Inverclyde council

AGENDA ITEM NO: 9

Report To:	**Education & Lifelong Learning Committee**	**Date:**	**1 November 2011**
Report By:	**Corporate Director Education and Communities**	**Report**	**EDUC/44/11/EM**
Contact Officer:	**Eddie Montgomery**	**Contact No:**	**01475 712472**
Subject:	**Inverclyde Academy – Wind Turbine**		

1.0 PURPOSE

1.1 The purpose of the report is to provide the Committee with a summary of the issues experienced in relation to the wind turbine at Inverclyde Academy and advise of the strategy being adopted to address the issues.

2.0 SUMMARY

2.1 The turbine is currently off line with potential repair and capital cost neutral replacement procurement options being considered.

3.0 RECOMMENDATION

3.1 That the Committee note the report.

Albert Henderson
Corporate Director Education
& Communities
7th October 2011

4.0 BACKGROUND

4.1 The wind turbine at Inverclyde Academy was procured as part of the design and build contract for the construction of the new Inverclyde Academy and Newark Primary School carried out by Barr Construction during Feb 2007 – Dec 2008.

As part of the early design process the Council commissioned the Design Team to investigate and report on a number of renewable technologies that could be incorporated into the designs for the schools. The Council considered the options and based the final decision on inclusion of renewable technology items in line with affordability constraints i.e. initial capital costs, available grant funding, and life cycle costing / payback periods. The project Engineers also utilised a sustainability matrix for each building as the designs developed.

A 50kW turbine was chosen due to the favourable estimated energy production, the availability of grant funding, and relatively short payback period. This was then taken forward and formed part of the planning approval process for the project. The choice of suppliers in 2006 was limited for specific turbine sizes and indeed this remains the case in 2011. There were only two 50kW turbines available to the market, the Entegrity turbine and the Brumac turbine. Following investigation by the main contractor post tender award, Brumac were unable to deliver which left the Entegrity turbine as the only viable option. Further investigations at that time concluded that the main alternative closest to the 50kW would be the WES 18/80 (80kW) which was significantly different in size and style to that approved through detailed Planning and therefore was not an option without considering a material change to the approved planning application. At that time there was no indication that there were any issues with the Entegrity turbine and indeed the turbines had been installed across the US and Canada with a number of installations at various stages throughout the UK and Ireland.

The associated works (i.e. civils and electrics) were subject to tendering by the main contractor (Barr Construction Ltd) as part of their sub-contractor placement. The Energy Savings Trust (EST) list of approved installers was provided to all main contract tenderers as part of the main contract tender package. Perpetual Energy Ltd. (installers of the turbine) were sub-contracted by main contractor Barr Construction.

The foundations for the turbine were constructed during September and October 2007 with ducting and trenching works following on for the connections to the plant room and transformer building. The turbine installation was carried out during November 2007. Final commissioning of the turbine was delayed due to the delay on the main contract and a delay in the final grid connection by Scottish Power with practical completion of the contract achieved in December 2008.

4.2 Following final commissioning the turbine operated normally until May 2009 with the only problems experienced during that time being minor technical issues related to the remote monitoring equipment and re-setting of routine alarms which were attended to by the sub-contractor (Perpetual Energy Ltd).

On the 19th May 2009, the Council received a letter from the manufacturer (Entegrity Wind) requesting that the turbine be shut down as a safety precaution to allow an inspection of the gearbox. This was not specific to the Inverclyde Academy turbine and was requested of all owners of Entegrity turbines throughout the UK and Ireland. The turbine was off-line until early July 2009 when the remedial works to the gearbox were completed by Perpetual Energy Ltd. on behalf of Entegrity Wind. Less than a week later the Council were informed by Perpetual Energy Ltd. that the turbine manufacturer Entegrity Wind were in receivership.

The turbine operated normally until March 2010 with again the only problems experienced being minor technical issues related to the remote monitoring equipment and re-setting of routine alarms which was finally addressed by the replacement of the controller in December 2009 by Perpetual Energy Ltd.

It should be noted that in that time the defects liability period on the main contract ended (December 2009) and Perpetual Energy Ltd were placed in voluntary administration (early 2010) citing the chasing of a hugely ambitious wind farm project in the US, slow paying large corporates and unfortunate events in the global banking collapse as contributors to their demise. In the months preceding the end of the defects liability period alternative maintenance companies were investigated and it was found that there was generally a lack of maintenance support for the small scale wind sector with a limited number of companies interested or available, most firms being more concerned with larger wind farm opportunities. Prices and terms had been sought from Perpetual Energy Ltd and another firm Energy Mechanics Ltd with a view to entering into a maintenance agreement for the turbine. No formal contract was entered into although Energy Mechanics Limited were engaged by Barr Construction to complete their contractual obligations under the defects liability of the original contract.

