

**Report of the Chief Constable to the Chair and Members  
of the Policy & Resources / Corporate Development Panel  
5<sup>th</sup> February 2009**

**Executive & Presenting Officer: Mrs Ann Hall, Assistant Chief Officer  
(Finance & Commissioning)**

**Status: For Decision**

## **Energy & Water Usage Reduction Proposals**

### **1 Purpose**

- 1.1 At their meeting on 7<sup>th</sup> August 2008 Members agreed a programme of works recommended by the Carbon Trust to reduce energy consumption at an estimated cost of £137k with an overall pay back period of 1.2 years.
- 1.2 At that meeting Members requested an update report and further measures that could be undertaken to reduce both energy and water usage.

### **2 Recommendations**

Members are asked to:

- 2.1 Note that a detailed investigation by the Facilities Team into the recommendations of the Carbon Trust has resulted in the clarification of the Estate carbon reduction priorities.
- 2.2 Approve the revised priorities:
  - The installation of voltage optimisers at Force Headquarters;
  - The completion of lighting efficiencies across the Estate, as piloted within Ladgate Lane HQ;
  - The implementation of a boiler efficiency programme as first indicated within the Carbon Trust Report;
  - The implementation and review of plant control settings as first indicated within the Carbon Trust Report;

- The implementation of a programme to manage the purchasing and installation of cistern displacement water saving devices throughout Ladgate Lane. Including the validity of expanding this programme across the Estate.

2.3 Approve the revised allocation of the £137k as follows:

- Purchase of voltage optimisers £90k
- Lighting, boiler & sundry efficiencies £12k
- Project implementation £35k

### 3 Reasons

#### 3.1 Energy

Members will recall that the priorities identified by the Carbon Trust were:

- Improve Lighting Efficiency
- Boiler Efficiency Improvements
- Energy Management Improvements

3.2 The recommendations previously brought forward by the Carbon Trust were generic assumptions based on evaluations of energy usage at our larger buildings. These have now been systematically evaluated for feasibility of delivery. Incorporated in this evaluation has been the preparation of Display Energy Certificates (DEC) that give an indication of each buildings energy efficiency. The buildings that have been reviewed are:

- Force Headquarters
- Stockton Divisional Headquarters
- Hartlepool Divisional Headquarters
- Middlesbrough Divisional Headquarters
- Kirkleatham Divisional Headquarters
- Cannon Park
- North Ormesby

3.3 The following issues were also taken into consideration in the evaluation:

- Hartlepool Divisional Headquarters – The current refurbishment and plant replacement programme includes energy efficiency measures that will increase the buildings DEC score to acceptable levels.
- Middlesbrough/Kirkleatham Divisional Headquarters – These buildings are brand new and have energy efficiency systems integral to their design.
- Cannon Park – The facility will be decommissioned in August 2009.
- North Ormesby – The residual life of North Ormesby is currently under review.

#### 3.4 Lighting

A major use of energy is lighting. Costs can be reduced by limiting the time that lights are illuminated and/or using more energy efficient lights

- 3.5 The simplest way of reducing illuminated hours would be to replace manual switches by motion sensors at Headquarters and Stockton. Middlesbrough, Kirkleatham and Hartlepool are already fitted with motion sensors.
- 3.6 However, retro fitting such a system can be expensive as the costs will include new equipment and potential wiring modifications to the existing system.
- 3.7 Headquarters and Stockton are fitted with CAT2 fittings that are reasonably energy efficient. To fit more energy efficient lighting units is expensive as existing luminaries cannot operate with T5 high efficiency tubes and new high frequency units and tubes would need to be purchased and fitted.
- 3.8 The following table illustrates the potential costs and payback period using Headquarters as an example.

	Current Annual Cost (18hrs per day)	Savings per year	Cost of installation	Payback years
Installation of Motion Detectors only throughout corridors and toilets throughout Police Headquarters	£13	£7	£43	6
Installation of new energy efficient lighting (High frequency T5 fluorescent) without the installation of motion detectors in all corridors	£13	£3	£54	18
Installation of motion detectors and high frequency energy light fittings in all corridors.	£13	£7	£97	14

- 3.9 On the basis of the above payback periods it is **not** recommended that motion detectors or more energy efficient fittings are taken forward for Headquarters and Stockton.
- 3.10 The Facilities department are carrying out a pilot scheme whereby the number of tubes in each lamp fitting is reduced with a consequent reduction in energy usage. If the pilot proves successful it will be rolled out as appropriate.
- 3.11 In addition, consideration is being given to the optimum time that sensor activated lights remain illuminated.
- 3.12 Voltage Optimisation  
Voltage optimisation units automatically reduce incoming voltage to match the requirements of the site. Relatively small reductions in voltage can make substantial savings in energy without detriment to plant operation.

