A 17. SOCIO-ECONOMIC EFFECTS

A 17.1 INTRODUCTION

The design of the proposed Viking Wind Farm has changed since the Section 36 application, and its associated Environmental Statement, were submitted in the Spring of 2009. This chapter describes how these changes would affect socio-economic interests.

Before reading this chapter, please first read Addendum Chapter A1, the Introduction, and Chapter A4, the Development Description. Failure to read these two chapters carefully may lead to a misunderstanding of the assessment work described in this chapter. This addendum chapter provides a discussion of the effects of the work which has taken place since the 2009 ES was submitted, and is not intended to provide a complete new assessment of the issues. Therefore it must be read in conjunction with Chapter 17, the socio-economic assessment of the 2009 Environmental Statement.

A 17.2 CONSULTATION RESPONSES

No further consultations were undertaken, and therefore no changes have been made. For a summary of comments from all statutory consultees please refer to Appendix A1.1.

A 17.3 CHANGES IN THE POLICY CONTEXT

The Scottish Parliament has reinforced the commitment to renewable energy and endorsed the ambitious 20:20:20 targets for renewables. The consolidated Scottish Planning Policy (SPP) document, published in February 2010, includes a chapter on renewables which states the following:

> Paragraph 33 – "The planning system should proactively support development that will contribute to sustainable economic growth"; and
>
> Paragraph 45- "The planning system should support economic development in all areas by taking account of the economic benefits of proposed development plans and development management decisions."

A 17.4 CHANGES IN METHODOLOGY

The basic methodology has remained the same though a number of the key variables have been revised to take account of the adjustments to the scale of the Viking project as well as the most recent data and intelligence. These changes are highlighted in the tables that follow:-

Table A 17.1: Current and Previous Input Assumptions

Factors	Assumptions April 2009	Revised Assumptions 2010
Physical Factors		
Number of Turbines	150	127
Output of Turbines	3MW, 3.6MW, 4.2MW	same
Total Capacity	540MW,	457.2MW
Load Factors/Output Levels	34.3%, 44.3%, 54.3%	38.3%, 46.3%, 54.3%
Construction Programme	2012 – 2016	2013 - 2017
Lifetime Assumption	20 years each machine	same
Finance		
Capital cost: base case	£1.477m per MW: 90%, 100%, 120%	£1.5m per MW, same sensitivity
Low Case	£1.255m per MW	£1.35m per MW
High Case	£1.699m per MW	£1.8m per MW
Off Site Costs	£6m	£4m
Funding Package		
Overall	85% loan, 15% from partners	80% loan, 20% from partners
SSE	50%	same
Viking	45% loan/equity (80/20)	same
Private Investor	5%	same
Finance rate	3%, 6%, 9%	5.5%, 6.5%, 7.5%
Operational Costs		
Transmission Charges range per kw p/a	0.76, 1.00, 1.23	0.85, 1.00, 1.15
Community Income		
Land Lease/Rentals	fixed amount per MWh	% of gross income
Community Levy	£2000/MW per annum +2.5% ROC recycle value	£2000/MW per annum +2.5% of ROC recycle value
Business Rates	£12,500 per MW x 540 x 0.45 + buildings	£42,888 per MW x 457.2 x 0.414 x 0.975

Further amendments have also been made to the wage assumptions which are based on more recent information that has become available. The assumptions used for labour cost are displayed in Table 17.2 below.

Table A 17.2: Salary Input Assumptions

Occupations	April 2009	Revised 2010
- Management	£40,000	£42,000
- Admin/IT/Support	£16,000	£18,000
- Technical/Engineering	£26,000	£30,000
- Skilled Trades	£22,000	£24,000
- Semi Skilled Trades	£20,000	£22,000

A number of factors have influenced the changes seen in the assumptions table above. The load and availability factors have been amended and merged into one. For the base case a 97% availability factor has been used instead of 98%. The assumptions on output and efficiency levels have been amended in the light of revised power curves and outputs to increase the expected load factor from 44.3% to 46.3%. In addition, although the main reason for the removal of 23 turbines was on environmental grounds after consultation, several of them were located on less productive sites, which has boosted the overall load factor.

