ENER-G Combined Power Ltd

Providing Global Energy Solutions

Heart of England NHS Foundation Trust Case Studies

DECC CHP Outreach Workshop

Aston University

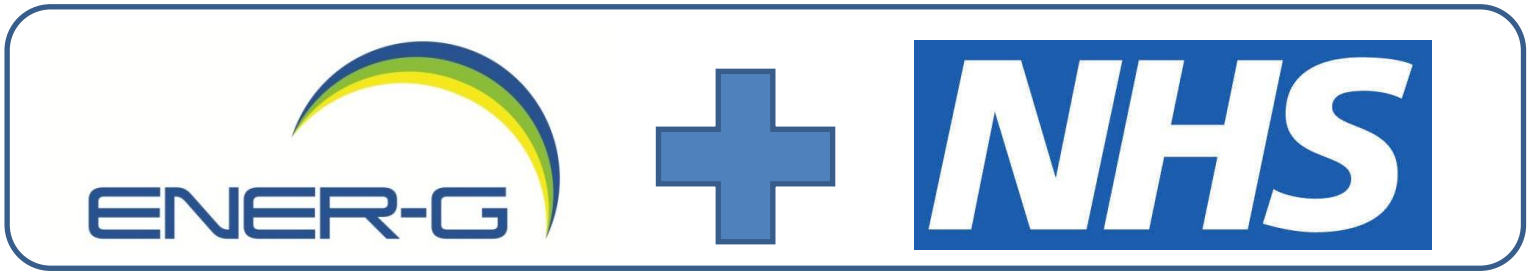
16th January 2014

Setting The Scene

- We face risks from all sides – health and safety, statutory, and environmental that can result in injury, loss of business continuity, personal legal liability or corporate legal liability
- Estates Departments are used to making the case for change, identifying the way forward and implementing projects, normally the most skilled such department in a Trust
- Sometimes we just cant reach the top of the pile – there is no money, or we just cant get the Board to acknowledge the risks

ENER-G & NHS Trusts: Why we work together

- Long term partnership with mutual benefits
- Ethical approach
- Highly fundable: A trustworthy client base with government backing
- Good fit for our business
- Good CHP application generally, optimum running hours, good base load heat demand
- Helping to manage risk



ENER-G Combined Power - Powering the NHS

- 58 operational units across the NHS
- Fleet of engineers available 24/7 to keep you running
- Complete range of CHP units from 4 kWe to 7MWe
- CHP systems fully designed, assembled and tested at our on site facility in Manchester
- European leader in CHP technology
- Fully funded options avaliable
- On-site demand reduction measures including:
  - Boiler replacement/optimisation
  - Water saving measures
  - Low energy lighting systems
  - Insulation upgrades
  - Pump & motor efficiency upgrades
  - Variable speed drives
  - BMS
  - Controls and Metering
  - Monitoring, recording and reporting

www.energ.co.uk/chp

Sunderland Hospital
1550 kWe CHP

Birmingham Heartlands Hospital
Full Turnkey Energy Centre with 1165 kWe CHP
Pilot CEF Scheme

Wirral University Teaching Hospital NHS Foundation Trust
ENER-G CEF Scheme

Arrowe Park Hospital
A new 1710 kWe CHP

Clatterbridge Hospital
A new EnergyCentre with 770 kWe CHP

NHS

Solihull Hospital
770 kWe CHP system together with a 340 kW absorption chiller

Shrewsbury Hospital
1150 kWe trigeneration scheme

Salisbury Hospital
850 kWe CHP

Birmingham Heartlands Hospital

Project Risks

- Ageing inefficient coal-fired plant
- Need to reduce operational and energy costs
- Environmental concerns
- Critical investment required
- Fuel choice restricted to coal
- Clearance of backlog maintenance

Heartlands Site before measures

Old Coal-Fired Boilers

Old Coal-Fired Boilers

Birmingham Heartlands Hospital

ENER-G's Solution

- New dual-fuelled steam energy centre
- High efficiency 1.1MW CHP system
- Demand-side measures including
  - Lighting, boiler replacement, pump & motor upgrades, VSDs
- PPP project structure effectively self-funded from savings produced
- New natural gas supply to site
- Clearance of Backlog maintenance

