TURNCOLE WIND FARM
Environmental Statement 2010

Volume 2 – Appendices
## APPENDICES

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APPENDIX 1.1 CALCULATION OF HOMES SUPPLIED AND POLLUTION SAVED BY TURNCOLE WIND FARM

The method used to calculate homes supplied and pollution savings at the proposed Turncole Wind Farm, is based on that used and supported by the BWEA as industry standard seen at http://www.bwea.com/edu/calcs.html

Households Supplied

To calculate the number of households whose annual electricity demand would equal the output of the proposed Turncole Wind Farm, the following equation has been used:

Number of Households = \( \frac{\text{installed capacity (kW) \times 0.323 \times 8,760}}{4,700} \)

Where:

- the installed capacity of Turncole Wind Farm is nominally 12.6MW, or 12,600kW, this is 7 turbines each of 1.8MW capacity.
- 0.323 (i.e. 32.3%) is the mean load factor that takes into account the fluctuating nature of the wind, and various loss mechanisms (e.g. wakes and electrical transmission), based on NOABL wind speed data (http://www.bwea.com/noabl/index.html) which is an estimated wind speed database from the DTI.
- 8,760 is the number of hours in a year
- 4,700kWh is the average UK household electricity usage per year (Figures taken from http://www.bwea.com/edu/calcs.html).

Therefore: Homes supplied = \( \frac{12,600 \times 0.323 \times 8760}{4,700} = 7585 \)

In Summary, Turncole Wind Farm would produce enough electricity to supply 7585 homes.


In Maldon District there were 24,189 occupied households in 2001.

Percentage of households served = \( 100 \times \frac{7585}{24,189} = 31.36\% \) of homes in Maldon District. In Summary, Turncole Wind Farm would supply the equivalent of approximately 31.4% of the homes in Maldon District.

Pollution Savings

Every unit (kilowatt-hour, kWh) of electricity produced by the wind displaces a unit of electricity that would otherwise have been produced by a power station burning fossil fuel.

For each unit of electricity generated by Turncole Wind Farm, savings would be made of 430g CO\(_2\) and small amounts of other pollutants (Figures taken from BWEA, 2008).

To calculate pollutants saved by the wind farm the following equation has been used:

Annual CO\(_2\) emissions reductions (in tonnes) = \( \frac{(A \times 0.323 \times 8,760 \times 430)}{1,000} = 15,330 \)

Where: A is the rated capacity of the wind energy development in MW i.e. 12.6 MW; 0.323 (i.e. 32.3%) is the mean load factor that takes into account the fluctuating nature of the wind, and various loss mechanisms (e.g. wakes and electrical transmission) based on NOABL; 8,760 is the number of hours in a year.

The above calculations are based on conservative assumptions and computer modelling, if the calculations are based on actual measured wind speed then the resulting mean load factors would increase to 39.8%. This would mean that the potential equivalent electricity could power over 9,300 homes and save 18,890 tonnes of CO\(_2\) per annum
APPENDIX 3.1 ENVIRONMENTAL STATEMENT SCOPING REPORT (MARCH 2010)

INTRODUCTION

This document relates to a proposal by RES UK & Ireland Ltd (RES) for a proposed wind farm. The Turncole Farm site comprises of open, flat arable farmland. The proposed site is located approximately 3km south east of Southminster, as shown on the Site Location Plan, Appendix 1. It is estimated that the site could accommodate up to 7 large wind turbines, although it is recognised that the number may change due to technical, environmental, commercial constraints and the suitability of the site.

RES intend to submit a planning application and accompanying Environmental Statement (ES) to Maldon District Council for the proposed Turncole Farm Wind Farm, and have committed to commission studies to assist in an Environmental Impact Assessment (EIA) under Schedule 2 of the Environmental Impact Assessment Regulations 1999 (hereinafter the EIA Regulations).

The undertaking of an EIA will help to ensure that the likely significant environmental effects, both positive and negative, of the proposed development are assessed in a systematic way. In addition it will enable the significance of these effects and, if appropriate, the scope for reducing, mitigating together with possible enhancements is to be clearly understood by the Council, the public and the statutory consultees.

In line with best practice, the overall EIA process is being initiated through a scoping exercise with the planning authority and in consultation with other prescribed consultation bodies will guide our EIA process. A Scoping Report is provided here to identify all aspects of the scheme of potential environmental significance and to highlight the key issues to be addressed in the ES.

Additional objectives are:

- To establish the availability of baseline data;
- To define a survey and assessment framework from which a comprehensive overall assessment can be produced;
- To invite statutory and non-statutory consultees to comment on the project in terms of:
  - the potential effects to be assessed;
  - the environmental assessment methodology outlined for each issue;
  - any other areas which should be addressed in the assessment; and
  - any issues of perceived concern.

To invite the planning authority and consultation bodies to provide any relevant environmental information relating to the site and surrounding area.

THE APPLICANT

RES is one of the world’s leading renewable energy developers. From large-scale wind farms and biomass power plants to on-site renewables, we are dedicated to the provision of reliable, low-carbon energy solutions. Drawing on decades of experience in the renewable energy and construction industries, RES has the expertise to develop, construct and operate projects of outstanding quality. Our enviable track record in project delivery has given us a reputation for excellence that is second to none. In the quarter of a century since RES was formed, we have played a central role in the development of the global renewable energy market and we have helped to move the sustainable energy debate from the margin to the mainstream.
EIA APPROACH

EIA is the systematic assessment of the potential effects of a proposal on the environment, including effects on human activity. The outputs, in the form of an ES, are used to inform the decision making process of the consenting authority, in this case Maldon District Council. The following key stages would be followed in the development process:

- **Scoping:** consultation with relevant statutory consultees and other stakeholders to obtain their views on the proposal; identify potential impacts; identify existing environmental information and to agree methods for the assessment of these impacts. Scoping will also establish the need for feedback to, and ongoing consultation, with various key consultees.

- **Baseline Studies:** identification of existing environmental conditions and sensitivities through review of existing information and monitoring and field studies as required;

- **Layout Freeze:** once the baseline sensitivities are understood a wind farm layout will be designed which will seek to minimise negative effects and maximise beneficial effects.

- **Assessment of Effects and their Significance:** an assessment of the significance at local, regional, national and international scales of potential impacts;

- **Mitigation:** ‘Primary Mitigation’ is measures undertaken during the layout of the proposal which seeks to avoid effects from the outset by maintaining a suitable separation distance from sensitive receptors. ‘Secondary Mitigation’ are measures designed to avoid, reduce remedy or compensate for any predicted significant impacts of the proposal. Other measures may also be described which seek to reduce any non-significant effects.

- **Residual Effects:** identification and assessment of residual effects after mitigation.

CONSULTATION

A consultation programme will be undertaken as part of the EIA process, to allow those with an interest in the development to participate in the decision-making process. The following organisations have been, or will be, consulted by RES during the EIA process:

- Local Planning Authority
- County Council
- Environment Agency
- Natural England
- English Heritage
- Royal Society for the Protection of Birds
- Public Rights of Way Officer
- Local Wildlife Trust
- OFCOM
- JRC
- BBC
Please advise if additional consultees are to be contacted.

**DESCRIPTION OF PROPOSED DEVELOPMENT**

**Site**

The site lies 3km to the south east of Southminster. The site is centred on Ordinance Survey grid ref TQ 991 977 and covers an area of 465 hectares.

**Project Description**

The site is considered to have sufficient capacity for up to 7 wind turbines, however this may change as a consequence of the EIA process informing the design. As currently proposed, the Turncole Farm Wind Farm would produce sufficient electrical energy every year to satisfy the average annual requirements of approximately 11,125 homes. As currently proposed, the wind farm development at Turncole will comprise:

- Up to 7 three-bladed horizontal axis wind turbines of up to 127m tip-height, nominally rated at up to 2.3MW;
- at each turbine, associated low to medium voltage transformers and related switchgear;
- turbine foundations;
- hard-standing areas for erection cranes at each turbine location;
- a single, permanent, free-standing meteorological mast;
- a series of on-site tracks;
- a site access route from the main road network;
- borrow pits;
- a sub-station compound containing a control building;
- a network of buried electrical cables;
- temporary construction compounds; and
- One or two temporary guyed meteorological masts to be used for detailed wind definition and wind farm commissioning/acceptance testing.

Wind Turbines

Using the 2.3MW Siemens turbine as a guide, turbine dimensions would be: tower height 80m, rotor diameter of 93m; giving an overall tip height of 126.5m. The indicative capacity of each turbine is 2.3MW, and the overall wind farm capacity will be up to 16.1MW. The turbines will be painted in a visually recessive colour, typically a light grey or white.