The capital cost figure per turbine has been raised to cover unforeseen contingencies though at this stage the cost figures are expected to come in below the level used in the model. As would be expected the overall capital cost has fallen by 14% to £685m (excluding decommissioning costs of £22m)

The transmission charge per kilowatt per annum has been revised based on a change in National Grid's guidance. As a result the cost has dropped, resulting in lower overall revenue expenditure for the project.

The assumptions which have the largest affect on the outputs of the previous model include reducing the number of wind turbines by 15%, the increase in the load factor, the alterations to the assumed salaries and the reduction in the transmission charge.

Changes have also been made to the electricity price which is made up of a base price plus ROC value and Climate Change levy to take account of the latest industry projections. While the starting price has been reduced the profile through time is expected to be more stable which has resulted in a higher overall value over the life of the project. The actual figures are not quoted on grounds of commercial confidentiality.

The method for calculating the land rental has been altered from a rate per MWh to a proportion of gross income, to reflect changing practice. This results in higher levels of costs to the project and higher levels of income into Shetland (for landlords and crofting tenants).

The estimate for the rateable value of the wind farm has risen due to new methods of calculation based on guidelines published by the Scottish Government on renewables. These result in a higher ratable value for the windfarm which leads to a significant increase in the business rates to be paid.

A 17.5 CHANGES IN BASELINE CONDITIONS

No changes have taken place other than those described above.

A 17.6 CHANGES IN THE PROPOSED WIND FARM

A reassessment of the cost of works and the reduction in the number of turbines has resulted in a reduction in the allowance for off site road works. These were estimated to be £6m and have now been reduced to £4m. The reduction in the number of turbines has also reduced the amount of materials and labour required to carry out the project. These changes to the assumptions are echoed in the changes in the impact assessment below.

A 17.7 CHANGES IN AGREED MITIGATION

The mitigating measures identified in the previous report remain valid. The change in the scale of the project, with the reduced number of turbines and a construction period which remains the same duration, effectively means that one of the mitigating measures suggested, i.e. extending the construction period, has been implemented. It should be easier to make more use of local labour and contractors.

A 17.8 CHANGES IN THE IMPACT ASSESSMENT

The changes to the assumptions identified in paragraph A 17.4 above have been fed into the model which has been rerun to produce a new set of outputs and impacts. These are summarised below.

A 17.8.1 Construction

Table A 17.3 below shows the headline impact figures produced by running the changes to the assumption through the model. The figures below are concerned with the CAPEX inputs and relate to the development and construction phase of the project.

Table A 17.3: Headline Impact Figures for Construction 2010 Scheme

Development / Construction	Value of output	Employment			Wages
	£m	Job years	FTEs	Average jobs per annum	£m
Direct	331.90	3,793	379	759	96.67
Indirect	120.22	1,304	130	261	
Induced	51.75	640	64	128	
Gross Total UK	503.86	5,738	574	1,148	
Rest of World	353.90	3,728	373	746	93.21
Gross Total	857.77	9,466	947	1,893	189.88

NB: It should be noted that the total amount figure is more than the capital cost as it includes the multiplier effect within the UK. The table does not include the £22m worth of decommissioning costs.

Comparing the results in the table above with those from the same table from the 2009 model shows a 13% reduction in total gross value of output and direct wages income from construction. The number of direct construction jobs falls by 21% and the total gross construction jobs falls by 22%.

If the appropriate economic multipliers are subsequently applied it is possible to quantify the gross impact in output terms by location, as presented in Table A 17.4. For example this shows the significant impact on Shetland with direct local spend being nearly £60m over the construction period.

Table A 17.4: Output Impact of Construction by Region and Type 2010 Scheme

All figures in £000s			Cumulative		Cumulative		Cumulative
DIRECT	Shetland	RoS	Scotland	RoUK	UK	RoW	Total
Bulk Materials	16,941	38,235	55,176	62,045	117,221	136,538	253,758
Plant/Equip	9,503	27,676	37,179	16,278	53,457	44,078	97,535
Labour related	25,661	50,103	75,764	34.274	110,038	103,641	213,679
Overhead	2,914	6,749	9,663	6,931	16,595	17,695	34,290
Profit	3,269	12,218	15,487	19,098	34,585	51,592	86,537
Total	**58,288**	**134,981**	**193,269**	**138,627**	**331,896**	**353,904**	**685,800**
% of Total	8%	20%	28%	20%	48%	52%	100%
INDIRECT	15,102	29,897	44,999	75,219	120,218		
INDUCED	15,337	5,573	20,909	30,839	51,748		
TOTAL	**88,727**	**170,451**	**259,178**	**244,684**	**503,862**	**353,904**	**857,766**

NB: Output in this case is effectively expenditure rather than income.

