

KENT COUNTY COUNCIL

SELECT COMMITTEE - RENEWABLE ENERGY

MINUTES of a meeting of the Select Committee - Renewable Energy held in the Bewl Room, Sessions House, County Hall Maidstone on Wednesday, 14 April 2010.

PRESENT: Mr K A Ferrin, MBE (Chairman), Mr C Hibberd, Mr R E King, Mr T Prater, Mrs P A V Stockell and Mrs E M Tweed

IN ATTENDANCE: Mr P Binnie (Head Of Operations), Mr A Morgan (Energy Management), Mrs R Spore (Head of PPP/PFI), Mr J Thorp (Group Managing Director, Thameswey Ltd) and Mrs C A Singh (Democratic Services Officer)

UNRESTRICTED ITEMS

8. Minutes of the Meeting held on 31 March 2010

(Item 1)

RESOLVED that the Minutes of the meeting held on Wednesday, 31 March were agreed.

9. Presentation by Andy Morgan, Energy Manager, Peter Binnie, Head of Property Operations and Rebecca Spore, Head Of Ppp/pfi*

(Item 2)

(1) Mr Binnie gave a brief account of the renewable technologies being introduced at Oakwood House, Maidstone (Oakwood House has 40 en-suite bedrooms) and gave an outline of the ideas for an Energy Centre at Oakwood Park Campus, Maidstone. (Further details are attached to the minutes as Appendix 1).

(2) He advised that heating for the new bedroom block at Oakwood House was supplied by electricity and the grid limits for the site had been reached. As there was to be an extension to increase the number of bedrooms there was an opportunity to use renewable sources of energy at the site. Consultants were appointed and the option agreed for the site, due to the available land, was a ground source heat pump which would provide 60% of the annual heating load plus solar panels producing 15% of the energy required for hot water for the 40 bedrooms. This project is now complete and will shortly be appraised.

(3) Mr Binnie added that this project led to the idea of an energy centre to serve the whole Oakwood Park Campus with the cluster of buildings consisting of schools, colleges and universities. This was very much at the embryonic stage, although sources of potential funding had been identified.

(4) Mr Morgan referred to an aerial map of the Oakwood Campus advising that there were; 2 Universities, 3 Secondary Schools and 2 Primary Schools which were all publically owned. They all used mainly gas boilers and electricity from the main grid. (Further details relating to the proposal are attached to these minutes as Appendix 2.)

(5) The total energy bill for Oakwood Park Campus was estimated (based on ground area of sites only) at £ ¾ m, which represents a significant amount of CO₂ emissions from the site.

(6) An energy centre at the site could be of benefit both financially and in terms of reducing in the CO₂ footprint. Barriers would include the diverse ownership of the buildings; the majority would have to be on board for proposal to be viable. A major factor would be tying in with the Building Schools for the Future (BSF) and Academy development. New schools must be 60% lower in carbon output than Building Regulations stipulate.

(7) Of the 3 secondary schools on the site; Astor of Hever was to be an Academy; regarding St Simons Stock there was a concern about finance; and Oakwood Park Boys Grammar School was to be rebuilt, with timing phased later in the BSF programme (2016/2017) if plans were on track.

(8) There had not yet been any discussions with the College but Mr Morgan was aware there were plans for the College's redevelopment which had run into financial difficulties.

(9) The Select committee were advised that there was a recently established Stakeholder Group which was starting to collaborate looking at ideas for the whole campus.

(10) The Chairman suggested that the universities and colleges would be feeling the pinch with the current cuts in funding and Mr Binnie advised that the University of Creative Arts had considered vacating the site but would now be staying for at least 8 years.

(11) Mrs Tweed enquired why the University had such a large bill and was advised that the energy costs were estimated on the basis of floor area and this was a large establishment. Mr Ferrin added that the building was high and there were a number of kilns which may add to the energy requirements.

(12) In response to a question by Mr Hibberd, Mr Morgan advised that he had not been in touch yet with anyone else who had built a CHP plant. A number of universities had done this as each campus comprised separate units and facilities. Economically there was the issue of term times and the need for the energy supplier to stay in business throughout the year. There was also experience of hospitals using CHP. Mr Binnie advised that he had worked for a university in the past which had a ring main with an energy centre and excess energy would be sold back to the grid, earning an income when the site was not being used. It was acknowledge that this would depend on the Grid wishing to take the energy.

