Fred. Olsen Renewables

Chapter 15

Socio-Economic Assessment

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Glossary

Term	Definition
Direct Economic Impact	Economic impact associated with contracts for development and construction and operations and maintenance.
Environmental Impact Assessment	Environmental Impact Assessment (EIA) is a means of drawing together by the developer, in a systematic way, a description of the development and information relating to of the likely significant environmental effects arising from a proposed development
Environmental Impact Assessment Report	A document reporting the findings of the EIA and produced in accordance with the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 Regulation 5
Gross Value Added	A measure of the economic value added by an organisation or industry.
Indirect Economic Impact	Economic impact from the wider spending within the supply chain.
Induced Economic Impact	Economic impact from the spending of those employed in contracts associated with the Proposed Development.
Jobs	A measure of employment, which considers the headcount employment of industry or organisation.
The Applicant	Fred. Olsen Renewables Limited
The Proposed Development	The Proposed Windy Standard I Repower Wind Farm
Years of Employment	A measure of employment which is equivalent to one person being employed for an entire year and is typically used when considering short-term employment impacts, such as those associated with construction activity.

List of Abbreviations

Abbreviation	Description
ABS	Annual Business Survey
AGER	Advisory Group on Economic Recovery
Capex	Capital Expenditure
DECC	Department for Energy and Climate Change
EIA	Environmental Impact Assessment
FORL	Fred. Olsen Renewables Limited
FTE	Full Time Equivalent
GVA	Gross Value Added
GW	Giga Watt
MW	Mega Watt
NPF	Scotland's National Performance Framework
ONS	Office for National Statistics
Opex	Operational Expenditure
SIC	Standard Industrial Classification
REP	Regional Economic Partnership
TS2020	Tourism Scotland 2020

15.1 STATEMENT OF COMPETENCE

15.1.1 The socio-economic, tourism and recreation assessment was undertaken by BiGGAR Economics, an independent economic consultancy. Over the last 20 years, BiGGAR Economics has developed considerable experience in assessing the socio-economic and tourism impacts of similar developments, having worked on approximately 150 wind farm projects across the UK.

15.2 INTRODUCTION: SUMMARY OF FINDINGS

15.2.1 This chapter includes a socio-economic, tourism and recreation assessment of the Proposed Development carried out by BiGGAR Economics. Unless otherwise stated, for the purposes of the analysis, it was assumed that the Proposed Development would comprise of up to eight 6.2 megwatts (MW) turbines for a total generating capacity of up to 49.6 MW.

15.2.2 During its construction and development and operations, the Proposed Development is expected to deliver a series of economic benefits. It was estimated that the expenditure associated with construction activity could generate:

- £2.4 million Gross Value Added (GVA) and support 35 years of employment in Dumfries and Galloway; and
- £10.6 million GVA and 149 years of employment across Scotland.

15.2.3 The expenditure required for the operations and maintenance of the Proposed Development could generate each year:

- £0.3 million GVA and support three jobs in Dumfries and Galloway; and
- £0.7 million GVA and eight jobs across Scotland.

15.2.4 The Proposed Development will also contribute to public finances through the payment of non-domestic rates, which could amount to around £0.3 million each year.

15.2.5 The Applicant, Fred. Olsen Renewables Limited (FORL), is committed to maximising local economic benefits by following Scottish Government guidance on community benefits and offering up to £248,000 each year to local communities during the operation of the Proposed Development. This funding will complement the existing contribution to local projects from the community benefits of Windy Standard I and Windy Standard II, which have delivered investment in the community worth over £530,000.

15.2.6 The Applicant also wishes to work with suppliers to maximise local economic content and strengthen the local renewable sector. In addition, it is pursuing opportunities to create the skills required locally to benefit from future projects in the renewable energy sector. This includes the provision of bursaries to local students at Dumfries and Galloway College and the potential use of decommissioned turbines for training purposes.

15.2.7 The Applicant is exploring ways to re-purpose the material from the existing turbines. To achieve this, the Applicant has signed a memorandum of understanding with ReBlade (see Appendix 15.1), a company offering specialist blade and nacelle decommissioning services. Wind turbine components could then be re-used in several ways including for a local play park and to create bus shelters. This would benefit local children and broaden the range of benefits from the project, in line with the holistic approach to wellbeing advocated in Scotland's National Performance Framework (NPF).

15.2.8 The assessment also considered the relationship between the Proposed Development and local tourism and recreation. To do so a literature review on tourism and recreation, and onshore wind developments was carried out. This found that evidence for Scotland has consistently suggested that there is no relationship between onshore wind developments and tourism activity at national, regional and local level.

15.2.9 The analysis has also considered tourism and recreation assets that are located within 15 km from the Proposed Development. It found that the Proposed Development will not have any significant effects on local accommodation providers, recreation trails and tourism attractions.

15.3 LEGISLATION POLICY AND GUIDANCE

15.3.1 There is no specific legislation, policy, or guidance available on the methods that should be used to assess the socio-economic effects of a proposed onshore wind farm development for the purposes of an Environmental Impact Assessment (EIA). The proposed method has, however, been based on established best practice, including that which is used in UK Government and industry reports.

15.3.2 In particular, this assessment draws on studies by BiGGAR Economics on the UK onshore wind energy sector, including a report published by RenewableUK and the then Department for Energy and Climate Change (DECC) in 2012[1] on the direct and wider economic benefits of the onshore wind sector to the UK economy and a subsequent update to this report published by RenewableUK in 2015[2].

15.3.3 The evidence collected in those studies is frequently reviewed and updated by BiGGAR Economics, based on its most recent experience working with wind farm developers. Evaluations of costs and the extent to which contracts are carried out in Scotland and within local authority areas, as well as experience working with developers in Dumfries and Galloway have all contributed to this assessment.

15.3.4 Similarly, there is no formal guidance on the methods that should be used to assess the effects that wind farm developments may have on tourism assets. This assessment has been undertaken in line with best practice in assessing the tourism and recreational effects of onshore wind farm proposals.

15.3.5 For recreational assets, guidance has been provided by NatureScot on how to assess effects on recreational amenity[3] and the approach outlined has been used. This considers several potential effects, including direct effect on facilities, such as limitation or restrictions on access, and effects on the intrinsic quality of the resources enjoyed by people.

15.4 METHOD OF ASSESSMENT

Study Area

15.4.1 The socio-economic baseline considers the study areas of:

- Dee and Glenkens;
- Dumfries and Galloway; and
- Scotland.

15.4.2 The quantifiable economic impacts reported in this document are inclusive, i.e., the reported impact for Scotland includes the impacts within Dumfries and Galloway.

15.4.3 The tourism and recreation assessment consider assets which lie within 15 km of the Proposed Development, which is standard for this type of assessment.

Socio-economics

15.4.4 The assessment of economic effects was undertaken using a model that has been developed by BiGGAR Economics specifically to estimate the socio-economic effects of wind farm developments. This model, which was also used as the basis for an assessment of the UK onshore wind sector for the then DECC, is frequently updated to reflect the most recent evidence available on the onshore wind sector in Scotland. The analysis has also

[1] DECC, RenewableUK. (2012) *Onshore Wind: Direct and Wider Economic Impacts.*

[2] RenewableUK. (2015) *Onshore Wind: Economic Impacts in 2014.*

[3] Scottish Natural Heritage. (2013) *A Handbook on Environmental Impact Assessment.*

informed Stantec's[4] assessment of the Applicant's economic footprint in Scotland, including the impacts associated with Windy Standard I and Windy Standard II wind farms.

15.4.5 The units of measurement which are used to quantify the economic impacts of the Proposed Development are:

- GVA: this is a measure of the economic value added by an organisation or industry and is typically estimated by subtracting the non-staff operational costs from the revenues of an organisation;
- years of employment: this is a measure of employment which is equivalent to one person being employed for an entire year and is typically used when considering short-term employment impacts, such as those associated with construction; and
- jobs: this is a measure of employment, which considers the headcount employment of an industry or organisation.

15.4.6 To estimate the economic activity supported by the Proposed Development, it is first necessary to calculate the expenditure during the development and construction, and operation and maintenance phases. The total expenditure figure is then divided into its main contracts using assumptions regarding the share that could be expected by main and sub-contractors in each study area.

15.4.7 There are three sources of economic activity:

- constituent contracts and the jobs they support;
- wider spending in the supply chain (indirect effect); and
- spending of those employed in these contracts (induced effect).

15.4.8 There are four key stages of this model:

- estimation of the total capital expenditure (capex);
- estimation of the value of contracts that make up total expenditure;
- assessment of the capacity of businesses in the study area to perform and complete contracts; and
- estimation of economic impact from resultant figures.

Tourism and Recreation

15.4.9 The potential effects of wind farm developments on the tourism and recreation sector is a well-researched topic, and as such key studies have been included for reference, including:

- Wind Farms and Tourism Trends in Scotland[5] and Wind Farms and Tourism Trends in Scotland: Evidence from 44 Wind Farms[6]; and
- The Economic Impacts of Wind Farms on Scottish Tourism[7].

15.4.10 Tourism assets in the vicinity of the Proposed Development have been identified and the analysis focuses on whether the Proposed Development is likely to lead to a change in behaviour, for example fewer tourists visiting the area.

Assessment of Potential Effect Significance

15.4.11 The initial consideration of the sensitivity of an area's economy, or a tourism asset to an effect is assessed based on the criteria outlined in Table 15.1.