If the construction job figures are examined in more detail then it is possible to identify employment by occupational categories and geographic levels. With the appropriate multipliers at the different user levels it is then also possible to quantify the gross impact in employment terms, as presented in Table A 17.5.

Table A 17.5: Direct Construction Employment Impact by Region Category 2010 Scheme

All figures in Job Years			Cumulative		Cumulative		Cumulative
DIRECT	Shetland	RoS	Scotland	RoUK	UK	RoW	Total
Management	61	130	191	79	269	200	469
Administration	78	168	247	102	349	258	607
Technical/Engineering	197	360	557	183	739	427	1,166
Skilled Trades	260	693	953	708	1,661	2,403	4,064
Semi Skilled Trades	275	349	623	152	775	440	1,215
Total	**870**	**1,700**	**2,570**	**1,223**	**3,793**	**3,728**	**7,521**
% of Total	12%	23%	34%	16%	50%	50%	100%
INDIRECT	255	549	804	501	1,304		
INDUCED	298	287	585	56	640		
TOTAL	**1,423**	**2,535**	**3,959**	**1,779**	**5,738**	**3,728**	**9,466**

The calculations above indicate that the number of job years expected to be created in Shetland is 870, which equates to 174 jobs on average each year, over the 5 year construction period. If wages and salaries are examined in more detail then it is possible to allocate the income impact by occupational category and geographic levels. This information is provided in Table A 17.6 and shows £22.1m (£4.4m per annum) in wages coming into the Shetland economy over the construction period.

Table A 17.6: Construction Wages Income Impact by Region and Type 2010 Scheme

	All figures in £000s					
DIRECT	Shetland	RoS	RoUK	RoW	Total	% Total
Management	2,542	5,463	3,309	8,388	19,702	10%
Administration	1,410	3,030	1,835	4,652	10,927	6%
Technical / Engineering	5,901	10,795	5,476	12,800	34,973	18%
Skilled Trades	6,238	16,639	16,984	57,682	97,543	51%
Semi Skilled Trades	6,041	7,668	3,342	9,684	26,736	14%
Total	**22,133**	**43,595**	**30,947**	**93,206**	**189,881**	**100%**
% of Total	12%	23%	16%	49%		

Tables A 17.3 to A 17.6 above all display similar trends when compared to the equivalent tables from the 2009 scenario. These trends show that under the new set of inputs and assumptions there is approximately 15% less income and a greater decrease in the number of jobs of approximately 23%. This is due to the added effect of increased salary assumptions. The increase in salary results in a higher cost per employee and therefore fewer jobs can be potentially created with the income generated.

A 17.8.2 Operational

The main changes here relate to transmission charges and land rentals as well as a number of other differences in the load factor and electricity prices. These are described in paragraph A 17.4 above.

The level of local ownership within a project of this scale is unique. As a result of this and other agreements revenue generation and income impacts during the operational phase will be significantly different from other projects with a more standard ownership model. It is expected that the potential overall financial benefit to the Shetland community will go beyond the normal direct and multiplier effects of a new business. These benefits could be around £37m on average each year over the 23 year life of the project (see table A 17.11). In a community of 22,000 this impact will be considerable.

Similar to the way in which revenue generation and income details were presented for the construction phase, Table A 17.7 provides information associated with the conventional direct and indirect effects of the operational phase of the project.