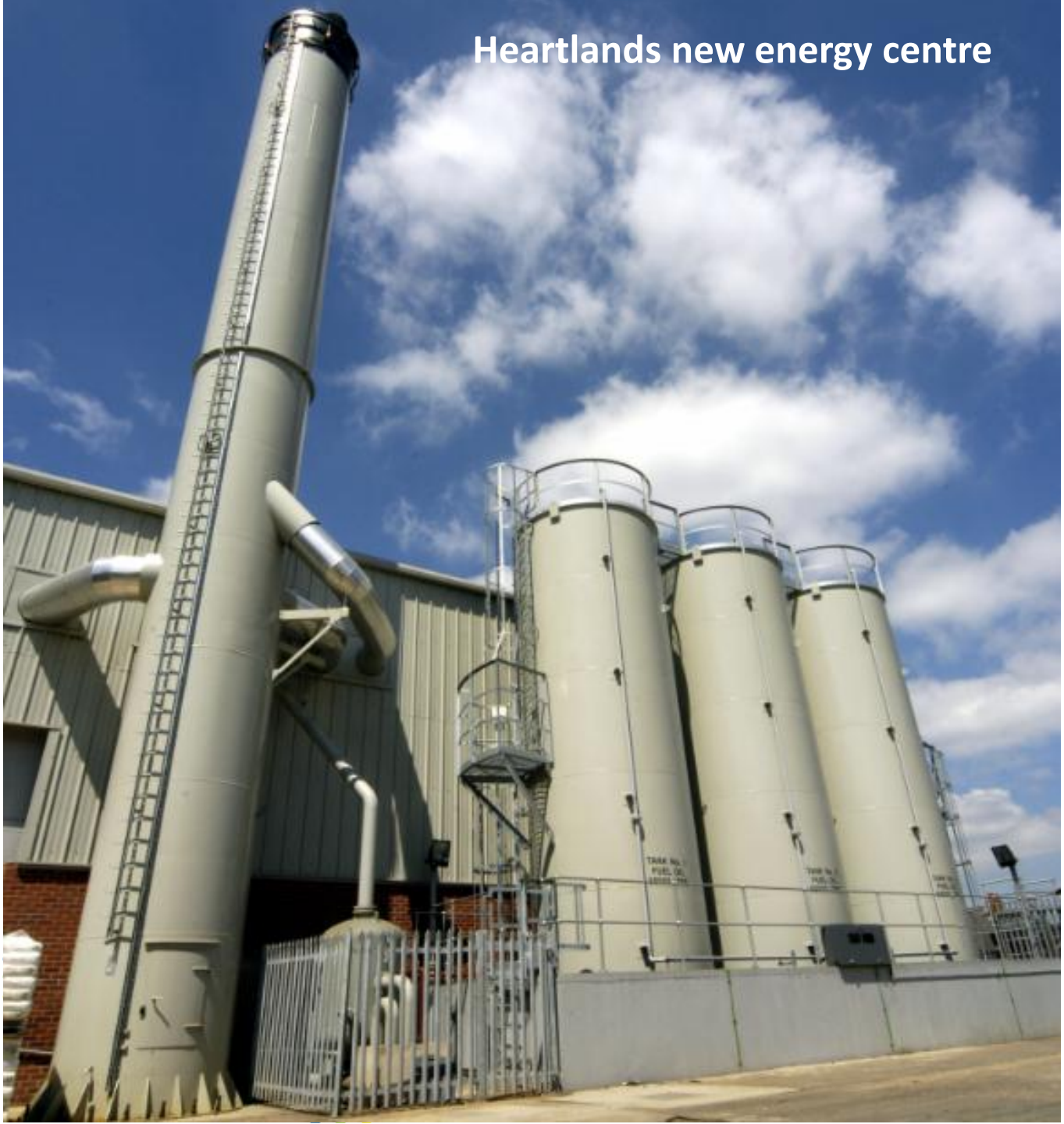
Birmingham Heartlands Hospital

Energy centre: - 1.1MWe, 1.26MWt CHP system
- steam raising from waste heat and LTHW
- high efficiency boilers (from coal)

