

**Socio-economic impact
assessment of Aquamarine
Power's Oyster Projects**

Report to Aquamarine Power

March 2009

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1: Executive Summary

- 1.1 Aquamarine Power has proposed to install a 10 MW demonstration array of their Oyster wave power device at a site at Marwick Head on Orkney and to deploy a 190MW commercial wave power farm at Brough Head covering the northwest and north Mainland coastlines of Orkney.
- 1.2 This report covers the socio-economic impact of these two projects and provides information pertinent to Aquamarine Power's application to the Crown Estate in response to their call on Marine Energy Development Opportunities in the Pentland Firth Strategic Area.
- 1.3 Orkney's current strengths lie in industries that face challenging futures; there is clear evidence that the number of people being employed as workers in the agricultural industry is falling and throughout the last decade the fishing and oil industries have seen large scale reductions in activity.
- 1.4 It is clear that Orkney has relative strengths in industries that are in the marine energy supply chain, as a result some businesses on Orkney may be well placed to undertake work for Aquamarine in the future.
- 1.5 Due to the scale and nature of both the demonstration project and commercial wave power farm, Orkney is unlikely to benefit from large scale contracts that arise at the beginning and end of the Oyster projects, however there is real scope for the Orkney economy to benefit during the operation and maintenance stage, where local companies involved in the marine supply chain are likely to be able to win a significant amount of work. This is important given the (continuing) decline in opportunities in traditional industries.
- 1.6 The economic impact of the Oyster project for Orkney and Scotland is measured using the additional jobs and gross value added that the project creates. These are shown below:

Table 1-1 Estimated GVA created by the project, Orkney and the rest of Scotland (£m, 2009 prices)

Stage	Orkney	Rest of Scotland (excluding Orkney)	All of Scotland (including Orkney)
Fabrication	4.2	65.6	69.8
Installation	8.0	125.1	133.1
Operation & Maintenance	22.9	8.1	31
Decommissioning	3.2	50.5	53.7
Total	38.3	249.3	287.6

Source: SQW Consulting

Table 1-2 Total additional job years ¹ created by the project, Orkney and the rest of Scotland			
Stage	Orkney	Rest of Scotland (excluding Orkney)	All of Scotland (including Orkney)
Fabrication	100	1,568	1,668
Installation	203	3,048	3,251
Operation & Maintenance	892	263	1,155
Decommissioning	150	2,280	2,430
Total	1,345	7,158	8,503

Source: SQW Consulting

- 1.7 The economic impact is significant; between 2010 and 2036, the project is estimated to generate almost £300m of additional economic activity in Scotland. In addition, 8,503 job years will be created, equating to an average of 52 additional jobs each year in Orkney, and 6 jobs each year in the rest of Scotland over a 26 year period.
- 1.8 Of particular significance to Orkney is the development and strengthening of a new industry which can help to offset the effects of reliance on declining industries and at a Scottish level. The benefits to the Orkney economy of the projects' fabrication and installation stages can help to combat rapidly increasing unemployment in the short term due to the current recession.

¹ Job years is used as a more accurate reflection of the labour market impact than jobs. This is because of the varying length of jobs which will be generated by the different stages of the project. For example, a job that lasts for 10 years is more valuable to the economy than a job that lasts for just two years. Using jobs as a measure of the labour market impact would hide this important distinction.

2: Introduction

- 2.1 Aquamarine Power has proposed to install a 10 MW demonstration array of their Oyster wave power device at a site at Marwick Head on Orkney and to deploy a 190MW commercial wave power farm at Brough Head covering the northwest and north Mainland coastlines of Orkney.
- 2.2 This report covers the socio-economic impact of these two projects and provides information pertinent to Aquamarine Power's application to the Crown Estate in response to their call on Marine Energy Development Opportunities in the Pentland Firth Strategic Area.

Table 2-1 Aquamarine's proposed installation size

Project	Size	Number of units
Marwick Head demonstration site	10 MW	20
Brough Head commercial site	190 MW	380

Source: Aquamarine Power

- 2.3 The aims of this socio-economic study are to identify the main impacts that the new development is likely to have on the economies of Orkney and Scotland as a whole, focusing on the additional jobs and Gross Value Added (GVA) which it generates. The report also identifies some of the social impacts of the project.
- 2.4 The report considers a number of key components through which the new development is likely to contribute to the Orkney and Scotland economies:
- through Aquamarine's direct spend on local inputs
 - direct employment in Aquamarine Power's own operations
 - through knock-on employment generated indirectly
 - the gross value added that Aquamarine's installation can generate
- 2.5 Table 2-2 provides an estimated timeline for the proposed development of the two projects.
- 2.6 Fabrication of the units is expected to start in 2010 and continue until 2018 with installation of the units lasting for eight years between 2011 and 2018. Operation and maintenance will be performed throughout the lifetime of the units (20 years). Finally, decommissioning is expected to last for eight years between 2031 and 2038.

Table 2-2 Estimated timeline of Oyster project				
Year	Fabrication	Install	O&M	Decommissioning
2010	X			
2011	X	X		
2012	X	X	X	
2013	X	X	X	
2014	X	X	X	
2015	X	X	X	
2016	X	X	X	
2017	X	X	X	
2018	x	X	X	
2019			X	
2020			X	
2021			X	
2022			X	
2023			X	
2024			X	
2025			X	
2026			X	
2027			X	
2028			X	
2029			X	X
2030			X	X
2031			X	x
2032			X	X
2033			X	X
2034			X	X
2035			X	X
2036			x	X

Source: SQW Consulting

2.7 The remainder of the report is structured as follows:

- Section 3 – baseline of the Orkney economy
- Section 4 – sectoral analysis of the Orkney economy
- Section 5 – economic impact assessment

- Section 6 – social impacts
- Section 7 – conclusions and summary

3: Orkney Baseline

3.1 This section reviews the data available on the Orkney economy, comparing Orkney to the Highlands and Islands region and to Scotland in terms of:

- employment
- unemployment
- skills
- business stock
- gross value added (GVA)

Employment

3.2 In 2007, Orkney had a higher proportion of working age residents in employment compared to the regional or national figure. Similarly, there is a smaller proportion of working age residents who are in unemployment in Orkney compared to the Scottish average.

