivery (e.g. Sector Development Plans, Local Energy and Site Infrastructure Proposals and Transportation and Logistics Interventions).

(ii) A strategic task force in which local authorities as the democratic representatives, local businesses as the ones who are impacted, government as the policy makers holding the purse strings and the relevant agencies work together to achieve the objectives of the framework. Key to this will be the timely and prompt management of issues as they arise including constraints, conflicts and opportunities. Personnel on the task force should be named at all levels so that continuity can be achieved (e.g. the EA representatives will know the background and will be required to pass that on in case of a change of personnel so that experience of the study area is not lost and decision makers in key agencies are visible to all other stakeholders).

The task force could consist of senior officials from TVU, LAs, ONE, GONE, Government Departments (BIS, CLG, DoT, DEFRA), EA, HSE, NE, NEPIC, CPI and industry (e.g. Corus, Sembcorp, Sabic, Impetus and PD Ports) in addition to a named representative from each organisation at an operational level.

The working of the 'executive' and the 'task force' function will need some development within the client team. It is suggested that the executive team would drive the task force in terms of identifying constraints that need to be overcome and opportunities that need to be grasped. The executive team would also ensure – through the task force - that during project development, the right organisations are consulted at the right time at the right level in that organisation and that constraints to development are dealt with promptly with as they arise.

A number of issues for consideration within 'Framework ownership and delivery' are set out below:

1. ***An overall governance structure -*** Tees Valley Unlimited (TVU) is the sub-regional partnership for the Tees Valley and will have responsibility for delivering the Joint Tees Valley Investment Plan. TVU has a high level 'leadership' Board, supported by a second tier Executive Board which is supported by specific themed sub-boards. The officer support is largely provided through the current Tees Valley Joint Strategy Unit structure, (although this is subject to review/consideration). The key issue for the North and South Tees Framework is the securing of a dedicated individual (with a background at a senior level in industry) to drive the initiatives forward and deal with issues and conflicts if and when they arise. This leadership role, while not necessarily a full time position, is of particular importance given the different industrial sectors that operate within the study area. Hence, the recommendation is that there is a 'Head of North and South Tees'. The reporting and governance structure needs to be assessed but it is recommended that the individual and team sits

within the TVU structure and could report to the TVJSU Director and also to the Chair of the Economic Development Strategy sub-board of TVU. This Head of North South Tees would need support from a team to assist with the tasks included within this document.

2. ***Ownership and Coordination of Sector Development Plans (SDP) -*** as the sector development plans are developed and delivered it is important that a high degree of coordination is maintained in order to review relative progress and achieve a 'joined up' approach. It is also important that the needs of any potential over-arching Low Carbon Industrial Transition Economic Area (LCITEA) are targeted within each SDP.

3. The study area spatial plan - A key output from the Framework is the 'masterplan' which sets out the key areas and the uses that they should be retained for. This approach requires the local authorities to endorse the plan and agree a mechanism through which any proposals or planning applications that impact on the study area (either within it, or within a zone that could impact one of the constraints such as Health and Safety Zone, flood risk, contamination or European designated sites) are notified to the North South Tees team within the TVU for comment. This will require a memorandum of understanding to be drafted and agreed between TVU and the local authorities, which ensures that inappropriate development that could impact on the key sites is discussed and the way forward agreed at the TVU level. In addition, monitoring of development of the opportunities in terms of actual and predicted demand for services and land will be important as this will allow adjustment of priorities if required and if competing/conflicting demands are present.

4. Public sector land / site availability strategy - Two strategic sites proposed for acquisition to bring under public sector control (Bran Sands and South Bank Wharf) have been identified separately and form key investment recommendations for this framework. In addition to these, there will be other opportunities arising from plant closures, market disposals, etc which offer the public sector potential to acquire and therefore be in a stronger position to influence strategic investment in the study area. Further work has been discussed elsewhere in relation to identifying pipeline corridors, transport routes and sites for the development of specific sectors - all of which will enable key land interests to be identified. In due course, the public sector should establish a programme of acquisition or securing options, co-ordinated by the 'Head of North and South Tees' to ensure it can proactively progress key acquisitions in relation to the core projects but also respond quickly as opportunities emerge.

5. Provision of knowledge and expertise

The 'Head of North South Tees' would be the key point of contact for economic development and investment activity in the study area. The postholder and the North South Tees team will be able to provide data, knowledge and expertise on both existing and proposed sites/projects in the area, their interactions, constraints and opportunities, assistance with the consenting process and assistance with access to funding. The database provided by the North South Tees Industrial Framework will be an initial starting point, but this data will need to be kept up to date through on-going dialogue with, in particular, the private sector. The areas in which knowledge and expertise would be provided to project developers and site operators include:

(i) Grant access and funding
(ii) Electrical connection issues – see 6 below
(iii) Flood risk
(iv) Obtaining planning permission
(v) Identifying suitable sites (see also 4 above)
(vi) Contamination issues
(vii) Health and Safety
(viii) Nature conservation

6. Funding of Off-site infrastructure - The Framework has identified a number of investments that would enhance the capacity of the service infrastructure system - such as upgrades to the strategic network (e.g. grid connections, gas supply, water & sewerage etc). It is challenging to secure upfront investment from the utility companies to provide this, without confirmation of end users and their requirements, which often leads to delays in upgrading works and discourages investment. The public sector should consider a proactive response to this - there are investment models in operation which have enabled the public sector to create a special purpose vehicle which negotiates with service providers to ensure that an upfront investment to address constraints results in a receipt to the public sector through a share of the subsequent connection fee and income. A joint vehicle

could be created which also addresses the highway and transport constraints identified by the TVJSU and set out in the proposals for the 'Joint Infrastructure Development Allocation' (JIDA).

Moreover, the purpose of this intervention is to ensure that where separate projects exist that rely on common infrastructure improvements, developments are not held up by the need for the first development to improve off site infrastructure with a disproportionately high burden of the overall cost. This links to the planning process and the assessment of community contributions that result.

The current project-by-project approach can lead to frustration for both developers and service providers when capacity is limited or new investment is needed that may not be justified for a single project. The 'Head of North South Tees' would operate as a 'single voice' for the area allowing better planning of service provision and coordination of projects to optimise costs and timing. In order to fulfil this role, the 'Head of North South Tees' will need:

- Buy-in to his role from both project developers and service providers such as National Grid Transco and NWL; and

- Ability to access specialist skills (e.g. grid connection expertise)

7. Promotion and branding of North-South Tees

As an area, the North South Tees has not been developed or promoted as a brand to the same degree as other industrial clusters such as Rotterdam or Emshaven. As the 'voice' for the industrial development of the area, the 'Head of North South Tees' will need to champion a brand for the area, help the development of branding of the area (and zones within it). The project database developed for the current study can help initiate this by identifying logical development locations for specific uses across the study area. Branding could also be developed for each of the zones, focusing on the services, skills and synergies within each zone and how these could attract further inward investment. The area and zone brands would then be promoted in a targeted fashion at a global level. A central plank of this brand could be the LCITEA. Examples of branding and promotion should be used from other clusters, e.g. Jubail, Mab ta Phut and Rotterdam – see descriptions below.

8. Support to key development projects

An important role of the public sector partners in the study area is to assist the private sector to achieve its objectives. It is therefore crucial that the 'Head of North South Tees' role has the full support of the private sector in the area. Whilst the public sector cannot directly fund the private sector (given state aid laws) it can support activities by working closely with interests to ensure that constraints are known, fully researched and mitigation proposals in place, prior to planning applications being submitted. There are also funding models that could enable loans to be made by the public sector to aid economic development. Sources of potential funding need to be identified and efforts to obtain them supported. The study area, in particular the river and shore line, has a number of significantly important environmental designations and future major development proposals (Able UK, Crude Oil Upgrader, river dredging) could face significant time delays if issues are not brought forward early and in full discussion with planning and environmental bodies. The role of the executive and task force body will therefore be to proactively consider these issues and work with the private sector and regulatory bodies at an advanced stage - so that projects are not unduly delayed at the planning stage. Also, the team need to understand potential and actual investments by the private sector in order to assist with a joined up approach.

9. Coordination and communication between landowners, operators, agencies and authorities

A level of cooperation exists at present but it could be significantly improved. A key task for the Head of North South Tees will be to develop effective relationships with the key players within the study area to enable clear communication, encourage mutually beneficial development and jointly address constraints.

This could range from jointly addressing strategic issues, such as river dredging, through to working together to more effectively use waste products and excess heat.

An account management approach is proposed to achieve this with a key account management

process led by the Head of North South Tees strategically and consistently. Candidates companies for this approach include multinationals such as Sabic, Sembcorp, Growhow, Lucite, Corus and Tioxide and UK-based companies such as Able, Impetus and Ensus.

In addition, opportunities and constraints can often be developed and overcome respectively by use of a strategic, commercial approach. As an example, mitigation measures for potential impact to protected sites can be facilitated by the provision of key parcels of land and therefore deals that benefit multiple parties, should, if required, be encouraged.

10. ***Lobbying***

This is a key role for the executive team and would include issues such as mobilising support for initiatives such as support for Dow EO, UK Ethylene Optimisation, decommissioning of Royal Navy Ships, development of a Low Carbon Industrial Transition Economic Area, Network Rail improvements and the attraction of shipping lines to Teesport.

11. Clearance of Redundant Sites

While not perhaps an immediate priority, in the medium to long term consideration needs to be given to how sites held in private ownership with redundant assets can be decommissioned and cleared both from the point of view of land supply and improving the image of the study area.

12. Agree Individual Contributions to LCITEA

Use existing data to agree contributions and targets for individual companies to the low carbon transition plan.

4) Project rationale and opportunity

The rationale for the tasks set out above is to address the concerns of the private sector regarding an uncoordinated approach to the study area, and to give 'leadership' to the future of this important economic driver for the region. The opportunity is to create a 'planned' approach for the study area, where there is long term co-ordination and forward thinking to address constraints and maximise assets. At present, there is concern regarding the plethora of organisations and bodies which results in a lack of clarity on key priorities. The Framework will provide this clarity, and the identified individual with appropriate support and resources will need to co-ordinate its delivery.

The gradual break up of ICI, the issues of globalism and the lack of public sector assets has meant that the private sector in the study area has in the last 15 years or so followed individual commercial agendas. The result is an area with significant strengths but clear constraints which can only be overcome by public sector-led intervention.

5) Anticipated outputs and outcomes

The output from this approach is a greater level of leadership and response from the public sector, to address issues, work with the private sector and drive forward both projects identified in the Framework and future development of the study area.

In the longer term there is an opportunity to implement one or more of a range of funding models that will allow the public sector to invest in key assets and then see a return on the investment as development proceeds. The approach to investment must be fit for purpose and is considered of critical importance in taking forward the projects recommended by this study.

6) Estimated costs

The costs at this stage would relate to revenue funding for a core team (the scale and size of which needs to be determined) but initially for a senior individual to reside within the TVJSU structure (with a small support team) and to directly advise the TVU Executive and Full Board. Further resources would need to be identified to progress the projects, as set out in the related proforma.

In addition, approximate costs for some aspects of these functions are shown below:

- Develop a public sector land availability strategy - £50,000
- Provision of knowledge and expertise. Access to specialist advice in numerous subject areas as and when required through a call-off arrangement (Grant access and funding, Electrical connection issues, Flood risk, Obtaining planning permission, Contamination issues, Health and Safety and Nature conservation) – indicative annual budget - £150,000
- Funding of off site infrastructure - £50,000
- Promotion and branding - £100,000.

7) Delivery mechanism, funding and phasing

This has been largely covered in project description, section 1, above. In summary, the 'Head of North South Tees' needs to work within the overall responsibility of the TVJSU Director, to co-ordinate the strands of work set out above and possibly report to the Economic Development strategy sub-board of TVU and the Executive Board of TVU. This mechanism would provide the North/South Tees area with a focused resource and the structure within which to prioritise requirements and investments.

The timescale of this intervention is important in that the objectives relate to long term economic development and as such a commitment to this intervention is needed for at least 5 and preferably 10 years.

8) Potential risks

The key risks can be summarised as follows:

1. The impact of 'do nothing' - the tasks set out above are a key outcome from the work undertaken to develop the Framework. Without dedicated resource to deliver the outcomes, particularly in relation to co-ordination, promotion and fostering greater interaction with the private sector, then an ad hoc reactive response to issues will become the norm, which presents an uncertain picture to the private sector. A pro-active, visionary and committed public sector will be key to turning round the fortunes of the study area.

2. Resources - dedicated resources will be required, initially to support a senior individual, with ongoing investment to address the key tasks set out above. Appointment of the individual post holder will be critical – they will need to have the full support of industry and have strong experience of partnership working in an industrial environment.

3. Local political acceptability and 'buy-in' - this could be seen as greater sub-regional control by local politicians, but the presence of Leaders, Chief Executives and Mayors within the TVU Board and Executive is an opportunity to address these concerns.
4. Private sector buy-in. The private sector will need to buy-in to the Framework and in particular the role of the 'Head of North South Tees'. Without this, uncoordinated development and decisions by different companies will continue and many of the opportunities identified for the area may be lost. .

9) Next steps

1. Prepare a job description for the key post

2. TVJSU to commence discussion with partners on the governance structure for the Framework (supported by 1 above) and the spatial planning strategy.

APPENDIX 1C

PROPOSED INTERVENTION PROJECTS – ENERGY & INFRASTRUCTURE

1) Project Name

Improve availability of wayleave (pipeline) corridors

2) Project Location

North South Tees Study Area

3) Description of Project

This project aims to improve the pipeline network within and beyond the study area in terms of use charges and availability / capacity for moving products between locations e.g. hydrogen, syngas, carbon dioxide, other bulk gases/liquids.

The first stage will be a detailed feasibility study to expand on the initial data gathered as part of the broader North South Tees IDF. This study will need to include:

- Existing pipelines including size, capacity, condition, materials of construction, ownership;
- Past uses of redundant pipelines;
- Potential capacity and uses of redundant pipelines to facilitate future developments;
- Potential capacity of existing corridors to accommodate new pipelines for future developments;
- Opportunities to rationalise existing uses to free up capacity
- Establish a database for use by the new North South Tees delivery body, TVR etc.

