

Governance, Risk, and Best Value Committee

2.00pm, Thursday, 9 October 2014

Currie Wind Turbine – Spend to Save – referral report from the Finance and Resources Committee

Item number	7.7
Report number	
Wards	All

Executive summary

The Finance and Resources Committee on 28 August 2014 considered a report on the work undertaken to identify a sustainable solution to the operation of the wind turbine at Currie High School. The report was referred to the Governance, Risk and Best Value Committee to scrutinise the previous wind turbine installation arrangements

Links

Coalition pledges	See attached report
Council outcomes	See attached report
Single Outcome Agreement	See attached report
Appendices	See attached report

Terms of Referral

Currie Wind Turbine – Spend to Save

Terms of referral

- 1.1 On 28 August 2014 the Finance and Resources Committee considered a report on the work undertaken to identify a sustainable solution to the operation of the wind turbine at Currie High School.
- 1.2 The current wind turbine was not eligible for Feed in Tariff (FiT) revenue and relied solely on the energy saving produced from wind turbine generation. At current energy prices, the energy savings generated by the turbine would not be sufficient to meet costs. The Council would have to provide an additional £100 a year on top of energy budget savings to keep the turbine operational.
- 1.3 The Finance and Resources Committee agreed:
 - 1) To note the report and the work currently undertaken to identify a sustainable solution to the operation of the wind turbine at Currie High School.
 - 2) To refer the report to Council to approve the use of the Council's Spend to Save fund to replace the existing wind turbine at Currie High School with a new turbine provided at 'cost price' by the turbine manufacturer.
 - 3) To refer the report to the Governance, Risk and Best Value Committee to scrutinise the previous wind turbine installation arrangements.

For Decision/Action

- 2.1 The Governance, Risk and Best Value Committee is asked to scrutinise the previous wind turbine installation arrangements.

Background reading / external references

[Currie Wind Turbine - Spend to Save](#)

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Links

Coalition pledges	See attached report
Council outcomes	See attached report
Single Outcome Agreement	See attached report
Appendices	See attached report

Finance and Resources Committee

10am, Thursday, 28 August 2014

Currie Wind Turbine – Spend to Save

Item number	6.13
Report number	
Executive/routine	
Wards	Pentland Hills

Executive summary

In 2008, Currie High School installed an 11kW wind turbine, funded by the Energy Savings Trust Initiative, with support from the Sustainable Development Unit in Corporate Services.

Ongoing maintenance and servicing of the equipment was funded through the Sustainable Development Unit, but this arrangement ceased in 2012. Due to structural and health and safety issues the wind turbine is currently out of service and requires investment to secure its long term operation. The purpose of this Spend to Save proposal is to review options to make the wind turbine operational and maximise the potential for revenue generation.

Part of the options appraisal includes securing Feed in Tariff (FiT) revenues for the wind turbine. There will be a 10% reduction in FiT rates in October 2014. To benefit from the increased rate the replacement wind turbine would need to be installed and commissioned before the end of September 2014.

Links

Coalition pledges	P50
Council outcomes	C018,C025
Single Outcome Agreement	S03,S04

Currie Wind Turbine – Spend to Save

Recommendations

It is recommended that Committee:-

- 1.1 Notes the contents of this report and the work undertaken to identify a sustainable solution to the operation of the wind turbine at Currie High School.
- 1.2 Approves the use of the Council's Spend to Save fund to replace the existing wind turbine installation at Currie High School with a new turbine provided at 'cost price' by the turbine manufacturer.

Background

- 2.1 In 2008, Currie High School installed an 11kW wind turbine. The system was funded by an Energy Savings Trust grant with support from the Council's Sustainable Development Unit.
- 2.2 Ongoing maintenance and servicing of the equipment has, in the past, been supported by the Sustainable Development Unit, but this funding stream has proved inconsistent with funding unavailable in 2011, 2012 and 2013.
- 2.3 The turbine is currently out of service. The access ladder for the turbine is not compliant with current health and safety regulations and, therefore, needs to be upgraded to allow for ongoing maintenance and servicing requirements.
- 2.4 There is a further unforeseen maintenance pressure as the fixing mechanism applied to anchor the tower now requires ultrasonic inspection twice a year following problems with other installations of this type elsewhere in the country.
- 2.5 The purpose of the Spend to Save proposal is to review the options available to the Council to make the wind turbine operational and maximise the potential for revenue generation.

Main report

- 3.1 The current wind turbine is not eligible for Feed in Tariff (FiT) revenue (see Appendix 1) and relies solely on the energy saving produced from wind turbine generation. At current energy prices, the energy savings generated by the turbine will not be sufficient to meet costs. The Council would have to provide

an additional £100 a year on top of energy budget savings to keep the turbine operational.

