

Heat Management – A business opportunity

CONNECTIVE ENERGY

A company developed by Carbon Trust Enterprises



Waste heat opportunity

Waste heat waste has been a common phenomenon in the UK for a long time

Relatively few heat networks exist at present; most involve community heating or bespoke heat supply projects

- Many companies produce heat in their manufacturing processes.
- 45% of the UK's industrial primary energy consumption is currently wasted as heat released into the environment.
- 40TWh of waste heat is considered recoverable:
 - equivalent to the heating needs of Greater Manchester
 - worth around £1 billion per annum
 - Potential annual carbon savings of 7.5 million tonnes CO₂e

1. Source: DTI

Economic and Environmental Impact

The economic impact of the waste heat has increased recently in line with energy prices and regulatory pressure

- Increases in energy costs over recent years mean that businesses in the UK currently face both the highest gas prices and amongst the highest electricity prices in Europe. This presents a significant challenge to UK business competitiveness, particularly against emerging economies.
- Government climate change mitigation policies require immediate action from industry and the public sector to stabilise and reduce carbon emission levels to sustainable levels.

These factors have combined to create an unmet need for stable, low cost, low carbon heat supply and optimisation of associated regulatory benefits.

Barriers to resolution and unlocking mechanisms

Market complexities in the capture and transfer of waste heat have so far prevented the successful implementation of these projects

Barriers

- Complex negotiations between multiple stakeholders with differing objectives
- High resource requirement to pursue one-off opportunity
- Lack of capital and specific knowledge
- Unwillingness to rely on others for utilities

Unlocking mechanisms

- Trusted, independent third party can manage negotiations and provide solutions based on standard methodologies
- Aggregation of small projects to access debt finance and to manage risks through a portfolio approach
- Best of breed specialist skills available: Engineering, regulatory, finance.

Launch of new business

Connective Energy is a low-carbon solutions provider aiming to connect industrial scale energy suppliers with surplus capacity, with local industrial scale consumers for whom this energy could be an economically attractive alternative to existing sources.

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Our mission is to reduce carbon emissions as part of a commercially attractive business model.

Business Partners

Connective Energy Limited is a Joint Venture involving three best-in-class companies that provide complementary skills and capabilities

Carbon Trust Enterprises

- Low carbon leader
- Regulatory expertise
- Lead generation
- Funding



Mitsui Babcock Energy

- Carbon abatement technology leader
- Engineering expertise
- Lead generation
- Funding



Triodos Renewable Energy

- Renewables project expertise
- Financing expertise
- Funding



Connective Energy

- Full time team
- London-based
- £20m committed funds

Business Positioning

Connective Energy offers a turnkey solution

Heat suppliers and vendors make information available and commit themselves to supply and consume energy

One Stop Shop

- Project Identification and Screening
- Project Development
- Project Financing
- Project Construction
- Operational Management
- Regulatory Compliance

Scenarios

- **Waste Recovery**
 - Capture of heat (primarily) otherwise Wasted to the Environment
 - Non-invasive Recovery, Owned & Operated by CEL
- **Enhanced Waste/Energy Efficiency Recovery**
 - Multiple Plant Efficiency Optimisation
 - Fuel and Carbon Optimisation
 - Lower Capital & Operating Costs

Business Model and consumer benefits

Connective Energy operates a business model based on **TRANSPARENCY**

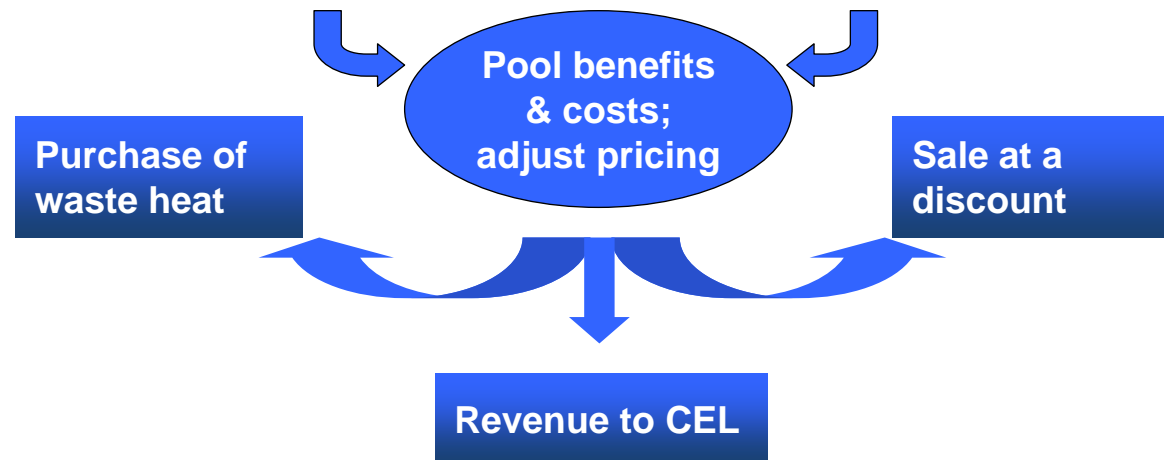
All the benefits and costs of the heat recovery opportunity are pooled before being divided amongst the participants

