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, 12 May 2010.

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

IN ATTENDANCE: Mrs S Frampton (Research Officer) and Mrs C A Singh (Democratic Services Officer)

UNRESTRICTED ITEMS

6. General Briefing

(Item 1)

(1) RESOLVED that Members received briefing material to aid their discussions with the witnesses for the meeting.

7. Ian Tubby - Head of Biomass Energy Centre and Matthew Woodcock - Programme Manager, South East Region, Forestry Commission

(Item 2)

(1) The Chairman and Members welcomed Mr Tubby and Mr Woodcock to the meeting and asked them to give their presentation (a copy of the presentation is attached to these notes).

(2) Mr Tubby said that he wanted to reassure Members on the technologies used in the wood fuel systems and highlight some of the areas, which could cause projects to fail, which he suggested were easy to address and some of the non wood fuel related biomass that the Forestry Commission dealt with from time to time.

(3) He began by referring to a graph, on slide1, on the issue of carbon stocks. He advised that the carbon content in all trees had approximately 50% of carbon and 50% of water. He then offered 3 scenarios as follows:

(4) For high forest, if you planted up a hectare of field with small trees and did nothing to it there would be a slow take up amount of carbon, once the canopy closed and the trees were photosynthesising at a rapid rate and putting on growth very quickly there would be a rapid increase of carbon on the hectare of field. After 80 years depending on the trees and the planting density that would plateau, as some of the trees would die, branches would fall off; the carbon would oxidize and be returned to the atmosphere. In this scenario the carbon stock would remain constant and in the hectare of land you would remove 150 tonnes of carbon from the atmosphere. The growth rate would be just less than 4 oven dried tonnes per hectare per year, which was a reasonably fast rate of growth and would be achievable in Kent.

(5) The other extreme in woodland management would be clear fell assuming the same yield but when you harvest the trees your carbon stocks in the land fell back to zero and increased again when you replanted. Mr Tubby referred to a slide that showed 3 harvests. The carbon stock on the hectare of land would average at 100 tonnes per hectare, a lower level than the scenario above but each of those harvests meant that you were removing the carbon from the woodland and could be included in construction or remain resident in the lifetime of the building or it could be used to displace coal, oil or gas and keep fossil carbon locked up into the ground.

(6) In Kent he suggested that you would find this scenario, which was the establishing of woodland and once the woodland was mature you would take some thinnings every 10, 15 or 20 years that would result in the carbon stock on the hectare of land falling but the carbon could go into the fuel supply chain or the construction industry where it would remain locked up again for the lifespan of the building.

(7) This was simplistically how carbon stocks build up in woodlands under different management systems.

(8) Mr Tubby provided information packs for Members on the management systems.

(9) Mr Tubby then spoke on soil carbon. If you were planting forestry on well worked agricultural soil that had a very low organic content the carbon stock in the soil would probably have built up considerably over a period of time. Conversely, if you planted woodland on a carbon rich soil, eg peat, you may lose carbon from the soil because of the exposure to the air and oxidise during the establishment phase. This was a complex area but demonstrated that as well as the above ground carbon flows and stocks, the soil carbon should be considered and was an area that was coming under increased scrutiny in terms of bio energies sustainability issues and soil sustainability, where you plant the forestry and how the woodland was managed.

(10) Members were given the opportunity to ask questions which included the following:

(11) In response to a question by the Chairman, Mr Tubby advised that coppicing would resemble the clear fell example mentioned in paragraph (5) above but instead of planting new trees you would be relying on regrowth from the coppice shoot. It would depend on the scale you were coppicing at. If you focused on a hectare of coppice, the stock on the hectare would build up then fall back to zero as you removed the above ground growth. Looking at the coppice plantation as a whole, one that was in active management there were all stages of coppice growth, the carbon stock should remain fairly constant because the wood that you were removing at one harvesting operation would be replaced in the same years growth on the blocks of coppice that you did not harvest.

(12) In response to a follow up question by the Chairman, Mr Tubby explained that the example he gave where trees reached 80 years old was for high forest. For coppice, you would be coppicing every 15 or 20 years because after that point the productivity of the coppice would go down because of the competition for light and nutrients or the size of the material on the coppice stores would be too big for your end market, those were the things that governed the coppice lengths rather than the

harvest happening at 80 years it would happen after 15 years and each of those sore teeth shapes *(he referred to the graph)* would take place after 15 years instead of 80 years.

(13) In response to a question by Mrs Tweed, Mr Tubby advised that the calorific value was very similar for different species of trees, if you look at it in kilowatts per tonne, a kilogramme of seasoned oak and a kilogramme of seasoned pine you would get the same amount of energy from both of those samples if they were at the same moisture content. Species choice would come down to the type of site you were looking to plant on and you would need to match the requirement of the species to the soil you were working with eg with loamy soil you may be able to plant ash, which burnt well on open fires and in stoves. In the poorer soils you might chose other species that did not grow quite as quickly. In terms of combustion and conversion there was not a species you should avoid at all costs.

(14) Using a slide, Mr Tubby then explained that the carbon stocks at the woodland scale, in terms of carbon savings when you use the wood to displace oil that could be achieved. He explained that the first bullit point was based on a house using about 20,000 kilowatt hours per year and how switching to wood could save 7 tonnes of CO^2. The second bullit point 340 tonnes saving enough carbon dark side to send 100 passengers from the UK to Australia. If you looked at carbon omissions with different renewable technologies and wood fuel you would need to look at the life cycle analysis figures not the figures for omission on combustion because if you burnt a kilogramme of wood and a kilogramme of oil the carbon omissions themselves would be similar because you were burning carbon to generate your energy. Biomass and wood fuel would only save carbon if it was being sourced from well managed woodland where new trees were being planted or coppiced regrowth was taking place, which was an important distinction to make especially with large scale end users that may be importing biomass from overseas.

(15) There were two scales for markets; large scale, industrial end users that were burning tens of thousands of tonnes of biomass each year, Mr Tubby did not think that there was a huge potential for those markets of benefit from Kent's forest estate because they were trading biomass on an international market and the price they were paying feed stock was not attractive to foresters it would not cover the cost of felling, extraction and processing. It may appeal to farmers looking to get away from arable or dairy and looking to plant SRC acanthous but across the country the uptake of this had been slow because of the price being paid by the end market. He felt that the opportunity for foresters existed in small scale heat applications and that type of market you may be able to sell woodchip for £50 - £110 per tonne depending on the quality of the fuel and moisture content and the customer's specification. A large scale power generating plant may be paying £20-£30 per tonne and at that point it would not be economically viable unless you were a tree surgeon and your job had already paid for the wood you had at the back of the truck and you may face a disposal cost. This market could change quite radically with the renewable heat incentive coming in 2011 where you may see various business models and business packages for; boiler installers, fuel suppliers and energy supply companies to sell to end users.

(16) Mr Tubby showed a slide that indicated a few best practises in a boiler set up. He indicated that best practise was not followed at places he had seen. He said that typically he had seen a boiler being installed before energy saving measures had

been made to the building, to cut the carbon footprint, to minimise energy use where ever it came from. The energy saving also had a bearing on the boiler size; unfortunately people were still over specifying boilers. This tended to happen where someone sized the boiler accurately the job, the job then went to tender, they looked at the specification and they added 10% on the capacity just to make sure, that tender then went to another party who added another 10%, and before you knew it you had a very large boiler ordered, which meant the capital cost went up, the efficiency went down and there were problems with omissions. Most of the problems tended to come up in the fuel reception, the fuel storage and fuel handling areas, if Kent and others were going to see wood fuel deployed on a larger scale and many more installations going in those would be the areas that would need to be addressed. There needed to be good communication between the energy user the fuel supplier and the boiler installer to make sure the delivery lorry was compatible with the fuel store and the end user was not ordering fuel on a weekly basis because this would push up the costs and increase traffic movements and would generally be unsatisfactory. He felt that people became hung up on fuel supply distances. The Planning Guidance suggests that 25-30 miles should be the maximum. In terms of carbon omissions there was no difference if the biomass was coming from 10 miles or 70 miles away you would still realise huge carbon savings within those distances.