Table 3-1 Unemployment and employment by region, 2007

	Orkney	Percentage of total working age population	Highlands & Islands	Percentage of total working age population	Scotland	Percentage of total working age population
Working age population	11,900	-	260,500	-	3,225,413	-
In unemployment	300	3%	7,505	3%	118,500	4%
In employment	10,700	90%	223,405	86%	2,543,100	79%

Source: ONS

3.3 Self-employment makes up a greater proportion of total employment in Orkney than anywhere else in Scotland with 13.6% of those in employment working for themselves compared to 11.5% in the Highlands & Islands and just 7.8% in Scotland as a whole. While self-employment can be taken as a measure of entrepreneurship to a certain degree, it may also reflect the lack of alternative employment opportunities in the area, particularly for an island economy where work opportunities are limited by geography.

Unemployment

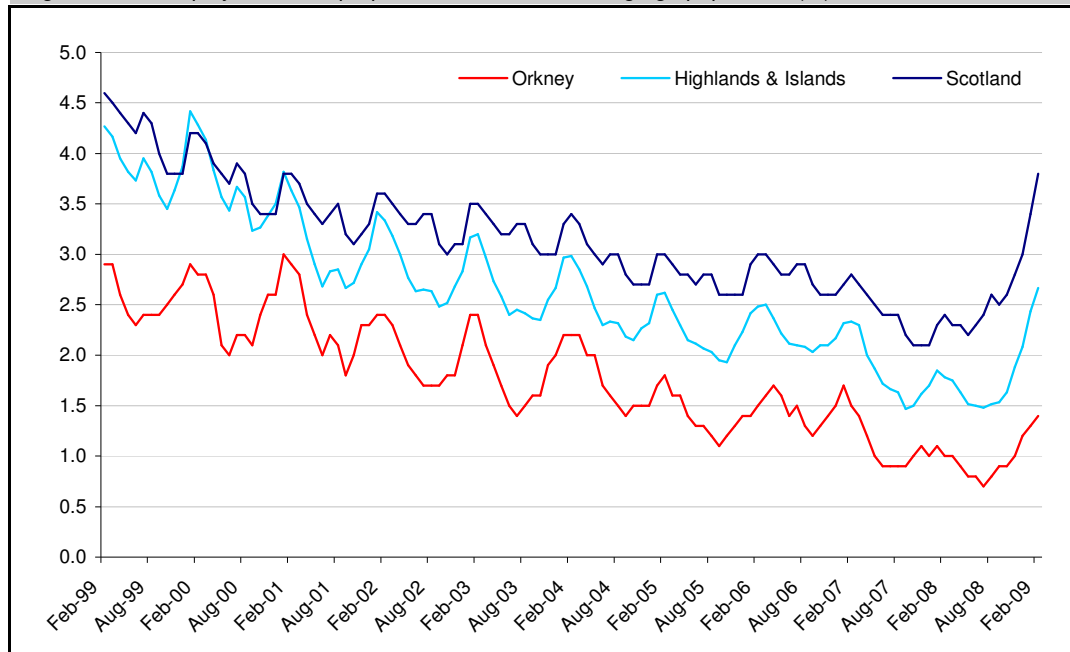
3.4 Figure 3-1 charts the rate of unemployment for the ten years till February 2009 for Orkney, the Highlands & Islands and Scotland.

3.5 As of February 2009, unemployment in Orkney stood at 1.4% compared to 2.7% in the Highlands and Islands and 3.8% in Scotland. Between February 2008 and February 2009, Orkney has seen unemployment increase by 40%. However, this increase is smaller than

Scotland as a whole which has seen unemployment increase by 58% over the same period. This suggests that Orkney has so far been less affected by the recession in terms of job losses than the rest of Scotland as a whole.

- 3.6 Orkney is affected to a greater extent than the rest of Scotland for seasonal unemployment. There is greater variation in the level of unemployment month to month in Orkney than the rest of Scotland. It is assumed that this is due to the higher proportion of seasonal employment in the tourism sector.

Figure 3-1 Unemployment as a proportion of resident working age population (%), 1999 to 2009