Turbine Foundations

The turbines will be fixed to reinforced octagonal tapered concrete foundations up to 20m diameter. The foundations will be formed in excavations up to 4m deep, depending upon the depth of peat on the site, and the depth to suitable load bearing ground. Prior to excavation, topsoil and existing vegetation will be lifted and stored. After completion the foundations will be backfilled with reserved excavated material and the original vegetation will be reinstated if it is considered ecologically sensitive. Concrete for site construction, including turbine foundations, would either be batched on-site, with materials either being sourced on-site or brought in from off-site depending on availability, or obtained from off-site sources located as close to the site as possible.

Transformers

Turbines typically generate at 690V. In order to prevent cable losses and to minimise cable diameter, the voltage is increased to 33kV by transformers at each turbine.

Electrical Cabling

The turbines would be electrically connected to the control building by means of 33kV cables. These cables would be laid underground in trenches running adjacent to the site tracks, leading to the on-site control building. These trenches would be backfilled with retained excavated material, marked with buried safety warning tape and have the original vegetation reinstated.

Control Building

The electrical cables would terminate at the control building, located adjacent to the grid substation compound, comprising switchgear, control equipment and mess facilities. Typically the
control building would be approximately 20m x 13m x 6m high and with an appropriate vernacular design.

**Access and Site Tracks**

The access route to the site is yet to be confirmed and shall be subject to computer generated swept path analyses to confirm the horizontal alignment. Existing tracks on the site itself will be utilised wherever reasonably practicable. New and upgraded tracks would be typically up to 6m wide with appropriate widening at corners and passing places dependent on site conditions. The verges of the tracks would be reinstated as appropriate after construction.

**Borrow Pits**

Stone will be required for various purposes, primarily track construction. A proportion of this will be won from foundation excavation and the remainder will be sourced from on-site borrow pits if the stone is found to be suitable.

**Crane Hardstanding Pads**

The turbines are erected using mobile cranes. These require areas of hard standing adjacent to the turbine locations, which can support the load of the cranes on their outriggers. The pads, typically up to approximately 20m by 40m dependent on site conditions, are formed by excavating soft ground, and infilling with compacted stone.

**Construction Compound**

A site compound of approximately 50m by 50m, would be required to contain temporary site offices and with services including sealed waste storage toilet facilities; sufficient parking for cars and construction vehicles; containerised storage facilities and a receiving area for incoming vehicles. After construction, the compound would be removed and the site cleared of hard-core, with the ground re-graded to a natural profile.

**Grid Connection**

The electrical connection between the wind farm and the grid network will be subject to a separate planning application under Section 37 of the Electricity Act 1989. The detailed environmental studies and reporting shall accompany that application. However, if sufficient detail is available from the District Network Operator the ES for the wind farm proposal will include consideration of the environmental effects of the indicative grid route corridor.

**Construction Process**

It is currently estimated that construction would take approximately 12 months from award of contract; however this would be subject to environmental and weather constraints which may extend this period. The main phases would include:

- access route road improvements;
- site entrance construction and excavation of first borrow pit;
- construction/upgrade of on-site access tracks;
- construction of temporary construction compound and hardstandings;
- construction of turbine foundations, requiring the import of concrete and steel;
- construction of the substation compound and control building;
- excavation of trenches and laying of cables alongside site tracks;
connection of distribution cables;

delivery and erection of wind turbines;

commissioning of site equipment; and

site demobilisation and restoration.

Some of these activities will be carried out concurrently in order to reduce the length of the construction programme. Site restoration will be conducted as early as possible.

Vehicle Movements during Construction

Vehicle movements associated with construction works will include:

- Cars and minibuses for transporting construction personnel onto the site;
- Heavy goods vehicles (HGVs) for pre-construction delivery of site offices and construction equipment;
- HGV abnormal load vehicles for delivery of the turbine components and base rings;
- Two mobile road going cranes, used for the erection of the turbines; and
- Standard HGVs for transporting electrical cable, steel reinforcement for foundations, construction plant fuel and other items and equipment.

A traffic management plan will be agreed in consultation with the local highway authority and other stakeholders. This will address scheduling, location of passing places and diversions for abnormal loads if required.

Operational Maintenance

A wind farm is typically visited up to four times a month by a small maintenance crew. There will also be a requirement for maintenance of the access tracks and substation.

Decommissioning

Turbines typically have an operational life of 25-30 years and the normal operating life of the wind farm would be 25 years. At the end of this period the turbines can be removed, reconditioned or replaced, and appropriate site restoration measures implemented.

POLICY

The ES shall draw upon various policies relevant to the proposal against which the suitability of the proposal shall be assessed. A planning statement will be submitted with the application, but shall not form part of the ES.

National Planning Policy


The EIA will consider the following national policies:

- UK and regional renewable energy targets;
Please confirm if there are other documents that should be used

Development Plan Policies Applying to the Proposal

As required by the Town and Country Planning Act 1990 and the Electricity Act 1989, the wind farm proposal will need to consider the applicable development plan policies. The determination made by the Maldon District Council, will need to be in accordance with these policies unless material considerations indicate otherwise.

The ES will consider the following local and regional planning plans and policies:

- Regional Spatial Strategy for the East of England (the east of England Plan) (12th May 2008);
- Essex and Southend-on-Sea replacement Structure Plan 2001 (saved policies)
- Maldon District Replacement Local Plan November 2005 (saved policies)

Please confirm that these documents constitute the development plan and which policies should be given particular consideration. Additionally please confirm the timescale for adoption of the Local Development Framework.

STRUCTURE OF THE ES

The ES would be produced in 3 volumes:

Volume I: Non Technical Summary - available free of charge to interested parties.

Volume II: Environmental Statement including technical appendices.

Volume III: Figures and Photomontages.

A separate Planning Policy Statement to discuss whether the wind farm is in accordance with the Development Plan and other material considerations, taking into account the findings of the EIA. This would be prepared and submitted with the ES and planning application as a separate document in support of the application.

CONTENT AND OVERVIEW OF ES VOLUME 2 CHAPTERS

CHAPTER 1 INTRODUCTION

- The Application
- The Applicants
- EIA and the ES - Describes the environmental assessment process, methodology used and structure of the EIS. The significant effects approach.
- Defining the Significance of Environmental Effects
Consultations

CHAPTER 2 RENEWABLE ENERGY AND DEVELOPMENT PLAN

- Rationale and Need for the Project
- Greenhouse gases and climate change
- Renewable energy and electricity production
- Energy Payback & Recycling
- International, EC, UK and Regional Policy on Renewable Energy
- Planning Policy Guidance & Statements
- Contribution of the Proposal
- Public Attitudes

CHAPTER 3 DESIGN DEVELOPMENT & CONSULTATION

- Introduction and location of search
- Identification of potential sites and their selection
- Preliminary consultation and site visits
- Commitment to progression of site

CHAPTER 4 DESCRIPTION OF THE PROJECT

- Site Description - Location, topography and landuse, designations, wind resource etc.
- The Proposed Development - Site layout and design evolution, land use requirements, anemometer masts, the wind turbines, substation and control building, grid connection, main road access, on site access tracks
- Construction - Construction program, site access tracks, crane outrigger pads, foundations, temporary works, cabling, substation and control building, materials and transport, pollution control measures, workforce.
- Reinstatement - Site access tracks, turbine bases, other areas
- Operation and Maintenance - Operational features, transport, workforce
- Decommissioning

CHAPTER 5 LANDSCAPE AND VISUAL ASSESSMENT (This study would be undertaken by an independent consultant). A 30km radius study area around the wind farm is anticipated to be agreed through consultation. The LVIA chapter will consist of the following work stages: Introduction; Methodology description; Consultation with relevant statutory consultees (to agree upon study area, viewpoints, cumulative sites and methodology to be employed); Identification of baseline environment; Consideration of mitigation measures; Assessment of effects upon landscape character and visual amenity; and, consideration of any Cumulative effects.
The methodology to be employed will be agreed at the outset with the local planning authority and will be consistent with recognised industry guidelines including:

- Landscape Character Assessment: Guidance for England and Scotland Countryside Agency and Scottish Natural Heritage 2002);
- The Landscape Institute and Institute of Environmental Assessment’s Guidelines for Landscape and Visual Impact Assessment (2002);
- Visual assessment of wind farms: Best practice. University of Newcastle (2002);
- **Baseline** - Landscape character and designations would be considered.

**Assessment of Effects**

- The assessment will consider effects upon landscape character areas, settlements, transport corridors, public rights of way and registered parks and gardens.
- Approximately 15 viewpoints would be selected of short, medium and long distant views from representative locations. List to be agreed with Local Planning Authority. Wirelines would be produced from each viewpoint and a photomontage produced for up to 5 of these key viewpoints.
- Please suggest a draft list of viewpoints within the scoping opinion response which the local authority wishes to see selected as viewpoints for the assessment.
- Photographs would be taken using a 50mm lens as recommended best practice by the Landscape Institute.
- Cumulative effects of the proposal with those of other wind farm projects built and or consented in the area shall be considered. Please confirm details of other wind farm projects within 25km of the proposal.

