



Cloud Hill Wind Farm

Technical Appendix 14.2 Assessment
Methodology for Socio-Economics,
Tourism, Recreation And Land Use

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1. INTRODUCTION

This technical appendix (TA) of the Environmental Impact Assessment Report (EIA Report) presents the methodology used within the socio-economic, tourism, recreation and land use assessment of the Proposed Development presented in Chapter 14: Socio-economics, Tourism, Recreation and Land Use, in Volume 1: EIA Report Text.

Chapter 14 evaluates the effects of the Proposed Development on socio-economics, recreation, tourism and land use resources.

The socio-economic, tourism, recreation and land use methodologies presented in this TA contains the following elements:

- Introduction;
- Guidance and Sources;
- Scope of Assessment;
- Study Areas;
- Assessment Methodologies;
- Assessing the Significance of Effect; and
- Glossary.

Chapter 14 of the EIA Report utilises separate methodologies to identify the magnitude of effect on socio-economics, tourism, recreation and land use. The key considerations for each section of this assessment are set out below.

1.1 Guidance and Sources

The following guidance documents and online sources have been utilised to formulate methodologies for socio-economics, tourism, recreation and land use:

- RenewableUK (2015) Onshore Wind: Economic Impacts in 2014¹;
- BiGGAR Economics (2021) Case Study of Crossdykes Wind Farm²;
- Office for National Statistics (2022) Non-Financial Business Economy, UK Regional Results: Sections A to S, Scotland, 2008 to 2020³;
- Scottish Government (2022) Supply, Use and Output Tables⁴; and
- Scottish Government (2012) Standard Industrial Classification (SIC): Information⁵.

¹ RenewableUK (2015) Onshore Wind: Economic Impacts in 2014 [Online] Available at: [onsore_economic_benefits_re.pdf \(ymaws.com\)](https://ymaws.com/onsore_economic_benefits_re.pdf) (Accessed on 10/03/2023)

² BiGGAR Economics (2021) Case Study of Crossdykes Wind Farm [Online] Available at: [Volume 3 - Appendix 14A Case Study of Crossdykes Wind Farm \(1\).pdf](#) (Accessed on 24/04/2023)

³ Office for National Statistics assumptions. Office for National Statistics (2022) Non-financial business economy, UK regional results: Sections A to S, Scotland, 2008 to 2020 [Online] Available at: [Non-financial business economy, UK regional results: Sections A to S - Office for National Statistics](#) (accessed on: 03/07/2023)

⁴ Scottish Government (2022) Supply, Use and Output Tables [Online] Available at: [> Multipliers - Supply, Use and Input-Output Tables - gov.scot \(www.gov.scot\)](#) 9Access on 04/04/2023)

⁵ Scottish Government (2012) Standard industrial classifications (SIC): information [Online] Available at: [Standard industrial classification \(SIC\): information - gov.scot \(www.gov.scot\)](#) (accessed on 20/04/2023)

1.2 Scope of Assessment

1.2.1 Socio-Economics

The socio-economic assessment criteria relates to the economic and employment effects that the Proposed Development are likely to create within the socio-economic study area, as defined in the following Section (Section 1.3.1). These effects are defined in terms of Full-Time Equivalent (FTE) jobs and the Gross Value Added (GVA) generated by the Proposed Development. The assessment aims to predict the likely effects (positive, negative or neutral) arising from the Proposed Development. Socio-economic effects are divided into:

- Direct effects: for example, employment opportunities in the construction, operation and maintenance and decommissioning of the Proposed Development. The nature and scale of the economic effects would depend on the total cost and the sources of the materials and labour. Other direct effects include a community benefit fund and the payment of business rates payable to the local authority throughout the operational phase of the Proposed Development;
- Indirect effects: such as employment opportunities created down the supply chain by those companies providing services to the Proposed Development during construction, operation and decommissioning; and
- Induced effects: for instance, employment created by the additional spend of wages into the local economy and the purchasing of basic materials, equipment and office space for staff.