Table 15.1 Socio-economics, tourism and recreation sensitivity criteria

Sensitivity	Description
Very high	The asset has little or no capacity to absorb change without fundamentally altering its present character and/or is of very high tourism, recreational or socio-economic value, or of national importance. For example, it is a destination in its own right (for attractions), with a substantial proportion of visitors on a national level.
High	The asset has low capacity to absorb change without fundamentally altering its present character and/or is of high tourism, recreational or socio-economic value, or of importance to Scotland.
Medium	The asset has moderate capacity to absorb change without substantially altering its present character, has some tourism, recreational or socio-economic value and/or is of regional importance (e.g., Dumfries and Galloway). For example, it is a popular destination among current visitors (for attractions), with a significant contribution to the regional economy.
Low	The asset is tolerant to change without detriment to its character, has low tourism, recreational and/or socio-economic value, or is of local importance. For example, it is an incidental destination for current visitors (for attractions).
Negligible	The asset is resistant to change and/or is of little tourism, recreational or socio-economic value. For example, an incidental destination with low numbers of current visitors (for attractions).

15.4.12 The magnitude of the potential effect will be assessed based on criteria presented in Table 15.2.

Table 15.2 Socio-economics, tourism and recreation magnitude criteria

Magnitude	Description
High	Major loss/improvement to key elements/features of the baseline conditions such that post development character/composition of baseline condition will be fundamentally changed. For example, a major long-term alteration of socio-economic conditions, a major reduction/improvement of recreational assets, or a substantial change to tourism spend.
Medium	Loss/improvement to one or more key elements/features of the baseline conditions such that post development character/composition of the baseline condition will be noticeably changed. For example, a moderate alteration of socio-economic conditions, a moderate reduction/improvement in the recreational asset, or a moderate change to tourism spend.
Low	Changes arising from the alteration will be detectable but not material; the underlying composition of the baseline condition will be similar to the pre-development situation. For example, a small alteration of the socio-economic conditions, a small reduction/improvement in the recreational asset, or a small change in tourism spend.
Negligible	Very little change from baseline conditions. Change is barely distinguishable, approximating to a "no change" situation.

15.4.13 The sensitivity of the asset and the magnitude of the predicted effects will be used as a guide, in addition to professional judgement to predict the significance of the likely effects. Moderate and major effects are assessed as significant in EIA terms (and shown in bold). The significance criteria are outlined in Table 15.3.

[4] Stantec. (2021) *Fred Olsen Renewables Ltd, Economic Footprint*.

[5] BiGGAR Economics. (2017) *Wind Farms and Tourism Trends in Scotland.*

[6] BiGGAR Economics. (2021) *Wind Farms and Tourism Trends in Scotland: Evidence from 44 Wind Farms*.

[7] Moffat Centre. (2008) *The Economic Impacts of Wind Farms on Scottish Tourism.*

Table 15.3 Significance matrix

	Sensitivity				
Magnitude	Very High	High	Medium	Low	Very Low
High	**Major**	**Major**	**Moderate**	**Moderate**	Minor
Medium	**Major**	**Moderate**	**Moderate**	Minor	Negligible
Low	**Moderate**	**Moderate**	Minor	Negligible	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible	Negligible

15.5 CONSULTATION

15.5.1 Within the scoping report, no issues have been raised regarding socio-economics, tourism and recreation. For this reason, the assessment of potential effects is based on professional judgement, best practice and on what is considered in similar assessments.

15.6 BASELINE

Strategic Economic Context

National Performance Framework

15.6.1 Scotland's NPF[8] explicitly includes 'increased well-being' as part of its purpose and combines measurement of how well Scotland is doing in economic terms with a broader range of well-being measures. The NPF is designed to give a more rounded view of economic performance and progress towards achieving sustainable and inclusive economic growth and well-being across Scotland and aims to:

- create a more successful country;
- give opportunities to all people living in Scotland;
- increase the well-being of people living in Scotland;
- create sustainable and inclusive growth; and
- reduce inequalities and give equal importance to economic, environmental, and social progress.

15.6.2 The NPF sets out eleven outcomes, underpinned by eighty-one indicators, that combine to give a better picture of how the country is progressing towards these goals. As well as GDP and employment measures, the NPF's outcomes reflect the desired fabric of communities and culture, education, the environment, health and well-being as well as measures to help tackle poverty. It is these indicators on which the Scottish Government focuses its activities and spending to help meet the national outcomes.

15.6.3 The Proposed Development would contribute to achieving several of the national outcomes through the spending during construction and operation as well as through community investment and development.

Climate Change (Emissions Reduction Targets) (Scotland) Act

15.6.4 The Climate Change (Emissions Reduction Targets) (Scotland) Act[9], passed by the Scottish Government in 2019, sets the legally binding target of achieving net-zero carbon emissions by 2045. This target was set ahead of that for the UK, which aims to achieve net-zero emissions by 2050. Following the passing of the bill, amendments have included an increase of the interim targets to a reduction of 70 % in carbon emissions by 2030 and 90 % by 2040.

15.6.5 The Proposed Development would support the development of the renewable energy sector in Scotland, contributing to Scotland's ability to achieve the targets set out in the Act.

Scottish Government Economic Strategy

15.6.6 The growth of the renewable energy sector was a priority for the Scottish Government prior to the COVID-19 pandemic. The importance of the sector as a driver of economic recovery and transformation is difficult to overstate.

15.6.7 In March 2022, the Scottish Government released the National Strategy for Economic Transformation[10], which set out its ambition for Scotland's economy over the next 10 years. The Scottish Government's vision is to create a wellbeing economy where society thrives across economic, social and environment dimensions, which delivers prosperity for all Scotland's people and places. Of particular importance is the ambition to be greener, with a just transition to net zero, a nature-positive economy and a rebuilding of natural capital.

15.6.8 A key longer term key challenge identified in the strategy is to address deep-seated regional inequality, which includes in rural and island areas that face problems such as a falling labour supply, poorer access to infrastructure and housing. The transition to net zero presents a further challenge of delivering positive employment, revenue and community benefits.

15.6.9 To deliver its vision and address the economy's challenges, five programmes of action have been identified (with a sixth priority of creating a culture of delivery), including:

- establishing Scotland as a world-class entrepreneurial nation;
- strengthening Scotland's position in new markets and industries, generating new, well-paid jobs from a just transition to net zero;
- making Scotland's businesses, industries, regions, communities and public services more productive and innovative;
- ensuring that people have the skills they need to meet the demands of the economy, and that employers invest in their skilled employees; and
- reorienting the economy towards wellbeing and fair work.

15.6.10 The strategy notes that Scotland has substantial energy potential, with a quarter of Europe's wind potential, and that it has developed a growing green industrial base. This provides a strong foundation for securing new market opportunities arising from the transition to net zero, for example in the hydrogen economy and in the decarbonisation of heating systems, where Scotland may be able to secure first-mover advantage, and will need continuing investment and support. Renewable energy also has a role to play in supporting productive businesses and regions across Scotland.

Local Energy Policy Statement

15.6.11 The Scottish Government's latest statement on Local Energy Policy[11] highlights the role of localised energy solutions as part of a green recovery to the Covid-19 pandemic and towards a net-zero and decarbonised economy. The strategy is interlinked with other strategic documents in a concerted effort to increase energy efficiency; reduce emissions and eradicate fuel poverty.

15.6.12 The statement identifies the wide range of stakeholders involved in local energy and sets out the following key principles:

[8] Scottish Government. (2018) *National Performance Framework.*

[9] Scottish Parliament. (2019) *Climate Change (Emissions Reduction Targets) (Scotland) Act 2019.*

[10] Scottish Government. (2022) *National Strategy for Economic Transformation*.

[11] Scottish Government. (2021) *Local Energy Policy Statement*.

- people: engaging with stakeholders from the outset and supporting the different ways each of these will want to be involved;
- places: local energy projects should reflect the features of the local area and work in collaboration with others;
- network and infrastructure: consider the existing energy infrastructure in the area and secure high level and quality of supply to all;
- pathway to commercialisation: create projects that are commercially viable, can be replicated in the future and support net zero emissions; and
- opportunity: projects should create high value jobs and support the wider industry and its workforce.

South of Scotland Regional Economic Partnership's Regional Economic Strategy

15.6.13 The South of Scotland Regional Economic Partnership (REP) covers Dumfries and Galloway and the Scottish Borders. In 2021, the South of Scotland REP published its first regional economic strategy[12], which sets out targets over a 10-year time frame to shift the region's economic performance, its outward profile, and the way by which wealth is created and shared amongst people.

15.6.14 The REP's vision for the South of Scotland is shaped by six key themes:

- skilled and ambitious people: building on existing efforts to expand the population and attract new talent to the region to support the success of sectors important to the economy, create and fill the jobs of the future and ensure everyone has the skills, learning and adaptability to thrive throughout their lives;
- innovative and enterprising: strengthening the region's role as a hub for research, innovation and enterprise, working across the private, public and third sectors to propel business starts, resolve localised challenges, achieve more for less, drive productivity and attract new investment;
- rewarding and fair work: establishing an inclusive economy with wellbeing at its heart by creating and investing in employers which offer jobs that generate localised wealth, pay a fair wage, offer decent conditions, flexibility, diversity and long-term career structures for young people, leading to employee happiness and contentment and which ultimately contribute to reducing poverty and deprivation;
- cultural and creative excellence: better celebrating the region's physical and globally renowned history of inventions and innovation, traditions, contemporary, digital and emerging creative practices and active lifestyle. These provide the opportunity to place culture and creative industries at the heart of the region's thriving economy;
- green and sustainable economy: meeting net-zero emissions goals, improving wellbeing and creating new economic opportunities by harnessing the full potential of the region's natural resources and approach to land use to: further improve quality of life; restore nature; develop visitor offer; adapt and enhance resilience to climate change; and to deliver cleaner energy and greener jobs; and
- thriving and distinct communities: making the South of Scotland exceptional, emphasising quality of life, connectivity, amenity and vibrant neighbourhoods, ensuring the region is attractive, competitive and able to address population decline.

