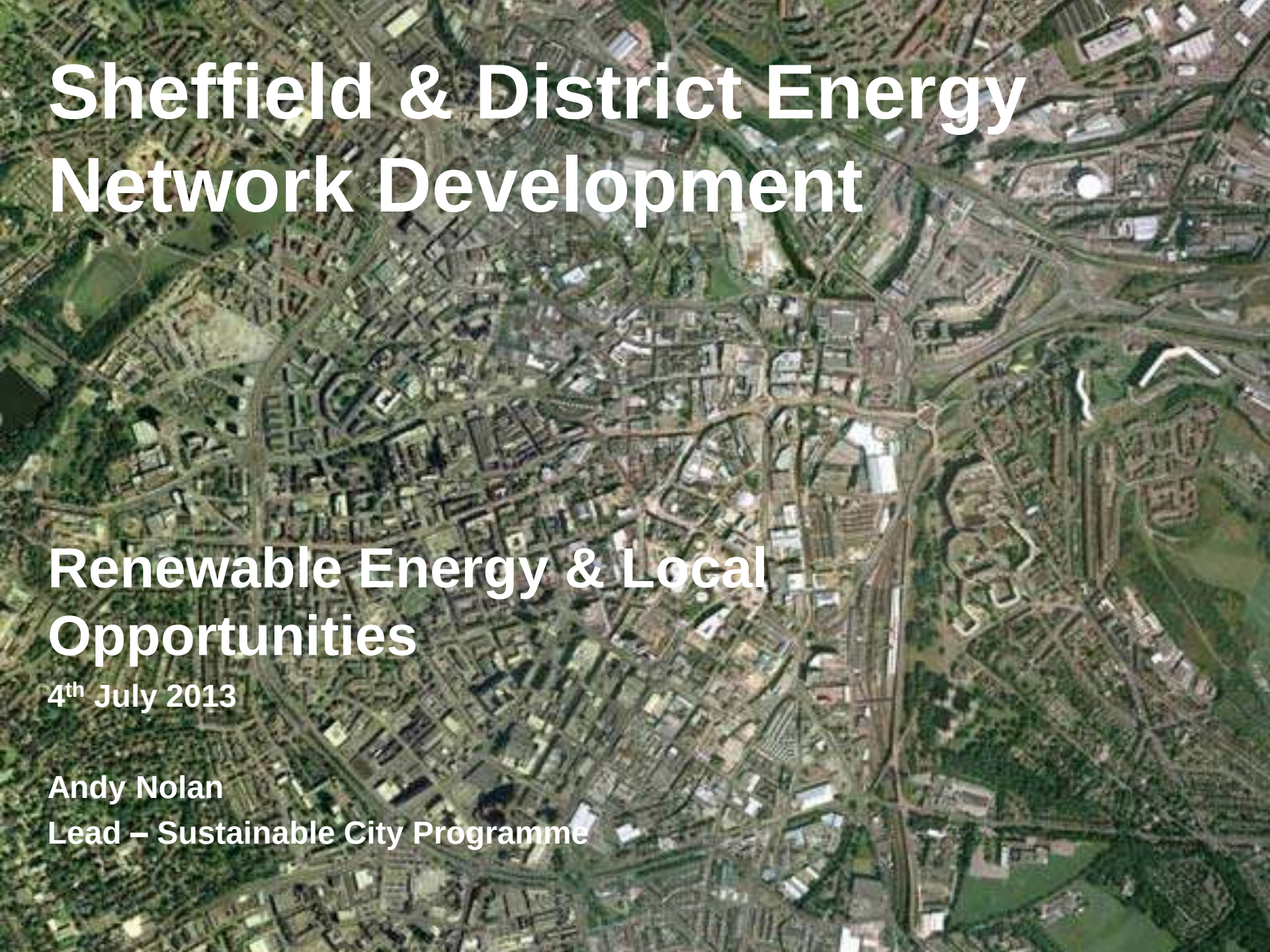


Sheffield & District Energy Network Development

Renewable Energy & Local Opportunities

4th July 2013

Andy Nolan
Lead – Sustainable City Programme

What we'll cover

- The drivers for and history of district / community heating in Sheffield
- The role of planning
- Scaling up for the City Region

- Drivers for Change
  - Carbon Reduction Targets
  - Energy Security
  - Cost & Fuel Poverty
  - Opportunity for jobs and growth
- The Need and the Opportunity

Headline Findings for the Sheffield City Region

£3.4 billion (c13% of £26bn GDP) left the SCR economy in 2011 through payment of the energy bill. This figure is forecast to grow to **£4.6 billion** by 2022.

There is a commercially attractive opportunity to bring **£3.7 billion** of investment into the SCR economy to exploit cost effective low carbon and energy efficient options.