1.2.2 Tourism and Recreation

The tourism and recreation assessment criteria relates to any potential changes in tourist or recreational habits/activities within the tourism and recreation study area, as defined in the following section (Section 1.3.2). Factors which might lead to change in recreational behaviour include loss, closure, or diversion of routes; obstructing access routes or enhancing access; reduction or enhancement of amenity value; and changes in setting and context of the recreational resource. For the purposes of this assessment, amenity is considered to be a combination of visual amenity and noise levels experienced by the users of tourist attractions, recreational facilities and accommodation. Effects on tourism and recreation can be positive, negative or neutral.

1.2.3 Land Use

The land use assessment criteria relates to the change in land use which occurs within the Site boundary. Land use is the anthropogenic management and occupation of the environment and what the land is used for, both presently and in the future. Developments can affect the ability of the land to be effectively used for its current purpose and also affect the potential use in the future. This can result from direct loss of land to new infrastructure, which is therefore no longer available for the current land-use; and disruption to existing land use operations occurring as a result of the construction and operational activities of a new development (e.g. access restrictions).

1.3 Study Areas

The study areas in this assessment are receptor specific and detailed in the following Sections.

1.3.1 Socio-Economics

The study areas utilised to formulate this EIA Report's socio-economic impact assessment are based on the RenewableUK (2015) research which refers to the accumulation of socio-economic data either nationally (UK), into the English region or devolved nation, or within the individual local authority area. More up-to-date research that focuses on a more direct locality is not presently available.

For the purposes of this assessment, the study areas are defined as follows:

- Local – the local council area. The Proposed Development is located in Dumfries and Galloway; however, as the Proposed Development sits 5.4km east from the council district boundary, East Ayrshire will also be considered. This is largely due to the fact that local impacts are anticipated to be felt more by areas in East Ayrshire close to the Proposed Development; and
- National (devolved nation) – Scotland;
- UK.

1.3.2 Tourism and Recreation

The study area for tourism and recreation will consider all tourist and recreational facilities within 10km of the Proposed Development in order to capture the receptors most likely to be affected by the Proposed Development. Distances from the Proposed Development will be measured from the nearest turbine.

Within the Site boundary, it is broadly assumed that direct impacts are only experienced when a physical change, that alters that receptor's utilisation, occurs. Receptors within the Site boundary that do not experience physical changes altering its utilisation are considered to only experience in-direct impacts; however, this will be reviewed on a case-by-case basis. Tourist and recreational receptors outside of the Site boundary will be considered to have indirect impacts only.

1.3.3 Land Use

The study area for land use consists of all land within the Site boundary that will be occupied by the Proposed Development. This can be a temporary land-use change which will occur during construction and decommissioning, or during the operational phase of the Proposed Development.

1.4 Assessment Methodology

1.4.1 Socio-Economics

A quantitative, desk-based assessment will be undertaken by utilising the framework detailed in Tables 14.4-14.6, in the section below (Section 1.5), to determine the sensitivity, magnitude of impact and significance of effect in line with the EIA regulations.

It will involve the following stages:

- Direct impacts arising from the project spend, in terms of project spend, employment and gross value added (GVA) for the construction (CAPEX) and operational and maintenance (OPEX) phases of the Proposed Development;
- The number of full-time equivalent (FTEs) job years for the CAPEX and OPEX phases;
- Indirect and induced employment to calculate the net employment benefit; and
- Indirect and induced GVA to calculate the net economic benefit.

The direct impacts will be estimated using RenewableUK (2015) study, Onshore Wind: Economic Impacts in 2014 which utilised 20 case studies from across the UK to develop a framework for calculating the project spend per annum, employment opportunities, and gross-value added (GVA) contributions of a given onshore wind farm development⁶.

