BiGGAR Economics

Economic Impact of Wind Energy in the Scottish Borders

A report to

Scottish Borders COUNCIL

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1 EXECUTIVE SUMMARY

In 2012 onshore wind energy contributed at least £10.8 million gross value added (GVA) to the Scottish Borders economy and supported 115 local jobs. By 2020 this impact could be up to £33.3 million GVA and 325 jobs. There are several actions that could be taken by Scottish Borders Council to help to realise this opportunity. These relate to labour market and supply chain development and increasing the capacity of local communities to maximise benefits from community benefit funding. Realising this opportunity is not inconsistent with maintaining a strong and growing tourism sector but the Council will have an important role to play in balancing the continued growth of both sectors.

1.1 Background and Context

In 2011 the direct and supply chain impacts associated with the onshore wind sector contributed £548 million GVA to the UK economy and supported 8,600 jobs. Support for the sector amongst the general public is also high, with around two thirds of people stating that they supported onshore wind developments. Despite this, concerns about negative impacts on the tourism sector in particular are often raised in public debates about continued growth of the sector.

The importance of tourism to the economy of the Scottish Borders means that it is important that such concerns are fully considered so this study includes a review of existing literature about negative effects of wind farms in tourism. The conclusion of this review is that there is no evidence that wind farms have any significant effect on tourism. Indeed, despite the increase in deployment of onshore wind in the Scottish Borders since 2008, tourism related employment in the area has increased by significantly more than any other local authority area in Scotland over this period.

1.2 Onshore Wind in the Scottish Borders

The number of turbines and installed capacity in the Scottish Borders has grown considerably since 2007, reaching 355 wind turbines with a total installed capacity of 436 megawatts (MW) by 2012. Although the Scottish Borders covers only around 2% of the land area of the UK (6% of Scotland), this level of deployment represents around 9% of the UK total (and 14% of the Scottish total).

Of the 355 turbines in the Scottish Borders in 2012, 27% (96 turbines) were located on small developments with a capacity of less than 5MW but these turbines accounted for only 1.5% of installed generating capacity. The vast majority of installed generating capacity in the Scottish Borders comes from larger sites of more than 5MW.

1.3 Feedback from Local Businesses

A survey of 140 local businesses was undertaken to help identify any positive or negative impacts associated with the onshore wind sector and to help understand the existing local supply chain. Respondents included six businesses that were already providing goods and services to the onshore wind energy sector. These businesses estimated that these services were currently generating £1.9 million turnover and supporting more than 15 jobs in the Scottish Borders. Other businesses indicated that they would be interested in becoming involved in the sector.

Sixty five tourism businesses responded to the survey, two thirds of which reported that the wind energy sector has no impact on their business. Ten tourism businesses reported that there had been a negative impact on tourist numbers and that this had lead to a negative impact of £0.1 million in turnover and four jobs.

1.4 Current Impacts

The current impact of the wind energy sector in the Scottish Borders was quantified using data about existing installed capacity and capacity in the planning process. Impact was calculated using a modelling approach that has been used on behalf of the Department of Energy and Climate Change (DECC) to assess the economic impact of the UK onshore wind sector as a whole and on behalf of numerous wind farm developers to assess the impact of individual developments across the UK.

The results of the analysis suggest that the current annual impact of the onshore wind energy sector on the Scottish Borders economy amounts to £20.1 million turnover. This supports £10.8 million GVA (0.7% of the total GVA in the Scottish Borders economy) and 115 jobs. This impact does not however include the multiplier effects associated with employees spending wages in the local economy and other economic effects such as non-domestic rates paid so the full impact could be considerably higher.

In addition, most large wind farm developments also contribute directly towards the local economy through community benefit funding. It is estimated that community benefit funding currently provides around £1.2 million to the Scottish Borders economy each year. This funding can help communities to secure additional funding from national and competitive funding sources, helping to lever additional funding into communities in the Scottish Borders.

1.5 Future Impacts

The future economic impact of the onshore wind sector in the Scottish Borders will depend on future levels of deployment. This study considers four potential deployment scenarios. These range from one where sites that have already been approved are built but no more planning applications are approved to one where the level of installed capacity reaches 1,675 MW by 2020, around four times the level of current deployment.

Using these scenarios it is estimated that by 2020 the onshore wind sector could be contributing between £9.6 and £23.4 million GVA to the economy of the Scottish Borders and supporting between 58 and 209 jobs. These impacts are however based on businesses in the Scottish Borders maintaining their current share of the onshore renewable energy market. In practice there will be opportunities for businesses to increase their market share and secure some of the contracts that are currently being awarded to businesses elsewhere in Scotland.

If businesses in the Scottish Borders succeed in increasing their market share then it is estimated that by 2020 the onshore wind sector could be contributing between £11.6 and £33.3 million GVA to the economy of the Scottish Borders and supporting between 76 and 325 jobs. This could increase the onshore wind sector's contribution to the Scottish Border's economy to 2.5% of GVA; this would be equivalent to generating an additional 1.5% in economic growth, at a time when Scottish economic activity has not yet recovered to pre-recession levels.

1.6 Opportunities and Barriers

The onshore wind sector represents a significant opportunity for the Scottish Borders economy. There are a number of actions that the Scottish Borders Council could take to maximise the local benefits of this opportunity and to help address potential barriers.

One of the potential barriers is the perception that further development of the sector could have negative impacts on the tourism sector. Although there is no evidence to support these perceptions, feedback from local businesses suggests that some local businesses believe that they have been negatively affected. For this reason, it is important that the environmental impact assessments undertaken to support all wind farm planning applications in the Scottish Borders fully consider the extent to which the development would be visible from important tourist routes in the area and from tourist accommodation.

Actions that would help to maximise the impacts from future wind farm developments in the Scottish Borders include:

- promoting awareness about new wind farm developments and associated opportunities for suppliers amongst local businesses through supplier engagement events;
- raising awareness about employment opportunities in the wind energy sector amongst the local workforce through the local careers advisory service and by encouraging developers to support relevant training and educational initiatives; and
- building capacity within local communities to leverage maximum benefits from the funding available.

Many of these actions could be delivered directly by the Scottish Borders Council but a more coordinated approach could be achieved by establishing a separate organisation. Proposals to create such an organisation already exist in the shape of the Borders Energy Agency.

2 INTRODUCTION

This report summarises the findings of analysis undertaken by BiGGAR Economics on the economic impacts of the on-shore wind sector in the Scottish Borders. It forms part of a wider economic, landscape and community impact study commissioned by Scottish Borders Council.

Ironside Farrar undertook the landscape report and Research Resource undertook a public attitudes survey.

2.1 Study Objectives

The objectives of this report were to:

- confirm (actual and potential) total output of power to the national grid from all approved and projected wind farms in Scottish Borders;
- carry out desk top review of previous research on wind turbines;
- confirm other economic benefits of turbines to Scottish Borders, e.g. local businesses, landowners, employment creation;
- consider any potential negative impact on the local economy;
- confirm sum of community payments from developers resulting from existing and proposed wind farms; and
- consider how could the Council intervene to maximise economic benefits.

2.2 Approach

The starting point for this study was a literature review that considered existing evidence about the economic impacts of the onshore wind sector the sectors effect on the tourism sector and its significance for land-based industries. The next step was to assess current demand and supply of wind energy in the Scottish Borders and the development of wind energy capacity in the area to date.

An electronic survey of 140 local businesses was then undertaken to help identify the positive and negative impacts associated with on-shore wind energy in the Scottish Borders. The current economic impact of the on-shore wind sector in the Scottish Borders was calculated using a specially developed Excel based model. The future potential economic impact of the off-shore wind sector, including the potential value of community benefit funding, were then considered using four different deployment scenarios.

The report concludes by considering the economic opportunity presented by the development of wind energy in the Scottish Borders, the barriers that exist to realising this opportunity and how the benefits from on-shore wind could be maximised for the Scottish Borders economy.

2.3 Note on Terminology

This report uses a number of measures for the capacity of wind energy generators and the supply and demand of electricity.

Installed capacity is measured in Watts. A kilowatt (KW) is 1,000 Watts, a megawatt (MW) is 1,000 KW (or a million Watts) and a gigawatt is 1,000 MW.

To put this in some context, the wind turbines currently being installed in wind farms in Scotland typically have a capacity of 2-3 MW while the smaller turbines that have been installed in farms will typically be in the 10-50 KW range.

Most electricity companies bill customers in units of electricity used as measured by kilowatt hours (KWh). A megawatt hour (MWh) is 1,000 KWh, a Gigawatt hour (GWh) is 1,000 MWh and a Terawatt hour (TWh) is 1,000 GWh.

To put this is some context, Ofgem estimates[1] that the median UK household uses 3,300 KWh (or 3.3 MWh) of electricity per year. A 2.3 MW wind turbine that has a capacity factor of 30%, would generate 6,044 MWh per year.

2.4 Structure

The remainder of this report is structured as follows:

- Chapter 3 reviews existing literature relating to the economic impact of onshore wind energy, the impact of wind farms on the tourism sector and on land based industries;
- Chapter 4 describes the development of wind energy in the Scottish Borders, the demand for electricity and the supply of wind energy in the Scottish Borders;
- Chapter 5 considers four future development scenarios for the onshore wind sector in the Scottish Borders;
- Chapter 6 summarises the results of a survey of businesses based in the Scottish Borders about the opportunities and challenges presented by the onshore wind industry;
- Chapter 7 quantifies the current and potential future value of community benefit funding in the Scottish Borders;
- Chapter 8 estimates the current economic impact of wind energy on the Scottish Borders economy;
- Chapter 9 quantifies the potential future economic impact of wind energy on the Scottish Borders economy;
- Chapter 10 describes the scale of the economic opportunity that the on-shore wind sector represents for the Scottish Borders economy, potential negative impacts and possible actions to deliver positive and mitigate negative impacts; and
- Chapter 11 presents a summary of the findings from the research.

[1] Ofgem (January 2011), Typical domestic energy consumption figures, Factsheet 96.

3 LITERATURE REVIEW

This section considers existing evidence about the economic impacts of the onshore wind sector, the sectors effect on the tourism sector and its significance for land-based industries.

3.1 Context

The current state of the UK onshore wind energy sector was summarised in a report by RenewableUK in October 2012[2], which report found that during 2011/12, 44 new onshore wind farms were delivered in the UK and that these developments contributed an additional 774 MW of onshore capacity, taking total onshore wind capacity to 4,998 MW. It is estimated that these projects cost almost £1.1 billion to deliver and that around £804 million of this investment was retained by UK businesses. Although significant, this level of investment represents only around 3% of the $50.7 million that the Global Wind Energy Council estimated was invested in wind energy around the world in 2011.

In 2011, the Global Wind Energy Council ranked the UK 8th world wide and 4th in Europe in terms of installed wind capacity. Germany currently leads Europe in this ranking with total installed capacity in excess of 29,000 MW, more than four times the amount of installed capacity in the UK. This illustrates the significant potential for growth that exists for the sector in the future.

The increase in onshore wind deployment in recent years has led to an often fierce public debate about the desirability of further growth in the sector with economic issues, such as concerns about negative impacts on the tourism sector, sometimes central to the debate. Those that engage in the debate have strongly and sincerely held views and it would be easy to conclude that the public was split on the issue of onshore wind turbines. However, there is evidence that a high proportion of the public in the UK support the sector.

The Department of Energy and Climate Change (DECC), the UK Government department with responsibility for energy policy throughout the UK undertakes a quarterly survey to track public attitudes relevant to its main areas of responsibility. The latest survey[3] reported the following responses to questions on renewable energy and onshore wind:

- Do you support or oppose the use of renewable energy for providing our electricity, fuel and heat? 79% of respondents strongly supported or supported this statement and 4% opposed or strongly opposed it; and
- Generally speaking, do you support or oppose the use of the following renewable energy developments: onshore wind? 67% of respondents strongly supported or supported this statement and 12% opposed or strongly opposed it.

3.2 Tourism in the Scottish Borders

In 2011 almost 0.5 million tourists visited the Scottish Borders and they spent almost £150 million. The number of tourists to the Scottish Borders has increased

[2] RenewableUK (October 2012), Wind Energy in the UK, State of the Industry Report 2012.
[3] Department of Energy and Climate Change (December 2012), Public Attitudes Survey (based on fieldwork undertaken in September 2012).

by 17.5% since 2006, compared to an increase of 4.3% across Scotland as a whole.

In 2011 tourism accounted for around 9% of employment in the Scottish Borders, slightly higher than across Scotland as a whole where the rate was 7.8%. Tourism related employment has however increased by 14% in the Scottish Borders since 2008. This is higher than any other local authority area in Scotland and in contrast to the fall of 4% that has been recorded across Scotland as a whole over the same period.

These statistics suggest that the tourism sector in the Scottish Borders is currently outperforming the sector across Scotland as a whole.

3.3 Economic Impact

In 2012, DECC and RenewableUK published a report that assessed the economic impacts[4] of the commercial onshore wind sector in the UK to address important knowledge gaps about the economic value and potential of the sector.

