

Appendix A EPRP Case Studies

A1. EPRP – Dublin Port Headquarters



Crane lifts new boilers and microCHP to rooftop boiler house

Project Overview

Name of projects

Port Centre Boiler House Refurbishment

Port Centre Ventilation Controls Retrofit

Client Name

Dublin Port Company (DPC)

ESCOs

Consultant: PowerTherm Solutions

Mechanical Contractor: T Bourke & Co.

Controls Contractor: Standard Control Systems

Year contract signed

2012

Type of facility

Office building

Scope of works

Boiler House Refurbishment

The boiler house refurbishment involved the removal of 2 oil-fired combi-boilers, LTHW pumps and pipework, MCC and controls panel and associated pneumatics.

The upgrade included the installation of 2 286 kW modulating and condensing gas-fired boilers; 4.5 kWe / 12.5 kWth microchip with condenser module and 1500 litre buffer vessel; LTHW pumps, pipework, valves and commissioning sets with lagging of same; DHW calorifier; new MCC and controls panel; extensive electricity, gas and heat metering; ancillary equipment.

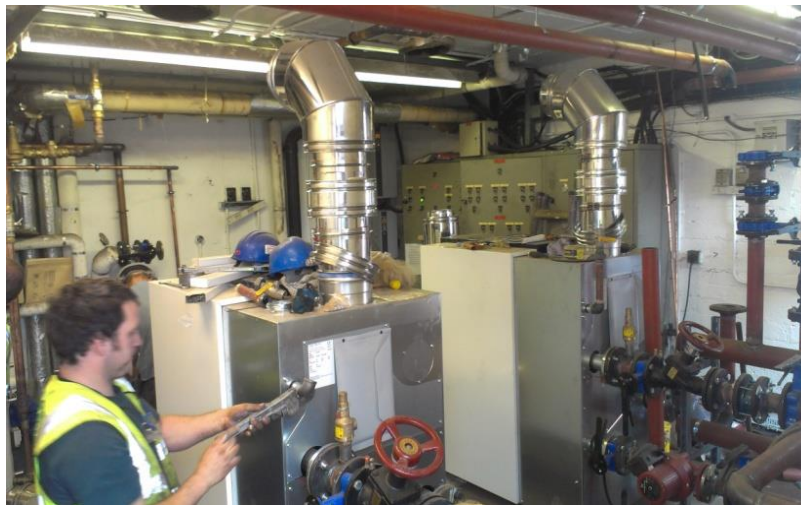
Advanced control strategies were developed to maximise boiler efficiency using direct modulation and weather compensation. Using advanced control also allowed for the CHP to be used as lead heat generator, then charging the buffer vessels when there is no heat load, then discharging the buffer vessel when the heating is first started in the morning, while avoiding charging of the buffer vessel during the day. The CHP (and boilers if required) are used to maintain domestic hot water at temperature when there is no space heating load, while avoiding wasteful cycling or heat loss into the space heating circuits.

Ventilation Controls Retrofit

The ventilation controls retrofit included the removal of pneumatic controls for the Variable Air Volume (VAV) boxes in offices, and installation of BMS control units and electro actuators on the VAV boxes, and room temperature sensors. Whereas before office temperature control was erratic, each office is now monitored and controlled via the BMS, and the temperature control of the main AHU can be harmonised with the requirements of the offices.

Any non-energy works and how were these treated?

n/a



New condensing gas boilers and pipework being installed

Energy Performance-Related Payment

EPRP overview

Boiler House Refurbishment

The consultant and the main contractor each guaranteed separately to the client that the project would achieve a 15% energy-efficiency improvement in fossil-fuel use. If this guarantee was not achieved, each would lose 7.5% of their respective contract values.

Ventilation Controls Retrofit

This involved a pain/gain share arrangement – performance was measured by evaluating electrical savings. If 100% of the target electrical kWh savings are achieved, the parties receive 100% of their respective fees. For each 1% of additional savings, the contractor will receive a bonus of 0.5% of their fee, up to a maximum of 5%. For each 1% savings falling short of target, the contractor will incur a penalty of 0.5% of their fee, up to a maximum of 5%.

Contractual arrangements for EPRP

Boiler House Refurbishment

The standard NEC3 Engineering & Construction Contract was used in conjunction with DPC Health, Safety and Environmental requirements. In addition to the Works Retention of 5%, an Energy Performance Guarantee Retention (also a percentage of overall contract value) was included. A short attachment to the contract detailed the terms of this energy guarantee retention.

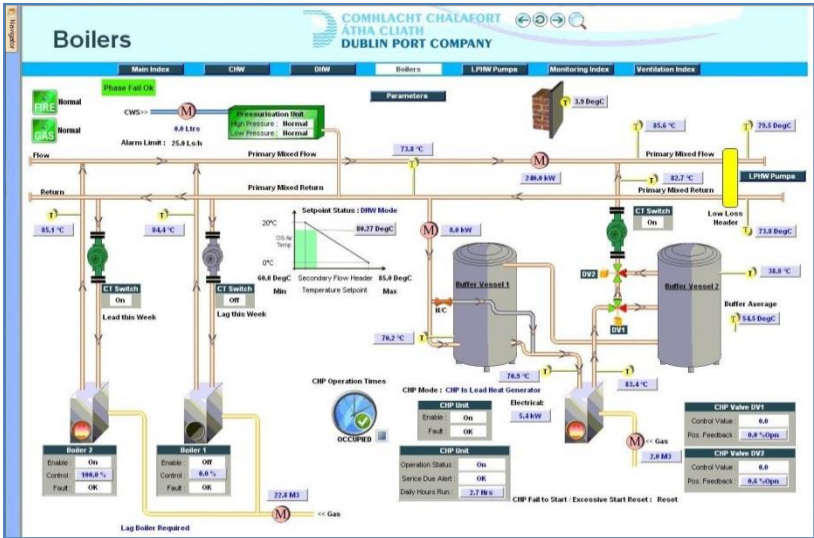
Ventilation Controls Retrofit

As this was a smaller contract, a purchase order was issued to the successful bidder. The request for quotation documentation incorporated

the terms of the pain/gain share arrangement.

Measurement & verification of savings

An M&V plan including baseline energy data was prepared by the consultant (a certified M&V professional) for each project. After several months it was demonstrated that savings from both projects were substantially in excess of the guaranteed amount.



Controls graphic illustrates the new installation and control

Procurement Process

Procurement process

Traditional public procurement was used for the projects. For each project, bidders responded to a detailed Invitation to Tender, specifying the works. Bidders were required as part of their submission to accept the terms of the performance guarantees.

Extent of survey analysis by all bidders

A brief explanation of the expected energy-efficiency impact of the various works was provided by the design consultants in the ITT. Contractors surveyed the building to establish cost of works and satisfy themselves that the energy savings guarantee level was achievable.

Final award criteria

Accepting the performance guarantee was a minimum condition of all tenders. Cost, quality of plant and equipment, contractor experience in similar projects, quality of tender documentation, HS&E standards were all considered as award criteria.

Project Viability

Cost of works

Circa €300k (ex VAT) for both projects, including design. An SEAI grant reduced the cost to DPC by 35%.

Projected savings

Electricity savings of 13%
Gas savings of 27% (degree-day adjusted)
Note that actual savings are higher than was projected.

Financing

Financing arrangement (debt and equity)

Client-financed (with 35% funding from SEAI under BEW 2012 scheme)

Source of finance and rate of interest

n/a

Balance sheet allocation of

n/a

debt

Other

Annual service fee	No
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Allocation of energy price risk	n/a
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Inflation	n/a
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