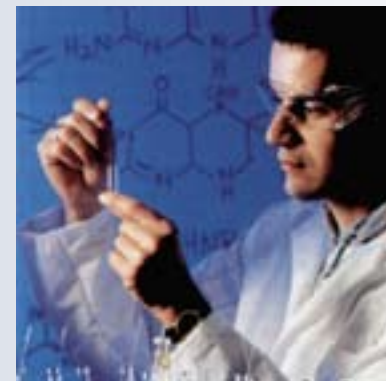
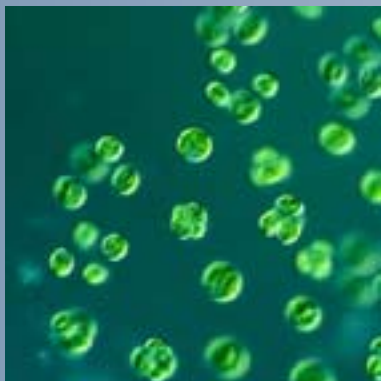


A large, stylized number '3' in a dark blue color serves as a background element on the left side of the image. It is composed of two thick, rounded strokes. The word 'Energy' is written in a bright pink, sans-serif font, positioned in the lower-left quadrant of the image, partially overlapping the bottom of the number '3'.

Energy

A large, stylized number '3' in a dark blue color serves as a background element on the left side of the image. It is composed of two thick, rounded strokes. The word 'Energy' is written in a bright pink, sans-serif font, positioned in the lower-left quadrant of the image, partially overlapping the bottom of the number '3'.

Energy





Save It!

HOUSEHOLD CO₂ EMISSIONS BILL

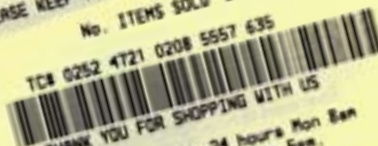
HOME ENERGY	3.8 Tonnes/Annun	37%
CAR USE	2.7 Tonnes/Annun	26%
FOOD MILES	2.1 Tonnes/Annun	20%
WASTE MATERIALS	1.6 Tonnes/Annun	16%
	misc	1%

EPS NO. 7641

VISA *Signature Verified
A/C No. **** *
EXPIRY DATE FROM 07/08
AUTHORISATION No. 030386

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We rely on energy in every aspect of our lives, taking for granted that we will have access to heat, power and fuel. But with declining gas, oil and coal production, and ageing nuclear power stations Britain is at a crossroads. The threat of climate change also requires us to reduce carbon dioxide (CO₂) emissions by cutting fossil fuel use. Government expects industry to respond to this 'green' agenda, but we will all have a role to play. A strategy is urgently needed that sets out a vision for our future energy security – one based on sustainable development and diversity of supply.

Context

energy

How secure is our energy supply?

For the last few decades the UK has been relatively self-sufficient for energy. Plentiful supplies of coal, oil and gas kept power stations going, the lights switched on and our homes warm. However, with declining reserves of North Sea gas and oil, and the decline of our coal industry in the face of foreign competition, the UK is now a net importer of energy. Recent events in the Middle East and Russia and South America have served to highlight the potential threat of relying on energy from politically unstable countries. As a result there are increasing concerns about our energy security and affordability. The government's Energy Review raises the prospect of new nuclear stations, but there is public backing for a greater emphasis on renewables.

Where does our energy come from?

- Coal (15%): Whilst 50% of our coal is still mined in the UK, the rest is imported from countries such as South Africa, South America and Australia. Economic deep mines reserves are estimated at 10 years.
- Oil (35%): North Sea reserves have begun to decline; we import oil from Norway, the Middle East, North Africa and increasingly Russia.
- Gas (39%): North Sea reserves will decline over the next 20 years; we are increasingly coming to rely on gas from Russia, the Middle East and North Africa.
- Uranium (9%): Our nuclear power stations will need replacing by 2020, and we rely on uranium from Africa, Australia and Russia - where mining has significant environmental impacts.



60% CO₂ cuts by 2050?

"In my view, climate change is the most severe problem we are facing today, more serious even than the threat of terrorism." *Sir David King, Government's Chief Scientific Advisor*

In 1997 the UK signed the Kyoto Protocol and agreed to cut its CO₂ emissions by 12.5% by 2012. However, in the longer term we may need to cut CO₂ emissions 60% by 2050 to avoid dangerous climate change. The Government's 2003 Energy White Paper adopted this as the UK's target. This will require a fundamental change in the way we use energy, with reduced reliance on fossil fuels. A combination of solutions will be needed including energy efficiency, clean fossil fuel technologies and renewable forms of energy.

Fiscal measures such as carbon taxes and quotas may be needed to influence behaviour. On the positive side, significant economic benefits - such as highly skilled new jobs - are predicted from the shift to a 'low carbon' economy. The planning system also has a key role to play, with North Yorkshire County Council's Renewable Energy Study (RES) highlighting the importance of local planning frameworks in ensuring the delivery of national targets.

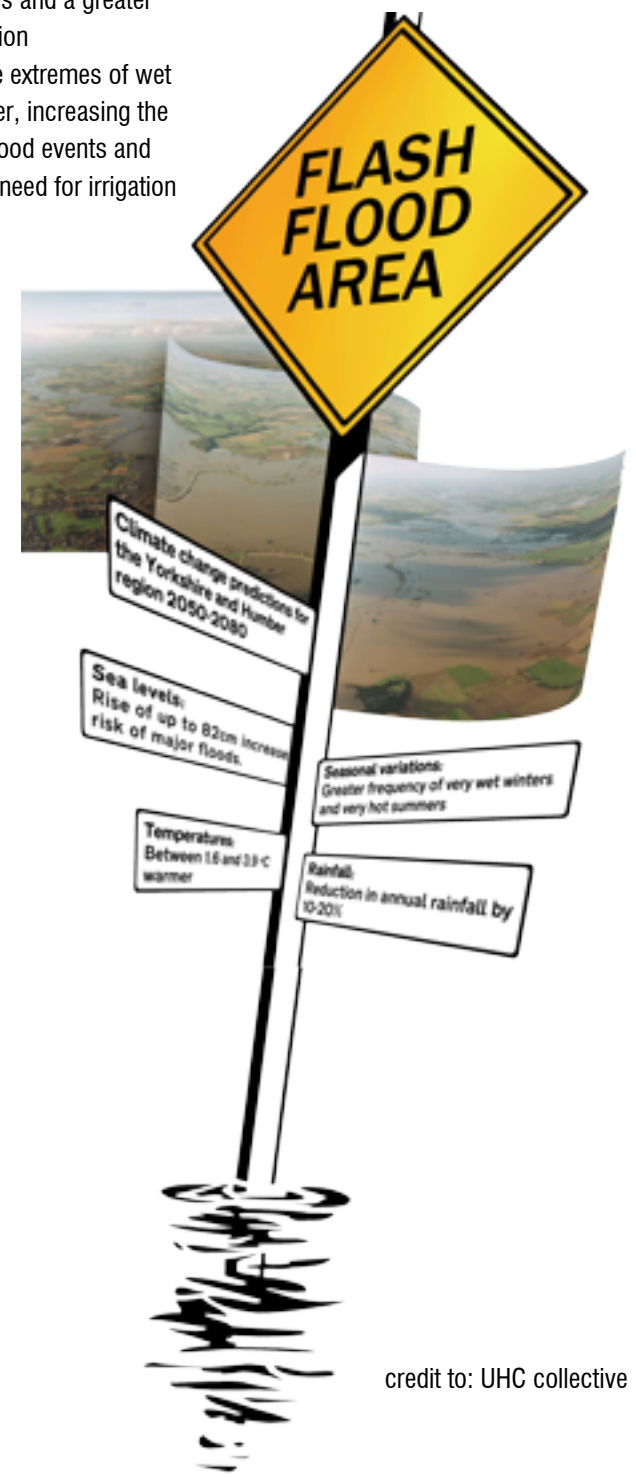
Could Selby flood more often?