(17) In response to a comment regarding the line on the slide that read “Seriously consider energy supply Companies”, Mr Tubby explained that quite often potential end users who would like to switch to wood fuel felt that they did not know enough about the fuel supply, where to buy woodchip and did not know much about the biomass boilers themselves, all they wanted was a warm building. Energy supply companies took on the risk of boiler maintenance and fuel supply and just sell heat to the end user and the heat would be measured by a heat meter and the energy user would be billed accordingly. The energy supply company approach could be very attractive to schools where they would not have enough time to compare quotes and fuel supply and get the best dealer, boiler in and go to tender for an energy supply company rather than biomass boiler installers. It also gave energy installers the opportunity to add value to what they were selling, instead of selling woodchips, they were selling kilowatt hours of heat and if that could be linked to fossil fuel prices then hopefully the energy user would be making a saving and the heat supply company would be making a profit. For that to work the profit needed to go back down to the people supplying the biomass in the forest.

(18) Mr Tubby then spoke on the potential for energy crops both on the very large scale and potentially on a heat only scale if the moisture content could be kept down. He advised that a couple of County Councils were looking into the potential of growing Sure Rotation Coppice (SRC) [Willow coppice that you harvest every three years, an automated process, grown on agricultural land] on their own land holdings to supply their boiler and other parts of their buildings estate.

(19) Mr Tubby said that the Forestry Commission was fielding many more enquiries on anaerobic digestion technology from across the country and he felt that it would be a technology that there would be more of in the future and not just used to managed slurry but also potentially to manage food waste mixing it with grass or maize silage as well. That approach did not affect the change of land use which many people got concerned about when they hear about energy crops and biomass.

(20) Mr Tubby then spoke on straw advising that if there was agriculture in the region producing rape straw and wheat straw there could be potential for developing that as feed stock for energy production. There was a lot of discussion on whether there was more potential to feed it back into the soil as a fertilizer or whether there was potential to use it as energy feed stock.

(21) He added that in the short term, the renewable heat incentive that was coming through looked very good but he had concerns that there would be a lot of demand and that he was not convinced that there were enough approved appliances to meet the demand. He felt that there would be more and more concerns expressed about air quality and the need for cost effective verbate technology would increase. The Forestry Commission was also coming up against Sustainability Assurance Schemes, in the future that could cause fuel suppliers some problems if they had more paper work to fill and they were quite a small forestry operation of only a few hundred tonnes per year, it could be another reason not to go into that sector. The Government needed to be careful how it was implemented. He felt that there would be more small scale CHP in the next few years, normally it works on an industrial scale and he was not convinced that it gave farmers and foresters the opportunity at present.

(22) For the future there were second generation bio fuels which could use enzymes to release sugars from straw and wood to produce bio ethanol but because of the mass flow, 5 tonnes of wood was needed to produce one tonne of liquid fuel, therefore price of fossil fuel would need to be very high to make those economics stacked up even if the technology was in place.

(23) In response to a question by Mr King, Mr Tubby explained that in terms of conversion efficiency just burning wood to generate heat and displace gas and oil was the most effective way to go. The boilers available today had an efficiency of 80% upwards. Generating power with wood blending with coal and coke firing it would have a conversion efficiency of 25%. He said that he was not entirely sure of the figures for producing the liquid fuel but estimated it at 20-25%, it depended on what other co products could be sourced from the process as well as the ethanol there may be char that could be burnt to generate heat or electricity or put into the soil. This mass flow and what the most appropriate end market was was something that had not been resolved at government level.

(24) Mr Woodcock highlighted that the Government Biomass Energy Centre was the government's one stop shop of information on all forms of biomass including anaerobic digestion.

(25) Mr Woodcock then highlighted some of the key issues from his slide presentation that affected Kent which included the following:

(26) He advised that the Regional Forestry Strategy encapsulated all the benefits that the woodland could deliver to society and the environment. He felt that in order to do that there needed to be a robust industry to keep them delivering that. In Kent there were 40 000 hectares of existing woodland, the Forestry Commission directly managed about 3½ thousand and other public bodies managed 2½ thousand and the Wildlife Trust circa 95 charities managed 1200 but this could be more as they had recently bought more land and could be up to 2000.

(27) In response to a question, Mr Woodcock advised that because predominantly the woodland type was coppice or native woodland, there were about 3000 hectares of conifer and 2000 hectares were the Forestry Commissions, the majority of the woodlands in Kent were of coppice origin. In order to deliver the biodiversity the coppice would need to be brought back in cycle, although there may be reticence in some areas to manage, to deliver the biodiversity most of it would need active management, there would always be some areas which were none intervention, which was important too but the majority could be managed. He referred to a slide that indicated in pink the areas where the Forestry Commission had grant schemes for felling licenses approved for, highlighting that this did not mean that all the wood in those managed woods was harvested at the moment, conversely it did not mean that those not in the scheme were not managing their wood, though they should not be felling too much of it, that was critical. The England Wood Field Strategy was agreed with Government 3 years ago where the forestry Commission agree to bring in an extra 2 million cubit metres of wood to the wood fell market by 2020 from currently under managed woods. The South East had a ¼ of that target and on a County basis by taking the woodland area per county removing the woodlands that ere managed by the Forestry Commission and looking at what was left, Mr Woodcock felt that discussions should start for Kent at about 90 tonnes per year potential. That was not much more than half of a very conservative estimate, if a hectare of woodland in Kent could grow at 4 cubic metres of wood per year, chestnut was 8 per year on a good cycle, so would ash, hornby would be less but the density was higher, if you multiply the area by 4 you had about 140 thousand cubic metres per year at a conservative estimate. Mr Woodcock felt that half of that would be available to the wood fell market. He felt that Kent was strong in this regard because of its history in managing the woodlands was relatively recent and the accessibility to the woodlands was relatively good. He reminded the Committee of the Governments Low Carbon Transition Plan and the aspiration to create a lot more woodlands across the country.

(28) In response to the regulation covering the Forestry Commission Woodcock explained that the prime legislation on felling trees in the Forestry Act where by anyone wishing to fell more than 5 cubic metres of woodland per calendar quarter needs to get a felling license from the Forestry Commission. However active coppice management which would be chestnut on a 15 year rotation usually did not get to a size which fell into a licensable category. He recalled that someone tried to remove that exemption and was shot down robustly by the Kent Coppice Growers, if it were in cycle it would not need a license. The felling license was there to ensure the areas remain as woodland and that the felling was carried out in a sustainable way. There were a wide range of guidelines backed up by the UK Forestry Standard, which sets out the sustainability criteria. He referred to tree preservation orders that had been historically important in Kent. The small coppicing that fell out of the licensing requirements were being grobbed. There were cases in Kent where the woodland were being broken down into small holdings some worked well as 5-6 hectares in a block with people that wanted to do the right thing even if they did not know how to but there had also been woodlands broken down into caravan site blocks in eg Ashford. Ashford District Council historically had used article 4 directive to prevent the loss of woodland to develop the woodland in that way. It was a useful regulation to stop the loss of woodland.