Options to secure availability of key pipeline routes range from public ownership of key strategic pipeline corridors to use of influence and coordination to deliver improvements, e.g.:

- Public sector could buy corridors or pipeline "bundles" and ensure availability to new projects in a strategic manner. Once project goes ahead, developer would purchase the necessary assets, public sector could then re-invest in further purchase to ensure there is always capacity available.
- Public sector could develop agreements or options with owners of redundant pipelines to guarantee their availability for future projects.

4) Project Rationale and Opportunity

If the public sector makes available pipeline space within existing corridors then this would provide an element of de-risking to projects such as the IGCC and future CO_2 network, future steam networks, etc. It would also provide added flexibility on location for new projects, i.e. they would not be constrained to choose a particular location because of a lack of pipeline availability elsewhere.

Companies within the study area could apply for the right for assistance to get new projects off the ground or existing operations could build a case for public sector intervention while highlighting the benefits of the N/S Tees area.

As wayleave corridors are currently in private ownership and this means that new or existing operations can't get a connection or wayleave route, there is a clear need for the public sector to intervene.

5) Anticipated Outputs and Outcomes

Key outcome would be removal of pipeline availability as a constraint to project development. In particular, this would assist the development of an area-wide CO_2 /CCS network.

Funding models will mean that outputs could be new infrastructure with investments recouped from operation once development has taken place.

6) Estimated Costs

Costs will depend on the option followed. Costs for "influencing" options will be low compared to those involving purchase of assets and/or land.

Costs for a feasibility study estimated at £ 50,000

7) Delivery Mechanism, Funding and Phasing

A strategic public sector body for the area would be the most suitable mechanism to progress the possible options. Agreement would need to be reached on a mechanism for acquiring a pipeline or securing pipeline capacity - this would be an innovative approach for the public sector and will raise

issues in terms of maintenance and liability.

Initial funding would be required for purchases of land or pipelines, it is expected that this would be recovered from projects as they are developed and may be re-invested in further purchases.

First phase could be establishing an initial corridor on the South Tees for CO_2 transport from an IGCC plant to the coast. Subsequent phases would include making river crossings available to allow the CO_2 network to extend to the North Tees, plus making corridors available for a North Tees/Seal Sands steam network.

8) Potential Risks

Risks include:

- Existing pipeline owners may not be willing to divulge details of pipelines and their potential availability
- Delays to particular projects could mean delays to public sector recovering investment in land/pipeline purchase
- Existing land/pipeline owners may be unwilling to sell or make routes available at a reasonable price
- Uncertainty in establishing a mechanism that enables the public sector to acquire and retain an influence over key service infrastructure - this could include the establishment of an 'arms length' special purpose vehicle

9) Next Steps

- Review options for alternative mechanisms/schemes that would enable the public sector to influence pipeline capacity/use
- Define corridor requirements and routes for CO_2 network and other strategic links
- Further contact with pipeline/corridor owners to confirm conditions under which they would be willing to participate
- Develop approach for making each of these available (may be different for each project)
- Establish strategic body able to purchase assets/negotiate options etc.

1) Project name

Options for integrating Energy Use

2) Project location

This project is not location specific and could apply to existing industrial facilities anywhere in the study area. However, the most logical place to start would be Seal Sands/North Tees.

3) Description of project

Seal Sands/North Tees has little integration between steam users and steam generators. Some sites are net producers at some times and net consumers at other times. The Thor project (a proposed new 1020MW gas fired power station) also offers the opportunity to provide significant steam supplies efficiently.

The project is therefore to put in place a steam supply network connecting producers and users allowing steam assets to be used more optimally, reducing costs.

There is a need to ensure that:

- System operation & economics are not dependent on a single producer or user.
- New entrants can join the network, i.e. it is a positive attraction for inward investment.
- Smaller sites can participate at competitive rates.

A range of possible approaches is available to install and operate the network, e.g.:

Option 1) Public sector facilitates discussions between private sector who then establish the network(s) required.

Option 2) Not-for-profit JV between private sector companies, with public sector facilitating set-up

Option 3) ESCO – not-for-profit public sector or private company owns and operates network, purchasing steam from producers and selling it to users. A public ESCO could use a PFI-type model to get the network built.

- Links to district heat networks recommendation – could both be developed/operated by the same ESCO

4) Project rationale and opportunity

Fixed cost reduction for existing and potential new businesses.

Flexibility for energy companies and existing process industry to supply local heat/steam and electricity to the grid.

Many of the heat/steam producers and users have been operating at Seal Sands / North Tees for some time without the benefits of integration. Wilton, by comparison, was developed by ICI under a strategic and visionary model in the 1950s/1960s, but which now does not exist in North South Tees. Hence, there is a clear rationale for the public sector to intervene and drive through integration so that individual operators get to benefit from integrated steam generation and use.

5) Anticipated outputs and outcomes

A steam network is established providing competitive energy costs for existing and new businesses meaning that industry in North South Tees should be more competitive with European and other sites worldwide.

A successful operating structure could act as a model for industrial collaboration elsewhere in the area.

The type and magnitude of public sector input would depend on the level of cooperation and commitment shown by potential participants in a new scheme. It is possible that the private sector will need financial encouragement to develop such a scheme, however, if this is the case, public sector finance could be raised against future income / sales (as is the case for other infrastructure developments in the study area.

6) Estimated costs

Costs depend on the willingness of the private sector to lead the build/operation of the network or whether the public sector needs to establish an ESCO.

Cost for a detailed feasibility study is £100,000.

7) Delivery mechanism, funding and phasing

Delivery mechanisms as discussed above.

Funding requirements will depend on the delivery mechanism. Facilitation activity will require low funding, ESCO development likely to require higher levels of funding for set-up and potentially for initial capital investment.

Phasing will depend on the participants in the scheme. Major development of the network may need to await Thor, although some parts could be established earlier (e.g. linking SABIC-Ineos-Conoco).

8) Potential risks

- Over-reliance on a single steam supplier such as Thor may affect network commercial and operating flexibility. Mitigate by including a number of suppliers (e.g. SABIC, Ineos etc.)
- Private sector companies may not be able to reach agreement on structure and operation of network.
- Initial network investment required may be prohibitive.
- Pipeline corridors/land required may not be readily available.

9) Next steps

- Liaise with key North Tees/Seal Sands operators, Thor etc. to determine willingness to be involved and agree best approach to development.
- Develop outline network design, operating approach and layout.
- Identify public sector role.

1) Project name

Action Plan to develop District Heat Network(s)

2) Project location

Across study area, with Billingham and South Tees the most obvious initial locations due to the proximity of heat sources to heat demand.

3) Description of project

The project consists of establishing one or more heat networks to use spare heat from industry to supply local commercial, industrial and domestic users of low grade heat.

A typical network would consist of:

- heat exchangers to transfer heat from the industrial source(s);
- thermal buffer store (hot water tank);
- absorption chillers (if cooling/chilling also being provided);
- pumping station;
- pipe network;
- heat exchangers and meters at each end user.

It would be advantageous to have a number of heat sources supplying the system to provide flexibility/back-up. It would also be advantageous to have a mix of end users to provide a more even system demand over daily/seasonal cycles – provision of heating in winter and chilling in summer can also help balance demand.

A suitable energy supply company (ESCO) will need to be established to build and operate the system.

- Link to steam network – could both be developed/operated by the same ESCO.
- Link to ORC power generation – both may compete for same heat sources.

4) Project rationale and opportunity

Many of the industrial sites in the study area produce “low grade” heat as a by-product of their activities (in the form of hot water or low pressure steam). Future power generation projects will also produce spare heat.

This heat typically has limited use on site and is dumped, either to atmosphere via cooling towers or to the river in cooling water.

This low grade heat could be used for space heating/hot water provision for commercial and domestic buildings, cooling/chilling using absorption chillers, low temperature heating to greenhouses etc.

There is therefore an opportunity to use heat that is currently wasted to provide useful energy to existing and future users in the study area and provide income to the heat producers

A number of successful district heating schemes operate elsewhere in the UK, for example in Southampton, Sheffield and the Barkantine scheme in London. Most are based on a private sector energy management firm running an energy supply company (ESCO) to design, supply and install DH systems. There will normally be public sector involvement, though not necessarily one requiring capital investment – it may, for example, act as a guaranteed customer for part of the output. The ESCO is in charge of the operation and maintenance of the system, responsible for the connection of new customers and for issuing bills.

Taking Southampton as an example:

> The scheme developed by Southampton County Council (SCC) in partnership with a private company, Utilicom (who set up Southampton Geothermal Heating Company – SGHC - to deliver the scheme). Utilicom provided all of the funding and SGHC installed and operate the system. SCC were not exposed to any financial risk - this helped to gain a high level of local political support.
>
> SGHC assesses new customers wishing to connect and provide a cost for connection and a price for energy. All heat and chilled water supply agreements are for 20 years – costs in each agreement are based on indices to ensure that cost savings at the start of the contract are maintained throughout the period of supply.

Connection and supply agreements can be tailored to individual cases e.g. the connection of the De Vere Grand Harbour Hotel was done at zero capital cost; the cost for the connection to be recovered over the period of the contract in slightly higher bills.

For most customers, energy consumption is metered, automatically calculated and bills are sent out directly to customers by Utilicom. For apartments a single bill is sent to the managing agent who then divides the bill in proportion to individual energy usage, collects payment then makes a single payment to Utilicom.

Bills (which include costs of fuel and system maintenance) are reported to be approximately 10-15% cheaper than conventional systems.

The Barkantine system:

This supplies heat and power to a swimming pool, school and housing estate in Tower Hamlets. It was developed as a PFI scheme with the ESCO established as a subsidiary of energy company EDF. Tower Hamlets Council secured funding for the initiative from the Department of the Environment, Transport & Regions to demonstrate using PFI for energy services schemes.

The Council sets the electricity tariff in the service contract, which must be at least 20% less than the average of the cheapest ten alternative electricity suppliers to the area. The financial viability of the scheme is secured by ensuring enough properties are connected to support operational costs through heat and power sales and by exporting surplus power to the national grid. Remote reading of meter in each individual dwelling or users enables individual billing according to consumption.

The energy services scheme was introduced towards the end of a refurbishment programme which included energy efficiency improvements to the existing buildings.

An Operating Committee comprising Council and Company representatives will deal with technical and service issues.

5) Anticipated outputs and outcomes

Improved overall energy efficiency in the study area and therefore reduced greenhouse gas emissions.

Lower energy costs for existing heat users, positive benefit to help attract future developments.

Extra revenue for industry from sale of otherwise wasted heat.

A strong selling-point for the study area - demonstrating the green/renewable credentials of Tees Valley and the ability of the public sector to make things happen.

6) Estimated costs

An initial study to establish network location(s), size, participants etc. would cost approximately £100,000.

There will be initial set-up costs to establish the ESCO, substantial capital investment will be needed to build the network(s). Retrofitting existing buildings in built-up areas is more costly than fitting new developments from the outset.

7) Delivery mechanism, funding and phasing

An ESCO would be the logical means to deliver this project. It would need to build the network and then operate it, buying heat from industrial suppliers and selling it to end users. It is likely that this ESCO would need public sector involvement e.g. as part of a public/private partnership. To maximise benefits to heat suppliers and users it could be established on a not-for-profit basis, although private sector partners are likely to seek a profit element.

It may be possible to build the network using a PFI-type approach to avoid high upfront capital costs (as in the case of Barkantine), or for the private partner to act as the funder (as was the case with the Southampton district heating scheme). Funding may also be available through regeneration schemes such as the Community Energy Savings Programme (CESP). Once established, the ESCO would be expected to operate without further subsidy.

The Government's recent "Low Carbon Industrial Strategy" indicates potential funding availability of £25 million for up to 10 new district heating schemes.

A phased approach to building each network is likely to be appropriate, establishing connections to key heat suppliers and users initially but building these elements with sufficient capacity to connect further suppliers/users in future. If larger, more straightforward connections are made initially then the network can start to generate revenue and become a going concern before expanding to connect more complex parts of the network.

8) Potential risks

- Capital costs for network may be prohibitive;
- There may not be enough firm heat demand available in right locations;
- Future withdrawal of an industrial heat supplier may reduce the viability of network – mitigate by using a number of suppliers.

9) Next steps

- Carry out a feasibility study to establish network location(s), size, participants etc.
- Develop details of ESCO.

1) Project name

On-site energy optimisation and ORC power generation

2) Project location

Across study area at suitable industry sites.

3) Description of project

Optimise on-site use of waste heat through a review of operational practices and computer control systems (such as SCADA) as a zero-capital approach to reducing energy use and waste.

Evaluate the use of remaining spare low pressure steam/hot water to generate electricity using Organic Rankine Cycle (ORC) technology.

Capital investments will ultimately need to be made by the private sector on a site-by-site basis. The project for the public sector is to:

- Review with industry sites their position with respect to operation and control optimisation capability (most are likely to have this in-house) and the extent to which energy use optimisation has been carried out (many are likely to have done this already);
- Where a lack of capability exists, consider provision of expert capability to assist sites with optimisation;
- Where sites have already carried out optimisation and suitable resources exist, encourage companies to consider use of ORC technology and whether it could help reduce their energy costs;
- Potentially assist in setting-up a demonstration ORC unit at one site, if project is viable for the private sector

4) Project rationale and opportunity

The operation and control of industrial processes is not always set-up to optimise energy use An example of this is heat lost to steam boiler "blowdown"- large proportions of this heat can be recovered as pre heating of feed water. Dependent on the way operators run activities such as boiler water purification systems these can be as little as 0.5% losses or as high as 5% of steam generated.

Another example is the way pressure and temperature controls are measured and controlled. These control "loops" can be "tuned" with waste minimisation in mind, possibly meaning additional pressure and temperature sensors are added to the system.

These 2 examples can reduce waste heat, and should be undertaken before capital expenditure on further recovery of the heat is considered.

Once optimisation has been carried out, suitable remaining waste heat can be considered for other use such as ORC power generation. ORC uses low temperature heat resources to vaporise a low boiling point fluid which drives a generator. This allows lower temperatures to be used than those required to generate using a conventional steam power cycle. ORC systems have been installed with heat source temperatures as low as 74'C (although efficiency is low at such low temperatures).

There are a number of industrial sites in the study area which produce low pressure steam or hot water as a by-product. It is likely that, due to their high energy use, optimisation of operation and control has already been carried out. There may therefore an opportunity to investigate whether ORC would provide a cost effective way to make use of spare heat resources.