Such investments would pay for themselves in 5 years, cutting energy bills by **£723 million** a year.

They would also create **3,000 jobs** and an extra **£147 million** in wider GVA every year.

50 Years of District Heating

- **1960's** - Park Hill and Hyde Park flats are connected by a pipeline to form the basis of a large scale District Energy Network (DEN) using a central oil fired boiler system
- **1970's** - The original Energy Recovery Facility (ERF) is connected to the Park Hill and Hyde Park DEN so that 'waste heat' can replace the oil fired boilers and investment and development of 'community' scale schemes in Council owned housing stock
- **1980's** - The DEN is extended to the Norfolk Park area and other blocks of flats are connected. Sheffield Heat & Power Ltd formed to own, develop, manage and operate the DEN
- **1990's** - The DEN is extended into the city centre and then out to Weston Park. Both Universities are connected and a large number of private sector buildings are connected. A steam turbine is added to the ERF
- **2000's** - The District Energy business is transferred to Veolia Environmental Services as part of one of the largest integrated waste management contracts in the UK. More private sector buildings are connected
- **2006** - A new state of the art ERF is handed over to Veolia, reducing the reliance on fossil fuel back up and providing more energy for further expansion of the DEN
- **Present** – Aspiration to expand, decarbonise and add resilience to existing network. Integrating with new networks planned in the Don Valley

Sheffield District Heating Network

Key:
- Connecting buildings (rollover for name)
- Pipeline
- Stand-By/Peaking Energy Stations
- Landmarks
- Featured Building (click for more details)

District Heating in Sheffield - Scale

- ERF providing 45MW thermal energy
- the UK largest District Heating system
  - 147 connected buildings
  - 125,000,000 kWh energy sold
- electrical generating plant
  - Original 6.8MW turbine replaced by 19.3MW turbine
  - 100,000,000 kWh of electricity sold
- 87 MW of gas and oil back-up boilers

VEOLIA
ENVIRONMENTAL
SERVICES

District Heating in Sheffield – The Basics

- Distributed pipework system
- Water
- Temperature up to 120°C
- Pressure up to 16 bar
- Distributed by pumps
- Backed up by 87MW of boilers
- Computer controlled for maximum efficiency

VEOLIA
ENVIRONMENTAL
SERVICES

District Heating in Sheffield – Customer Benefits

- Reduced heating, capital and maintenance costs
- Safe and reliable operation
- Back up facilities
- Space-saving
- Flexibility/better control
- A cleaner local environment
- Conservation of finite fossil fuels and large energy savings