**Mitigation Measures**

**Conclusion and Summary of Effects** - A cumulative visual assessment will be undertaken of any existing or consented wind farms (as of the date the scoping opinion is received by RES) within the 30km study area around the proposed RES wind farm.

**CHAPTER 6 ECOLOGICAL ASSESSMENT (FAUNA AND FLORA)** (This study would be undertaken by an independent consultant). Chapter to consist of:

- **Introduction, Methodology** (reference made to current best practice guidelines) and Consultations
- **Baseline**

The baseline shall be established from site surveys. Surveys employed at the site shall be agreed with Natural England and RSPB (with whom RES are already in consultation regarding bird surveys) and shall include:
Turncole Wind Farm
Volume II Environmental Statement

- Vantage Point (VP) bird surveys.
- Brown and Shepherd breeding bird surveys.
- Wintering bird surveys.
- Phase 1 habitat surveys.
- Mammal and Protected Species surveys.

- Assessment of Effects
- Mitigation Measures
- Conclusion and Summary of Effects

CHAPTER 7 ARCHAEOLOGY AND HISTORICAL HERITAGE (This study would be undertaken by an independent consultant). Chapter to consist of:

- Introduction, Methodology and Consultations - The assessment will include a desk based assessment and if considered necessary a one day walk over field visit.
- Baseline - Nearby features such as St Peters Chapel and St Leonards Church shall be considered.
- Assessment of Effects - Such assessment shall include consideration of direct effects of the proposal on cultural heritage features and indirect visual effects on significant features up to 5km from the site.
- Mitigation Measures - Such measures will be devised with reference to PPG 16 and other relevant guidance.
- Conclusion and Summary of Effects

CHAPTER 8 HYDROLOGICAL ASSESSMENT (The hydrological assessment would be undertaken by an independent consultant). Chapter to consist of:

- Introduction, Methodology and Consultations
- Baseline - The Environment Agency and Council will be consulted to obtain surface and groundwater information for the desk study. Nearby private water supplies will be identified. Surface water catchments will be mapped. A site walkover survey may be undertaken if required.
- Assessment of Effects - This chapter shall outline all the potential effects of wind farms on hydrological features.
- Mitigation Measures & Residual Effects - A range of mitigation measures relating to hydrology that are employed on wind farm sites will be described and the residual effects of the proposal shall be assessed.
- Conclusion and Summary of Effects

CHAPTER 9 NOISE ASSESSMENT (undertaken by RES’s own noise team)
• **Introduction, Methodology** (with reference to Report ETSU-R-97: 'The Assessment and Rating of Noise from Wind Farms') and Consultations
  
  o The noise emission characteristics and layout of the candidate wind turbines shall be described.

• **Baseline environment** - The nearest, or most noise sensitive, properties near the proposal shall be identified and indicative ambient noise levels, based on a background noise survey, shall be determined.

• **Impact assessment** - Noise emission levels owing to the wind turbines shall be predicted using a sound propagation model. Noise emission levels shall be compared with the background levels and assessed in light of planning consents or relevant noise limits.

• **Mitigation measures**

• **Conclusion and Summary of Effects** - Conclusions regarding the significance of the resulting effects of the operational wind farm development on the noise environment and residential amenity.

**CHAPTER 10 TRANSPORTATION AND ACCESS**

• **Introduction, Methodology and Consultations**

• **Alternative Transport Methods and Routes**

• **Baseline** - Existing conditions of the proposed access route including traffic flows and recognised constraints or sensitive locations would be identified. This would be done through site investigations to examine the route and in collaboration with the local highways authority to establish road strength and safety issues such as visibility splays.

• **Impact assessment**
  
  o The number and type of construction, operation and decommissioning traffic movements would be determined. Once this is established this would be assessed against the available access routes to the proposed site.

  o Any traffic management measures which would be required to ensure the safety of other road users would be examined.

  o Any road improvements, upgrading necessary would be described and technical scale drawings would be produced.

• **Mitigation Measures** - The preferred route would be chosen and any mitigation measures which are seen necessary by the local highways authority would be agreed.

• **Conclusion and Summary**

**CHAPTER 11 ELECTROMAGNETIC INTERFERENCE**

• **Introduction and Methodology**

• **Consultations** - With the appropriate bodies to whom electromagnetic interference may be a problem would be carried out. The possible problems which could occur would be
explored such as interference with television reception, microwave communications and air traffic safeguarding.

• **Impact Assessment**
  
  o Consultation would lead to greater knowledge of existing links and transmitters and the requirement of mitigation measures to offset any disruption such as:
    
    o Reflection / scatter of point-to-point microwave radio links;
    
    o Reflection of television signals leading to ‘ghosting’ images, and
    
    o Radar and obstacle effects for aircraft.
    
    o Investigation would be undertaken to examine any potential problems with interference and ways to minimise interference through site layout.

• **Mitigation Measures** - Arrangements with the telecommunications and transmitting companies would be described to cover any costs necessary for any mitigation measures necessary.

• **Conclusion and Summary**

**CHAPTER 12 SOCIO-ECONOMIC ASSESSMENT**

• **Introduction, Methodology and Consultations**

• **Baseline, Impact Assessment and Mitigation Measures**
  
  o A brief overview of the baseline conditions of the following subjects would be provided, followed by an assessment of the effects of the proposal and any mitigation or enhancement measures proposed:
    
    o Economics of wind farms;
    
    o Recreation, including rights of way and recreational uses within and around the site;
    
    o Tourism, including a general overview of the role of tourism in the area and experience of wind farm effects elsewhere;
    
    o Education, including the role of wind farm projects in education;
    
    o Safety, describing the regulations and RES procedures that would apply during construction and operation of the proposal;
    
    o Shadow Casting, which will describe the frequency and duration of any periods during which the proposed turbines may cast a shadow over a nearby property, and
    
    o Reflected light, which will describe the potential for the turbines to reflect sunlight.

• **Summary and Conclusion**
3 August 2010

Mr Knight
RES UK and Ireland Limited
Beaufort Court
Egg Farm Lane
Kings Langley
Hertfordshire WD4 8LR

Dear Mr Knight

REQUEST FOR A SCOPING OPINION UNDER THE TOWN AND COUNTRY PLANNING (ENVIRONMENTAL IMPACT ASSESSMENT) (ENGLAND AND WALES) REGULATIONS 1999

THE PROPOSAL IS FOR A WIND FARM DEVELOPMENT BY RENEWABLE ENERGY SYSTEMS LIMITED (APPLICATION SOR/MAL/10/00226) AT TURNCOLE FARM, THE MARSHES, SOUTHMINSTER

The application for the Scoping Opinion was considered at the Council’s Planning and Licensing Committee on Thursday 29 July 2010. This followed a comprehensive consultation process with statutory and non-statutory bodies including the local parish councils. At the committee meeting members agreed that nothing should be scoped out of the Environmental Impact Assessment. The committee agreed that the Environmental Impact Assessment must satisfactorily address those matters raised by the consultees. To assist you with the preparation of the Environmental Impact Assessment please see the enclosed reports.

In terms of the identified sections/chapters of the future Environmental Statement please see the statements below:

Chapter 3 – Design Development and Consultation
The environmental statement should explain in detail the site selection process explaining the reasons why other options were discounted and why the current site was considered the best in environmental terms. This should include consideration of off-shore options.

Chapter 5 – Landscape and Visual Assessment
The assessment must recognise that the proposed turbines would be visible from many parts of the District and beyond and are located within an area of the District with a distinct landscape character. It is considered that more than 5 photomontages should be produced for the development. It has been suggested that a viewpoint should be created for Wallasea Island as this area could see increased visitor numbers in the future who would be able to view the wind farm across the River Crouch. This is recommended as an alternative to viewpoint 10, which is currently positioned on Foulness Island and therefore cannot be accessed by the general public as this island forms Crown Land for the Ministry of Defence, although there are residential properties located on the island. There should also be photomontages showing the cumulative impact of the ‘Middlewick’ and ‘Bradwell’ wind farms. These cumulative assessments are essential requirements of the Environmental Statement. Officers consider that the list of viewpoints shown on the approved plans is considered acceptable, with exceptions of the suggested viewpoint change above, for the applicant to undertake the landscape and visual impact assessments.
Chapter 6 - Ecological Assessment
The site lies in a sensitive location for nature conservation interests and the statement must address the comments of Natural England. The cumulative and in-combination impact of this and other wind farm proposals may be significant with the potential need for an appropriate assessment should the proposal have a significant effect on the Dengie SSSI/SAC/SPA and Ramsar site. Proposals for monitoring should also be included.