5) Anticipated outputs and outcomes

Potentially reduced energy use and/or electricity costs for industrial sites.

6) Estimated costs

Costs for facilitation/encouragement activities will be low.
Costs for a control optimisation expert are estimated at £ 50,000 per year

Costs for an ORC demonstration unit will depend on the specific project selected and the level of public sector support required. For example, capital cost for a system using 10t/hr of LP steam to generate 600 kW of electrical power may be approximately £ 1 million.

7) Delivery mechanism, funding and phasing

Existing organisations can be used to deliver encouragement/facilitation, contract an external expert and provide demonstration project grants. Alternatively, the new North South Tees body recommended as one of the other intervention projects could fulfil this role.

Timing of any deployment will depend on results of each site's own investigations.

8) Potential risks

- External expert finds only limited scope for optimisation;
- Electricity savings from ORC may not justify initial capital cost;
- Private sector may have other priorities than to investigate ORC, and/or may not have capital available to invest;

9) Next steps

- Initiate discussions with sites on whether operation and control optimisation assistance is required;
- Evaluate need to provide external expert.
-

1) Project name

Influencing services costs (energy, utilities etc.)

2) Project location

Across study area

3) Description of project

Use public sector influence to:

- Encourage supply contracts provided to process plant operators to be competitive. Overall objective is for operators to benefit from the advantages of integrated service supply without being disadvantaged relative to other European suppliers. Note – the input costs to service providers for electricity, gas etc. are often driven by UK/international markets.
- Assist service providers to offer more competitive rates when needed e.g. via tax breaks on energy costs when UK prices peak compared to elsewhere.

It must be recognised that supply contracts are a matter for negotiation between the 2 parties involved. The terms agreed will therefore reflect the operators ability/desire to mitigate risk e.g. through premiums to fix costs over the long term.

4) Project rationale and opportunity

The study area contains a number of international chemicals process complexes with significant infrastructure.

Costs for energy and other services often represent a major element in manufacturing costs and can be a differentiator between international locations (see Chemical Industries Association Survey reported 19 November 2009 which stated that 53% of UK chemical companies said energy security and price would act as a key barrier to UK investment, http://www.cia.org.uk/pressReleaseDetails.php?id=363).

The "service provider" model in place in the study area provides high quality integrated services but (a) suffers from reduced income if individual operators close (increasing price pressure on remaining operators) and (b) is a commercial operation and therefore, while providing a service of general benefit, will always seek to maximise profit.

The relative volatility of UK electricity and gas prices compared to continental Europe has also had a negative effect on costs in the study area as service supply contracts are often linked to wholesale prices.

Higher service costs impact on both costs for existing businesses and on location selection for new businesses.

Hence, there is considered to be an opportunity to use public sector influence to encourage/assist service providers to offer more competitive long term rates to operators. Possible ways of doing this are described in 3) above.

5) Anticipated outputs and outcomes

More competitive service costs in the area would benefit both existing and future operations. In addition, mechanisms to shield prices from the volatility of UK energy markets would be useful in providing more certain long term costs for operators.

6) Estimated costs

Costs of leadership/influence activities would be low.

Cost of tax breaks on energy costs at times of high market prices could be substantial depending on the degree of assistance and the "cut-in" level chosen.

7) Delivery mechanism, funding and phasing

Leadership/influencing activities could be carried out through existing bodies, but may have more impact if conducted as one of the first activities of the new delivery body recommended by a number of the

other intervention projects.
Public funding would is likely to be required for any tax breaks on high energy costs.

It is recommended that discussions/ influencing activities begin as soon as possible. The timing of other measures will depend on the formation of a new delivery body.

8) Potential risks

- Energy market costs are outside the control of any of the parties involved i.e. tax breaks or support costs uncertain.
- Service providers may be unwilling to review existing arrangements.

9) Next steps

- Liaise with service providers and users on way forward;
- Assess mechanisms/feasibility of assisting with service costs e.g. via tax breaks.

APPENDIX 1D

PROPOSED INTERVENTION PROJECTS – TRANSPORT & LOGISTICS

1) Project name

North South Tees Roads

2) Project location

Across study area – with monitoring of specific projects

3) Description of project

The project consists of a number of interventions relating to the road network:

Following the PB review of the Penelope model, a bi-annual review matching likely development projects, planning conditions and land use designations should be undertaken. This will allow an overview of the impact of development projects on the road network to be maintained.

To fully understand the scale of impact on parts of the strategic road network assessed as part of the Penelope modelling and to determine if the road network is able to continue to operate to a satisfactory level of service in future scenarios, further traffic modelling work is recommended.

It is suggested that a more detailed review is carried out on the links identified in Table 3.16 of the transportation report using the traffic model developed as part of the Tees Valley Area Action Plan work. This work should also take into account emerging transport schemes as identified in the Area Action Plan and including schemes to be delivered as improvement conditions within planning approvals and identify any resultant pinch points on the road network.

Should the delivery of the key road improvement schemes (e.g. those linked to the Northern Gateway Container Terminal) be delayed, it is recommended that the implementation of the related transport improvement schemes be monitored in relation to updated forecast demand and if necessary implemented independently to ensure the forecast congestion on the Strategic Road Network will not act as a constraint to the future growth in this part of the Tees Valley.

In terms of local road links, the following issues should be taken forward for further review and action as appropriate:

a Seal Sands Emergency Access Route (including flood issues raised by the recent Stockton BC Strategic Flood Risk Assessment Issues paper);

b Access to the Port along the A1053 (Tees Dock Road) – which was subjected to flooding in July 2009 impacting access to the port;

c The private road link upgrade proposal between PD Ports and Wilton.

4) Project rationale and opportunity

While the road system is generally good in the study area, improvements are required either strategically (Project Paris, Seal Sands Emergency Road) or as a result of planning conditions for new development projects.

It is important that where road improvements are supported by the public sector (e.g. Project Paris) project delivery is encouraged and progress monitored.

Where upgrades are required by specific projects (e.g. Northern Gateway, South Tees Eco Park), it is important that coordination is achieved (see also Framework Ownership and Delivery, coordination of infrastructure improvement).

5) Anticipated outputs and outcomes

Achieve an up to date understanding of the impact of developments both positive and negative through use of the Penelope model.

Improved Road system delivered through key strategic projects (e.g. Project Paris) and coordination of development related improvements – so that multiple planning related improvements are 'joined-up'.

6) Estimated costs

Resource within TV JSU to review input parameters to penelope model once every 2 years. Major road priorities will be defined by the DFT scheme to develop a sustainable transport network (DAST) in 2010 and beyond.
7) Delivery mechanism, funding and phasing
It is anticipated that these projects will be carried out by the North South Tees team and/or the JSU in collaboration with Local Authorities.
8) Potential risks
Over-ambitious road improvements as planning conditions act to prevent developments moving forward.
9) Next steps
Monitor status of key planning proposals and strategic road improvement projects. Develop a protocol to obtain the information from stakeholders to put into model.

1) Project name

North South Tees Rail Interventions

2) Project location

Across study area – and with links to East Coast Main Line

3) Description of project

The project consists of a number of interventions relating to the rail network:

Promote gauge clearance on routes between North South Tees and the East Coast Main Line - Gauge-clearance on the routes between North South Tees and the ECML is presently being examined to GRIP4 stage by Network Rail and partners. This is expected to identify a preferred option by March 2010. Key stakeholders in the area should continue to promote this intervention.
(R6) Engage in East Coast Main Line gauge clearance.

TV JSU and local stakeholders should engage with studies examining potential gauge clearance to at least W10 on the ECML north of Doncaster, in line with existing Northern Way priorities. When complete this would support the use of the ECML as a diversionary route for W10 gauge freight in line with both Strategic Freight Network and Northern Way objectives.
(R7) Formation of a rail user working group – To address constraint (G)

Formation of a Rail Users Working Group, which should include not just local industry and governmental but also rail operator and infrastructure representatives, with a view to seeking a more co-ordinated approach to rail investment and help identify potential rail (in particular freight-oriented) opportunities. This must be complementary to – or a sub-group of – the existing Tees Valley Strategic Rail Partnership in order to ensure a coordinated approach.

Further examination of potential use of rail-sidings and railheads – Potential use of extensive rail-sidings in the study area (and within the wider Tees Valley rail network should be examined, either through a specific study or via enhanced co-operation between key stakeholders. This will help assess and encourage demand for rail facilities in the area. It is important that ongoing developments and dialogue related to the Stockton-Middlesbrough Initiative, SMI (which may involve redevelopment of the existing Tees Yard sidings at Thornaby) are taken into consideration when examining potential expansion or relocation of facilities in the North and South Tees area.

Identifying the present demand and opportunities for use of both existing and future railheads is an important step forwards. Ensuring that planned railheads are accessible to wider industrial users – as is proposed at the SITA site in Billingham where Growhow plan to have access – will help ensure that rail use grows, while helping prevent duplication of infrastructure.

4) Project rationale and opportunity

Use of rail for freight has a number of key advantages over road including carbon emissions, reduced road traffic, reliability and, in some cases cost.

The study area has a well developed rail network, however, constraints exist, both physical and otherwise to its use. With the right encouragement and support from the public sector, increased use, and therefore more competitive industry can be achieved.

As an example, information from Russell Group is provided below:

Russell (or Russell Group) is a leading Scottish based, privately owned company offering a complete range of transport, warehousing and distribution services by road, rail or sea.

Russell operate 5 rail linked depots throughout the UK offering a choice of mode for freight movement in the UK. Russell rail linked depots are road connected with a distribution fleet on site enabling smooth transfer of goods for onward delivery.

Russell has a comprehensive depot network in Scotland and throughout the UK enabling them to service our customers JIT requirements. Russell operate a road fleet comprising 180 vehicles, 500 trailers and over 1,000 containers.

Russell International is the shipping, forwarding and foreign distribution division of the Russell Company. Working in partnership with a number of world side service providers enables Russell to offer European, International and Worldwide coverage as required.

International services include:

• Scheduling of transport by road, rail, sea and air.
• World wide import and export freight forwarding.
• UK wide export groupage services
• European consolidation services.
• Full and part load cargos
Other services offered by Russell include:

- *Warehousing*
- *Container Ops*
- *Container hire*
- *Property rental*

Russell group now operate freight trains from Scotland to Barkings Railfreight terminal. Around 65 truck journeys a week between Silvertown in east London and various points in Scotland are no longer necessary thanks to a new contract signed between Tate & Lyle PLC and the Russell Group, one of the UK's leading railfreight specialists.

Five times a week, an intermodal train leaves the Russell Group's Barking railfreight terminal heading for Freightliner's Coatbridge railfreight terminal. Operated by Direct Rail Services (DRS) on behalf of the Russell Group, each train moves on average over 350 tonnes of bulk cane sugar products in liquid and granulated forms, all destined for major blue chip customers in Scotland.

5) Anticipated outputs and outcomes

Increased rail use for freight purposes
Reduced HGV traffic
Reduced carbon emissions

6) Estimated costs

Resource within TV JSU for these projects.

7) Delivery mechanism, funding and phasing

It is anticipated that these projects will be carried out by the North South Tees team and/or the JSU in collaboration with Local Authorities and the wider transport initiatives.

8) Potential risks

Rail services are not flexible enough to deal with the needs of industrial freight
Costs to use rail are too high

9) Next steps

Lobbying for gauge clearance as part of a wider North South Tees Programme
Commence Gauge enhancements to ECML project
Establish regular rail used working group

1) Project name

Develop and Deliver Strategic Dredging and River Frontage Plan

2) Project location

River Tees and Seaton on Tees Channel

3) Description of project

This project seeks to support these and future river-related projects through:

- Reviewing existing data sets and initiatives
- Providing a summary of related marine / river works regulation
- Identifying solutions to specific dredging issues relating to beneficial or alternative reuse and physical constraints to dredging
- Establishment of a database of river frontage conditions
- Establishment of a database of environmental parameters including water quality, sediment contamination, marine life and impacts of river works on these parameters, as supporting evidence in the regulation of any future river works.

Review of Existing Datasets and Initiatives

Whilst estuary-wide reviews have been undertaken in the past (The Tees Estuary Partnership's Tees Estuary Management Plan, SONET II, etc), what is being recommended here is the development of specific data sets to inform future investment / development decisions and to ensure future regulatory conditions are based on appropriate knowledge, thereby accelerating their agreement and minimising constraints. However, the initial stage must be to identify and collate existing data to ensure that the proposed work:

- can identify and be informed by existing studies and does not replicate existing work
- is aware of and informed by ongoing studies and initiatives, and their likely outputs and timescales

River / Marine Regulation

Works in the river / marine environment come under the control of a number of regulators and statutory consultees. These include the MFA (FEPA Licence and CPA Consent, but to be replaced in 2010 by the MMO and more integrated regulations), EA (Land Drainage Consents), PD Ports (Works Licences), Crown Estate and other owners of the riverbed / seabed (seabed leases and aggregate licences), HMRC (aggregate levy), Local Planning Authorities (conventionally for work above MHWS), etc. It is important to have a clear understanding of which regulators remit extends to which areas, and what consents need to be applied for, plus the timescales and costs required to obtain them.

River Water Depths

PB Ports is responsible for maintaining the shipping channel through a continuous programme of surveying and dredging, and have records and the best understanding of this. Dredging of private berths will be undertaken as capital / maintenance dredges for the berth owner, either by PD ports or by privately chartered dredgers.

Whilst considered unlikely by both PD ports and the Royal Navy, the possibility of UXO within the Tees estuary cannot be discounted. It is therefore recommended that a UXO desk study be undertaken.

PD Ports will have a licence for disposal of maintenance dredged material at sea – for this, they will need to maintain the licence, undertake periodical sampling and testing, and provide returns on tonnages disposed of at the identified licences sites. Any capital dredged material will, in the first place, have to be assessed for beneficial reuse or alternative terrestrial disposal, before sea disposal could even be considered. Testing will be required – this is not simple or straightforward. For beneficial reuse, there may be requirements for EIA, modelling,

etc, and there may be fees / taxes incurred from Crown estate and HMRC.

If it proposed to reuse dredged material, the first step should be to assess the likely geotechnical parameters of the dredged material (alluvial silts, glacial till, Mercia Mudstone, etc) and compare it to likely physical parameters required for the reuse purpose (e.g. flood defences or dock infill).