- 3.2 In light of current issues with the anchoring method, the turbine manufacturer has offered to replace the turbine at cost price and carry out the necessary upgrading of the turbine tower. This would resolve the current maintenance and access issues. When installed, the turbine will be designated as a new installation and would therefore qualify for FiT revenue.
- 3.3 In order to assess the best course of action, the following options for the wind turbine have been considered:-
- Option 1** Do nothing;
 - Option 2** Remove the existing wind turbine completely;
 - Option 3** Install a new installation ladder and introduce a maintenance regime for the existing wind turbine installation; and
 - Option 4** Install a new turbine at a significantly reduced cost.
- 3.4 Option 1 does not involve an upfront capital cost and is the approach that has been adopted for the past couple of years. It does not solve current issues and does not eliminate the need to spend funds on the installation at some point in the future. Ongoing revenue costs to ensure that the turbine is maintained in a safe condition will continue.
- 3.5 Option 2 would incur a cost to remove the turbine and carry out remedial work to the ground. It may be possible to recover a portion of this cost from the salvage value of the existing turbine, however, this option delivers no benefit to the school, nor the wider energy and sustainability agenda, and does not maximise the potential for revenue generation.
- 3.6 Option 3 offers a short term solution to the ongoing maintenance issues with the existing turbine. It would be possible to make the turbine operational for around £5,000, however, this would not solve the problems with the anchoring mechanism. The annual energy savings from turbine generation (circa £1,800 when fully operational) would not be sufficient to cover annual servicing charges (circa £1,000) and the ongoing requirement to carry out ultrasonic testing on the fastening rods (circa £900 a year). There would be no payback on the £5,000 capital expenditure. Furthermore, there is the possibility that the Council would need to address the problems with the existing fastening rods in the future. If this were the case, to continue turbine operation the Council would need to pay to upgrade the existing tower to current standards (estimated at circa £10,000).
- 3.7 Option 4 involves replacing the existing installation with an entirely new turbine and foundation. It is the sole FiT eligible solution and therefore benefits from far greater revenue potential. The turbine installation has been offered 'at cost' by the wind turbine manufacturer. A typical installation of this type would cost

£50,000-£60,000 but has been offered to the Council at £22,500. Once ancillary works and contingencies have been added the cost is estimated to be £27,000.

- 3.8 Total revenue from the FiT eligible scheme is estimated at £5,600 annually, including any electricity savings on site. Once annual servicing requirements have been considered, the turbine would save approximately £4,600 annually offering payback on the investment in less than six years. The FiT revenue (circa £3,700 annually) would be guaranteed for 20 years assuming that the turbine remains operational.
- 3.9 Over the long term there is not a 'no cost' solution to this. Option 4 is the recommended solution as it meets the Council's objectives, creates a long term revenue stream for the Council and presents an opportunity to secure the future of the turbine. A contract for servicing and maintenance of the turbine would be put in place once the turbine is operational.
- 3.10 The nature of the works to replace the turbine will require moving heavy vehicles over soft ground which is prone to water retention. Therefore the best time to carry out the works is in the summer months to avoid the additional cost of laying supporting tracks. It is intended that these works will be carried out this summer, however, if this is not possible then the works may need to be rescheduled to a later date.

Measures of success

- 4.1 A fully functioning wind turbine at Currie High School.
- 4.2 Revenue generation of circa £4,600 annually from the wind turbine.
- 4.3 Wider educational and sustainability benefits gained from having a fully functioning wind turbine.

Financial impact

- 5.1 The new turbine installation will have a net revenue generation of £4,600 annually. FiT revenue would be guaranteed for 20 years. The initial investment of £27,000 would payback in less six years meaning that the Council would benefit fully from net revenue for the remaining 14 years of FiT revenue.
- 5.2 If the turbine is not installed before the FiT rate reduces in October 2014 the revenue generation from the turbine will reduce to £4,200 increasing the payback to 6.4 years. The manufacturer is keen to work with the Council to help meet the deadline but their ability to do so will depend heavily on both their availability and that of sub contractors and weather conditions.
- 5.3 Annual servicing and maintenance requirements will be met by a nominal £1000 allocation from the wind turbine revenue. This sum accounts for the service life of consumable items contained within the wind turbine installation. If additional and unforeseen works are required to the turbine then this would be funded

through the savings. This may impact on the payback if during the early years of operation.