(29) Mr Woodcock advised that anyone that wished to create a large area of woodland or remove large areas of woodland the Environment Impact Regulations for Forestry apply. The only place that they had been applied in Kent was when Mr

Prescott gave money to create Jeskyns Farm near Gravesend. There had been a full environmental impact assessment on the proposals there, the final outcome on what was delivered was very different to what was originally proposed and took on board a lot of local comment, the same would apply if someone wanted to remove an area of woodland to another land use. In terms of protecting species there was the European Protected Species Regulations which owners get very concerned about, the way this had been addressed was to give best practise guidelines for owners when you should coppice when you had eg dormouse and as long as they had those guidelines they would not require formal license to work the wood from Natural England

(30) Mr Woodcock then spoke about the requirement for central government bodies to buy any woodland products from demonstratively sustainable sources. There was a process called independent certification of woodlands, which most of the south east woodland owners did not go for because it was quite complex. The Central Point of Expertise on Timber Procurement (CPETP), a government body, says that an owner would have a management plan on their wood which the Forestry Commission could give grant aid and there would be an audit protocol, which the Forestry Commission would do as part of its normal inspections and this would be checked by some one else on a sample basis. The CPETP category B allowed the smaller woodland owners to meet those categories without too much burden on themselves. As a whole he felt they were robustly covered to ensure that the woodlands were not treated inappropriately that if the market went very strong the forestry Commission was watching.

(31) Mr Woodcock advised on issues to consider when considering a wood fill heating system which included the following

(32) Mr Woodcock advised that the forestry commission had made studies tours to Austria and Finland (Mr Brazier was present on the tour to Austria). He tabled a newsletter that came out of the study tours. Those were two countries where wood was use all the time the technology was very advance, the boiler were like those used in this country and were very efficient. The problems in this country were the cost, a Finish specialist was invited to this country in June to give advice on a selection of sites. Mr Woodcock said that if the County Council would like the specialist to look at a site in Kent he would be happy to arrange that for either a site that was not working too well or a new site this would be independent advice.

(33) The Chairman thanked Mr Woodcock and said that he would like to take up the offer and asked Ms Frampton to speak with Mr Andy Morgan.

(34) He went on the say that because there were a limited number of installations the experience of putting these systems was low and the companies that could do the installations was low a bigger barrier was the Government Procurement Rules that Forestry Commission had to go to a certain number of tenderees, which ended up being a sequence of subcontractors in that process he referred to the Maidstone Borough Council case where one of the sub contractors went bust and the reason why the system was not running was there was a leak in the chimney and no one would agree to fix it. He said that there were now small companies being set up in Kent and the South East, which he feared would be excluded from the tendering process and because of that a small number could keep the prices high. Mr Woodcock asked whether something could be done about this. There was a need to

understand the whole system there were a lot of companies that would sell the boiler the standard on the continent was to provide a turn key service basically you ordered a heating system and they provide one that worked they did not just sell you a boiler and expect you to get a plumber in to install it, you got a full snagging contract and you were left with a system that worked.

(35) In answer to the question on re establishing Kent's network of woodlands, Mr Woodcock said that if there was a market for the product then the woodlands would be managed. The price for the woodchip, if you wanted to buy woodchip for a high quality boiler like the Austrian type, which was very efficient, you would be paying approximately £80 per solid dry tonne to be delivered. He felt that as things bite that price would go up because owners of woodland would realise that the woodland had value and £100 per tonne would be more realistic, this equated to a fuel cost of 3 pence per kilowatt hour. The incentive proposed under the renewable heat incentive for systems up to 45 kilowatts was 9 pence per kilowatt hour from 45 – 500 kilowatts was 6½ pence per kilowatt hour and beyond that it was slightly less. Those incentives could make a huge difference to the viability of the systems.

(36) Mr Woodcock stressed the need to raise awareness in the business opportunity for the rural secure. The standard model on the continent was for a group of farmers or forester who had got together who might rent a room at a school they fit the boiler they facilitate the sourcing of the fuel and the school buys the heat. He felt that the people who would be strongest at that would be those who had learnt to do it for themselves, those that had already put in systems and had established their own supply chain and had demonstrated their credibility. The next step would be for them to go into selling heat. If a relationship could be struck up with someone with a wood close to the heat user the carbon transport costs low, a local relationship going and the buyer is assured of their supply. When you put wood on a lorry this added 7-8 pence per tonne to transport the wood.

(37) There were problems with woodland skills. There was a very aged workforce and there were more skills that needed to be encouraged. The management would be more mechanised than at present. He said that he was trying to discourage oversized machinery working in Kent's woods, because there would be damage to the stores, compact the soil and vulnerability to pests. Some of the continental machinery that had come into the south east region such as tractor based harvesting had a long reach of a minimum travel ability and could reach sweet chestnut. It would not suit everything and he said that he was not saying that all woods should go into wood fuel.

(38) Mr Woodcock then led onto exemplas of best practise. He felt that there was a need to promote those systems that were working well, because everyone remembered those systems that were not working well. There was a public understanding of the benefits to woodland forestry management because the majority of people felt that chopping trees was wrong.

(39) Mr Woodcock tabled posters on the management of forestry.

(40) Mr Woodcock explained that he had been asked to give examples of where some focused effort could be put in to try out some mechanisms to develop the wood fell market rather than doing things everywhere, to see what worked and what did not work. The two areas selected were the South Downs National Park and the North

Kent Downs. He was in discussions with Mrs C McKenzie, KCC and Mr N Hanson from Kent Downs, Area of Outstanding Natural Beauty (AONB) looking at a KCC INTERREG project. They would be looking at three key areas ie market pull, what could be done to get the markets running to make it easy for them. The information gained from the woodland heats solution project from the continent would be useful for this. The Forestry Commission had sponsored HETAS, solid fuel company, to finish their training course for their plumbers on solid fuel for wood and was hoping that they would roll out the training package to Kent or the South Downs at least.

(41) Mr Woodcock advised that in terms of the supply chain the Forestry Commission already worked on the principle that if someone was interested in putting in a system to use wood, Commission would try and make the introductions to the wood foresters owners etc advising of the potential market and these are the incentives that could help to pursue that market.

(42) The Forestry Commission was also trying something very new in helping woodland owners who had woodland close to woodland that it directly managed to help them manage their woods because there was a shortage of Management Foresters over the years there had been a sharp decline.

(43) Mr Woodcock then spoke about communications referring to the Kent Downs Orchid published to raise the benefits of woodland management.

(44) Mr Woodcock felt that it would be good to explore ways of jointly looking at opportunities by looking at the KCC estate, he acknowledge that a lot of work had already been undertaken on this, to find benefits, biodiversity and jobs.

(45) Mr Woodcock then led onto exemplars of best practise. He felt that there was a need to promote those systems that were working well, because everyone remembered those systems that were not working well. There was a public understanding of the benefits to woodland forestry management because the majority of people felt that chopping trees down was wrong.

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(50) Mr Woodcock then spoke about communications referring to the Kent Downs Orchid publicised to raise the benefits of woodland management.

(51) Mr Woodcock spoke on partnership working with KCC and said that it would be good to find ways where the Forestry Commission and KCC could jointly look at opportunities in the KCC estate, he acknowledge that a lot of work had already been undertaken on this, to promote the benefits, biodiversity and jobs as this would be an opportunity to secure jobs in the rural environment and provide jobs. Helping the industry establish itself and considering the fuel potential from the KCC existing wood.

(52) With regard to the Governments aspiration for more woods, Mr Woodcock advised that Kent was a well wooded area and, questioned whether there was a need for more woods, he gave five areas where there could be thought given to potential woods as follows:

- Around the Thamesgateway to improve both the look of the area and the accessibility around the area.