The floods in 2000 and 2002 resulted in millions of pounds of damage to homes and businesses across North Yorkshire. Selby District residents have felt the economic impact as homes and businesses have become more difficult and costly to insure. Millions of pounds have already been spent on additional flood defences by the Environment Agency, and more investment may be needed in the future. Whilst we can't directly attribute the floods to climate change, a combination of heavier seasonal rainfall and rising sea levels could result in more frequent flooding in the Selby District. It could also influence patterns of agricultural production in the district. On the positive side, the floods inspired campaigns such as 'Planet York', which successfully encouraged households and businesses to 'do their bit'.



Climate change predictions for the Yorkshire and Humber region 2050-2080

- Sea levels: Rise of up to 82 cm resulting in higher tidal surges and greater salinity
- Temperatures: 1.6 to 3.9°C warmer resulting in more frequent water shortages and a greater need for irrigation
- Rainfall: 10-20% less annual rainfall resulting in more frequent water shortages and a greater need for irrigation
- Seasons: More extremes of wet and dry weather, increasing the frequency of flood events and increasing the need for irrigation in summer



credit to: UHC collective

The energy industry has come to dominate the district's landscape, with large-scale interventions delivering national energy security and demonstrating the best of British technological innovation.

Energy was identified early on as a key Renaissance theme. The location in the district of two of the UK's largest coal fired power stations - Drax and Eggborough - the Selby 'superpit' mining complex and Kellingley Colliery has placed energy at the heart of the local economy for over three decades. This theme has continued with development of the UK's first willow-fired power station, and one of the EU's largest low energy glass manufacturing plants.

Timeline

energy

2

Stillingfleet miners,
credit to: UK Coal, Martyn Pitt

1 Central Planning

Post-war - 1970's

The era of post-war nationalisation of the coal and electricity industries. Projects in the national interest were planned and developed by British Coal and the Central Electricity Generating Board (CEGB). Coal was seen as the main source of fuel for electricity generation, and North Sea gas was introduced for domestic heating and cooking.

The UK's most productive mine Kellingley Mine (1965): Redeveloped by British Coal in the 1960s Kellingley was one of the first UK mines to produce more than 2 million tonnes of coal/year. With the closure of the Selby mine complex it became one of only three remaining deep mines in Yorkshire, all now operated by UK Coal.



Big plans for electricity generation Eggborough Power station (1967) Drax Power Station (1974 and 1986): Constructed by the Central Electricity Generating Board (CEGB), these stations were long term investments designed to burn British coal and provide a secure supply of electricity for decades to come. They were well designed and engineered and it is claimed they still have a life span of over a decade. At the time Drax had the tallest stack at 259 m and at 4,000 MWe was the largest power station in Europe. It currently supplies 7% of the UK's electricity.

King Coal

Selby Mine complex (1983): Approved by Energy Minister Tony Benn in 1976, Selby started production in 1983 and was the most advanced deep mining project in the world. It was designed to supply Yorkshire's power stations, and to produce 10m tonnes of coal a year for at least three decades.

2 Creating Markets

1980's - 1990's

The era of privatisation and the creation of liberalised energy markets. A 'dash for gas' saw its share of electricity generation growing from virtually nothing to nearly 30% in less than a decade. Falling electricity prices made it difficult for private investors to viably operate coal fired power stations. The coal industry struggled to compete with cheaper foreign coal. Environmental regulations designed to tackle acid rain began to place additional pressure on the coal industry.

Changing hands

Drax and Eggborough: Post privatisation the two power stations have changed hands several times as utilities and investors have changed strategies and priorities. Originally owned by generators National Power and Powergen, Drax was purchased by US investors AES in 1999 and Eggborough by British Energy in 2000. Financial difficulties in 2003 saw Drax and AES part company with the formation of Drax Power Ltd to take control. The company was listed on the stock exchange in December 2005.



End of an era

Selby Mine complex decline (1990's-2004): Despite initially realising the expected production of 10 million tonnes a year, production began to decline during the 1990's because of geological problems. The high fixed costs of operating Gascoigne Wood drift mine at under capacity became a financial burden. The quality of the coal was also low, requiring investment in coal washing to meet the power stations requirements. Competition from imported coal was the final blow and with increasing losses the new owners UK Coal decided to close the complex in 2004 with 2,000 job losses.

Tackling acid rain

Drax Flue Gas Desulphurisation plant (1996): An EU Directive resulted in national targets to tackle acid rain. For power stations to burn British coal with high sulphur content requires expensive pollution control equipment. The first to be installed in the UK, the Drax FGD plant removes at least 90% of the sulphur dioxide - a major cause of acid rain - from waste gases, producing up to three quarters of a million tonnes/year of gypsum for the manufacture of plasterboard and related products by companies such as British Gypsum.

3 Changing Priorities

2000 and beyond

The era of growing climate change and energy security threats. The decline of North Sea gas and oil resources, coal imports and ageing nuclear capacity have raised issues about our energy security. In 2003 the Government's Energy White Paper prioritised both of these issues and set a radical target to reduce CO₂ emissions by 60% by 2050. The introduction of the Renewables Obligation in 2003 has begun to stimulate the market for renewable electricity, particularly wind energy, but it is likely that Government may give the go ahead for new nuclear generation capacity.



A growing energy business

ARBRE willow-fired power station (2000): A British and Swedish venture, ARBRE planned to burn coppice willow grown by over 40 farmers within 25 miles of the plant but closed for technical and financial reasons. The farmers, organised as producer group Renewable Energy Growers, have successfully worked with specialists such as Renewable Fuels Ltd to identify new markets, including Drax Power Station.

Window of opportunity

Saint Gobain 'Planitherm' plant (2003): Established in 2003 with support from Yorkshire Forward, the

Eggborough plant produces special heat trapping glass, responding to demand created by stricter UK Building Regulations.

Which way will the wind blow?

Humberhead wind farm proposals (2004-ongoing): There are 15 wind farm proposals in the Humberhead area, including a 24 MW wind farm in Selby District. The intensity of development proposed in the area has prompted debate about merits of wind power.



Farming the oil field

Whitemoor Business Park (2005): A group of companies are considering building a 10 MW oil seed power station at UK Coal's Whitemoor Business Park. All of Selby's mine sites have similar potential because of their substantial electricity grid connections.

Coal moves over

Drax co-firing trials (2005): Following trials Drax Power plans to co-fire biomass with coal in order to generate renewable electricity. Planning permission has been granted for a new processing plant located at Drax, and supply contracts are being established with farmer producer groups such as Renewable Energy Growers (willow crops) and specialists such as Renewable Fuels (willow crops) and BICAL (miscanthus).

Vision...

Engagement of the whole community – households, farmers, industry, small businesses and the public sector – in order to meet the challenges, and realise the benefits, of a sustainable energy future.

energy

3

Energy Renaissance

Gwynt Teg wind farm co-operative, North Wales,
credit to: Win Jones



industry, small businesses and the public sector – in order to make it happen.

Renaissance’s emphasis on stakeholder engagement creates the ideal vehicle to deliver on climate change objectives, whilst creating economic opportunities in a significant growth sector. Selby District’s links to the energy, farming and logistics industries, together with access to the White Rose Consortium’s science base (York, Leeds and Sheffield) and the Centre for Industrial Collaboration at Hull and the National Science Learning Centre could enable a range of projects to be developed. Furthermore the establishment of Future Energy Yorkshire Ltd. by Yorkshire Forward clearly establishes the economic importance of sustainable energy to the region.

Project Framework

Based on our work with a range of stakeholders – including representatives from industry, higher education, trade associations, support bodies, Selby District Council, Yorkshire Forward and members of the community – we have identified five key themes:

- Home comfort
- Growing opportunities
- Community biofuels
- Future coal
- Developing eco-industries

Under each theme there are a range of project proposals. The projects cover a spectrum of linked activities that work in tandem to deliver the long-term vision:

- Education and awareness
- Training and capacity building
- Research and innovation
- Planning and development
- Pilots and demonstrations
- Large-scale implementation

In addition it is proposed that a co-ordinating body is established – Selby District Energy Renaissance - to co-ordinate delivery of the vision. The co-ordinating body will include representation from key stakeholders such as Selby District Council, North Yorkshire County Council and Yorkshire Forward to ensure that Energy Renaissance complements and reinforces existing policies, plans and initiatives.