(13) In response to a question about the idea for an energy centre, officers concurred that there were no firm plans but they were in favour of a gas CHP system or a biomass boiler for heat provision, but a lot more analysis was needed.

(14) The Chairman remarked about gas not being a renewable source and there was a discussion regarding whether the two could be combined. Mr Morgan advised that

they could but it would depend on the balance of costs and benefits as well as the needs of the site.

(15) The Chairman sought some clarity as to how realistic the project would be in the current political climate with a general election in May and questions about the future of the BSF programme. It was felt that the Academies programme would survive but acknowledged that secondary schools were suffering financial difficulties and some were almost bankrupt. The cost-saving aspects of the scheme could make it more attractive to schools as if, for example, new schools were built they would not need to build a boiler house or have the concerns regarding boiler maintenance.

(16) In response to a question by Mrs Tweed on whether the existing schools could have ground source heat pumps, Mr Morgan explained that work was being undertaken to look at systems for existing building stock. All the buildings on the Oakwood Park Campus were in need of attention all were interlinked, which meant that any problem with one meant a knock on effect which needed to be addressed. There needed to be efficiencies even if BSF did not progress.

(17) Mr King suggested that with an annual energy bill of £3¼m for the Oakwood Campus there was a basis to do something to improve efficiency. He questioned how the capital investment would be reached and how this would be written off over 30 years. Mr Morgan advised that the Low Carbon Buildings Trust had not been interested in the Oakwood House scheme but in principle would offer support to a larger scheme for Oakwood Park.

(18) Mrs Stockell felt that this was an excellent place to start and that it was the right time to carry out such a project. She said that she would give her support to commissioning consultants and suggested that this could be a flagship energy centre. Mrs Stockell felt assured that Maidstone Borough council would also give its support and said that the schools and universities on the site were full and doing well on this popular estate.

(19) Mr Prater felt that the site had a number benefits such as a large area to make it suitable for ground source heat pumps. He asked about the capital cost and payback for the work at Oakwood House and Mr Binnie advised that the cost of the ground source pump and solar thermal system was £150,000. The ground source pump would pay back over 8 years and it was closer to 15 years for the solar panels but these were by way of trialling a new system.

(20) Mr Prater suggested that when the consultants were appointed to look at the project for Oakwood Park Campus, they should be initially steered to looking at renewable options since if gas was used, this would not be a renewable option. There were ground source heat pumps, photovoltaics, solar thermal and biomass which could be used to ensure the project was a flagship project. Consultants would need a steer on this since if we said 'the cheapest' they may opt for something that would not enable a renewable flagship project.

(21) The Chairman asked when the school boilers would need renewing and Mr Binnie indicated that most needed replacing now.

(22) The Chairman was concerned about the viability of the project given the number of different bodies involved and the timescales, as the Academy was due to open on

the site in 2011. Rebecca Spore advised that the Academy would open in January 2011 in the same buildings and the new building would start in summer 2012, and finish in 2014. It was under the feasibility and active design part of batch 2 procurement. Mr Ferrin indicated that there was a window between now and summer 2012 and Rebecca Spore agreed that if the Academy was to benefit we would need to scope and be ready before the detailed design of the Academy.

(23) Mr Hibberd urged that we find other ways to generate electricity apart from with steam turbines since there would be great pressure on all public bodies to do so and he therefore felt that the committee should at least sanction a feasibility study.

(24) Mrs Stockell commented about extended schools and the fact that as a result, energy cost would go up and up. Mr King agreed and suggested we 'think outside the box' looking at ways to use surplus energy and heat.

(25) The majority of Members agreed that the officers should go ahead and appoint consultants to conduct a feasibility study, while at the same time gauging the stakeholders' support for the project as the deadline for instigating the project was tight.

(26) Mr Binnie indicated that there was a potential cost of £50,000 for a full feasibility study and that the question of surplus energy had been discussed. With support from the Carbon Trust the cost could be a lot less; it remained for the right specialist to be found.