The report includes a literature review of existing evidence relating to the actual and potential economic impact of the renewable energy sector. This concluded that, although many reports on the sector have been published in the UK and elsewhere, few incorporated robust assessments of economic impacts. The study therefore represents the most robust evidence available about the scale and potential of the sector.

The study is based on case study evidence from 18 wind farms across the UK and consultations with representatives from key companies in the onshore wind supply chain. The case studies included phase two of Crystal Rig Wind Farm, in the Scottish Borders. This wind farm consists of 61 turbines, has an installed capacity of 138 MW and is operated by Fred Olsen Renewables. The total construction cost of Crystal Rig II amounted to £168 million of which approximately two thirds was spent on the turbines. The on going operational and maintenance costs associated with the site are £6.7 million per year.

The study found that in 2011:

- the direct and supply chain impacts associated with the onshore wind sector amounted to £548 million gross value added (GVA) and 8,600 jobs across the UK;
- the income effects generated by the expenditure of employees in the onshore wind sector contributed a further £85 million GVA to the UK economy and supported 2,400 jobs; and
- employee expenditure in the local economy during the construction phase (e.g. on food and accommodation) contributed a further £11 million GVA to the UK economy and supported 300 jobs.

In addition to the impacts on the UK economy, the report also analysed the proportion of impacts that were secured at the national/ regional and local levels. This found that, on average, the local authority area in which wind farms were

[4] DECC and RenewableUK (May 2012), Direct and Wider Impacts of Onshore Wind (The full report is available on the DECC website: http://www.decc.gov.uk/en/content/cms/meeting_energy/wind/onshore/delivering/cost_economic/cost_economic.aspx.)

based secured the following proportions of the economic impact at each stage of the project:

- planning, development and pre-construction: 7%;
- construction and turbines: 8%; and
- operations and maintenance: 29%.

The report also considered the future impact of the sector based on a range of deployment scenarios. The scenarios were based on the scenarios used in the UK Renewable Energy Roadmap published by DECC in 2011 and the National Renewable Energy Action Plan 2010, i.e. 10GW, 13GW, 15GW or 19GW installed onshore wind by 2020. Using these scenarios, the report estimated that by 2020, the total direct and supply chain impact of the onshore wind sector in the UK could be:

- 8,700 jobs and £580 million GVA in the 10GW scenario;
- 11,600 jobs and £780 million GVA in the 13GW scenario;
- 13,800 jobs and £913 million GVA in the 15GW scenario; or
- 17,900 jobs and £1,183 million GVA in the 19GW scenario.

3.4 Tourism Impact

A significant number of reports have been published regarding the potential impacts of wind farms on tourism; however, many of these were published before 2007 at a time when the onshore wind industry was still in its infancy in Scotland and have since been superseded by better evidence. Many of the reports that have been published have also been commissioned by supporters or proponents of particular projects and have often been based on questionable methodology. For these reasons, there is no merit in reviewing these reports here.

By far the most comprehensive and robust study of the potential effect of wind farms on tourism was undertaken by Glasgow Caledonian University on behalf of the Scottish Government in 2008[5]. In April 2012 VisitScotland added to this research by publishing research on consumer attitudes to wind farms and their effect on tourism[6].

3.4.1 Glasgow Caledonian University Research

The Glasgow Caledonian University study was based on an extensive literature review and a survey. The literature review considered 40 studies from the UK and Ireland and reports from Denmark, Norway, the US, Australia, Sweden and Germany and found that there was no evidence to suggest that wind farms have a serious negative economic effect on tourists. A person-to-person survey considered the views of 380 tourists in four case study areas (Caithness & Sutherland; Stirling, Perth & Kinross; Scottish Borders; Dumfries & Galloway) and was undertaken at locations that maximised the likelihood that respondents would have seen a wind farm during their visit. The key findings from this survey were that:

[5] Moffat Centre & Cogent SI (March 2008), the Economic Impacts of Wind Farms on Scottish Tourism, A report for the Scottish Government.
[6] VisitScotland (2012), Wind Farm Consumer Research.

- 75% of people felt that wind farms had a positive or neutral effect on the landscape;
- 2% of those interviewed who had seen a wind farm in the area (4 respondents out of 191) said that it would affect their decision to visit the area again – 2 indicated that the likelihood would increase and 2 that the likelihood would decrease. These 4 respondents were intercepted in the Stirling/Perthshire area. None of the respondents in Caithness & Sutherland indicated that the wind farm they had seen would affect their decision to visit the area again;
- after seeing a photomontage of a local wind farm before and after development, 3% of respondents said that it would affect their decision to visit the area again; and
- after seeing a photomontage of a local wind farm before and after an extension was added, 7% of respondents said that it would affect their decision to visit the area again.

The worst-case scenario was of a negative economic effect equivalent to 3.5% of jobs in tourism by 2015, compared with a situation where there were no wind farms. This was as a result of two potential effects: visibility from tourist routes (impacting on decisions to return) and visibility from accommodation (impacting prices some tourists might be prepared to pay).

Overall the study concluded that potential effects on the tourism sector are so small that, provided planning and marketing are carried out effectively, there is no reason why the growth of renewable energy to order to meet renewable energy targets should be incompatible with growth in the tourism sector.

3.4.2 VisitScotland Research

The research commissioned by VisitScotland incorporated the views of 3,000 interviewees. This report found that for 83% of residents in Scotland the decision to holiday in Scotland would not be affected by the presence of a wind farm. The study also found that 80% of respondents in Scotland, when asked about holidays and short breaks in the Scottish countryside, disagreed or felt neutral that wind farms spoilt the look of the Scottish countryside. Almost half (46%) of respondents in Scotland stated they would be interested in visiting a wind farm visitor centre.

3.4.3 Scottish Parliament

During 2012, the Economy, Energy and Tourism Committee of the Scottish Parliament heard evidence from a wide range of experts as part of an inquiry into the achievability of the Scottish Government's 2020 renewable energy targets, the merits of the targets and what the risks and barriers are to realising them. Tourism was one of the issues investigated by the Inquiry and the evidence considered included both of the reports cited above. The findings of the Committee were published in November 2012 and including the following conclusions on tourism:

"While some strongly held localised and anecdotal opinion exists, the Committee has seen no empirical evidence which demonstrates that the tourism industry in Scotland will be adversely affected by the wider deployment of renewable energy projects, particularly onshore and offshore wind.

Whilst care always needs to be taken in terms of the planning process and decisions on the siting of individual projects in areas popular with tourists and in our rural and wild land areas, no one has provided the Committee with evidence, as opposed to opinion, that tourism is being negatively affected by the development of renewable projects. However, given the importance of this issue, the Committee recommends that VisitScotland and the Scottish Government continue to gather evidence on this from visitors to Scotland."[7]

3.4.4 Local Tourism Studies

In September 2012 the Association for the Protection of Rural Scotland published a survey of the practices and opinions of 29 accommodation providers in the Scottish Borders[8]. The study found that 90% of the businesses surveyed referred to the area's beauty in their marketing material, 76% felt that large scale turbines would be unhelpful to marketing the area and 33% had discussed the issue with customers.

None of the questions included in the survey asked respondents whether the turnover of their businesses had actually been affected by nearby wind farm developments so the survey does not provide any evidence of negative impact. What the survey does demonstrate is that some accommodation providers in the Scottish Borders are concerned about the potential impact of wind farms on the tourism sector.

3.5 Land Based Industries

The National Farmers Union is the largest farming organisation in the UK. In 2009 it published a briefing note[9] in which it recognised that its members are well placed to capture renewable energy flows and stated its aspiration that "every farmer and grower should have the opportunity to become a net exporter of low carbon energy." Although the NFU states that it is "technology neutral" with respect to the technologies that could be used to realise this aspiration, it acknowledges that wind power is one of many land based renewable energy resources available to agriculture.

The briefing note goes on to consider the opportunities for different scales of agricultural wind power development and the costs associated with such development. It finds that much of the industry's experience to date has been with relatively large developments in which farmers have typically received an annual rent of between £4,000 and £5,000 per MW. The briefing also considers the costs associated with smaller scale developments.

In 2012, returns to the annual Scottish Agricultural Census[10] showed that 45% of the 494 Scottish farms that participated in the survey were engaged in some form of diversification. The Census also showed that the area of activity that has seen the most growth since 2009/10 was wind turbines, with the number of farms engaged in this activity more than doubling since 2009/10.

[7] Scottish Parliament - Economy, Energy and Tourism Committee (November 2012), 7th Report (Session 4), Report on the achievability of the Scottish Government's renewable energy targets, pg. 55-56.
[8] Association for the Protection of Rural Scotland and Ruberslaw Wild Woods Camping (September 2012), the Economic Value of Landscape in the Scottish Borders.
[9] NFU (November 2009), Wind power in agriculture – small, medium and large scale.
[10] Scottish Government (2012), Economic Report on Scottish Agriculture, 2012 edition.

In terms of the total amount of income generated, wind turbines were found to be the second most valuable type of farm diversification activity. The most valuable form of diversification was renting out buildings but this did not include tourist accommodation and catering, which was the only area of diversified activity to make a loss in 2010/11.

4 DEVELOPMENT OF WIND ENERGY IN THE SCOTTISH BORDERS

The economic impact of onshore wind energy in the Scottish Borders is dependent on the number of wind energy sites and the installed capacity of these sites. The majority of the capacity is concentrated in developments with a capacity greater than 5MW, which operate within the Renewable Obligations Certificates (ROCs) scheme. There are also a number of sites with a total capacity of less than 5MW. These developments comprise of smaller turbines (either individual turbines or in small groups) and qualify for the Feed In Tariff (FITs) scheme.

This chapter discusses:

- demand for electricity in the Scottish Borders;
- the historical development of wind energy capacity in the Scottish Borders;
- the supply of wind energy in the Scottish Borders; and
- the market for Scottish Borders wind energy.

4.1 Electricity Demand

To put the production of wind energy in the Scottish Borders into context it is useful to consider the amount of electricity that is used within the area. In 2010 electricity consumption in the Scottish Borders was 604.6 GWh[11]. The National Grid estimates that 2% of the electricity produced is lost in distribution[12] so 604.6 GWh of consumption would therefore require 616.9 GWh of electricity production.

The majority (53.3%) of electricity demand in the Scottish Borders is for commercial and industrial consumers and domestic consumers use the remaining 46.7%. Between 2005 and 2010 demand for electricity decreased by 4.8%. This decrease is lower than for Scotland as a whole, which saw a 8.2% decrease over the same time period, reaching 27,390 GWh by 2010.

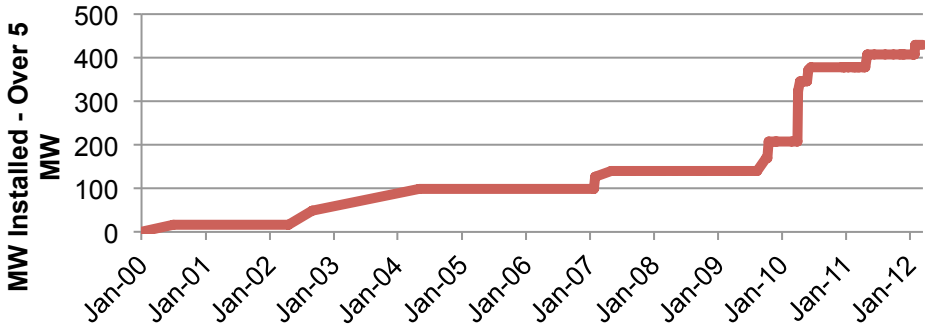
Further analysis shows that the rate of consumption per businesses consumer has not decreased in this time frame and that the decrease in commercial consumption has been as a result of there being fewer commercial customers. Domestic consumers have decreased their consumption by 11% over this time frame in the Scottish Borders and 10.4% in Scotland.

4.2 Historical Development of Wind Energy Capacity

The first onshore wind development in the Scottish Borders was the Dun Law Wind Farm that became operational in July 2000. The installed capacity of the larger scale turbines has increased from 17 MW in 2001 to around 100 MW in 2004 to 429 MW in 2012 (Figure 4-1).

[11] DECC (March 2012), Sub-national local authority electricity consumption statistics 2005-10.
[12] National Grid (June 2008), Investigation into transmission losses on UK electricity transmission system.

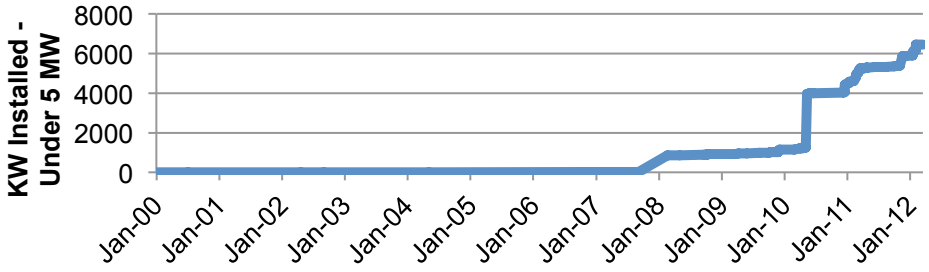
Figure 4-1: Development of Onshore Wind in the Scottish Borders – sites over 5MW



Source: Scottish Borders Council and RenewableUK Wind Energy Database, October 2012

The development of sites under 5 MW has grown since 2008. The smaller turbines with a 6.5 MW installed capacity, represent 1.5% of the total installed capacity in the Scottish Borders in 2012. There is a large range of turbine sizes within this category and sites with multiple MW installed have increased the total capacity in this range from 858 KW in 2008 and to 6,500 KW (6.5 MW) in 2012 (Figure 4-3).