Delivery Mechanism

Selby District Energy Renaissance:

The establishment of an independent, not-for-profit co-ordinating body. This could be established as a membership organisation - such as a Development Trust, ‘Consortium’ Co-operative or an Industrial & Provident Society - with a board representative of the range of energy renaissance stakeholders. The aim of the body would be to co-ordinate delivery of the Energy Renaissance projects. We envisage its main roles being to:

- Increase awareness
- Signpost advice/information
- Network stakeholders
- Build partnerships to deliver projects
- Obtain project funding

It would be project-focussed, seeking to create new economic opportunities, enabling Selby District residents to take action and helping public bodies to meet climate change targets.

The closure in 2004 of the Selby mine complex symbolised the end of an era, with large-scale centralised planning replaced by the liberalised market. Investment is now more fluid and, given the right market conditions, capable of responding quickly to new opportunities and priorities. But this laissez faire approach also has significant weaknesses, lacking the strategic direction to respond to risks such as climate change and energy security.

Driven by climate change, high gas prices and the need for diversity of supply, there is growing consensus that our future energy supply will need to develop as a patchwork of smaller scale projects located in many more ‘backyards’. This will require greater engagement with stakeholders – households, farmers,



Pilot Projects

These 4 pilot projects serve to harness the enthusiasm of key stakeholders, whilst ensuring there is visible action 'on the ground' to help attract further funding and build investor confidence.

Project 1: Hearts and Minds

A community-wide campaign to raise awareness of the need for action on climate change. Taking its cue from the 'Planet York' campaign it would aim to build wider acceptance, and make the link to practical action. The project will comprise community-wide initiatives:

- **Leading by example:** Commitment of Selby District Council to a programme of training and awareness accompanied by corporate carbon reduction targets.
- **Carbon challenge:** Working directly with 100 Selby households to reduce their carbon emissions. The workforce at large sites such as Drax Power Station could also be targeted.
- **The next generation:** Working with local schools and colleges, as well as organisations such as the National Science Learning Centre, in order to reach the next generation.
- **Carbon champions:** Establishing a network of volunteers within the community that can spread the word.
- **Ideas bank:** Establishing a web-based 'ideas bank' of actions that households, businesses and individuals can take.
- **Climate change 'club':** Establishing a club bringing together local businesses. Members would make a commitment to carbon reduction, share knowledge and best practice on how best to achieve the reductions.
- **Farmer Energy:** Building acceptance of biomass energy projects by communicating the

wider benefits to farmers and the district community.

Project 2: Fit for the 21st Century

Demonstrating how new and existing homes and workplaces can meet the carbon challenge of the 21st Century. The project will explore the different techniques that can be applied to make them more energy efficient, and to incorporate micro-renewables. It will consist of two initiatives:

- **Fresh thinking:** Demonstration low energy homes and workplaces will be constructed using a number of different techniques, and incorporating micro-renewable technologies such as solar thermal collectors. More experimental technologies such as LED lighting, ridge wind turbines, passive ventilation and end-use metering will also be trialled.
- **Time for a makeover:** Homes and workplaces will be the subject of a low carbon 'makeover'. Different techniques will be used to raise energy efficiency to modern standards, and to incorporate micro-renewables. The aim will be to develop a standard package of measures that could be offered to homeowners and workplace managers.

The project will also serve as a test-bed for techniques that could be applied at Gascoigne Wood, and a starting point for developing the local skills base.

Project 3: Community biofuels

Developing a range of biomass heat and power projects across the district. Projects will support the market for a range of different locally sourced fuels – including willow and oil seed crops and organic waste collected from homes and industry - and where practical provide a test bed for new technologies developed

in the region. It will also seek to maximise revenue for farmers by supporting the establishment of a new 'Farmer energy' company. The project will consist of four initiatives:

- **Public buildings:** Coppiced willow will be used to heat 2-3 schools and a number of public buildings in Sherburn, Selby and Tadcaster.
- **Business parks:** Oil seed will be used to heat and power White-moor Business Park, and potentially Gascoigne Wood Biopole. Coppiced willow will be used to heat Brackenholme Business Park.
- **Olympia Park:** A mix of fuels, including processed organic waste, together with tried and tested technology, will be used to heat and power Olympia Park.
- **Off-grid village:** Coppiced willow will be used to supply heat to homes and businesses where there is no current mains gas connection.

Project 4: Future Coal

Exploring a range of solutions for the use of waste heat and CO₂ from coal power stations. The project will seek to develop links with Research & Development in the EU, USA and Japan in order to pilot a number of technologies. Pilot plants will be installed at industrial sites in the district in order to evaluate performance.

- **Heat when and where you want it:** Heat transport technology will be used to store and move waste heat from industrial sites in order to heat homes and workplaces in the district. The use of 'transheat' type technologies will be explored, including the wider potential to utilise waste heat from Selby's power stations. This will include looking at the impact on generating efficiencies and heat storage requirements.

- **Green oil from CO₂:** 'Emissions-to-biofuels' type technology will make use of CO₂ and waste water from Tate & Lyle's Citric Acid plant at Selby to grow algae. The algae will be processed to supply end-markets which could include biodiesel production and pharmaceutical manufacturing.

The project will form a starting point for ongoing research into a range of solutions by the White Rose Consortium of Universities in support of the 'climate care' park proposal.

Landmark Projects

Yes to Wind Power

The development of an iconic multi-megawatt wind farm in the district. This would be a highly visible demonstration of the district's commitment to renewable energy. The wind farm will be part community-owned enabling the profits to be distributed locally in order to support further energy renaissance initiatives. Farmer land owners could also take the lead and share in the financial benefits – as demonstrated by Westmill wind farm in Oxford.

Gascoigne Wood 'Eco-village'

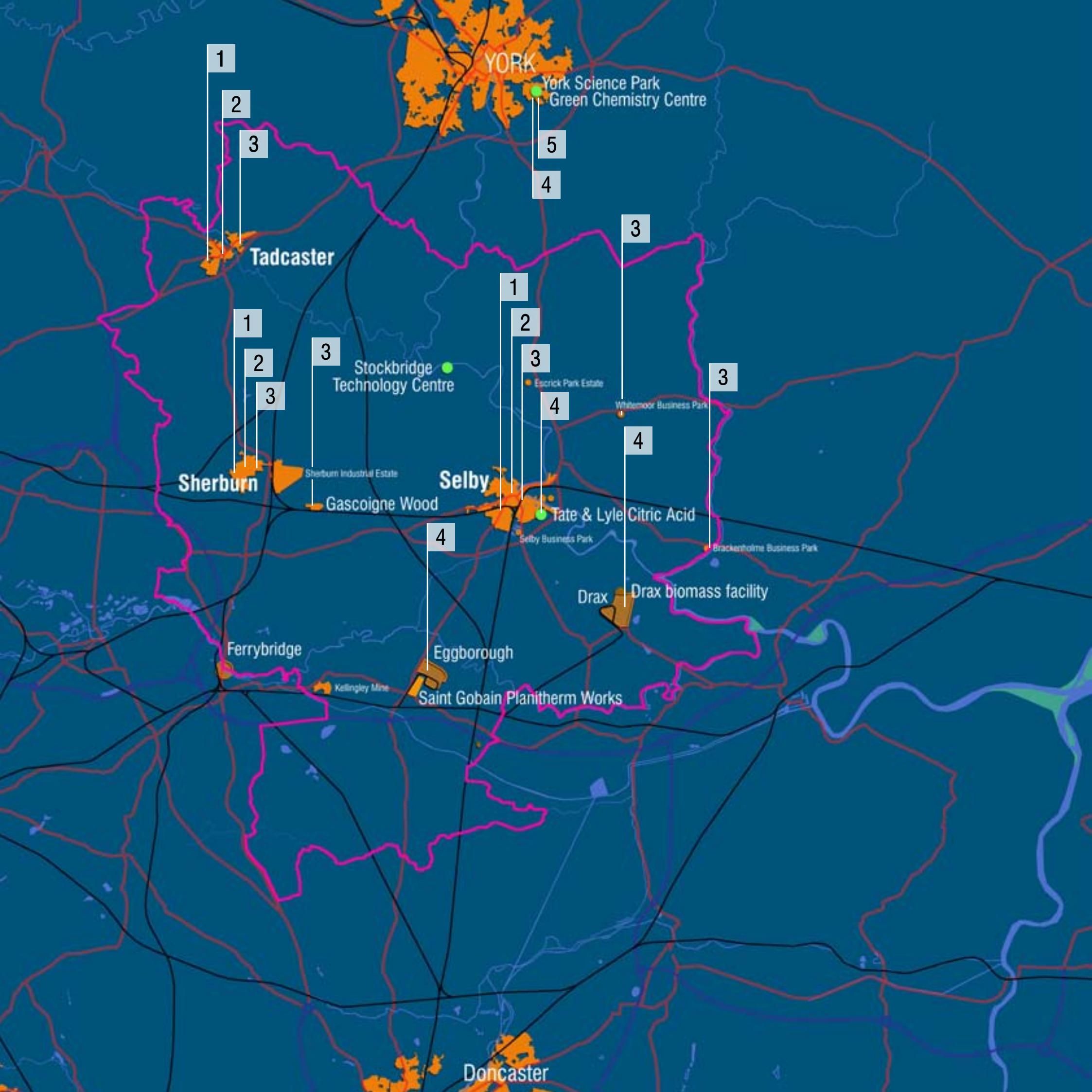
The development of an exemplar 'Eco-Village' adjacent to the former Gascoigne Wood mine. The vision is for a large-scale demonstration of energy efficient and carbon neutral homes and workplaces consisting of up to 3,000 new residential units.