Borderlands Inclusive Growth Deal

15.6.15 In 2021, the Scottish and UK Government signed with the Borderlands regions (Carlisle City, Cumbria County, Dumfries and Galloway, Northumberland County and Scottish Borders) the Borderlands Inclusive Growth Deal[13] with the ambition of supporting the region to reach its full potential. The deal outlines four strategic aims:

- enabling infrastructure: investing in the infrastructure required to support improvements in connectivity, helping people access the region;
- improving places: revitalising places across the Borderlands region to attract people to live, work and visit;
- supporting business, innovation and skills: stimulating business growth to create a more diverse regional economy; and
- encouraging green growth: capitalising on the green credentials of the Borderlands region to facilitate decarbonisation and the creation of new high value jobs supporting low carbon energy generation and carbon reduction.

15.6.16 The Proposed Development would support the region in utilising low carbon energy to create new jobs within the Borderlands region and would develop the credentials of the area as a leader in renewable energy development.

Dumfries and Galloway Council Plan 2017-2022

15.6.17 The Dumfries and Galloway Council Plan[14] sets out the Council's priorities over the five-year period, which include:

- build the local economy: committing to invest in key infrastructure; support the growth of small and medium sized businesses; increase the attractiveness of the area to business; and improve skills levels;
- provide the best start in life for all our children: invest in modern schools; raise ambition and attainment; promote early intervention to protect the most vulnerable children; provide support for children to be healthy and active;
- protect our most vulnerable people: support older or vulnerable people to live independent lives; keep communities safe; address the causes of poverty and inequality; and provide the care and support older or vulnerable people need; and
- be an inclusive Council: include local people and communities in decision-making; empower communities to make the most of their assets; and increase equality of opportunity.

15.6.18 When considering the economic structure of the region, the Plan singles out energy supply and renewables as one of the sectors to support in their growth and development. In addition, it highlights how natural resources provide opportunities to maximise local benefits. As part of the commitment to invest in infrastructure, one of the aspects mentioned is to 'encourage innovative renewable generation'.

Carsphairn Community, Future Plan

15.6.19 The plan[15] considers the ambitions of the local community and identifies projects to fund through wind farms' community benefits. The Carsphairn Community Trust works with other organisations in the area, including Carsphairn Community Council, to deliver benefits to the local community.

15.6.20 The demographic structure of the area was seen as a potential challenge, with risks to the viability of the village's school if no inward migration of young people was to take place. The need for community housing was also identified because of the area's low wage economy.

15.6.21 Local consultations highlighted the following challenges:

- poor broadband and mobile phone signal;
- neglected buildings;
- flooding;
- poor public services; and
- traffic.

15.6.22 The community identified the following initiatives as those more deserving of community benefit funding:

[12] South of Scotland REP. (2021) *South of Scotland Regional Economic Strategy.*

[13] The Borderlands Partnership. (2021) *Borderlands Inclusive Growth Deal.*

[14] Dumfries & Galloway Council. (2017) *Council Plan 2017-2022.*

[15] Carsphairn Community Trust. (2016) *Carsphairn Community, Future Plan.*

- upgrading broadband;
- renewable energy schemes, including consideration of community owned wind turbines;
- tourism development and promotion;
- recreation and activities;
- community transport; and
- provision of community housing.

Socio-Economic Indicators

Population Estimates

15.6.23 In 2020, it was estimated that the population of Dee and Glenkens was 10,568[16], or around 7.1 % of Dumfries and Galloway's (148,300)[17] (Table 15.4). Dee and Glenkens has a relatively older population than both Dumfries and Galloway and Scotland as a whole. The population aged 65+ comprised 30.8 % of its total population, compared to 26.4 % in Dumfries and Galloway and 19.3 % across Scotland. The share of the population aged under 16 was smaller in Dee and Glenkens (13.4 %) in comparison with Dumfries and Galloway (15.6 %) and Scotland (16.8 %). The ward also has a smaller working age population (55.8 %) compared to Dumfries and Galloway (58.1 %) and Scotland as a whole (63.9 %). If the population structure of Dee and Glenkens was the same as for Scotland as a whole, there would be an additional 1,215 people of working age or younger. This suggests that younger people have left the area in search of economic opportunities elsewhere.

Table 15.4 Population estimates

	Dee and Glenkens*	Dumfries and Galloway	Scotland
Total	10,568	148,300	5,466,000
0-15	13.4 %	15.6 %	16.8 %
16-64	55.8 %	58.1 %	63.9 %
65+	30.8 %	26.4 %	19.3 %

*Source: National Records of Scotland (2021), Population Estimates 2020. *National Records of Scotland (2021), Electoral Wards Population Estimates 2020*

Population Projections

15.6.24 While there were no available data on the projected population structure of Dee and Glenkens, it is likely that similar demographic trends are at work as in Dumfries and Galloway as a whole.

15.6.25 Over the period 2018-2043, the population of Dumfries and Galloway is expected to decline by 8.4 %, from 148,790 to 136,286[18] (Table 15.5). On the contrary, by 2043 the total population of Scotland will be 5,574,819 or 2.5 % larger than it was in 2018.

15.6.26 Both the population of Dumfries and Galloway and Scotland are expected to age. Though following a similar trend, this will be more marked in Dumfries and Galloway, where by 2043 those aged 65+ will comprise 33.7 % of the total population from 25.5 % in 2018. Over the same period in Scotland, this age group will include 24.9 % of the population up from 18.9 %.

15.6.27 Between 2018 and 2043, it is expected that the relative share of the population of working age will decrease in Dumfries and Galloway from 58.8 % in 2018 to 53.0 % in 2043, compared to Scotland where it is expected to fall from 64.2 % to 60.3 %. On this basis, the working age population in Dumfries and Galloway is expected to fall by 15,257, a decrease of 17.4 %, compared to Scotland as a whole where the working age population is expected to fall by 3.7 % over the same period. This suggests a lack of opportunities in the local authority resulting in workers leaving the area.

Table 15.5 Population projections, 2018-2043

	Dumfries and Galloway		Scotland	
	2018	2043	2018	2043
Total	148,790	136,286	5,438,100	5,574,819
0-15	15.7 %	13.2 %	16.9 %	14.8 %
16-64	58.8 %	53.0 %	64.2 %	60.3 %
65+	25.5 %	33.7 %	18.9 %	24.9 %

Source: National Records of Scotland (2020), Population projections 2018-2043

Industrial Structure

15.6.28 The largest employer within Dee and Glenkens is the manufacturing sector which employs 20.0 % of those in employment in the area, compared with 9.4 % in Dumfries and Galloway and 7.0 % across Scotland as a whole[19] (Table 15.6). The manufacture of food products accounts for the largest share of manufacturing employment, with 13.3 % of workers in Dee and Glenkens employed in this sector. Dee and Glenkens has also a larger share of the population employed in accommodation and food services (15.0 %) than Dumfries and Galloway (7.8 %) and Scotland (7.1 %).

15.6.29 Employment in construction, one of the sectors associated with construction and development contracts is 7.5 % of total employment, a larger share of total employment than across both Dumfries and Galloway as a whole (4.3 %) and Scotland (5.1 %).

15.6.30 Data on employment in agriculture, forestry and fishing for Dee and Glenkens exclude farm agriculture. This does not make them directly comparable with the estimates available for Dumfries and Galloway and Scotland. However, it is expected that employment in this sector would be relatively high in a rural area such as Dee and Glenkens. With a local working age population of 5,892, data on sectoral employment are available for 3,000 people. Assuming a similar employment rate locally as in Dumfries and Galloway (68.3 %) would imply a larger number of people in employment (4,024). As a result, it is possible that employment in agriculture, forestry and fishing could account for around 1,000 jobs in the area, equivalent to more than a quarter of employment in Dee and Glenkens.

[16] National Records of Scotland (2021), Electoral Wards Population Estimates 2020

[17] National Records of Scotland. (2021) *Population Estimates 2020.*

[18] National Records of Scotland. (2020) *Population projections 2018-2043.*

[19] Office for National Statistics. (2021) *Business Register and Employment Survey (BRES) 2020.*

Table 15.6 Industrial structure, 2020

	Dee and Glenkens	Dumfries and Galloway	Scotland
Manufacturing	20.0 %	9.4 %	7.0 %
Accommodation and food service activities	15.0%	7.8 %	7.1 %
Education	10.0 %	7.8 %	8.0 %
Human health and social work activities	7.5 %	17.3 %	16.1 %
Construction	7.5 %	4.3 %	5.1 %
Professional, scientific and technical activities	6.7 %	4.3 %	7.0 %
Arts, entertainment and recreation	4.2 %	2.0 %	2.2 %
Other service activities	4.2 %	1.8 %	1.7 %
Transportation and storage	3.3 %	4.7 %	4.3 %
Water supply; sewerage, waste management and remediation activities	3.0 %	0.9 %	0.7 %
Mining and quarrying	3.0 %	0.1 %	1.1 %
Public administration and defence; compulsory social security	2.5 %	3.9 %	6.2 %
Real estate activities	1.7 %	2.2 %	1.5 %
Agriculture, forestry & fishing	1.7 %*	11.8 %	3.1 %
Wholesale and retail trade and repair of motor vehicles and motorcycles	1.5 %	15.7 %	13.7 %
Information and communication	1.5 %	1.0 %	3.5 %
Administrative and support service activities	1.5 %	3.9 %	7.7 %
Electricity, gas, steam and air conditioning supply	1.0 %	0.5 %	0.8 %
Financial and insurance activities	0.0 %	0.7 %	3.1 %
Total Employment	**3,000**	**63,800**	**2,544,000**

*Source: Office for National Statistics (2021), Business Register and Employment Survey (BRES) 2020. *Figures exclude farm agriculture.*

15.6.31 In 2021, Stantec[20] carried out an economic impact assessment of the Applicant's economic footprint within Scotland. The study found that Windy Standard I and Windy Standard II (previously named as Brockloch Rig I and II in the report) had supported a total of 536 per year equivalent jobs across Scotland during construction and development and around 450 full time equivalent (FTE) job years during operation. The Proposed Development will safeguard and contribute to the local employment supported by the Applicant's activities.