Capital dredge projects are conventionally planned and funded by the organisation that requires them. There might appear to be logic behind promoting a 'joined-up' approach to combine different organisations dredge requirements into one dredging campaign – reduction in mobilisation costs due to sharing of the vessel costs, streamlining of consents process through a common approach being utilised across the projects, reduction in survey / monitoring costs due to data sharing, etc. However, there are also limitation to this approach – one dredger may not be the most appropriate to all schemes, required timings of different projects may not synchronise (and, since dredgers need to be chartered well in advance, delays may not be manageable), imposed environmental windows may prevent co-operation due to time limitations.

River Edge Facilities

The varied and private ownership of the river edge facilities is such that condition data is rarely publicly available. Similarly, the age of the facilities is frequently such that records do not exist of the original design such that load capacities are not always available (often they are anecdotal – 'we lifted X load in Y year, so the proposed lift will be possible').

Whilst a river frontage survey appears to be a useful dataset to acquire, in order to make estimations of their useful life and potential capacity for future use, it must be a focussed approach to optimise the cost. A full visual inspection survey, from the river, might achieve approximately 400m per day. This would clearly need targeting at priority river frontages. It should also be combined with a data gathering exercise and site visits (with land owner / occupier agreement), and could lead to the need for invasive sampling and testing. River works need planning in advance to make the most of tidal conditions and daylight hours. The load capacity of individual quays and wharves can be carried out visually using the EA 'Guidelines for Flood Defences' which contains Grading categories and their value in terms of Estimated Useful Life.

However, a first stage might be to undertake a relatively quick river bank video survey. This would be undertaken from a vessel passing up / down each bank at high tide and low tide. This would provide records for initial assessment of river frontage types, identifying any obviously apparent issues, and planning further work, but does not provide any analysis. An initial estimate might be 5km of frontage per day. The survey should cover the whole river from the Corus Ore terminal to Newport Bridge and back to Phillips Inset Dock plus frontages along the Seaton Channel. This totals approximately 30km, including Tees Dock and TERRC but excluding any other basins, docks, etc.

Environment

For any works in the river (including dredging, piling and deposition of materials), the required licences are likely to impose environmental constraints on the works. These might include water quality, sediment quality, benthic surveys, fish tracking, underwater noise, etc. In the absence of existing data sets and knowledge, a conservative precautionary principle approach may be taken by the regulators. This could result in significant environmental windows being imposed, restricting the works to certain months of the year, times of the day or states of the tide. However, if existing data can be demonstrated to mitigate these concerns, a more flexible approach to the works will be possible, with cost and programme benefits.

Some of the data will already exist, for instance water quality monitoring by the EA and local authorities, sediment sampling as part of marine site investigations (although the necessary specific testing regime may not have been followed, at least potential issues may be identified), fish surveys and tracking by Cefas and the EA, etc.

This data should be identified and either centrally located or have its location identified such

that future co-ordination is possible. Gaps in the datasets should be identified and, possibly in discussion with the key regulators and statutory consultees (including EA, MFA, Crown Estate, Cefas, Natural England and local authority EHO's) an approach agreed to address these gaps as far as possible.

It is likely that any gaps in knowledge would be addressed through a combination of desk study (to relate work undertaken elsewhere to the specifics of the Tees) and targeted survey to provide specific information and baseline data.

4) Project rationale and opportunity

The River Tees has played a crucial role in the development of Teesside, and it's importance is likely to remain, even if the industries change. The river is a critical element of the regional infrastructure for variety of river users and stakeholders, all of whose requirements need to be considered and addressed if the river is to be managed in an acceptable, sustainable and economic way.

Key elements of river management relate to:

- River works regulation
- River water depths
- River edge facilities – quays, jetties, load out areas, related facilities and infrastructure
- Environment – quality of water and sediment, management of marine life

A number of the key development proposals in several sectors (e.g. petrochemical, ship decommissioning, off shore wind, logistics, energy generation) include significant river works (capital dredging, piling, placement of materials, etc). Specific current opportunities include the Northern Gateway, the new ConocoPhillips LNG terminal, the Heavy Crude Oil Upgrader and decommissioning activities linked to the Able TERRC Facility.

Support to these key developments through increased access to the river and associated quay wharves and early identification of regulatory constraints / requirements will de-risk opportunities associated river works.

5) Anticipated outputs and outcomes

Summary of existing data sets / initiatives
Summary of regulatory requirements
Dredging A - Identification of possible physical parameters of dredged material and appropriate possible beneficial reuse or alternative use options for these parameters
Dredging B - provision of UXO desk study.
Phase 1 River frontages - Video overview of river frontages
Phase 2 River frontages - Visual survey of river frontages and estimates condition, load capacity and useful life for specific areas
Phase 3 River frontages – physical investigation /testing of specific structures
Phase 1 Environmental database – desk study of existing Tees data and identification of gaps
Phase 2 Environmental database - desk study of non-local data for application to tees scenario
Phase 3 Environmental database – specific targeted surveys / monitoring as appropriate

6) Estimated costs

A phased approach is recommended to ensure value for money and flexibility with regards a changing situation.

Summary of regulatory requirements - £10,000
Dredging A – Identification of possible physical parameters of dredged material and appropriate possible beneficial reuse or alternative use options for these parameters - £10,000
Dredging B - provision of UXO desk study – quote needed
Phase 1 River frontages - Video overview of river frontages – £28,000

Phase 2 River frontages - Visual survey of river frontages and estimates condition, load capacity and useful life for specific areas – to be confirmed on scope definition
Phase 3 River frontages – physical investigation /testing of specific structures - to be confirmed on scope definition
Phase 1 Environmental database – desk study of existing Tees data and identification of gaps
Phase 2 Environmental database - desk study of non-local data for application to tees scenario - to be confirmed on scope definition
Phase 3 Environmental database – specific targeted surveys / monitoring - to be confirmed on scope definition

7) Delivery mechanism, funding and phasing

It is anticipated that these projects will be carried out by the North South Tees team in collaboration with relevant authorities / agencies – i.e. Natural England, Environment Agency and MFA.

8) Potential risks

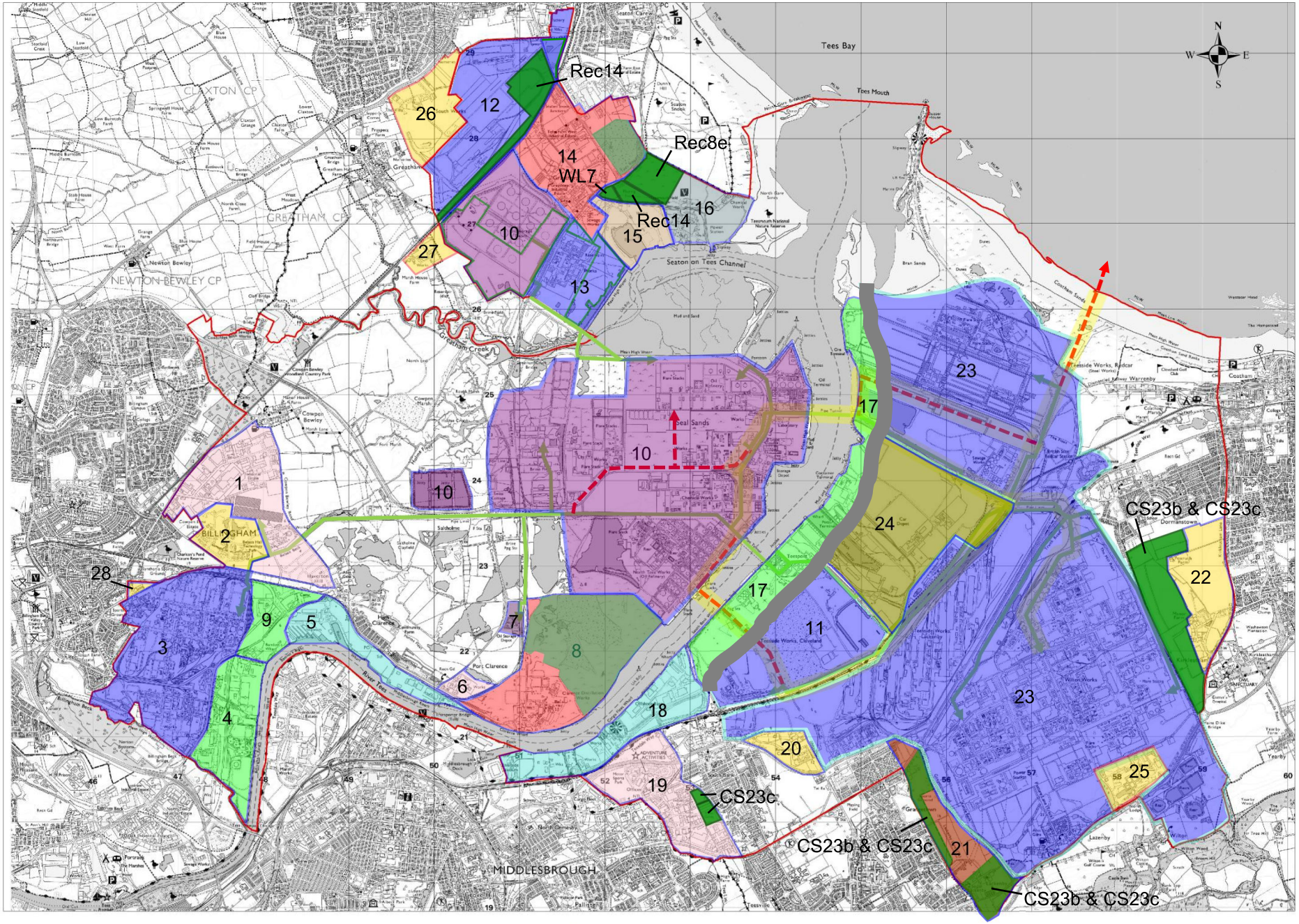
Information not being available for review, or becoming available after completion of project
Changes to regulatory legislation requiring updating of guidance
Long-term maintenance of datasets
Quay owners / occupiers not agreeing to river and / or terrestrial access to river frontage
Restrictions on river work due to daylight hours, tidal conditions, weather
Commercial sensitivity of data relating to river frontages, dredged materials and environmental parameters
Agreement of confidentiality / access limitations on data provided by third parties
Raising regulatory, stakeholder or other concerns relating to issues that have previously not been considered

9) Next steps

Commission:
Data review
Regulation overview
Dredging A
Dredging B
Phase 1 River
Phase 1 Environmental

APPENDIX 2A

STRATEGIC LAYOUT



Existing pipeline corridors:
Possible new corridors:
Plot boundary variable:

Potential strategic sections:

Locally Important Conservation and geomorpholohical sites (extent unknown):

APPENDIX 2:
PROPOSED STRATEGIC LANDUSE

Map Ref	*Zone Name / Comments*	*Primary Sectors / Operation Description*	*Secondary Sectors / Operation Descriptions*	*Land use not to be encouraged*
1	Cowpen	General Industrial, Industrial Estates, Processed Food, Carbonated Drinks, Greenhouses (cultivation), Energy Synergies, Logistics		Residential, process and/or hazardous industry
6	Port Clarence			
19	South Bank			
2	Belasis	Office accommodation, science parks, research and development, technical services, light industrial (e.g. small scale speciality or pilot facilities)		Residential
20	Corus Research			
22	Kirkleatham			
25	Wilton Centre			
26	Golden Flatts			
28	Billingham fringes			
27	Former RHM Site	Possible compensatory habitats land		
3	Billingham Complex	Process and/or Hazardous Industry (PHI, including Chemicals, Steel, Biotechnology, Oil and Gas and Biofuels sectors) Energy Generation, Resource Recovery, Off shore wind related manufacturing activity	General industrial, training facilities, manufacturing related office accommodation	Warehousing unless integral to manufacturing operations. Logistics unless integral to manufacturing operations.
12	Hartlepool Pipe Mill			
13	Huntsman Tioxide			
23	South Tees (exc river frontage) and Wilton Site			
4	Billingham Riverside	Port Related Development (multi-user logistics) including bulk and unitised logistics. Off shore wind related assembly and transport activity (17 only) and service sites. Project heavy lift and temporary storage.	General industrial, training facilities, manufacturing related office accommodation	Operational processing, residential
9	Haverton Hill / NEERC			
17	South Tees River Frontage Sites			
5	Haverton Hill / Port Clarence Riverside Sites (Middlesbrough Reach)	Port Related Development. Oil and Gas Fabrication and Decommissioning. Specialised Engineering Services. General Industrial. Logistics. Off shore wind service sites	General industrial, training facilities, manufacturing related office accommodation	Residential
18	Cargo Fleet Riverside sites including Tees Commerce Park			
7	Port Clarence Distribution Terminal	Liquid / Gas processing, refining, storage. Biofuels and biorefineries. Fine chemicals. Resource recovery and waste treatment. Other PHI Energy Generation	General industrial, training facilities, manufacturing related office accommodation	Warehousing unless integral to manufacturing operations. Logistics unless integral to manufacturing operations.
10	North Tees and Seal Sands			

Map Ref	*Zone Name / Comments*	*Primary Sectors / Operation Description*	*Secondary Sectors / Operation Descriptions*	*Land use not to be encouraged*
8	**Port Clarence**	**Resource Recovery, PHI, Energy Generation (note green space use at Port Clarence and Graythorp landfills following licence expiry)**	**General industrial, training facilities, manufacturing related office accommodation**	
14	**Graythorp**			
15	**TERRC**	**Multi User Facility - Oil and Gas and Marine Sector Fabrication and Decommissioning, Resource Recovery**		
16	**Hartlepool Nuclear Power Station and surround**	**Energy Generation. Decommissioning and Rebuild (Power Station)**		
21	**Wilton Fringes**	**Energy Synergies, Carbonated drink, Greenhouses, small scale generation**		**Residential, process and/or hazardous industry**
24	**Teesport**	**Port Related Development including bulk and unitised, port centric logistics, energy generation. Off shore wind related transport activity**		

Note 1 – Green space is included with reference to existing local authority local plan policies.