This assessment typically utilises the maximum anticipated output; however, for the purposes of this assessment the minimum anticipated output has been utilised to give a conservative estimate of

⁶ RenewableUK (2015) Onshore Wind: Economic Impacts in 2014 [Online] Available at: [onshore-economic-benefits-re.pdf \(ymaws.com\)](https://www.ymaws.com/onshore-economic-benefits-re.pdf) (Accessed on 10/03/2023)

anticipated impacts and effects. For this assessment, 11 turbines with an approximate generating capacity of 5.6 MW per turbine, and a total generating capacity of 61.6 MW, has been utilised. This will create a conservative, 'worst case scenario' of anticipated socio-economic outputs.

The BESS unit, with a storage capacity of approximately 30 MW, will not be included for the purposes of this quantitative assessment as there is a lack of publicly available data and/or frameworks for calculating the employment and economic impacts of BESS facilities. It is anticipated that there will be beneficial socio-economic impacts during the construction and operational phases that will have positive impacts on employment and GVA at a local, national and UK study area; however, this cannot be quantified at this time.

Using the 2015 RenewableUK Report, the average expenditure during the development, construction and operation and maintenance phases can be estimated based on the average spend per MW. The average spend per MW varies depending on the phase of the Proposed Development and accrues either internationally, nationally, into the English region or Scotland, or within the individual local authority area. These numbers have also been amended to reflect 2023 market values. International socio-economic effects have not been considered as part of this assessment. Table 14.1 outlines the percentage of spend and average spend per MW for the CAPEX and OPEX phases, as well as the amended 2023 market value.

Table 14.1: Percentage of Spend and Average Spend per MW for CAPEX and OPEX Phases

	Construction (CAPEX)			Operation and Maintenance (OPEX)		
	Percentage of Spend (%)	Weighted Spend per MW (£)	Amended 2023 Market Value ⁷	Percentage of Spend (%)	Weighted Spend per MW (£)	Amended 2023 Market Value ⁸
Local	12	158,501	185,709	42	25,244	29,577
Region/ Nation	36	480,182	562,609	58	34,587	40,524
UK	47	613,312	718,592	87	51,992	60,916

Note: Regional/national percentage of spend is inclusive of local spend. UK spend is inclusive of regional/national percentage of spend. International spend for construction phase is 53% of total spend. International spend for construction phase is 13% of total spend. Spend per MW for the construction phase applies for the whole construction phase. Spend per MW for the operational phase is per annum.

The RenewableUK study also created a framework for estimating impacts from the Proposed Development, in the form of FTEs and GVA. Again, this varies depending on the phase of the Proposed Development, but not depending on the locality. The number of FTEs are calculated by dividing the estimated project spend, which has been calculated from the information in Table 14.1, by the average employee turnover rate. GVA is calculated by applying GVA multipliers to the project spend. Table 14.2, below, outlines how the numbers of jobs and GVA is calculated. These numbers

⁷ ERM calculations based on RenewableUK assumptions. RenewableUK (2015) Onshore Wind: Economic Impacts in 2014 [Online] Available at: [onsshore_economic_benefits_re.pdf \(ymaws.com\)](https://www.ymaws.com/onsshore_economic_benefits_re.pdf) (Accessed on 10/03/2023)

⁸ ERM calculations based on RenewableUK assumptions. RenewableUK (2015) Onshore Wind: Economic Impacts in 2014 [Online] Available at: [onsshore_economic_benefits_re.pdf \(ymaws.com\)](https://www.ymaws.com/onsshore_economic_benefits_re.pdf) (Accessed on 10/03/2023)

have also been amended to reflect 2023 market values, using non-financial business economy, UK regional results.⁹

Table 14.2: Turnover per Employee and GVA for CAPEX and OPEX Phases

Construction (CAPEX)				Operation and Maintenance (OPEX)			
Turnover per Employee (£)	Amended 2023 Turnover (£) ¹⁰	Gross Value Added (GVA) (£)	Amended 2023 GVA (£) ¹¹	Turnover per Employee (£)	Amended 2023 Turnover (£) ¹²	Gross Value Added (GVA) (£)	Amended 2023 GVA (£) ¹³
137,942	139,855	0.432	0.457	121,935	133,576	0.430	0.451
137,942	139,855	0.432	0.457	121,935	133,576	0.430	0.451
137,942	139,855	0.432	0.457	121,935	133,576	0.430	0.451

FTE job years can then be calculated based on the FTEs calculated from the information in Table 14.2. and the anticipated period of each phase of the Proposed Development. For example, 18 months of work is calculated as 1.5 FTE years. Assumptions are for a construction period of 18 months and operational period of 35 years. Decommissioning is anticipated to last for a duration of 18 months; however, due to a lack of available data on the economic and employment impacts of decommissioning onshore wind farms, no quantifiable conclusions can be made at this time.