Economic Activity

15.6.32 In 2021, the economic activity rate in Dumfries and Galloway was 73.4 %, or 4.4 % lower than across Scotland as a whole (75.9 %)[21] (Table 15.7). At the same time, the unemployment rate was 6.4 % compared to a Scottish average of 4.8 %. This suggests that, despite a smaller share of the population being of working age, there is a lack of opportunities available, leading to a larger unemployment rate and lower rates of labour market participation.

15.6.33 Data on annual gross earnings for those in full time employment suggest a degree of commuting from Dumfries and Galloway to areas where higher salaries are paid. In 2021, the median annual gross wage of those living in Dumfries and Galloway was £22,690 compared to £26,139 for Scotland, while the median annual gross income in workplaces in Dumfries and Galloway was £25,560, compared to £31,672 across Scotland as a whole[22].

Table 15.7 Economic activity rates, 2021

	Dumfries and Galloway	Scotland
Economic Activity Rate	73.4 %	75.9 %
Unemployment Rate	6.4 %	4.8 %
Median Annual Gross Income (resident)	£22,690	£26,139
Median Annual Gross Income (workplace)	£25,560	£31,672

Source: ONS (2022), Annual Population Survey Jan 2021-Dec 2021. ONS (2022), Annual Survey of Hours and Earnings-resident analysis 2021

Summary of Socio-economic Context

15.6.34 The electoral ward of Dee and Glenkens accounts for 7.1 % of the total population of Dumfries and Galloway. Over the period to 2043, the working age population of Dumfries and Galloway is expected to fall by 17.4 %, while the population aged 65 and older is expected to increase. This suggests a lack of opportunities available to people of working age resulting in workers leaving the area, including the local Dee and Glenkens area. Furthermore, despite its smaller share of working age population, the local authority performs worse than Scotland on a range of labour market indicators, featuring a lower economic activity rate and higher unemployment.

15.6.35 The largest shares of employment in the area is accounted for by agriculture and by manufacturing and, in particular, manufacture of food products. In common with other rural areas in Scotland, Dee and Glenkens has a relatively large share of its population employed in accommodation and food service activities. Dee and Glenkens also has a relatively larger share of its workforce employed in construction, one of the sectors associated with construction and development contracts.

15.6.36 Given declining population trends, the safeguarding and expansion of existing activity by the Applicant in the area could favour the retention and attraction of young people through high skilled and high paying jobs. This will support rural communities across Dumfries and Galloway and future economic growth.

Strategic Tourism Context

Tourism Strategy: Scotland's Outlook 2030

15.6.37 Following on from the Tourism Scotland 2020 (TS2020) strategy[23], a collaborative network of industry experts created Scotland's Outlook 2030[24], which is focused on creating a world-leading tourism sector in Scotland that is sustainable in the long-term.

15.6.38 The strategy is focused on four key priorities:

- people;
- places;
- businesses; and
- experiences.

[20] Stantec. (2021) *Fred Olsen Renewables Ltd, Economic Footprint*.

[21] ONS. (2022) *Annual Population Survey Jan 2021-Dec 2021*.

[22] ONS. (2022) *Annual Survey of Hours and Earnings-resident analysis 2021*.

[23] Scottish Tourism Alliance. (2012) *Tourism Scotland 2020.*

[24] Scottish Tourism Alliance. (2021) *Scotland's Outlook 2030.*

15.6.39 The strategy recognises the effects of climate change, technological advancements, Brexit and changing consumer behaviour on tourism, and highlights the need for collaboration between government, communities, and the public and private sectors.

15.6.40 There are six conditions highlighted by the strategy as crucial for success:

- using technological advancements and information to understand changes and trends in tourist behaviours;
- ensuring policies are in place that support the vision;
- enabling investment opportunities into Scotland's tourism market;
- improving transport and digital infrastructure;
- greater collaboration between businesses in the industry; and
- positioning Scotland as a great place to live and visit locally and globally.

15.6.41 A main commitment of the strategy is to address the effects of energy demand associated with tourism and make the sector commit fully to Scotland's ambition of becoming a net-zero society by 2045.

Tourism and Recreation

Tourism Baseline

Sustainable Tourism GVA and Employment

15.6.42 In its 2015 economic strategy[25] the Scottish Government identified six sectors as growth sectors, that is, economic sectors where Scotland had a comparative advantage. Sustainable tourism was one of the sectors identified.

15.6.43 In 2019, around 7,000 people were employed in sustainable tourism in Dumfries and Galloway, equivalent to 3 % of the total employment in the sector across Scotland (229,000) (Table 15.8). It was estimated that in 2018 the sector generated £78.1 million GVA in Dumfries and Galloway and over £4.1 billion GVA across Scotland.

Table 15.8 Sustainable tourism: employment and GVA, 2018-2019

	Dumfries and Galloway	Scotland
GVA (£m)	78.1	4,141.2
Employment	7,000	229,000

Source: Scottish Government (2020), Growth Sector Database

Visitors to Dumfries and Galloway

15.6.44 In 2019, it was estimated that 5.7 million day-visitors spent time in Dumfries and Galloway, spending on average almost £42 per visit, broadly in line with the average spend per day visit of visitors to Scotland[26] (Table 15.9). There were around 32,000 visits from international visitors, contributing £16 million in spending[27]. Domestic overnight visitors spent on average £172 per visit, equivalent to a total £122 million over 2019[28].

Table 15.9 Visitors to Dumfries and Galloway

	Dumfries and Galloway	Scotland
		Visitor Numbers (million)
Day Visitors	5.7	140.8
Domestic Overnight Visits	0.7	13.8
International Visitors	<0.1	3.5
		Spend (£ million)
Day Visitors	239	5,749
Domestic Overnight Visitors	122	3,200
International Overnight Visitors	16	2,538

Source: Visit Scotland (2021), Insight Department: Dumfries and Galloway Factsheet 2019.

15.6.45 The most visited attraction in Dumfries and Galloway is Gretna Green Famous Blacksmith Shop. Galloway Forest Park is the main outdoor destination and attracts over 385,000 visitors each year (Table 15.10). While the Park's boundary is at its closest within 15 km from the Proposed Development[29], its centre is over 25 km distant.

Table 15.10 Top five attractions in Dumfries and Galloway

Attraction	Annual Visitors
Gretna Green Famous Blacksmiths Shop	772,448
Galloway Forest Park	385,437
Threave Garden	120,840
Mable Forest	63,291
Delbeattie Forest	55,042

Source: Visit Scotland (2021), Insight Department: Dumfries and Galloway Factsheet 2019

15.6.46 In 2017 Visit Scotland[30] published the results from a visitor survey considering why people spent time in Dumfries and Galloway during 2015 and 2016. The survey found that 63 % of visitors were attracted to the area because of its scenery and landscape. Over one in three visitors mentioned history and culture as the motivation for their visit, whereas 41 % visited Dumfries and Galloway to get away from it all (Table 15.11).

Table 15.11 What attracted visitors to Dumfries and Galloway

Attraction	
The scenery & landscape	63 %
Holidayed here before and wanted to return	43 %
To get away from it all	41 %
The history and culture	35 %
To visit a particular attraction	32 %

Source: Visit Scotland (2017), Scotland Visitor Survey 2015 & 2016

[25] Scottish Government. (2015) *Scotland's Economic Strategy.*

[26] Visit Scotland. (2021) *Insight Department: Dumfries and Galloway Factsheet 2019.*

[27] Visit Scotland. (2021) *Insight Department: Dumfries and Galloway Factsheet 2019.*

[28] Visit Scotland. (2021) *Insight Department: Dumfries and Galloway Factsheet 2019.*

[29] Visit Scotland. (2021) *Insight Department: Dumfries and Galloway Factsheet 2019.*

[30] Visit Scotland. (2017) *Scotland Visitor Survey 2015 & 2016*

Local Visitor Attractions

15.6.47 Local visitor attractions are set out in Table 15.12 below, which provides a brief description of them and considers their distance from the Proposed Development. The list also includes outdoor activities, such as mountain biking and country sports, which are relatively popular in the area.

Table 15.12 Local visitor attractions

	Description	Distance (km)
Knockengorroch World Ceilidh	A music festival promoting multi-cultural forms and musical genres.	6
Holm of Daltallochan Stone Circle	Neolithic and Bronze Age stone circle north of Carsphairn.	7
Striding Arches	A landscape installation consisting of three sandstone arches to represent Scots migrating over the past two-hundred years.	8
Carsphairn Heritage Centre	The Centre each year hosts an exhibition on local history.	9
Galloway Forest Park	The Park is renowned for its landscapes and is suitable for a range of recreational activities including walking, cycling and fishing.	12
Adventure Doon	It offers games of Archery Tag, a game which is a mixture between paintball and dodgeball.	12
The Merrick Circle Part 2	A mountain bike route close to Galloway Forest Park.	12
Loch Doon Castle	A medieval castle from the late 1200s.	13
Scottish Dark Sky Observatory	Within Galloway Forest Dark Sky Park, the observatory is publicly accessible to all those interested in knowing more about astronomy. At the time of writing, it was closed following a fire.	13
Dalcairney Falls	Picturesque waterfall located near Doon Bridge.	14
Scotland's Country Sports Activity Centre	An estate within Dumfries and Galloway hosting a range of traditional country sports.	15

Source: Visit Scotland. (2021). Insight Department: Dumfries and Galloway Factsheet 2019.

Local Accommodation Providers

15.6.48 Through an online search on the VisitScotland portal, Bookings.com, Google Maps and Carsphairn Community website, several accommodation providers were identified in the area surrounding the Proposed Development. There were no providers within 5 km of the Proposed Development, 18 within 5-10 km and 20 within 10-15 km (Table 15.13).

15.6.49 Accommodation providers in the area tend to be clustered around a few locations and settlements, including around the B741 and the A76 close to Bankglen and New Cumnock; in and around Carsphairn; close to Dalmellington; and on the banks of Loch Doon.