Figure 4-2: Development of Onshore Wind in the Scottish Borders – sites under 5MW

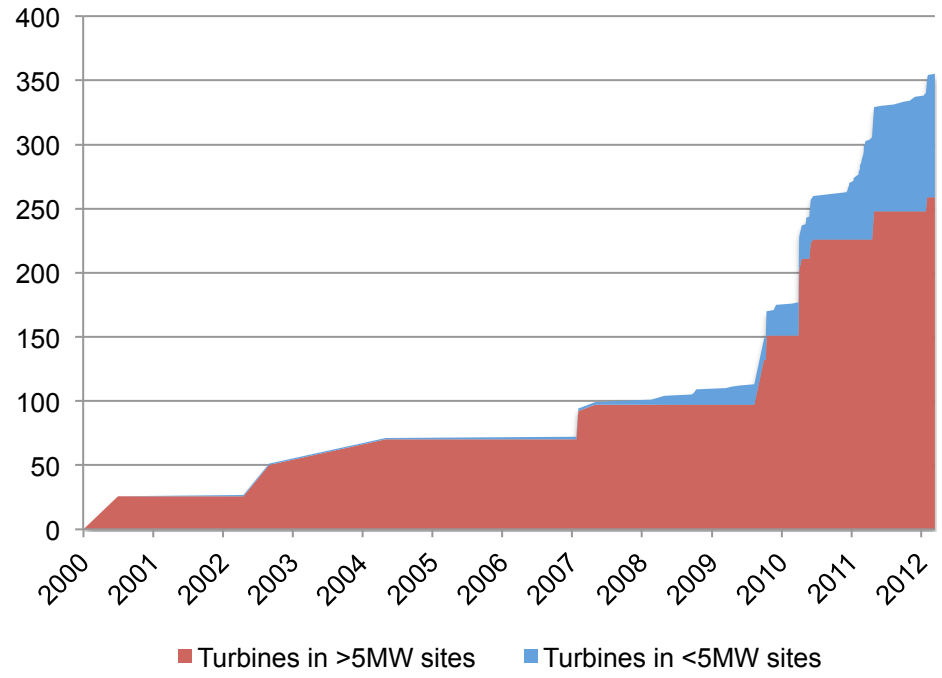


Source: Scottish Borders Council and RenewableUK Wind Energy Database, October 2012

The number of operating turbines in the Scottish Borders has increased from none in Jan 2000 to 355 in 2012. Of the 355 turbines in 2012, 259 are located in sites with an installed capacity greater than 5 MW and the remaining 96 are in sites that had an installed capacity less than 5 MW. Sites below 5 MW do not need to confirm their operational status with Scottish Borders Council once they have received planning permission and therefore it is assumed that all of the turbines in this category that have planning permission have been erected.

This means that small turbines (on sites with a capacity of less than 5 MW) account for 27% of the wind turbines in the Scottish Borders, but only 1.5% of the installed electricity generating capacity.

Figure 4-3: Number of Wind Turbines in the Scottish Borders



Source: Scottish Borders Council and RenewableUK Wind Energy Database, October 2012

4.3 Current Capacity and Supply of Electricity

4.3.1 Developments over 5MW

There are currently 259 wind turbines in the 13 wind farms that are operational in the Scottish Borders[13]. Of these wind farms, 4 are extensions and so the 13 wind farms are on 9 sites (Glenkerie, Drone Hill, Carcant, Toddleburn, Crystal Rig, Long Park, Dun Law, Black Hill and Bowbeat). These are predominantly situated along the north and west boundaries of the Scottish Borders Council area.

These sites have an installed capacity of 429 MW, which is 9% of the total installed wind capacity of the UK and 14% of the Scottish total. The Scottish Borders has 2% of the UK land area and 6% of Scotland's land area.

The installed capacity does not define the output of the wind farms in any given area. The output is measured in GWh and reported annually. The maximum amount of energy that a turbine can produce is the installed capacity multiplied by the number of hours in a year (8,760). The amount of energy actually produced by the turbine will always be a percentage of this and is known as the capacity factor. For example if a 1MW turbine produces 1,752 MWh of electricity then it will have a capacity factor of 20% (i.e. 1,752 is 20% of 8,760).

Wind farm sites of more than 5MW in the Scottish Borders have an average capacity factor of 31.6% and therefore produce 1,186 GWh of electricity each year (Table 4-1).

[13] RenewableUK, UK Wind Energy Database, accessed 12th September 2012.

Table 4-1: Capacity factors of wind farms in the Scottish Borders

Wind Farm	Installed Capacity (MW)	Output (GWh) (Apr 11 – Mar 12)	Capacity Factor
Crystal Rig	188	538	32.7%
Dun Law	47	119	28.9%
Glenkerie	19	60*	35.4%
Toddleburn	28	80	33.0%
Longpark	38	87	26.2%
Black Hill Wind Farm – A	29	79	31.6%
Carcant	7	20	33.1%
Total	*355*	*983*	*31.6%*
All Scottish Borders	**429**	**1,186**	**31.6%**

*Source: Ofgem, All Certificates by Accreditation (RO, REGO) 2011-12. *Projected based on three months data.*

4.3.2 Developments under 5MW

There are currently 60 sites that have been granted planning permission to build 96 wind turbines with an installed capacity of under 5 MW. These sites represent an additional 6.5 MW of capacity in the Scottish Borders. There is a significant range in the size of these sites, ranging from single 2 kW turbines with a tip height of 13 metres to multiple 900 kW turbines with tip heights of 84 metres.

The majority of sites under 5MW that have been approved in the Scottish Borders are in the 15 kW to 100 kW band but there is also a significant number of sites in the 1.5 kW to 15 kW band. The installed capacity of approved sites is more evenly distributed across the bands. While sites in the 15 kW to 100 kW represent 57% of the total sites that have been approved, they only represent 18% of the approved capacity. Although there in only one site in the 1.5 MW to 5 MW band it has a capacity of 2.7 MW, which represents 42% of the approved capacity of small wind in the Scottish Borders.

Table 4-2: Feed in Tariff band of small scale wind in Scottish Borders

Feed In Tariff Band	Sites		Approved Capacity	
	Number	%	Capacity (kW)	%
Under 1.5kW	1	2%	-	-
1.5kW – 15kW	18	30%	139	2%
15kW – 100kW	34	57%	1,192	18%
100kW – 500kW	4	7%	1,080	17%
500kW – 1.5MW	2	3%	1,350	21%
1.5MW – 5MW	1	2%	2,700	42%
Total	**60**	**100%**	**6,461**	**100%**

Source: Scottish Borders Council, Planning Applications Database.

4.4 Financial Incentives

The main support mechanism for renewable electricity projects in the UK are Renewables Obligations Certificates (ROCs). Smaller scale generation is mainly supported through the Feed-In Tariff scheme (FITs). This section provides information about both schemes.

4.4.1 Developments over 5MW

ROCs were introduced in the Utilities Act 2000 and were implemented in April 2002. They ROCs place an obligation on UK electricity suppliers to source an increasing proportion of electricity they supply to customers from renewable sources. ROCs are green certificates issued to operators of accredited renewable generating stations for the eligible renewable electricity they generate. Operators can then trade the ROCs with other parties, with the ROCs ultimately being used by suppliers to demonstrate that they have met their obligation.

Where suppliers do not have sufficient number of ROCs to meet their obligation, they must pay an equivalent amount into a 'buy-out' fund. This fund is then distributed back to suppliers in proportion to the number of ROCs they produced in respect of their individual obligation.

4.4.2 Developments under 5MW

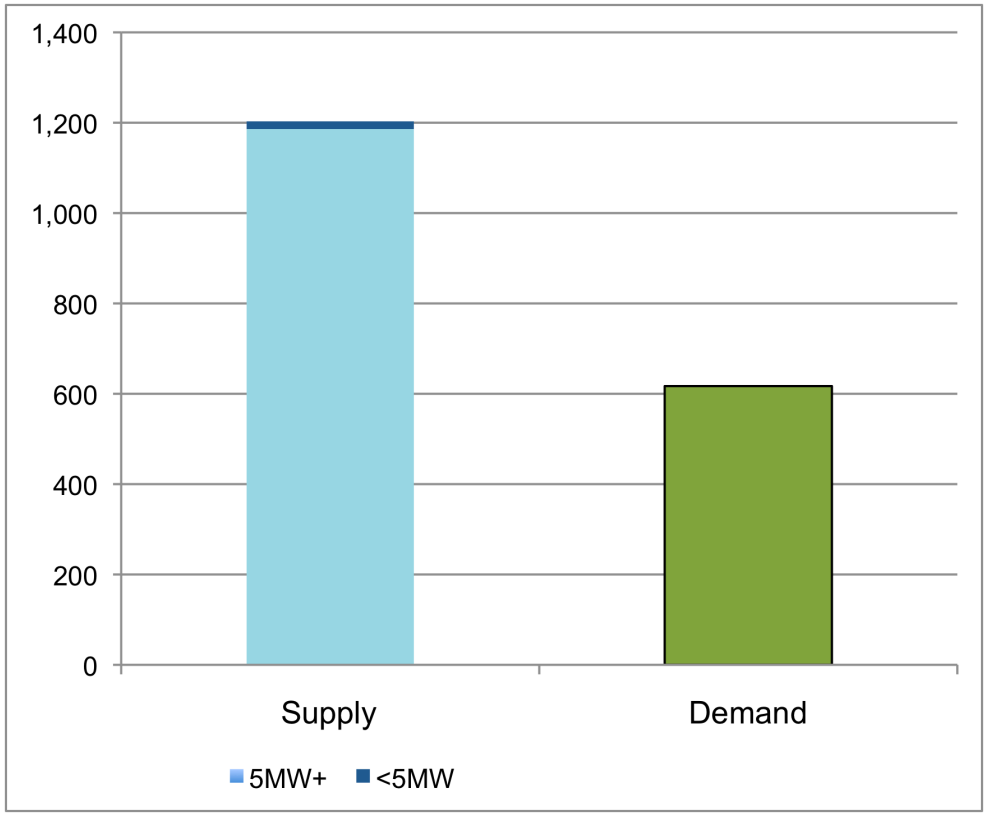
Owners of smaller turbines benefit financially through the Feed In Tariff (FIT) and Export Tariff schemes. The Feed-in-Tariff scheme for small-scale wind projects was announced in 2008 and came into law in 2010. The level of FITs varies depending on the band a development falls into and are paid for every kWh of energy produced. The Export Tariff is a standard rate across all small wind developments that is paid for all the energy that is exported to the national grid. The prortion of the wind farm output that is exported to the grid, and therefore applicable to the Export Tariff, is measured using a Smart Meter or assumed to be 50% if there is no Smart Meter available[14].

4.5 Supply and Demand

Currently the amount of electricity produced from wind in the Scottish Borders is greater than the area's demand for electricity. Electricity production from wind energy is almost double the total level of demand for electricity (Figure 4-4).

[14] http://www.fitariffs.co.uk/FITs/principles/export/ (accessed 29th October 2012)

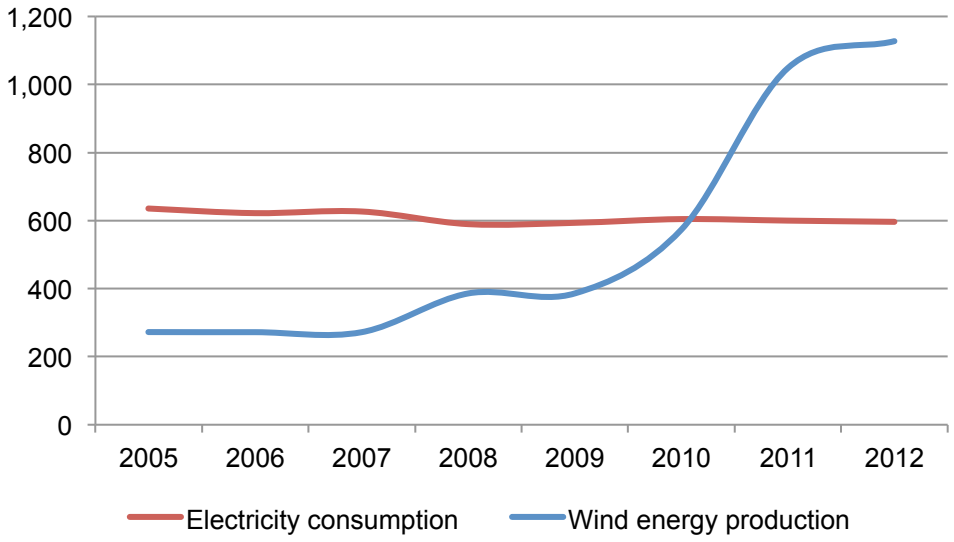
Figure 4-4: Supply of wind energy & demand for electricity in the Scottish Borders (GWh)



This results in the Scottish Borders being a net exporter of electricity based on wind energy alone. Electricity consumption in the Scottish Borders has not varied considerably since 2005 but the level of electricity produced by wind energy has increased significantly. The Scottish Borders became a net exporter of electricity in 2010, when the output from Crystal Rig 2 came online (Figure 4-5).