Using the results generated from the RenewableUK Study, the indirect, direct and induced impacts on FTE job years and GVA can be calculated. This will be done by applying Scottish Government Type I and Type II multipliers to the GVA, calculated from the information in Table 14.2, and FTE job years¹⁴. Type I and Type II multipliers quantify the impacts anticipated by a change in other related economic variables. Type I variables are used to estimate the indirect impacts which are created by more people working in onshore wind which will mean a higher demand for planners/consultants, construction workers, manufacturing, etc. Type II multipliers calculate the induced impacts, which is caused by the proportion of increased income being re-spent on final products (e.g. the more money the output creates, the more jobs will be created as a result). Type I multipliers calculate the direct and indirect impacts, Type II multipliers calculate the direct, indirect and induced impact.

⁹ Office for National Statistics (2023) Non-financial business economy, UK regional results: Section A to S [Online] available at: [Non-financial business economy, UK regional results: Sections A to S - Office for National Statistics](#) (Accessed on 02/06/2023)

¹⁰ ERM calculations based on Office for National Statistics assumptions. Office for National Statistics (2022) Non-financial business economy, UK regional results: Sections A to S, Scotland, 2008 to 2020 [Online] Available at: [Non-financial business economy, UK regional results: Sections A to S - Office for National Statistics](#) (accessed on: 03/07/2023)

¹¹ ERM calculations based on Office for National Statistics assumptions. Office for National Statistics (2022) Non-financial business economy, UK regional results: Sections A to S, Scotland, 2008 to 2020 [Online] Available at: [Non-financial business economy, UK regional results: Sections A to S - Office for National Statistics](#) (accessed on: 03/07/2023)

¹² ERM calculations based on Office for National Statistics assumptions. Office for National Statistics (2022) Non-financial business economy, UK regional results: Sections A to S, Scotland, 2008 to 2020 [Online] Available at: [Non-financial business economy, UK regional results: Sections A to S - Office for National Statistics](#) (accessed on: 03/07/2023)

¹³ ERM calculations based on Office for National Statistics assumptions. Office for National Statistics (2022) Non-financial business economy, UK regional results: Sections A to S, Scotland, 2008 to 2020 [Online] Available at: [Non-financial business economy, UK regional results: Sections A to S - Office for National Statistics](#) (accessed on: 03/07/2023)

¹⁴ Scottish Government (2022) Supply, Use and Output Tables [Online] Available at: [Multipliers - Supply, Use and Input-Output Tables - gov.scot \(www.gov.scot\)](#) 9Access on 04/04/2023)

The multipliers utilised are dependent on the Standard Industrial Classification (SIC) the work belongs to, which varies with each phase of the Proposed Development, as the type of works associated with each phase varies¹⁵. Using the RenewableUK 2015 study, the main industries for each phase could be estimated. For the purposes of this assessments, any contracts placed overseas are not included for calculating the local and regional employment and economic benefits These are listed below:

- CAPEX phase – balance of plant, grid connection and turbine contracts; however, balance of plant will only be considered for the purposes of this assessment as grid connection is not considered as part of this application and the majority of turbine contracts will be placed overseas. Balance of plant and activities mainly consist of construction/electrical work, landscaping. As no felling or plantation is associated with the Proposed Development, this has not been included for the purposes of this assessment. Accommodation providers will be widely utilised at this time. An exact breakdown of the contracts, percentage by percentage, are not available;
- OPEX phase – repair and maintenance activities and electrical work.

Table 14.3 below shows the Employment and GVA multipliers associated with the CAPEX and OPEX phases, and the calculated average.