- Within the AONB, particularly where there could be linkage between woods to improve the ecological productivity,

- There were also areas around flood amelioration around areas like Ashford where you could put in a low down and identify areas that could be flooded and by using trees on that environment you would not reduce the productivity of it. It was also possible to use trees and the short rotation coppice to slow down the flows through a flooded area too.

- Hobby farms on the High Weald, where we know that the land had been broken up over the last 30 years. A lot of ownership was in smaller blocks, where there were 2 or 3 paddocks creating woodland to provide the fuel for the property or a group of properties may be an option in a well wooded environment. A few more hundred hectares would not make too much difference to the landscape.

- The Low Weald, because of the nature of the soil was very carbon hungry in terms of maintaining agricultural production; hence there may be an opportunity for some woodland creation in those areas.

(53) In response to a comment made by Mrs Tweed regarding support and advice for farmers, Mr Tubby advised that the Biomass energy Centre worked closely with the National Non Food Crop Centre that provided advice for farmers looking to grow industrial crops that could include oil seed rape, and so they would argue that that advice was out there. Mr Woodcock added that when they took the study tour they

were taken to a town called Murek, eastern Austria, where they had a group of farmers that had set up the whole sustainability package for the town so that they had district heating with wood, AD producing methane, and the gas was going into the gas network too. They had solar photovoltaic, they also had an oil seed rape plant producing biodiesel. The pump at the front supplying that biodiesel went back to the growers. There were technical issues about the process it was not just a matter of pressing the oil seed rape. The plant was not huge, the farmer brought in the oil seed rape it would be crushed and they took their biodiesel back. He then mentioned the example of a project DEFRA ran on the Goodwin Estate.

(54) In response to a question by Mr Prater, Mr Tubby explained that one of the down sides to biomass systems was the high capital cost. A new gas boiler may cost £1500 to £2000, if you bought a wood or pellet boiler it may cost £10 000 for the equivalent output. The heat incentive was aiming to give the owner payback after 8-10 years - if your boiler was in place more than 10 years you would get a greater incentive.

(55) The Government was making sure that it was a not coming up with perverse incentives. For a normal household they would deem what was an average heat load using the SAP rating process which was used to calculate how much energy a house would use. For a domestic house it could be estimated that they would use 15000 kilowatts of heat so you would be paid no more that 15000 times the value of the incentive, so it would be down to you where you sit there shivering or spending the money given to you.

(56) In response to a follow up question by Mr Prater, Mr Tubby explained that the building itself would be assessed to say 15000 kilowatt hours. For a school or a larger energy user they would use a heat meter.

(57) In response to a question by Mr Smith, Mr Tubby advised that the maintenance of the machinery would be ash removal which would be undertaken by staff maybe once a week or once a fortnight. A lot of the systems were self cleaning to a degree but needed to be serviced annually. It was a concern that he and his colleague had as to whether there were the skilled people to carry out the maintenance at a reasonable rate. The maintenance costs can be very high and the response time by the boiler installation companies could be quite long. Mr Woodcock said that if you thought of that for a local grower to put in a system they would take on all that responsibility, they would look for a local relationship with a local engineer and plumber. The technology was very robust. You would not have to buy the best boiler at £10000 you could buy a log boiler for £3000 from Baxi.

(58) In response to a question by the Chairman, Mr Tubby and Mr Woodcock advised that difference in price for a boiler was because of them being less common and it was intrinsically more expensive. The engineering in a biomass boiler was a lot more complex that a gas or oil boiler which puts the price up. There were cases of people importing the boilers themselves rather than going through a UK agent. As there were more biomass systems going in and competition get stiffer the capital cost would reduce to a degree, but it would never compete with gas or oil because the technology needed to be more robust.

(59) In response to a question from Mr Smith, Mr Woodcock explained that wood would not solve all the problems - it was one element in a renewable energy mix. It was silly not to use a resource we had that was currently not being used.

(60) At the current time, when talking about a small installation of 100 kilowatts this was not a problem, even at 90,000 tonnes we could do 90 community colleges the size of Crowborough, which would be a big system to start off. There were a lot of people using fire wood which may continue to grow. What made him really nervous was people speaking of large installations saying "I am going to put in a power station and I want to see if there are 250k tonnes a year from Kent". We say "there probably was but how much will you pay"? They then say "£25 per tonne" and we say "come back"!. He recalled Sittingbourne pulp mill that use to take 100k tonnes of wood per year and we never had all the woodlands in Kent managed just with that market alone. There were a few investors looking at small scale CHP that would be looking at tens of thousands of tonnes per year. The difficulty would be to find a site to use the heat. He mentioned the Eastern Quarry, a site of that scale could use that heat.

(61) In response to a question by Mr King, Mr Tubby advised that there were 10 energy supply companies that already supply boilers maintain it and you just pay for the output such as Dalkia. He felt that companies like that would be doing interesting things with the new heat incentive. They may own the boiler and sell the heat to the owner of the building - that approach removes the high capital cost to the end user but meant that the company had to be careful with their cash flow to ensure that they did not have all their capital tied up in boilers with insufficient revenue coming back through the renewable heat incentive.

(62) There were fuel suppliers and installers that were looking at ways in which they could wrap up finance packages and payment packages to the end user to address the high capital cost and the use of the renewable heat incentive. He felt that the heat incentive was a step in the right direction and moved away from the capital grant scheme, which potentially could leave end users looking for someone to maintain the system.

(63) In response to a question by Mr King, Mr Woodcock suggested that no one had come forward with a scheme for local heat and power because Ashford was too big. The builder did not want to do this because they were unfamiliar with it and the area was probably too big for the small local estates to invest in because it was not just the boiler it was the investment required in putting a heat main into the new estate as opposed to conventional power, with a boiler in ever house.

(64) The Forestry Commission had been working with SEEDA on their forestry site to encourage them to get the developers as part of the norm to put in a heat main from day 1 and then it would be easier. The heat main was very common in Europe that made a site like Ashford work. He felt that until we saw one or two going in and working smoothly people would be reluctant to go ahead. He gave an example of a system of homes in Redhill with a central boiler - some one got it wrong by leaving gravel in the pipes. Mr Tubby added that this was touching on the national psyche where people would say I could not possibly share my boiler, I want my own boiler that I have complete and utter control over and if I am on a shared system how would it affect my house price. People would need to be educated that this would change the control they had over their homes. Trying to educate the developer and the users was another challenge. Mr Woodcock said that one of the key things on wood fuel as

a whole was networking information about what had been done and where and doing that in a way that raises the awareness of the public and technical advice to the companies. He felt that the economic slow down had been beneficial because it had stopped that drive for more and more houses and people were now starting to think about these things.

(65) In response to a question by Mr Hibberd, Mr Tubby said that there were trace elements in wood, which would reflect the type of soil that it was growing in. Using wood from a traditional site there could be a trace element of metal. In a coastal location there would be a high salt content which for a heating system, could cause corrosion. On an industrial system the contents of the wood was measured very closely but this should not be a problem on a small scale project.

(66) In reply to a follow up question Mt Tubby advised that for 13 kilowatt hours you would burn 1 tonne of wood.

(67) In response to a question by Ms Frampton, Mr Tubby advised that any imported boiler would need the Microgeneration Certification Scheme (MCS) accreditation.

(68) In reply to a question by the Chairman, Mr Woodcock and Mr Tubby suggested the following should be carried out by KCC:

(a) Lead by example

(b) Educate the potential users

(c) Lobby for sympathetic planning

(d) Work on a pilot in Kent

(66) The Chairman and Members thanked Mr Tubby and Mr Woodcock for attending the meeting.