Benefits to Heat Vendor:

- Additional revenue streams
- CCL rebates
- Reduced operating costs
- Capital Grants
- Optimisation of asset base
- CSR / Branding

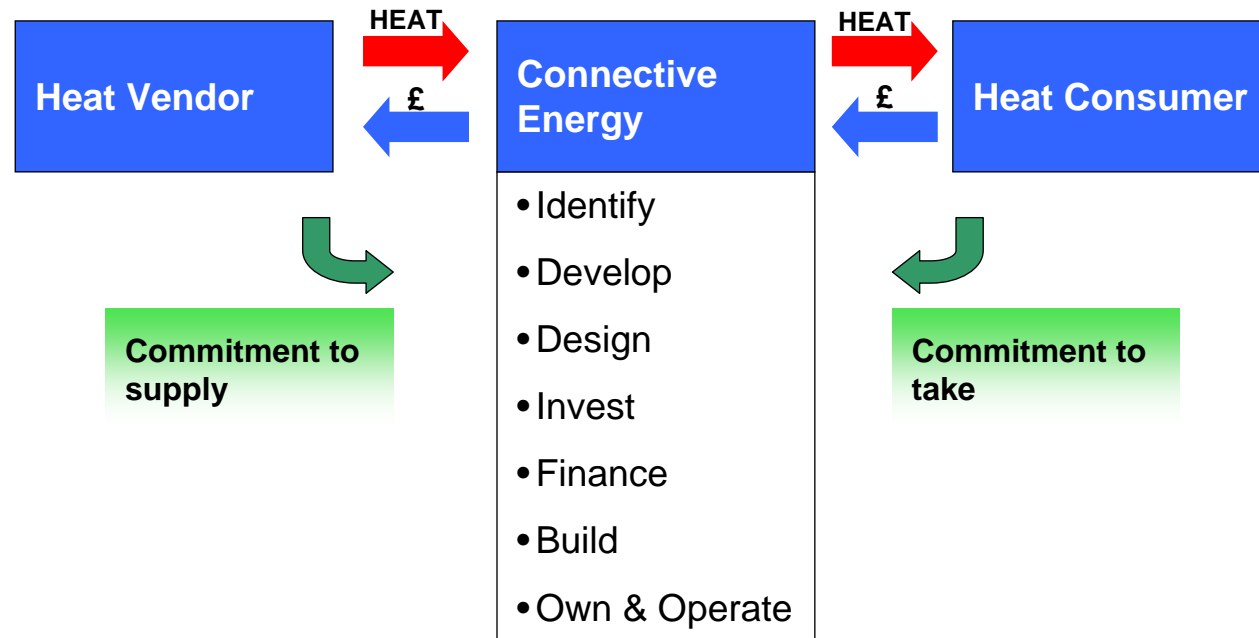
Benefits to Heat Consumer:

- Reduced operating costs
- Regulatory compliance
- EU ETS credits
- Offset of capital costs
- Hedge against fuel price
- CSR / Branding



Project mechanics




Connective Energy sits between the heat vendor and the heat supplier



Unique selling proposition

Connective Energy offers something that has not been available before

Unique Selling Proposition

-  An independent company backed by best-in-class shareholders/operating partners
-  Unique partnering and open book approach with shareholders and customers
-  Delivers projects with real commercial and environmental benefits

Contact Connective Energy

Connective Energy are based in a centrally located London office

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Development Process

The Connective Energy Development Process has been designed to overcome the traditional obstacles to commercially viable waste heat solutions



- Initial Discussion HV
- Initial Discussion HC
- Technical Feasibility
 - Technical Assessment
- Financial Feasibility
 - Financial Assessment
- Sign EoI Stage I
 - Proof of Concept
 - Sign EoI Stage II
- Draft Heat Trading Contracts
- Draft EPC contract
- Engineering Design
- Secure Funding
- Planning Considerations
- EPC and O&M Costs
- Programme of Works
- Financial Close & Sign Contracts
- Planning applications
- Order Plant & Equipment
- Site Establishment
- Construct
- Test & Commission
- Handover
- Operate & Maintain
- Metering & Billing

Sample project types

Connective Energy has a variety of projects across the country at various stages of development

- Transfer of 36MWth steam from power plant to provide process steam for manufacturing plant. Provision for direct wire electrical supply to replace existing supply. Energy efficient plant optimisation making redundant current gas fired steam raising plant. Localised electrical supply that will back off network supply and reduce losses.
- Transfer of 6MWth condensate from power plant to provide chemical process heat. Provision for direct wire electrical supply to replace existing supply. Energy efficient plant optimisation.
- Conversion of LFG generation plant to CHP for supply of 4.5MWth to nearby Brick Works. Waste heat recovery making redundant current gas fired heat raising plant.
- Transfer of CDA from compressor station to nearby manufacturing process. Energy efficient plant optimisation making redundant less efficient compressor plant.