APPENDIX 2B

LAND ASSESSMENT

TEES VALLEY JOINT STRATEGY UNIT

NORTH AND SOUTH TEES INDUSTRIAL DEVELOPMENT FRAMEWORK

LAND USE RATIONALISATION - APPENDIX TO STAGE 2 REPORT

July 2009

Prepared by
Parsons Brinckerhoff Ltd
Manchester Technology Centre
Oxford Road
Manchester
M1 7ED

Prepared for
Tees Valley Joint Strategy Unit
Melrose House
Melrose Street
Middlesbrough
Tees Valley
TS1 2XF

Report Title	**:**	**North and South Tees Industrial Development Framework – Land Use Rationalisation Report**
Report Status	**:**	**Draft**
Job No	**:**	**FSE97402a.**
Date	**:**	**July 2009**
Prepared by	**:**	**..... Kate Morgans, James Ware, Denise Hughes**
Technical check	**:**	**..... Sarah-Jane Claxton**
Checked by	**:**	**..... Sarah-Jane Claxton**
Approved by	**:**	**..... Paul Noble**

CONTENTS

SECTION 1

INTRODUCTION

1 INTRODUCTION

1.1 The North South Tees Study Area

1.1.1 The study area, which includes some 9,000 Hectares of land, is dominated by the lower reaches of the River Tees. From the western boundary of the study area moving downstream, the river passes through Billingham Reach, Bamlets Bight and Middlesbrough Reach and then through active/inactive wharfs (including Clarence, Cargo Fleet and South Bank), petrochemical related Jetties and Tees Dock and finally to Teesmouth.

1.1.2 Land use within the study area includes active and available industrial (of all classes), active and available port/wharf related, active and disused landfill, protected sites/areas of ecological significance and minor residential/agricultural. It has a rich and diverse history of manufacturing-related development starting from rapid growth in the early 19th century (during the industrial revolution) due to the sequential discovery of conveniently located natural resources such as Iron, Coal, Salt/Brine and finally, in the 1960s, North Sea Oil.

1.1.3 In addition to public utilities, the rail and road network and the port, a significant proportion of the study area's private infrastructure was installed by large companies (some of which having now been acquired by other corporations) such as ICI, British Steel, Phillips Petroleum and BASF.

1.1.4 The study area can be divided into the following key areas:

- Wilton
- South Tees (Corus, Teesport and the South Bank area)
- Billingham
- North Tees/Seal Sands (from Port Clarence up to the Conoco refinery)
- Greatham and Graythorpe.

1.1.5 In terms of industrial sectors represented in the study area, it has been estimated that the following sectors are currently represented (approximate number of permitted installations at time of report production – includes sites not yet operating but with a valid environmental permit):

a chemicals (including commodity, fine, speciality and contract chemical manufacture, petrochemicals and bulk liquid storage) - 31 permitted installations;

b combustion (for energy generation) – 11 permitted installations;

c Energy from Waste - 2 permitted installations;

d Gas processing - 4 permitted installations;

e Iron and steel - 4 permitted installations

f Landfills - 5 permitted sites

g Oil and gas processing - 2 permitted installations

h Solid Waste treatment and Oil Recovery - 5 permitted installations

i Water/effluent treatment - 4 permitted installations.

1.1.6 Other key sites/activities that are not presented in the above list as they do not require environmental permits to operate include:

- PD Ports operations at Tees Port and Tees Commerce Park,
- Logistics related facilities (bulk storage, tanker parks, rail sidings, pipeline corridors),
- Engineering facilities often associate with the off shore industry and located at riverside locations,
- Industrial Estates.

1.2 Development Scenarios used for Assessment of Constraints and Opportunities

1.2.1 In order to provide a benchmark against which to measure the constraints and opportunities assessments, two possible development scenarios were compiled as follows:

a a negative weighted growth path which assumes a mix of nine project concepts in addition to confirmed investments and the continuation of existing trends in current industrial activity. This also takes into account announced facility closures;

b a positive weighted growth path which assumes a mix of seventeen project concepts in addition to confirmed investments and the continuation of existing trends in current industrial activity.

1.2.2 The project concepts include a range of potential development types including renewable, fossil fuel and nuclear energy generation (with one example including carbon capture and storage and associated improved integration of carbon dioxide transmission infrastructure), energy from waste, an eco park, a papermill, bulk import, crude oil processing and expansion of Teesport (the northern gateway container terminal). The purpose of the development scenarios approach is to provide a selection of sites that may be suggested for development, and analyse the constraints associated with them.

SECTION 2

LAND USE ASSESSMENT

2 LAND USE ASSESSMENT

2.1 Introduction

2.1.1 This section presents key information in relation land use, land ownership and leasehold sites.

2.1.2 It should be noted that this document is not a market led study as could be carried out by a land agent.

2.2 Wilton International Site

2.2.1 The petrochemicals cluster at Wilton International is a large integrated chemicals complex. Created 50 years ago and now owned by SembCorp Utilities (UK) Limited, it is one of few sites in Western Europe with special development status although this 'instrument of consent' can only be used once for each plot on Wilton.

2.2.2 Wilton International hosts the following companies involved in manufacturing or energy-related activities.

a Artenius – occupying three plots in the central section of the site, Artenius manufacture PTA and PET using imported paraxylene as a feedstock from Sabic and Ethylene Glycol from Dow. The size of the three plots is 27.45 Ha.

b Croda – occupy three plots in the north eastern part of the site. Croda manufacture ethoxylates and surfactants from a feedstock of Ethylene Oxide which is manufactured by Dow. The total land holding is 15.6 Ha.

c Dow Chemical Company – occupy 2 plots of total area 9.6 Ha in the eastern part of the site for the manufacture of Ethylene Oxide from Ethylene (produced by Sabic) and oxygen from BOC.

d Ensus UK Ltd – occupy a plot of area of approximately 9 Ha in the south west part of the site for the manufacture of ethanol and animal feed from wheat. This plant is currently undergoing commissioning. In addition, Ensus has leased two areas from Sembcorp (total area 8.3Ha). Yara, formerly part of the Norsk Hydro group, will support the bio-refinery project by investing in a new liquid carbon dioxide plant. The new facility, with an annual liquid CO2 capacity of 250,000 tons, is being constructed next to the Ensus bio-refinery at Teesside.

e Huntsman Polyurethanes – occupy two plots of area approximately 6.8 Ha in the north eastern part of Wilton site for the manufacture of nitrobenzene and aniline using imported feedstocks from Sabic, hydrogen from BOC and nitric acid from Growhow.

f Sabic UK Petrochemicals – occupy a number of plots (generally the eastern part of the site) for their steam naphtha cracker and associated storage and ancillary operations. The total area occupied is estimated at 102 Hectares. Of this, it is understood that significant parts of the site contain open ground and redundant assets (e.g. parts of the paraxylene plant and the former Olefins 5 plant). For the purposes of this study, approximately half of this area is assumed to be in active use – with a quarter as redundant assets.

g Sembcorp – the landlord and provider of services at Wilton have power generation active operations on the site including the main power station (which includes 2 coal boilers, 4 primary turbines and 3 secondary turbines, 1 gas turbine, package boilers and a biomass power station) and various distribution networks (pipelines and cables, etc).

h UK Wood – has a plot of approximately 4 Hectares for the importation and storage of wood for Wilton biomass power station.

i Teesside Power (PX Ltd) – has a leased plot of 13.75 Ha used for the Teesside Power station.

2.2.3 Other companies holding smaller and /or redundant plots of land at Wilton International Site include Air Products, Hertel, Ineos Chlor, JC Musgrave, Wilton Centre, Polymer Industries and Transco.

2.2.4 Using employment land survey and Sembcorp data, land use at Wilton can be summarised as follows:

a Available light industrial – 72 ha (of which 49 is earmarked for various projects);

b Available process land – 146 ha (of which 38 is earmarked for Sonhoe).

c Estimated land used at Wilton by operating companies – 215.5Ha.

d Estimated redundant land at Wilton held by operating companies - >80 Ha (including land owned by Invista and Sabic, but actual redundant land value considered to be much higher).

2.2.5 Hence the total accounted for by this process is approximately 515Ha. Given that the total land holding within the main operational part of Wilton International is approximately 600Ha, this means that redundant (not classed as available) land may account for as much as 150 – 170 Ha of land.

2.2.6 Plans for the long term future of Wilton should include dealing with redundant assets and land from a land availability and image point of view (see also Stage 2 report recommended project interventions).

2.2.7 In terms of recent investment and ongoing activity, Wilton International hosts several extremely significant and strategic process industries (see section 3.2.2 above). Recent investments include the Sabic LDPE plant and the Ensus Bioethanol and Yara CO_2 facilities and the Sembcorp Biomass power station.

2.2.8 Given the strengths of Wilton site, land use should be continued to be reserved for bulk manufacturing, especially for industries using the facilities (heat, steam, services) provided at the site.

2.2.9 Examples of project concepts that should be targeted for Wilton are considered to include the following:

a Waste separation and treatment (including pyrolysis, autoclaving, gasification, oil recovery, reprocessing, anaerobic digestion, fibre recycling)

b Biofuels, bio refineries production, biomass processing – including 2nd generation biofuels;

c Industrial biotechnology;

d Fermentation processes (on site or on the fringes of Wilton International);

e Algae demonstration processes;

f Further development of hydrogen and syngas projects;

g Plastics conversion, polymer (reverse cracking), production of light weight polymers for autos;

h Formulated products;

i Carbon capture from current and new process industries;

j Crude Oil processing including the 'upgrader' concept;

k Paper recycling;

l Power generation (fuels could include biomass – possibly with a drying process added, waste, coal and all with the potential for carbon dioxide capture).

The land use plan proposed by this project takes these potential uses into account and is presented as Appendix 2A.

2.3 South Tees (Corus, Teesport and the South Bank Area)

2.3.1 Broadly, the land at South Tees area is split between generation, power, waste, process and steel, ancillary buildings (e.g. office, training, engineering workshops), redundant, available - PPHI or heavy and available – light industrial.

2.3.2 The major land owners/lease holders in this area are summarised below.

- Corus UK Limited – occupies 27 No. areas of land, covering an area of 1220 Ha. The main operational sites are used for all aspects of the manufacture of precision steel, plain carbon manganese, low alloy steels and special steels. There is one blast furnace on the site which produces 3.5 million tonnes of steel per year.
- Tees and Hartlepool Port Authority Limited (now known as PD Teesport Ltd) own 6 No. sites located in the South Tees area totalling 347 Ha including the largest individually owned site area equating to318.7 Ha. This largest site is not classified as available for development however, 2 No. of the remaining five sites associated with land off the west side of former Smiths Docks is classed as available for port related development (~15 Ha). PD Teesport Limited is registered as owning two sites equating to 63 Ha of land in the South Tees area none of which is classified as available for development.
- ICI Chemicals and Polymers Limited own 114.7 Ha in the Bran Sands area of South Tees and lease 5.8 Ha south west of Tees dock. Neither of these land areas classed as available for development.
- Ian Grainger is registered as leasing 68.7 Ha of land and owning 2.3 Ha within the Coatham Sands Area. The land is currently used as a golf course and is currently not available for development. The Council of the Borough of Redcar and Cleveland own 59 Ha associated with the golf course.
- The Council of the Borough of Redcar and Cleveland are registered as owning and leasing 239.24 Ha of land in the South Tees area equating to 251 No. sites. Only 29 No of these are greater than 1 Ha in size.

2.3.3 Clearly, the dominant landowners in 'South Tees' and Wilton are Corus, Sembcorp and PD Teesport. The key objective for Sembcorp and PD Teesport Ltd in terms of land use policy is to maximise income generation from their land portfolio in the areas of process industry manufacturing and logistics respectively.

2.3.4 There is a potential for conflict between potential tenants of the Sembcorp / PD estates and the needs of the landowners in terms if income generation, and this can act as a constraint to development on these sites.

2.3.5 There is uncertainty in relation to the Corus estate in that at the time of writing this report there is a great deal of uncertainty in relation to the future of Teesside Cast Products.

2.3.6 Whatever the eventual outcome, there are significant tracts of key development land within the Corus estate which needs to be part of the development plans going forward.

2.4 Billingham

2.4.1 Land ownership for all companies with plots >15 Ha is summarised below:

2.4.2 Teesside Environmental Trust has freehold rights over 15 pieces of land and leasehold rights over two pieces of land in the Billingham area. This includes the largest owned area of the land which is dedicated to the Teesside International Nature Reserve (248.5 Ha) which is located in the south eastern corner of the site. In total the area of land owned and leased by Teesside Environmental Trust is 360.6 Ha.

2.4.3 ICI Chemicals and Polymers Ltd own or lease 10 No. registered pieces of land in the Billingham area. This includes land at Cowpen Bewley, Belasis Avenue and two small areas of land (<0.05 Ha combined) at the Methanol Plant. The total area of land owned by ICI is approximately 476 Ha including the 3rd and 4th largest land areas of 236.7 Ha and 182 Ha at Cowpen Bewley (landfill site currently undergoing restoration). Land available for use for potentially polluting hazardous industries (PPHI) is 2.2 Ha lying to the south of Belasis avenue.

2.4.4 Huntsman ICI Petrochemicals Limited is registered as owning two pieces of land associated with the Brine Reservoirs at Saltholme. Combined these sites cover an area of 59 Ha and none of this area is noted as available by the council.

2.4.5 RSPB lease 20 sites and own one in the Billingham area. These sites cover a total area of 393 Ha with 359 Ha being located at the pumping station at RSPB Saltholme.

2.4.6 Marlow Foods Limited own (freehold) three registered pieces of land located on the north side of Belasis Avenue which total 24.4 Ha. 16.9 Ha of this is considered to be potential available general industrial land by Stockton Council which is currently not reserved but allocated for use.