The value of energy exports will depend on the prices that electricity from individual generators is sold at on wholesale electricity markets. However, if the average wholesale price was 10p per unit (KWh), the value of exports in 2012 would have been almost £60 million.

Figure 4-5: Supply of wind energy & electricity demand in the Scottish Borders (GWh)



5 FUTURE SCENARIOS FOR WIND ENERGY IN THE SCOTTISH BORDERS

The economic impact of wind energy in the Scottish Borders is expected to change as the installed capacity increases between 2012 and 2020. This chapter considers potential growth scenarios to 2020 that will be used to calculate the future economic impact later on in this study. This chapter discusses:

- potential developments of wind energy in sites over 5MW and installed capacity scenarios for 2020;
- the market for wind energy produced in the Scottish Borders in 2020; and
- potential developments of wind energy in sites under 5MW.

5.1 Developments Over 5 MW

There are sites in the Scottish Borders that are in various stages of the pre-operational process. Fallago Rig is the only site that is currently under construction and will be the largest single wind farm in the Scottish Borders with an installed capacity of 144 MW. It represents 7% of the capacity that is currently being constructed in the UK. A further 31MW of capacity has been approved in the Scottish Borders but not yet constructed and there is 329 MW of capacity in the planning system.

The Scottish Borders currently has 9% of UK installed capacity but 4% of UK capacity in planning (and 7% of the Scottish capacity in planning). This suggests that the proportion of UK installed capacity in the Scottish Borders may be lower in 2020 than it is in 2012.

This report considers the implications and impacts of four scenarios for the onshore wind industry in the Scottish Borders to 2020.

The first scenario is that those sites that have been approved are built but no more planning applications are approved. There are currently four sites that have planning permission but have not yet been built with an approved capacity of 171 MW. This would increase the total installed capacity of the Scottish Borders to 605 MW.

The second scenario is that everything in the 50% of the sites that are currently in planning gets approval but no new sites are approved in time to become operational in 2020. There are currently 12 sites awaiting a decision from the planning committee, with a combined proposed capacity of 330 MW so in scenario 2 there would be 770 MW installed by 2020.

There were four scenarios described in the DECC and RenewableUK report[15]. Scenarios 3 and 4 have been based on Scenarios 3 and 4 in this report and assume that the level of growth in the Scottish Borders matches the level of growth in the UK. In Scenario 3 there would be 1,313 MW of installed capacity in the Scottish Borders in 2020 and in Scenario 4 there would be 1,675 MW.

These scenarios are summarised in Table 5-1, in terms of the numbers of turbines, installed capacity and electricity generation implied (based on the capacity factors calculated in Table 4-1).

[15] DECC and RenewableUK (May 2012), Direct and Wider Impacts of Onshore Wind.

This shows that the Scottish Borders could produce up to 4.6 TWh of electricity in 2020, which is equivalent to 17% of the Scottish electricity demand.

Table 5-1: Scenarios and outputs (Sites over 5MW)

Scenario	Turbines	Installed Capacity (MW)	Energy Output (GWh)
2012 (429 MW)	259	429	1.2
Scenario 1 (605 MW)	321	605	1.7
Scenario 2 (935 MW)	386	935	2.6
Scenario 3 (1,313 MW)	697	1,313	3.6
Scenario 4 (1,675 MW)	889	1,675	4.6

Source: BiGGAR Economics

The Scottish Borders is already a net exporter of electricity form wind turbines. The value of the electricity exported is significant and will increase as the installed capacity increases. It is possible to estimate the potential annual value of the electricity exported using a value of 10p per kWh. The results of this calculation for each of the four scenarios is given in Table 5-2.

Table 5-2: Energy exports and value

Scenario	Energy Output (TWh)	Energy Exports (TWh)	Export Value (£m)
2012 (429 MW)	1.2	0.6	59.4
Scenario 1 (605 MW)	1.7	1.1	109.7
Scenario 2 (935 MW)	2.6	2.0	201.0
Scenario 3 (1,313 MW)	3.6	3.1	305.7
Scenario 4 (1,675 MW)	4.6	4.1	405.9

Source: BiGGAR Economics

5.2 Developments under 5MW

There are also an 24 small scale wind sites currently awaiting a planning decision from the Scottish Borders Council. Taken together these sites would comprise 30 turbines and a capacity of 3.7 MW. The majority of capacity in planning process is in the 500 kW to 1.5 MW band.

Table 5-3: Feed in Tariff bands of small-scale wind in planning

Feed In Tariff Band	Sites		Approved Capacity	
	Number	%	Capacity (kW)	%
Under 1.5kW	0	0%	-	-
1.5kW – 15kW	8	33%	73	2%
15kW – 100kW	5	21%	245	7%
100kW – 500kW	7	29%	1,335	37%
500kW – 1.5MW	4	17%	2,000	55%
1.5MW – 5MW	0	0%	-	-
Total	**24**	**100%**	**3,653**	**100%**

Source: Scottish Borders Council, Planning Applications Database.

If all of these sites were granted planning permission and built, this would increase the installed capacity of small-scale wind from 6.5 MW to 10.2 MW. The development process for small-scale wind is however generally shorter than for larger scale wind farms and so further applications might be expected. This report therefore considers the implications of the level of installed capacity from small-scale wind doubling between 2012 and 2020.

6 FEEDBACK FROM BUSINESSES

This section presents the results of a survey of businesses in the Scottish Borders.

6.1 Methodology

A business survey was undertaken with the aim of identifying positive and negative impacts associated with onshore wind energy in the Scottish Borders.

While it was recognised that many businesses may not be directly effected by the onshore wind sector, the study sought to give as many businesses in the Scottish Borders as possible the opportunity to participate. It was anticipated that the types of businesses that might be most likely to respond to the survey would be businesses already involved in the sector (such as those supplying goods and services to the sector or owners of turbines or land on which turbines are based), businesses interested in becoming involved in the sector and tourism businesses.

A web-based questionnaire was designed, covering issues relevant to each of these types of businesses (although respondents were routed through the questionnaire as appropriate; for example, only tourism businesses were asked questions on impact on the tourism sector).

We are grateful for the assistance of business organisations in the Scottish Borders who invited their members and contacts to participate. Each sent an email explaining the objectives of the study and containing a link to the online survey and then at least two reminders. The organisations that assisted us were:

- Federation of Small Businesses, which sent the survey out to approximately 540 businesses in the Scottish Borders;
- Borders Machinery Ring, which sent the survey out to approximately 400 businesses; and
- Scottish Borders Chamber of Commerce, which sent the survey out to approximately 80 businesses.

Although there may be some overlap in membership between these three organisations, we understand that this is not likely to be significant. We are also aware that some of those who received the survey forwarded it to other businesses. In total the survey, was sent to more than 1,000 businesses in the Scottish Borders

Responses were received from 140 businesses. Responses were excluded from the analysis if the business was based outside the Scottish Borders, if the respondent did not give a name or postcode for their business or if the business could not be verified through an internet search as being in the Scottish Borders. This excluded 14 responses, leaving 126 responses to be analysed.

6.1.1 Types of Businesses Responding

More than half of the businesses that responded to the survey identified themselves as being in the tourism sector. The next largest group of respondents, which accounted for a quarter of respondents, were in land-based sectors.

A wide range of business types were represented in the other responses, ranging from an opticians, a light manufacturer, a jewellery designer and manufacturer, a sawmill, a legal services provider, a building contractor and a cleaning equipment distributor. The main categories of businesses are broken-down in Table 6-1.

Table 6-1: Type of Business

Type of Business	Analysed Respondents
Tourism Business	65
Land based industries	32
Other	22
No Response	7
Total	**126**

Source: Scottish Borders Business Onshore Wind Survey

The remainder of this chapter summarises the key findings emerging from the survey and is structured as follows:

- section 6.2 describes the current involvement of Scottish Borders businesses in the wind energy sector;
- section 6.3 describes the potential future involvement of Scottish Borders businesses in the wind energy sector; and
- section 6.4 describes the impacts of wind farms reported by tourism business.

6.2 Current Involvement in Wind Energy

Businesses were asked whether they could be classified as part of the tourism sector. Those that answered yes were asked questions relevant to tourism sector impacts and the key findings of these questions are summarised in section 6.4.

Non-tourism businesses were asked about the nature of their involvement in the wind energy sector, if any (Table 6-2). Two-thirds of non-tourism businesses did not believe that onshore wind energy currently affected their business. In total, 20 businesses that responded to the survey were involved in the onshore wind sector in some capacity.

Six businesses reported that they supplied goods and services to the onshore wind sector (including one that responded “other”) and four businesses indicated that they had wind turbines.

Of the ‘Other’ respondents, four related to potentially owning a wind turbine, two related to renting land for turbines and four related to applying for planning for wind turbine.

Table 6-2: Involvement in Onshore Wind Energy Sector (Non-Tourism Businesses)

Please describe how onshore wind energy currently affects your business	Respondents
I have wind turbines	2
I supply goods and services to the onshore wind sector	3
I supply goods and services to the onshore wind sector and I have wind turbines	2
Onshore wind energy does not currently affect my business	40
Other	13
Responses	**60**

Source: Scottish Borders Business Onshore Wind Survey

6.2.1 Suppliers to Onshore Wind Sector

Consultations with business organisations indicated that few Scottish Borders businesses are currently involved in the onshore wind. The consultees suggested that the type of work undertaken is likely to be related to fencing and forestry contracts. There is also one company involved in public relations activity.

The business organisations believed that the limited involvement in the wind energy supply chain by Scottish Borders company was related to the structure of the local economy, with many small businesses that may not have the skills and experience to access supply chains for large wind-farm development projects. Some businesses may also believe that the perceived nature of the sector, with peaks and troughs of local demand related to the construction of individual wind farms, could make the sector a risky one to enter.

The business survey found that there were six businesses that supplied goods and services to the onshore wind sector. Five of these businesses provided details of goods and services supplied. Four of these businesses are mainly involved in the site identification and development stage and one is mainly involved during the construction phase.

The importance of the onshore wind sector to these businesses varied with the sector accounting for between 40% and 50% for one businesses, between 20% and 30% for one other and less than 20% for the other four suppliers.

These businesses also provided estimates of the proportion of business and jobs supported by onshore wind energy. In total, these six suppliers estimated that the sector generates around £1.9 million of their turnover and supports 15.2 jobs.

Table 6-3: Suppliers to Onshore Wind

Responses	Value
Number of respondents that supply to onshore wind	6
Number of companies whose proportion of business related to onshore wind energy is between 40% and 50%	*1*
Number of companies whose proportion of business related to onshore wind energy is between 20% and 30%	*1*
Number of companies whose proportion of business related to onshore wind energy is between 10% and 20%	*2*
Number of companies whose proportion of business related to onshore wind energy is less than 10%	*2*
Number of jobs supported in companies that supply to onshore wind that is supported by onshore wind	15.2
Estimated amount of annual turnover supported by onshore wind energy	£1.9 million

Source: Scottish Borders Business Onshore Wind Survey

6.2.2 Other Impacts on Business

The 20 businesses that indicated they had some involvement in the wind energy sector were asked if they had experienced any other impacts in addition to the turnover and employment impacts identified above. The positive impacts identified included:

- increased financial viability: 7 businesses;
- access to new customers: 4 businesses;
- helped me keep my business open: 4 businesses;
- entry into new markets: 3 businesses; and
- helped with utility costs: 2 businesses.

Four businesses identified potential negative impacts. These impacts included increase in power bills, potential reduction in property value, habitat and landscape impacts and concerns that clients will not want to build near wind farms.

6.3 Potential Future Involvement in Wind Energy

6.3.1 Interest in Future Involvement

The 40 businesses that are not currently involved in the sector, were asked about their interest in being involved in the sector in the future.

A third stated that they were not interested in future involvement but others indicated some interest in future involvement. Of those that indicated a desire to be involved in the sector:

- 5 said they would like to provide goods and services to the onshore wind sector in the future;
- 15 said they would like to have wind turbines; and

- 2 said they would like to be involved in the sector in the future but did not specify how.

6.3.2 Constraints to Future Involvement

One of the objectives of the study was to consider how Scottish Borders Council could intervene to maximise economic benefits from the wind energy sector. Businesses that were already involved in the sector or had indicated an interest in becoming involved were therefore asked about any constraints to their future involvement.

As summarised in Table 6-4 and Table 6-5 the potential future constraints were different for different groups of respondents. For current and potential suppliers the most commonly identified constraint was lack of information on tendering opportunities. For those that had or wanted to have wind turbines, planning and grid connection issues were those raised most often.