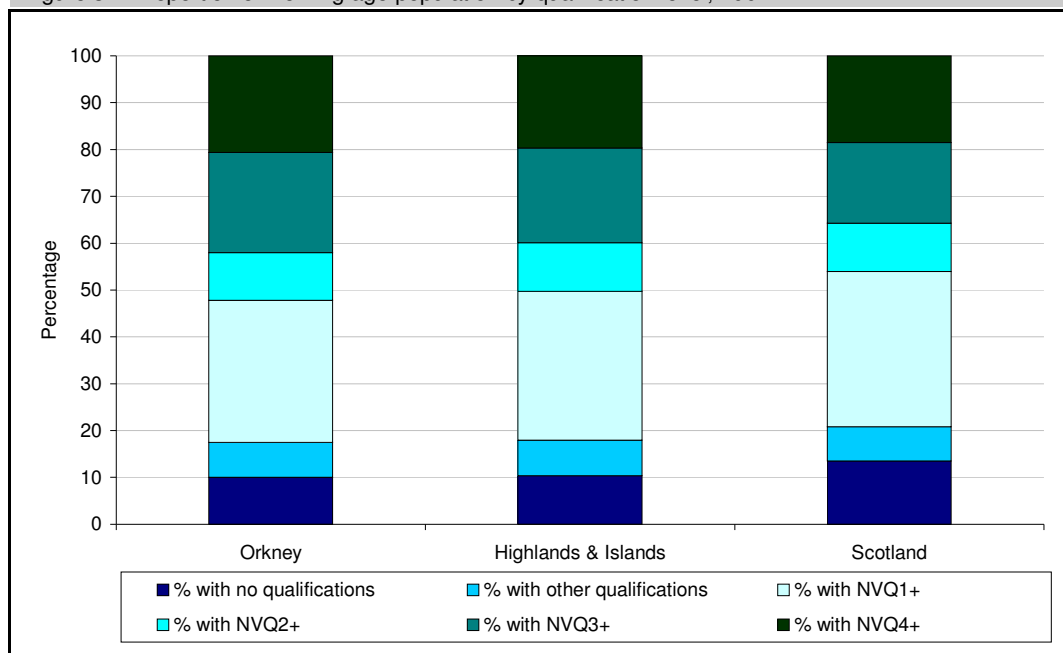
Source: NOMIS

Skills

- 3.7 Orkney has a broadly similar skills profile to the rest of Scotland, with around ten percent of the working age population having no qualifications, a further 50% having qualifications at NVQ 1 or 2 and 40% having NVQ3 or above. It is more important to analyse the availability of potential employees by job rather than qualification because it is experience rather than a particular qualification level that Aquamarine and their contractors will need.
- 3.8 The majority of direct employment that Aquamarine expects the Oyster project to generate will be split between Orkney and Edinburgh. Those based in Orkney will be mainly at managerial levels and will be responsible for managing the project at the site. The majority of these positions are likely to be filled by new employees who are already based in Scotland, if not Orkney. This is because there is a strong labour market in Scotland which has the requisite skills needed for managerial positions in renewable energy, mainly driven by the transferable skills gained in the oil and gas sector. In Orkney, there are a limited number of experienced project and operations managers and Aquamarine would be competing with other renewables operators to try and attract these potential employees.

3.9 It is difficult to determine the exact skills needs of Aquamarine's suppliers. However, from the analysis of employment by SIC code it is clear that there are workers in both Orkney and Scotland who have experience in relevant sectors. For example, Aquamarine has stated that their contractors are likely to include companies with experience in drilling, diving, marine vessels, surveying, health and safety and management – and evidenced by our own analysis of SIC codes. Indeed, many of the companies based in Orkney which supply firms using the European Marine Energy Centre facility have suitable experience to become contractors on the new project.

Figure 3-2 Proportion of working age population by qualification level, 2007



Source: Annual Population Survey

Business base

3.10 The Annual Business Inquiry (ABI) 2007 statistics show that Orkney has 716 VAT registered businesses per 10,000 of population, compared to 417 per 10,000 in the Highlands & Islands and 276 per 10,000 in Scotland as a whole.

Table 3-2 VAT registered businesses, 2007

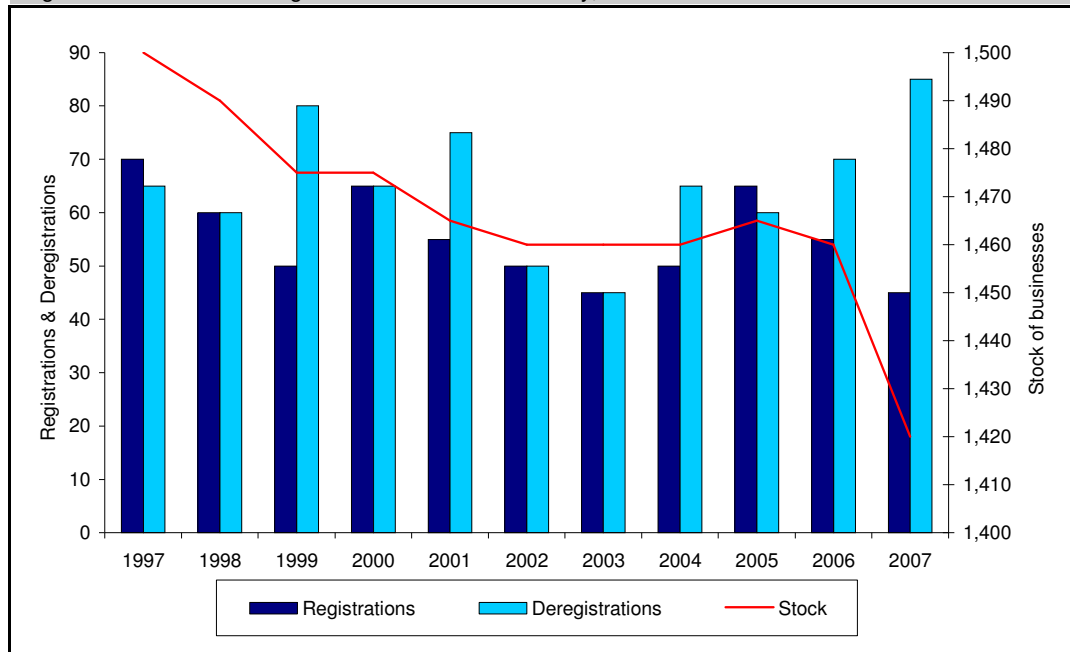
	Number of VAT registered businesses	Population	No of businesses per 10,000 population
Orkney	1,425	19,900	716
Highlands & Islands	18,031	431,910	417
Scotland	141,880	5,144,200	276

Source: NOMIS

3.11 Although Orkney has more businesses per head of population than Scotland as a whole, the stock of businesses in Orkney has fallen by more than 5% during the decade to 2007 compared to a 16% increase in the stock of VAT registered businesses in Scotland as a whole

over the same period. This fall is caused by a fall in new business registrations (down 36%) and an increase in the number of business de-registrations (up 31%) over the same decade.