(27) The Chairman asked a question about grid connections at the site Mr Binnie advised that the grid was at maximum capacity. The only thing which had prevented them acting before was the need for support and the fact that the issue was cross directorate.

(28) A discussion took place about the size and energy needs of the buildings on site and that those rebuilt were likely to be more compact and have lower energy needs.

(29) The Chairman suggested that officers submit a report direct to the Cabinet Member, stating that the Select Committee were supportive of further investigation of the proposal, rather than via their individual Directorates, as a matter of urgency.

(26) RESOLVED that the Chairman and Select Committee Members thanked Mr Binnie, Mrs Spore and Mr Morgan for attending the meeting and that a progress report be submitted to the Select Committee at a future meeting.

10. Presentation by John Thorp, Group Managing Director, Thameswey Ltd *(Item 3)*

(1) The Chairman welcomed Mr Thorp to the meeting and asked him to begin his presentation. It was agreed that Members would ask him questions throughout rather than waiting till the end.

(2) Thameswey Limited was an energy and environmental services company, wholly owned by Woking Borough Council and was the only one of its kind in the country. It was established in 1999. Thameswey Limited acts as a partner to Woking Borough Council to invest in combined heat and power plant (energy stations), to sell

heat and power in an environmentally friendly way, with a view to improving the environment within the Borough. In May 2000, Thameswey Limited invested in its joint venture company, Thameswey Energy Limited, to finance the first energy station in Woking Town Centre.

(3) Mr Thorp began his presentation, which is attached to these Minutes as Appendix 3. He explained that he was a marine biologist so was familiar with Climate Change issues, but did not have an engineering background. If engineering-related questions arose he could refer to experts in his organisation.

(4) Mr Thorp advised that since 1990 there had been the following achievements:

a. Corporate

- Energy Consumption Savings (2008) -31%
- CO₂ emission reductions (2008) -29%
- Sustainable Energy CHP Self Generation (2008) +41%
- Renewable Energy Self Generation (2008) +2%

b. Borough Wide

- Energy efficiency of residential property (up to 2008) +35%
- CO₂ emission reductions (2008) -21%
- Number of households assisted with energy
- conservation grants (1996 – 2008) 5,072

(5) At one time Woking had 9% of the UK’s installed photovoltaic panels but in the last 2 years BP had replaced them due to a fault. Mr Thorp envisaged that in due course the 2% renewable energy figure would rise considerably.

(6) Across the Borough, energy profits were reinvested. None of the money went into general revenue; it was boundaried and spent collaboratively by the Borough Council and the Company on sustainable activities.

(7) The three aims were; Reduction of CO² equivalent emissions, adaptation to climate change and promotion of sustainable development.

(8) Mr Thorp outlined how Woking work with developers (who often want to reduce their costs by locating outside of central London) so that both parties achieve their aims. He used the example of developers wishing to build apartments often as high rises close to the station and the way that the company can integrate these with the carbon reduction aspirations of the Council by working with developers as early as possible. In this way they are able to forecast what developers are likely to want in the next 25 years.

(9) Furthermore, they are well aware that developers do not want a lingering association, or to monitor sustainability so Thameswey offer ESCo services enabling developers to complete their project, earn their fee and leave.

(10) This process is facilitated by C-Plan (leaflet attached as Appendix 4) which is an interactive online workflow process for developers and planners and avoids the sometimes adversarial nature of the relationship between those two groups.

(11) Discussing the core town centre CHP plant, Mr Thorp advised that this is at the side of a multi storey car park, taking up 6 parking spaces on 3 floors. It runs on natural gas from the gas grid and provides electricity and distributed heating to buildings in the central business district on a private wire network. The company also moves its power across the EDF network, paying them distribution use of system charges (DUOS)

(12) A fuel cell adds back up heat and electricity for the swimming pool and leisure centre. All buildings can operate in island mode. If the grid goes down, the location is still self sufficient in electricity and heat. CHP recovers heat as well as generating electricity providing efficiencies of up to 90% instead of the central power stations/national grid system which could be as little as 25% efficiency at the point of use.