Table 6-4: Constraints on future involvement (% supplier businesses, n=11)

Are there issues preventing you from being further involved with onshore wind energy?	Current & Potential Suppliers (% of 11)
Lack of information on tendering opportunities	45%
Planning process for wind turbines unclear	36%
Perception that application for wind turbine would not be favourably considered due to opposition to wind turbines	36%
Company not on 'approved' contractor's list	27%
Cost of grid connection	18%
Lack of knowledge/experience of tendering procedures	18%
Time required to tender	18%
Nothing is preventing me from being involved further	27%

Source: Scottish Borders Business Onshore Wind Survey

Table 6-5: Constraints on future involvement (% those that have/want turbine, n=19)

Are there issues preventing you from being further involved with onshore wind energy?	Have/ Would Like Turbines (% of 19)
Perception that application for wind turbine would not be favourably considered due to opposition to wind turbines	26%
Planning process for wind turbines unclear	26%
Cost of grid connection	26%
Lack of knowledge/experience of tendering procedures	16%
Lack of skills/expertise	16%
Lack of information on tendering opportunities	11%
Company not on 'approved' contractor's list	5%
Time required to tender	5%
Nothing is preventing me from being involved further	21%

Source: Scottish Borders Business Onshore Wind Survey

6.4 Impact on Tourism Businesses

Sixty five respondents indicated that they could be considered part of the tourism sector. Seventy five per cent of these businesses stated that the existing wind farm developments in the Scottish Borders did not have any impact on their business (Table 6-6).

Table 6-6: Impact of existing wind farm developments (as % of tourism businesses)

Impact of existing wind farm developments on businesses	Value
No	75%
Yes – positive impact identified	0%
Yes – negative impact identified	15%
Yes – impact not described	10%

Source: Scottish Borders Business Onshore Wind Survey

Ten respondents noted a decrease in the number of tourists, nine stated that it was a small decrease and one stated it was a large decrease.

Eight of the businesses that reported a decrease in tourist numbers quantified the impact on their business in turnover terms and three quantified the decreases in employment terms. The combined impact of this is an estimated £106,800 in turnover and four jobs.

Table 6-7: Impact of existing wind farm developments (as % of tourism businesses)

Impact of existing wind farm developments on tourism businesses	Value
Number of respondents indicating negative impacts	10
Number of companies indicating a large decrease in tourist numbers	*1*
Number of companies indicating a small decrease in tourist numbers	*9*
Number of companies quantifying a decrease in turnover	*8*
Number of companies quantifying a decrease in employment	*3*
Estimated decrease in jobs	4
Estimated decrease in turnover	£106,800

Source: Scottish Borders Business Onshore Wind Survey

One respondent who replied on behalf of a tourism business stated that they there were considering closing their business. Another stated that if a wind farm with planning permission went ahead they would probably not have a viable income and another said the possibility of a wind farm being erected overlooking their business meant their business delayed opening by two years. Four respondents stated that their visitors had a negative perception of wind farms.

Tourism businesses were also asked to suggest any ways that any negative impacts could be mitigated. Most of the comments received related to not building wind farms or not building them in the Scottish Borders. There were four respondents who suggested that positive impacts from onshore wind energy on tourism businesses could be increased by opening up access to them - for example through cafes, walkways and visitor centres that would in effect turn the wind farms into attractions in their own right. Two proposals related to using the funds from wind farms to support tourism initiatives.

7 COMMUNITY BENEFIT FUNDING

This section quantifies the current and future potential value of community benefit funding in the Borders.

7.1 Community Benefit Funds

Many wind farm developers establish community benefit funds as a way of making a financial contribution to the communities in which the wind farm is located. The amount of community benefit funding available (if any) is agreed through negotiation between individual wind farm developers and the host community in which they hope to operate. As a result, there is considerable variation in the amount of funding available through different community funds.

A study undertaken in 2011 for Scottish Borders Council[16] found that the annual value of community benefit funding in the Scottish Borders was more than £1.2 million. The total amount of installed capacity in the Scottish Borders is currently 429 MW so this implies that, on average, community benefit funding in the Borders amounts to £2,795 per MW.

While neither a statutory requirement nor a condition of planning, the principle of community benefit funding is now well established and details of individual agreements are now publicly available via the Scottish Government's Register of Community Benefits. This makes it simple for interested parties to compare the amount of funding per MW agreed for individual developments across Scotland and means that the current average will be the starting point for future negotiations. This means that average community benefit contributions are likely to increase rather than decrease in the future.

In 2011, the Forestry Commission announced the process it would use for awarding contracts to develop wind farms on publicly owned land. The process included provision for community benefit payments of £5,000 per MW. In a speech to the RenewableUK conference in Glasgow in October 2012, First Minister Alex Salmond echoed this by suggesting that in future an appropriate minimum level for community benefit funding would be at least £5,000 per MW.

If the benchmark of £5,000 per MW becomes established then this would represent a significant increase in the amount of community benefit funding currently available. The benchmark is however a minimum recommendation so there will always be an incentive for community negotiators to try and secure higher contributions.

7.2 Future Community Benefit Funding

The future value of community benefit funding in the Scottish Borders will depend on both the level of deployment in the area and the funding agreements put in place by individual developers. This chapter estimates what the value of community funding would be under the four deployment scenarios described in chapter 5 and under three funding contribution rates:

- £2,795 per MW – the current average in the Scottish Borders;
- £5,000 per MW - the benchmark recommended by the First Minister and the Forestry Commission; and

[16] Scottish Borders Council (December 2011), Borders Energy Agency Business Plan.

- £7,000 per MW – to reflect the possibility that skilled negotiators may be able to secure contributions higher than the recommended benchmark.

Existing community benefit agreements would not be affected by increases for future developments. The calculations are therefore based on increased contributions for future developments only.

The results of these calculations are presented in Table 7-1. This shows that by 2020, wind farms in the Scottish Borders could generate between £1.7 million and £9.9 million per year for local communities.

Table 7-1: Community Funding Scenarios for 2020 (£m)

Scenario	£2,795/MW	£5,000/MW	£7,000/MW
Scenario 1 (605 MW)	1.7	2.1	2.4
Scenario 2 (935 MW)	2.6	3.7	4.7
Scenario 3 (1,313 MW)	3.7	5.6	7.4
Scenario 4 (1,675 MW)	4.7	7.4	9.9

Source: BiGGAR Economics

7.3 Delivery Options

The extent to which these benefits are realised will depend to some extent on the mechanisms used to administer and distribute the funds.

One option is to allocate the funding via community councils or other representative local bodies. Although this has been the approach used by many wind farm developers to date, community councils or other local bodies may not have the experience or expertise required to negotiate agreements, assess local needs and manage funds. This issue is discussed further in section 10.2.2 and section 10.3.

Another option would be to commission a management organisation to manage the funding on behalf of the communities. This could either be an established organisation such as the Scottish Communities Foundation or a new organisation with a remit focused on the Scottish Borders.

Community benefit funding could also be administered by establishing a new community development trust. Community development trusts are established, owned and managed by local communities to tackle local issues and to improve the quality of life in the community. There are several community development trusts associated with wind farms in Scotland and many of these are represented by the Development Trusts Association Scotland.

Alternatively, community funding could be administered using a model like that developed by SSE Renewables. This model involves distributing half of the available funding to local community projects and the other half to regional projects. It was piloted in the Scottish Highlands and is now being rolled out elsewhere in Scotland. If the proposed Clyde Wind Farm Extension is consented by the Scottish Government, that would include the Scottish Borders.

7.4 Impact of Community Funding

The economic, social and community benefits that will be associated with this funding will depend on the projects and initiatives that are funded but it is possible

to give some indication of the economic and social impact of such funding using figures from the Scottish Council for Voluntary Organisations (SCVO). These figures suggest that one full-time equivalent job is supported in the voluntary sector in Scotland for every £54,000 of income received. On this basis, future community funding in the Scottish Borders could support between 31 and 183 full-time equivalent jobs in the local voluntary sector.

It is also important to note that the impact of community benefit funding is likely to be higher in the current economic climate. This is because public spending cuts mean that community organisations are finding it increasingly difficult to provide match funding for local projects. Match funding is often a requirement of funding organisations so local projects are finding it increasingly difficult to secure the funding they require.

The community benefit funding described above would help to address this issue by providing a potential source of match funding for local projects. This means that the funding could be used to leverage in additional funds into the local area, which would make the total impact higher than suggested above.

8 CURRENT IMPACT ON THE SCOTTISH BORDERS ECONOMY

This section quantifies the current economic impact of wind energy on the Scottish Borders economy.

8.1 Commercial Wind Farms (Sites over 5 MW)

8.1.1 Development Impacts

Development impacts are those associated with getting a wind farm project to the construction stage. This includes the designing the project, undertaking environmental studies, reaching legal agreements, securing project funding and planning permissions.

The costs associated with this stage of wind farm projects in the Scottish Borders and the proportion of those costs that are accrued by businesses in the Scottish Borders council area are taken from the BiGGAR Economics report to the DECC in May 2012[17]. This report found that the cost per MW for the development of a wind farm in the UK is £108,759. Of this 8.0% typically accrues in the Local Authority Area that the wind farm is built.

These contracts represent an increase in turnover to the businesses involved. The number of jobs that are supported by this turnover and the GVA that this generates has been calculated by applying the appropriate GVA to turnover and turnover per employee ratios for the sectors involved in the wind industry. The summary of these impacts is given in Table 8-1.

Table 8-1: Development impacts per MW by area

	£ per MW in UK	£ per MW in Scottish Borders
Turnover	£106,330	£8,742
GVA	£63,798	£5,420
Jobs	1.04	0.08

Source: BiGGAR Economics, Onshore Wind: Direct & Wider Economic Impacts, 2012

The level of capacity that is currently being developed in the Scottish Borders is the sum of the developments that are in the planning system and those that are in pre-planning (e.g. scoping). There was 329 MW of wind energy capacity in the planning process in October 2012. The capacity that was in the pre-planning stages at this time is not given and therefore an assumption has been made by BiGGAR Economics based on previous research.

Table 8-2: Capacity of Wind Energy in Scottish Borders in Development stage

	Proposed Capacity (MW)	Source
Scoping	700	BiGGAR Economics Assumption
Planning	329	Scottish Borders Council
Total	**1,029**	

Source: BiGGAR Economics

[17] DECC and RenewableUK (May 2012), Onshore Wind: Direct & Wider Economic Impacts

The direct economic impact of the sites in the development stage is calculated by applying the impacts per MW to the capacity described in Table 8-2. The impacts given in Table 8-1 cover both the scoping and planning stages of a development however so the impacts are applied across both stages to avoid double counting.

In this way it can be shown that the development of wind energy in the Scottish Borders currently directly contributes £2.9 million GVA to the Scottish Borders economy and supports 43 jobs.

Table 8-3: Direct Economic Impact of Development in the Scottish Borders

	Impact in Scottish Borders
Turnover (£m)	4.6
GVA (£m)	2.9
Jobs	43

Source: BiGGAR Economics

8.1.2 Construction Impacts

Construction impacts are the economic impacts associated with the erection and connection of the turbines. This includes preparing the site, manufacturing and installing the wind turbines, balance of plant and connecting to the grid.

The costs associated with this stage of wind farm projects in the Scottish Borders and the proportion of these costs that accrued to businesses in the Scottish Borders Council area are based on the DECC and RenewableUK study and informed by BiGGAR Economics previous experience of wind developments in the Scottish Borders. This found that the cost per MW for the construction of a wind farm is £1.2 million and it has been assumed that 5% is retained in the Scottish Borders (out of a total 45% retained in the UK economy). The manufacture and supply of the turbines represents a large proportion of these contracts. These contracts have largely been sourced outside the UK because there are no UK based wind turbine manufacturers (apart from tower manufacturers, including one based in Argyll).

As with the development phase impacts, the number of jobs and amount of GVA that this additional turnover supports has been calculated by applying the appropriate GVA to turnover and turnover per employee ratios for the sectors involved in the wind industry. A summary of these impacts is given in Table 8-4.

Table 8-4: Construction impacts per MW by area

	£ per MW in UK	£ per MW in Scottish Borders
Turnover	£529,393	£59,131
GVA	£195,875	£23,652
Jobs	3.37	0.17

Source: BiGGAR Economics, Onshore Wind: Direct & Wider Economic Impacts, 2012

In October 2012 there was 144 MW of capacity being constructed in the Scottish Borders, at Fallago Rig. The direct economic impact of the sites in the construction stage is calculated by applying the impacts per MW described in Table 8-4 to the 144 MW of capacity that is currently being constructed.

In this way it can be estimated that the construction of wind energy developments in the Scottish Borders currently directly supports 24 jobs and £1.5 million GVA in the Scottish Borders.

Table 8-5: Direct Economic Impact of Construction in the Scottish Borders

	Impact in the Scottish Borders
Turnover (£m)	3.8
GVA (£m)	1.5
Jobs	24

Source: BiGGAR Economics

8.1.3 Operations and Maintenance Impacts

Operations and maintenance impacts are the economic impacts associated with maintaining and operating the site and the turbines, typically over a 25 year period.

The costs associated with this stage of wind farm projects in the Scottish Borders and the proportion of these costs that accrue to businesses in the Scottish Borders council area are taken from the DECC and RenewableUK report, which found that the annual cost per MW for the operations and maintenance of a wind farm is £52,659. Of this, 29% is retained in the local authority area that the wind farm is built in.