Figure 3-3 Stock of VAT registered businesses in Orkney, 1997 to 2007



Source: NOMIS

Gross Value Added

- 3.12 Gross Value Added (GVA) is usually defined as the difference between output and intermediate consumption for a given sector or firm. This means that it is made up of the difference between the value of goods and services produced and the cost of the raw materials and other inputs which are used up in the production process.
- 3.13 Table 3-3 shows GVA and GVA per head for 2006 for Orkney, the Highlands & Islands and Scotland. GVA per head in Orkney is higher than the Highlands & Islands average but is one quarter lower than the national figure.

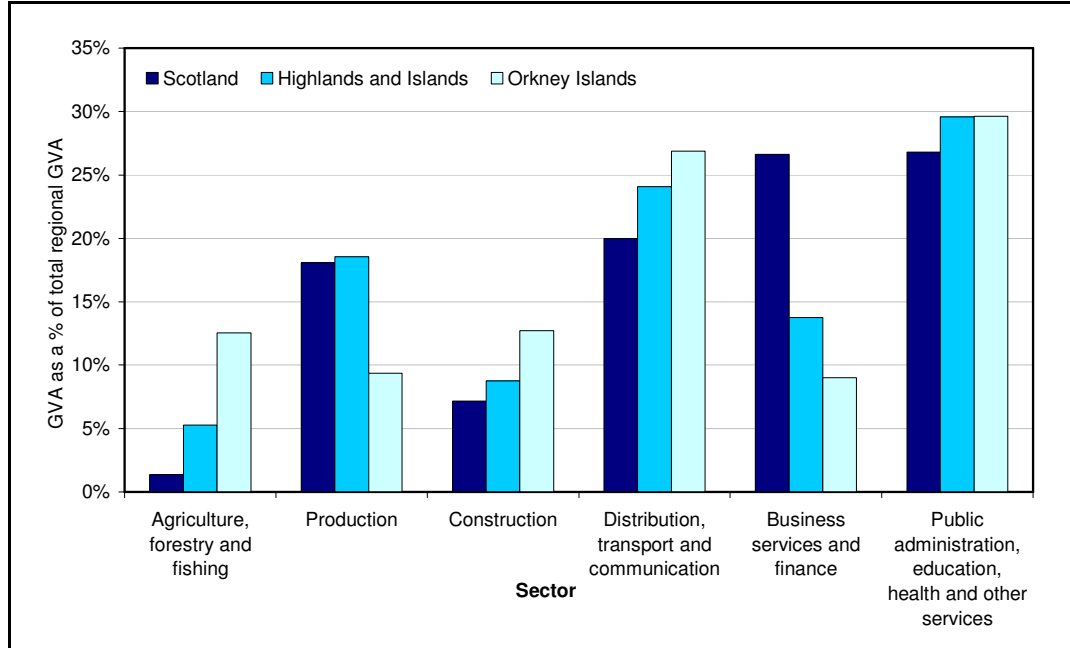
Table 3-3 GVA and GVA per head by region, 2006

	Orkney	Highlands & Islands	Scotland
GVA	£289m	£6,174m	£93,361m
GVA per head	£14,640	£13,996	£18,246

Source: <http://www.statistics.gov.uk/pdfdir/gva1208.pdf>

- 3.14 There are important differences in the make up of these GVA figures between the three regions. The public sector generates almost a third of the total GVA for Orkney and the rest of the Highlands & Islands (30%) and slightly less for Scotland as a whole (27%). For Orkney, the next largest contributors are distribution, transport and communication (27%), agriculture, forestry and fishing (13%) and construction (13%). In contrast, Scotland as a whole relies much more on business services and finance (27%) and production (18%) as wealth generators.

Figure 3-4 Sectoral GVA as a percentage of total GVA, 2006



Source: ONS

4: Sectoral Analysis

- 4.1 Section 4 presents a more detailed analysis of some of the economic variables discussed in Section 3. The objectives are two fold; to identify the sectors on which Orkney currently relies for jobs and growth and secondly to identify whether there is the local capability to supply the Aquamarine Power project.

Orkney's current strengths

- 4.2 Table 4-1 below displays employment by broad sector for Orkney, Highlands & Islands and Scotland. Compared with the rest of Scotland, Orkney is over-represented in a number of sectors including fishing, construction, transport, hotels and restaurants, storage and communication and public administration, education and health. Orkney is under-represented in manufacturing, finance and business activities compared with Scotland and broadly similar to the national share in the other sectors.

Table 4-1 Sectoral composition of employment, 2007

Sector	Orkney	Highlands & Islands	Scotland
Agriculture, hunting and forestry	0.4%	0.7%	1.4%
Fishing	2.2%	1.6%	0.2%
Mining and quarrying	0.2%	0.6%	1.1%
Manufacturing	5.8%	8.2%	9.2%
Electricity, gas and water supply	0.3%	0.5%	0.7%
Construction	9.8%	6.9%	5.7%
Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods	15.3%	14.3%	14.7%
Hotels and restaurants	9.2%	11.0%	7.2%
Transport, storage and communication	10.0%	6.2%	5.4%
Financial intermediation	1.2%	1.1%	3.8%
Real estate, renting and business activities	6.0%	9.9%	14.9%
Public administration and defence; compulsory social security	9.5%	8.6%	6.9%
Education	9.1%	8.1%	8.0%
Health and social work	17.1%	17.3%	15.5%
Other community, social and personal service activities	3.8%	5.0%	5.3%
Total	100.0%	100.0%	100.0%

Source: ABI

- 4.3 A similar analysis of Orkney's workplaces shows that Orkney is over-represented in fishing, manufacturing, electricity, gas and water supply, construction, transport, storage and communication and public administration.