The Eco-village could be developed as a building exhibition in order to raise standards within the house-building industry – emulating the success of German schemes such as Kronsberg and Vauban. Leading edge, pioneering developers will be selected as partners to ensure delivery. The homes will incorporate timber frames, natural insulation materials, low energy lights and appliances, energy management

systems and green roofs. The whole scheme will be supplied with heat from an on-site biofuelled power station proposed by UK Coal.

The scheme will aim to discourage private car ownership. Instead a new railway station will provide a public transport link and residents will have 24hr access to a car club for personal mobility. A 100% biofuel forecourt will provide all residents with access to vehicle biofuels.





Vision...

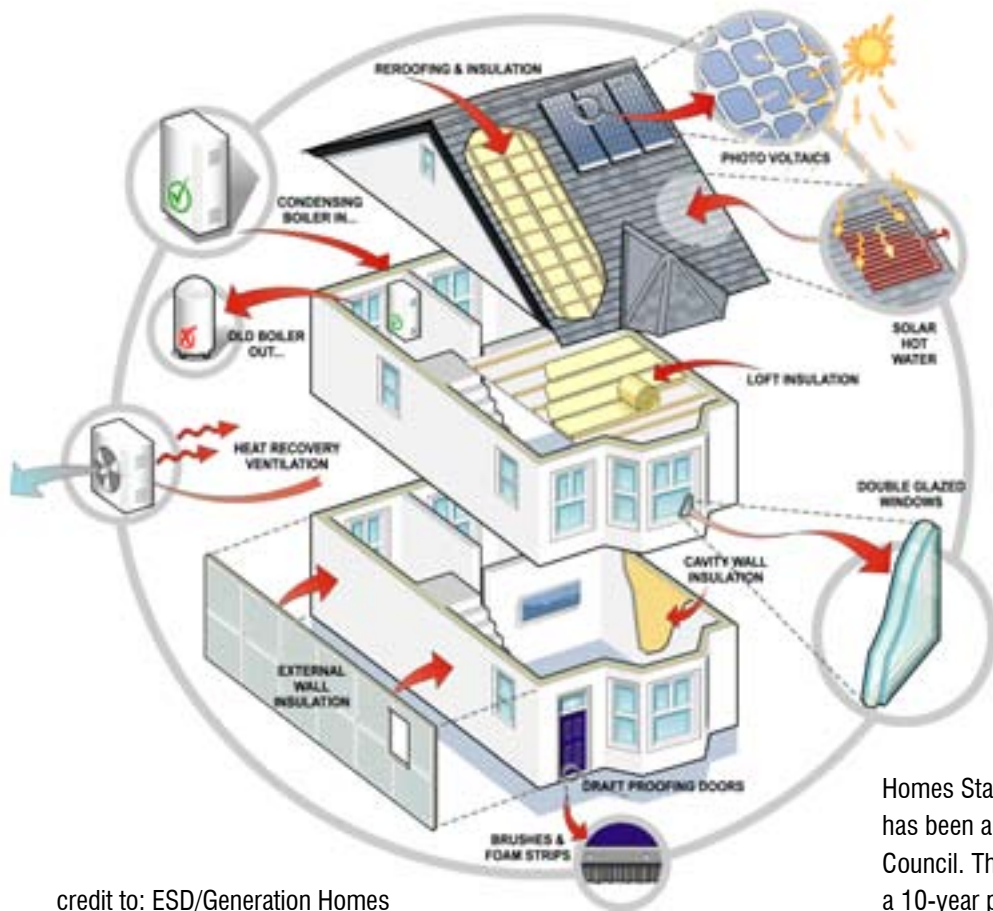
A comprehensive programme to improve the thermal efficiency and install solar collectors on homes across the district in order to reduce heating bills and ensure affordable warmth for every resident.

energy

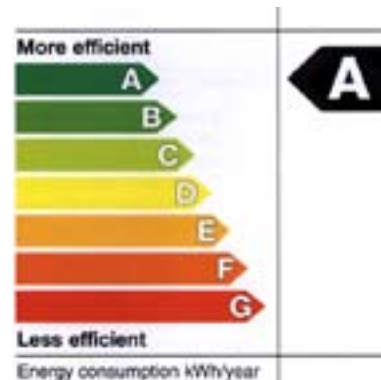
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Home Comfort

Masonite timber roof and solar photovoltaic roof tiles,
credit to: Masonite & Solar Century



credit to: ESD/Generation Homes



There are just over 30,000 homes in the Selby District of which 12% are council owned, 10% are privately rented and around 78% are owner occupied. Reflecting the districts more rural setting the majority of these properties are houses – either detached, semi-detached or terraced. This lower density housing creates a challenge to improve energy efficiency, with properties having larger areas of heat loss walls. Furthermore the average thermal efficiency of the housing stock has been estimated by Selby District Council to be National Home Energy Ratio (NHER) 4, which means that the typical Selby District home will take four times more

energy to heat than a new home. This relatively poor performance, together with the lower densities, Conservation Area restrictions and a high proportion of owner occupation makes it harder to co-ordinate action and influence decisions and creates a significant challenge to improve thermal efficiency and to deliver 'home comfort'.

With targets established by the Home Energy Conservation Act (HECA) 1995, which requires Selby District Council to identify measures to improve the energy efficiency of all homes in the district, and more recently the Government's Fuel Poverty strategy and the Decent

Homes Standards, energy efficiency has been a priority for the District Council. The Council has established a 10-year programme, which sets targets to raise performance to NHER 6.5 for council property and 5.5 for private property. The main focus has been on tackling fuel poverty, with grants being used to reach the fuel poor across all forms of tenure.

The Council currently works in partnership with the York Energy Efficiency Advice Centre (EEAC) and Eaga Partnerships to deliver its HECA (Home Energy Conservation Act) targets, improvement programmes and to provide advice and information for the public. The main source of funding has been the government's Home Energy Efficiency Scheme (HEES) (now called 'Warm Front') however resources to tackle the private rental and owner-occupier sector are more limited. These have traditionally been the most difficult sectors to target. Councils and EEAC's therefore have to be creative in order to lever in additional money by, for example, working with utilities that are under a statutory requirement to subsidise efficiency programmes.

Project Proposals

Affordable warmth standard:

The establishment of a standard for the improvement of the thermal efficiency of Selby's council housing stock. The standard will be based on measures that could be taken to improve the stock, including insulation, glazing, draughtproofing, efficient boilers and solar (thermal) collectors. It will also establish an overall performance target for the building fabric expressed in terms of heating bills, SAP rating and carbon emissions.

Responsible landlords: The establishment of a voluntary accreditation scheme for private landlords. The aim of the scheme will be to raise standards and provide tenants with information to compare properties. The scheme could be trialled with proactive 'champions' who would like to differentiate their properties. Prospective tenants will be able to obtain an information pack with details of accredited landlords.