8. Jonathan Scurlock - Chief Adviser, Renewable Energy and Climate Change and William White -South East Regional Director, National Farmers Union
(Item 3)

(1) Mr White and Mr Scurlock were welcomed by the Chairman and Members to the meeting.

(2) Mr White gave a brief introduction advising that there were 5000 commercial farmers and growers paying a voluntary subscribing to the NFU an apolitical organisation.

(3) **How much production is coming of the farms for renewable energy, from which crops, what sort of potential is there to enhance that production and what sort of incentives were there to ensure that happens?**
(4) Mr Scurlock advised that the current position in the EU directives says that by 2020 across the Union renewable energy in all its forms, electricity generation,

supply of heat and transport fuels too had to become 20% across the whole of the EU. The UK had a target of 15% set which would be a big stretch over the next ten years as the UK was close to the bottom of the league table with 2-2½%, mostly in electricity very little renewable heat and a growth in transport renewable fuels. The NFU farmers were aware of the business opportunities of renewable energies but most farmers were still heavily dependent on fossil fuels.

(5) The level of awareness was growing. There were a number of initiatives taking place. The NFU and the CLA were involved with Farming Futures website farmingfutures.org.uk; which was a DEFRA funded information service designed to raise awareness about climate change, problems and solutions across many sectors, targeted at farmers. It was successful. It highlights that there was a growing problem which was reflected in farmer's ordinary experience in eg input costs, concerns with energy bills.

(6) To make this happen, some of the government policies were falling into place partly driven to the need to respond to the EU renewable directive. The Renewable Electricity Obligation was one of the earliest measures in 2001 that took over from the non fossil fuel obligation. There was then the Renewable Transport Fuel Obligation that required a rising proportion of bio fuels or other renewable transport services in the general public transport services mix mostly delivered by low blends of bio fuels. That was providing a useful new business opportunity for farmers and growers. Farmers had always grown grains whether wheat or oilseed rape for multiple purposes the best quality would go into making bread and biscuits, the middle quality would go for animal feed and the lower end of product quality would be used for producing industrial starch. The transport fuels needed and investment was being put in now into the market was large wheat to ethanol plants, 3 large plants, one already commissioned and one to come on line in North Humberside and a third one also in the North East region.

(7) Mr White put this in the Kent context. He had asked 10 NFU offices across Kent if there were any anaerobic digestion projects on the farms; there was not a single response. In contrast in Chichester there were 2 large vegetable growers supplying the multiples, the driver for them was the unique selling point they could offer anaerobic digestion to get rid of their waste, it was environmentally friendly, which the supermarkets wanted in their portfolio. In Kent there were biomass boilers, Nick Sanford SEEDA champion promoting biomass to farmers; it was very slow to take off. There was another SEEDA champion for Bio fuels, Andrew Martin an arable farmer on the Marsh he purchased an oil crush for oil seed rape but his project did not get further than the pilot, he was now selling the oil as cooking oil. There were farmers putting there toe in the water but nothing had taken off.

(8) **How big is that potential?**
(9) Mr Scurlock advised that the potential was huge. The UK had the best wind resources in Europe. There was also a very substantial bio energy resource, but this was not as easy to comprehend because it was in many different technologies and resources all of which required their own particular market drivers to make them happen but overall wind and bio energy were the UK's two biggest followed by solar in particular solar voltaic and small scale hydro. There was also ground source heating or heat pumps with some form of enhanced heat store as digging trenches in the ground was something that farmers could do and had the necessary land.

(10) **What would make the farming community regard this as mainstream and not peripheral?**
(11) Mr White felt this was achieved through removing barriers and introducing incentives. Mr White said that in his written submission to the Committee he made reference to force or targeting through the planning process. He felt that when a developer was planning a housing development a percentage of those through the local authority's plans should have renewable heat. Mr White questioned how else could you get the market going. The farmer need to see that there was a market for the woodchip that he had in his dormant woodland. There were other incentives that came out on 1 April.

(12) Mr Scurlock mentioned other incentives that included; renewables Electricity Obligation, Renewable Transport Obligation, which was suppose to drive in innovation in bio fuels the most recent budgetary revisions was to get rid of a duty derogation a duty differential between bio fuels and regular fossil liquid fuels has slowed down the opportunity at a small scale.

(13) Mr Scurlock explained that his Audi A6 had been modified to run on pure vegetable oil, which was provided by three farmers in North Wales. This was technically doable but needed to be market driven in order to get the majority of the NFU members interested rather than just being the early adopters and innovators. Many people in the mass market looked at the incentives that were available such as the feed in tariffs, [a small scale electricity revenue based reward mechanism] which was going to cause parts of the market to take off. Mr Scurlock advised that from 2011 there were plans, which should incentivise, from April, the supply of renewable heat, there would be some revenue based reward per kilo watt hour of renewable heat. This would be a great opportunity for farmers to diversify to heat services for new houses in rural areas for farm based business units. He advised that some farmers were still held back because they looked at it and felt that there would be problems with the distribution network operators and the electricity companies at local level. Farmers were saying that the network operators would not offer them a connection at a reasonable price and the process for getting that connection had huge up front costs rather than a friendly visit from a representative from the electricity company who was keen to come to the farm and talk about putting in new renewable electricity generation.

(14) Mr Scurlock considered whether the Environment Agency and Environment Regulation had a great fear in deploying aerobic digestion and were very bureaucratic giving; exemptions, standard permits, bespoke permits that were all very complicated for which he felt would need professional advisors to help you through. There was also a fear of planning committees. Mr Scurlock felt that planning committees had not been well briefed and there were concerns with previously unknown technology which hold up planning applications and then made projects uneconomic.

(15) **Did this fall outside the normal planning issues for agriculture?**
(16) Mr White said that if there were farmers in the room today they would say that there were still permitted development rights but they were far more limited than you were suggesting.

(17) Mr Hibberd agreed saying that the planning committees were struggling at present, the anaerobic digestion (AD) were generating public criticism, they too blamed the planning authorities but the planning authorities were keen to get a solution to this but had to take the technical advice that they were given and at the moment most of the technical advice was coming from the Department of Environment and there were problems with finding an alternative credible source of advice.

(18) Mr White said that DEFRA's anaerobic digestive implementation plan was very positive about the prospects for the industry and how it could be deployed in various forms; whether you were looking at the role of the water industry with their sewage sludge digesters or the opportunities for farmers to do purely farm feed stocks or the opportunity for farmers and waste management people to get together and do mixed feed stocks.

(19) Mr Hibberd advised that one of the conclusions of the Climate Select Committee was that agriculture was in a very favourable position in regards to climate change as it would give farmers the opportunity to produce better produce, with a shorter growing season and generally a better result as lot of this was through the enthusiasm by the NFU when they met the Committee.

(20) **What contribution could you make to the overall problem; bio fuels was one example but what could you make from animal waste generally it was put back into the ground?**
(21) Mr Scurlock advised that the idea of farm based AD was that you could take the manure and slurry through the digester and still use them afterwards because none of the nutrients were lost and the digestate, the by product contained all of the nutrients but since it had been through a process you know a lot more about those nutrients and could be applied to land in a more scientific manner. It was appositive way of looking at AD as a form of conditioning of using manure and slurry but you would not be able to make these part of an answer that was economically viable unless you put something in besides manure and slurry.