Chapter 7 - Archaeology and Historical Heritage
The Environmental Statement will need to consider the archaeological and historic building interests in the area taking into consideration with the new PPS5. The Conservation Officer’s comments have identified that there are a number of mainly grade II listed buildings in the area. The cumulative impact of the ‘Middlewick’ and ‘Bradwell’ wind farms and the proposal will need to be identified in the Environmental Statement.

Chapter 8 - Hydrological Assessment
The Environmental Statement will need to consider geological issues together with matters of a hydrological nature. A Flood Risk Assessment will be required to accompany any planning application submitted to the Council as the site falls within a high risk flood zone (Flood Zone 3).

Chapter 9 - Noise Assessment
It is expected that the assessment should consider in detail the potential impacts all noise aspects of the proposal as well as the information detailed in the Environmental Health consultation response.

Chapter 10 - Transportation and Access
The local rural road network is not well suited to heavy traffic and abnormal loads so careful consideration must be given to this potential impact of the proposal, including consideration of means of transportation other than by road. It is suggested that consideration is given to the delivery of turbines via the river as proposed with the ‘Middlewick’ wind farm application. If this is not possible the Environmental Statement will need to clearly demonstrate the planning reasons why this is not possible. It is also considered that a rail delivery of aggregates and materials to the site should be explored as another alternative.

Chapter 11 - Electromagnetic Interference
Extensive consultations will be required to consider telecommunications, television and radar, including Stansted and Southend airports, the Port of London Authority and Network Rail.

Chapter 12 - Socio-Economic Assessment
The consideration of the socio-economic impacts on the District should include details of the community benefits that would accompany the proposed wind farm.

In addition to these more topic based comments:

i) The Environmental Statement should also address the cumulative effects of the proposal across a wide number of issues. The ‘Bradwell’ wind farm has planning permission and the ‘Middlewick’ wind farm has recently been refused planning permission, although it is unclear at this stage whether there will be any appeal against the decision.

ii) The Environmental Statement should also consider the environmental impacts of the development across the entire lifecycle. The environmental statement should include details of the arrangements to secure the decommissioning and removal of the windfarm at the end of its lifecycle; with details explaining the arrangements should the developer/operating become insolvent.
iii) The Environmental Statement should specifically relate the proposal to the planning policy background, with detailed assessment against development plan policies including the Replacement Maldon District Local Plan Policy PU6 Renewable Energy amongst others and the emerging Local Development Framework Core Strategy policies.

iv) The Environmental Statement should consider the beneficial impacts of the development upon the local area and wider District.

Should a planning application be made the applicant will be expected to submit enough copies of the Environmental Statement to ensure full and effective consultation with all statutory and other consultees plus other full copies to be made available to local communities and interested groups. Receipt of the whole document on a CD-ROM will be acceptable for some consultees. The exact number of copies of the Environmental Statement should be discussed with officers prior to the submission of the full planning application.

I hope this information is of assistance and should you have any further queries relating to this matter please contact the case officer Chris Purvis on the telephone number below.

Yours sincerely

Jennifer Candler
Head of Planning Services
REPORT of
HEAD OF PLANNING SERVICES
to
PLANNING AND LICENSING COMMITTEE
29 JULY 2010

REQUEST FOR A SCOPING OPINION UNDER THE TOWN AND COUNTRY PLANNING (ENVIRONMENTAL IMPACT ASSESSMENT) (ENGLAND AND WALES) REGULATIONS 1999

TURNOCLE FARM WIND FARM PROPOSAL BY RENEWABLE ENERGY SYSTEMS LIMITED (APPLICATION SOR/MAL/10/00226)

1. PURPOSE OF THE REPORT


2. AREA FOR DECISION / ACTION

2.1 Background

2.1.1 This matter was considered at the meeting of the South Eastern Planning Committee on 14 June 2010 when it was decided to refer the matter to this Committee for determination in view of its District-wide importance. This report includes the Members Update which was considered at the South East Area Planning Committee together with the original report, which is attached at APPENDIX 1.

2.1.2 At the meeting of the Area Committee, concerns were raised in respect of the following:

- No details to visually show the appearance of the wind turbines on plans and through photographs to show the impact of the wind farm upon the area.
- The proposed electricity production of 16.1MW for the wind farm to provide approximately 11,000 homes was not considered accurate. It was considered that the electricity production will need to be evidenced to demonstrate the lowest electricity production, the highest electricity production and the average electricity production annually.
- Traffic figure details, transport and access information that the applicant (RES Ltd) had previously presented to the local Parish Councils had not been submitted as part of the scoping opinion application. It was requested that this

Agenda Item no.
information be provided and whether any damage caused to the highways would be repaired during and after the construction phase of the development.

- Whether sufficient public engagement and consultation had been carried out.
- Clarity regarding an assessment of protected species which could be threatened and how this would be considered.

2.2 Area of Action / Officer Comments

2.2.1 The applicant has submitted a letter seeking to address the issues raised by the South Eastern Area Planning Committee but has stated that it is unreasonable for such information to be requested in determining this Scoping Opinion application. It should be noted that the purpose of the Scoping Opinion application is for the local authority to agree to the methodology for undertaking the Environmental Impact Assessment. The consultation responses and conclusions stated in the main report are required to inform the applicant of the issues to be considered prior to the undertaking of the Environmental Impact Assessment. The consultation process undertaken for the purposes of the application accords with the Regulations.

2.2.2 Landscape and Visual Impact

2.2.2.1 In respect of the information requested to visually show the appearance of the turbines and wind farm impact upon the area the applicant has requested that the committee agree to the methodology and viewpoint locations before visualisations can be produced as the Scoping Opinion process is used to inform the design process for the proposed wind farm. The applicant has stated that ‘the number, size and location of the turbines cannot be fixed until baseline studies have been completed and those results assessed and a layout decided upon. It would therefore be unsuitable to produce visualisations at this time based on provisional layouts that may change. However, a photomontage representation of a potential wind farm design has been provided for one of the viewpoint locations at Twizzelfoot Bridge south of the wind farm site at an approximate distance of 1.2km to the wind farm centre’.

2.2.2.2 Officers consider that the list of viewpoints shown on the approved plans is considered acceptable for the applicant to undertake the landscape and visual impact assessments. Nevertheless the submission of a visualisation drawing showing the impact from Twizzelfoot Bridge is helpful to show the impact of the proposed wind farm and goes beyond the requirements of a Scoping Opinion application.

2.2.2.3 In addition to the comments in the main report it has been suggested that a viewpoint should be created for Wallasea Island as this area could see increased visitor numbers in the future who would be able to view the wind farm across the River Crouch. This is recommended as an alternative to viewpoint 10, which is currently positioned on Foulness Island and therefore cannot be accessed by the general public as this island forms Crown Land for the Ministry of Defence although there are residential properties located on the island.

2.2.3 Electricity Production

2.2.3.1 With regard to the electricity production request information from the applicant has stated that electricity production is not considered material to the Scoping Opinion application but the applicant has provided indicative details based upon a 7 turbine development. The applicant has stated that ‘it is predicted that the each turbine can
produce 2.3 MW of electricity. To determine the number of homes the wind farm can provide electricity for the capacity factor and average UK household energy consumption is required. Renewable UK quotes the average capacity factor in the UK to be 30% with the average yearly household consumption being 4.7 MW hours based upon Renewables UK (formerly British Wind Energy Association). Therefore the number of homes that can be provided by the Turncole Wind Farm would be 9010 homes based upon electricity production of 42340 MWh/y. The lowest electricity production would be when the wind does not blow at all, and nothing would be generated. The highest electricity production would be when the wind is blowing well and would be 16.1 MWh each hour for the wind farm. The wind does fluctuate and as a result we consider the annual average electrical generation as detailed above to be the most informative.

2.2.3.2 The electricity prediction information shows that 9010 homes would be powered by the wind farm based upon the Renewables UK (formerly British Wind Energy Association) figures. These figures are taken from national organisation for wind energy.

2.2.4 Transportation and Access
2.2.4.1 For the traffic and transport queries the applicant has stated that consultation has been carried out with the Essex County Highways to assess the number of potential access routes to site. It has been stated that the delivery of abnormal loads carrying the turbine components were assessed during a dry run in March of this year. As well as the abnormal loads there will be approximately 2,755 heavy goods deliveries. To assess the volume of traffic currently using the road network traffic count data produced by Mouchel (Consultancy company used by Essex highways) was acquired for 6 locations; this will allow us to assess the potential increase in traffic flows arising from the proposed development and the effects thereof. To assist the officers and the committee a drawing has been submitted which shows three potential access routes to site that were tested for feasibility during a dry run, the location of the traffic count data and also the data from these locations.