Table 8-6: Operation & Maintenance Costs per MW per year by area

	£ per MW per year in UK	£ per MW per year in Scottish Borders
Turnover	£47,610	£15,181
GVA	£19,996	£7,894
Jobs	0.29	0.08

Source: BiGGAR Economics, Onshore Wind: Direct & Wider Economic Impacts, 2012

There is currently 429 MW of operational capacity in the Scottish Borders. The direct economic impact of operational sites can be calculated by applying the impacts per MW to the operating capacity.

In this way it can be shown that the operations and maintenance of wind energy in the Scottish Borders currently directly supports 34 jobs and contributes £3.8 million GVA to the Scottish Borders economy.

Table 8-7: Direct Economic Impact of Development in the Scottish Borders

	Impact
Turnover	7.4
GVA	3.8
Jobs	34

Source: BiGGAR Economics

8.1.4 Over 5MW Summary

Taking projects at all three stages together, the direct economic impact of wind energy from sites with a capacity of more than 5 MW (commercial wind farms) in the Scottish Borders has been estimated at 102 jobs and £8.2 million GVA from a turnover of £15.8 million (Table 8-8).

Table 8-8: Direct Economic Impact of wind energy (over 5MW) in the Scottish Borders

	Development	Construction	Operations & Maintenance	Total
Turnover	4.6	3.8	7.4	**15.8**
GVA	2.9	1.5	3.8	**8.2**
Jobs	43	24	34	**102**

Source: BiGGAR Economics, figures may not total due to rounding

8.2 Small Scale Wind (Sites under 5MW)

The development of wind energy installations that are less that 5MW also have an economic impact in the Scottish Borders. These sites participate in the Feed-In-Tariff and Export Tariff schemes rather than the Renewables Obligations Certificates.

8.2.1 Development, Construction & Operational Impacts

The economic impacts associated with the development and construction of wind energy installations in the Scottish Borders is measured by considering the level of construction and the costs associated with this construction that accrued to the Scottish Borders.

Table 8-9: Costs per kW by area

	Estimated Total Cost	% in Scottish Borders
Development & Construction	£4,250	25%
Operations & Maintenance	£133	25%

Source: BiGGAR Economics Assumption, Enviko website based on 20kW turbine

The costs per kW installed are based on the costs associated with both development and construction. There are currently 3,653 kW of sites that are in the planning process and 1,435 kW of sites that were approved in 2011. It is assumed that the sites that were approved in 2011 are equivalent to the sites that were built in 2012. On that basis, in 2012, 1,435 kW of wind would have been in the construction phase. There was 6,461 kW of installed capacity that required maintenance. The GVA/turnover and Turnover per employee ratios are assumed to be the same as for larger wind energy projects.

In this way it can be shown that the development and construction of wind energy installations of less than 5 MW generated £0.9 million GVA and 13 jobs from a turnover of £1.7 million in the Scottish Borders economy.

Table 8-10: Direct Impact of Development & Construction in the Scottish Borders

	Impact
Turnover (£m)	1.7
GVA (£m)	0.9
Jobs	13

Source: BiGGAR Economics

8.2.2 Tariff Impacts

The largest financial benefits of the small-scale wind energy installations come from the tariffs that are applied to the energy produced.

The owners of the turbines benefit in a number of ways financially through the Feed In Tariff (FITs) and Export Tariff schemes, along with reduced energy costs. The majority of the sites in the Scottish Borders are on farms and the farmers applied for the planning permission for them. The FITs vary depending on the band a development falls into and are paid for every kWh of energy produced. The Export Tariff is a standard rate across all small wind developments that is paid for all the energy that is exported to the national grid.

It is assumed that the capacity factors of the small-scale wind installations are similar to the larger sites in the Scottish Borders. If this figure is rounded to 30% it can be estimated that the potential financial benefit of the approved small-scale wind installations in the Scottish Borders is £2.6 million. The breakdown of this by tariff and band is given in Table 8-11. The actual benefit to the owners of the turbines will be higher than this as this does not include the reduction in their own energy costs from using the output of the turbines.

Table 8-11: Financial benefits of small scale wind

Feed In Tariff Band	Anticipated output kWh (30% capacity)	Pence per kWh		Moneys received (£m)		
		Feed in Tariff	Export Tariff	Feed In Tariff	Export Tariff	Total
Under 1.5kW	0	35.8	4.5	0.0	0.0	0.0
1.5kW – 15kW	365,292	28	4.5	0.1	0.0	0.1
15kW – 100kW	3,131,262	25.4	4.5	0.8	0.1	0.9
100kW – 500kW	2,838,240	20.6	4.5	0.6	0.1	0.6
500kW – 1.5MW	3,547,800	10.4	4.5	0.4	0.1	0.4
1.5MW – 5MW	7,095,600	4.9	4.5	0.3	0.2	0.5
Total	**16,978,149**			**2.2**	**0.4**	**2.6**

Source: Scottish Borders Council, Planning Applications Database.

The GVA impact of this can be calculated by subtracting the costs associated with the production of this electricity. These costs are calculated by applying the level of installed capacity in this category to the operations and maintenance costs

descried in Table 8-9. In this way it can be shown that the tariffs received by the small scale turbines generate £1.7 million in GVA for the Scottish Borders.

Table 8-12: GVA from tariffs in the Scottish Borders

	Impact
Tariff Income (£m)	2.6
Operations & Maintenance Costs (£m)	0.9
GVA	1.7

Source: BiGGAR Economics

8.2.3 Under 5MW Summary

The direct economic impact of wind energy from small-scale wind (sites under 5MW), is 13 jobs and £2.6 million GVA from a turnover of £4.3 million. The impact is broken down in Table 8-13

Table 8-13: Under 5MW impact summary in the Scottish Borders

	CAPEX & OPEX	Tariffs	Total
Income (£m)	1.7	2.6	4.3
GVA (£m)	0.9	1.7	2.6
Jobs	13	-	13

Source: BiGGAR Economics

8.3 Current Economic Impact Summary

The economic impact of the onshore wind energy sector in the Scottish Borders in 2012 was £10.8 million GVA and 115 jobs from a turnover of £20.1 million. The breakdown of this impact is given in Table 8-14. The GVA impact is the equiavent of 0.7% of the total GVA in the Scottish Borders economy[18].

The total economic impact of the sector will be higher than the figures presented in the table, since no account has been taken of income multiplier effects (i.e. the economic impacts from employees spending wages in the local economy) and other economic effects such as non domestic rates paid and economic impacts delivered by community benefit impacts.

Table 8-14: Direct Economic Impact of wind energy in the Scottish Borders

	Development	Construction	Operations & Maintenance	Small scale wind	Total
Turnover	4.6	3.8	7.4	4.3	**20.1**
GVA	2.9	1.5	3.8	2.6	**10.8**
Jobs	43	24	34	13	**115**

Source: BiGGAR Economics, figures may not total due to rounding

[18] GVA data from National Statistics for NUTS3 areas, gives a GVA figure for the Scottish Borders for 2011 (the latest year for which data is available) of £1,513 million (1.4% of total GVA for the Scottish economy).

9 POTENTIAL FUTURE IMPACT IN SCOTTISH BORDERS ECONOMY

This section quantifies the potential future economic impact of wind energy on the Scottish Borders economy. This is based on the future deployment levels that are described in Chapter 5. These impacts are reported, as they would be in 2020.

9.1 Commercial Wind Farms (Sites over 5 MW)

9.1.1 Development Impacts

The impact from the development stages will depend on the level of capacity installed by 2020. The capacity expected to be in the development stages each year, in each of the scenarios, is given below in Table 9-1.

Table 9-1: Capacity in Development stages 2020 in the Scottish Borders

	2012	Scenario 1 (605 MW)	Scenario 2 (935 MW)	Scenario 3 (1,313 MW)	Scenario 4 (1,675 MW)
Capacity (MW)	1,029	0	379	663	934

Source: BiGGAR Economics, figures may not total due to rounding

The economic impacts of the future scenarios have been estimated using the same method as for the current economic impacts. In this way it can be estimated that the economic impact of the development stage in the Scottish Borders could range from nothing in Scenario 1 to £2.6 million GVA and 39 jobs in Scenario 4.

Table 9-2: Economic Impact of Development stage in 2020 by Scenario

	2012	Scenario 1 (605 MW)	Scenario 2 (935 MW)	Scenario 3 (1,313 MW)	Scenario 4 (1,675 MW)
Turnover (£m)	4.6	0	1.7	3.0	4.2
GVA (£m)	2.9	0	1.0	1.8	2.6
Jobs	43	0	16	28	39

Source: BiGGAR Economics,

If, however, the Scottish Borders was able to increase the proportion of the development contracts that were awarded in the local area from 8% to 16% then the impacts would increase. The economic impact for each of the scenarios, if the proportion of development contracts that were awarded in the Scottish Borders doubled, is given in Table 9-3.

Table 9-3: Economic Impact of Development stage in 2020 by Scenario with Increased Scottish Borders Share of Supply Chain

	2012	Scenario 1 (605 MW)	Scenario 2 (935 MW)	Scenario 3 (1,313 MW)	Scenario 4 (1,675 MW)
Turnover (£m)	4.6	0	3.4	5.9	8.3
GVA (£m)	2.9	0	2.1	3.7	5.2
Jobs	43	0	32	55	78

Source: BiGGAR Economics,

9.1.2 Construction Impacts

The construction impacts have been based on the average annual amount of construction that would be required to meet the amount of installed capacity anticipated in each of the scenarios by 2020. The level of capacity that is in the construction stages in each of the scenarios is given below in Table 9-1.

Table 9-4: Capacity in Development stages 2020 in the Scottish Borders

	2012	Scenario 1 (605 MW)	Scenario 2 (935 MW)	Scenario 3 (1,313 MW)	Scenario 4 (1,675 MW)
Capacity (MW)	144	0	63	110	156

Source: BiGGAR Economics, figures may not total due to rounding

The economic impacts of the future scenarios have been estimated using the same method as for the current economic impacts. In this way it can be estimated that the economic impact of the development stage in the Scottish Borders could range from nothing in Scenario 1 to £1.6 million GVA and 26 jobs in Scenario 4.

Table 9-5: Economic Impact of Construction stage in 2020 by Scenario

	2012	Scenario 1 (605 MW)	Scenario 2 (935 MW)	Scenario 3 (1,313 MW)	Scenario 4 (1,675 MW)
Turnover (£m)	3.8	0	1.6	2.9	4.1
GVA (£m)	1.5	0	0.7	1.2	1.6
Jobs	24	0	11	19	26

Source: BiGGAR Economics,

If, however, the Scottish Borders increases the proportion of the construction contracts that are awarded in the local area from 5% to 10% then the impacts would increase. The economic impact for each of the scenarios, if the proportion of development contracts that were awarded in the Scottish Borders doubled, is given in Table 9-6.

Table 9-6: Economic Impact of Construction stage in 2020 by Scenario with Increased Scottish Borders Share of Supply Chain

	2012	Scenario 1 (605 MW)	Scenario 2 (935 MW)	Scenario 3 (1,313 MW)	Scenario 4 (1,675 MW)
Turnover (£m)	4.6	0	3.2	5.8	8.1
GVA (£m)	2.9	0	1.3	2.3	3.2
Jobs	43	0	21	37	52

Source: BiGGAR Economics,

9.1.3 Operations and Maintenance Impacts

The majority of the increase in economic impact of the wind energy sector in the Scottish Borders will come from increased demand for operations and maintenance services. The will be the result of increased capacity in the Scottish Borders. The level of capacity that is in the construction stages in each of the scenarios is given below in Table 9-1.

Table 9-7: Installed capacity in 2020 in the Scottish Borders

	2012	Scenario 1 (605 MW)	Scenario 2 (935 MW)	Scenario 3 (1,313 MW)	Scenario 4 (1,675 MW)
Capacity (MW)	429	605	935	1,313	1,675

Source: BiGGAR Economics, figures may not total due to rounding

The economic impacts of the future scenarios have been estimated using the same method as for the current economic impacts. In this way it can be estimated that the economic impact of the operations and maintenance stage in the Scottish borders could range from £5.4 million GVA and 49 jobs in Scenario 1 to £15.1 million GVA and 135 jobs in Scenario 4.

Table 9-8: Economic Impact of operations & maintenance in 2020 in the Scottish Borders

	2012	Scenario 1 (605 MW)	Scenario 2 (935 MW)	Scenario 3 (1,313 MW)	Scenario 4 (1,675 MW)
Turnover (£m)	7.4	10.5	16.2	22.8	29.0
GVA (£m)	3.8	5.4	8.4	11.8	15.1
Jobs	34	49	75	106	135

Source: BiGGAR Economics,

If, however, the Scottish Borders increased the proportion of the operations and maintenance contracts that are awarded in the local area from 29% to 40% then the impacts would increase. The economic impact for each of the scenarios, if this proportion increased, is given in Table 9-9.