(22) **The usage of diesel oil in the farming community was considerable what was the scope in reducing that bearing in mind that it was mostly used to drive rotating machinery and I can not think of anything else that could fuel these, do you need diesel indefinitely or could you find another fuel?**
(23) Mr Scurlock explained that going back 100 years most European countries anything up to 1 in 4 arable fields were growing horse fodder which was used to provide transport energy for running the rest of the farm. There was nothing new about growing your own transport energy on the farm. With modern technology where you do not have to feed the transport when you were not working the ratio had improve where you can run a farm with 1 in 10 fields ie 100 hectare farm = 10k litres of vegetable oil from about 9 hectares 9% of your total field area. There were relatively few people practicing this now partly due to economics and some unfamiliarity with the technology but the same conversion that he had on his Audi A6 car was available for agricultural vehicles already. They would run on biodiesel a form of upgrade vegetable oil or they could be modified to run on pure vegetable oil that could be produced on the farm. The NFU were keen on the drop in biodiesel alternatives were the option as you would not have to convert the whole vehicle and

were relatively simple low cost modifications that could be made to existing equipment.

(24) **Who would pay for the processing plant?**
(25) Mr Scurlock said that there were farmers that were investing in their own rape seed crushing plant. Some of that was sold as a food grade product but the volume market if they wanted to crush a lot would be for energy purposes. The farmers may grow some high taste oil seed rape varieties to make food products and then grow some high production maximum oil yield varieties to service the fuel market.

(26) **What is going to be the driver for this? Would the NFU consider funding a mobile plant that travelled to the farms and converted the waste so that the farmer could use it rather than having to invest in the machinery?**
(27) Mr White felt that cost was always the issue and it would take a barrel of oil to reach the 'magic threshold' and it became economically viable for farmers to look at alternative fuel sources. He said that he was not for artificially adjusting things to force farmers down that route. If the multiples were to say to their suppliers 'we want to be the most green operator and we were going to do this through the following means; all tractors are to use pure processed oil, these were the costs for their 12k producers and they get 2pence per litre extra in the milk price to do this'. Mr White considered that this was how he would like it to be carried out with a price incentive so that it is recognised that there was value to doing this.

(28) Mr White explained that the net cost of crushing rapeseed oil was 55 pence per litre the net price for red diesel is 45-55 pence per litre the price was creeping back up. The farmer would have to account for the labour cost of operating oil seed crushing machine and also paying back the capital invested in the machine. Mobile processing rigs were a possibility, set up through a co op with funding through RDPE which was a major funding stream. Taxation was another issue HMRC were not sympathetic and was not interested, which was essentially due to the treasury. It was going to get rid of the 20 pence derogation on bio fuels compared with fossil derived liquid fuels. The government said that its policy for increasing the bio fuels in the UK economy was to fulfil the transport renewable fuels obligation. Mr White said that this was not working at present because following the Gallagher Review the government decision makers slowed down the accelerating requirement laced upon liquid transport fuel supplied by the renewable transport fuels obligation and so there was over fulfilment of the RTFO at present and the tradable certificate were virtually worthless, whereas the renewable electricity obligation had headroom the industry was struggling to catch up with the government target but there was always room for the government to buy and trade certificates within that headroom and the certificates had substantial value to the renewable transport fuels obligation was not the case at the present time and unless the government sees that it would have to readjust the RTFO to see those certificates having value. Mr White felt that all of the small bio fuel processors and producers were being squeezed at present.

(29) **There were huge numbers of the public in Kent that would like the opportunity to run their cars on vegetable oil but it seemed that we needed to get the distributors on board who is selling it?**
(30) Mr Scurlock explained that his can would also run on ordinary diesel and vegetable oil. The suppliers of the vegetable oil were often linked to those that offered the conversion technology for vehicles. He advised that his conversion was by Elsbett a German run manufacturer that had developed a lot of technology in the use of vegetable oil and diesels. There were other conversion manufacturers' one in Wolverhampton that dealt in diesel veg. The people trying to build an industry around this mainly Elsbett had a distributer in this region, in Tonbridge Dominic Goodwin of Bio motors Mr Goodwin had done a lot of lobbying with HMRC over taxation or the creation of derogations of very small producers of bio fuels. A Lot of the vehicle that people were converting were out of warranty but Elsbett offered a warranty on the conversion work done, they would pay for repairs that could be attributed to the conversion not working properly. He said that he could buy the fuel in 200 litre oil drums which were delivered to his house. He was also sharing a fuel supply, 1000 litre IVC which came directly from Theo Jones at DML bio fuels in North Wales. There were also countrywide a chain of farm shops that had set up filling areas in the north east region. Mr White advised that there was also a firm in Brighton that would provide bio fuel.

(31) Mrs Tweed commented that this was a stumbling block to the entrepreneurial farmers to sell the oil and for the public to find a distributor and having the capacity to store huge amounts of oil on their own premises. Mr Scurlock felt that the heating oil market needed to be watched as the renewable heating incentive may breathe new life into this. There had been experimental work undertaken in Norfolk with Riello a supplier of central heating/boiler systems.

(32) **What happens if the land to grow the rapeseed oil is sold off for housing development?**
(33) Mr White felt that this was not an issue providing the development funding goes into the farming industry to maintain and increase then he did not see any difficulty in food production keeping pace with land loss but this required a step change in the R and D effort that went into the farming industry which had been systematically run down in the last 20 years. Food 2030 which was DEFRA's food security paper the whole thing was being rethought. He felt that there were tensions with the seawalls not being maintained because of the cost and so some of the best and most versatile land, which was usually below the 5 metre contour was lost to the sea to benefit the environment biodiversity he felt that there were real tensions with what government policy said against food production.

(34) **What would it cost to convert and buy 100 litres of oil?**
(35) Mr Scurlock advised that Elsbett would sell a conversion kit for your car for £500 or £1000-£1100 fitted with the warranty on it. The fuel cost in large bulk approximately 70 pence per litre in the smaller drums it was 9p pence per litre and you pay a small fee to rent the drum and pump from the supplier. He was not sure of the cost for the conversion of the heating boiler but estimated it at £1000 for installation and the modification to the burner. Mr Scurlock stated that under the current tax rules if you were using less than 2500 litres per year you did not need to register or pay duty but that was an administration simplification measure brought in by the HMRC it did not represent future government policy on taxation on bio based fuels. He felt that the government had overlooked the opportunities for local

production, distribution, and job creation in those supply chains. Mr White advised that there was a website called biodiesel filling UK which mapped out the companies that wee buying vegetable oil and diesel which was a voluntary initiative. The Energy Saving Trust tried to maintain a data base of alternative fuels but dropped as it was difficult to keep up to date. Morrisons until recently were supplying a 30% blend of biodiesel which was receiving quite favourable uptake with a fleet of operators but with the removal of the duty derogation the bulk supplier of the fuel Harvest Energy found that it was no longer economic Morrisons had dropped the product and that had created problems for them as it had put in a lot of investment working on which pump on all of the various forecourts was going to be dispensing the alternative product.

(36) **Do you think that we would regionalise the farms so that bio fuels could be produced in one area because renewables can be produced in some areas better than others?**
(37) Mr White said in the broad sense this was yes, farmers did not tend to collate but by collaboration the answer would be yes. Farmers would be able to send out renewable energy if they worked together. There were various projects that attempt to bring sources of wood stocks together but it was difficult but he felt that would reach this point. Mr Scurlock said that many renewable technologies necessarily will export energy services just by virtue of the economic scale being deployed. If you were putting on micro wind turbines or a small amount of solar PV then that would be meeting on farm energy needs but an AD generally in order to be economic with the feed in tariffs being accessible from central government had to be quite a big piece of kit it would be a relatively large dairy or live stock farm but it would produce ten times as much electricity needed on the farm itself so that electricity connect was essential to make that work and the public would definitely benefit from 90% of the renewable electricity produced on that farm. For Kent as a whole there was every expectation that farmers would be net exporters of renewable energy services and providing that solution to help and deploy the low carbon economy.