Table 14.3: Employment and GVA Multipliers for the CAPEX and OPEX Phases

	Employment Multiplier		GVA Multiplier	
	Type I	Type II	Type I	Type II
CAPEX				
Construction (SIC 41-43)	1.6	1.8	1.6	1.9
Accommodation (SIC 55)	1.1	1.2	1.2	1.5
Repair & Installation of Machinery & Equipment (SIC 33)	1.3	1.8	1.2	1.4
Architectural & Engineering Activities: Technical Testing and Analysis (SIC 71)	1.3	1.5	1.3	1.6
CAPEX Average¹⁶	1.3	1.6	1.3	1.6
OPEX				
Repair & Maintenance (SIC 33)	1.3	1.8	1.2	1.4

¹⁵ Scottish Government (2012) Standard industrial classifications (SIC): information [Online] Available at: [Standard industrial classification \(SIC\): information - gov.scot \(www.gov.scot\)](http://www.gov.scot/StandardIndustrialClassification) (accessed on 20/04/2023)

¹⁶ ERM calculations based on Scottish Government assumptions. Scottish Government (2012) Standard industrial classifications (SIC): information [Online] Available at: [Standard industrial classification \(SIC\): information - gov.scot \(www.gov.scot\)](http://www.gov.scot/StandardIndustrialClassification) (accessed on 20/04/2023)

	Employment Multiplier		GVA Multiplier	
	Type I	Type II	Type I	Type II
Electricity (SIC 35.1)	2.4	2.9	1.7	1.9
Services to buildings & Landscape Activities (SIC 81)	1.3	1.4	1.4	1.8
Architectural & Engineering Activities: Technical Testing and Analysis (SIC 71)	1.3	1.5	1.3	1.6
OPEX Average¹⁷	1.6	1.9	1.4	1.7

All these multipliers refer to sectoral interactions within the Scottish economy, it is necessary to think that only a share of these indirect and induced impacts would be felt within the local, socio-economic study area (Dumfries and Galloway Council and East Ayrshire Council). As a result of this, BiGGAR Economics (2021) Case Study of Crossdykes Wind Farm has been used, which assumes that 22% of indirect impacts and 47% of induced impacts will be felt locally¹⁸.

A displacement factor of 10% is applied to all direct jobs. There is assumed to be no deadweight or substitution, as this is a new project. A leakage discount rate of 3.5% will be applied to the estimated GVA for each year from 2023 so that costs can more accurately be calculated for the lifetime of the construction and operational phases of 36.5 years.

Direct impacts are calculated for the local, national and UK study areas. Indirect and induced impacts are only calculated for the local study area as it was agreed that socio-economic data which accumulated into local area would be of most relevance to the assessment.

1.4.2 Tourism and Recreation

A qualitative, desk-based assessment will be undertaken by utilising the framework detailed in Tables 14.4-14.6 in the section below (Section 1.5) to determine the sensitivity, magnitude of impact and significance of effect in line with the EIA regulations.

For the purposes of this assessment, core paths will be dealt with together, with exception of the Southern Upland Way which shall be separately assessed. Specific core paths will be detailed as necessary to discuss specific impacts/sensitivity levels. The SUW will be dealt with as its own receptor due to the importance of this route and its proximity to the Proposed Development. Accommodation providers will also be assessed together, and specific providers will be drawn to as necessary to discuss specific impacts/sensitivity levels. Figure 14.1: Recreational Routes Map and Figure 14.2: Recreational and Tourist Receptor Map, in Volume 2a: Figures Excluding LVIA, provide useful context for all tourist and recreational receptors discussed as part of the assessment.

