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Crichton Boiler-house - Biomass Boiler Installation

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RECOMMENDATION

The NHS Board is asked to endorse the attached business case for a biomass boiler installation at Crichton boiler-house at a cost of £426k.

SUMMARY

Biomass Boiler Installation

The project aims to provide a reliable renewable thermal energy source to the Crichton Royal and Dumfries and Galloway Royal Infirmary sites. It is anticipated that the scheme will meet 48% of the site thermal energy demand with an energy yield of 12,500 MWh per annum. Two of the existing 4 boilers will be retained to meet the peak loads and provide 100% backup.

An application for the maximum available 40% capital funding has been made to the Scottish Biomass Support Scheme. Funding allocation will be conditional on achieving completion by March 31st 2008. In order to adhere to this timescale, the planning application has been lodged for the project and detailed design work continues to be progressed.

The scheme cost, net of grant, is £426k of which £357k is classed as capital. The scheme will generate projected revenue savings of £63k per annum, giving a payback period of 6.6 years.

It will demonstrate the Health Board's commitment to environmental sustainability and reduction in carbon emissions by offsetting 2,375 tonnes of CO₂ per annum, a total of 47,500 tonnes over the projects 20 year life span. The DTI benchmark figures indicate that a 1.5 MW boiler of the size selected will create 15 sustainable green jobs, which will directly benefit the local economy.

1. Introduction and Background

1.1 Context and Background to the Project

The existing boiler capacity at the Crichton boiler-house was sized to suit the entire Crichton site prior to site retraction and the sale to the local authority. Ring fenced Carbon Energy Efficiency Funding (CEEF) was utilised in 2007 to replace the burners on two of the existing boilers. The remaining two smaller boilers are nearing the end of their useful lives and one of them is surplus to requirements. Free consultancy services were funded by the Carbon Trust and provided by Renewable Devices Energy Services (RDES) to initially carry out feasibility studies into all available renewable energy options for the site. A further detailed feasibility study and business case was commissioned into the preferred wood chip biomass option.

1.2 Strategic Direction and Objectives

The project will reduce the environmental impact of the activity on the Crichton and DGRI sites by making considerable savings in the release of CO₂ to atmosphere. It will further grow the local economy by creating and/or sustaining up to 15 local jobs. The use of a locally procured fuel source will also provide increased resilience of supply and will go some way to protect the organisation from the largely politically and increasingly foreign controlled fluctuations in the hydro-carbon fuel market.

1.3 Service Objectives

It is the objective of the project to provide a state of the art boiler facility which will generate environmentally friendly steam supplies with increased resilience, reduced supply chain risks, and will also generate significant revenue savings.

2 Technical Summary

2.1 The proposed system will require the removal of two existing Cochran Wee Chieftain Boilers with a single 1.5 MW steam raising wood chip biomass boiler to supply the base load at the site.

2.2 The previously undertaken feasibility study identified woodchip biomass boiler technology as the most appropriate for the site energy loads. By matching the boiler to the site base demand it will ensure that maximum efficiency and payback will be achieved. Two existing Cochran Thermax Boilers with a combined rating of 10 MW will meet the peak loads and provide 100% backup.

2.3 The boiler has been subject of a formal tender process and a Binder 1200-1650 USRF steam raising wood chip boiler has been provisionally selected. It has the following characteristics:

- Carbon neutral footprint;
- Low sulphur;
- Medium NOX.

2.4 It is proposed the wood fuel will be stored in an underground bunker situated adjacent to the existing boiler house. The bunker will be 15 m x 7 m x 3 m (L x W x

D) which is a gross volume of 315 m³. However, accounting for the loss of capacity where the hydraulic rams and extract auger within the bunker, the active volume is anticipated to be in the order of 200 m³, which will provide 3-4 days storage capacity assuming a wood chip moisture content of 35%. Ground level access hatches will be included for ease of delivery of the wood chip.

2.5 Considerable work has been undertaken to study current and future wood chip availability and potential suppliers of the same. It is anticipated that a five year contract will be entered into to allow the market to stabilise and to ensure that the projected revenue savings are achieved. Costs provided from a potential supplier have been utilised within the report.

2.6 The time scale for the project is tight but with the necessary commitment completion by March 2008 is achievable to benefit from the available grant assistance.

3 Financial Summary

3.1 The financial appraisal is attached as Appendix 1. The total cost is £678k which would net to £426k if the grant application to the Scottish Biomass Support Scheme was successful.

3.2 The annual cost savings would be as set out below. The main comparator is gas and is included at the national contract rate which is held until 30.9.08.

