

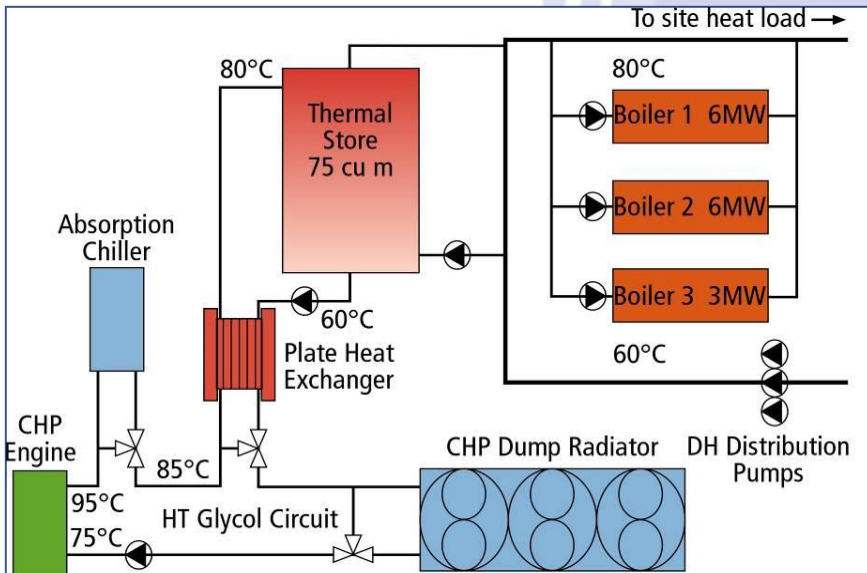
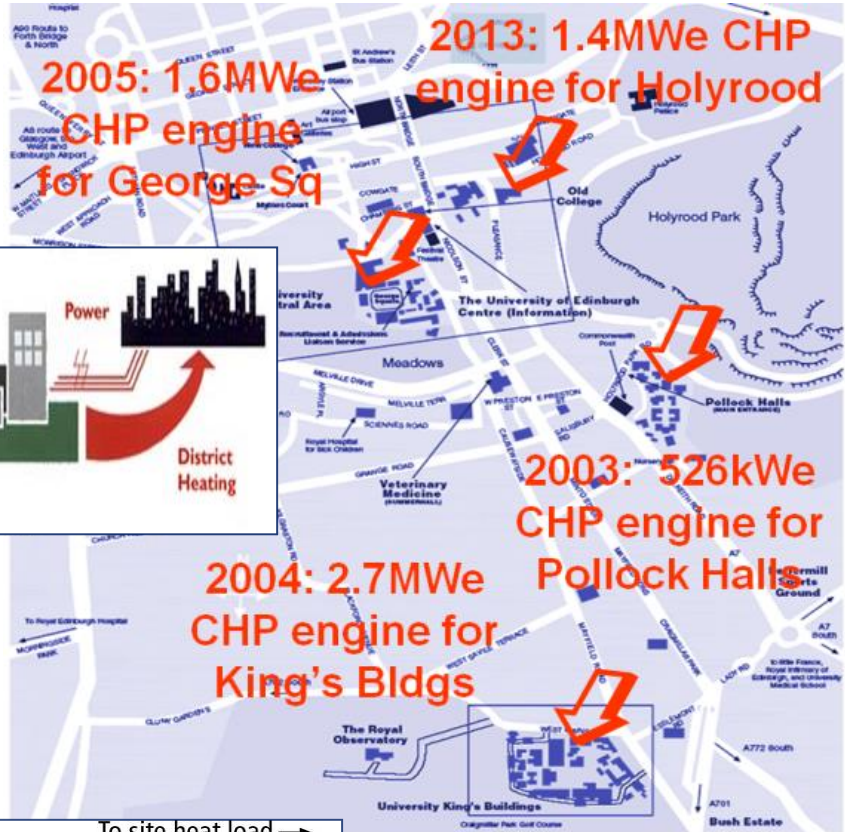
Trigeneration at University of Edinburgh

Combined Heat and Power / District Heating and District Cooling

Heat wasted vs Heat used



First three CHP engines burn natural gas to generate 80% of power needs on three campuses – saving 8,500t CO₂e and £1.5m annually. £12m investment all paid off.