2.2.4.2 During pre-application discussions and correspondence Essex County Highways have been involved and oversaw a dry run exercise of the preferred delivery route. This was carried out in March this year. The preferred delivery route is the route indicated red on the plan which follows the Lower Burnham Road from South Woodham Ferrers and along Old Heath Road east until Church Road before heading south and heading east along Marsh Road in Burnham until West Wick before travelling north along an unmade track to Turncole Farm. The drawing also shows the location of the traffic count data and also the data from these locations.

2.2.4.3 In terms of repairs to the road network a full road condition survey will be undertaken and the potential access route will be upgraded and improved if required, at the applicant’s cost before the start of the wind farm construction to allow all vehicles access to the site. Post construction the applicant will make good any damage to the roads caused during by the construction of the wind farm, returning the roads to their original condition as per the road survey.

2.2.4.4 Comments from County Highways on all these issues are awaited and will be reported. Officers consider that turbine delivery via the River Crouch should be investigated as similar arrangements are proposed for the Middlewick wind farm.
planning application. A marine delivery route would reduce the impact upon the existing road network. Secondly it is considered that a rail delivery of aggregates and materials to the site should be explored as an alternative. There are no objection to the full road condition survey being undertaken which is conditioned should the Middlewick wind farm planning application be approved.

3. CONSULTATION REPLIES

3.1 Parish Councils

3.1.1 Southminster Parish Council – This consultation response was received after the South East Area Planning Committee. The Parish Council has the following concerns:

1. What does 16.1MW generated and enough electricity for 11250 homes really mean? As the system will only be approximately 30% efficient there will not be 16.1MW generated all the time. This output is only when everything is optimum, i.e. correct wind speed for max generation. The statement that 11250 homes will be supplied with electricity is too sweeping a statement and depends on house loads. If an average usage (i.e. 1.5KW/hr) is assumed can it be explained the range of housing to be supplied across the whole range of generating capabilities (i.e. low wind to high wind).

2. The scoping document highlights the journeys of the main wind turbine units and the problems of access, particularly if Southminster main streets are used, but the preferred route will be via Marsh Road in Burnham on Crouch. What about the 4000 plus vehicle movements that are to be made to build the bases for the seven-turbine system mounts and ancillary equipment? If those are to be made through Southminster and the Dengie have all aspects if the difficulties arising been taken into consideration?

3.1.2 Burnham on Crouch Town Council – In response to the additional information on the landscaping and visual impact assessment the Town Council is unable to comment and will support the views of Maldon District Council.

3.2 External Consultees

3.2.1 ECC Highways and Transportation – to be reported

3.2.2 Essex Wildlife Trust – No response

3.2.3 RSPB – No response

3.2.4 English Heritage – Whilst English Heritage is broadly supportive of renewable energy we are aware that such developments can be detrimental to the historic environment. English Heritage has drawn up guidance for planners and developers, Wind Energy and Historic Environment. This is designed to be used in conjunction with other standard methodologies associated with development of these proposals,
such as those set out by the Landscape Institute and the Institute of Environmental Management and Assessment. The Environmental Statement should be informed by these. English Heritage’s guidance should be included in this list.

In general terms, English Heritage advises that a number of considerations will need to be taken into account including the impact of the ancillary infrastructure as well as the turbines, which include:

- Direct impacts on historic sites, buildings and areas, whether statutorily protected or not; all grades of listed building should be identified;
- The potential effects on marine archaeology;
- Indirect impacts, particularly on the setting of listed buildings, scheduled monuments, registered parks and gardens, conservation areas etc., including long views;
- Cumulative impacts.

The issue of setting should be considered in light of the guidance on the setting of listed buildings in PPS5 policy HE10, and in Conservation Principles (English Heritage, 2008). Any application should contain sufficient information to enable the impact of the development on the setting of designated assets to be properly considered and independently assessed. This should include the provision of visualisations.

3.2.5 Stansted Airport – Having liaised with the Air Traffic Services Provider, NATS (NSL) regarding this wind farm. The view is that because the airspace in this area is controlled by NERL, they would support whatever decision NERL give for this wind farm. This is because if the turbines are visible to the radar utilised by Stansted Airport, it would be up to NERL to decide whether the wind farm would have an unacceptably high impact on their operations or not. If it did, then NATS (NSL) would support NERL’s objection because it would affect operations at Stansted Airport, however if it didn’t and NERL did not object to this wind farm, then NATS (NSL) would also have no problems with this development.

3.2.6 OFCOM (The Office of Communications) - OFCOM have found that within the assessed fixed link frequency bands a fixed link, ref 0464833/1 operated by the Port of London Authority, is within or has path(s) that crosses a 1500 m radius coordination area for the stated turbine location. This assessment is based on the OFCOM fixed links database status as at 30 May 2010, which may vary before the wind farm project implementation. This response to your co-ordination request is only in respect of microwave fixed links managed and assigned by OFCOM within the bands and frequency ranges. Please be aware that the data is “as recorded” by OFCOM on its database, based on the grid reference coordinates and other details provided to OFCOM by Fixed Link operators at the time of their licence application.

3.2.7 JRC (on behalf of the UK Fuel & Power Industry) – In the case of this proposed wind energy development, JRC does not foresee any potential problems based on known interference scenarios and the data you have provided. However, if any details of the wind farm change, particularly the disposition or scale of any turbine(s), it will be necessary to re-evaluate the proposal. In making this judgement, JRC has used its best endeavours with the available data, although we recognise that there may be effects which are as yet unknown or inadequately predicted. JRC cannot therefore be
held liable if subsequently problems arise that we have not predicted. It should be noted that this clearance pertains only to the date of its issue. As the use of the spectrum is dynamic, the use of the band is changing on an ongoing basis and consequently, developers are advised to seek re-coordination prior to considering any design changes.

3.2.8 **British Telecom (BT)** – No objections.

3.3 **Internal Consultation**

3.3.1 **Economic Development** - Whilst the site may be seen by some as a distortion of the wide open landscape that the district is famous for. Evidence of other projects of this nature has demonstrated that they have the potential to become a tourist attraction in their own right. The site is a known diversification for landowners and farmers to generate income without losing the use of the land. Economically this is a positive project.

3.3.2 **Coast and Countryside Officer** – No objections although mitigation measures need to be considered to avoid disturbance to breeding birds. If any on site borrow pits are excavated the positions of these pits should be shown, and what will happen to these after the construction phase of the development. A viewpoint should be considered for Wallasea Island as this area is hoped to attract many visits in the future as a coastal nature reserve.

3.3.3 **Conservation Officer** – Additional comments following additional information submitted on the Landscape and Visual Impact Assessment (LVIA). Having read through ‘Wind Farm Landscape Visual Impact Assessment Methodology’ submitted it is the Conservation Officer’s opinion that the built heritage of the Maldon District at this location that forms the landscape character is not being sufficiently taken account of. The wider landscape settings of listed buildings and the agricultural land use associated with the listed buildings are intrinsically linked. The Conservation Officer commented previously that landscape character i.e. natural environment and built environment are intrinsically linked especially at this location where the flat Dengie Marshes and the historic manors, halls, farms and religious buildings identified are characteristic of the landscape (reclaimed marsh) and its historic use at this location. The LVIA focuses on the impact of wind turbines to residents, visitors, recreational visitors and the travelling public but not the historic landscape itself. The impact of the proposed Turncole Wind Farm should be assessed and the cumulative impact of the three combined proposed wind farms in close proximity in this given historic context should be objectionably assessed for impact on the historic landscape that includes the buildings themselves and not just who lives in them and may visit them. A Heritage Statement should clearly set out an assessment of the impact of the proposed development on the designated heritage assets and clear justification and reasoning for so doing as set out in PPS5 Planning for the Historic Environment Policy HE1.2 and HE1.3 (Heritage Assets and Climate Change) and Policy HE6.1, HE6.2 HE6.3 (Information Requirements for applications for consent affecting heritage assets). This applies to below ground archaeology also.

The coastal path runs the entire length of the District’s eastern boundary with the North Sea from the mouth of the Blackwater Estuary to the River Crouch. **Gunfleet Agenda Item no.**
Sands wind farm (under construction) is very evident in the seascape when standing at St Peter’s Chapel, Bradwell on Sea and is, according to the map submitted, over 20km away from that location out at sea. In the Conservation Officer’s opinion further visual impact assessment should be taken from vantage points along the length of the coastal path. There should be a further vantage point between VP06 and VP05 to the east looking south-west (within the 10km radius band where the map is marked ‘Dengie Flats’).

VP03 is on high ground at St James Church, Asheldham and the view from the Church across agricultural land requires to be assessed for cumulative impact. Likewise to VP06 showing the hierarchy of windfarms from Hockley WF, through Middlewick WF and onto Turncole WF.

Recommendation: Setting and wider landscape setting of listed buildings and on subterranean archaeology are potentially significant. The cumulative visual impact with Hockley Farm windfarm and the Middlewick Farm windfarm should also be taken further into account.