Regulating and encouraging efficiency: A comprehensive programme to raise the efficiency of owner occupied properties in the district - both new and existing. The pilot for this programme will be the 'carbon challenge' project as described in section 4. This will seek to demonstrate how greater energy efficiency can be combined with micro-renewables such as solar thermal collectors. It will also seek to develop links with local industry in order to develop installation capac-



ity. An energy-labelling scheme is proposed for properties bought and sold in the district so that buyers can make an informed choice. The label would provide simple information on the heating requirements of the home expressed in terms of kWh, likely bills and carbon emissions. The scheme could be trialled with proactive housebuilder 'champions' who would like to differentiate their properties.

Efficiency measures such as insulation, glazing, draughtproofing and efficient boilers will be widely promoted to all existing owner-occupiers, building on progress made to date with grant schemes such as the Home Insulation Programme. In order to increase take-up equity release could be offered, building on experience with the Home Appreciation Loan scheme.

Solar hot water: Solar thermal collectors will be encouraged and, following adoption of a new Local Development Framework, required for all new properties in the district. They will be promoted to existing owner-occupiers through Selby District Energy Renaissance's 'hearts and minds' programme – with support to access grants. Partnerships will be developed to accredit local solar installers.

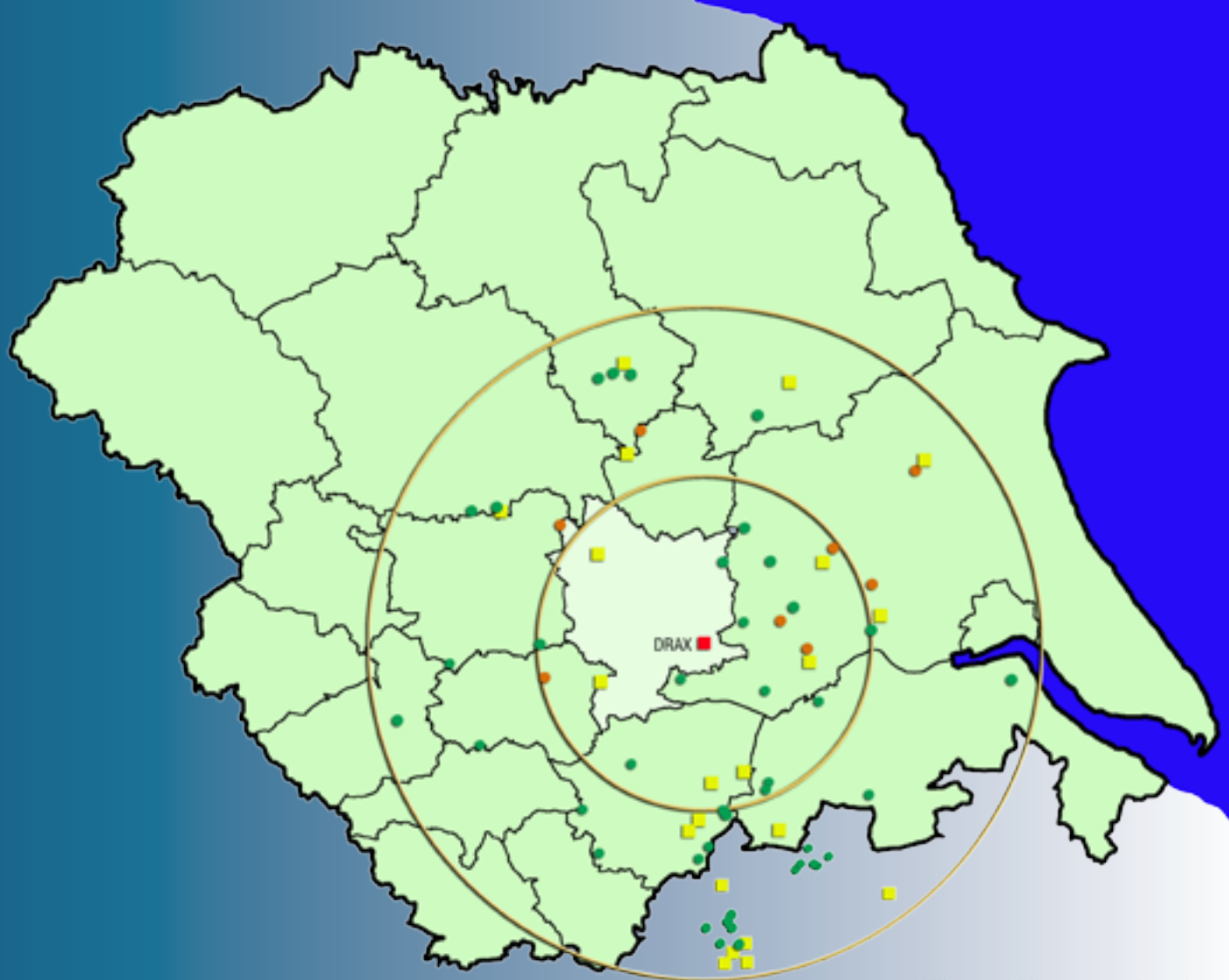


Vision...

The district's farming community, working with it's processing and logistics industries, will become a major supplier of renewable biofuels to the Yorkshire heat, power and transport markets.

energy 5 Growing Opportunities

Willow harvester,
credit to: Agrobransle



Willow and Miscanthus plantations,
credit to: DEFRA/RDS

Key

- Short rotation coppice (former ARBRE-Woodland Grant Scheme)
- Miscanthus
- Short rotation coppice (current energy crop scheme - approved)
- Drax power station
- 25km & 50km interval radii

Energy crops have significant potential as a renewable energy source and, with concern growing about the scale of wind power proposals, would contribute to diversity of supply.

With flooding a major concern, energy crops could bring additional benefits to the district. The Environment Agency is interested in the potential of plantation energy crops to retain water. Together with partners it is exploring the opportunities through the SPROUT (Strategic Partnership for the River Ouse and Tributaries) project.

At a time when it is becoming increasingly difficult for farmers to make a living, energy crops could become a valuable new source of income. The potential was recently highlighted by the government's

Biomass Task Force, and Selby District's Energy Renaissance seeks to build on their recommendations.

The failure of the ARBRE project has, however, resulted in a negative perception of energy crops. Lessons need to be learned and pre-conceptions challenged, with work needed to build farmers' confidence. In seeking to do this the district's farmers have access to a range of support on their doorstep:

- **Oil seed:** Springdale Crop Synergies, the award winning Driffild-based farm research centre, are breeding to increase yields and are actively developing energy projects in the Selby District.
- **Willow:** Renewable Fuels at Escrick are the UK arm of Swedish co-operative Agrobransle, the

world's leading willow experts. The producer group Renewable Energy Growers supports willow farmers, originally having being formed to supply ARBRE. Doncaster-based Coppice Resources also draw upon expertise of personnel involved with ARBRE.

- **Miscanthus:** BICAL from the West Country are the UK's leading miscanthus experts and have established a farmers producer group to supply Drax.

In addition the Stockbridge Research Centre, a former MAFF facility, has the potential to act as a local knowledge centre for biomass crops.

At present there are only a handful of growers in the district, however, with low commodity prices and the availability of establishment grants

from DEFRA, Single Farm Payments and special EU support makes it an attractive proposition. Supply contracts from Drax power station also offer security, and urban markets for small-scale heat and power - such as proposed for Holbeck in Leeds - are set to grow.

Growing crops for the vehicle fuel market is also a potential new

source of income. A combination of high fuel prices, the new EU Biofuels Directive (which requires 5.75% market share by 2010) and the prospect of a UK Biofuels Obligation are stimulating growth in the market. There are a number of producers in Yorkshire such as Rix Biodiesel on Humberside, and the Non-Food Crop Centre at York is working to develop the market.



Willow harvesting, credit to: Coppice Resources

Project Proposals

Growing Co-operatively: The active encouragement of Selby District’s farmers to join biofuel producer groups controlled by farmers. Farmers would benefit from farm-based knowledge and expertise, sharing the cost of harvesting equipment and by cutting out ‘middle-men’ in order to maximise value. They would also be able to access sources of expertise in, for example, crop breeding. Producer Groups could also establish new ventures to exploit new markets and add value (see Biopole project).



Miles per hectare: The active development of local demand for vehicle biofuels. Forecourts would be signed up to sell biofuels, starting with 5% blends and potentially offering blends up to 100% on a ‘members-only’ basis. Business and public sector vehicle fleets and farmers would be encouraged to use biofuels. The National Non-Food Crop Centre has also suggested that farmers could establish bio-refineries to produce fuel from oil seed and waste oil, with the potential to emulate the success of US farmer co-operatives. Farmer producer groups could use this opportunity in order to meet local demand and self-supply.