VEOLIA
ENVIRONMENTAL
SERVICES

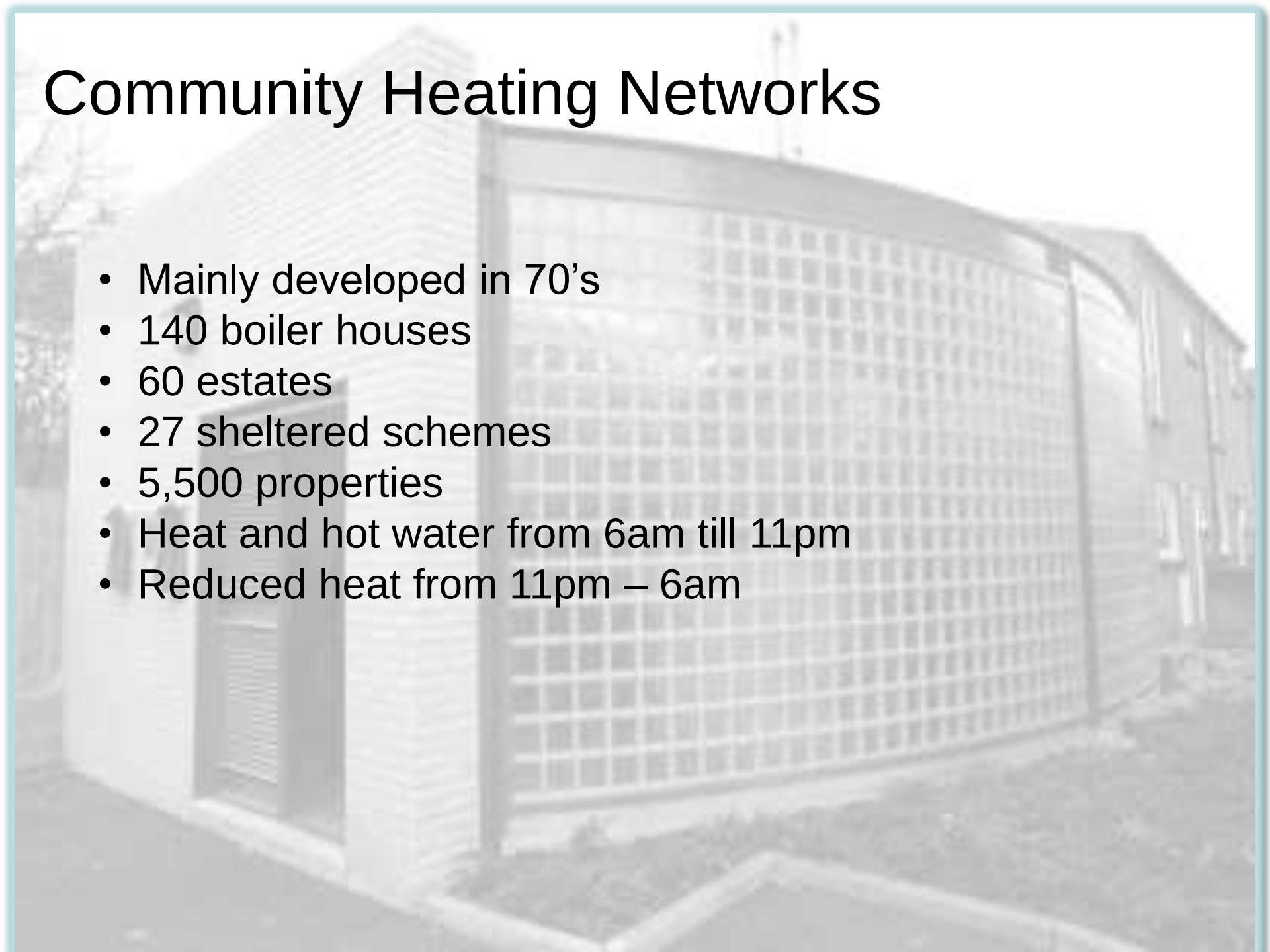






- 5 Swimming Pools
- 3 Art Galleries
- 3 Theatres
- Radio Station
- 2 cinemas
- 27 Office Blocks
- 4 Hotels
- 2 universities
- FE College
- Hospital

Community Heating Networks



- Mainly developed in 70’s
- 140 boiler houses
- 60 estates
- 27 sheltered schemes
- 5,500 properties
- Heat and hot water from 6am till 11pm
- Reduced heat from 11pm – 6am

Role of Planning

- Policy and Guidance
  - Land Use
  - Energy generation
  - Feedstock (waste?)
  - Air Quality
- Community engagement
- Stimulating demand & Working with Developers
- Seeing the ‘Bigger’ picture