- 3.13 Initial indications are that installing voltage optimisers at Force Headquarters would cost approximately £90k and generate minimum annual savings of £30k giving a maximum payback period of 3 years.
- 3.14 It is recommended that optimisers are installed at Force Headquarters and piloted. This would be paid for from a redirection of the previously allocated budget for energy reduction measures. Subject to satisfactory results, proposals should then be brought forward to roll out to appropriate sites.
- 3.15 Water  
The Water Act 2003 places a duty on all public bodies to 'take into account, where relevant, the desirability of conserving water supplied to premises'. The major uses of water in the force are toilets and taps.
- 3.16 Toilets  
It is essential that toilets flush effectively to maintain standards of hygiene, but designs are now available that use significantly less water than was required in the past. In older properties, flushing the toilet represents the largest proportion of water used. In the home as average household with a 9 litre toilet flushes around 110 litres of water away, which is 30% of its total consumption per day. Toilets in office accommodation account for an even greater proportion of total water used.
- 3.17 For example, at Police Headquarters there are 59 toilets situated around the building. Each of the cisterns holds around 9 litres of water. Many devices are available to avoid wasting water. Cistern displacement devices (water hippos) are often available free of charge from water companies. The installation of water displacement devices into the cisterns by the facilities in-house team could potentially save up to 3 litres per flush. This would not affect the efficiency of the toilet. Over a year the amount of water that could be saved using this method could be around 230k litres with a cost saving of £200 per year.
- 3.18 It is recommended that cistern displacement devices are fitted across force properties as appropriate.
- 3.19 Taps  
About a third of water used in offices comes through the tap. Installing taps with high quality flow regulator spray can reduce this amount by up to 80%. Sensor taps and timed turn-off push taps prevent wastage and flooding where taps may be left running. They also offer improved hygiene as the tap does not have to be touched after hands have been washed.
- 3.20 Within Police Headquarters there are 57 hand basins, the majority of which have the domestic full flow type or self closing full flow type. There are very few of the more efficient sprinkler/aerated type. The table overleaf sets out the difference in volume.

<b>Type of tap</b>	<b>15 second operation</b>	<b>1 minute operation</b>
Domestic full flow	1.5 litres	4 litres
Self closing full flow	1.5 litres	4 litres
Self closing sprinkler	400 millilitres	1.8 litres

3.21 As a benchmark if each basin was used 10 times per day for 1 minute each time with the full flow type of tap there would be a consumption of 2,280 litres per day at a cost of £1.91 (£0.85 per cubic metre). If the basins were fitted with self closing sprinkler type tap there would be a consumption of 1,026 litres per day at a cost of £0.89 (£0.85 per cubic metre).

3.22 However, the cost of purchasing the more efficient sprinkler type of tap would be in the region of £130 per basin. Without any installation costs the cost for the taps would be in the region of £7,000 to generate savings of £400 per annum, a pay back period of 17 years.

3.23 It is not recommended that sprinkler taps are fitted across the force.

#### 3.24 Boiler Efficiency

The recommendations identified by the Carbon Trust relating to Ladgate Lane HQ boiler efficiency improvements, are all low tech improvements, such as pipe lagging, which will be undertaken by the internal estates team and contained within existing budgets.

#### 3.25 Project Implementation

The original proposal, presented to Members in August 2008, included £35k for project implementation. This is being addressed by a secondment from within the Facilities Team. Project implementation includes:

- Detailed pre-implementation assessment of the Carbon Trust proposals;
- Installation and monitoring of the voltage optimisers;
- Conducting the lighting efficiency pilots;
- Carrying out the boiler efficiency programme;
- Reviewing plant control settings;
- Installation of water cistern hippos;
- Detailed usage and budget monitoring.

## **4 Implications**

### 4.1 Finance

There are no financial implications other than those mentioned above. The revised expenditure proposals are set out in the table overleaf.

<b>Revised Utilities Reduction Budget</b>	
	£000s
Voltage Optimiser Purchase	90
Lighting, Boiler & Sundry Efficiencies	12
Project Implementation	35
	<b>137</b>

4.2 Diversity & Equal Opportunities

Diversity considerations are kept under constant review in line with Force policies and 'Putting People First'. There are no issues arising from this report to bring to Members attention.

4.3 Sustainability

The measures outlined in the report will contribute to the financial stability of the organisation and overall environmental sustainability.

4.4 Risk

There are no risk implications arising from this report.

**5 Conclusion**

5.1 The measures outlined in the report will contribute to the financial stability of the organisation and overall environmental sustainability.

Sean Price  
Chief Constable