2.4.7 Impetus Environmental Services, Impetus Holdings Limited and Orb Land Limited have absolute freehold of 15 No. sites and caution against freehold on one site in the Billingham area. These registered sites total an area of 61.5 Ha with the largest site located to the north of New Rd (28.25 Ha). This site is currently under industrial application for creation of an Eco Park including a waste transfer station and glass recycling plant. Numerous other Impetus owned sites are noted as available land by Stockton Council, details of these sites are provided in the table below:

Land Registry ID	Location	Size (Ha)	Industry Type
1277	Land lying to the south of Belasis Avenue	16.5	Not reserved but allocated for PPHI
1248	Land on the south side of Haverton Hill Rd	5.2	Not reserved but allocated for PRD
1236	Land lying to the south of Belasis Avenue	3.5	Not reserved but allocated for GI
1264	Land lying to the south of Belasis Avenue	3.4	Not reserved but allocated for PPHI

1245	Land on the north side of Haverton Hill Rd	0.4	Not reserved but allocated for GI
1243	Land on the north side of Haverton Hill Rd	0.05	Not reserved but allocated for GI

PPHI =Potentially Polluting Hazardous Industries
PRD = Port related development
GI = General Industry

2.4.8 Sembcorp have four registered sites within the Billingham area totalling 53.3 Ha. 41 Ha of this is relating to the Saltholme pipeline which runs across the middle of the Billingham area. The three remaining sites are either available or partly available as noted by Stockton Council. Two of these sites have been allocated to general industry in the area classified as Belasis Avenue North and South and the third site has been partly noted as available for PPHI (north west corner) for long term use (noted as Chemplex (FR ICI) by Stockton Council) in the area of the railway sidings.

2.4.9 The Urban Regeneration Agency (care of English Partnership) own ~17.9 Ha of land around the Haverton Hill area of Billingham. The majority of this land is available for use for PRD and although not reserved has outline planning permission. The only areas which are not available for development are those associated with the building north of the slipways (~1.1 Ha)

2.4.10 Port Clarence Properties Limited has freehold of 6 No. sites located adjacent to the River Tees totalling 18.6 Ha. One of these sites (6.95Ha) located south west of Port Clarence road is available for port related development according to Stockton Council.

2.4.11 Growhow (formerly TERRA NITROGEN (UK) LIMITED) own ten registered sites (87.65 Ha) in Billingham with the largest site (56.8 Ha) located in the western area adjacent to the planned Eco Park. Approximately 11 Ha of land is noted by the council as being available for general industrial use in the area north of Belasis Avenue and south of Belasis Creek.

2.4.12 ELBA Securities Limited is registered as owner of three sites in the Billingham area totalling 20.4 Ha. Of this 20.4 Ha)

2.4.13

2.4.14

2.4.15

2.4.16

2.4.17

2.4.18

2.4.19

2.4.20

2.4.21

2.4.22

2.5 North Tees/Seal Sands (from Port Clarence up to the Conoco Refinery)

2.5.1 Current landownership from land registry data provided to PB as part of this project for landowners with land >15 Ha and owners of available land are summarised below.

2.5.2 ConocoPhillips - The site stabilizes crude oil by separating the Natural Gas Liquids (NGLs) and unwanted impurities. The terminal receives crude oil from the Ekofisk complex and several other Norwegian and UK offshore fields. The operation stores, meters and exports separated NGLs (ethane, propane, normal butane and isobutane) worldwide. The terminal imports approximately 800,000 Barrels of Oil per Day and processes 67,000 Barrels Per Day of NGLs.

2.5.3 PD Teesport is registered as owning two areas of land at Seal Sands in Stockton with the largest area of land totalling 285 Ha. At Seal Sands a large proportion of land owned by PD Teesport is leased out to Norpipe Petroleum, Norsea Pipeline Limited and Norpipe Oil As (129.7 Ha) which is then operated by Conoco Phillips. Of this leased land approximately 14 Ha is classified as available for development allocated to Potentially Polluting Hazardous Industry (PPHI). Of the main PD Teesport land north of the river part of this has been made available for PPHI development.

2.5.4 Amoco (UK) Exploration Company lease 29 Ha of land from PD Teesport in the area of Seal Sands. Approximately 50% of this land (14.5 Ha) is noted as being available for PPHI development.

2.5.5 Laporte Industries Limited (now Fine Organics) is registered as owning three areas of land at Seal Sands totalling 27.4 Ha. Out of the three sites the largest area 15 Ha is noted as available for PPHI development.

2.5.6 Cory Environmental Developments Limited lease 10.9 Ha of land in the Seal Sands area which is available for PPHI development.

2.5.7 Lundbeck Pharmaceuticals Limited is registered as owning 8.1 Ha of land in the Seal Sands area of Stockton. The northern area of this site which equates to approximately 4 Ha has been allocated as available land for PPHI development. The Yorsipp (Trustee) Limited 4 Ha site located to the east of Lundbeck is also partly available (northern area) for PPHI development. The Lundbeck operating plant closed in 2008 and is redundant.

2.5.8 A small area of land, (less than 0.01 Ha) leased by Innogy Cogen Ltd is available for PPHI development. In addition to this adjacent land leased by National Grid Gas PLC (0.68 Ha) is also available along with a small section of the land owned by PD Teesport.

2.5.9 Impetus Reclamation Limited is registered as owning the second largest area of the land (234 Ha) in the Stockton area. Approximately 75% (175 Ha) of this is noted by the council as being available for PPHI development (North Tees Pools) including one of the lakes. Impetus owns another 25 Ha of land in the area east of Seaton Carew Road south of the Oil Storage Depot. This land is not available classified as available for development.

2.5.10 South of the Impetus 234 Ha site lies 106 Ha of land currently registered as being owned by Zero Waste Limited. This land is part of the Clarence Works site and is not classified as available for development.

2.5.11 Adjacent to the southern boundary of the Zero Waste site lies a rectangular piece of land adjacent to the River Tees which is registered to Corus UK Limited. This 9.56 Ha stretch of land is available for PPHI development (North Tees Pools).

2.5.12 Huntsman ICI Petrochemicals (UK) Ltd and Huntsman Petrochemicals Ltd are registered of owning and leasing 26 No sites, 8 No and 18 No respectively, in Stockton. The total area of these sites combined is 265.9 Ha, out of this 265.9 Ha only 18.3 Ha of this is noted as available for development by the council. This 18.3 Ha site is located to the south west of the North Tees Works (Oil Refinery) and has been allocated for PPHI.

2.5.13 BASF PLC is registered as owning (9 No including one possessory freehold) and leasing (7 No) 16 No. sites in the Stockton area (north of the pipeline) totalling 107 Ha. Of the nine freehold sites seven are available and one is partly available for development. Of this 107 Ha ~45 Ha (assuming 12.5% available of site number 2425) is available for PPHI development. It should be noted that this land is now owned by Ineos although the land registry records do not show this.

2.5.14 BITMAC Ltd own 39 Ha of land in connection with the Port Clarence Works and surrounding land adjacent to the River Tees. According to the council the land surrounding the works is available for port related development. This equates to approximately 50% of the total site area (19.5 Ha).

2.5.15 Scott Bros Environmental Services Ltd are registered as owning three plots of land within the Port Clarence Works area totalling 8.6 Ha. 8.57 Ha of this is available for port related development (PRD).

2.5.16 Tees Storage Limited lease 16 No. pieces of land and own one in the Stockton area equating to 38.5 Ha, 34.7 Ha of which is associated with the freehold site on the north west bank of the River Tees in Seal Sands. Approximately 50% of this site (17.35 Ha) has previously undergone planning permission for the erection of a Vopak Terminal or is noted as available land for PPHI.

2.5.17 Sembcorp Utilities UK Limited SCU (UK) is registered as owning two sites and leasing four in the Stockton Area. The two freehold sites are located at the Brine Pumping Station and land surrounding the pipeline running to the east of Seaton Carew Road (totalling 34.4 Ha). A section of land south of the pipeline is available for development for PPHI in association with the Impetus owned land to the south. In total the land leased by Sembcorp covers 2.6 Ha, none of which is available for development.

2.5.18 Elba Securities Limited has absolute freehold of three sites associated with the Port Clarence Refinery totalling an area of 19.11 Ha. All three of these areas are noted as being available for port related development.

2.5.19 Petroplus Refining Teesside Limited lease eight sites within the Stockton area totalling 55.4 Ha. The second largest area leased by Petroplus is associated with the pipeline running east of Seaton Carew Road in a north south direction. Two areas of the land leased by Petroplus, associated with land adjacent to the North Tees Oil Refinery, are partly available for PPHI development. These available areas equate to approximately 5.5 Ha (~25% of 13 Ha and ~20% of 11 Ha).

2.5.20 Seal Sands Gas Transportation Limited lease two pipeline areas in Seal Sands (totalling 18.677 Ha). None of these areas are available for development.

2.5.21 Land associated with the Dow Chemical Company Limited leased land to the north of the Seal Sands Works is available for PPHI development (4.24 Ha). Additional land

leased by Dow Chemical Company which is adjacent to the aforementioned site is not available.

2.5.22 H.J. Banks Company and Limited are registered as owning 1.9 Ha of available land north east of the oil storage depot associated with Port Clarence Works (North Tees Pools). This available land has been allocated for use for PPHI.

2.6 Greatham and Graythorp

2.6.1 Current landownership from land registry data provided to PB as part of this project for landowners with land >15 Ha and owners of available land are summarised below.

2.6.2 Broadly, the land at Greatham and Graythorpe is split between generation, power, waste, process and steel, ancillary buildings (e.g. office, training, engineering workshops), redundant, available - PPHI or heavy and available – light industrial.

2.6.3 The major land owners are shown as follows:

a Able UK Ltd – occupying 10 No. sites, 7 No. sites with an area of 26.4 Ha is north of the Tees Road and make up a register landfill called Seaton Meadows. The other 3 No. sites of 46.1 Ha in total is the main ship decommissioning area, (a.k.a. Teesside Environmental Reclamation and Recycling Centre (TERRC)) which includes a dry dock of approximately 10 Ha, and feeds to the Seaton on Tees Channel. The lease on the land is registered to Elba Securities Ltd.

b Huntsman Tioxide – occupying one large land parcel of 87.9 Ha. In the centre of the site there are several satellite sites owned by Midland Montagu and Lloyds Industrial totalling 0.15 Ha of land within the Trioxide freehold. The factory manufactures Titanium Dioxide used as a pigment for paint, sunscreen and foodstuffs. The crude titanium dioxide is purified via converting to titanium tetrachloride in the chloride process. This titanium tetrachloride is distilled, and re-oxidized with oxygen to give pure titanium dioxide while also regenerating chlorine.

c ConocoPhillips – occupying 11 No. sites, 6 No. make up the oil terminal at Seal Sands with a site area of 152.6 Ha. The site stores stabilized crude oil processed at the Seal Sands refinery. Once the oil has been processed the oil is stored temporarily at the site. The 10 Tanks hold large volumes of stabilized crude oil until it is transferred by pipeline to the ConocoPhillips Jetties for export via ship[1]. The pipeline is laid along a corridor consisting of 5 No. sites making up 1.9 Ha.

d British Energy – Nuclear Power Station owned by EDF, occupies five plots including two satellite and three north of the Seaton on Tees Channel. The station proves electricity to the national grid and has a total size of 68.6 Ha. 5 No. packets of land are also owned by the Central Electricity Generating Board totalling 52 Ha. The largest area of land is 41.8 Ha and includes a major area of the Seaton on Tees Channel.

e Corus UK Ltd – Hartlepool operations are focused on pipe work the mill has the capacity to produce 84" steel pipes. The site consists of 2 adjoining land parcels totalling 141.7 Ha.

f Council Owned – Hartlepool Borough Council own 41 No. sites across the industrial area they have a cumulative ownership of 33.6 Ha. The largest area is 12.7 Ha and is adjoining the Corus tubes site, the average is 0.8 Ha and the smallest is 0.002 Ha.

[1] http://www.hartlepool.gov.uk/site/scripts/documents_info.php?documentID=457&pageNumber=4

2.6.4 Other companies with significant land holdings (>1 Ha) are presented here in descending order of the Land holding: Olnato Ltd (10.63 Ha), Northumbrian Water (10.17 Ha), Niramax Group Limited (9.07 Ha), Sycamore Property Developments (7.78 Ha), Baker Hughes Ltd, (7.73 Ha), Dean Group Plc (4.68 Ha), G.E. Northeast Ltd (4.04), Brenda Road Developments (3.56 Ha), Jacob Friedman (3.48 Ha), Clevestones Trans Ltd (3.43 Ha), Caparo Engineering Ltd (3.07 Ha), Harbans Singh Kalsi (3.05 Ha), Ranjit Singh Boparan (2.99 Ha), Yardsave Ltd (2.90 Ha), Brenda Road Holdings (2.56 Ha), Downham Properties Ltd (2.35 Ha), G Abbot and Company (holdings) Ltd (2.14 Ha), Youngs Recycling Group Ltd (3.22 Ha), Deborah Services (holdings) Ltd (1.15 Ha) and Alkron Properties Limited (1.06 Ha).

SECTION 3

FINDINGS

3 FINDINGS

3.1.1 The land registry data, which can be accessed as part of the Geographic Information system which accompanies this project, is to varying degrees out of date as company names and transactions have taken place and the land registry information appears not to have caught up.

3.1.2 There are examples of delays to development in the study area as a result of lack of clarity on land ownership. This may be due to problems with company or landowner dataflow to the land registry or a problem with land registry data management.

3.1.3 It is recommended that access to land agent advice (or similar) is provided to assist companies and the public sector development agencies pursuing or releasing employment land in relation to these issues.

3.1.4 Comments on availability of land are taken from the council employment land records. Land owners and occupiers and their agents must be contacted in order to get an up to date view on specific land availability.

3.1.5 Potential constraints on land use in the study area are numerous and varied and include:

- Private sector land banking for various corporate/strategic policy reasons;
- Private sector owners seeking commercial benefit developments only, which rule out certain development types, depending on the strategic objectives of the land owner;
- Owner valuation / commercial terms incompatible with developer (or developer funder) valuation and/or resources;
- Land contamination;
- Flood Risk;
- Protected (habitats) sites;
- Health and Safety;
- Transportation and logistics issues including access to sites and wharfs;
- Ability to move feedstock, intermediates, products, waste and utilities along wayleave corridors to other locations as necessary can be restricted by lack of access to appropriate land.

3.1.6 These potential constraints can and are regularly overcome and public sector agencies often assist operators and developers with the identification of options and solutions.

3.1.7 The North South Tees project technical reports and GIS provide information, analysis and recommendations to assist with the process of identifying and overcoming constraints.

3.1.8 There are a number of reasons why land is not made available for new investment. As noted in stage 2/3 of the development framework, it is recommended that the public sector develop a land availability strategy which targets key sites and if necessary, purchases a site or an option upon purchase of such a site.