Table 4-2 Sectoral composition of workplaces*, 2007

Sector	Orkney	Highlands & Islands	Scotland
Agriculture, hunting and forestry	1.1%	2.1%	0.9%
Fishing	9.4%	5.7%	1.1%
Mining and quarrying	0.4%	0.4%	0.3%
Manufacturing	6.2%	5.9%	5.7%
Electricity, gas and water supply	1.2%	0.5%	0.2%
Construction	11.4%	10.7%	9.1%
Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods	21.3%	20.0%	22.0%
Hotels and restaurants	6.8%	10.4%	8.6%
Transport, storage and communication	8.7%	6.1%	4.5%
Financial intermediation	1.7%	1.3%	2.2%
Real estate, renting and business activities	11.6%	15.4%	24.8%
Public administration and defence; compulsory social security	3.6%	3.7%	2.2%
Education	3.4%	4.0%	3.2%
Health and social work	6.5%	6.5%	6.7%
Other community, social and personal service activities	6.8%	7.4%	8.6%
Total	100.0%	100.0%	100.0%

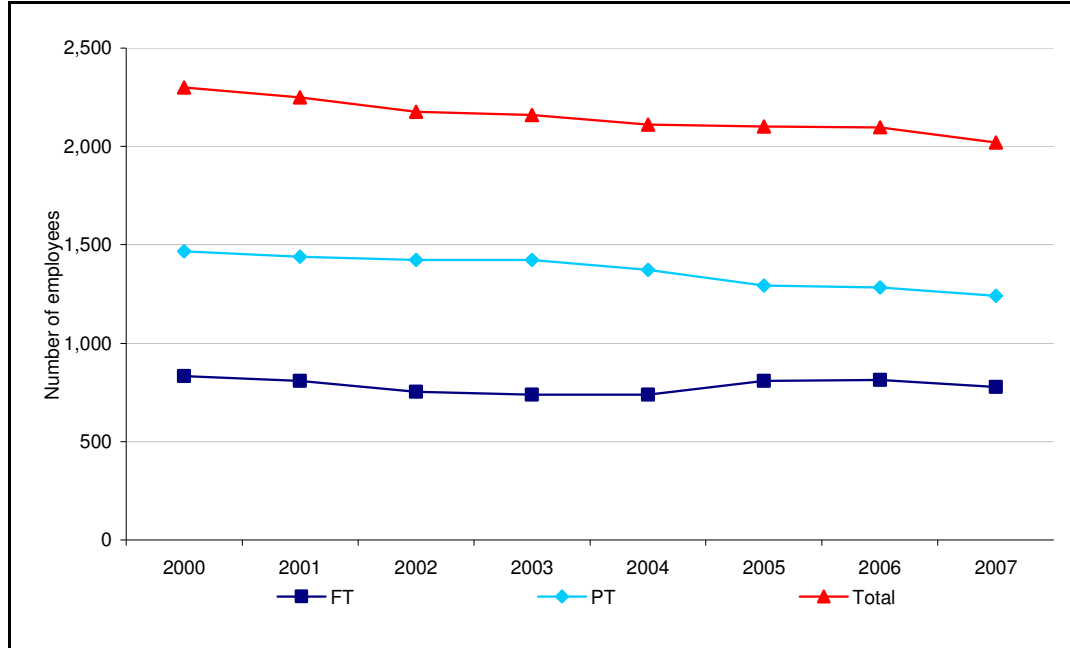
*Source: ABI. *'Workplace' units are used by the ABI as a proxy for businesses. There may be some discrepancy between workplace units and registered businesses. For example, a business may have several offices within an area and each of these would be counted as a separate unit.*

- 4.4 From the analyses of the current sectors in terms of workplaces and employees, a number of industries emerge as being relatively more important to Orkney than the rest of Scotland.

Agriculture

- 4.5 According to Scottish Government's Agricultural Census figures, employment in agriculture plays a more important role in Orkney's employment figures than shown by the Annual Business Statistics. According to the Agricultural Census 2007, just over 2,000 people are employed in agriculture on the islands. However, more than half of these jobs are part-time. Between 2000 and 2007, agricultural employment fell by almost seven percent. Excluding farm occupiers and their spouses, the fall is even more dramatic with a fourteen percent fall in the number of regular and casual staff in the same period. This suggests that workers will find it increasingly difficult to find employment in the agricultural sector in Orkney.