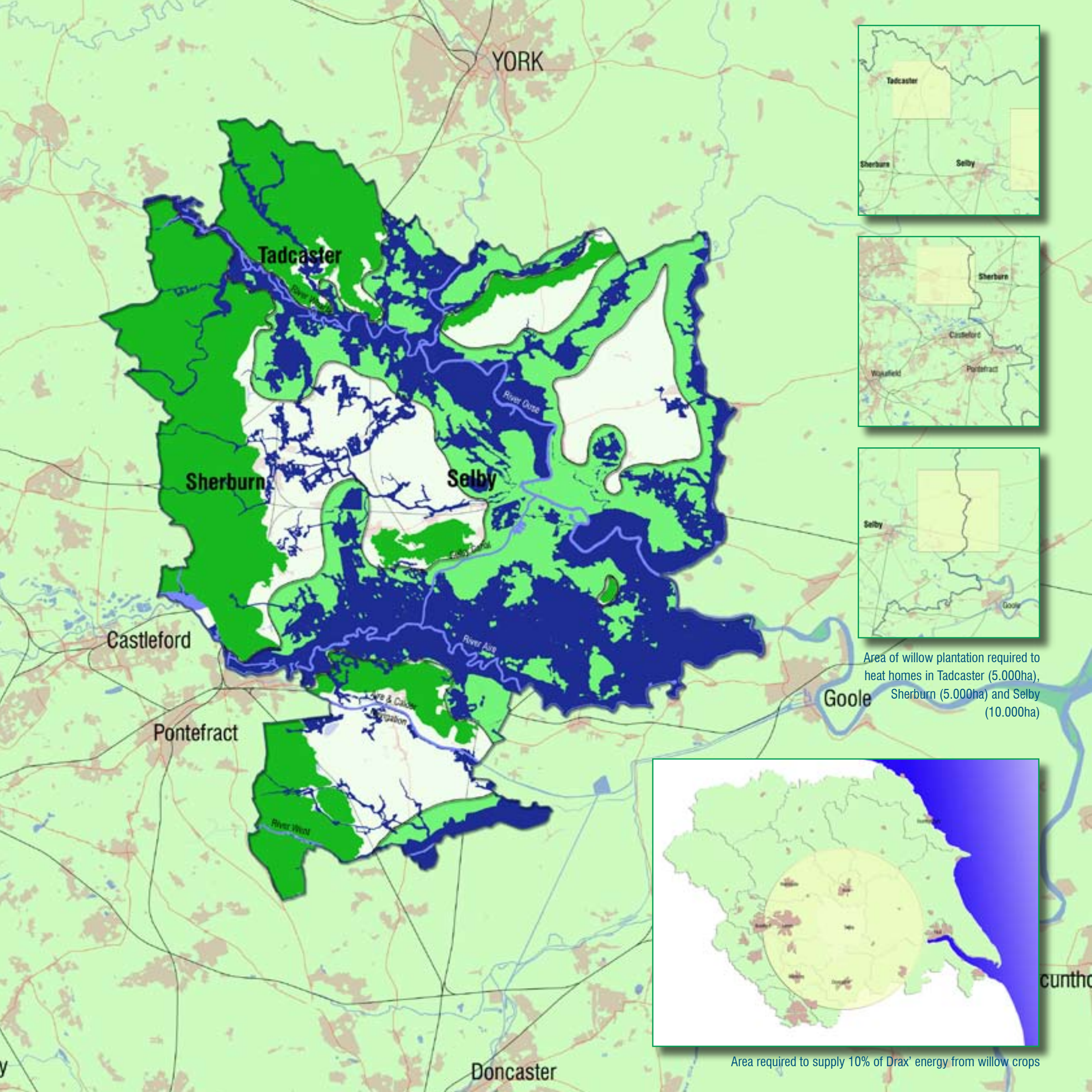


‘Bio-net’ distribution: The development of an efficient distribution network to get biofuels to end-markets in Yorkshire. Sewage sludge fertiliser could also be distributed to growers. The distribution network would make use of a range of different modes, with an emphasis on rail and water borne transport. The network could be established as a joint venture between farmer producer groups, biofuel specialists and local logistics firms – emulating the Swedish venture Naturbransle. Drax Power Station and Gascoigne Wood have been identified by stakeholders as potential logistics hubs.

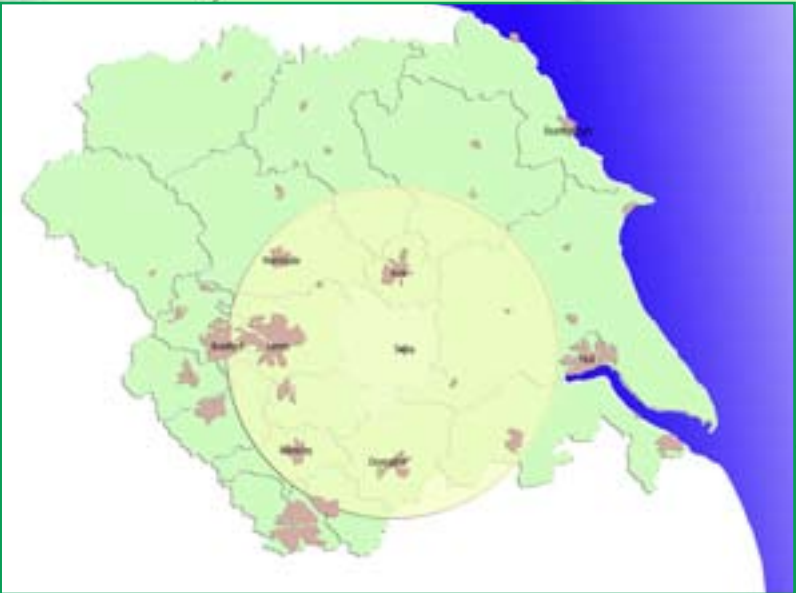


Key

- Energy crop areas of opportunity
- Non-food crop areas of opportunity
- Flood level
- Water bodies



Area of willow plantation required to heat homes in Tadcaster (5,000ha), Sherburn (5,000ha) and Selby (10,000ha)



Area required to supply 10% of Drax' energy from willow crops

Vision...

Development of a district-wide heating plan – targeting public and private buildings – in order to support the market for locally grown biofuels.

**Farmar
Energi**

energy
6

Community
biofuels



The failure of ARBRE has highlighted the risk of farmers relying on large-scale projects using unproven technologies. Whilst co-firing by coal power stations such as Drax is creating a substantial, stable market for biomass crops up until 2016, both the NFU and Ben Gill's Biomass Task Force have recommended development of the market for smaller scale heating projects, using proven technology.

Pioneering farmers such as Gareth Gaunt and Rupert Burr have gone further, suggesting that farmers should add value to their fuel by delivering heating services – as demonstrated by successful farmer-controlled businesses in Sweden and Austria.

Pilot projects are, however, required to build confidence in biomass heating systems, and in this respect the public sector is the ideal position to support the biomass heating market and to lead by example. Pioneering councils such as Telford and Barnsley both demonstrate what can be achieved, with commitments to install wood heating systems in council buildings, leisure centres and schools. Projects like these could support the carbon reduction aims of North Yorkshire County Council, who manage many of Selby District's community buildings, and can also play an important educational role in the local community.

The planning system also has a potential role to play in developing the market by encouraging future housing schemes to adopt Combined Heat and Power technology.

A potential Eco-Village has also been suggested on land owned by UK Coal at Gascoigne Wood, with the potential to make use of the existing electricity substation capacity to support a large Combined Heat & Power plant project. These developments create significant opportunities for community heating.

Wider awareness raising has also been highlighted as being crucial to building public acceptance of

biomass schemes. It is proposed that this is covered within the hearts and minds 'landmark' project.

The establishment of partnerships with technology providers and heating engineers is important to ensure the quality of installed systems. In

the UK pioneering projects have largely relied on wood heating specialists currently receiving DEFRA 'biomass infrastructure' grants - such as Econergy and Rural Energy. In Yorkshire emerging firms such as Bioflame also have the potential to become technology partners.