(38) **What three things would you like the Select Committee to ask the government to do and what three things would you like Kent County Council to do?**
(39) Mr White said that the government should consider the following:

- Grid Access
- Better planning guidance
- Better targeted Renewable Energy Tariffs
- Look at permitted development rights for some renewable projects such as Photo Voltaic on farming building roofs
- The wind industry were keen to see PD in rural areas extended to taller turbines
- Government documents published SEEDA such as ‘Harnessing the Elements’ need to have teeth

and those for KCC

- Lead by example
- Put your efforts into lobbying Central Government for our points to the government

(40) The Chairman and Members thanked Mr White and Mr Scurlock for attending the meeting.

9. Dr Howard Lee - Lecturer and Sustainability Champion, Hadlow College *(Item 4)*

(Please note – a PowerPoint presentation prepared by Dr Lee will be appended to these notes)

1. Dr Lee explained that as an educator he had no agenda in the field of renewable energy other than his aims towards achieving sustainability and quality of life for the citizens of Kent.

2. Hadlow College offers a Sustainable Land Management Degree which, so far, is the only such degree in the country and takes account of social as well as geographical issues.

3. Dr Lee explained to the select committee that he was highly conscious of resource efficiencies and that we are moving into a position of considerable change. With 'wobbly economics, resource depletion including oil depletion, climate change and other factors, 'business as usual' will not continue and we must think about what we put in its place to avert crisis by looking at possible scenarios. There are strong links between energy and food security.

4. Mr Ferrin indicated the committee was interested to hear Dr Lee's views and to learn of the issues on which KCC should make representation to the government, and those upon which we could act ourselves. Dr Lee had posed these questions to his students and it was evident that there were no easy answers.

5. To begin with, it is necessary to understand the requirement across the county and what could be done about changes using a spatial geographical approach and GIS to clarify what, for the county, is an appropriate mix of technologies.

6. Dr Lee believed that the offshore wind developments around the coast were potentially very successful. Regarding onshore wind in the county, having visited the testing site and seen demonstrations, he believed that medi turbines which are 15-20m tall (Quiet Revolution - QR) could be successful in Kent if correctly sited.

7. Solar technology should be incorporated anywhere there was a new development and PV-T (combining photovoltaic and solar thermal panels for both electricity generation and heat production) were far more efficient than the single technologies. Crossways house featured on Grand Designs in Staplehurst had used this technology. The architect, Mr Richard Hawkes had stated to Dr Lee at a conference that 12 square metres of PV-T panels on an average house would provide most of the heating and electricity required.

8. Anaerobic digestion provides around a 50:50 ratio of Carbon Dioxide and Methane (a greenhouse gas which if burned, is not a problem), and end products rich in nitrogen and phosphorus which are both used as fertilisers. The gas can be

burned in gas engines to provide electricity and heat. Methane can also be used to drive petrol engines having first been scrubbed and stored in cylinders as for liquid propane gas (LPG). Dr Lee believes that all these are interesting developments which are in danger of passing us by in Kent.

9. The amount of petrol and diesel now used (for transport) could in no way be replaced by the methane but some of it could.

10. For woody biomass there is also potential, as well as biodiesel from oil seed rape. For woody biomass Dr Lee felt that sweet chestnut coppicing in Kent should be reenergised and he used as an example a farmer near Canterbury who ran a soft fruit business and had successfully installed a large wood chip boiler.

11. If biomass boilers were installed in schools to replace oil-fired heating, this would be of great benefit. However this source of renewable energy would not provide heat or electricity for most people, though it could be of some use in rural areas.

12. Regarding biodiesel, from oily crops, and bioethanol from starchy crops it is Dr Lee's view that these have no future due to food security issues. In this regard he believed that the situation now is similar to that in the 1930s. We can produce all our own wheat but in terms of overall food supply only enough for 2/3 of the country can be produced here and this is taking account of relatively high inputs to agricultural systems from fossil fuel-based fertilisers.

13. In the past, the horse had a high-energy diet and provided the work on farms. Now talented farmers have maximised crop yields, but only by relying on supplies of fertiliser and pesticides which are themselves dependent on natural Gas and oil. These are fixed resources and the evidence for Peak Oil and Peak Gas shows that demand will soon exceed supply; the problem being short-term access. New supplies are becoming increasingly difficult to access, and usually involve drilling for oil through deep sea and bedrock, pushing the technology to its limits. This risks catastrophic failures and environmental pollution, such as the current situation off the coast of the US.

14. Demand for oil is rising and so we are close to a situation where demand exceeds supply and this could be as soon as this, or next year according to some experts. An influencing factor is the economic recovery of Europe. However, UK recovery in the first quarter of 2010 has been limited and our GDP has only risen by 0.2% this year while the US was 3.2%. As Europe moves ahead, so will the demand for oil and gas which has a big impact on price and availability. Economists and governments are rightly nervous and as with July 2008, prices could go up very suddenly. For farmers this means the price of fertilisers go up along with the price of oil, they may not be able to make ends meet as the price of the inputs exceeds the value of the outputs they can achieve – meaning that yields would drop away. Instead of producing 2/3 of what the country needs, dependency on oil could reduce domestic food production further.

15. It is then necessary to look at the worst case scenario to enable planning. Apart from climate change drivers, what would happen if supplies of oil and gas were compromised? What would happen to our way of life in Kent if petrol and diesel rose to £3, £4 or £5 per litre – in that extreme scenario people would not be able to afford to get to work, there would be interrupted supplies of food as agricultural

inputs were scarce. We have seen how the media impacts on consumers and supermarkets, who operate on 'just-in-time'- delivery, could see empty shelves within 48 hours.

16. The government would therefore like to see more self sufficiency. We cannot rely totally on on-farm production. We can reduce fossil inputs but without them we cannot achieve the same level of production. What is required is Zero Carbon Farms, and pilot projects are needed to find out how farms function with no fossil energy inputs. Organic farmers are already working on this principle. Bore Place in Kent is looking at this and the concept needs to be driven forward so that we can learn from the challenges that arise.

17. Furthermore, regarding food and energy, the urban and periurban areas are at the centre of the challenge. These are crowded areas and account for 80% of the population of the UK where energy, food and water supplies will be the biggest challenge over the next 30-40 years. Universities are not currently carrying many courses in this areas – a quick search revealed only a post graduate course at Reading University; in London there are NGO projects but there is little at government or regional government level.

18. Mr Ferrin indicated that the select committee was concerned about these issues and supported the view and the need for research, but what were the potential solutions?

19. Dr Lee said there was not enough known about tying the technologies together – it was not just energy generation and not just food production but more about how to fit these two things together and to empower communities, who would be much more faced with responsibility for food and energy generation at a local level.

20. Mr Ferrin indicated that for an area like Hadlow it was clear to see how this might work but for Cliftonville, for example, what is the potential and how could it be achieved? In response Dr Lee indicated the need for pilot projects and groups of households working together to achieve what was best in terms of food, energy and water.

21. For example a study could comprise 20-30 houses with 40-50 people to see how they could function over a few years. With the appropriate funding, houses could be retrofitted, with PV-T and in some cases ground source heat pumps though these are not so attractive energetically, and rainwater harvesting. The properties could be monitored for energy and water and people could share in a community allotment based on gardens or on adjacent land. This would be managed by a group of people in the mode of the Low Carbon Community at Hadlow, growing fruit and vegetables, keeping chickens; accessing renewable energy, harvesting rainwater, recycling and composting. Small-scale anaerobic digestion is a possibility. The biodiversity and social issues would also be monitored along with physical and mental health. In the past, large market gardens used to surround our cities so the concept is really nothing new.