Figure 4-1 Agricultural employment in Orkney, 2000 to 2007

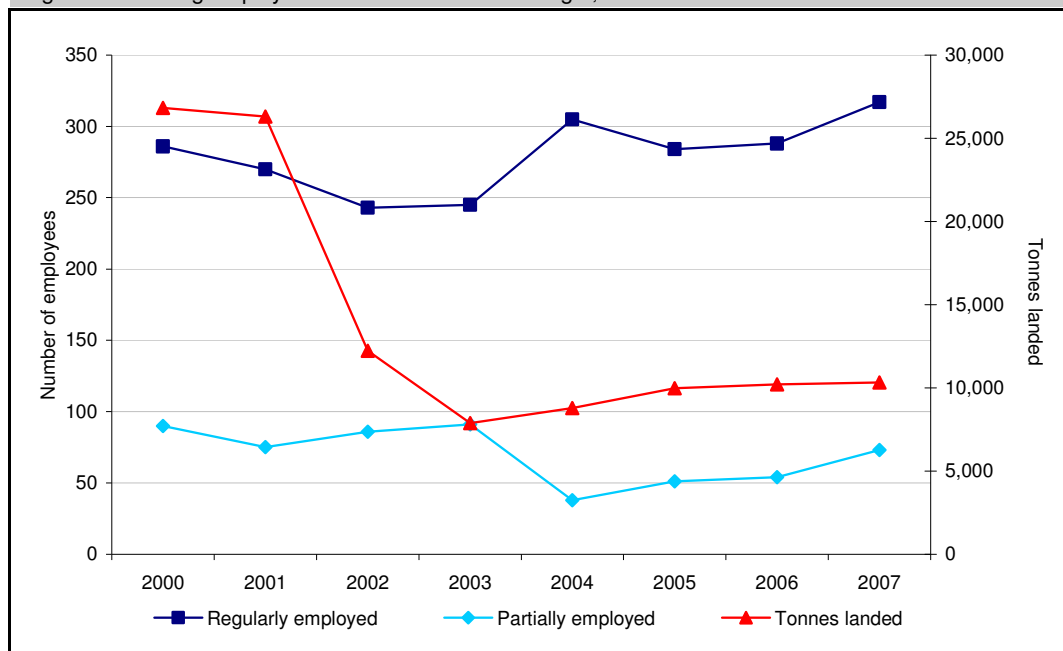


Source: Scottish Government Agricultural Census

Fishing

- 4.6 The total amount of fish that are caught by Orkney fisherman has fallen dramatically since the early 2000s when over 25,000 tonnes were caught each year. This fell between 2001 and 2003 by more than half and has stabilised at around 10,000 tonnes per year.
- 4.7 Regular employment in the fishing industry has actually increased over the period 2000 to 2007 despite the falling catches. There was a large shift in 2003 of partially employed workers becoming full-time and 2007 has seen a further increase in employment in the fishing industry.

Figure 4-2 Fishing employment and tonnes of fish caught, 2000 to 2007



Source: Scottish Sea Fishing Statistics 2007, <http://www.scotland.gov.uk/Publications/2007/09/12153002/0>

- 4.8 As well as sea fishing, fish farming is a significant contributor to Orkney's fishing industry. However, according to the Scottish Fish Farms Annual Production Surveys², the number of full-time employees fell to a low of 43 workers in 2007 compared to 73 a year previous and 128 in 2003. The Orkney Economic Review 2008³ confirms that there have been signs of decline in this element of the industry.

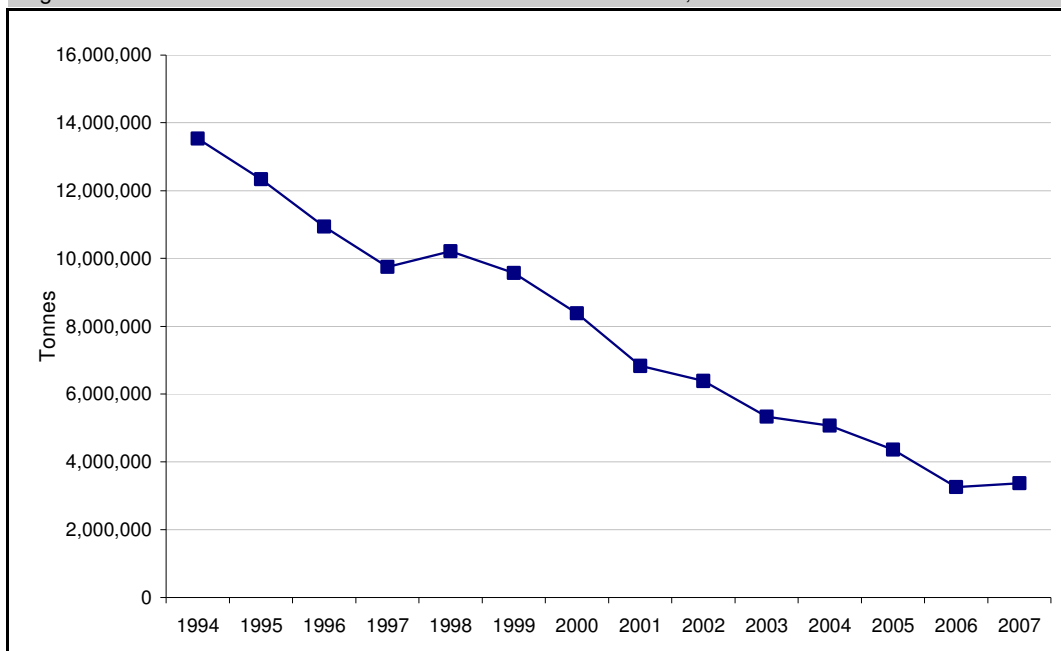
Energy

- 4.9 There has been a dramatic fall in the amount of crude oil being shipped through the Flotta terminal from North Sea oil fields in the last decade, falling from a peak of over ten million tonnes in 1998 to less than three and a half million tonnes in 2006 and 2007. Overall energy production continues to decline with the loss of oil shipments from the Foinaven oilfield in 2007 and rapidly declining shipments of propane and ethane gas through Flotta putting further pressure on this part of the energy production sector in Orkney.

²http://www.marlab.ac.uk/Delivery/Information_resources/information_resources_view_documents.aspx?resourceId=23693

³http://www.orkney.gov.uk/media/v3/service/Business%20and%20trade/Economic_Review_2008.pdf

Figure 4-3 Tonnes of Crude Oil loaded from the Flotta Oil Terminal, 1994 to 2007



Source: Orkney Islands Council, 2008

- 4.10 Orkney's current strengths lie in industries which face challenging futures; there is clear evidence that the number of people being employed as workers in the agricultural industry is falling and between 2000 and 2007 the amount of fish being landed in Orkney fell by more than half. The oil industry has seen a similar reduction in activity during this time.