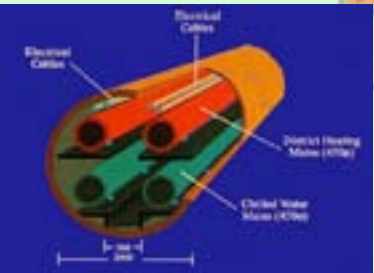
Project Proposals

District heat plan: The establishment of a strategy to grow the biofuel heating market, with the potential to partner with fellow Renaissance town Barnsley. It will aim to switch all public and community buildings in the district over to biofuels for heating by 2015.

The plan will also seek to ensure that new developments use biofuels for heating, with a focus on the masterplans for Olympia Park and Gascoigne Wood.

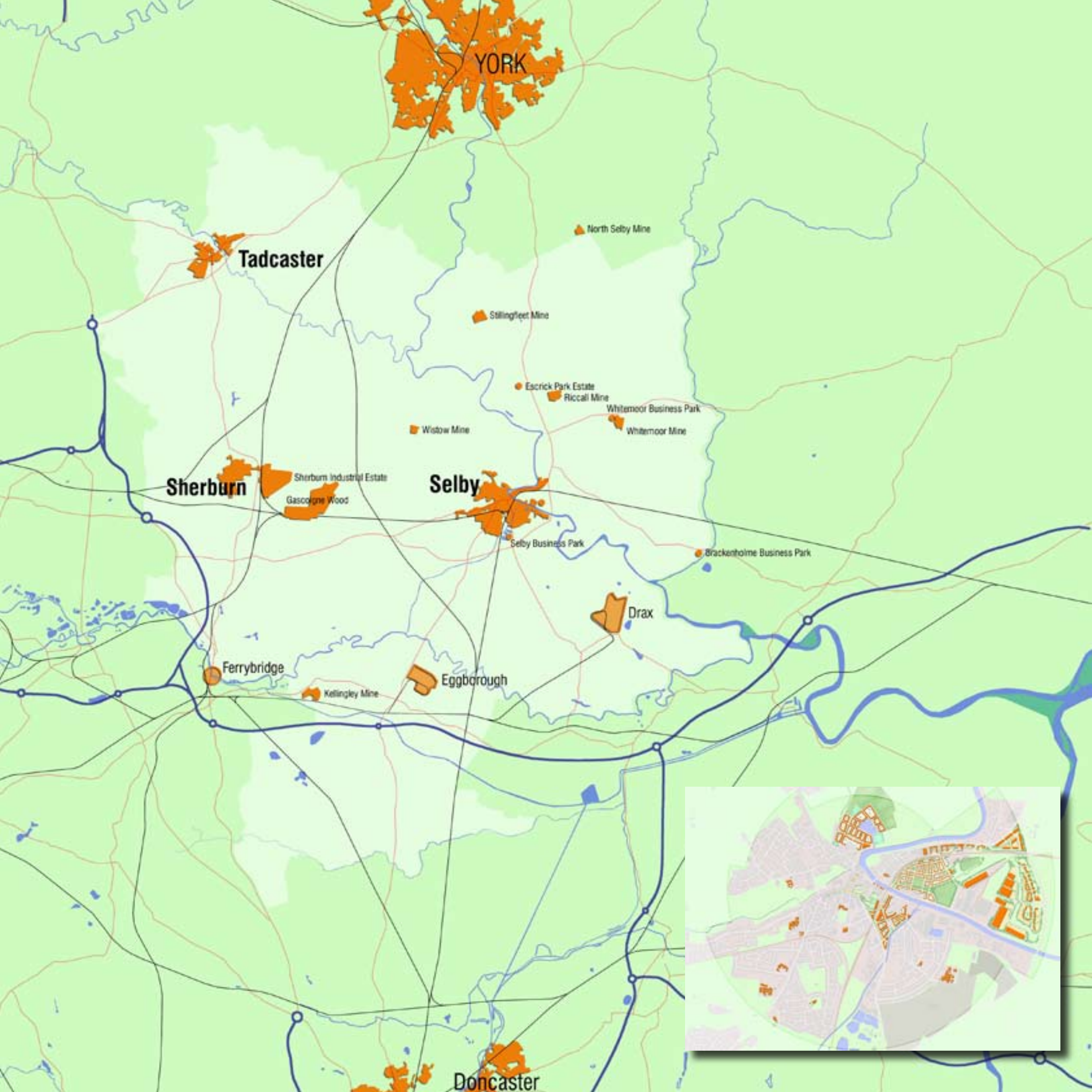
Existing homes and private buildings will be encouraged to switch over, with advice being made readily available. The plan will also seek to address barriers such as inflexible regulations, which apply in Smoke Control Zones, as well as targeting villages and homes that are off the gas network. Potential pilot projects include Brackenholme and White-moor Business Parks. Synergies between the demand for heating and adjacent industrial uses, such as Tate & Lyle Citric Acid in Selby, which has its own Combined Heat & Power plant will also be explored.

Farmer Energy Ltd: The establishment of a new company that would enable farmers to directly benefit from biomass heating opportunities. The company would be owned and controlled by local farmers. The aim of the company would be to add-value to energy crops by selling heat to end-users – a model successfully used by farmers and foresters in Sweden and Austria. Services would be delivered by working in partnership with specialist installers and equipment providers.



Indicative heat network for Eco-Village





Vision...

Research and Development of novel waste heat and CO₂ applications, creating the potential for coal power stations to become hubs for eco-industries.

energy



Future Coal



Drax and Eggborough power stations ensure a large, secure supply of electricity for the country. With coal power's position in the UK's energy mix now secured until at least 2020 by strong political support, attention has focussed on the potential for clean coal power generation. Both power stations are investing heavily to reduce SO₂ and NO_x emissions, and mechanisms such as the Renewables Obligation and EU Emissions Trading are incentivising carbon reduction. However, a long term energy policy framework is needed from central government to secure investment. Whilst Kellingley Colliery remains competitive, UK Coal is keen to secure its future position.

Set within the wider context of Yorkshire Forwards 'Vision for coal' there are broadly three options available to

secure a future for coal power and for it to become more sustainable:

1. Co-fire with sustainably sourced, renewable biomass,
2. Improve efficiency by investing in technologies such as super-critical boilers and feedwater heating,
3. Explore options for Carbon Capture and Storage (CCS), as promoted by the government.

Energy Renaissance has sought to broaden the debate, identifying 'blue skies' efficiency and CCS options, with a focus on waste heat and CO₂.

Waste heat: *Is there potential for the large-scale storage and transport of waste heat, and if so how could it be used as a resource?*

Electricity generation is inefficient unless the waste heat is used. Both

stations waste around 60% of their energy – the water vapour rising from the cooling towers - and enough to heat Leeds, Sheffield, Hull, York and Doncaster combined. One solution successfully demonstrated by Scandinavian cities is to use it to for district heating. However, whilst heat pipelines are feasible utilising waste heat would reduce power generating efficiencies and therefore revenue from power sales. In addition, Yorkshire's towns and cities do not have heating networks of a scale that could justify the large-scale pipelining of heat - although this may change in the future.

CO₂ emissions: *Is there potential for the large-scale extraction of CO₂ from coal fired power stations, and if so could it be used as a resource?* Drax and Eggborough are two of largest single sources of CO₂ emis-

sions in the UK, emitting annually over 28 million tonnes. Tackling climate change will require these emissions to be addressed either through co-firing coal with carbon-neutral biomass fuel, or by capturing and storing and/or utilising the CO₂. Current proposals by Drax to co-fire 500,000 tonnes/year of biomass will cut their CO₂ emissions by 5%

by 2009. To make deeper cuts more radical solutions will be needed. The government has recently published a carbon abatement strategy, which supports the capture of CO₂ from power stations. However, the current proposal to store the CO₂ in oil wells and aquifers poses significant risks and is not a long-term solution.



Project Proposals

URBED have worked with the Tyndall Centre and the University of York to identify potential solutions for the waste heat and CO₂ problem. The proposals are based on the most promising solutions, and the extent of research in this field suggests there could be potential to identify further solutions.

These activities could be clustered to form ‘climate care’ industrial parks adjacent to Drax and Eggborough power stations, with close liaison with Selby District Council Planning Department to scope and identify potential sites.