A fourth Energy Centre now completed to serve Holyrood / Pleasance – an £8m investment.

These engineering infrastructure projects complement capital investments in new buildings and refurbishment of older sites.

The intention is to progressively reduce our carbon emissions and contain rising energy costs.

The University's Climate Action Plan 2010-20 implements one aspect of our Social Responsibility and Sustainability Strategy.

Major funding has been allocated to contain energy consumption – which has been rising due to expansion in the University ... from merging with Roslin and College of Art, and from increases in lab-based research activity and student numbers.

May 2015





Combined Heat & Power / District Heating

The University installed four Energy Centres providing Combined Heat and Power (CHP) and District Heating (DH) – with an overall investment of over £20 million in a decade 2003-2013. We set out in 1990, the year we launched our energy efficiency programme, by hosting a UK conference on Energy Management in Further and Higher Education.

From 2003 to 2006 Edinburgh won £5million grant support from a “Community Energy” programme – funded by DEFRA and managed by the Energy Saving Trust – to install three combined heat and power (CHP) installations with an overall infrastructure investment of £12million. Each year these now save over £1.5million and cut emissions by 8,500 tonnes CO₂e. Our proactive and innovative approaches to improving energy efficiency attracted recognition and they were honoured with a Green Energy Award for Best Environmental Initiative in 2004.

UK grants support energy efficiency changes

The first CHP was installed at the Pollock Halls of Residence home for more than 2,000 first year undergraduate students in 2003. The campus of now a dozen buildings was originally heated by three 2MW dual-fuel (natural gas and light oil) boilers that continue to provide top up and stand-by district heating capacity. The CHP system saves 450 tCO₂ emissions annually.

The second location to get a CHP upgrade was the King’s Buildings – 35 buildings home of the College of Science and Engineering – which saw a 45 year old steam heating network replaced with a CHP system, saving 2,600 tonnes of CO₂e and £450,000 in bills in the first year of operation alone. The University reviewed four different energy options before deciding on the CHP system because it had the lowest Whole Life Cycle cost. £4.3million was invested in the system, of which £1.63million was provided from a second Community Energy grant.

The third CHP installation was at the University’s George Square campus, where 50 year old steam boilers were replaced with an innovative Trigeneration system used to power, heat and cool the many central area buildings. Annual savings were £220,000 / 1,250 tonnes of CO₂ emissions and savings are now £500,000 annually. The cost was £6.9 million – £2.7million grant.

A vital component of Edinburgh’s CHP/DH systems is the Building Energy Management System which allows heating and ventilation equipment to be remotely controlled to optimise comfort conditions while minimising energy costs. The system control is based on return temperature and the primary flow temperature is allowed to modulate to achieve the desired engine cooling.

Although the Community Energy Programme managed by Energy Saving Trust and the Carbon Trust has ended, the University continues to pioneer initiatives promoting positive environmental behaviour. From 2009 to 2011 a student-led project – Transition Edinburgh University – won funding from Scottish Government’s Climate Challenge Fund to help cut the personal carbon footprint of the 40,000+ University community. Lessons learned helped establish a Department for Social Responsibility and Sustainability supporting and advising those taking positive action.

Fourth CHP Project breaks new ground

“Following the success of the first three Low / Zero Carbon installations installed by Crown House Technology, a fourth has been installed to further contain our greenhouse gas emissions,” said David Barratt, University Engineering Operations Manager before commissioning a fourth scheme the Holyrood / Pleasance Energy Centre in late 2013.

A 1.5MWe CHP engine and two 9 MWth boilers supply district heating and HV networks serving nearly 20 academic and student accommodation buildings. The £8million capital project, delivered by Vital Energi, first delivered heat in October 2013 and power in February 2014. This is the first district heating network where the majority of the route lies within the local authority roadways and was more high profile to those outside the University.

For more information please see www.ed.ac.uk/sustainability and “University of Edinburgh Focuses on Sustainability, Adds CHP” Journal article from the International District Energy Association in 2006 www.eauc.org.uk/file_uploads/district_energy_article_dec06_.pdf.

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