Risk, policy, compliance and governance impact

- 6.1 The reinstatement of the wind turbine at Currie High School aligns with the aims and objectives of the Council's Energy Policy and Energy Policy Action Plan.
- 6.2 Legislation has been used as a means to drive forward change to reflect EU targets on emission reduction. Increasingly, legislators are looking towards public bodies adopting a planned response to energy efficiency and carbon reduction. It is important that the Council is receptive to the likelihood of increased legislation and develops plans and strategies to improve the efficiency of its built environment.
- 6.3 On rare occasions in the past, the turbine caused shadow flicker in 2-3 houses adjacent to the school due to specific seasonal weather conditions. This has been considered as part of the project and a proposal has been put forward to install an accessible override that would allow the school to switch off the turbine for an appropriate period of time if problems with shadow flicker arise.

Equalities impact

- 7.1 There are clear benefits to the right to Education and Learning through the reinstatement of the wind turbine. When the wind turbine was operational it was used to increase awareness of sustainability issues and also incorporated in educational materials. Through consultation with the school it is anticipated that these activities will be further developed once the turbine is operational.
- 7.2 The turbine will be a visible and accessible demonstration of renewable power. It will be accessible to pupils at Currie High School as well as pupils at the Woodlands School and has potential to be recognised by the wider community.
- 7.3 As explained in 6.3, there is the potential for shadow flicker to occur in 2-3 adjacent houses. This has been considered as part of the equalities and rights impact assessment and as part of the wider project and steps will be taken to reduce the impact on local houses.

Sustainability impact

- 8.1 There is significant potential for sustainability benefits through the delivery of a fully operational wind turbine at Currie High School. This includes both educational and environmental benefits.
- 8.2 The turbine will be of direct benefit to the school pupils and had been incorporated in to lesson plans when operational in the past. There is also potential for wider educational benefits if lesson plans are shared with other schools as part of the [Small Steps Awareness Campaign](#).

- 8.3 The turbine will generate an estimated 19,000 kWh of electricity per year and save 10.3 tonnes of associated CO₂ emissions per year.

Consultation and engagement

- 9.1 The original request to reinstate the turbine was received from the school. The school have been instrumental in gaining support for finding a fix for the turbine and are very keen to maximise the educational and sustainability benefits of an operational wind turbine. We have kept the school informed of progress to date on the reinstatement of the wind turbine.

Background reading/external references

None.

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Links

Coalition pledges	P50 – Meet greenhouse gas targets, including the national target of 42% by 2020.
Council outcomes	CO18 – Green – We reduce the local environmental impact of our consumption and production. CO25 – The Council has efficient and effective services that deliver on objectives.
Single Outcome Agreement	SO3 – Edinburgh's children and young people enjoy their childhood and fulfil their potential. SO4 – Edinburgh's communities are safer and have improved physical and social fabric
Appendices	Appendix 1 - Feed in Tarrifs, Appendix 2 - Supplementary Report

Appendix 1 – Feed in Tariffs

The Feed in Tariff (FiT) is a government payback scheme for electricity generated by renewables, and applies to a range of technologies including solar PV, wind turbines, hydro and combined heat and power systems. The feed in tariff is dependent on:

- the size of the system
- what technology is installed
- when the technology was installed
- who put the technology in place (certified installers)

There are two parts of the tariff; the generation tariff and the export tariff. The generation tariff is applied to all electricity generated by the renewable system, regardless of how much is consumed onsite. The export tariff is applied to any surplus electricity that has not been consumed onsite and is fed back into the grid. The FiT is based on a 20 year contract (or 25 year contract for solar panels), and generation and export tariff prices are fixed at the same rate for the duration of the contract.

The current rates for an 11kW wind turbine like the one at Currie are 17.78p/kWh, with an export rate of 4.77p/kWh. These rates are scheduled to run from 1st April 2014 to 31st April 2015; however it is widely expected that there could be an additional depression of 10% on the 1st October 2014. In the event of a change, new tariffs would be published on the 31st of July 2014.

Current and historic FiT rates for an 11kW Wind Turbine

Turbine Size	Tariff Period	Tariff (p/kWh)
Wind turbine with total installed capacity greater than 1.5kW but not exceeding 15kW	1 st March 2010 – 31 st March 2012	31.03
	1 st April 2012 – 30 November 2012	29.65
	1 st December 2012 – 31 st March 2014	22.23
	1 st April 2014 – 31 st March 2015	17.78*
Export Rate	Post 1 st December 2012	4.77