- New gas supply to site
- Cooling (Trigeneration): 300kW
- Energy efficient lighting x 1800 fittings
- Public Private Partnership (PPP)
- 15 years guaranteed performance
- Contract signed May 2006
- Commissioned Oct 2007 (5 years operational experience)

Tangible benefits

- Saving £688,270 per year
- Reducing carbon emissions by 1,627 tpa - 42% reduction
- Carbon Trust grant £403,000 - Community Energy Programme
- Trigeneration increases utilisation in summer


Heartlands new energy centre

New Gas-Fired Boilers in new energy centre


DANGER
HIGH VOLTAGE
DANGER
OF DEATH
CAUTION
HOT SURFACES
WEAR EYE
PROTECTION
KEEP CLEAR

CHP system

Birmingham Heartlands Hospital

Saving £688,270 per year from:

Energy Savings

CHP	£225,627
Absorption Chilling, removal of coal drives, lighting and thermal insulation:	£39,210

Non-energy savings

Avoided Capital Charges:	£245,000
Labour saving:	£95,291
Subcontract savings:	£74,036
VAT Savings:	£9,106

TOTAL SAVINGS:	**£688,270**

Solihull Hospital

Project Issues and Risks

- Ageing inefficient steam plant
- Need to reduce operational and energy costs
- Environmental concerns
- Critical investment required
- Clearance of backlog maintenance

Solihull Hospital

ENER-G's Solution

- New dual-fuelled LTHW energy centre
- High efficiency 770kWe CHP system
- Demand-side measures including
  - Lighting, boiler replacement, pump & motor upgrades, VSDs
- PPP project structure effectively self-funded from savings produced
- Clearance of Backlog maintenance

Solihull Hospital

- 770kWe internal combustion engine based tri-generation system
- LPHW from engine heat recovery plus new boilers (energy centre)
- 7MW of boilers within main building
- 340kW absorption chiller
- Lighting upgrade
- Total guaranteed savings of £903K per annum
- Annual CO_2 savings of circa. 2,000 tonnes
- Public Private Partnership (PPP)
- 15 years guaranteed performance
- Contract signed Oct 2008
- Commissioned March 2010

Solihull Hospital

Saving £903,352 per year from:

Energy Savings

CHP	£350,089
Absorption Chilling, water, lighting and new boiler plant:	£111,020

Non-energy savings

Labour saving:	£3,234
Parts and Other:	£101,921
Capital Charges:	£337,088
TOTAL SAVINGS:	**£903,352**

Heart of England NHS Foundation Trust

Combined Heat and Power (CHP) Installation

SAVINGS

	Savings Per Annum	
	£k	CO_2 Tonnes
Heartlands Hospital (2006)	688	1627
Solihull Hospital (2010)	903	2000
	1591	**3627**

Things to Consider

Project Development

- Modelling of data, Integration of suitable technologies into single solution
- Quality of data, frequency, future site loads
- Consider strategic changes over the term – 15 years is a long time

Construction and Project Management

- Understanding site sensitivities and business continuity
- Legal liability, corporate compliance and Health and Safety

Guaranteed savings

- Remote monitoring and metering of equipment and site energy demand
- World class service; 30 years' experience, a fleet of dedicated service engineers across the UK, excellent operational availability brings unrivalled expertise in all aspects of energy efficient technology

Summing up

Risks are not going to stop coming. At ENER-G we have a battery of tools and experience for managing risks, winning investment and supporting our Trusts.

- In House Design (both Mechanical and Electrical)
- Data logging
- In House Finnance
- Strategic Supply Partners
- Boiler House Management and Maintenance
- 24/7 Maintenance and Support

Any questions?