(13) Photovoltaic cells have been placed on social housing roofs and Members were also advised of the solar canopy erected above Albion Square stretching from the railway station entrance to Albion House in Woking. The canopy is equipped with photovoltaic cells to collect solar energy to light the canopy which provides a covered social space and link between the station and the central business area. The canopy is approximately 34 metres in length and 22.5 metres in width. The glazed roof includes over 35,000 photovoltaic cells, laminated in 272 glass panels having a peak electrical output of 81 kW. The PV cells cost £437,000 to install, offset by a grant from the Energy Saving Trust of £370,000 and the net cost will pay back in 7 years. The energy generated is in excess of that required to light the canopy, and any surplus energy is exported to other council sites and the EDF grid.

(14) Mr Hibberd commented on the non-availability of such grants today, which is the case. However Mr Thorp indicated that with the Feed-in Tariff now in place, those people installing PV panels would get an amount based on installed capacity and export of electricity.

(15) Mrs Tweed commented on the large redevelopment in Ashford where there were huge opportunities for the town and Mr Thorp agreed that where there is development we should think about sustainability and how to incorporate renewables.

(16) Mr Thorp went on to explain how Thameswey had acquired ESCS in order to secure himself and his staff to provide management and support for Thameswey.

(17) Mr Ferrin asked about the relationship with social housing stock and this was purely on an energy supply basis. (deleted)

(18) Woking's arrangements are unique in that they are vertically integrated and Mr Thorp pointed out that 451 other local authorities had not followed their lead.

(19) Mr Thorp advised that it was essential to have a business plan for sustainability. His company was looking at a return of 8% overall for projects over 30 years and this was 12-12.5% outside Worthing over 30 years. Work described in Milton Keynes should return a net 23.5% over 30 years. Mr Thorp added that in addition Thameswey borrow money from Woking Borough Council who borrow from the Public Works Board at 5.5%. Woking Borough Council makes a profit of £750,000 per year on the money Thameswey borrow from them for entrepreneurial, non statutory services.

(20) The economics of an ESCo are in the generating, distribution and retail markets of energy. The economics do not work when selling wholesale to the Grid. Thamesway have an Exemption Licence C Class from Ofgem, have metering and billing services and carry out their own customer relations work.

(21) In response to a question from Mr Ferrin about whether Thamesway actively market their services, Mr Thorp indicated that regarding domestic energy this was usually tied in to the normal network. The in-house call centre sells electricity to private householders and businesses.

(22) In response to a question from Mr Prater regarding the Feed-in Tariff, Mr Thorp indicated this was only in relation to renewables and so did not apply to the gas CHP. He further stated that he felt there was a problem with the Renewable Heat Incentive (RHI) since district heat networks were not well developed therefore renewable heat networks were not well developed. He believed the process should have begun with a heat incentive, then a sustainable heat incentive, then a renewable heat incentive. It is currently envisaged that companies using fossil fuel will pay a levy on their fuels to support RHI and he therefore opposes the RHI levy.

(23) Mr Thorp explained how his company was enabled to be competitive by having a 30 year business plan as they could offer electricity prices 5% below that offered by a dual fuel basket of five major suppliers (measured on a quarterly basis). He stated that Thamesway do not exclude third party suppliers since they were always able to undercut them by charging suppliers to move their power across the private wires.

(24) Regarding heat supplies, Thamesway was the only supplier and Mr Thorp explained that apartments have a heat exchanger. There was no gas supply since Thamesway use, but do not supply gas. The price charged for heat was based on the most energy efficient gas boiler on the market thus ensuring this would always be competitive.

(25) In response to a question from Mrs Tweed, Mr Thorp described the CHP concept, saying that due to the collection of waste heat, there was always a heat supply and users had independent control of heating and hot water in their apartments.

(26) In response to a question from Mr King about heat distribution pipes Mr Thorp referred to a slide showing heat pipes in Milton Keynes, saying that there was almost no noise, vibration or heat from the well insulated energy station. The building is 'hemmed in' and hidden within the city centre. CHP in Woking blends into the townscape however there has been an issue where residents have several times called the Fire Brigade thinking a car in the multi storey car park is on fire (due to the steam). Main heat distribution pipes have a diameter of 450mm and they are placed in a 2m x 2m trench. With thick insulation, heat loss is less than 0.1degree Celsius per kilometre. Thamesway pump heat at a variable flow but at constant temperature. Closer to where the heat is required pipes go down in size and are in a trench measuring 0.5m x 0.5m. In placing the underground pipes Mr Thorp recalled instances where there was a necessity to dig in to roads as it was not known where services were on the central reservation.