4. CORPORATE OBJECTIVES

4.1 The following corporate objectives are considered relevant:
   • Protecting Rural Heritage;
   • Promoting Civic Pride.

5. IMPLICATIONS

(i) Impact on Customers – None.

(ii) Impact on Risk – None.

(iii) Impact on Resources (financial) – None.

(iv) Impact on the Environment – The proposal resulting from the Scoping work would lead to the production of electricity in the District from a natural renewable energy source helping to tackle climate change and reduce carbon dioxide emissions.

6. RECOMMENDATION

That this report and that considered by the South Eastern Area Planning Committee (APPENDIX 1), including the recommendations of the consultees, form the basis for the Council’s adoption of the Scoping Opinion Report. The Developer is also requested to have regard to the representations made by Parish Councils in the preparation of any environmental statement.

Background Papers:
  • RES Environmental Statement Scoping Report;
- Maldon District Replacement Local Plan 2005;
- Emerging Local Development Framework Core Strategy and Statement of Community Involvement;
- Shaping the Future of the Maldon District – The Community Plan;
- Maldon District Council Energy Strategy 2004;

Enquiries to: Chris Purvis, Senior Development Control Officer, (Tel 01621 875740).
APPENDIX 3.2 LIST OF ORGANISATIONS CONTACTED

A full list of bodies contacted to date by RES on the Turncole Wind Farm proposal is as follows:

- Maldon District Council
- Environment Agency
- Natural England
- English Heritage
- Royal Society for the Protection of Birds (RSPB)
- Essex Wildlife Trust
- North Essex Badger Group
- British Horse Society
- Ramblers
- Ofcom
- British Telecommunications (BT)
- Port of London Authority
- Joint Radio Company (JRC)
- Arqiva
- Water Authority
- TRANSCO
- Drainage Board
- Essex County Council
- National Grid
- Civil Aviation Authority (CAA)
- Defence Estate
- National Air Traffic Services (NATS)
- London Southend Airport
- Essex Highways Authority

Further organisations and individuals have been consulted directly or in more detail by the environmental consultants undertaking the various assessments for this ES and by RES directly these are detailed within the relevant sections of the ES.
Welcome

RES is pleased to introduce plans for a new wind farm at Turncole Farm, located to the south east of Southminster and north east of Burnham on Crouch in the Maldon District of Essex. It is imperative that we develop clean, green energy sources now. Renewable energy can reduce climate-changing pollution, provide a reliable supply of electricity to homes and businesses, create ‘green collar’ jobs and bring important economic benefits, both locally and nationally.

As the most advanced renewable energy technology, onshore wind power has a vital role to play in meeting our needs. It is acknowledged that every part of the UK needs to do its bit towards meeting challenging targets for a more secure electricity supply, and Turncole Wind Farm is an exciting project which will help Essex to do this.

What are we proposing?

We consider the site to have potential for up to seven turbines. Each turbine would be up to 127m high, to the tip of the blade. The proposed layout has been carefully designed, following site studies aimed at reducing the visual and ecological impact of the project, while maximising the amount of cleaner, greener electricity generated.

A seven turbine wind farm would have an indicative installed capacity of at least 12.6MW. A wind farm of this size would be likely to generate enough electricity to power the equivalent of approximately 7,600 homes*, or all of the homes within the wards of Burnham on Crouch North, Burnham on Crouch South, Southminster, Tillingham and Althorne.

We are confident that this is a very good site for a wind farm and that a sensitively designed project will be an asset to the area. Subject to the outcome of the environmental investigations, and consultation responses received from the public exhibitions, we hope to submit a planning application in late Autumn. The plans to the right show the site location and turbine layout.

Local consultation

Over the past few months, RES has been talking to community representatives, parish councils and members of the district and county councils. We have been taking on board their views about how the wider public consultation should be undertaken. The parish councils agreed that it would be helpful to set up a Community Liaison Group, which we have acted upon. The Group is made up of elected representatives from all of the local communities around the wind farm, and we shall continue to meet every 1-2 months to discuss any matters relating to the proposed wind farm.

Jon Knight is the Project Manager for the proposed Turncole Wind Farm and his contact details can be found overleaf. Please contact him if you have any queries about the wind farm at any point during the development process.

COME ALONG TO OUR EXHIBITIONS AND FIND OUT MORE!

We will be holding exhibitions, to present our current proposal and to consult with you how the project may be improved at the following times:

Tuesday 14 September, 2–8pm, Southminster Memorial Hall
Wednesday 15 September, 2–8pm, Burnham on Crouch Carnival Hall

We look forward to meeting you and discussing the proposal in more detail.

You are welcome to attend either exhibition, irrespective of where you live, as the information displayed at both will be identical. We have endeavoured to cover a range of times, to enable as many people as possible to come along and see the plans for the wind farm, and we look forward to meeting you.

*Based on a conservative capacity factor of 32.3%, derived from the NOABL database. This figure may change in the future as further wind speed monitoring data becomes available. An average household electricity consumption figure of 4,100kWh/year was used in the calculation.
Who are we?

RES is a leading independent renewable energy project developer. RES grew out of the Sir Robert McAlpine group, which is one of the UK’s major civil engineering and construction contractors with over 130 years’ experience in the industry.

From large-scale wind farms and biomass power plants to on-site renewables, we are dedicated to the provision of reliable, low-carbon energy solutions. Drawing on decades of experience in the renewable energy and construction industries, RES has the expertise to develop, construct and operate projects of outstanding quality. Our enviable track record in project delivery has given us a reputation for excellence that is second to none. In the quarter of a century since RES was formed, we have played a central role in the development of the global renewable energy market and we have helped to move the low-carbon energy debate from the renewable energy market and we have helped to move the low-carbon energy debate from the renewable energy market and we have helped to move the low-carbon energy debate from the mainstream.

Leading by example

RES recognises that renewable energy has to go hand in-hand with improving energy efficiency and reducing energy demand. That is why RES’s award-winning UK head office, in Hertfordshire, is a pioneering example of a ‘low carbon’ office, with electricity and heat provided from its own wind turbine, solar panels, biomass grown on site and natural cooling.

The number of staff employed by RES in the UK increased from 190 to 306 during 2008, and this number is expected to continue to grow throughout 2010, despite the current economic climate.

A local landmark

As at many other wind farm sites around the UK, the project is expected to be of interest to local schools and visitors to the area. Some schools choose to follow the progress of a wind farm application as a project for their students, offering opportunities for learning about a whole range of curriculum subjects, from energy and the environment to citizenship, history and art.

For example, we have previously sponsored the energy education charity CREATE (www.create.org.uk) to work with schools around our wind farm sites to help them to reduce their energy bills. In Yorkshire, we have worked with 3 schools to introduce the Diploma in Engineering. If your school is interested in such a project, please contact us, as our educational centre in Hertfordshire can provide educational materials.

If you’re a member of a group such as the Scouts, WI, Round Table, Rotary, Probus Club, etc., or work for a local company, and would like us to come and give you a presentation on the wind farm, don’t hesitate to drop us a line.

The project team

Jonathan Knight

Jon Knight is the Project Manager responsible for the Turncole Wind Farm proposal and oversees every aspect of this wind farm proposal, coordinating the various departments of RES to ensure that the site is suitable, the right turbines are chosen and that all the necessary studies and assessments are carried out thoroughly. Jon studied Mechanical Engineering at University and has been involved in the wind industry since 1997. Before moving into project management, he was a Technical Analyst at RES.

Amy Bambridge

Amy Bambridge is the Community Relations Manager for Turncole Wind Farm. Work on community environmental management projects led her into the wind industry. She handles all of the local community work and is the first point of contact for enquiries about community funds and the consultation process.

Our changing energy supply

The UK is moving towards generating a higher percentage of its electricity from renewable sources. The most recent figures available, for 2009, show that the UK’s electricity primarily comes from three sources: gas (45%), coal (28%) and nuclear (18%). Despite our abundant natural renewable resources, we generate just 7% of our electricity from renewables. We are increasingly dependent on imported fuels, particularly gas, which is not good for our economy or our energy security. As conventional fuel resources decline, we need to make use of home-grown energy sources that will never run out. Indigenous and renewable wind power has an important role to play in keeping the UK’s lights on.

The UK has signed up to the EU Renewable Energy Directive, which includes a legally binding target of 15% of total energy from renewables by 2020. This means that at least 30% of our electricity will need to come from renewable sources within ten years, with wind power (the most mature of the renewable technologies) expected to provide the bulk of this total.

Why wind?