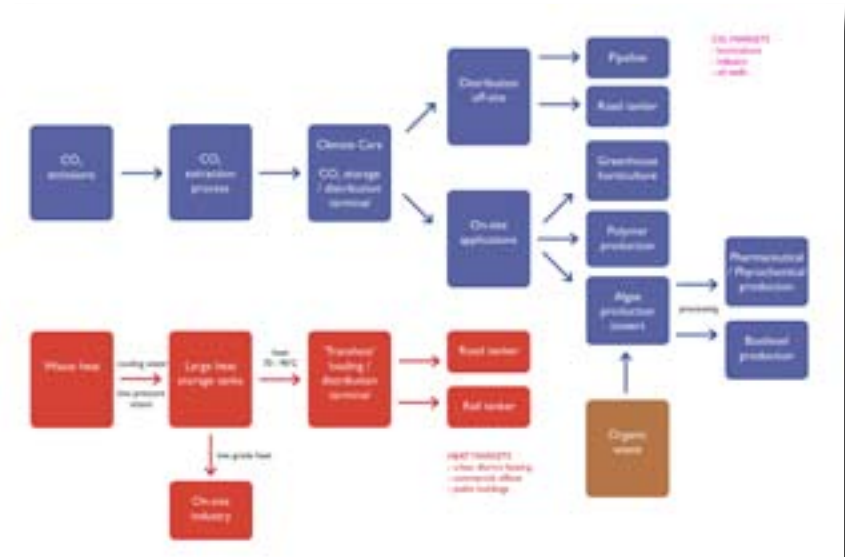
Additional proposals are to develop a clean coal power station in the district - based on cutting edge technology with its own ‘climate care’ park - and to celebrate the iconic status of the power station cooling towers in Selby district’s landscape.

‘Climate care’ industrial park: The establishment of an industrial park adjacent to each power station. The aim of each park will be to reduce CO₂ emissions for each MWh of electricity generated by 20% by 2015. The parks would attract industrial activities that would make use of waste heat and CO₂. The heat and CO₂ hub project proposals set out potential activities and anchor tenants. The sites will need to be scoped and selected based on the technical suitability and transport connections. The University of York are researching similar high yield processes – creating the potential for a range of biotechnology-based solutions.



value products, such as biodiesel and pharmaceuticals. Algae production could also make use of sewage sludge and waste heat. Firm CO₂ and heat supplies could also be used to attract more horticulture.

Clean Coal power station: The research and development of ‘zero emission’ clean coal technology based on international expertise with a view to constructing a new 500 MWe+ power station in the Selby vicinity. The power station could help to secure a sustainable future for Kellingley Colliery, and could also support ‘climate care’ park activities - in a similar vein to proposals at Hatfield. Land owned by UK Coal at Kellingley could be explored as a potential site.



‘Climate Care’ Park: process diagram

Heat hub: The development of a heat distribution hub. Low-grade waste heat (70-90°C) bled from the turbines or boilers, and buffered by large heat storage tanks – as demonstrated by Danish power stations such as Aenaes - would be transported by road, rail and pipeline to large consumers using ‘Transheat’ type latent heat storage technology and/or insulated pipelines. Because heat recovery would reduce power generating efficiencies any loss in revenue would need to be balanced against potential new revenue from heat sales and carbon reductions.



Cool towers: Celebrating the iconic appearance and visibility of the power station cooling towers in Selby District’s landscape. The towers could form the basis for large-scale art installations to symbolise and promote Energy Renaissance. This could take a number of different forms including murals, projections and LED lighting displays - as demonstrated by EU power companies such as RWE and Electrabel.

CO₂ hub: The development of a CO₂ distribution and manufacturing hub. CO₂ would be extracted from flue gas by a new plant. It would be used by manufacturers on site, potentially including polycarbonate plastics and the growing of algae to produce high



Vision...

The establishment of Selby District as a prime location for eco-industries, demonstrated by the commitment of the district's existing industry and establishment as a centre of excellence for low carbon technologies and non-food crops.

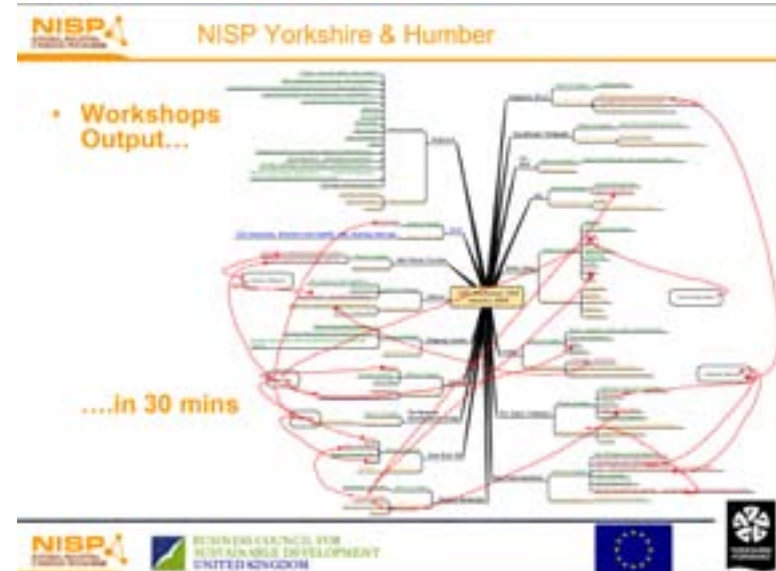
energy 8 Developing Eco-industries



The market for low carbon products and services is set to grow substantially over the next few years, and has been described as the coming 'green revolution'. With such significant forecast growth opportunities it makes sense to gear up the district's businesses to benefit. Saint Gobains investment in a new low energy glass plant at Eggborough, with the creation of 60 jobs, demonstrates the potential and companies such as Linpac Polymers and Tate & Lyle are already investing in clean technologies and green products. Growth in demand for building products such as natural insulation and low energy glazing, as well as biomass boilers and solar roofs, will also increase the need for specialist installers.

There is also increasing pressure on industry to become more eco-efficient, with the empha-

sis on becoming more productive whilst using less energy and raw materials. The Climate Change Levy and the Landfill Tax are just a few of the measures creating pressure for change, along with the longer term prospect of higher gas and oil prices. Increasing priority is also been given to innovation and the Research & Development of new eco-efficient products and processes. For Selby's industry the prospect of becoming 'eco-industries' could deliver a range of benefits. The greatest incentive will be the prospect of bottom line financial savings. For larger businesses it would contribute towards Corporate Social Responsibility (CSR) commitments. With growing scrutiny of suppliers 'green' credentials environmental responsibility it could help to secure new business, and can also improve relations with the local community.



Climate change 'club': The establishment of a club bringing together local business leaders. Members would have to demonstrate a commitment to carbon reduction, and in return they would share knowledge and best practice on how best to achieve reductions. There could also be potential for joint working on mutually beneficial projects such as co-generation or on-site wind energy. The club could be established under the auspices of the Selby Industrial Association and the Selby Waste Minimisation Club.

Industrial symbiosis: The encouragement of active collaboration between local industry in order to reduce waste and save energy. The National Industrial Symbiosis Project (NISP) is supported by Yorkshire Forward and the DTI. Its aim is to encourage businesses to work together for competitive advantage. So, for example, one businesses waste (e.g. yeast from a brewery, shells from seafood processing) could become the raw material for another business (e.g. mushroom growing, manufacturing pollution control filters). The tried and tested NISP workshop format could be used to map out areas of potential collaboration, enabling projects and R&D requirements to be identified.

Building capacity: The establishment of partnerships with colleges and higher education to build capacity within the local economy. The aim would be to help local businesses to benefit from emerging demand. For example, York Energy Efficiency Advice Centre (EEAC) has already identified the need for more solar heating installers in North Yorkshire. Training could therefore be provided on solar plumbing to local businesses with complementary skills in order to fill this niche.

Low Carbon R&D: The establishment of a low carbon technology Research & Development Centre modelled on the success of research centres in Gelsenkirchen and Freiburg (Germany). Energy technologies are a proposed R&D theme for the science park proposals (see Economy section). The emphasis would be on pre-commercialisation and prototyping. Potential projects could include the Future Coal proposals and biomass heating technologies, such as being developed by Bioflame with the support of the University of York. The buildings at such a centre would integrate state-of-the-art low energy design features and renewable energy technologies.