¹⁷ ERM calculations based on Scottish Government assumptions. Scottish Government (2012) Standard industrial classifications (SIC): information [Online] Available at: [Standard industrial classification \(SIC\): information - gov.scot](http://www.gov.scot) (www.gov.scot) (accessed on 20/04/2023)

¹⁸ BiGGAR Economics (2021) Case Study of Crossdykes Wind Farm [Online] Available at: [Volume 3 - Appendix 14A Case Study of Crossdykes Wind Farm \(1\).pdf](#) (Accessed on 24/04/2023)

1.4.3 Land Use

A qualitative, desk-based assessment will be undertaken by utilising the framework detailed in Tables 14.4-14.6 in the section below (Section 1.5) to determine the sensitivity, magnitude of impact and significance of effect in line with the EIA regulations.

1.5 Assessing the Significance of Effects

1.5.1 Sensitivity of Receptors

The sensitivity of receptors considers their ability to adapt to changes brought about by the Proposed Development. This will be assessed in line with best practice guidance, legislation and statutory designations. Table 14.4 details the framework for determining the sensitivity of each receptor.

Table 14.4 Framework for Determining Sensitivity of Receptors

Sensitivity of Receptor	Definition
Very High	The asset is of very high socio-economic, tourism, recreation or land use value. It is of importance at an International/UK level and has little or no capacity to absorb change without fundamentally altering its present character. For example, it is a destination in its own right which will attract a substantial proportion of visitors and/or possesses priority in UK policy.
High	The asset is of high socio-economic, tourism, recreation or land use value. It is of importance at a UK/national level and has little capacity to absorb change without fundamentally altering its present character. For example, it is a destination in its own right which will attract a high number of visitors and/or possesses priority in UK policy.
Medium	The asset is of moderate socio-economic, tourism, recreation or land use value. It is of importance at a national/regional level and has some capacity to absorb change without fundamentally altering its present character. For example, it is a destination in its own right will attract a moderate number of visitors and/or possesses priority in Scottish policy.
Low	The asset is of moderate socio-economic, tourism, recreation or land use value. It is of importance at a regional/local level and has capacity to absorb change without fundamentally altering its present character. For example, it is an incidental destination for current visitors which attracts a small number of visitors and/or possesses priority in local Council policy.
Negligible	The receptor is resistant to change and is of little socio-economic, tourism, recreation or land use value.

1.5.2 Magnitude of Impact

The magnitude of impact will be identified through consideration of the Proposed Development, the degree of change to baseline conditions predicted as a result of the Proposed Development and the duration and reversibility of the impact.

The criteria for assessing the magnitude of an effect are presented in Table 14.5.

Table 14.5 Framework for Determining Magnitude of Effects

Magnitude of Impact	Definition
High	Total loss or major alteration (positive or negative) of the socio-economic, land use, recreation, or tourism assets/receptors.
Medium	Loss of, or alteration to (positive or negative), one of more key elements of the socio-economic, land use, recreation, or tourism asset's baseline value.
Low	Slight alteration (positive or negative) of the socio-economic, land use, recreation, or tourism asset/receptors.
Negligible	Barely perceptible alteration (positive or negative) of the socio-economic, land use, recreation, or tourism asset/receptors.

1.5.3 Significance of Effect

The sensitivity of the asset and the magnitude of impact will be used as a guide, in addition to professional judgement, to predict the significance of the likely effects. Table 14.6 summarises guideline criteria for assessing the significance of effects.

Table 14.6 Framework for Assessment of the Significance of Effects

Magnitude of Impact	Sensitivity of Resource or Receptor				
	Very High	High	Medium	Low	Negligible
High	Major	Major	Moderate	Moderate	Minor
Medium	Major	Moderate	Moderate	Minor	Negligible
Low	Moderate	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Minor	Negligible	Negligible	Negligible

Effects predicted to be of major or moderate significance are considered to be 'significant' in the context of the EIA Regulations and are shaded in light grey in the above table. Effects can be positive, negative or neutral and these are specified where applicable in the assessment within Chapter 14: Socio-Economics, Tourism, Recreation and Land Use (Volume 1: EIA Report Text).

**ERM has over 160 offices across more 40
countries and territories worldwide**

ERM's Edinburgh Office

6th Floor

102 West Port

EH3 9DN Edinburgh

T: +44 (0)20 3206 5200

F: +44 (0)20 3206 5440

www.erm.com