Table 9-9: Economic Impact of Construction stage in 2020 by Scenario with Increased Scottish Borders Share of Supply Chain

	2012	Scenario 1 (605 MW)	Scenario 2 (935 MW)	Scenario 3 (1,313 MW)	Scenario 4 (1,675 MW)
Turnover (£m)	4.6	14.5	22.4	31.4	40.1
GVA (£m)	2.9	7.5	11.6	16.3	20.8
Jobs	43	67	104	146	186

Source: BiGGAR Economics,

9.1.4 Commercial Wind Farms (Over 5 MW) Summary

If the current proportions of the supply chain secured in the Scottish Borders stays the same, the total economic impact of large wind energy developments in the Scottish Borders in 2020 could range from £5.5 million GVA and 49 jobs (Scenario 1) to £19.3 million GVA and 200 jobs (Scenario 4).

Table 9-10: Economic Impact in the Scottish Borders by 2020

	2012	Scenario 1 (605 MW)	Scenario 2 (935 MW)	Scenario 3 (1,313 MW)	Scenario 4 (1,675 MW)
Turnover (£m)	15.8	10.5	19.5	28.6	37.3
GVA (£m)	8.2	5.5	10.1	14.8	19.3
Jobs	102	49	102	152	200

Source: BiGGAR Economics,

If the current proportions of the supply chain secured in the Scottish Borders increases as described above, the total economic impact of commercial wind farm developments in the Scottish Borders in 2020 could range from £7.5 million GVA and 67 jobs (Scenario 1) to £29.2 million GVA and 316 jobs (Scenario 2).

Table 9-11: Economic Impact in 2020 in the Scottish Borders with Increased Scottish Borders Share of Supply Chain

	2012	Scenario 1 (605 MW)	Scenario 2 (935 MW)	Scenario 3 (1,313 MW)	Scenario 4 (1,675 MW)
Turnover (£m)	15.8	14.5	29.0	43.1	56.5
GVA (£m)	8.2	7.5	15.0	22.3	29.2
Jobs	103	67	157	238	316

Source: BiGGAR Economics,

9.2 Small Scale Wind Impacts (Under 5 MW)

The economic impact of wind energy sites of less than 5 MW is also expected to change in the future. The level of Feed-In-Tariff is subject to change in the future and this will have an impact on both demand for small wind turbines developments in the Scottish Borders and the income that is generated from the installed turbines. This report has assumed that by 2020 the installed capacity, in the under 5 MW category, will be 12,922 kW. This is double what is currently installed but would represent a slow down in the number of sites that are installed compared to the period between 2008 and 2012.

9.2.1 Development, Construction & Operational Impacts

The economic impact, per kW installed, of the small-scale wind energy developments is not expected to change in the development, construction & operational stages. Therefore the impact in 2020 is calculated using the same methodology as for the current impact. The anticipated capacity in each stage of the capacity in 2020 is given in Table 9-12.

Table 9-12: Capacity by stage in 2020 – Under 5MW

	Development	Construction	Operational
Capacity (MW)	3,634	808	12,922

Source: BiGGAR Economics Assumption,

Using the same methodology as for the current impact, it can be estimated that the economic impact of the development, construction and development stages in the Scottish Borders by 2020 could be £0.7 million GVA and 9 jobs from a turnover of £1.3 million.

Table 9-13: Direct Impact of CAPEX & OPEX in the Scottish Borders 2020

	Impact
Turnover (£m)	1.3
GVA (£m)	0.7
Jobs	9

Source: BiGGAR Economics

9.2.2 Tariff Impacts

The economic impacts of the tariff income generated by small-scale turbines will increase proportionally as installed capacity increases. Applying the installed capacity of 12,922 kW to the proportions and tariffs described in Table 8-11 gives a total GVA of £3.4 million from a tariff income of £5.2 million.

Table 9-14: Tariff impacts and assumptions in the Scottish Borders 2020

	Impact 2012	Impact 2020
Installed Capacity	6,461 kW	12,922 kW
Electricity produced	17.0 GWh	34.0 GWh
Feed-in-Tariff	£2.2 million	£4.4 million
Export Tariff	£0.4 million	£0.8 million
Total Tariff Income	**£2.6 million**	**£5.2 million**
Operations & Maintenance Costs	£0.9 million	£1.8 million
Total Tariff GVA	**£1.7 million**	**£3.4 million**

Source: BiGGAR Economics

9.2.3 Small Scale Wind (Under 5 MW) Summary

The direct economic impact of wind energy from sites included in the Feed-in-Tariff and Export Tariff, under 5MW, was 9 jobs and £4.1 million GVA from a turnover of £6.5 million. The impact is broken down in Table 9-15.

Table 9-15: Under 5MW impact summary in the Scottish Borders

	CAPEX & OPEX	Tariffs	Total
Income (£m)	1.3	5.2	6.5
GVA (£m)	0.7	3.4	4.1
Jobs	9	-	9

Source: BiGGAR Economics

9.3 Total Future Impact Summary

9.3.1 Total Future Impact Based on Current Market Share

If the current proportions of the supply chain secured in the Scottish Borders stays the same, the total economic impact of all wind energy developments in the Scottish Borders on the economy of the Scottish Borders by 2020 could range from £9.6 million GVA and 58 jobs (Scenario 1) to £23.4 million GVA and 209 jobs (Scenario 4).

Table 9-16: GVA Impact in the Scottish Borders by 2020 (£m)

	2012	Scenario 1 (605 MW)	Scenario 2 (935 MW)	Scenario 3 (1,313 MW)	Scenario 4 (1,675 MW)
Development	2.9	-	1.0	1.8	2.6
Construction	1.5	-	0.7	1.2	1.6
Operations & Maintenance	3.8	5.5	8.4	11.8	15.1
Small scale wind	2.6	4.1	4.1	4.1	4.1
Total GVA	**10.8**	**9.6**	**14.2**	**18.9**	**23.4**

Source: BiGGAR Economics,

Table 9-17: Jobs Impact in 2020 by Scenario

	2012	Scenario 1 (605 MW)	Scenario 2 (935 MW)	Scenario 3 (1,313 MW)	Scenario 4 (1,675 MW)
Development	43	-	16	28	39
Construction	24	-	11	19	26
Operations & Maintenance	34	49	75	106	135
Small scale wind	13	9	9	9	9
Total Jobs	**115**	**58**	**110**	**161**	**209**

Source: BiGGAR Economics,

9.3.2 Total Future Impact Based on Potential Market Share

This chapter has considered how the economic impact of on-shore wind developments in the Scottish Borders could be affected if the proportion of contracts secured in the Scottish Borders were to increase. These increases are described in Table 9-18.

Table 9-18: Contract procurement increase scenarios

	Current level	Increased level
Development	8%	16%
Construction	5%	10%
Operations & Maintenance	29%	40%
Small scale wind	25%	25%

Source: BiGGAR Economics,

If the current proportions of the supply chain secured in the Scottish Borders increases as described in Table 9-18, the total economic impact of wind energy developments in the Scottish Borders on the economy of the Scottish Borders by 2020 could range from £11.6 million GVA and 76 jobs (Scenario 1) to £33.3 million GVA and 325 jobs (Scenario 4).

This could increase the onshore wind sector's contribution to the Scottish Border's economy to 2.5% of GVA; this would be equivalent to generating an additional 1.5% in economic growth, at a time when Scottish economic activity has not yet recovered to pre-recession levels.

Table 9-19: GVA Impact in 2020 by Scenario (£m) with Increased Scottish Borders Share of Supply Chain

	2012	Scenario 1 (605 MW)	Scenario 2 (935 MW)	Scenario 3 (1,313 MW)	Scenario 4 (1,675 MW)
Development	2.9	-	2.1	3.7	4.1
Construction	1.5	-	1.3	2.3	3.2
Operations & Maintenance	3.8	7.5	11.6	16.3	20.8
Small scale wind	2.6	4.1	4.1	4.1	4.1
Total GVA	**10.8**	**11.6**	**19.1**	**26.4**	**33.3**

Source: BiGGAR Economics,

Table 9-20: Jobs Impact in 2020 by Scenario with Increased Scottish Borders Share of Supply Chain

	2012	Scenario 1 (605 MW)	Scenario 2 (935 MW)	Scenario 3 (1,313 MW)	Scenario 4 (1,675 MW)
Development	43	-	32	28	78
Construction	24	-	21	19	52
Operations & Maintenance	34	67	104	106	186
Small scale wind	13	9	9	9	9
Total Jobs	**115**	**76**	**165**	**161**	**325**

Source: BiGGAR Economics,

9.3.3 Scottish Impacts

This chapter has only considered impacts that could accrue to businesses based in the Scottish Borders. These developments will however also generate impacts elsewhere in Scotland. The scale of these impacts will depend on the proportion of contract value secured by companies elsewhere in Scotland.

The 2012 RUK report referred to above found that Scottish companies typically secure 29% of expenditure during the construction phase, 41% of expenditure during the development phase and 65% of expenditure during the operations and maintenance phase. These proportions are two to five times larger than those that are currently secured by companies based in the Scottish Borders so it is reasonable to expect that the economic impacts across Scotland as a whole would also be at least double the impact for the Scottish Borders.

This study also only considers impacts that would be generated by wind farms constructed in the Scottish Borders. In practice however, it is possible that companies based in the Scottish Borders could also benefit from wind farms being constructed elsewhere in Scotland. The likelihood of this would increase if businesses in the Scottish Borders were able to develop specialist expertise in wind farm development and operations as a result of their experience working on local developments. If businesses in the Scottish Borders do manage to secure contracts working on wind farms elsewhere in Scotland then the economic impact of the sector on the Scottish Borders economy would be larger than quantified in this report.

10 OPPORTUNITIES AND BARRIERS

This section considers the economic opportunity presented by the development of wind energy in the Scottish Borders, the barriers that exist to realising this opportunity and how the benefits from on-shore wind could be maximised for the Scottish Borders economy.

10.1 Economic Opportunity

This report has considered the potential scale of the economic opportunity presented by the development of wind farms in the Scottish Borders. It has found that in the future, the value of contracts that could be secured by businesses in the Scottish Borders could be between £11.8 million and £33.3 million by 2020.

As described above, the lifecycle of a wind farm involves three main stages:

- development;
- construction; and
- operations and maintenance.

A wide variety of jobs are involved in each of these phases. The extent to which the Scottish Borders will benefit from the future development of wind energy in the Scottish Borders will depend on the extent to which local businesses and the local workforce are able to supply these requirements. The type of opportunities that will be created during each phase of development are described in further detail below.

10.1.1 Development

The development phase involves developing the project and undertaking necessary technical testing and analysis, putting in place the necessary legal and financial framework and then managing the project. The type of jobs involved during this phase include:

- site identification and investigation;
- finance;
- legal;
- planning policy and submission;
- environmental impact assessment;
- community liaison;
- ornithological surveys;
- ecological surveys;
- transport consultants;
- archaeologists;
- heritage consultants;
- landscape architects;

- telecoms engineer;
- acoustic consultants; and
- business plan development.

These specialist and skilled jobs can be done by the wind farm developer itself or contracted out to specialist consultancies. Local knowledge and experience are likely to be an advantage during this phase so there are likely to be opportunities in these areas for small and medium sized businesses in the Scottish Borders.

10.1.2 Construction

The construction phase involves three main types of activity:

- turbine manufacture;
- turbine installation; and
- grid connection.

The onshore sector is a mature sector with an established supply chain in terms of manufacturing and it can be difficult for new entrants to enter the supply chain. The Scottish Borders does not have a tradition of heavy industry so there are unlikely to be significant opportunities for the local economy related to turbine manufacture. Turbine installation and grid connection could however present opportunities.

Turbine installation covers a range of activities including:

- civil and project management;
- roads and access;
- substation buildings;
- turbine foundations and hard standings;
- forestry, logging and landscape service activities; and
- electrical installation and installation of industrial machinery and equipment.

This can involve a wide variety of trades from plasters, bricklayers, electricians, crane operators, HGV drivers, stone crushing machine operators, timber harvester operators, chainsaw operators and fibre optic networking technicians. There are likely to be opportunities for local companies during this phase of development.

The type of activities usually involved in grid connections contracts include:

- engineering services, which includes engineering activities and related technical consultancy and technical testing and analysis;
- construction services including civil engineering; and
- electrical components.

There are likely to be opportunities for firms based in the Scottish Borders during this phase, particularly in relation to civil engineering and other engineering services.

10.1.3 Operations and Maintenance

During the operations and maintenance phase there are two main areas of activity: turbine maintenance and site maintenance. Turbines can be operated and maintained by the turbine manufacturer for a warranty period or they can be maintained by contract or by technicians working for the owner of the wind farm.

Given that technicians, both those working for turbine manufacturers and those working for maintenance providers, tend to live locally, this is an important source of economic impact at the local level. Not only in terms of generating local jobs, but also in terms of spending their wages in the local economy.

Site maintenance activity includes routine tasks such as maintaining site access tracks and bridges, maintaining drainage ditches and repairing gates and fences. From time to time, site maintenance may also involve tasks such as snow clearing or tree clearance. For this reason, locally based companies usually undertake this type of work because the work-flow is unpredictable and often requires the contractor to attend the site at short notice.

10.2 Barriers to Opportunity

This section considers the barriers that exist that could prevent the Scottish Borders from fully benefiting from the opportunities described above.