The marine energy supply chain

- 4.11 We have reviewed the Marine Energy Supply Chain identified by Scottish Enterprise (2007)⁴ and used a subset of the supply chain to better reflect the industries that are likely to be needed as suppliers for Aquamarine's Oyster project. The main elements of the likely supply chain have been broken down to a four digit Standard Industrial Classification (SIC) so that it is possible to identify the number of local and national businesses that are potentially able to supply the necessary goods and services to Aquamarine. The complete supply chain can be seen at Table A-1.

Employment

- 4.12 Of key importance to this study is the level of employment involved in the marine energy supply chain. Table 4-3 shows employment in the marine energy supply chain for Scotland, the Highlands & Islands and Orkney. Of the 8,400 employees in Orkney, approximately 13% are employed by businesses which are potentially part of the marine energy supply chain, a higher proportion than the rest of the Highlands & Islands and slightly higher compared to Scotland as a whole.

⁴ Scottish Enterprise (2007) Energy Industry Market Forecasts Renewable Energy 2007 - 2012

Table 4-3 Employment in the marine energy supply chain⁵

	Number in employment	Number employed in marine energy supply chain	Percentage of total number in employment who work in marine energy supply chain
Orkney	8,400	1,118	13.3%
Highlands & Islands	175,275	16,662	9.5%
Scotland	2,407,657	305,890	12.7%

Source: ONS

4.13 A complete breakdown of employment by each industry within the marine energy supply chain can be seen in Table A-2. Comparing employment in Orkney to this supply chain shows that Orkney has relative strengths in some areas of the marine energy supply chain compared to the rest of Scotland, including:

- General construction of buildings and civil engineering works
- Sea and coastal water transport
- Research and experimental development on natural sciences and engineering
- Renting of water transport equipment

4.14 Areas in which Orkney has a high level of employment but no relative advantage over the rest of Scotland include:

- General mechanical engineering
- Technical testing and analysis
- Architectural and engineering activities and related technical consulting
- Legal activities
- Accounting, book-keeping and auditing activities; tax consultancy

4.15 For Scotland, there are particular strengths within business services such as finance and insurance and IT.

Business Base

4.16 For this study it is necessary to investigate the number of businesses in each area that would potentially be involved in the marine energy supply chain, as these are the businesses that would be directly involved with Aquamarine's new developments. Table 4-4 shows the number of business workplaces in the marine energy supply chain per 10,000 of population. This indicates that Orkney has more workplaces that are involved in marine energy per head of population than the Highlands & Islands or Scotland.

⁵ Does NOT include self employed

Table 4-4 Number of workplaces* in the marine energy supply chain per 10,000 population, 2007

	Number of business workplaces	Population	No of workplaces per 10,000 population
Orkney	140	19,900	70
Highlands & Islands	2,274	431,910	53
Scotland	27,153	5,144,200	53

*Source: ABI *'Workplace' units are used by the ABI as a proxy for businesses. There may be some discrepancy between workplace units and registered businesses. For example, a business may have several offices within an area and each of these would be counted as a separate unit.*

4.17 As with employment in the marine energy supply chain, we have identified the number of businesses in each industry along the marine energy supply chain. This analysis again highlights that Orkney has relative strengths in particular areas including:

- General mechanical engineering
- Manufacturing of engines and turbines, except aircraft, vehicles and cycle engines
- Manufacturing of other electrical equipment not elsewhere classified
- Production of electricity
- Sea and coastal water transport
- Building and repairing of ships
- General construction of buildings and civil engineering works
- Manufacture of instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process control equipment

4.18 The existence of a much higher proportion of marine energy related workplaces per 10,000 population in Orkney suggests that local businesses will be well placed to win work from Aquamarine.

Summary

4.19 Orkney's current strengths lie in industries which face challenging futures; there is clear evidence that the number of people being employed as workers in the agricultural industry is falling and throughout the last decade the fishing and oil industries have seen large scale reductions in activity.

4.20 By investigating Orkney's relative strength in industries which are in the marine energy supply chain, it is clear that Orkney businesses may be well placed to undertake work for Aquamarine job in the future. While this may be not be true of some of the large scale contracts which are likely to arise at the beginning and end of the Oyster project, there is real scope for the Orkney economy to benefit during the operation and maintenance stage where local companies involved in the marine supply chain are likely to be able to win significant amount of work. This is important given the (continuing) decline in opportunities in traditional industries.