(27) Mr Thorp told Members about a development of key worker houses in Woking Borough where there was an equity scheme, all of which were built to Code 5 or 6, all with PV panels and insulation with polystyrene, concrete and polystyrene layers inside the brick outer layer. These homes cost 50% more than Code 4 (current Building Regulations) but will be sustainable over a very long period. They allow for the retrofitting of lifts should these be required by residents as they get older. Appliances are A* rated; electricity is by private wire; (deleted)

(28) In response to a question from the Chairman, Mr Thorp indicated that in Milton Keynes to lay the piping for the district heating system cost £1000 per metre and that the furthest points from the central core were at 400m distance. If a system was needed for, say a group of 50 houses, plus offices and a hotel 500m to 1km away they would put in a small CHP close to where it was needed. He indicated that it was always necessary to be able to sell to the heat. Heat production/sale limits constrain the supply of the electricity as it is required to make the margins on production and sale.

(29) To provide services on a district basis Thamesway had carried out spatial analysis on Woking to see where the energy stations were needed. S106 could be used to connect to the existing area network. Developers are happy to pay the cost that would be incurred to install boilers, to Thamesway to enable them to fund a supply to them. It could be cost neutral to developers.

(30) In response to a question from Mr Prater, Mr Thorp explained that the company get the retail margin over a long period, but up-front would have negative cash flow and hence were always pre-investors. An added advantage to developers is they have no cabling to put in. Thamesway get the heat free of charge so the retail margin on it is high and despite the high capital investment, costs can be recovered.

(31) Mr Ferrin posed a question about what was being gained in terms of CO₂ output and whether CHP was in fact a good deal for the environment, in response to which Mr Thorp indicated that CHP compared favourably with electricity from the grid due to their being no losses in transmission. He also used the example that in a toaster 16% of the energy from the grid reaches the toaster to brown the toast since the system is inherently inefficient, whereas in a CHP supplied area 85% does so. Carbon figures from the two are:

i.CO ₂ per MW electricity from the grid	550g
ii.CO ₂ per MW from CHP	250g

(32) Mr Hibberd added comment about the efficiency of grid electricity being 35% whereas burning gas in a CCGT (combined cycle gas turbine) electricity had around 65% efficiency.

(33) Responding to a question from the Chairman about equipment supply (Woking's CHP uses converted marine diesel plant), it was stated that there had been no problems obtaining the plant from Austria and in addition, that there was a huge market for CHP anywhere but England. In Denmark for example, there were circumstances to encourage CHP such as no new housing being built with electric space heating and district heating beings used instead of retrospective gas grid connection for anywhere with no gas grid.

(34) The Chairman asked whether there was a minimum size for CHP and there was not; there were domestic-size micro CHP systems. In summer when the heat is not required it has to be switched off or wasted so for the most economic system there should be a 24 hour heat load. (CHP can also be used for cooling and this too is the case at Woking, with piped cold, piped heat and electric wires sitting alongside in the same trench.)

(35) The preferred type of development for CHP would be a mixed development with housing, light industry and it is also ideal for swimming pools. Without a balanced heat load a development is not suited to CHP and more suited to district heating boilers and grid power. Maidstone prison, in close proximity to Sessions and Invicta House was another example given of an ideal scenario for an economic CHP system. Schools, however, were not ideal but would be if next to a housing development to generate a balanced heat load.

(36) There followed a discussion about gas and Mr Thorp indicated that in Germany 6% is generated anaerobically (biogas) but he felt it would take some time for the UK to reach this level of renewable gas injected into the grid.

(37) Regarding biomass, Mr Thorp said considerations were the Clean Air scenario, fuel storage, delivery and maintenance; it therefore not being suited to a confined space. He was aware of problems with fuel supply and management organisations not responding to these problems. He had looked at adding biomass to the system at Milton Keynes but had concluded that it would operate only for 3 hours per year in a back up situation.

