

**APPENDIX 3 - Investment Options, Costs & Rationale
(to include: Utility Savings & Financial Benefits):**

Section 1: CNC Tube Manipulators (aka Benders)

Investment Options - Machinery:

The CNC Benders:

As part of the process of considering options, detailed research has been conducted on machinery available, the needs of Cefndy and the particular benefits of one particular model over another. As can be seen from the below, 8 models (3 manufacturers) have been considered. The E-Turn 32 (by an Italian company, BLM) appears to be the most effective for Cefndy's current and future needs.

Total Cost – to include tooling and ancillary software: £350,000

	<i>Elect 42</i>	<i>E-Turn 32</i>	<i>E-turn 42</i>	<i>CA Liner 542E</i>	<i>CA Liner 632</i>	<i>CA 942E</i>	<i>CA 1042</i>	<i>RVB 35</i>
Key features								
Bend all CH samples submitted for evaluation		*	*		*	*	*	
Automatically bend L/H & R/H		*	*		*	*	*	*
All electric drives (no hydraulic drives)	*	*	*				*	*
Cost < 350k for 2 x m/c's & all ancillaries	*	*		*	*	*		
UK based service dept	*	*	*					
% Rating	60%	100%	80%	20%	60%	60%	60%	40%

Utility Savings:

The below table provides information on existing electricity costs and potential savings. This is based on replacing 2 x CNC Benders.

The figures reflect:

- 8 hours per day run time
- Unit electricity cost 0.105p (confirmed)
- Consumption info provided by BLM based on their electric machine v their old hydraulic DB40 equivalent.
- The £3'669.75 saving is based on 1 machine, £7'339.5 for both.

Equipment	KWH's used pw	Cost per week	KWH's used per yr	Cost	New KWH's used pw	Cost	New KWH's used per yr	Cost	£ Savings
CNC Bender 1	787	£82.64	39350	£4,131.75	88	£9.24	4400	£462.00	-£3,669.75
CNC Bender 2	787	£82.64	39350	£4,131.75	88	£9.24	4400	£462.00	-£3,669.75

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Efficiency Savings/Increased Productivity:

The table below demonstrates an efficiency saving of 28% on the current cycle time achieved with Cefndy's CNC benders, if replaced by new equivalent. The detail below is based on 1 manufacturer's figures (BLM, which is currently the preferred company). All others however produce comparable savings and prior to purchase, a tendering process would be undertaken. A cross section of 4 parts was provided in batches of 100 (400 parts in total) to put through; as can be seen, time currently taken per 100 parts is 4.40 minutes on the Cefndy benders; the new model would do the same in 3.2 minutes.

PRODUCT	PROGRAMME NO.	NO. OF BENDS	LENGTH OF TUBE	1ST. CYCLE	2ND. CYCLE	3RD CYCLE	AVERAGE	Time per 100 in minutes	
DB40 Addison									
C280 ARM	NEW107	8	1943	44.8	44.8	44.8	00:45	01:15:00	
X220 LOWER BRACE	NEW201	4	1640	21.7	22.3	22.1	00:22	00:36:40	
X220 BACK	NEW202	7	2389	33.8	34	33.9	00:34	00:56:40	
	NEW324	8	1690	33.6	33.1	33	00:33	00:55:00	
NEWT59/T60	NEW418	6	1880	33.3	33.7	33.3	00:34	00:56:40	
Elect 42 BLM								04:40:00	
C280 ARM	NEW107	8	1943	29	29	29	00:29	00:48:20	
X220 LOWER BRACE	NEW201	4	1640	15	15	15	00:15	00:25:00	
X220 BACK	NEW202	7	2389	25	25	25	00:25	00:41:40	
	NEW324	8	1690	29	29	29	00:29	00:48:20	
NEWT59/T60	NEW418	6	1880	23	23	23	00:23	00:38:20	
								03:21:40	72.02%

1. Cefndy could therefore produce +28% products with the same amount of labour
2. Cefndy could reduce or re-apportion labour and still produce the same amount of parts