- No net operational emissions
- Will never run out
- Could help in the fight against climate change
- Efficient and reliable
- Economically viable
- Improves our energy security
- Tried and tested technology
- Safe:
  - Quick and easy to install
  - No long-lasting legacy
  - Quick and easy to remove

Wind power works! It is the technology that can help us address climate change and keep the lights on. As thousands of projects across the UK and around the world show, wind energy is already successfully generating carbon-free power and bringing jobs and economic benefits to communities.
Benefiting local people and the economy

It is our policy to ensure that each wind farm development brings tangible benefits to the local community. The usual mechanism for this is through the provision of a community fund, which is paid annually and relates to the size of the wind farm.

We are proposing a community fund of £2,000 per installed MW. For an indicative installed capacity of 12.6MW, for example, this would equate to more than £25,000 per year.

The fund will be managed by a local body, the formation of which shall be decided in consultation with local communities. We would encourage anyone with a view on how the community fund should be managed or spent to discuss this with us or your representatives on the Community Liaison Group at any time during the planning process. It is important to note that the offer of a community benefit fund will not affect the decision to grant planning permission for the project as it is not a planning matter.

Community funds are operating successfully at other RES wind farms in the UK. For example, at Altahullion Wind Farm in Northern Ireland, the fund has been spent on the creation of a new community riverside pathway and footbridge, entertainment activities for family fun days, summer schemes for local children, and the maintenance and running of community buildings.

Short to medium-term jobs will be created during the construction period (usually around a year) and we will be looking for local and regional businesses that can provide the following people, services and materials: civil engineering, haulage, concreting, security, electrical skills, etc. There will be additional benefits to other businesses in the area, such as hoteliers.

Interested in a wind farm visit?

Visiting a wind farm can be useful in helping people learn more about wind energy and understanding at first hand what the project proposed for their area might be like. “We always offer local people a group visit to an operating site as a way of helping people to make informed decisions about wind farms, because there are so many false rumours in circulation. It’s a particularly effective way to dispel the myth that turbines are noisy, for example,” says Amy Bambridge, RES’s Community Relations Manager.

If you would be interested in seeing an operating wind farm in action, please contact Amy on 01923 299328 or email amy.bambridge@res-ltd.com.

If you would like to know where the UK’s wind farms are situated, please go to www.bwea.com/ukwed/ for an up-to-date map.
Any more questions?

We would be happy to cover any issues in more detail in forthcoming newsletters. If you would like to see anything discussed in more detail, don’t hesitate to let us know.

More information about wind power can be found at the following websites:
- The British Wind Energy Association: www.bwea.com
- General information about the role renewables can play in UK electricity generation: http://www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/energy_mix/renewable/explained/explained.aspx
- Information about renewables for your home or community: http://www.energysavingtrust.org.uk/Generate-your-own-energy

Why is this a good site for a wind farm?

The wind farm layout at Turncole has been designed through an iterative process to reduce environmental, ecological and visual impacts, based on the results of ongoing environmental impact assessments undertaken on the site and in the surrounding area. The results of these will be presented at the forthcoming exhibitions.

When designing a wind farm site, we effectively start with a blank canvas onto which we add the different constraints identified during the environmental surveys. The locations of the turbines will also take into account separation distances between turbines, the distance from houses, and set back distances from rights of way, power lines and areas used by bats, for example.

The Dengie peninsula has many characteristics which make it ideal for siting a wind farm. It is relatively sparsely populated, so we will be able to maintain a good separation distance of hundreds of metres between turbines and homes. The data collected from the met mast has demonstrated excellent wind speeds, the site is situated close to a grid network making it easy for distributing the power produced from the wind farm and the primary land use is for farming, which will be able to continue as normal around the turbines.

As part of our consultation work, we have considered the ways in which turbine components could be transported to the site. Although it is only necessary to have seven abnormal loads for each proposed turbine, the transport routes have been an important consideration, even in these early stages. In March of this year we carried out a transport ‘dry-run’ on various access routes throughout the Dengie peninsula as part of our studies, using an empty turbine delivery lorry under police escort, with officers from the Council’s Highways Department present. Three potential routes have been identified and are still being investigated in conjunction with the relevant highways authorities. No decision has yet been made as to the preferred route. As our consultation work continues we would be keen to hear your comments about a possible transport route for the proposed site.
APPENDIX 3.4 MAP OF MAILOUT
V90-1.8 MW
V90-2.0 MW
Built on experience
Optimal efficiency

The OptiSpeed® generators in the V90-1.8 MW and the V90-2.0 MW have been adapted from those in Vestas’ highly successful V80 turbine. OptiSpeed® represents a significant advance in wind turbine efficiency as it allows the rotor speed to vary within a range of approximately 60 per cent in relation to nominal rpm. This means that with OptiSpeed®, the rotor speed can vary by as much as 30 per cent above and below synchronous speed. Its purpose is simple: to maximise energy output.

It does this by tapping the higher efficiency of slow and variable rotation, storing excess energy in rotational form and exploiting the full force of transient gusts. All told, OptiSpeed® boosts annual energy production.

As an added benefit, OptiSpeed® also reduces wear and tear on the gearbox, blades and tower on account of lower peak loading. Moreover, as turbine noise is a function of wind speed, the lower rotation speeds made possible by OptiSpeed® naturally reduce sound levels.

Finally, OptiSpeed® helps our V90s deliver better quality power to the grid, with rapid synchronisation, reduced harmonic distortion and less flicker.

3×44 metres of leading edge

Vestas blades have always been among the lightest on the market, and with the V90 turbines, we have once again raised the bar. The new blades feature several new light-weight materials, most notably carbon fibre for the load-bearing spars. Not only is carbon fibre lighter than the fibre glass used in previous blades, but its strength and rigidity have also made it possible to reduce the amount of material required. This means that even though our V90s have 27 per cent more swept area than our V80s, the longer blades actually weigh about the same.

The V90 blades also have a new profile that is aerodynamically superior to the previous generation. Vestas engineers developed this technologically advanced profile by optimising the relationship between the overall load impact on the turbine and the power generated annually. The fruit of their labours was an entirely new plane shape and a curved back edge.

The resulting airfoil improves energy production, while making the blade profile less sensitive to dirt on its leading edge and maintaining a favourable geometrical relationship between successive airfoil thicknesses. For the V90 turbine, this translates into an increase in output combined with a decrease in load transfers - as well as improvements on the bottom line.

Proven Performance

Wind power plants require substantial investments, and the process can be very complex. To assist in the evaluation and purchasing process, Vestas has identified factors that are critical to wind turbine quality: energy production, power quality and sound level.

We spend months testing and documenting these performance areas for all Vestas turbines. When we are finally satisfied, we ask an independent testing organisation to verify the results - a practice we call Proven Performance. At Vestas we do not just talk about quality. We prove it.

* Vestas OptiSpeed® is not available in the USA and Canada
Technical specifications

1 Hub controller
2 Pitch cylinders
3 Blade hub
4 Main shaft
5 Oil cooler
6 Gearbox
7 Mechanical disc brake
8 Service crane
9 VMP-top controller with converter
10 Ultrasonic wind sensors
11 High voltage transformer
12 Blade
13 Blade bearing
14 Rotor lock system
15 Hydraulics unit
16 Machine foundation
17 Yaw gears
18 Composite disc coupling
19 OptiSpeed® generator
20 Air cooler for generator

Power curve V90-1.8 MW & 2.0 MW
OptiSpeed® allows the rotor speed to vary within a range of approximately 60 per cent in relation to nominal rpm. Thus, with OptiSpeed®, the rotor speed can vary by as much as 30 per cent above and below synchronous speed. This minimises both unwanted fluctuations in the output to the grid supply and the loads on the vital parts of the construction.

All specifications subject to change without notice.
State-of-the-art wind turbines are not developed in a vacuum. To create the new V90-1.8 MW and V90-2.0 MW turbines for low and medium wind, we have drawn on the vast experience gained as the leading supplier of wind energy systems in the world. In particular, we applied successful design elements from our existing range of turbines.

We began with the nacelles of our tried and tested V80 wind turbines, which feature OptiSpeed® generators for maximum productivity. To these, we fitted the revolutionary new blades from our high-wind V90-3.0 MW. We then modified the components to ensure optimal harmonisation and to make the very most of the target conditions.

The resulting V90-1.8/2.0 MW turbines are optimised for sites with low turbulence and low and medium winds. These innovative wind turbines are so successful that they can actually generate 25 per cent more energy than the corresponding V80s.

Naturally, the new integrated turbines feature innovations of their own innovations. For instance, Vestas engineers spent two years designing a more efficient and more robust gearbox. Moreover, while the 90-metre rotor weighs approximately the same as the V80 rotor, the longer blades mean higher loads, so we also reinforced the transmission and other major components of the V90.
Outstanding Performance

Siemens Wind Turbine SWT-2.3-93
Outstanding quality

Contents
Outstanding quality Page 2
Technical description Page 4
Technical specifications Page 6
Sales power curve Page 7
Nacelle arrangement Page 7
Based on more than 25 years of leading-edge design and construction, it is suitable for almost any type of application, both onshore and offshore. A rugged, conservative structural design, automatic lubrication systems with ample supplies, climate control of the internal environment and a simple generator system without slip rings provide exceptional reliability at long service intervals. Power conversion is implemented with Siemens’ unique NetConverter® system, offering maximum flexibility in the turbine response to voltage and frequency control, fault ride-through and output adjustment.