10.2.1 Negative Impacts on the Tourism Sector

Section 3.4 of this report considered the evidence that exists about the potential impact of wind farms on tourism. If found that there is no evidence that wind farms have a negative impact on the tourism sector, a conclusion shared by both VisitScotland and the Economy, Energy and Tourism Committee of the Scottish Parliament. Despite this, feedback from local businesses summarised in section 6.4 highlights that some local tourism businesses believe that their businesses have been negatively affected and have concerns about the potential negative impacts of future wind farm developments on the sector.

For this reason, it is important that any prospective developer fully considers any potential negative impacts of any proposed development on the tourism sector. The worst-case scenario considered in the Glasgow Caledonian University research described above identifies two potential sources of negative effects on tourism:

- visibility from tourist routes; and
- visibility from accommodation.

In order to assess the potential impact of any proposed wind farm on the Scottish Borders tourism sector, it would therefore be necessary to consider the extent to which the development would be visible from important tourist routes in the area and from tourist accommodation. Such considerations should be part of the environmental impact assessment undertaken to support all wind farm planning applications.

10.2.2 Community Capacity

Chapter 6 of this report considered the amount of funding that could be generated by wind farms for communities in the Scottish Borders through community benefit funding agreements. Although it is recommended that developers should contribute at least £5,000 per MW to local communities, this is neither a statutory

obligation nor something that is considered as part of the planning process. This means that at present the amount of funding secured by any given community is heavily influenced by the negotiation skills of the community representatives, which are highly variable.

Decisions about how to spend community benefit funding are often currently taken by groups such as community councils, who generally do not have any specialist training in this area. This means that the projects supported are not necessarily those that will deliver maximum long-term benefits to the local community. For example, if the individuals involved do not have any experience of securing external funding they may not be able to use the community benefit funding received to leverage in any additional funding.

For these reasons, it is likely that many community groups will currently lack the capacity to secure the maximum benefits from community benefit funding.

10.3 Maximising Benefits

This section considers how the benefits associated with the development of wind energy in the Scottish Borders could be maximised.

10.3.1 Supply Chain Development

This report has described how the development of wind farms in the Scottish Borders will create new demand for goods and services both during the construction and operational phases. Using local companies to supply goods and services for the development will help to increase the local impact of wind farm developments in the Scottish Borders. This means that anything that can be done to increase the proportion of goods and services sourced from local suppliers will help to maximise economic impacts for the Scottish Borders.

Promoting awareness about new wind farm developments and associated opportunities for suppliers amongst local businesses will be important for achieving this. One approach that has been adopted in other areas is for wind farm developers to participate in supplier awareness events that provide opportunities for the developer to meet with potential suppliers in the local area. Elsewhere such events have been organised by local business organisations (e.g. Chambers of Commerce) but this is something that organisations such as the Scottish Borders Council and other agencies could also play an active role in.

Other areas of activity could include providing business development assistance to businesses targeting wind farm supply chain opportunities, working in partnership with developers and major contractors. There may also be merit in highlighting the operations and maintenance opportunity and encouraging Scottish Borders businesses to prepare for this.

10.3.2 Labour Market

Just as wind farm developments in the Scottish Borders will create opportunities for local suppliers, they will also create employment opportunities for local people, particularly during the construction phase. In order to maximise the benefits to the local area from these opportunities, it will be important that people living in the area have the skills required by wind farm developers.

Some of the skills required will be general (e.g. fencing, constructing access roads) but others will be more specialised (e.g. turbine maintenance). The extent to which the local economy will benefit from these opportunities will depend on the

extent to which appropriate skills are available locally. Any activity designed to equip the local workforce with relevant skills will therefore help to maximise the impact of wind farm development on the Scottish Borders economy.

One approach that has been adopted elsewhere in Scotland is to encourage developers to contribute toward relevant skills and education by providing funding to local education providers. There are examples of some developers reaching provisional agreements with local colleges to contribute to relevant courses and the infrastructure required to deliver them in advance of even submitting planning applications.

Another approach is to raise awareness about employment opportunities in the wind energy sector amongst the local workforce, particularly young people. Elsewhere this has been achieved by encouraging wind farm developers to contribute to educational initiatives such as the Young SET Ambassadors, which is designed to encourage talented young people to consider careers in science, technology and engineering. This is also an area that local authorities such as the Scottish Borders Council have the capacity to influence directly, through careers advisory services in local schools.

10.3.3 Community

Chapter 7 of this report quantified the potential value of community benefit funding that wind farms in the Scottish Borders could generate in the years to come. As described in section 10.2.2, the extent to which these impacts are realised will depend to some extent on the capacity of local communities to leverage maximum from the funding.

In order to maximise the benefits of community funding it will be necessary to build capacity within local communities, particularly in the following areas:

- funding negotiation;
- needs analysis and project identification; and
- project delivery.

This could be achieved either by providing training and support directly to local community representatives or by supporting an organisation that would deliver this kind of support on behalf of local communities that require it. Providing training directly to community representatives is likely to deliver mixed results and will not deliver cumulative benefits to the Scottish Borders economy. For this reason, supporting an organisation to deliver support to local communities is likely to be a more efficient solution.

10.4 Summary

The potential scale of the economic opportunity generated by the development of wind energy in the Scottish Borders is estimated at between £11.8 million and £33.3 million. This opportunity will involve a wide variety of different jobs during each phase of development. The extent to which the Scottish Borders economy will benefit from these opportunities will depend on the degree to which the local workforce and local companies are able to meet these requirements.

This chapter has identified various ways in which the impacts from future wind farm developments in the Scottish Borders could be maximised. These include:

- promoting awareness about new wind farm developments and associated opportunities for suppliers amongst local businesses through supplier engagement events;
- raising awareness about employment opportunities in the wind energy sector amongst the local workforce through the local careers advisory service and by encouraging developers to support relevant training and educational initiatives; and
- building capacity within local communities to leverage maximum benefits from the funding available.

Many of these actions could be delivered directly by the Scottish Borders Council but a more coordinated approach could be achieved by establishing a separate organisation. Proposals to create an appropriate organisation already exist and are worth briefly highlighting here.

10.4.1 Borders Energy Agency

The Scottish Borders Council published a business plan for the Borders Energy Agency (BEA) in December 2011. This proposes that the BEA would become a "one-stop-shop" for renewable energy, energy management and energy conservation services in the Scottish Borders.

The business plan notes that because community councils have acted independently in the past, the amounts paid by wind farm developers has varied greatly. It also highlights concerns about the purposes to which community funding has been put and questions the legacy of the projects supported.

Among the functions proposed for the BEA would be services for communities including managing trust funds and support to identify and deliver projects. Such support will be very important to ensuring that the benefits of community funding are maximised in the future and the BEA could provide an appropriate delivery vehicle.

Other functions proposed for the BEA include market and supply chain development, education and communication. All of these functions fit well with the types of actions suggested in this chapter.

11 SUMMARY OF RESEARCH FINDINGS

This chapter highlights the main findings from the economic impact study of onshore wind in the Scottish Borders.

11.1 Literature Review

The key findings from the literature review were:

- DECC Public Attitudes Survey shows public support in the UK for renewable energy in general (79% in support & 4% opposed) including onshore wind (67% in support and 12% opposed);
- UK investment in wind energy in the last year has been significant but UK is still only 8th in the world and 4th in Europe in terms of installed capacity of onshore wind;
- onshore wind contributes £548 million in direct and supply chain GVA, supporting 8,600 UK jobs;
- by 2020, the UK economic impact of the sector could be £1.2 billion in GVA, supporting 17,900 jobs;
- the economic impact retained in the local area in which wind farms are based is typically 7% at the development stage, 8% during construction and 29% during operations and maintenance;
- concerns have been raised bout negative impacts on the tourism sector but there is no evidence of actual negative impacts occurring when wind farms have been developed.

11.2 Development of Wind Energy in the Scottish Borders

The analysis of current capacity, the current supply of wind generated electricity energy and demand for electricity found that:

- the number of turbines and installed capacity in the Scottish Borders has grown considerably since 2007;
- with 2% of the UK land area (6% of Scotland), the Scottish Borders has 9% of the UK's installed capacity of onshore wind (14% of the Scottish total);
- in 2012 there were 355 wind turbines, with an installed capacity of 436 MW;
- smaller developments accounted for 27% of the turbines (96 of 355) and 1.5% of the capacity (6.5 MW of the total of 436 MW) while larger developments of more than 5MW accounted for 73% of these turbines (259 of 355) and more than 98% of total capacity (429 MW of the total 436 MW); and
- in 2012 the Scottish Borders was an exporter of wind energy, producing almost twice as much of the electricity that it consumed; the value of these exports was around £60 million.

11.3 Future Scenarios for Wind Energy in the Scottish Borders

A number of potential future scenarios for wind energy in the Scottish Borders in 2020 have been considered:

- potential installed capacities in the Scottish Borders range from 605 MW to 1,675 MW (compared with 429 MW in 2012);
- this implies between 321 and 889 turbines on wind farm sites (compared with 259 sites over 5 MW in 2012);
- the future value of the electricity exports associated with could range from £109.7 million to £405.9 million; and
- the developments of wind energy sites under 5MW is dependent on the tariff incentives and is assumed to double between 2012 and 2020.

11.4 Feedback from Businesses

This study included a survey of 140 businesses, including 65 tourism businesses. The key findings from the survey were:

- the respondents included six businesses that were providing goods and services to the onshore wind energy sector, supporting £1.9 million in turnover and 15.2 jobs in the Scottish Borders;
- other businesses indicated interest in becoming involved in the sector, including five businesses that were interested in supplying goods and services and 15 businesses interested in having a wind turbine;
- 75% of the tourism businesses responding to the survey believed that the wind energy sector had no impact on their business; and
- ten tourism businesses believed that there had been a negative impact on tourist numbers, leading to a negative impact of £0.1 million in turnover and four jobs in the Scottish Borders.

11.5 Community Benefit Funding

Analysis of community benefit funding associated with wind farm developments found that:

- currently community benefit funding is providing an estimated £1.2 million per annum for investment in Scottish Borders communities;
- community benefit funding is expected to increase, associated with new wind farm developments and increased contributions, possibly to as much as £9.9 million per year by 2020;
- community benefit funding can help communities to secure additional funding, from national and competitive funding sources, helping to lever additional funding into Scottish Borders communities; and
- community councils and other local bodies may require support to maximise the economic and social benefits of funding.

11.6 Current Impact in Scottish Borders Economy

Estimates of the current annual impact of the onshore wind sector on the Scottish Borders economy, suggest that it could be contributing £20.1 million in business turnover, £10.8 million in GVA (0.7% of the total GVA in the Scottish Borders economy) and 115 jobs, including:

- £4.6 million in business turnover, £2.9 million in GVA and 43 jobs from wind farm projects in the development phase (i.e. projects being planned but not yet under construction);
- £3.8 million in business turnover, £1.5 million in GVA and 24 jobs from wind farm projects under construction;
- £7.4 million in business turnover, £3.8 million in GVA and 34 jobs from the operation and maintenance of wind farms; and
- £4.3 million in business turnover, £2.6 million in GVA and 13 jobs associated with small-scale wind.

11.7 Potential Future Impact in Scottish Borders Economy

The future economic impact of the onshore wind sector in the Scottish Borders will depend on the scale of the development of the sector and on the proportion of benefits that can be secured by Scottish Borders businesses. The economic impact of the sector on the Scottish Borders economy by 2020 could be:

- between £9.6 million in GVA (no further development of wind farms) and £23.4 million (capacity increases to 1,675 MW), supporting between 58 and 209 jobs in the Scottish Borders, if there is no increase in the market share secured by Scottish Borders businesses; and
- between £11.6 million in GVA (no further development of wind farms) and £33.3 million (capacity increases to 1,675 MW), supporting between 75 and 325 jobs in the Scottish Borders, if modest targets for increased market share by Scottish Borders businesses were achieved.
- this could increase the onshore wind sector's contribution to the Scottish Border's economy to 2.5% of GVA; this would be equivalent to generating an additional 1.5% in economic growth, at a time when Scottish economic activity has not yet recovered to pre-recession levels.

11.8 Opportunities and Barriers

The economic impact study has identified a range of opportunities, barriers that would need to be overcome and potential actions to maximise the economic impact of the onshore wind sector in the Scottish Borders:

- opportunities exist for a wide range of local businesses (from professional services to ground-works and civil engineering to asset management) to supply goods and services at the development and construction stages and, in particular, at the operation and maintenance phases of wind farm projects;
- the impact of the sector on the Scottish Border can be increased with interventions from Scottish Borders Council and other partners that aim to develop the local supply chain and provide local training opportunities;
- some tourism businesses have reported concerns about reduced visitor numbers and associated impacts on turnover and employment; it is important that the potential impact of future proposed developments on the tourism sector are comprehensively assessed, in particular visibility from key tourist routes and tourism accommodation;

- community benefit funding represents a significant opportunity to deliver social and economic benefits for communities, but local organisations may require support to make the best of this opportunity;
- the interventions that have been identified to maximise impact could be taken forward by the Borders Energy Agency, if it was resourced to do so.