In addition to this saving, the technology of the new machines allows for further savings:

- There is a "multiple tool stack", which means that when bending different diameters of steel, there is no need to change tool each time (as currently). The Operations Manager advises that this provides an additional 30 minutes per day saved
- A further 1 hour per day time saving per machine ie, 2 hours in total with 2 machines relates to the following additional benefits:
 - The "electric drives" on the new machines means that unlike with the hydraulic machines currently used, set up will be immediate. Currently manual set up means that with every new batch there is wastage in scrap for set up.
 - The multiple stack referred to previously also enables a smoother effect on production as current batches of same diameter have to be grouped to reduce the number of set ups. Producing in this way is inflexible and inefficient.

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The total impact then of having the 2 new CNC's is:

1. 5 hrs a level of output that would currently take 8 hrs
2. The predicted efficiency is 37.5% (this assumes a 25% cycle saving across all parts & a 12.5% saving in set-up time or 1 hr per day)
3. The 2 machines give an additional 6 hrs capacity per day on a standard 8 hr day.

Financial Aspect:

- Based on the total time spent bending in 2011/12, a total of 24,103 minutes or 401 hours would be saved by having the increased capacity of +28% cycle time. This equates to 10.8 weeks of work bending.
- In addition, the 1 hour per day saving in set up time, equates to 500 hours per year (based on a 50 week working year, allowing for Christmas shut-down and Bank Holidays).
- The value of Cefndy's hourly total manufacturing output is currently £1,429 per hour
- The total of 900 hours saving therefore equates to £1,284,003 possible increase sales revenue through acquisition of new benders and this supports the sustainability of Cefndy many years into the future.

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Section 2 : Powder Coating:

Investment Options - Machinery:

The Powder Coating Section does not require full replacement, but the plant needs upgrading and modifying. Such modification will include all “working parts” and will deliver the same as a new facility but at a fraction of the price, in light of the fact that booths and track are already in place.

Total Cost of Replacement & Upgrade - £110, 964

Areas for improvement are as follows:

- Pre-treatment upgrades
- Drying oven upgrades
- Stoving oven upgrades
- Powder coating booths
- Conveyor modifications
- Electrical wiring

Utility Savings:

The powder coating plant provides potential for savings on gas consumption. The recommended option is for replacement or upgrades of all plant items, rather than replacement of the casing as well. The upgrade would be substantial and provides the following efficiency savings:

Upgrade detail	% saving gas
Stove oven burner is 10 years old plus, at some point however it has been fitted with new control valves. The new style burner we are proposing is a more efficient burner due to the design of its combustion head. Stoving oven current consumption will be 280kw/hr. New consumption will be 240kw approx.	5%
New air curtains will be designed in such a way as to minimise cold air ingress into the oven as is currently occurring. This continual influx of cold air is one of the biggest loads on the burner. The new curtains will minimise this resulting in a greatly reduced load on the burner	10%
The existing pre treatment burner (As Stoving Oven Burner). Pre treatment current consumption 380kw/hr approx. New consumption with spray save will be 305 kw approx.	5%
Spray Save System within the drying oven. This consists of a stainless steel fully welded manifold which is fed from a pump fitted to stage one on the pre treatment plant. The solution is pumped from the tank through the manifold and returning back to the tank. This will heat up the solution which greatly reduces the loading on the burner. Drying oven current consumption 210kw/hr approx. New consumption will be 190kw approx.	20%

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Utility Savings:

	Kwh's used per hour	Hourly Cost	Kw Unit Cost	New Kwh's used	New Hourly cost	Saving per hour
Powder Coating & Degreasing Plant	870	£20.94	£0.02	735	£17.69	-£3.25

	No of days being used pa	No of hours per day used	Saving per hour	Annual Saving
Powder Coating & Degreasing Plant	250	12	-£3.25	-£9,747.93

The above consumption is based on a conservative 80% usage (ie, burners up to temperature and then they cut in/out to maintain consistent temperature)

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Section 3 : Compressor:

Investment Options - Machinery:

Following on from a recent failure of the Sullair ES8 (15kW) compressor at Cefndy, 2 companies have visited to quote on a new compressor and as a result have logged data to get an indication of the actual air requirement. It has been found that an 11kW compressor would be more than adequate for Cefndy's needs and this would provide utility cost savings

Total Cost of new Air Compressor - £5800 + VAT

Utility Savings:

The current compressor is, what is called, a "fixed" speed unit; the proposed new version would be both "fixed speed and energy efficient variable speed" ie, they would speed up and slow down to match the capacity of air required.