3.1.9 The objective of this recommended action is to improve availability of land for investment. The means of achieving this could range from outright ownership of a range of sites to support upcoming investment, the purchase of options or the use of resources (financial or physical assets) to bargain/negotiate with the private sector and achieve competitive offers for new investment.

APPENDIX 3 – PROJECT CONCEPTS DATABASE

PROJECT CONCEPT NUMBER	SECTOR		PLANT / PROJECT / CONCEPT	Estimated land area of plot	Source for area value	Type of plant	Generation to the grid: (MW)	Estimated electrical demand from grid: (MW)	Grid voltage	Utilities	Rail	Road	Ship	Storage requirements	Pipelines	Cavities	Construction Jobs	Full time Jobs	Source for jobs assumption	Location implications/drivers/ requirements	Location class*	Preferred location(s)	Reasoning	Benefits	Less preferred location(s), potentially needing enabling works	Reasoning	Benefits	Less preferred locations needing significant enabling works	Reasoning	Benefits	General benefits to area	General comments
1	Biofuels		Ensus bioethanol	7 ha	GoogleEarth	fermentation/ distillation		10	Sembcorp 11 kV	Sembcorp	no	wheat in, DDGS out	Ethanol (after Vopak)?	grain silos on site, bulk ethanol tanks (Vopak?)	ethanol to Vopak	no	500	50	ES	fixed	1	-	-	-	-	-	-	-	-	-	-	
2	Process		Sabic polyethylene plant	13 ha	ES	reaction/extrusion/ drying		0	Sembcorp 11 kV	Sembcorp	no	16500 HGVs per year (import + export)	no	bulk silos on site	connection to ethylene grid	yes	600	120	ES	fixed	1	-	-	-	-	-	-	-	-	-	-	
3	Energy		Teesside power station upgrade (gas plant) - *no change to overall capacity*	10 ha	GoogleEarth	power station	no change	-	275/400 kV		no	no	no	no	gas from N Tees		500	no change from current 200	ES NTS	fixed	1	-	-	-	-	-	-	-	-	-	-	
4	Energy		Sembcorp gas turbine 40 MW			power station	40	-		Sembcorp	no	no	no	no						fixed	1	-	-	-	-	-	-	-	-	-	-	
5	Other		Teaco (port)	27.57 ha	DAS	warehouse		2		Port	yes	yes	yes	-	no	no	tbc	900	DAS	fixed	1	-	-	-	-	-	-	-	-	-	-	
6	Process		Aromatics restructuring *(plus, minus effect)*	(existing)	-	process		no change		assume no change	assume no change	assume no change	assume no change	assume no change	assume no change	assume no change		assume no change		fixed	1	-	-	-	-	-	-	-	-	-	-	
7	Energy		SITA 3rd stream *(incineration) 20 MW*	1.5 ha	ES	power station	20	-	66 kV?		no	136 kt/yr waste in	no	waste storage on site	no	no	75	30	ES	fixed	1	-	-	-	-	-	-	-	-	-	-	
8	Energy		EDF offshore windfarm (60MW)	<<1 ha onshore	ES	power station	90	-	275kV?		n/a	n/a	n/a	no	no	no	450	< 10	ES	fixed	1	-	-	-	-	-	-	-	-	-	-	
9	Process		Invista	35 ha	GoogleEarth	nylon												300		fixed	1	-	-	-	-	-	-	-	-	-	-	
10	Refining		Oil Processing / Storage Plant A	25 ha	GoogleEarth	-												200	press reports	fixed	1	-	-	-	-	-	-	-	-	-	-	
11	Process		Chemical Works A and B	12 ha	GoogleEarth	-												200	press reports	fixed	1	-	-	-	-	-	-	-	-	-	-	
12	Process		Chemical Works C	22 ha	GoogleEarth	-												tbc		fixed	1	-	-	-	-	-	-	-	-	-	-	
13	Process		Chemical Works D	25 ha	GoogleEarth	-												tbc		fixed	1	-	-	-	-	-	-	-	-	-	-	
14	Process		Services Plant A	1 ha	GoogleEarth	-												20	press reports	fixed	1	-	-	-	-	-	-	-	-	-	-	
15	Energy		CCGT power station	10 ha	ES	power station	1020	-	400 kV	gas	no	no	no	no	Gas from NTS (CATS)	no	1000	60	ES	Large grid capacity, gas supply	2	North Tees Pools or Invera (SW)	Proximity to gas network, land and grid availability, consents granted	Possible steam supply to N Tees / Seal Sands industry	Ineos (N) or Conoco/PD land	Increased distance to grid	Possible steam supply to N Tees / Seal Sands industry	Wilton site (e.g. former invista)	Reserve Wilton for process industry. No shortage of steam at Wilton so no benefit as steam supplier here.	Re-use derelict land at Wilton		
16	Energy		EfW power station	2 ha	comparison to similar plant	power station	20	-			Yes	120 HGV movements per day - if no rail	no	waste store on site	no	no	200	115	ES	Medium grid capacity	1	Sita site	Builds on existing operations, railhead, consented		-			-			Use of railheads could open up new logistics opportunities on Billingham / N Tees	
17	Energy		Biomass power station (medium, imported wood)	14 ha	ES	wood handling and power station	300	-	275 kV	process water	no	yes - some local wood	yes - 2.4 million t/yr chips	120 kt chips on site	no	no	600	150	ES	Riverside, large grid capacity	2	PD Teesport	Fits with existing port operations, consented	Expanded bulk handling capability. Possible heat supply into wider area	TERRC or South Bank wharf	Would need new bulk import facilities at either and new jetty at South Bank Wharf.	Could enable bulk handling of other goods	Conus Import Terminal or Vopak land to south of main tank farm (issue of grid)	Either would need grid upgrade and site restoration		Expansion of bulk import / handling and storage facilities	
18	Refining		Gasoline blending and storage	5 ha	comparison to similar plant	blending pumps		2	tbc		probably	some product out by road	yes	bulk fuel tanks on site	possibly	no	100	20	estimate for fuel blending operation	Riverside, pipelines	2	Vopak or Simon Storage	Existing fuel handling infrastructure including jetties	Opportunity to increase use of rail network	SABIC North Tees	Less direct fit with fuel infrastructure	-				
19	Waste		Waste treatment & separation	9 ha	planning documents	waste handling & treatment		10		gas	yes - option	yes - 300 kt/yr waste in, also products out	no	waste on site	no	no		124	planning documents	Co-locate on eco-park	2	Corus south bank S of railway (current STEP site); Wilton E; Graythorp Industrial Estate; Port Clarence; Billingham	All will need some degree of enabling works (e.g. road access, grid)		See left			-				Cooperation and collaboration is the principle of the concept. Logistical flexibility is also key.
20	Biofuels		Fuel plant A	3 ha	comparison to similar plant	tbc		1			available	yes - feedstock in	no	bulk liquid tanks (off site?)	possibly - to bulk storage	no	400	50	estimate for process plant of this size	Pipeline for fuel transfer to bulk storage	2	N Tees / Seal Sands	Minimal data available on this project - fuel plant would best fit with existing infrastructure in this area		-							
21	Energy		Tyre pyrolysis	5 ha	planning documents	tyre pyrolysis & downstream processes	17	-	66 kV			no	180 t/d tyres in	no	tyre chip storage on site	no	no	250	50	planning documents	Prefer co-location with Eco-park/other waste processing. Pipeline corridor for gas useful	2	Corus south bank S of railway (current STEP site); Wilton E; Graythorp Industrial Estate; Port Clarence; Billingham	All will need some degree of enabling works (e.g. road access, grid)		See left							
22	Energy		Energy Plant A (UK biomass)	7 ha	scoping document	power station	49	-	66 kV	process water	no	yes - waste wood in	no	wood on site	no	no	400	100	Scoping document	Medium grid capacity	2	BRIE; Wilton (if Sembcorp); land south of Tioxide or Greatham Tank farm	Has necessary land, grid and road. Doesn't use riverside unnecessarily.	Could benefit Tioxide by supplying power and heat if located nearby	-			-					
23	Energy		Energy Plant B (imported biomass)	7 ha	comparison to similar plant	power station	49	-	66 kV	process water	no	tbc	yes - wood in	wood on site	no	no	400	50	comparison to similar facility	Riverside, medium grid capacity	2	TERRC; PD Ports	Ship access already in place. Likely to need grid upgrade if at PD Ports, wharf and handling upgrades at TERRC	Grid upgrade could open up south Tees to other developments	South Bank Wharf; Koppers; Vopak	Riverside available but likely to need grid and jetty upgrades.	Grid reinforcement could open up these areas to other projects	-					
24	Energy		CO_2 transmission system [3 - 5 years] *("coast" - CO_2 ring main/transmission system, PD Ports)*	tbc		pipelines and pumping stations		20-100			no	no	no		CO2 pipe network	possibly				Pipeline corridors, links to CO2 sources	2	Location of network determined by IGCC 1 & 2 and Corus, so likely spine on south Tees, spurs to N Tees & Wilton	Need to maximise network coverage & capacity to act as benefit for study area as a whole		-						Network could be competitive advantage for whole study area	
25	Energy		Coal IGCC no.1	30 ha	Planning documents	coal gasification + power station	800	-	275/400 kV	gas, process water, cooling water	Yes - coal in / fnl out	yes - sulphur out	yes - petcoke and some coal in	on-site coal/coke store	CO2 pipeline to N Sea storage; natural gas from NTS (CATS); H2 export	possibly - H2	1500	150	Meeting with developer	Shipshal for coal + large grid connection + pipeline corridors	2	South Bank - Corus land - S or N of railway	Proximity to rail, grid, ship, potential CO2 pipeline corridor	Establishes CO2 network	-			Ineos (S of Seal Sands Road); Corus Redcar	Major enabling works required (logistics for Ineos, grid + land for Corus)				
26	Refining		Crude oil upgrader	100 ha (over 3 sites)	Plan + GoogleEarth	settling-upgrader-syngas plant-power station	200	200	275 kv	gas, process water, cooling water	no	yes - products out	yes - crude in , products out (450 ship movements per year)	tank farm on-site for crude and products		H2, syngas?		400	press reports	Deep water access, pipelines, large area, grid connection	2	Current split site on Corus/Wilton; North Tees	New jetty could expand capacity for bulk liquids in large vessels	-				Both options need new deep water jetty at Bran Sands. North Tees could use 2 sites not 3 but would need connection under river to jetty.		Conus Import Terminal	Could provide single site but only if Corus Redcar site becomes available.		Major benefits to process cluster, source of advantaged feedstocks	
27	Process		Paper recycling	28 ha	ES	waste paper reprocessing		50	Sembcorp 11 kV	water, steam	no	yes - 515 kt waste paper in, 375 kt newsprint out, 140 kt pulp out	yes - 50 kt newsprint out		no	no	1500	160	ES	Steam, near waste separation preferred	2	Wilton E (i.e. Ecco site)	Has logistics, steam, land and consents		Billingham; Seal Sands	Probably equally valid locations, land available						
28	Process		Bulk Import A	25 ha	estimate for large bulk processing facility	tbc		30	tbc		no	yes	yes	onsite bulk solids	no	no		150	estimate for large solids handling facility	Riverside, 30 MW electricity supply	2	South Bank Wharf	Little data on project available - location has riverside, land and nearby power station projects. Would need new wharf.	New wharf could open up other opportunities in this area	PD Ports	Wharf in place but potential lack of land given other proposed projects	TERRC, Koppers , Vopak (more of a 2 really)	All would need new jetties or upgrade - dry goods handling	Could bring solids handling facilities to these areas		Consider co-locating with a power station using solid fuel to share bulk handling infrastructure
29	Ports		Northern Gateway [3 - 5 years] *(container terminal)*	50 ha	ES + GoogleEarth	container terminal		5			yes - 300,000 TEU/yr	yes - 1 million TEU/yr	yes	onsite container storage	no	no	150	800 (by 2029)	ES		1	PD Teesport	Only feasible location									
30	Energy		CCGT no 2	10 ha	comparison to similar plant	power station	800	-	400 kV	process water	no	no	no	no	gas	no	1000	60	comparison to similar facility	Large grid capacity, gas supply	1.5	North Tees / Seal Sands; Wilton	Land and gas supplies available. Grid may be a constraint depending on CCGT 1.									
31	Energy		new nuclear power station	15 ha	comparison to similar plant	power station	1500													Current nuclear power station	1	Current site	Only feasible location									
			Other Projects/Concepts:																												
			Biofuels																												
32	Biofuels		Tees Valley Biofuels (oil seed crushing)	5 ha	planning documents	crushing/refining plant			11 kV or 66 kV			yes - 1500 t/d seed in, oil & meal out	no	seed silos on site + bulk liquid tanks	possible oil pipeline to biodiesel plants	no	est 300	50	planning documents	Bulk storage, near biodiesel plant preferred	2	Vopak land - north of main tank farm	Proximity to tank farm, road, jetties. Near project 32.		Ineos; SABIC; Petroplus; Fine Organics land	Possible locations near jetties and bulk storage						
33	Biofuels		Biodiesel from oils (1st gen biofuel)	1.5 ha	comparison to similar plant	veg oil transesterification process		5	11 kV or 66 kV			fuel out?	veg oils in, fuel out via bulk storage	bulk liquid tanks (on or offsite)	possible pipelines to/from bulk storage		400	50	comparison to similar facility	Liquid storage or pipeline corridor preferred, near project 32 useful	2	Vopak land - north of main tank farm	Proximity to tank farm, road, jetties, pipelines. Location has consent.		Ineos; SABIC; Petroplus; Fine Organics land	Possible locations near bulk storage & project 32						
34	Biofuels		Biodiesel BTL (2nd gen biofuel)	5 ha	comparison to similar plant	gasification followed by FT synthesis		5	11 kV or 66 kV			biomass in, fuel out	fuel out via bulk storage	bulk liquid tanks (on or offsite)	possible pipelines to/from bulk storage		400	50	estimate for plant of this type/size	Liquid storage, biomass handling and pipeline corridor preferred	2	Tioxide or BRIE (if project 22 brings other biomass handling); Seal Sands	Possible sharing of biomass handling at Tioxide or BRIE. Cluster with other fuels on Seal Sands.		Wilton; other biomass power plant locations	Could share biomass logistics with other power plants						
35	Biofuels		Cellulosic ethanol (2nd gen biofuel)	7 ha	comparison to similar plant	cellulose treatment/ fermentation-distillation		10	11 kV or 66 kV			feedstock in, fuel out	fuel out via bulk storage	bulk liquid tanks (on or offsite)	possible pipelines to/from bulk storage		400	50	estimate for plant of this type/size	Liquid storage or pipeline corridor preferred	2	Wilton; Seal Sands	Synergy with Ensus at Wilton. Cluster with other fuels on Seal Sands.									