Table 15.13 Local accommodation providers

Distance (km)	Number of Accommodation Providers
0-5 km	0
5-10 km	18
10-15 km	20
Total	**38**

Source: Visit Scotland (2021), Accommodation Dumfries and Galloway. Booking.com. Google Maps. Carsphairn Community Website.

Recreational Trails and Core Paths

15.6.50 Hillwalking plays a relatively important role in outdoor tourism in the area. As such a series of recreational trails within 15 km from the Proposed Development were identified through the portal Walkhighlands[31] (Table 15.14).

Table 15.14 Recreational trails

	Description	Distance (km)
Cairnsmore of Carsphairn	This walk goes up the Cairnsmore of Carsphairn, a grassy summit with beautiful views.	3
Southern Upland Way 4: St John's Town of Dalry to Sanquhar	One of the longest sections of the Southern Upland Way, mostly in the moorland.	6
Striding Arches, near Moniaive	This route goes through the forest and brings the visitor to one of the three Striding Arches built by sculptor Andy Goldsworthy.	8
Dundeugh Forest, near Dalry	A 7 km circle in Dundeugh Forest, surrounded by the Water of Ken, Kendoon Loch and the Water of Deugh.	11
Ness Glen, near Loch Doon	A short walk going along the river.	12
Craiglea Trail and Loch Doon	The walk starts at the ruins of Loch Doon Castle, goes north and provides views over the water.	14

Source: Walkhighlands (2021), Walks

15.6.51 There are also several core paths within 15 km of the Proposed Development, including those listed in Table 15.15.

[31] Walkhighlands. (2022) *Dumfries and Galloway Walks.* [Online], Available from: https://www.walkhighlands.co.uk/galloway/ Accessed [10/02/2022].

Table 15.15 Core Paths

Core Path Number	Core Path Name
Path 16	Garryhorn Rig
Path 23	Dundeugh Hill;
Path 51	Benbuie to Troston Hill;
Path 52	Cairnhead to Blackmark Hill;
Path 154	Forrest Lodge;
Path 164	Bardennoch Trail Pack Road;
Path 199	Kendoon Youth Hostel to Butterhole Bridge;
Path 209	Loch Dee to Loch Doon;
Path 215	Lorg Trail;
Path 216	Manquhill Hill;
Path 443	Bank Hill to Graystone Hill;
Path 594	Carsphairn Forest and Knockengorroch; and
Path 667	Water of Deugh.
Path 443	Bank Hill to Graystone Hill;

Source: Dumfries and Galloway Council. (2021) Core Paths: Walking and Cycling in Dumfries and Galloway

15.6.52 Some walking and cycling activities are captured by fitness tracking applications such as Strava. Strava shows the relative popularity of recreational routes which are logged using the Strava fitness app. The app aggregates annual data on usage, which can be used as additional evidence on the extent to which trails are used, although not all the usage may be associated with tourism activity.

15.6.53 The heat map Plate 15.1 below shows that most of the activity near the Proposed Development tends to occur in Dalmellington to the west of the Proposed Development, Loch Doon to the south-west, and around Afton Reservoir to the north-east.

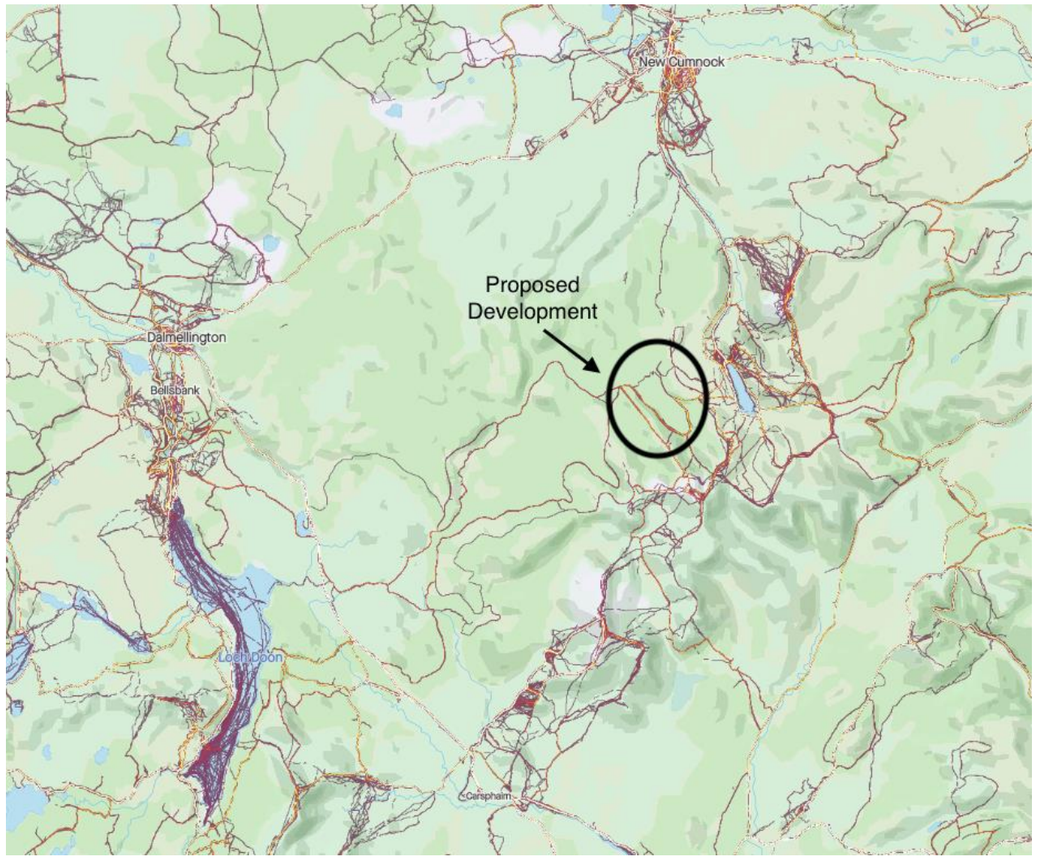

Plate 15-1 Heat map of trails and walks

Source: Strava (2022), Global Heatmap

15.7 ASSESSMENT OF POTENTIAL EFFECTS

Development and Construction

15.7.1 For the purposes of this assessment, it was assumed that the Proposed Development will feature up to eight turbines and have a total generating capacity of up to 49.6 MW. On this basis, it was estimated that the total construction and development expenditure could be up to £44.9 million.

15.7.2 To estimate the economic impacts during construction and development, expenditure was split according to the following contract areas:

- development and planning;
- balance of plant;
- turbine; and
- grid connection.

15.7.3 The largest expenditure was associated with turbines, equivalent to £33.1 million, or 74 % of total construction and development spend. Balance of plant contracts could contribute around 14% of total construction and development

expenditure, with development and planning, and grid connection accounting for 5 % and 7 % respectively (Table 15.16).

Table 15.16 Development and construction by contract type

	% Capex	Value (£m)
Development and Planning	5 %	2.4
Turbines	74 %	33.1
Balance of Plant	14 %	6.3
Grid Connection	7 %	3.0
Total	**100 %**	**44.9**

Source: BiGGAR Economics Analysis of case study evidence from comparable previously constructed wind farms.

15.7.4 To estimate the economic impacts from the construction and development of the Proposed Development, it was first necessary to make assumptions on the ability of businesses within each study area to carry out contracts.

15.7.5 Based on available evidence from similar developments within Dumfries and Galloway, it was estimated that around 31 % of the construction and development contracts could be carried out by Scottish businesses. Similarly, spending on businesses based in Dumfries and Galloway could be around £4.1 million, equivalent to 9 % of total construction and development expenditure. The largest opportunity for Scottish businesses could be in contracts associated with balance of plant, which could be worth £5.8 million. Balance of plant contracts could also be the largest contracts for businesses in Dumfries and Galloway, worth up to £1.8 million (Table 15.17).

15.7.6 Assumptions on local and Scottish content reflect the latest evidence available. The share of local content assumed for the Proposed Development is lower than for other projects in Dumfries and Galloway because of lower spending on balance of plant contracts, which tend to be carried out by local contractors. The analysis also accounts for the definitive closure of CS Wind's tower manufacturing facility in Argyll and Bute, which means that towers will be imported and not be procured within Scotland.

Table 15.17 Development and construction expenditure by study area

	Dumfries and Galloway		Scotland	
	%	£m	%	£m
Development and Planning	16 %	0.4	85 %	2.1
Turbines	3 %	0.9	9 %	2.9
Balance of Plant	28 %	1.8	92 %	5.8
Grid Connection	35 %	1.0	100 %	3.0
Total	**9 %**	**4.1**	**31 %**	**13.7**

*Source: BiGGAR Economics Analysis. *Totals may not add up due to rounding.*

15.7.7 Having estimated the size of the contracts that could benefit each of the study areas, it was possible to consider the GVA and short-term employment that these could support. This was done by splitting each contract category into smaller contracts and assigning each to an industrial sector, based on its Standard Industrial Classification (SIC)[32]. Direct GVA was then estimated by applying the relevant turnover per GVA from the UK Annual Business Survey (ABS)[33].

15.7.8 In this way, it was estimated that the Proposed Development could generate £1.8 million direct GVA in Dumfries and Galloway and £6.5 million direct GVA in Scotland (Table 15.18).

Table 15.18 Development and construction, direct GVA by study area (£m)

	Dumfries and Galloway	Scotland
Development and Planning	0.2	1.3
Turbines	0.4	1.3
Balance of Plant	0.8	2.8
Grid Connection	0.4	1.2
Total	**1.8**	**6.5**

*Source: BiGGAR Economics Analysis. *Totals may not add up due to rounding.*

15.7.9 Similarly, it was possible to estimate the number of direct jobs supported by spending in construction and development contracts. This was done by dividing the expenditure in each contract by the turnover per job ratio for the relevant sector. In this way, it was estimated that the Proposed Development could support 27 direct years of employment in Dumfries and Galloway and 94 direct years of employment in Scotland (Table 15.19).