Table A 17.7: Table Headline Impact figures for Operational Phase 2010 Scheme

	Value of output average per annum	Total over 23 year life	Employment		Wages Total over 23 years
Operational	£m	£m	Job years	Average jobs per annum	£m
Direct	72.88	1,676.27	2,628	114	75.26
Indirect	7.86	180.69	1,037	45	
Induced	9.58	220.25	344	15	
Total (UK)	90.31	2,077.21	4,009	174	
Rest of World	5.09	117.18	752	33	21.62
Total	95.41	2,194.39	4,761	207	96.89

If the table above is compared with the equivalent table from the 2009 assumptions, there is a 5% reduction in direct wages and a 7% reduction in total wages income. These changes in wages income are largely due to the reduced number of turbines which results in the need for fewer jobs. Direct employment decreases by 15% and total gross employment reduces by 16%. The fewer turbines and the increase in salary assumptions account for most of the decrease observed. However, the predicted change in the transmission charge, electricity price, and load factor compensates for this and has the effect of increasing the overall net revenue.

If the appropriate economic multipliers at the different levels are applied, it is possible to quantify the gross impact in output terms as indicated in Table A 17.8. This shows the significant impact locally with direct local output at around an average of £12.7m per annum over the 23 year operational life of the project.

Table A 17.8: Output Impact of Operation by Region and Type 2010 Scheme

All figures in £000s			**Cumulative**		**Cumulative**		**Cumulative**
DIRECT	**Shetland**	**RoS**	**Scotland**	**RoUK**	**UK**	**RoW**	**Total**
Bulk Materials	21,676	16,106	37,782	13,662	51,444	53,204	104,648
Plant/Equip	16,815	10,264	27,079	2,102	29,181	15,764	44,945
Labour Related	28,941	25,195	54,136	7,852	61,988	24,776	86,764
Overhead	14,582	54,436	69,018	14,795	83,814	5,859	89,673
Profit	209,629	982,725	1,192,354	257,492	1,449,845	17,577	1,467,422
Total	**291,642**	**1,088,727**	**1,380,369**	**295,903**	**1,676,272**	**117,181**	**1,793,453**
% of Total	16%	61%	77%	16%	93%	7%	100%
INDIRECT	79,140	21,917	101,057	79,636	180,693		
INDUCED	62,307	4,109	66,416	153,829	220,245		
TOTAL	**433,089**	**1.114.753**	**1,547,842**	**529,369**	**2,077,211**	**117,181**	**2,194,391**

NB: Output in this case is effectively expenditure rather than income and the profit figure is based just on a share of operating costs which means it is less than the figure used later in table A 17.11.

If the job figures are examined in more detail then it is possible to identify employment by occupational categories and geographic levels. With the appropriate multipliers at the different levels it is possible to quantify the gross impact in employment terms, as presented in Table A 17.9.

Table A 17.9: Direct Operational Employment Impact by Region and Category 2010 Scheme

All figures in Job Years			Cumulative		Cumulative		Cumulative
DIRECT	Shetland	RoS	Scotland	RoUK	UK	RoW	Total
Management	220	304	524	89	613	171	784
Administration	201	400	601	112	713	127	840
Technical/Engineering	299	473	772	133	905	209	1,114
Skilled Trades	241	112	352	45	397	246	643
Semi Skilled Trades	-	-	-	-	-	-	-
Total	**960**	**1,289**	**2,249**	**379**	**2,628**	**752**	**3,380**
% of Total	28%	38%	67%	11%	78%	22%	100%
INDIRECT	266	622	888	149	1,037		
INDUCED	272	65	337	7	344		
TOTAL	**1,498**	**1,976**	**3,474**	**535**	**4,009**	**752**	**4,761**

The calculations above indicate the number of direct jobs expected to be created in Shetland as 960 job years, which equates to around 42 skilled jobs each year over the 23 year operation period, plus a further 23 jobs per annum created in other sectors, and comes to 65 jobs overall. In addition a significant number of jobs will be supported in the rest of Scotland.

If the wages and salaries are examined in more detail then it is possible to allocate by occupational categories and geographic levels as presented in Table A 17.10. This shows over £1.2m average wage income per annum to Shetland households.

Table A 17.10: Operational Wage Income Impact by Region and Category 2010 Scheme

	All figures in £000s					
DIRECT	Shetland	RoS	RoUK	RoW	Total	% Total
Management	9,224	12,768	3,756	7,191	32,939	34%
Administration	3,615	7,207	2,017	2,279	15,118	16%
Technical/Engineering	8,964	14,198	3,986	6,258	33,406	34%
Skilled Trades	5,777	2,680	1,069	5,896	15,421	16%
Semi Skilled Trades	-	-	-	-	-	0%
Total	27,579	36,853	10,829	21,624	96,885	100%
% of Total	28%	38%	11%	22%		
23 Year Average	1,199	1,602	471	940	4,212	

In addition to the benefits from jobs and wage income to Shetland related to the construction and operation of the project, there will also be other community benefits from the land rental, community levy, profits to local shareholders, and income to Shetland based suppliers. These are summarised in Table A 17.11 below.