2. Biomass Plant Update

2008 Planning approved for Renewable Energy Plant

2010 Feasibility Study on M1 Gateway Art Project

2011 – E.ON announce construction plans

2011

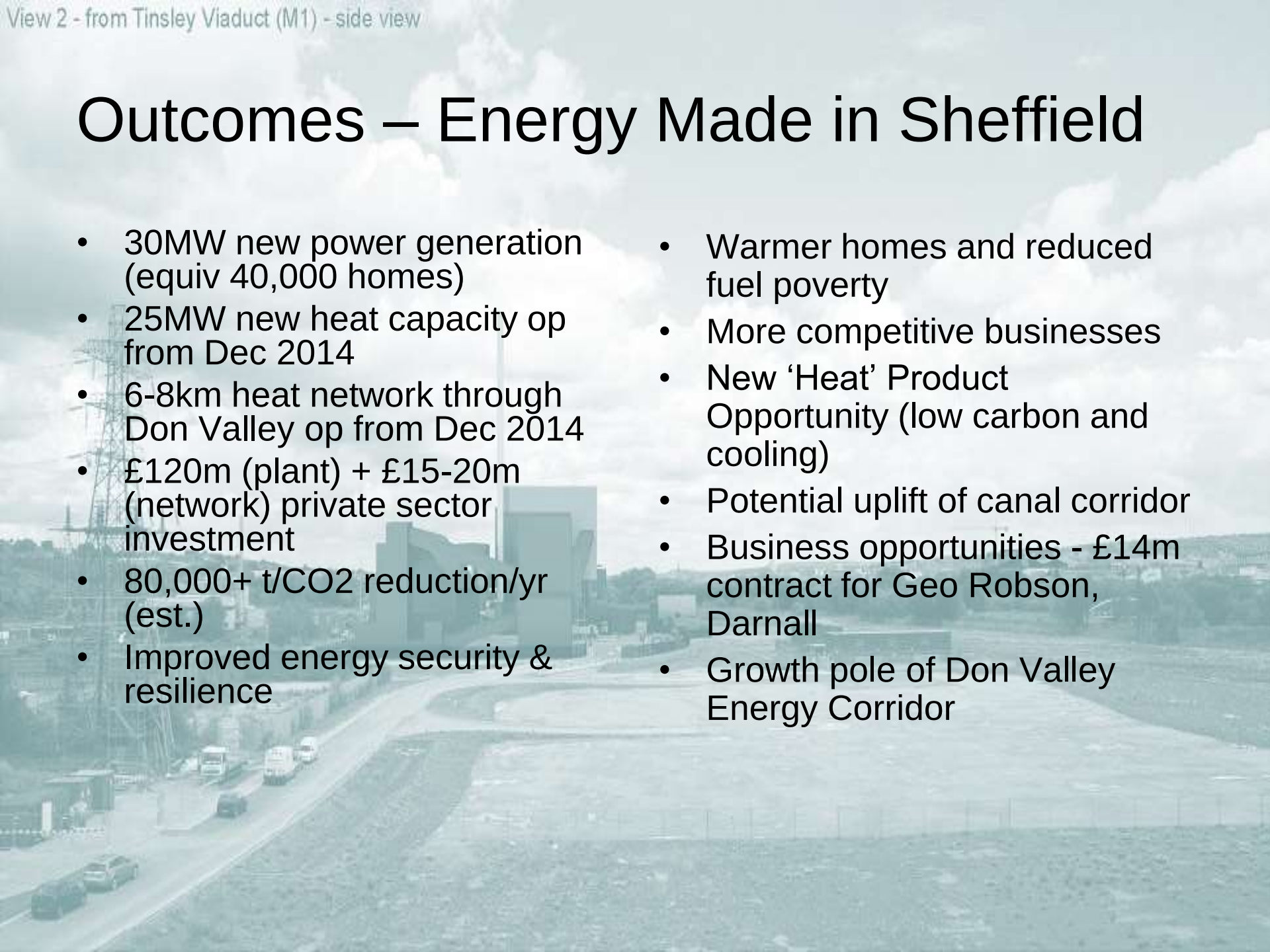
- Nov 2011 Ground Works commenced

2012

- Q1 / Q2 Piling Works
- Q3 / Q4 Structural Works

2014

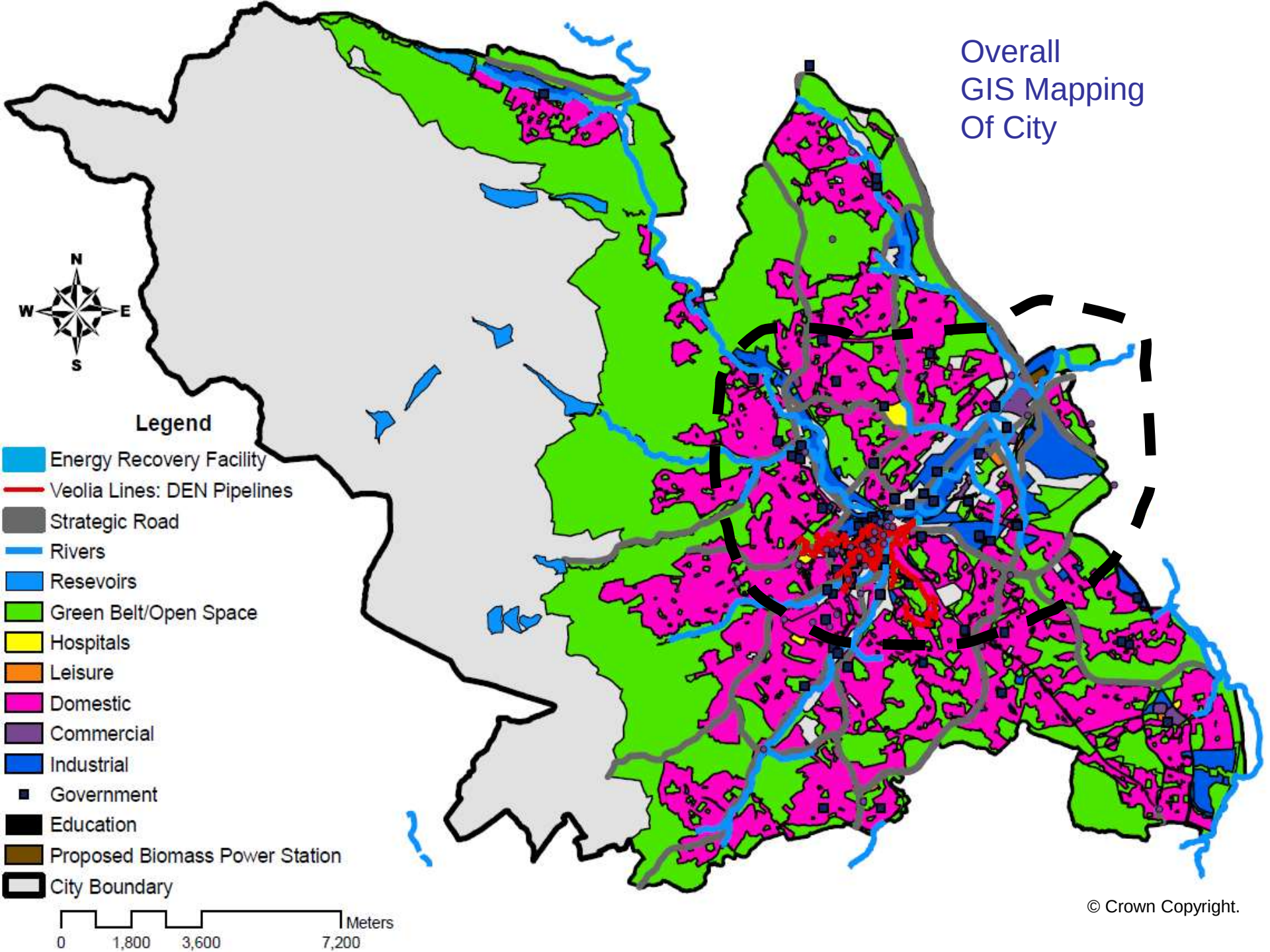
- Q4 Plant Operational



Outcomes – Energy Made in Sheffield

- 30MW new power generation (equiv 40,000 homes)
- 25MW new heat capacity op from Dec 2014
- 6-8km heat network through Don Valley op from Dec 2014
- £120m (plant) + £15-20m (network) private sector investment
- 80,000+ t/CO2 reduction/yr (est.)
- Improved energy security & resilience
- Warmer homes and reduced fuel poverty
- More competitive businesses
- New ‘Heat’ Product Opportunity (low carbon and cooling)
- Potential uplift of canal corridor
- Business opportunities - £14m contract for Geo Robson, Darnall
- Growth pole of Don Valley Energy Corridor

Overall GIS Mapping Of City



Decentralised Heat Vision

- City-wide, resilient, low carbon network
- 6 new zones
- Priorities –
  - ‘Lower’ Don Valley
  - ‘Upper’ Don Valley
  - City Centre expansion