Table 15.19 Development and construction, direct employment by study area and contract type (years of employment)

	Dumfries and Galloway	Scotland
Development and Planning	3	17
Turbines	7	22
Balance of Plant	11	39
Grid Connection	5	16
Total	**27**	**94**

Source: BiGGAR Economics Analysis

15.7.10 Expenditure in construction and development contracts is also expected to generate 'knock-on' effects across the economy. In particular, it will be associated with further rounds of expenditure along the supply chain and with the spending of the wages and salaries of those involved in the construction and development of the Proposed Development. These are referred to as 'indirect' and 'induced' impacts.

15.7.11 To estimate indirect and induced impacts, it was necessary to apply the relevant Type 1 and Type 2 GVA and employment multipliers from the Scottish Government Input-Output Tables[34] to the direct GVA and direct employment supported by the Proposed Development. Since the multipliers refer to sectoral interactions occurring at the level of the Scottish economy, it was necessary to adjust them when considering impacts taking place in Dumfries and Galloway.

15.7.12 Based on previous experience, indirect impacts in Dumfries and Galloway were considered a third of those in Scotland. From an internal analysis of household spend within local authority areas[35], induced impacts were considered as 70 % of those within Scotland.

15.7.13 Adding up direct, indirect and induced impacts, it was estimated that the construction and development of the Proposed Development could generate:

- £2.4 million GVA and support 35 years of employment in Dumfries and Galloway; and
- £10.6 million GVA and 149 years of employment in Scotland (Table 15.20 and Table 15.21).

[32] Office for National Statistics. (2009) *Standard Industrial Classification of industrial Activities (SIC 2007).*

[33] Office for National Statistics. (2021) *Annual Business Survey 2019.*

[34] Scottish Government. (2021) *Supply, Use and Input-Output Tables 2018.*

[35] Office for National Statistics. (2019) *Family Expenditure Survey in the UK- April 2017 to March 2018*

Table 15.20 Total GVA during construction and development, by study area (£m)

	Dumfries and Galloway	Scotland
Direct	1.8	6.5
Indirect	0.2	2.3
Induced	0.4	1.8
Total	**2.4**	**10.6**

Source: BiGGAR Economics Analysis

Table 15.21 Economic impact of development and construction (job years)

	Dumfries and Galloway	Scotland
Direct	27	94
Indirect	3	34
Induced	4	21
Total	**35**	**149**

Source: BiGGAR Economics Analysis

15.7.14 Based on the relative scale of activity and the sensitivity of its economy to change, the effect of construction and development spending on the economy of Dumfries and Galloway was assessed as **minor** (beneficial). As the scale of activity involved for the construction and development of the Proposed Development is relatively small compared to the size of the Scottish economy, its effect was assessed as **negligible** (beneficial).

15.7.15 The assessment was also carried out based on turbines with a capacity of 7.0 MW instead of 6.2 MW. This reflects the rapid development in wind turbines' generating capacity, which means that, by the time the Proposed Development will be constructed, 7.0 MW machines may become common across onshore wind developments.

15.7.16 Assuming a total generating capacity of 56.0 MW, it was estimated that the construction and development spending associated with the Proposed Development could generate:

- £2.6 million GVA and support 38 years of employment in Dumfries and Galloway; and
- £11.4 million GVA and 161 years of employment across Scotland.

15.7.17 The changed assumptions do not affect the conclusions reached on the effect of construction and development spending on the study areas considered.

Operations and Maintenance

15.7.18 To estimate the economic impact from the operations and maintenance of the Proposed Development, it was first necessary to consider the total expenditure required for its operation each year. Based on the number of turbines and its capacity, it was estimated that the annual cost of operations and maintenance (Opex) could be around £1.3 million.

15.7.19 It was further assumed that businesses in Dumfries and Galloway could benefit from a total £0.4 million in operations and maintenance contracts (32 % of Opex), whereas expenditure in Scottish contractors could be up to £1.0 million (81 % of Opex) (Table 15.22).

Table 15.22 Operations and maintenance spending by study area

	Dumfries and Galloway		Scotland	
	%	£m	%	£m
Operations and Maintenance	32 %	0.4	81%	1.0

Source: BiGGAR Economics Analysis

15.7.20 The total turnover generated in each study area was then divided by the turnover per GVA and turnover per job ratios of the sectors expected to carry out operations and maintenance contracts. In this way, it was estimated that the Proposed Development could generate £0.2 million direct GVA and support three direct jobs in Dumfries and Galloway, and £0.5 million direct GVA and six direct jobs across Scotland (Table 15.23).

Table 15.23 Operations and maintenance, direct impact by study area

	Dumfries and Galloway	Scotland
Direct GVA (£ million)	0.2	0.5
Direct employment	3	6

Source: BiGGAR Economics Analysis

15.7.21 As for the impacts from development and construction, it was necessary to estimate the indirect and induced impacts associated with operations and maintenance contracts. This was done by applying the relevant Type 1 and Type 2 GVA and employment multipliers.

15.7.22 Adding up direct, indirect and induced impacts, it was estimated that during its operations and maintenance, the Proposed Development could generate:

- £0.3 million GVA and support three jobs in Dumfries and Galloway; and
- £0.7 million GVA and eight jobs across Scotland (Table 15.24).

Table 15.24 Total annual GVA operations and maintenance, by study area

	Dumfries and Galloway	Scotland
Total GVA (£ million)	0.3	0.7
Total employment	3	8

Source: BiGGAR Economics Analysis

15.7.23 The effect of operations and maintenance spending on the economies of Dumfries and Galloway and Scotland was assessed as **negligible** (beneficial). Since the Proposed Development is a repowering project, it will support the retention of the existing operation and maintenance jobs from Windy Standard I wind farm. Were the Proposed Development not to go ahead, the lower levels of activity in the area could result in employment losses.

15.7.24 As for construction and development spending, the assessment was also carried out based on a turbine capacity of 7.0 MW. Assuming a total generating capacity of 56.0 MW, it was estimated that the spending on operations and maintenance contracts could generate:

- £0.3 million GVA and support four jobs in Dumfries and Galloway; and
- £0.7 million GVA and nine jobs across Scotland.

15.7.25 This assumption does not make any difference with regards to the conclusions reached as part of the assessment.

Non-Domestic Rates

15.7.26 Throughout its operations the Proposed Development is expected to generate revenue for Dumfries and Galloway Council in the form of non-domestic rates.

15.7.27 To assess this, it was first necessary to estimate the extent of non-domestic rates revenue that could be generated by the Proposed Development. Existing guidance on which assessments of a property's rateable value are carried out is based on onshore wind developments receiving subsidies and will not be updated until 2023. In addition, at present there is no evidence on actual non-domestic rates paid by operational onshore wind farm developments that are not supported by subsidies.

15.7.28 Based on conversations with onshore wind developers, a conservative rate of £7,000 of non-domestic rates per MW was assumed. This is an estimate based on information available at present and it is acknowledged that the rates paid will depend on a range of factors, including the Proposed Development's load factor.

15.7.29 On this basis, it was estimated that during each year of operation the Proposed Development could contribute around £0.3 million towards non-domestic rates and, in this way, support the revenue of Dumfries and Galloway Council.

15.7.30 Based on the size of the annual payments involved, the effect of non-domestic rates payments on the economy of Dumfries and Galloway was assessed as **negligible** (beneficial).

Community Benefits

15.7.31 Community benefits, an annual payment that is made by the developer to those communities in the proximity of a wind farm, have become a common practice to support local ambitions and needs. While they do not constitute a material consideration at the planning stage, commitment to a comprehensive package of community benefits has a role in fostering a good relationship between the developer and the community hosting a development.

15.7.32 To provide a framework on how to deliver community benefits, in 2019 the Scottish Government released its "Good Practice Principles for Community Benefits from Onshore Renewable Energy Developments"[36], which updated previous guidance issued in 2015. The Scottish Government recommends onshore wind developers to deliver community benefit funding worth £5,000 per MW of installed capacity. The document also encourages developers to engage in holistic ways to maximise benefits locally, going beyond a purely monetary approach.

15.7.33 Scottish Government guidance recommends that recipient communities develop a Community Action Plan, setting out their priorities and aspirations. This document will then be used by the local community to streamline funding to those projects delivering the largest local benefits.

15.7.34 The Applicant is committed to local communities benefitting from onshore wind projects through community benefits. As of late 2021, it had already spent over £5.7 million towards community benefits across its UK portfolio of projects, with over £4.3 million having already been allocated to projects. Projects receiving support tend to benefit the environment; increase energy efficiency; support tourism and recreation; or contribute to local amenity.

15.7.35 These principles have been showcased in the Applicant's activity at Windy Standard I and Windy Standard II wind farms. To date, the two developments have contributed over £530,000 in community benefits supporting communities across Dumfries and Galloway and East Ayrshire. This funding has been spent across a range of projects, including provision of local affordable tourism accommodation, community purchase of local woodland and vocational grants.

15.7.36 The Applicant is committed to offer a level of community benefit funding consistent with Scottish Government guidance of £5,000 per MW of installed capacity. This is equivalent to committing each year up to £248,000 in community benefit funding. The funding will support local aspirations and projects and generate economic impacts. Based on the economic ratios for the volunteering sector[37], it was estimated that a similar level of funding could support up to four jobs.

Circular Economy: Repurposing Existing Turbine Material

15.7.37 The decommissioning of the existing turbines also provides an opportunity for delivering local benefits. As part of this, the Applicant has considered the possibility of repurposing the material from the existing turbines. A few ideas have been considered, including the use of material for bus shelters and local pay parks.