Table A 17.11: Wider Financial Benefits to Shetland 2010 Scheme

Benefit	Lifetime Amount available	Average per annum over 23 years	Jobs direct	Jobs indirect
	£m	£m	jobs per annum	jobs per annum
Land Rental	178.4	7.8	3	78
Community Levy	29.0	1.3	3	6
Profit to VEL (50%)	587.6	25.6	8	270
- 90% to Community	528.8	23.0		
- 10% to local shareholders	58.8	2.6		
Other Income to Shetland-based Suppliers	53.0	2.3	-	-
Totals	848.0	37.0	14	354

Please note the job figures in Table 17.11 are in addition to those already identified in the previous construction and operational sections. The jobs generated by local suppliers are already in the model. It should also be noted that the community levy is for the local communities directly affected, and the profit to VEL is before tax and depreciation. Profit in this table is based on total revenue minus total costs.

If the figures for 2010 displayed above are compared with those from the 2009 outputs it can be seen that the community benefit and profit to Viking Energy are similar. For example the Charitable Trust should be able to receive £23m per annum, despite there being fewer turbines, due to changes in other key factors such as load factor, electricity prices, and transmission costs. The land rental income has increased significantly and the community levy income has risen by 27%; while the income to Shetland based suppliers shows a decrease which reflects the reduced project scale.

The overall scale of the impact of the land rental, community levy, profit to VEL, and income to Shetland based suppliers is expected to be in the order of £37m per annum which could help to sustain and create around 370 further jobs in addition to the 65 gross jobs per annum from the operation of the wind farm. The demand for these additional jobs could result in a modest amount of in-migration and population growth.

The jobs figures in Table A 17.11 above are estimates of the additional jobs that could be created as a result of the income to the local economy that could be spent on infrastructure projects or invested in local businesses. These are over and above the jobs calculated from the normal multipliers and are based on assumptions of the turnover required to sustain a new job in different sectors. It is assumed likely that only around half of the income is used to generate jobs during the life of the project with the remainder being invested for use after the end of the life of the wind farm, and thus not available to generate more employment in the short term. As a result the jobs estimate is likely to be at the lower end of the scale of what could be achievable.

The following table summarises what is included in the construction and operational sections, and highlights the total benefits to Shetland from the construction and the operation periods as well as the wider financial benefits that are brought about by the windfarm.

Table A 17.12 Overall Impacts on Shetland

Impact	Lifetime Output (£m)	Average Output p/a (£m)	Total Direct Job Years	Average Direct Jobs p/a	Av Gross Jobs p/a	Overall Direct Wages	Average Direct Wages p/a
Construction	58.3	11.7	870	174	285	22.1	4.4
Operation	291.6	12.7	960	42	65	27.6	1.2
	Lifetime Income	Average Income p/a	Total Job Years	Average Jobs p/a			
Wider Impacts	848.0	37.0	8464	368	-	-	-

NB: The construction phase for the project is set to last 5 years, the operational period 23 years and it has been assumed that the wider benefits are also over 23 years, although in reality they are likely to be over a longer period. It should be noted that is not possible to add up all the figures in the columns above as there would be double counting of some elements such as profit and labour costs.

The operation of the wind farm is likely to result in an average direct annual income to Shetland of £38.2m *(£37m + £1.2m, Table A.17.12),* and the creation and sustaining of around 430 gross jobs *(368 + 65, Table A.17.12)* per annum over the 23 year life of the project.