Major components, such as the rotor hub, the main shaft, the gearbox and the yaw system are all of particularly heavy dimensions and all details are designed using best engineering practice.

As a result, we offer the new SWT-2.3-93 wind turbine, providing outstanding quality and best-in-class technical features.
General design
The SWT-2.3-93 wind turbine is an upgraded version of the standard SWT-2.3-82 machine and includes the new B45 blade, a rotor diameter of 93 m, and hence a 25 percent increase of the swept area relative to the standard version of the SWT-2.3-82 wind turbine.

Rotor
The SWT-2.3-93 turbine has a three-bladed rotor with pitch regulation for power output optimization and control. The rotor speed is variable in order to maximize the aero-dynamic efficiency, and speed compliance during power regulation minimizes the dynamic loads on the transmission system.

Blades
The B45 blades are made of fiberglass-reinforced epoxy in Siemens’ proprietary IntegralBlade® manufacturing process. In this process, the blades are cast in one piece, leaving no weak points at glue joints and providing optimum quality.

The aerodynamic design represents state-of-the-art wind turbine technology, and the structural design has special Siemens safety factors over and above all normal industry and customer requirements.

Rotor hub
The rotor hub is cast in nodular cast iron and is fitted to the main shaft with a flange connection. The hub is large enough to provide a comfortable working environment inside the structure for two service technicians during maintenance of bolt connections and pitch bearings.

Blade pitch system
The blade pitch arrangement is used to optimize and regulate power output through the operating range. The blades are feathered to minimize wind loads during standstill under extreme wind conditions.

Main shaft and bearing
The main shaft is forged in alloy steel and is hollow for the transfer of power and signals to the blade pitching system. The main shaft is supported by a self-aligning double spherical roller bearing, grease lubricated from an automatic lubrication system. The bearing seals are maintenance-free labyrinth seals.

Gearbox
The gearbox is a custom-built, three-stage planetary-helical design. The planetary-helical, high-torque stage provides a compact high-performance construction. The intermediary and high-speed stages are normal helical stages arranged with an offset of the high-speed shaft and thus allowing passage of power and control signals to the pitch systems. The gearbox is equipped with large-capacity cooling and filtering systems that ensure optimum operating conditions.

Generator
The generator is a fully-enclosed asynchronous machine with squirrel-cage rotor, which does not require slip rings. The generator rotor construction and stator windings are specially designed for high efficiency at partial loads. The generator is internally ventilated and cooled with an air-to-air heat exchanger.
Mechanical brake
The mechanical brake represents the secondary safety system of the turbine. It is fitted to the gearbox high-speed shaft and has two hydraulic calipers.

Yaw system
The yaw bearing is an externally geared ring with a friction bearing. Eight electric planetary gear motors drive the yawing. The yaw gear motors are fitted with brakes, assisting the passive friction of the bearing for stable maintenance of the yaw position.

Controller
A standard industrial computer is the basis of the turbine controller. The controller is self-diagnosing and includes a keyboard and display for easy status readout and adjustment of settings.

Power conversion
The NetConverter® power conversion system allows generator operation at variable speed, frequency and voltage while supplying power at constant frequency and voltage to the MV transformer. The power conversion system is a modular arrangement for easy maintenance.

Tower
The SWT-2.3-93 turbine is mounted on a tapered tubular steel tower. The tower can be fitted with a personnel hoist as an option.

Operation
The wind turbine operates automatically, self-starting when the wind reaches an average speed of about 3 - 5 m/s. During operation below rated power, the pitch angle and rotor speed are continuously adjusted to maximize the aerodynamic efficiency. Rated power is reached at a wind speed of about 13 - 14 m/s, and at higher wind speeds the output is regulated at rated power. Speed compliance during power regulation minimizes the dynamic loads on the transmission system. If the average wind speed exceeds the maximum operational limit of 25 m/s, the turbine is shut down by feathering of the blades. When the wind drops back below the restart speed, the safety systems reset automatically.

Remote control
The SWT-2.3-93 turbine is equipped with the unique WebWPS SCADA system. This system offers remote control and a variety of status views and useful reports from a standard Internet Web browser. The status views present electrical and mechanical data, operation and fault status, meteorological data and grid station data. Primary level users can be granted access to any of the server’s features, including full control over the turbines.

Turbine Condition Monitoring
In addition to the WebWPS SCADA system, the turbine is equipped with a Web-based Turbine Condition Monitoring (TCM) system. The TCM system carries out precise condition diagnostics on main turbine components continuously and in real time. It gives early warning of possible component failures by continuous comparison of current vibration spectra with previously established reference spectra. The TCM system has various alarm levels, from informative through alerting level to turbine shutdown.

Grid compliance
The SWT-2.3-93 turbine complies with all currently valid grid code requirements on relevant markets. Voltage and frequency control and other grid-related adjustments can be implemented by the integrated Park Pilot facility in the WebWPS SCADA system, and the turbine has ride-through capability for all normal faults.
### Technical specifications

<table>
<thead>
<tr>
<th><strong>Rotor</strong></th>
<th></th>
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<tbody>
<tr>
<td>Diameter</td>
<td>93 m</td>
</tr>
<tr>
<td>Swept area</td>
<td>6,800 m²</td>
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<td>Rotor speed</td>
<td>6-16 rpm</td>
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<td>Power regulation</td>
<td>Pitch regulation with variable speed</td>
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<td>Type</td>
<td>B45</td>
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<tr>
<td>Length</td>
<td>45 m</td>
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<td>Activation</td>
<td>Hydraulic, fail-safe</td>
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<td>Gearbox type</td>
<td>3-stage planetary/helical</td>
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<td>Gearbox ratio</td>
<td>1:91</td>
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<tr>
<td>Gearbox oil filtering</td>
<td>Inline and offline</td>
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<tr>
<td>Gearbox cooling</td>
<td>Separate oil cooler</td>
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<td>Oil Volume</td>
<td>Approx. 400 l</td>
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<tr>
<th><strong>Mechanical brake</strong></th>
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<tr>
<td>Type</td>
<td>Fail-safe disc brake</td>
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<tr>
<th><strong>Generator</strong></th>
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<td>Type</td>
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<td>Voltage</td>
<td>690 V</td>
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<tr>
<td>Cooling system</td>
<td>Integrated heat exchanger</td>
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<tr>
<th><strong>Yaw system</strong></th>
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<tr>
<td>Type</td>
<td>Active</td>
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<table>
<thead>
<tr>
<th><strong>Monitoring system</strong></th>
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<tbody>
<tr>
<td>SCADA system</td>
<td>WebWPS</td>
</tr>
<tr>
<td>Remote control</td>
<td>Full turbine control</td>
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<tr>
<th><strong>Tower</strong></th>
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<tbody>
<tr>
<td>Type</td>
<td>Cylindrical and/or tabered tubular</td>
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<tr>
<td>Hub height</td>
<td>60 m, 80 m or site-specific</td>
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</table>

<table>
<thead>
<tr>
<th><strong>Operational data</strong></th>
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<tbody>
<tr>
<td>Cut-in wind speed</td>
<td>3 - 5 m/s</td>
</tr>
<tr>
<td>Nominal power at</td>
<td>13-14 m/s</td>
</tr>
<tr>
<td>Cut-out wind speed</td>
<td>25 m/s</td>
</tr>
<tr>
<td>Maximum 2 s gust</td>
<td>55 m/s (standard version)</td>
</tr>
<tr>
<td>Maximum 2 s gust</td>
<td>60-80 m/s (special version)</td>
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<table>
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<tr>
<th><strong>Weights</strong></th>
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<tbody>
<tr>
<td>Rotor</td>
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</tr>
<tr>
<td>Nacelle</td>
<td>82 tons</td>
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<tr>
<td>Tower</td>
<td>Site-specific</td>
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</tbody>
</table>
Sales power curve
The calculated power curve data are valid for standard conditions of 15 °Celsius air temperature, 1013 mBar air pressure and 1.225 kg/m³ air density, clean rotor blades, and horizontal, undisturbed air flow. The calculated curve data are preliminary.

Nacelle arrangement
1. Spinner
2. Spinner bracket
3. Blade
4. Pitch bearing
5. Rotor hub
6. Main bearing
7. Main shaft
8. Gearbox
9. Brake disc
10. Coupling
11. Generator
12. Service crane
13. Meteorological sensors
14. Tower
15. Yaw ring
16. Yaw gear
17. Nacelle bedplate
18. Oil filter
19. Canopy
20. Generator fan