(38) Mr Ferrin indicated that CHP was about energy efficiency rather than being a renewable energy solution and that a basic understanding of the economics was needed. Mr Thorp responded with information in relation to the Milton Keynes Project which served 1000 apartments and 300 commercial properties with 6MW installed capacity in an energy station and infrastructure network costing £23million. Eventually the system will have (deleted) two energy stations (a £40 million investment will be required to provide that level of activity). For Thamesway the project will reach break even by 2016, the money having been obtained through shares or commercial paper. It will turn into a long term investment for the remainder of the business plan, becoming cash positive in 2018. Billing turnover will be around £800,000 per quarter. However the development has stalled and no new buildings are currently coming on stream but Thamesway have accounted for substantial capital expenditure, and Mr Thorp added that over a 30 year business plan, two recessions could be expected.

(39) In response to a question about customer choice Mr Thorp indicated that the private wire was connected to the National Grid for synchronisation and if the CHP engines 'go down' customers would experience a seamless service.

(40) A further discussion took place about why a developer would choose CHP and the reason for this was the price neutrality, and the sustainability achieved by the reduced CO₂ emissions.

(41) A question was asked regarding whether Woking had made it a planning condition that CHP be used and this was not possible. However Woking can make a particular CO₂ profile a condition of development (which can be met by using CHP).

(42) The Chairman asked whether, as an independent company, there was a market in purely commercial terms and Mr Thorp responded with the example of Utilicom which operated as a fully commercial business, supplying Southampton and Birmingham without subsidy from the councils concerned.

(43) In response to a question about the money borrowed from Woking, Mr Thorp indicated that Woking was one of the most heavily indebted councils in Surrey and there was some nervousness regarding the long term business plan i.e. a 30 year business plan which councillors believe is difficult to explain to the electorate. However, Mr Thorp believed that debt is good for an entrepreneurial council.

(44) The Chairman was very impressed by the model and recommended that Mr Harlock from KCC should speak to Mr Thorp, who pointed out that the credit for the model should go to Ray Morgan, now the Chief Executive of Woking Borough Council and the then leader of the Council, Mr Jim Armitage who started the idea in 1990.

(45) Mr Thorp indicated, regarding providing advice to Local Authorities, that a first meeting would be free and then on a commercial consultancy basis.

(46) Considering the situation of Kent and the vast development taking place, Mr Thorp said that if sites were not on a gas grid it was more viable, but that housing developments alone were not good for CHP.

(47) Mr Hibberd agreed with the Chairman and added that having looked at the possibilities of solar heating in Thanet, this had opened his eyes to other possibilities.

(48) Mr Thorp added that old mine workings could be used as a CHP heat source.

(49) The Chairman spoke of a previous investigation of anaerobic digestion which worked well in relation to a Lille operation to power buses. However currently in Kent we are committed to thermal treatment at an Energy from Waste plant for 25 years. Mr Thorpe indicated that Surrey County Council had investigated these issues and decided to proceed only with a pyrolysis plant.

(50) In Germany anaerobic digestion had been used for some time, with gas injected into the grid. Gas companies were compelled to subsidise a £1.5 million injection facility and had reached 6% of the total. Mr Thorp did not expect UK to reach this proportion for 20 years, in competition with North Sea Gas, and gas from Ukraine, Russia or Libya and believed difficulties would relate to price and not supply since no one utility had enough buying power.

(51) Mr King indicated that it should be borne in mind that municipal waste arisings were considerably less than those arising from the commercial sector, which could provide a great deal of material for anaerobic digestion in response to which the Chairman indicated that commercial waste contained a high proportion of rubble and that Supermarkets such as Sainsbury's had begun to set up anaerobic digestion.

(52) In response to a follow-up question from Mrs Tweed regarding the PV Canopy in Worthing, Mr Thorp indicated that last year it had produced 42,000 kW hours of electricity as compared to its theoretical maximum production of 60,000 KW hours. In

general its performance is 60% of theoretical maximum. Lights on the canopy are powered by the PV and excess power is exported to the Grid (deleted). Grid power is imported to power the canopy lights at night. The net pay back time will be 7 years with net benefits of around £12-13,000 per year.

(53) Members were given a hand-out showing the C-Plan interactive tool (attached as Appendix 5).

(54) The Chairman and Members thanked Mr Thorp for attending the meeting.