22. Mr Ferrin said he was concerned about the provision of baseload electricity and Dr Lee said he was confident such a project could be self-sufficient in electricity and of more importance was the availability of food (and its transport). There followed a discussion about how this could work for supermarkets, offices and

factories and Dr Lee advised it would depend on the location of industries and the riots currently being experienced in Greece were given as an example of the results of inaction.

23. Mrs Tweed commented that it was an exciting prospect to think of getting communities to focus in on the life of the community as part of the wider picture. She could see potential in Ashford for links with the North School, where there was planning permission to build houses, and which could provide the opportunity to try this out with householders from 20 of the new houses, in conjunction with the farm on the school site.

24. Dr Lee said that many groups were interested in this concept and that resulting from a pilot there could soon be units of 500 -1000 people functioning properly as a sustainable community (there is evidence that this is about the maximum size that can sustain an active community).

25. Mr Ferrin said he was sure this could be done and had himself found £10,000 for four projects in Kent. Dr Lee agreed and indeed Hadlow had been one of these; the four projects were significantly different but had shown progress and that it works.

26. Mr Ferrin referred to Deal and that having had proof of concept, what was now needed was proof of delivery and evidence of base energy load across the place, saying even if Kent were covered with turbines this would still not satisfy base energy needs unless there was some advance with technology such as cold fusion.

27. In Dr Lee's view, we will never again be able to enjoy the energy richness of past decades since energy consumption per person per day was now 40 or 50 times more than it had been a few generations ago. Replacing this energy level with renewable energy was not possible and it was key to identify how we could work with people to gain their acceptance of change and that we could not, with renewables, have what we have now.

28. Mr Hibberd said he held a different view and believed that difficulties were caused by there being too many people. He believed that tackling this, and the location of people was the way to deal with the problem. He referred to the end of WW2 when London was overpopulated and it was agreed that people would be decamped out of London. This reduced the population by 4 million and as a result sustainable towns were developed. The population of Kent is now around 1.4 million which is too many for Kent's natural resources, while in some areas of the country there is little population. As a result of this we will continue to have problems.

29. Dr Lee responded that this kind of thing was possible. Inducements could be offered for people to relocate to less populated areas however when Jonathan Porrit had talked about UK population being half what is, this message was not well-received. It is a long term issue and would be related to quality of life. If people found the energy supply (in Kent) was less then they needed, and there were food problems, then they may want to move away but the government would have to offer encouragement. Mr Hibberd agreed that the alternative was to 'nibble at the periphery of the problem' and that it was indeed controversial.

30. Mrs Tweed referred to the plans for development in the South East and that Ashford was trying to deliver 27,000 new homes.

31. Mr King pointed out that it was less to do with where, particularly, we live and more to do with the overall sustainability of food and fuel. If we rely on imports the cost of bringing food and fuel in will rise, so food costs would rise while at the same time they would become shorter in supply. A rethink was needed to identify how we can become sustainable and this would involve habits of travelling to work, eating; the whole character of which would need to be radically redesigned over the next 20-30 years.

32. Mr King referred to Parishes, indicated that only 50% of the county was Parished so while Mr King's village was, for example, Parished, urban areas were not and in those areas people did not sit together and elect local representatives so politically there were not structures within which these issues could easily be moved forward.

33. Regarding the base source of underlying electricity this could not come from unreliable sources like wind or PV and Mr King asked Dr Lee what his views were on nuclear and tidal energy which were more reliable.

34. Dr Lee referred to interesting projects in Southampton and Birmingham where electricity was generated in the middle of a city and the problems of making it available. There were also district heating grids. In this regard the need for a national grid system could be reconsidered. Regarding a baseline supply, the days of dirty, coal fired power stations are numbered and dirty, coal-fired power stations will be taken offline in the next 10 years. This would mean there will be insufficient supplies and the national grid would crash. We could go back to looking at regional grids and the development of a base layer of electricity provided in urban areas, rather than expecting it to be brought in on pylons.

35. Though there are already efficient gas engines which burn natural gas, Dr Lee felt this would depend greatly on fossil energy availability and could only provide interim supplies while we are moving in the direction of renewable energy. Anaerobic digestion could, for example, provide energy 24 hours a day, 7 days a week and the gas produced could be burnt in gas engines.

36. Tidal energy is promising and there is the nuclear option to which Dr Lee had no particular objection however the shortfalls in energy supply would be much more immediate than the period over which nuclear and tidal energy could be developed. These were decades away from providing what we need.

37. In response to a question about what proportion of energy supply renewable energy could provide over the next 10 years, if there was sufficient investment, Dr Lee indicated that first we would need to reduce consumption and focus on improved quality of life for residents if pilots for households were taken forward and rolled out. Industry would need to be looked at on a site by site basis. On this basis renewable energy could realistically provide 50% of needs in the next 20 years.

38. A significant barrier to achieving this is the planning law which can be a serious impediment. Dr Lee had been keen to employ a 2/3 MW anaerobic digester for the community in Hadlow but Tonbridge and Malling had informally indicated this would not get planning permission due to public nuisance as this would have meant 3-4 20 tonne lorries per week across a particular route.

39. Mr King indicated that the County Council planning function had experienced the same dilemma regarding waste to energy (thermal) and Dr Lee stressed the need for this to be addressed regionally with a shift in planning so that proposals are better received by the district planning committee.

40. Mr Hibberd refered to the IPC having control over large scale planning but also that AD locally would depend on the fuel being brought in by lorries so there was still a reliance on fossil fuel (diesel oil). Was there therefore a need to determine the absolute necessities for electricity supply e.g. hospitals, communications industry to avoid breakdowns and disorder? Domestic supplies were some way down the scale of relative importance.

41. Dr Lee indicated that the public would of course not want power cuts but that these could become a regular occurrence.

42. Mr Hibberd agreed that this could hit hard as we were used to a system that had frequently doubled in capacity over 10 year periods, which had worked in the past. However there was now a need for the public to accept that in future, when it gets cold in the winter it 'was time to put on sweaters'.

43. Dr Lee agreed that it was important to focus on the fact that there would in fact be benefits for communities and that if this, and not the 'penalties' were the focus people would be more inclined to compromise. It was therefore important to identify how to divide up areas into community groups.

44. Mr Ferrin believed that there were perhaps more firmly established communities than might be thought, using the example of Farthing Corner and Parkwood where people knew the differences and already had established communities. Dr Lee found this encouraging.

45. Mrs Tweed referred to groups in Ashford that she believed were keen to take such ideas forward.

46. To progress it was agreed that there was a need to break down attitudes towards planning and that people needed to understand better the seriousness of the situation.

47. Ideas such as community allotments, adopt a garden, and work-based schemes could be important.

48. Mr Ferrin, in concluding the meeting asked Dr Lee about priorities for central and local government action and these were:

Central

1. A series of regional grids rather than one national grid

2. A greater emphasis on urban and peri urban sustainability for energy and food

3. The encouragement of sustainable communities with a much greater level of self sufficiency in energy, food and water

Local

- Pilot projects involving FE and HE establishments in monitoring sustainable communities, to help us learn best practise and then replicate

- Transport issues, car and taxi journeys – how to enable citizens to use cars less and still enjoy a good quality of life
- Encouraging community involvement and a priority for food self-sufficiency