*Subject to Feed in Tariff review on the 31st July 2014

APPENDIX 2 : Currie Wind Turbine – Supplementary Report

Background

- 1.1 Currie Community High School was one of six Scottish schools that participated in the Sustainable Secondary Schools Partnership from 2001-2005. The school already had a track record of being active in environmental projects and initiatives with strong support from school pupils and staff including the Head Teacher. Discussion with the school and sustainability staff at the Council led to a proposal to investigate opportunities for the installation of renewables in the school.
- 1.2 Funding for a feasibility study was secured and Renewable Devices Energy Solutions Ltd were commissioned in 2005 to investigate suitable renewable technologies. The school was seen as a good location for installation of a wind turbine as it benefits from a naturally exposed location making it suitable for wind power. The school swimming pool provided a constant electrical base load for electricity from the wind turbine to feed into. The swimming pool also provided a constant heat load, therefore, solar thermal panels were considered as a suitable technology.
- 1.3 Liaison with the school was very positive in this period with staff and pupils very engaged in the planning and development of the project, where appropriate, attending construction meetings with contractors, assisting with the specification, creation and design of display graphics. The intention was for data collected from the renewable technologies to be utilised in class work projects thus linking the project with curriculum activities.
- 1.4 Following a tendering exercise, Glendevon Energy was selected as the contractor for both technologies and in April and May 2008 respectively, both the solar panels and wind turbine became operational. An 11kW wind turbine was installed within the school grounds which was a two blade low-noise turbine manufactured by the Danish company Gaia-Wind Ltd. The school switched on a 30kW array of solar thermal panels covering an area of 30m² which were fixed into the roof of the PE Block. The heat from the solar panels was used to heat the school swimming pool.
- 1.5 Corporate Property project managed the specification and installation of both systems.
- 1.6 Between 2008 and 2012/13 both systems operated well with no technical difficulties reported.

Funding Issues

- 1.7 The renewable technologies project was funded by the CEC's Sustainable Development Unit with a capital grant managed by the Scottish Community

and Householder Renewables Initiative and provided from the Energy Savings Trust Initiative.

- 1.8 The total project cost was around £70K. A grant of £22,500 was approved from the Scottish Communities and Householder Renewables Initiative (SCHRI). The remainder was capital funding through the Council's Sustainable Development Unit.
- 1.9 What became clear during 2011 was that while funds were made available to maintain and service the turbine and solar panels they were only for the first three years of operation and it became apparent that there was no funding in place thereafter.
- 1.10 The technologies would have been eligible for government subsidy schemes and efforts were made by the school to register the turbine for both Renewable Obligation Certificates and latterly the Feed in Tariff. However, these applications were unsuccessful resulting in the school missing out on significant revenue generation for the turbine which could have in turn covered maintenance costs. Savings in the energy bill however would have been made through both systems but the school was absorbing these and stated at the time that it was unable to support the maintenance of the systems due to other budget pressures.
- 1.11 The school view was that maintenance and servicing of the systems was in line with similar work undertaken by the then City Development Department for school boilers, swimming pool plant, air conditioning systems etc. They also had the view that the costs were not significant. However just as the school had the view that they couldn't cover these due to budget pressures, this was the same view from City Development who equally did not have funds in any appropriate budgets to cover costs. The view from Finance was that while capital funds were available, these could not be used to support maintenance as they were classed as revenue costs even although this was tied to an original capital project.

Current Issues

- 1.12 As detailed in the report 'Currie Wind Turbine – Spend to Save', in addition to the maintenance requirements there is also a need to upgrade the access ladder and address the latent problems with the anchoring mechanism. The cost of getting the turbine operational is in excess of the annual savings and therefore additional funds are being sought on a spend to save basis.
- 1.13 For safety reasons, during initial project design it was determined that the access ladder start midway up the turbine tower. Although this was initially considered safe for access, it has subsequently been determined that the current location of the access ladder is too high to be accessed safely via a ladder and therefore the maintenance contractor can only access the ladder section via an elevated work platform or 'cherry picker'. This adds significantly

to the maintenance costs. Therefore, the intention would be to lower the access ladder as part of any works so that it can be safely accessed from a ladder. The lower ladder section would be locked off with a steel plate and would be fenced off.

- 1.14 The problems with the anchoring mechanism relate to the fastening rods that are embedded in the concrete foundation and the associated bolts that attach them to the turbine tower. Although compliant with standards at the time of installation they have subsequently been found to be insufficient to deal with the loading placed on them. The fastening rods at Currie have been tested and found to be satisfactory, however, there is no guarantee that this will continue to the case over the longer term.

Lessons Learned and Recommendations

- 1.15 This project was unique at the time and could be defined as a pilot project. It has been very successful in leading to the school winning a number of prestigious awards and has proven that carbon and financial savings can be made from these technologies. There have been no major technical issues with either system – they work well and provide a positive message to pupils and others. The school has been pleased with the project.
- 1.16 However what is clear is that projects of this type need to have maintenance and servicing built into any business case and/or specification to avoid the issues seen recently with the Currie High School project. More importantly it needs to be clear from the outset which budget will be covering the costs.
- 1.17 One solution would be that any maintenance and servicing be derived from any financial savings made through a reduction in energy, provided that these can cover costs.