36	Biofuels		Biorefinery	10 ha	more complex than other biofuel plants above	multiple processes converting biomass to chemicals		10	11 kV or 66 kV			feedstock in, products out	possibly products out (via bulk storage)	bulk liquid tanks (on or offsite), possibly solid feedstock store onsite	possible pipelines to/from bulk storage		400	75	estimate for plant of this type/size	Liquid storage and pipeline corridor preferred	2	BRIE; Seal Sands; Wilton	Cluster with other fuels on Seal Sands, with process on Wilton, with project 22 & 34 if these locate at Billingham	Could bring solids handling facilities to these areas								
37	Biofuels		Biomass processing (torrefaction demo)	2 ha	estimate for small demo	"ovens" + gas processing		2	11 kV or 66 kV			feedstock in, biomass out		biomass store on site			250	25	estimate for demo	Near spare heat source	2	Wilton	Likely to be small scale, Wilton has lots of spare heat		Billingham	Has spare heat						
			Energy																												
38	Energy		EfW power station	1 ha	comparison to similar plant	power station	20		66 kV		possible use for waste delivery	waste in, ash out		waste on site	no		300	30	comparison to similar facility	Road, medium grid capacity	2	Sita site	Fit with existing operations, grid and road capacity		Co-locate with Eco-park see projects 19, 53	Synergies with other waste treatment businesses. May need grid upgrades					Use of railheads could open up new logistics opportunities on Billingham / N Tees	
39	Energy		Hazardous waste incinerator	3 ha		combustion & gas cleaning	5					waste in, ash out		waste on site	no		300	25	estimate for facility of this size	Road, small-to-medium grid capacity	2	Fine Organics site	Has logistics and existing hazardous waste incineration licence		-			-			New small-scale generation connected at 11 kV at Seal Sands could balance new demand	
40	Energy		Organic Rankine Cycle power generation (up to 10 small projects)	<1 ha each	estimate for small "add-on" to existing plants	small power station	10		11 kV?					no	no		50	< 10	assume incremental work at existing facilities	Near sources of LP steam	1.5	"Add-on" to existing operations with spare LP steam	Lowers cost base slightly		-						New small-scale generation connected at 11 kV at Seal Sands could balance new demand	
41	Energy		Biomass power using byproducts from other waste plants	7 ha	comparison to similar plant	power station	50			water, gas		biomass in, ash out		biomass on site	no	no	400	50	comparison to similar facility	Medium grid capacity, prefer near eco-park	2	Wilton; Billingham	Grid, can co-locate with Eco-parks and greenhouses									
42	Energy		Biomass power from virgin UK wood	7 ha	comparison to similar plant	power station	50			water, gas		biomass in, ash out		biomass on site	no	no	400	50	comparison to similar facility	Medium grid capacity, road network	2	BRIE; Wilton (if Sembcorp); land south of Tioxide or Greatham Tank farm	Has necessary land, grid and road. Doesn't use riverside unnecessarily.	Could benefit Tioxide by supplying power and heat if located nearby	could also go on Wilton (if sembcorp) - all 1.5 - 2.0	CHP would benefit Tioxide						Not too location specific
43	Energy		Coal IGCC no.2	30 ha	comparison to similar plant	coal gasification + power station	800		275/400 kV	gas, process water, cooling water	Yes - coal in / fnl out	yes - sulphur out	Yes? Coal in	on-site coal/coke store	1 CO2 pipeline to N Sea storage + 2 Natural gas from NTS (CATS) + 3 H2 export	no	1500	150	Meeting with developer	Ship/rail for coal + big grid connection + pipeline corridors	2	South Bank - Corus land - S or N of railway	Proximity to rail, grid, ship, potential CO2 pipeline corridor	Establishes/ reinforces CO2 network	-			Ineos (S of Seal Sands Road); Corus Redcar	Major enabling works required (logistics for Ineos, grid + land for Corus)				
			Process																												
44	Process		Upstream projects at Wilton *(particularly ethylene oxide grid)*	tbc		tbc		from Sembcorp	Sembcorp 11 kV											Somewhere on Wilton	1.5	Wilton	Fit with existing infrastructure & operations, COMAH, steam/utilities etc.		-							
45	Process		Reverse cracking of polymers (R&D, deployment in longer term)	<1 ha	estimate for R&D facility	pilot plant		from Sembcorp	Sembcorp 11 kV								-	10		Somewhere on Wilton	1.5	Wilton	Fit with CPI, existing infrastructure & operations, COMAH, steam/utilities etc.		-							
46	Process		Polypropylene	17.6 ha	ES			from Sembcorp	Sembcorp 11 kV		no	400 kT PP out					600	90	ES	Somewhere on Wilton	1.5	Wilton	Fit with existing infrastructure & operations, COMAH, steam/utilities etc.		-							
47	Process		EO Derivatives	5 ha	comparison to similar plant			from Sembcorp	Sembcorp 11 kV		products out	products out					400	50	estimate for facility of this size	Somewhere on Wilton	1.5	Wilton	Fit with existing infrastructure & operations, COMAH, steam/utilities etc.	Strengthens EO supply chain including existing operations	-						Strengthens entire ethylene supply chain	Assumes existing EO facilities remain
48	Process		Plastic conversion	15 ha	estimate for large solids processing plant	forming plant		from Sembcorp	Sembcorp 11 kV		products out?	products out					400	50	estimate for facility of this size	Somewhere on Wilton	1.5	Wilton	Fit with existing infrastructure & operations, COMAH, steam/utilities etc.		-							
49	Process		Lightweight polymers			tbc														Somewhere on Wilton	1.5	Wilton	Fit with existing infrastructure & operations, COMAH, steam/utilities etc.		-							
50	Process		Formulated products	7 ha	comparison to similar plant	multiple liquid processing units		5				materials in / products out		small on-site tank farm	no	no	400	50	estimate for facility of this size	Depends on process	2	Seal Sands	Liquids infrastructure, logistics and hazard management; clusters with other similar sites		Wilton	Good alternative, but may not need all Wilton services so consider safeguarding for other projects						
51	Process		Acrylics	10 ha	estimate	MMA conversion						products out					500	100	estimate	Near Lucite	1.5	Billingham	Links to Lucite									
52	Process		Hydrogen ring	tbc		pipelines					no	no	no	buffer in cavities/ elsewhere	H2 pipelines	H2				Area-wide	2	Area wide - needs to link in Scrites, IGCC and Greenhow									Provision of network a cross study area would be a selling point for the area	
			Waste recycling/processing																												
53	Resource recovery	Eco-park (may be more than 1 depending on need - with not all uses on all sites)	fibre recycling	3 ha	estimate from STEP			1				waste in/ products out	no	on-site only	no	no	250	25	estimate	Group on Eco-park	2	Corus south bank S of railway (current STEP site); Wilton E; Graythorp Industrial Estate; Port Clarence; Billingham	All will need some degree of enabling works (e.g. road access, grid) but have reasonable logistics, land availability		See left			See left			cooperation and collaboration is the principle of the concept. Logistical flexibility is also key.	
	Resource recovery		composting	3 ha	estimate from STEP			< 1				waste in/ products out	no	on-site only	no	no	100	20	estimate	Group on Eco-park	2										
	Resource recovery		soil remediation	3 ha	estimate from STEP			< 1				soil in / out	no	on-site only	no	no	250	25	estimate	Group on Eco-park	2										
	Resource recovery		oil recovery/reprocessing	3 ha	estimate from STEP			1				oil in / out	no	on-site only	no	no	250	25	estimate	Group on Eco-park	2										
	Resource recovery		plastics reprocessing	3 ha	estimate from STEP			1			plastic in, products out?	plastic in, products out	no	on-site only	no	no	250	50	estimate	Group on Eco-park	2										
	Resource recovery		Anaerobic Digestion	3 ha								food waste in, biogas and digestate for composting out	no	on-site only	for bio gas	no	100	10	estimate	Group on Eco-park	2										
54	Resource recovery		new hazardous waste land/fill								possibly	waste in	no	no	no	no				Study required into location (& need)	2	tbc	tbc								
55	Resource recovery		ship decommissioning	30 ha	existing site						no	recovered materials out	vessels in	laydown areas	no	no		300	Able	Fixed	1	Able	Existing operation					Conus Import Terminal	Would need new basin, displaces current use			
56	Resource recovery		nuclear decommissioning	15 ha	existing site						no	materials in / out	no	laydown areas	no	no				Fixed	1	Current power station site + Graythorp Ind Est for services	Proximity to decommissioning site		-							
57	Resource recovery		oil & gas decommissioning	25 ha	comparison to Able						no	recovered materials out	structures in	laydown areas	no	no				Ready access from sea	2	TERRC (large) followed by smaller facilities in BRIE; Middlesbrough Reach; Haverton Hill	Existing site for large structures, smaller facilities with river access for smaller items		-			Conus Import Terminal	Would need new basin, displaces current use			
58	Resource recovery		process plant decommissioning	n/a																Plant sites fixed, skills hub anywhere	L 3	At sites. Hub at Graythorp Ind Est.	Synergies with other decommissioning		Hub elsewhere in area (wilton, Billingham etc.)							
			Agriculture/cultivation																												
59	Agri/biotech		Fruit/veg greenhouses	10 ha	comparison to similar facility	greenhouses			11 kV	water	possibly	products out	possibly	no	heat pipes, CO2	no	250	50	comparison to similar facilities	Heat, CO2 supply, non-strategic land	2	Land east of Wilton (Kirkleatham); Billingham North (Baards/Marlow)	Availability of heat & CO2; availability of non-strategic land								Customers for current waste products (heat, CO2)	
60	Agri/biotech		flowers	10 ha	comparison to similar facility	greenhouses			11 kV	water	possibly	products out	possibly	no	heat pipes, CO2	no	250	50	comparison to similar facilities	Heat, CO2 supply, non-strategic land	2	Land east of Wilton (Kirkleatham); Billingham North	Availability of heat & CO2; availability of non-strategic land								Customers for current waste products (heat, CO2)	
61	Agri/biotech		fermentation processes	2 ha	estimate for small specialty plant	"pharma" type plant		1	11 kV	water	no	feedstocks in, products out	no	no	heat pipes	no	400	50	estimate	Heat, non-strategic land, CO2 customer useful	2	Wilton; Billingham	Heat available; Synergy with CPI, Ensus (Wilton) or with Avecia (Billingham)									
62	Agri/biotech		algae demonstration	1 ha	estimate for demo unit	"intensified" algae cultivation and processing		1	11 kV	water	no		no	no	heat pipes, CO2	no	200	20	estimate	Heat, CO2 supply, non-strategic land	2	Land east of Wilton (Kirkleatham); Billingham North	Availability of heat & CO2; availability of non-strategic land								Customers for current waste products (heat, CO2); alternative bioenergy fuel source	
63	Agri/biotech		biotechnology relevant to local industry (i.e. production of feedstock/use of products)																	Links to local suppliers/customers	-	Co-locate with customers/suppliers									
			Steel																												
64	Steel		Low Carbon Emission Steel making R&D	1 ha	allowance for R&D unit			<1										10	estimate		3	Corus R&D centre	Existing operation									
			Food processing																												
65	Food		High value processed foods	5 ha	comparison to similar facility					water	no	goods out	no	tbc	heat/steam pipes	no	500	150	estimate	Heat supply	2	Billingham North	Heat supply; cluster with Marlow		Wilton fringes	Heat supply						
66	Food		Carbonated food/drink							water	no	goods out	no	tbc	CO2	no				CO2 supply	2	Billingham North; Wilton (Kirkleatham)	CO2 supply									
			Energy synergies																												
67	Energy Synergy		District heating - South Tees	1 ha	estimate	pumps & pipelines		1			no	no	no	no	heat pipes	no		10	assume small ESCo	Close to demand & heat source	2	South Bank, Grangetown	Heat available from Wilton & elsewhere; density of possible heat demand	Reduced energy costs to customers; increased revenue to producers									
68	Energy Synergy		District heating - Billingham	1 ha	estimate	pumps & pipelines		1			no	no	no	no	heat pipes	no		10	assume small ESCo	Close to demand & heat source	2	N / NW of Billingham e.g. Cowpen Lane Ind Est	Heat available from Billingham; density of possible heat demand; existing network to Baards & Marlow	Reduced energy costs to customers; increased revenue to producers									
69	Energy Synergy		Biomass drying	5 ha	estimate	driers					possibly	biomass in and out	possibly	wet & dry wood on site	no	no		10		Close to heat source	2	Wilton 10; new biomass power station sites	Heat available; share handling/logistics	Better fuel produced, increased revenue for heat suppliers	Wilton fringes, Billingham fringes	Heat available							
70	Energy Synergy		Absorption chilling	<1 ha	estimate - likely to be part of a wider site			1			no	no	no	no	cooling pipes	no		< 10	assume same ESCo as DH	Close to heat source	2	With project 67 or 68	Share heat source and network	Smoother demand profile (heating in winter,cooling in summer)	Wilton fringes, Billingham fringes	Heat available							
			Oil & gas																												
71	Oil & gas		Oil & gas fabrication												no	no				Ready access to sea	2	TERRC (platforms); BRIE, Haverton Hill , Middlesbrough Reach (smaller & subsea equipment),	Existing riverside facilities									
			Other																												
72	Energy		Off shore wind turbines manufacture and assembly										Yes	Large laydown and assembly area	no	no				Riverside with no height restrictions	2	South Bank Wharf	Land available to do manufacture & assembly on single site. Requires removal of overhead cable and upgrade to wharf.		Corus Import Terminal	Uses deep water when not necessary; displaces current land use					
73	Energy		Off shore wind turbine O&M service centre												no	no				Riverside	2	Riverside upstream of South Bank Wharf	Needs river but not deep water									
																					Location class										
																					1 = fixed location										
																					1.5 = fixed area, some flexibility on specific site										
																					2 = some location drivers but a number of areas/sites are possible										
																					3 = could locate anywhere										