	Current Gas Prices (fixed to Sept 08)	2.5% Rise in Gas Prices	5% Rise in Gas Prices	10% Rise in Gas Prices	15% Rise in Gas Prices
	£	£	£	£	£
Fuel Cost Saving Yr1	80,794	80,794	80,794	80,794	80,794
Fuel Cost Saving Yr5	403,971	428,180	452,390	500,810	549,227
Fuel Cost Saving Yr10	807,941	872,500	937,060	1,066,180	1,195,292
Climate Change Levy Saving	18,750	19,219	19,688	20,625	21,563
NPV over 20 years	(805,938)	(901,940)	(997,944)	(1,189,950)	(1,381,945)
Payback Period	6.6	6.1	5.7	5.1	4.5

3.3 Whilst the 6.6 payback period is slightly longer than normal convention of acceptable investment it is worthy of consideration as, for example, a 15% increase in Gas prices post contract end would reduce the payback period to 4.5 years. It is also hoped that as the Biomass market becomes more mature the price of Biomass product will fall.

3.4 A further consideration is that Climate Change Levy is very likely to increase in the coming years as we struggle to combat the effects of global warming.

3.5 The biomass boiler has been formally tendered and costs for this element of the works are robust.

3.6 The qualifying limits for the Carbon Trading Scheme are likely to be reduced in future years. The biomass boiler installation will assist in reducing our gross primary

energy load and hopefully continue our exemption from the significant costs associated with the scheme.

Policy/Strategy Implications	Environmental Policy
Staffing Implications	None internally (15 sustainable external local jobs)
Financial Implications	The financial implications have been discussed with the finance manager and the application for grant funding has been endorsed
Consultation	None required
Consultation with Professional Committees	None required
Risk Assessment	Included within the report
<p>The Board policy requirements on Diversity and Disability Discrimination are not applicable to the project.</p>	

**NHS Dumfries and Galloway
Biomass Option Appraisal
Financial Summary**

Appendix 1

			<i>Year 0</i>	<i>Year 1</i>	<i>Year 2</i>	<i>Year 3</i>	<i>Year 4</i>	<i>Year 5</i>	<i>Year 6</i>	<i>Year 7</i>	<i>Year 20</i>
			£	£	£	£	£	£	£	£	£
Capital Purchase											
<i>Plant</i>											
Biomass Boiler			344,000								
M&E			40,000								
Grant			(153,600)								
			230,400								
<i>Estates Costs</i>											
Installation			30,000								
Bunker, Site Prep & Demolition			135,000								
Grant			(98,200)								
<i>Professional Fees</i>			60,000								
			126,800								
Non Recurring Revenue		357,200	68,500								
		425,700									
Recurring Revenue Costs		677,500									
<i>Staff</i>	<i>wte</i>	<i>£/Unit</i>									
Maintenance Assitant	1.00	18,820		18,820	18,820	18,820	18,820	18,820	18,820	18,820	18,820
<i>Consumables</i>											
Service Contracts	1	9,000		9,000	9,000	9,000	9,000	9,000	9,000	9,000	9,000
Maintenance Parts	1	5,000		5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000
General Supplies	1	6,260		6,260	6,260	6,260	6,260	6,260	6,260	6,260	6,260
Rates & Metered Water	1	5,820		5,820	5,820	5,820	5,820	5,820	5,820	5,820	5,820
<i>Existing Budgets</i>											
Staff	1.00	18,820		(18,820)	(18,820)	(18,820)	(18,820)	(18,820)	(18,820)	(18,820)	(18,820)
Service Contracts	1.00	3,100		(3,100)	(3,100)	(3,100)	(3,100)	(3,100)	(3,100)	(3,100)	(3,100)
Maintenance Parts				0	0	0	0	0	0	0	0
General Supplies	1.00	6,260		(6,260)	(6,260)	(6,260)	(6,260)	(6,260)	(6,260)	(6,260)	(6,260)
Rates & Metered Water	1.00	5,820		(5,820)	(5,820)	(5,820)	(5,820)	(5,820)	(5,820)	(5,820)	(5,820)
				0	0	0	0	0	0	0	0
<i>Savings in Fuel Cost</i>											
Biomass vs Gas	1	80,794		(80,794)	(80,794)	(80,794)	(80,794)	(80,794)	(80,794)	(80,794)	(80,794)
Climate Change Levy Exemption	1	18,750		(18,750)	(18,750)	(18,750)	(18,750)	(18,750)	(18,750)	(18,750)	(18,750)
			425,700	(88,644)	(88,644)	(88,644)	(88,644)	(88,644)	(88,644)	(88,644)	(88,644)
NPV	3.5%	(805,938)									
Capital Charges				25,897	25,420	24,942	24,465	23,988	23,511	23,034	16,831
I & E Impact				(62,747)	(63,225)	(63,702)	(64,179)	(64,656)	(65,133)	(65,610)	(71,814)