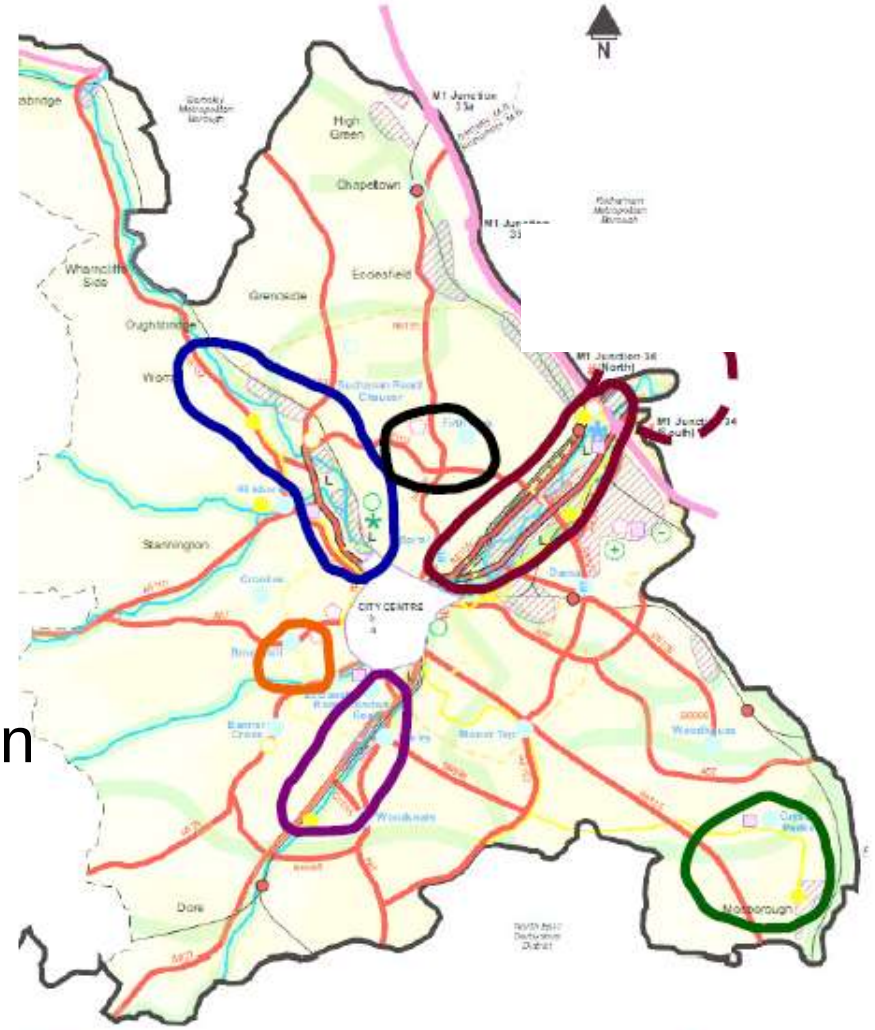
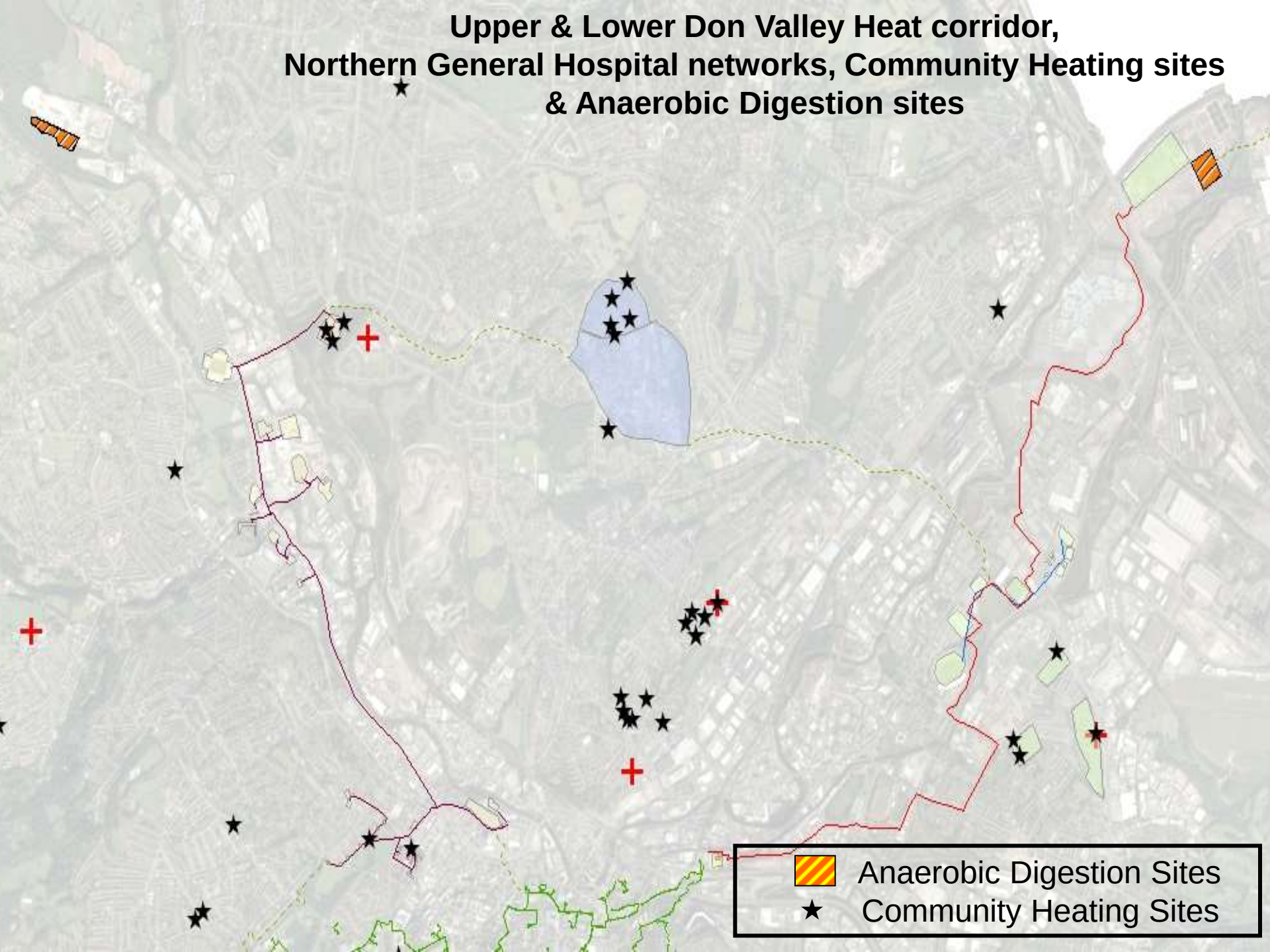


Figure 5.27: Primary areas suitable for energy network expansions within the study area. The main areas are: 1) Lower Don Valley —, 2) Lower Don extending into Rotherham - -, 3) Upper Don Valley —, 4) Northern General Hospital area —, 5) Mosborough/Crystal Peaks region —, 6) Sheaf Valley — and 7) Royal Hallamshire Hospital/SHU Collegiate Campus —.