In March 2010 the turbine operated intermittently and following an inspection by Energy Mechanics Ltd was thought to require a number of replacement sensors. A number of sensors were replaced however the turbine continued to operate intermittently with repeated fault conditions until June 2010. A further inspection of the turbine at the end of June was carried out by Energy Mechanics and a number of issues highlighted including further sensor malfunction. The turbine was taken off-line until further repairs could be affected. Following a visit in July the turbine was operational until early September 2010 when it was taken off-line due to another fault which was thought to be related to worn parking brake pads.

On 29th September 2010 Energy Mechanics informed the Council that they would no longer be able to support the turbine citing problems experienced with Entegrity Wind and AOC machines, parts supply and backup. They also stated that they were informing the other owners as the machines continued to be a financial and resource drain on their company that reflected badly on the companies ability on the ground. Energy Mechanics went into voluntary liquidation in April 2011.

4.3 Following the withdrawal of support from Energy Mechanics in September 2010 a search for alternative maintenance providers was carried out. However it proved difficult to engage with a suitable (or any) maintenance provider due to a combination of a lack of available providers and due to those that were able to be contacted being reluctant to take on or inspect a turbine that no longer had any backup from the original manufacturer in respect of parts and detailed working knowledge of the machine itself. A few firms expressed initial interest but after repeated contact failed to follow up with any commitment to prepare and submit proposals for inspection of the turbine.

Prior to Energy Mechanics withdrawing support they had provided a summary of the existing Entegrity and AOC turbine installations across the UK and Ireland. It was clear from this summary that the majority of machines were experiencing technical issues to some degree. Contact was made with the Ford Retail Group Property Manager as they had also invested in an Entegrity turbine which had experienced technical problems. The Ford turbine had actually been removed and a report prepared on its condition following issues with the gearbox. It became evident that the issues experienced with this turbine had most likely prompted the issue of the letter by Entegrity in May 2009 resulting in remedial works to the gearbox.

From the initial contact with one of the maintenance firms a small independent engineering firm were recommended and through this firm an inspection of the Inverclyde Academy turbine was arranged and was carried out utilising suitable access equipment in March 2011. To summarise the report it noted that there were a number of components requiring replacement and that the turbine should not be run in its current condition. It also stated that due to the unavailability of parts and the unknown condition of the gearbox, which could not be inspected more thoroughly, it was their opinion that it would be uneconomical to repair and they would be unable to offer any warranty on repairs should they be carried out, the conclusion being that the turbine should be removed or replaced.

4.4 Following receipt of the inspection report some initial options for replacement of the turbine were discussed with the firm who carried out the inspection. One of the options included replacement of the turbine with another similar sized turbine either in the same location or within close proximity of the original location. As the Council has already invested capital (including grant support) in the original turbine, a capital cost neutral replacement was considered to be the most appropriate option. In this model, the Council would enter into an agreement with a firm who would invest the capital sum required for installation of a new turbine with the revenue generated from Feed-In-Tariffs (FIT's) being retained by that firm. The Council would benefit from the off-setting of the energy consumption of the school. Agreements of this nature are usually linked to the term of the available FIT support i.e. 20 years.

The Council has been contacted by another firm who has also expressed an interest in offering a similar service regarding a capital cost neutral replacement of the existing turbine with a slightly different arrangement in respect of the agreement. This option would involve no direct off-setting of the schools energy consumption with the energy directly exported to the grid and a minimum annual payment guaranteed with an additional payment based on a percentage of the output of the machine.

Both options above involve removal of the existing turbine. The above options have been discussed in outline with the Corporate Procurement Manager. Should this course of action be adopted then it would be necessary to advertise the opportunity on the Public Contracts Scotland website and then investigate a method of tendering and evaluating expressions of interest. From the initial discussions to date with the interested firms draft agreements / heads of terms have been received for review. Any proposals involving this approach would require input from the Head of Legal and Democratic Services as part of the procurement process.

The options have also been discussed in outline with the Development and Building Standards Manager who has confirmed the position with respect to any statutory approvals (Planning) that may be required for each option. This would be subject to clarification of more detailed proposals with the relevant officers from the Planning Service.

4.5 In addition to the options being considered for replacement it was felt prudent to exhaust all available options for repair. To this end contact was made with the other owners of Entegrity turbines throughout the UK and Ireland.

Contact was made with an Engineering firm in Aberdeen who had purchased an identical turbine. The firm had recently bought over a small renewables firm and with the aid of that support have managed to keep their turbine operational. Initial discussions indicated that they may be able to assist with an inspection and repair, however subsequent follow up email communication requesting proposals and estimates have yet to yield a result.