This is in addition to around £10.9m of income per annum or £54.5m over the whole construction phase (*This is based on the total output/expenditure on local goods and services in Shetland (Table A.17.4) adjusted to take out employers costs ((£58.288m-£25.661m)÷5 years=£6.5m per annum) + wages of £4.4m (£22.1m÷5 years, Table A.17.6) per annum)*, and the creation and sustaining of 285 gross jobs. *The latter is based on 174 direct jobs per annum (870 job years÷5 years) + multiplier effect (553 job years÷5 years) to give 1,423 job years or 285 jobs per annum (Table A.17.5) over the 5 year construction period.*

As a result it is clear that the project could make a significant contribution to the local economy which is likely to exceed the direct impact of a normal business operation based in Shetland with an average operating expenditure (excluding the value of energy sales) of around £78m *(£1,793m÷23, Table A.17.8),* despite inevitable leakage effects from a small economy. In an economy the size of Shetland a business of this scale will be a major player, on a broadly similar scale to the value of turnover in either the fish catching or in operating expenditure in the oil and gas sectors (i.e. also excluding the value of sales), and significantly more than the traditional sectors of agriculture, tourism, and textiles. The total turnover of Viking Energy will clearly be much greater when the income from the sales of energy is taken into account.

In addition the project could be instrumental in helping to unlock Shetland's potential in marine renewable and other community and individual energy projects through the availability of an interconnector cable to the mainland of Scotland. At the moment many of these projects are unlikely to proceed due to the constraints of the local grid. All these potential projects would bring further economic benefits.

Given the scale of the project it also has the potential to have a strategic impact at a national level and make a significant contribution to meeting national targets for renewable energy generation. Companies throughout Scotland are likely to benefit from the project during both the construction and operational phases. The Scottish Government will benefit directly from a substantial rates bill over the lifetime of the project. It could also have a positive impact on the feasibility of several other projects in the North of Scotland.

A 17.9 SUMMARY AND CONCLUSIONS

The 15% reduction in the number of turbines to be installed might have been expected to reduce the economic impacts on the local economy, as well as the local economic and financial benefits to local communities. However the expected benefits have not been reduced as much as might be expected due to changing assumptions based on the latest intelligence and different circumstances. The reduced scale of the project has been offset by factors that have increased income to Shetland and reduced costs, such as the load factor, transmission charges, electricity prices, and land rental.

The continuing positive impact is also partly due to the unique ownership model with 50% local ownership. It is expected that around £848m over a 23 year period is likely to come into the local economy directly as a result of the operation of the wind farm, of which £529m will come to the Shetland Charitable Trust (average of £23m per annum before tax and depreciation).

The revised model suggests the wind farm will create an average of 42 new operational jobs directly per annum *(960 job years, Table A.17.5),* and generate at least another 23 in support services *(538 job years, Table A.17.5)* through local expenditure, as well as produce £12.7m of direct output *(£291.6m÷23, Table A.17.8,* and £18.8m of gross output *(£433m÷23, Table A.17.8)* per annum in the local economy. This is in addition to the impact during the five year construction phase of around 174 direct jobs per annum in Shetland, £4.4m per annum in direct income (wages) and £11.7m per annum in direct output during the construction phase that will go into the local economy (Table A.17.12).

If the income from land rental, community levy and local profits is taken into account the wider economic benefit to the Shetland community of the operation of the wind farm is likely to result in a direct annual income to Shetland of **£38.2m**, and the creation and sustaining of around **430 gross jobs** per annum over the 23 year life of the project. This is in addition to around **£10.9m** to local suppliers of direct income, and the creation and sustaining of **285 gross jobs** per annum over the 5 year construction period. The total value of all income to Shetland, arising from both construction and operation phases, is expected to be in the order of **£930m** *(£848m (Table A.17.11) + operational wages £27.6m (Table A.17.12)+ £54.5m from construction income/wages (see second paragraph following Table A.17.12))*.

The wider economic benefits arise from effects not picked up by conventional impact analysis, and include the investment made possible from the profits and income generated. It is estimated this could result in around 370 jobs being sustained over the life of the wind farm, with the potential for more from investment in new development projects. The eventual total could be even higher due to the cautious assumptions used regarding the level of local investment from resources available.

For a community of 22,000 this level of impact is very significant and may not be achievable by other types of development projects. Also this new source of income could come at a time when the existing oil funds have been seriously depleted, significant government spending cut backs are proposed, and there are insufficient public resources to maintain existing facilities let alone undertake new projects.

A 17.10 REFERENCES

There are no new references