Base Map Source: Sheffield City Council [29]

Upper & Lower Don Valley Heat corridor, Northern General Hospital networks, Community Heating sites & Anaerobic Digestion sites



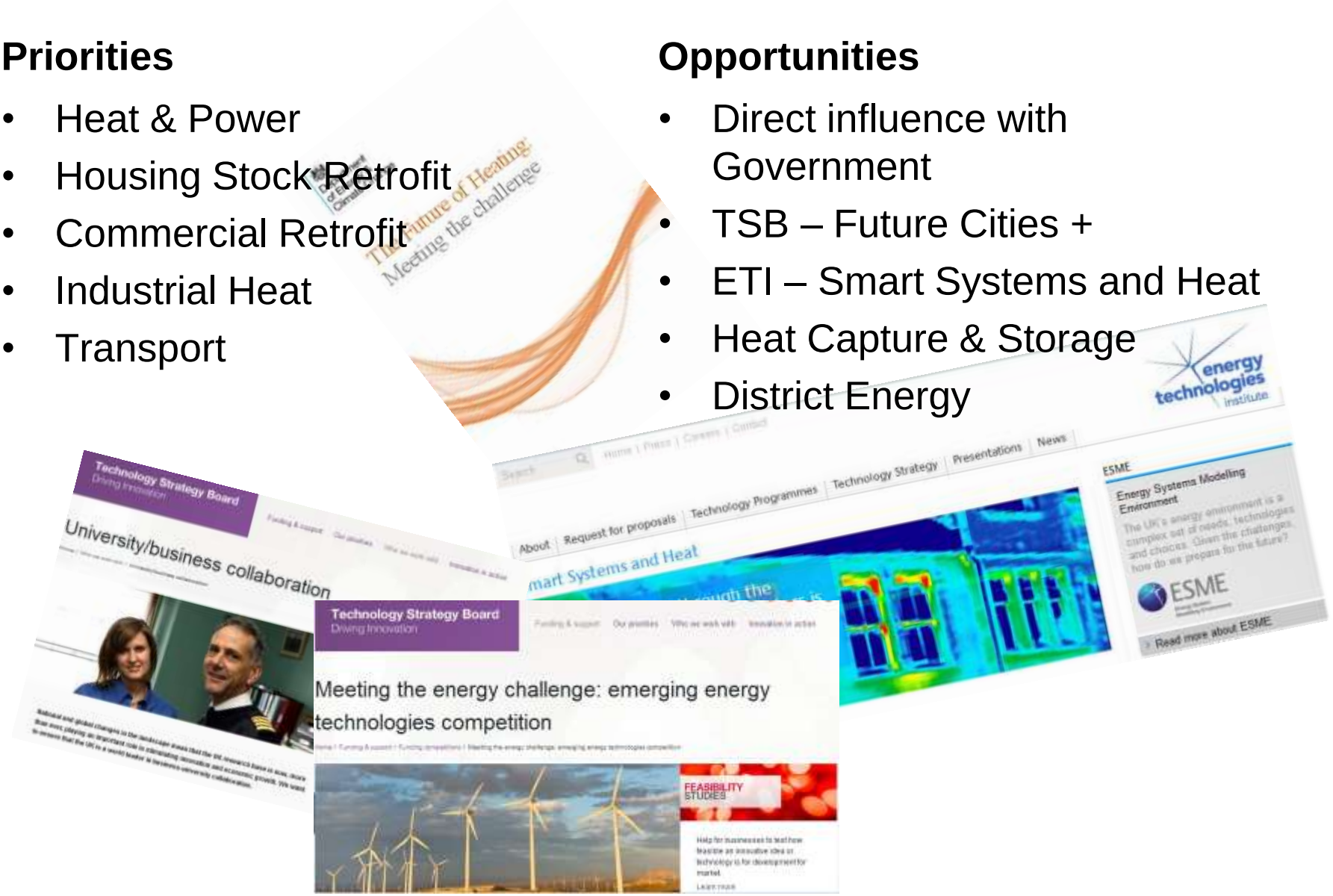
Energy Efficiency & Cities :