15.7.38 A similar initiative would extend the benefits from the decommissioning of the existing wind farm to children, improving their play environment, and to the broader community. This would be in line with a holistic approach towards the delivery of local benefits and with the framework towards maximising wellbeing set out in the NPF.

15.7.39 To maximise the circular economy opportunities associated with the repurposing of existing turbine material, the Applicant has signed a memorandum of understanding with ReBlade (see Appendix 15.1), a Scottish business specialised in delivering blade and nacelle decommissioning services.

15.7.40 The collaboration has three aims, to:

- re-use and re-purpose the decommissioned turbines and components;
- support Scottish businesses to research and invest in technical solutions to ensure that landfill is not the only option for turbine blades; and
- support Scottish businesses to invest in Scotland – creating economic growth, supporting skills and creating jobs.

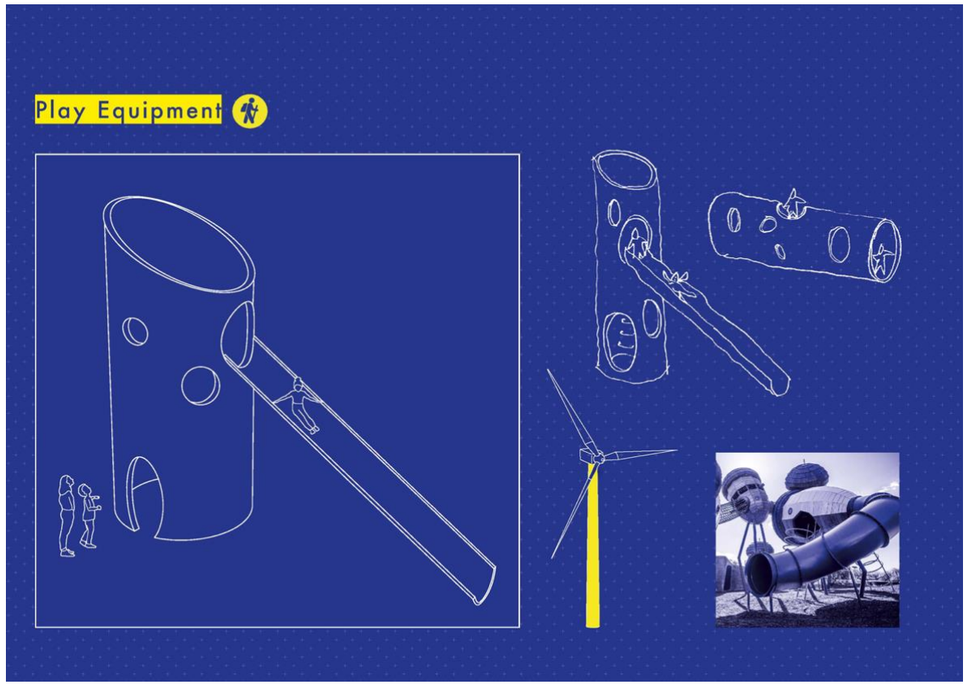

Plate 15-2 Example of Wind Turbine Re-use concept

[36] Scottish Government. (2019) *Scottish Government Good Practice Principles for Community Benefits from Onshore Renewable Energy Developments.*

[37] Scottish Council of Voluntary Organisations. (2020) *State of the Sector 2020.*

Tourism and Recreation Assessment

Literature Review

15.7.41 The most comprehensive study of the potential effects of wind farms on tourism was undertaken by the Moffat Centre at Glasgow Caledonian University in 2008[38]. The study was based on effects that could happen and found that, although there may be minor effects on tourism providers and a small number of visitors may not visit Scotland in the future, the overall effect on tourism expenditure and employment would be very limited.

15.7.42 This study is now over a decade old and in the intervening time wind farms have become a more common feature in Scotland. As such, it would be expected that any adverse effects on the tourism economy would now be apparent.

15.7.43 BiGGAR Economics recently published new research on wind farms and tourism in Scotland[39]. This research was based on a similar methodology to a previous study published in 2017[40] and sought to provide a more up to date analysis. The study was undertaken to understand the relationship between the development of onshore wind energy and the tourism sector in Scotland and investigated whether there was a relationship between trends in tourism employment and wind farm development.

15.7.44 The study notes that since 2009, the onshore wind sector has expanded considerably in Scotland, from an installed capacity of 1.75 Gigawatts (GW) in 2009 to 8.0 GW in 2019. Employment in tourism in Scotland also grew during these periods, by 19.7 % between 2009 and 2019, including by 3.0 % between 2015 and 2019.

15.7.45 The 2021 research identified 16 wind farms with a capacity of at least 10 MW that became operational between 2015 and 2019. Analysis of trends in tourism employment in the locality of these wind farms (study areas were based on a 15 km radius) found that 11 of the 16 areas had experienced more growth in tourism employment than for Scotland as a whole. For 13 of the 16 windfarms, trends in tourism employment in the locality had outperformed the local authority area in which they were based.

15.7.46 The research also re-examined the 28 wind farms considered in the 2017 report, again finding that the localities where they were based had outperformed Scotland and their local authority areas in the majority of cases. Moreover, the analysis found that in the six areas which had underperformed their local authority areas in the 2017 study, all had done better than their local authorities in the 2015 to 2019 period.

15.7.47 Overall, this research has analysed trends in tourism employment in the localities of 44 wind farms developed in recent years, providing a substantial evidence base. The study found no relationship between tourism employment and wind farm development, at the level of the Scottish economy, across local authority areas nor in the locality of windfarm sites.

Impact on Local Tourism and Recreation Sites

Visitor Attractions

15.7.48 The tourism and recreation baseline identified ten visitor attractions. To assess the effect of the Proposed Development on these assets, each has been considered based on its offering and on whether the Proposed Development is likely to result in any changes from the baseline position.

15.7.49 While there are no visitor attractions within 5 km from the Proposed Development, there are four which lay between 5 and 10 km from it. These include: Knockengorroch World Ceilidh, Holm of Daltallochan Stone Circle, Striding Arches and Carsphairn Heritage Centre. The main reason for visitors to spend time at these locations are the artistic value of the music and of the art installation, the historic significance of the Holm of Daltallochan Stone Circle and the offer available at Carsphairn Heritage Centre. The Proposed Development is not expected to affect any of these characteristics, and, through this, it is unlikely to affect visitors' behaviour. For this reason, its effect on these assets was assessed as **negligible**.

15.7.50 The remaining attractions are all between 11 and 15 km from the Proposed Development. Among these, the Merrick Circle Part 2, Adventure Doon and the Forrest Estate are all linked with sport activity being a mountain biking route, an archery tag venue and an estate for country sports. The Proposed Development is unlikely to affect the recreational value of these assets. For this reason, its effect was assessed as **negligible**.

15.7.51 Loch Doon Castle, a medieval castle that may have been built by Robert the Bruce, is located 13 km from the Proposed Development. The main reason for visiting this attraction is its historical and cultural value, which is not expected to be affected by the Proposed Development. As a result of this, its effect has been assessed as **negligible**.

15.7.52 Three of the attractions between 11 and 15 km from the Proposed Development provide visitors with an opportunity to spend time in nature. These include Galloway Forest Park, Dalcairney Falls, a picturesque waterfall near Doon Bridge, and the Scottish Dark Observatory, an ideal place for those who want to learn about astronomy and watch the stars. Given its distance from all these attractions, the Proposed Development is not expected to affect any of the characteristics that make these places attractive to visitors. For this reason, its effect was assessed as **negligible**.

15.7.53 Overall, the effect of the Proposed Development on the visitor attractions considered in the baseline was assessed as **negligible**. This both reflects the fact that the Proposed Development is a repowering of an existing onshore wind farm and that visitors' motivations for spending time at the attractions identified are unlikely to be affected by its presence.

Tourism Accommodation

15.7.54 The tourism baseline has identified a total 38 accommodation providers as being located within 15 km from the Proposed Development. They are all clustered around a few locations. To the north of the Proposed Development, they are mostly around the B741 and the A76 close to Bankglen and New Cummock. To the east there are some providers around Dalmellington, while to the west they are located on the banks of Loch Doon. To the south of the Proposed Development the closest accommodation providers are in Carsphairn. Most of the accommodation providers in the area are cottages and self-catered accommodation providers.

None of the accommodation providers is located less than 5 km from the Proposed Development, 18 are within 5 km and 10 km from it and 20 between 10 km and 15 km. As the key characteristics of visitor attractions and recreational opportunities in the area are unlikely to be affected by the Proposed Development, visitors are still expected to spend time at these accommodation providers. In addition, given their distance from the Proposed Development, it is unlikely that there will be any impacts on them. For this reason, the effect of the Proposed Development on the accommodation providers identified in the baseline has been assessed as **negligible**.

Recreational Trails and Core Paths

15.7.55 The closest recreational trail to the Proposed Development is Cairnsmore of Carsphairn, around 3 km to the south. As the walk develops over a loop, only part of it will be facing towards the direction of the Proposed Development. Given that the Proposed Development is a repowering of an existing site, little change is expected compared to the baseline position. For this reason, its effect on this trail was assessed as **negligible**.

15.7.56 Between 5 and 10 km from the Proposed Development, there are other two recreational walks. Striding Arches, near Moniavie, around 8 km from the Proposed Development, and the Southern Upland Way's segment from John's Town of Dalry to Sanquhar**,** around 6 km distant. The first walk goes through the forest up to one of the striding arches by local sculptor Goldsworthy; the second is a long section on the moorland. Given its distance

[38] Moffat Centre. (2008) *The Economic Impact of Wind Farms on Scottish Tourism.*

[39] BiGGAR Economics. (2021) *Wind Farms and Tourism Trends in Scotland: Evidence from 44 Wind Farms*.

[40] BiGGAR Economics. (2017) *Wind Farms and Tourism Trends in Scotland*.

from these two trails, it is unlikely that the Proposed Development will affect these two walks. For this reason, its effect was assessed as **negligible**.