The typical annual electricity saving this would give is detailed below.

Energy cost per kW/hr	£0.11	
Saving from new Compressor	20%	
Compressor spec	11	kW/hr
Saving in kW/hr	2.2	kW/hr
Annual consumption (hours)	4000	
2.2 kW/hr x 4000 hours	8800	per year consumption
£ saving based on per kW/hr cost	£924.00	

In addition, the Enhanced Capital Allowance (ECA) on a variable speed compressor (£2734) is greater than a fixed speed (£1854) and allows for a first year 100% tax off-set, equating to in the first year and then the above £924 every year thereafter.

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Section 4 : Health & Safety

The Fire Risk Assessment of July 2012 revealed the need for the following improvements; Property Services have achieved a funding budget of £30k but there is a shortfall as shown:

Spend required	Total Cost	Cost covered by Property Services	Balance to be covered by Cefndy	Balance needed from Corporate Reserve
Fire Compartmentation	£26,000	£26,000	£0	£0
Emergency Lighting Upgrade	£7,000	£4,000	£3,000 From revenue budget	£0
Fire Alarm Upgrade	£15,000	£0	£0	£15,000
General Lighting Upgrade	£16,200	£0	£0	£16,291
Repair to concrete support beam	£7,000	£0	£0	£7,000
Heating system	£11,000	£0	£0	£11,000
Totals	£82,200	£30,000	£3,000	£49,291

Utility Savings:

The figures provided below indicate annual savings for a new lighting scheme which we are advised will improve performance and safety of the installation as a whole.

Lighting		
Energy cost per kW/hr	£0.09	
Lighting load reduction	8.2	kW/hr
Total annual savings	£4,900.00	

Heating units are outdated and inefficient and Property Services have priced up works at a cost of £11,000 for overhead heaters.

Heating Recovery:

The Principal Energy Manager of DCC is currently investigating costs for a heat recovery system by extracting the waste heat from the new machinery. This would save gas consumption and is something he could fund to the tune of £5k. A confirmed price however could not be obtained until the new machinery is installed and this is seen to be a more long-term improvement. Based on the existing plant, the estimated cost for the heat recovery system would be in the region of £30,000. (less £5k Energy Budget contribution) - £25,000.

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Section 5 : Summary

Summary of Capital Investment	Cost
Plant Investment needed	
CNC (2 units - total cost)	£350,000.00
Powder Coating Refurb	£110,964.00
Compressor	£5,800.00
Sub-Total	£466,764
Health & Safety Investment needed	
Lighting System	£16,291.00
Heating System	£11,000.00
Fire Alarm Upgrade	£15,000
Repair to concrete gutter support section	£7,000
Sub-Total	£49,291
TOTAL	£516,055.00
Optional Additional Investment - Heating Recovery System	£25,000
Total	£541,055

Overall Utility Savings:

Saving Type	Utility Type	2014/15	2015/16	2016/17
CNC	Electric	£7,339.50	£7,486.29	£7,636.02
+2% per annum based on sales increase			£146.79	£149.73
Powder Coating	Gas	£9,747.93	£9,942.89	£10,141.75
+2% per annum based on sales increase			£194.96	£198.86
Compressor	Electric	£2,734.00	£924.00	£924.00
Lighting	Electric	£4,900.00	£4,900.00	£4,900.00
Total Annual savings (exc heat recovery system)		£24,721.43	£23,253.18	£23,601.76

**** Note: The above excludes the Heating Recovery System**