Priorities

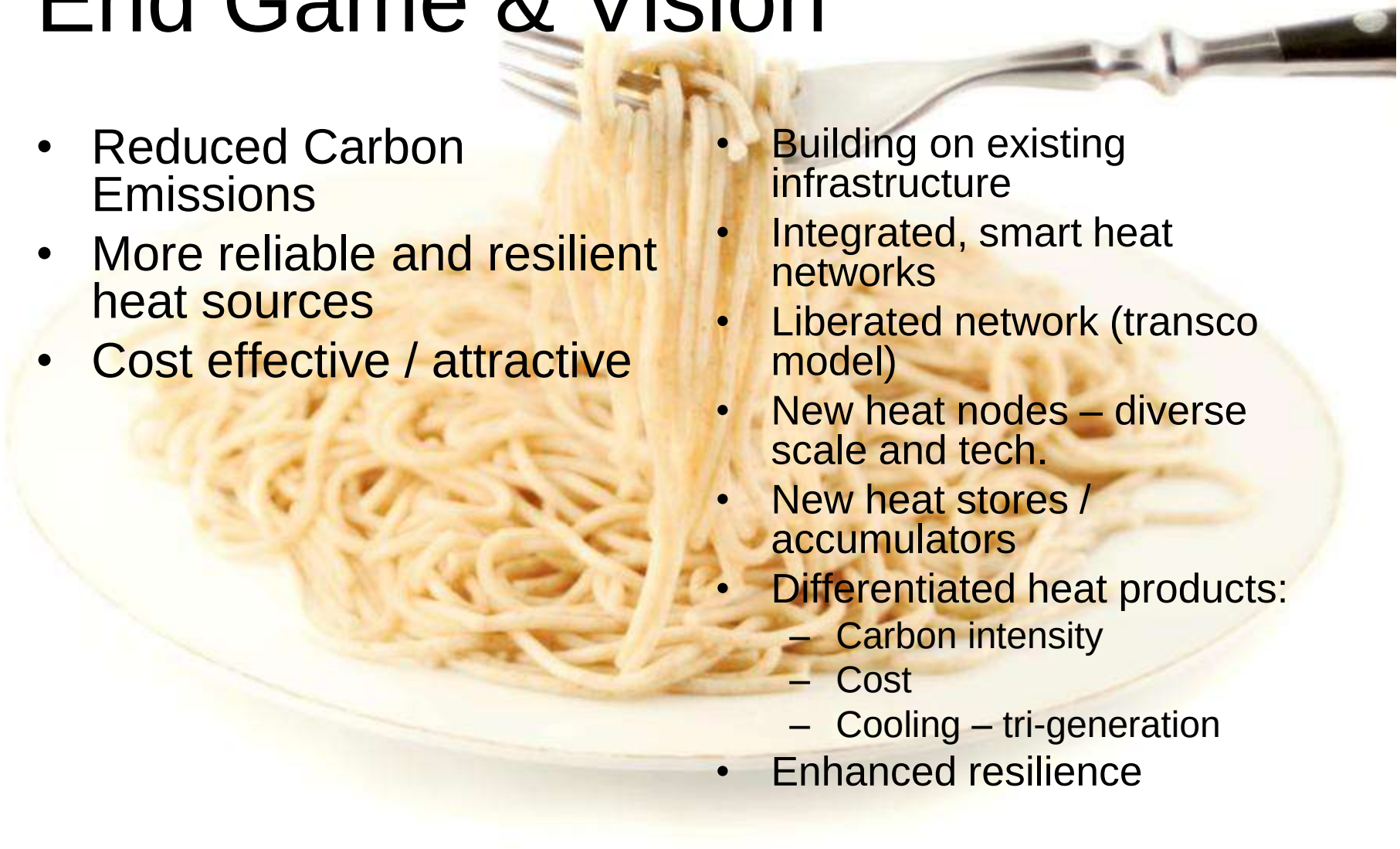
- Heat & Power
- Housing Stock Retrofit
- Commercial Retrofit
- Industrial Heat
- Transport

Opportunities

- Direct influence with Government
- TSB – Future Cities +
- ETI – Smart Systems and Heat
- Heat Capture & Storage
- District Energy



End Game & Vision



- Reduced Carbon Emissions
- More reliable and resilient heat sources
- Cost effective / attractive

- Building on existing infrastructure
- Integrated, smart heat networks
- Liberated network (transco model)
- New heat nodes – diverse scale and tech.
- New heat stores / accumulators
- Differentiated heat products:
  - Carbon intensity
  - Cost
  - Cooling – tri-generation
- Enhanced resilience

Key Success Factors

- Planning plays a proactive enabling role by:
  - Taking a long term view
  - Political commitment
  - Partnership approach
  - Commissioning budget (legal, financial, technical)
  - Legislative and market intelligence
  - Technical and financial expertise
  - Understanding the needs of business
  - Credibility with private sector
  - Strong interface with planning and regeneration
  - Sharing visions and sharing risk
  - Creativity

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Useful links:

http://www.veoliaenvironmentalservices.co.uk/Sheffield/What-happens-to-your-waste/District-Energy
http://www.eon-uk.com/generation/1490.aspx