15.7.57 The remaining recreational trails are all between 10 and 15 km from the Proposed Development. Dundeugh Forest, near Dalry is 7 km loop within the forest 11 km from the Proposed Development. Ness Glen, near Loch Doon is a short walk along the river. Around 14 km from the Proposed Development is Craiglea Trail and Loch Doon, which starts at the ruins of Loch Doon Castle and has views over the water. Given its distance from these trails, the Proposed Development is not expected to have an impact on their usage. For this reason, its effect was assessed as **negligible**.

15.7.58 There are also several core paths in the area, as listed in the baseline. These are either mostly devoted to local use or are part of the recreational trails described above. Given their more localised use, these paths have relatively lower importance on local tourism activity. For this reason, the effect of the Proposed Development on them has been assessed as **negligible**.

15.7.59 Overall, the Proposed Development is unlikely to have an impact on the attractiveness and use of any of the recreational walks and core paths considered in the baseline. For this reason, its effect on these tourism assets was assessed as **negligible**.

15.8 CUMULATIVE EFFECTS

15.8.1 Within 45 km from the Proposed Development there are 40 wind farm developments at various project stages. This includes:

- 16 approved wind farm developments;
- 13 operational wind farm developments;
- nine submitted projects; and
- two wind farm developments under construction.

15.8.2 The operating capacity of the operational developments is estimated at around 565 MW. However, if the other onshore wind developments that are currently going through the planning system were to become operational, this would raise operational capacity to around 1,741 MW.

15.8.3 The existence of a similar pipeline of works provides the potential for delivering larger economic benefits within Dumfries and Galloway. This is because a reliable stream of work may favour the expansion of existing businesses operating in the onshore wind sector, as well as allowing the entrance of new businesses within this sector. The Applicant is committed towards maximising local benefits and is willing to explore opportunities to develop local skills.

Supply Chain Development

15.8.4 As part of its commitment towards maximising local economic benefits, the Applicant will build on its existing local knowledge and take account of existing best practice on supply chain development and opportunities, as set out in RenewableUK's "Local Supply Chain in Onshore Wind, Good Practice Guide"[41]. The guidance included the following suggestions:

- maximise your local presence and begin early: start identifying potential suppliers early by being active and visible locally;
- partnerships work: look for partnerships with business groups and local authorities;
- the developer's role is that of an enabler: use information on potential suppliers to ensure primary contractors maximise local opportunities;
- provide the right information, at the right time: consider adopting an iterative process when communicating with businesses and leave them time to learn and adjust;
- communicate technical requirements early: this will give the opportunity for upskilling or the emergence of consortia to occur; and
- if you can, demonstrate local content in planning: where possible include a demonstrable commitment to local content in planning and carry out ex-post auditing.

15.8.5 Alongside this sectoral guidance, experience working on similar developments suggests that there are a series of other initiatives that a developer can undertake to maximise its local economic footprint. One of these consists into a commitment towards carrying out an ex-post evaluation of the economic content sourced locally. This provides a developer with an incentive to source as much content as possible locally.

15.8.6 In addition, there is the opportunity to leverage the experience from the construction and development of Windy Standard II. Through this, the Applicant has already developed an understanding of local suppliers' capacity to meet the requirements for different contracts. The developer is a member of Dumfries and Galloway Chamber of Commerce and has already been collaborating with the Chamber to ensure information on project-related contracts reaches as many businesses in the region as possible.

15.8.7 The construction and development of Windy Standard III, if coupled with the repowering of the Proposed Development, could also provide a stream of work for local businesses. The possibility to bid for contracts for more than one development may encourage local businesses to acquire the skills required, make investments in their workforce or enter into the onshore wind sector. This may result in a stronger onshore wind sector in Dumfries and Galloway.

15.8.8 The Applicant's commitment to ensure the local economy benefits from the Proposed Development is demonstrated by the organisation of a supplier open day. The event aimed to introduce interested businesses to the scope of works required and the type of contracts that will be available, in additional to the Applicant's existing local suppliers.

Skills Development

15.8.9 Whereas engagement with local suppliers ensures that they can make the most of the opportunities from the Proposed Development's contracts, developing skills is key to ensure that in the future there will be local businesses with the expertise to deliver onshore wind contracts. Reinforcing the skills profile of an area is particularly important for several reasons, as it:

- ensures the area will be able to benefit from similar projects in the future;
- provides training in relatively high-skilled, high-paying jobs; and
- increases the area's ability to retain young people.

15.8.10 As part of its commitment to fostering local skills, the Applicant is working with Dumfries and Galloway College. It will deliver a £10,000 grant to the College to fund bursaries for students. The funding, which will be ringfenced for students living within the DG postcode, will support their study expenses including logistics, accommodation and living costs, electronic requirements, books, and tools. The offer of a bursary acknowledges the relatively high transportation costs these students face and the economic and social importance of retaining young people locally.

15.8.11 In addition, as part of its commitment to repurpose turbine elements, the Applicant has signed a memorandum of understanding with Dumfries and Galloway College (see appendix 15.1). The agreement will result in the opportunity for the college to use turbine components as part of the material it has available for wind turbine training. Beyond setting out the steps required for the college to benefit from this opportunity, the agreement

[41] RenewableUK. (2014) *Local Supply Chain in Onshore Wind, Good Practice Guide.*

includes a commitment for the two organisations to work together to identify an approach for supporting renewables skills in the area.

15.8.12 Skills interventions could also be undertaken at an earlier stage, by engaging with local schools. The purpose of this earlier type of activity is to raise ambitions and showcase the benefits of a career in the onshore wind sector. Advocacy activity could also focus specifically on girls, who tend to be under-represented in Science, Technology, Engineering and Mathematics professions.

15.8.13 The Applicant has also signed a memorandum of understanding with a local company, 360 Training. 360 Training offer wind farm technician training as well as other Global Wind Organisation (GWO) accredited training courses.

15.9 CONCLUSIONS

15.9.1 The socio-economic structure of the local area and of Dumfries and Galloway highlight the need for the creation of job opportunities. This is both reflected in the demographic profile of the two areas, which have relatively older populations than Scotland, and in worse labour market outcomes.

15.9.2 These trends are set to reinforce in the future as, based on population projections, by 2043 the working age population in Dumfries and Galloway will have fallen by 17.4 % compared to 2018, while the population aged 65 and over is expected to increase. This highlights the continual need for the creation of opportunities in Dumfries and Galloway to support the retention of the existing population and attract more workers to the area, enabling economic growth.

15.9.3 The Applicant has 25 years' experience working in the local area, which has supported both local businesses and communities through the payment of over £530,000 in community benefits through Windy Standard I and Windy Standard II wind farms. The Proposed Development provides an opportunity both for retaining the operation and maintenance activity previously associated with Windy Standard I and for expanding the Applicant's local economic footprint.

15.9.4 During its construction and development, the Proposed Development will deliver a series of economic benefits including for local suppliers. In particular, it was estimated that the expenditure associated with construction activity could generate:

- £2.4 million GVA and support 35 years of employment in Dumfries and Galloway; and
- £10.6 million GVA and 149 years of employment across Scotland.

15.9.5 The expenditure required for the operations and maintenance of the Proposed Development could generate each year:

- £0.3 million GVA and support three jobs in Dumfries and Galloway; and
- £0.7 million GVA and eight jobs across Scotland.

15.9.6 Each year the Proposed Development is also expected to deliver £0.3 million in non-domestic rates. This revenue is set to support the activities carried out by Dumfries and Galloway Council.

15.9.7 The Applicant wishes to maximise local economic benefits. In particular, it has committed to deliver, in line with Scottish Government guidance, community benefits worth £5,000 per MW of installed capacity. This is expected to result in an annual contribution of £248,000 in community benefits, which will support projects across local communities and build on the existing activities that have been funded to date.

15.9.8 The Applicant is also committed to further the benefits from the Proposed Development by engaging with supply chain companies, as well as with education providers. Over the college term 2022-23, it will deliver a £10,000 bursary to support local students at Dumfries and Galloway College. In addition, the Applicant plans to give some of the turbine components from Windy Standard I to Dumfries and Galloway College for wind turbine training. These activities will contribute to strengthening the local onshore wind supply chain and skills.

15.9.9 The Proposed Development is one of the first repowering projects in Scotland. As such, it provides an opportunity for exploring ways of minimising the impacts surrounding turbine decommissioning. The Applicant has signed a memorandum of understanding with ReBlade, a company specialised in delivering blade and nacelle decommissioning services, with the aim of repurposing turbines in line with circular economy principles.

15.9.10 A literature review of the evidence on the relationship between wind farm developments and tourism was carried out. This found that there is no evidence that wind farm developments have an impact on tourism assets at the Scottish and regional level, nor in those areas in the proximity of an onshore wind development.

15.9.11 The assessment has also considered tourism assets that are located within 15 km from the Proposed Development. It found that the Proposed Development is not expected to affect local accommodation providers, recreation trails and tourism attractions.

15.10 MITIGATIONS AND RESIDUAL EFFECTS

15.10.1 There are no standard mitigation requirements for economic impacts during construction and development and operations and maintenance.

15.10.2 The residual effects on socio-economics are:

- **minor** effect on the Dumfries and Galloway economy and **negligible** effect on the Scottish economy from spending during the construction period;
- **negligible** effect on the Dumfries and Galloway and Scottish economy from spending during the operations and maintenance phase; and
- **negligible** effect on the Dumfries and Galloway economy from the payment of non-domestic rates.

15.10.3 No mitigation measures are required with regards to the tourism assets (recreational walks, visitor attractions and accommodation providers) in the proximity of the Proposed Development.

15.10.4 Residual effects on tourism and recreation assets have been assessed as:

- **negligible** for those visitor attractions within 15 km from the Proposed Development;
- **negligible** for those accommodation providers within 15 km from the Proposed Development; and
- **negligible** for those recreational trails and paths within 15 km from the Proposed Development.