Contact was also made with Dublin City Council who had purchased five identical machines for a public park. These machines had also been plagued with technical issues and had never been fully and finally commissioned, however the contact with Dublin City Council was able to assist with some information as they had only recently (within the last few months) been through a tendering exercise for the Planned Preventative Maintenance of their turbines including initial enabling works to fully commission the turbines. The turbines had been at a less advanced stage of completion than the Inverclyde Academy turbine when Entegrity Wind and Perpetual Energy had gone out of business.

From information provided, contact has now been made with a firm who may be able to provide support and repair of the turbine with the firm having staff from the former Entegrity Wind who have a detailed working knowledge of the Entegrity turbine and also access to parts suppliers. A date for inspection of the turbine has been provisionally agreed for early November with proposals and estimates pending final agreement.

4.6 The issues experienced with the Inverclyde Academy turbine and the insolvency of the original manufacturer are unfortunately not uncommon. From information obtained from previously engaged firms on the status of a significant number of UK installations and from investigations to date into the sector it would appear that there is generally a lack of established firms who specialise in providing maintenance support for the small scale wind market. It would also appear that there are a number of issues with small scale wind turbines and their reliability with varying degrees of technical issues being experienced by the majority of owners / operators. The recent issues reported in the press with the Scottish firm Proven Energy who had been established for more than 30 years highlights this. The collapse of Proven Energy due to a technical defect in one of their most popular turbines resulted in more than 500 turbines being shut down across the country.

5.0 OPTIONS UNDER CONSIDERATION

5.1 Repair Existing Turbine

Risk	Description
Financial	• cost of repairs (-). • cost of PPM contract (-). • school energy consumption offset (+). • possibility of registering turbine under new FIT scheme to be investigated (+).
Statutory Authority (Planning)	• no issues (+).
Disruption	• minimal – repairs affect localised area and measured in days (+).

5.2 Remove and Replace Existing Turbine with New Turbine in Existing Location (Leased)

Risk	Description
Financial	• capital cost neutral (+). • no FIT gain as taken by service provider (-). • school energy consumption offset or minimum payment & proportion of turbine output (+). • no repair / PPM costs as retained by service provider (+).

Statutory Authority (Planning)	• new planning application may be required unless new turbine is sufficiently similar to be considered as “de minimus” in planning terms (+/-).
Disruption	• moderate – works although localised would be measured in weeks and involve cranage with possible temporary traffic management on trunk road (-).

5.3 Remove and Replace Existing Turbine with a New Turbine in New Location (Leased)

Risk	Description	
Financial	• capital cost neutral (+). • no FIT gain as taken by service provider (-). • school energy consumption offset or minimum payment & proportion of turbine output (+). • no repair / PPM costs as retained by service provider (+).	
Statutory Authority (Planning)	• new planning application will be required and location may differ in relation to proximity to local housing (-). • new location may be further from existing school building (+).	
Disruption	• moderate – works although localised would also involve new service trenching and foundations and would be measured in weeks and involve cranage with possible temporary traffic management on trunk road (-).	

5.4 Remove Existing Turbine – No Replacement

Risk	Description	
Financial	• cost of removal (possibly cost neutral due to scrap value) (+/-). • possibility of grant funding repayment (-). • no further repair / PPM costs (+). • No future offset of electricity costs (-)	
Statutory Authority (Planning)	• no issues (+).	
Disruption	• minimal (+).	

6.0 CONCLUSIONS

6.1 The preferred option is to affect a repair on the existing wind turbine and, if successful, put in place a planned preventative maintenance, monitoring and call out contract with an appropriate firm.

6.2 Should it not be possible to repair and obtain the necessary long term support for the existing turbine then a capital cost neutral replacement should be investigated by the School Estate Team with the appropriate support and input from officers within Corporate Procurement and Legal and Democratic Services.

6.3 In the event that the options outlined in 5.1 – 5.3 above are not possible / feasible then consideration should be given to removal of the existing turbine.

6.4 It should be noted that no option has been provided for a Council funded replacement turbine due to the high capital cost involved and the current pressure on Council budgets / resources. The likely capital cost of a 50kW turbine at current market prices is in the region of £220,000-£250,000.

7.0 CONSULTATION

7.1 There are no direct staffing implications in respect of the report and as such the Head of Organisational Development, HR and Performance has not been consulted.

7.2 There are no legal issues arising from the content of this report and as such the Head of Legal and Democratic Services has not been consulted.

8.0 EQUALITIES

8.1 There are no equalities issues.

9.0 LIST OF BACKGROUND PAPERS

9.1 Scottish Community and Household Renewables Initiative (SCHRI) Case Study.
Alan Campbell Engineering Services report dated 11th April 2011.
Rotary Engineering Inspection report dated 5th April 2011.