5: Economic impact of Aquamarine

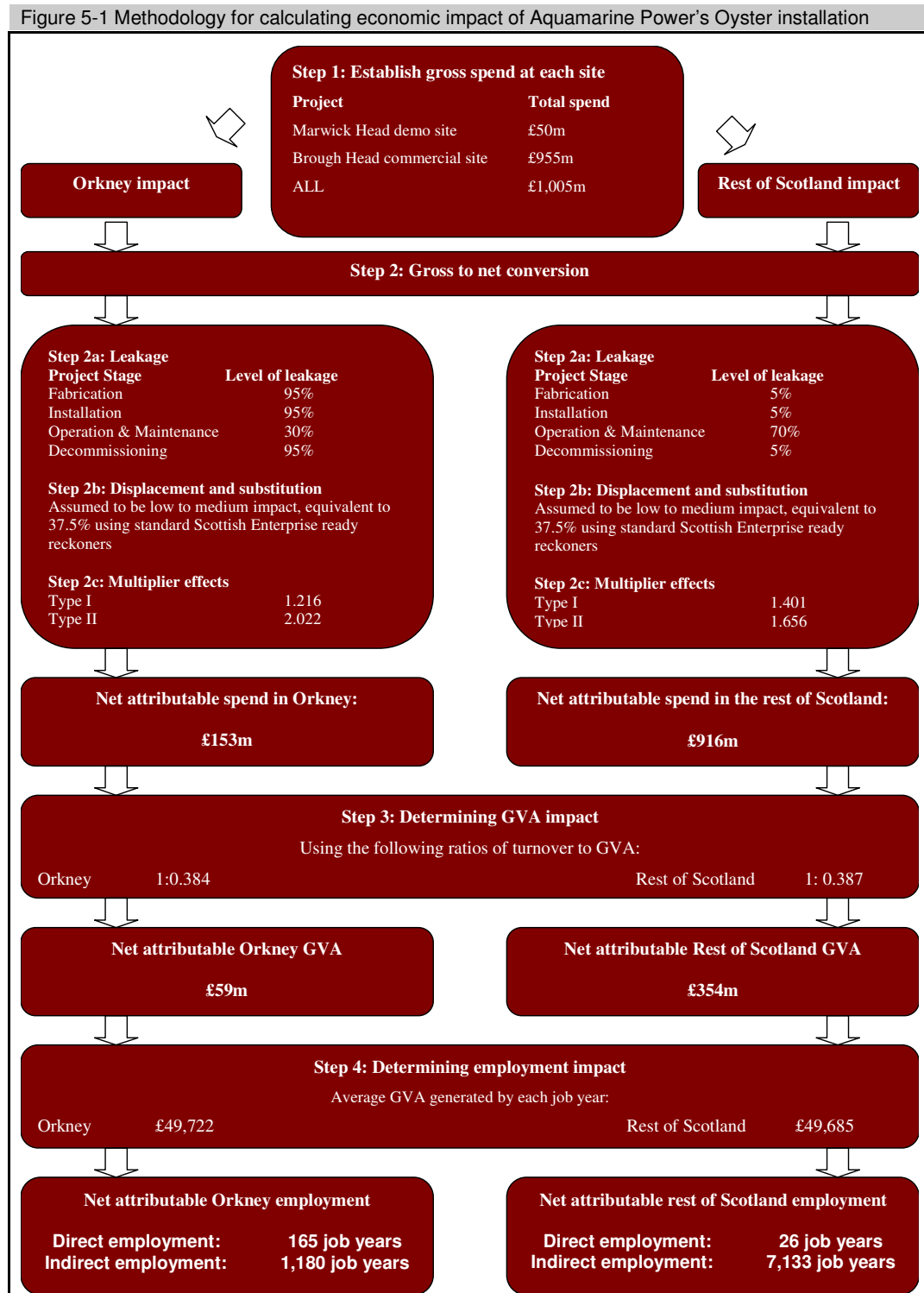
- 5.1 This section outlines our estimate of the economic impact of Aquamarine's installation of the Oyster marine renewable device for Orkney and Scotland as a whole.

Methodology

- 5.2 Our assessment of the economic impact has identified the main components through which the economic contribution of the project is made:

- Direct effects – the likely direct employment (the number of people employed in Orkney and Scotland by Aquamarine to work on this project in Orkney and the rest of Scotland) and Aquamarine's spend on goods and services in Orkney and the rest of Scotland. At this stage, consideration must be made of the impact that deadweight, leakage and displacement will have on the extent to which Aquamarine's activities generate genuinely additional economic impact:
 - deadweight – what would have happened without Aquamarine's activity?
 - leakage – to what extent is Aquamarine's spend used to purchase local inputs? i.e. what proportion of the money spent by Aquamarine will stay in the region (Orkney and Scotland)?
 - displacement – is the increased demand for goods and services going to lead to suppliers taking market share or factors of production from elsewhere in the economy?
- Indirect effects – further employment and spend will be generated by the project because of the “knock-on” impacts or multiplier effects. There are two elements to these multiplier effects:
 - Type I multiplier – is a measure of the indirect effects of the project by estimating the impact on Aquamarine's new suppliers. It reflects the increase in output of other companies in Aquamarine's supply chain
 - Type II multiplier – this includes the direct, indirect and induced effects of the Aquamarine project. Induced effects consider the impacts of increased local spending of wages and salaries paid by Aquamarine and its suppliers on the economy.
- Once the net direct spend has been calculated, this is converted to gross value added to identify the additional economic activity that the Aquamarine project generates for Orkney and Scotland
- Finally, we estimate the net additional job years that the Aquamarine project generates for Orkney and Scotland. This has also been calculated as full time equivalent jobs.

5.3 This methodology is set out in Figure 5-1.



Source: SQW Consulting

Gross spend

- 5.4 Aquamarine Power supplied estimated spend figures for the development of a 100MW wave power farm. We have converted these values to reflect the size of the two proposed sites; Marwick Head demonstration site (10MW) and the Brough Head (190MW) commercial site.

Table 5-1 Estimated total gross spend at each site (£m)					
Project	Fabrication	Installation	Operation & Maintenance	Decommissioning	Total
Marwick Head demonstration site	10.2	19.8	5.4	14.9	50.3
Brough head commercial site	193.8	376.2	103.2	282.2	955.3

Source: Aquamarine Power

- 5.5 Given that the estimated spend figures depend solely on Aquamarine installing the Oyster in the Pentland Firth, we have assumed that there is zero deadweight. In other words, the money that Aquamarine spends on inputs from businesses based in Orkney and Scotland is additional sales that these suppliers would not have received if the Aquamarine project did not go ahead. Therefore there is no deadweight associated with this increase in turnover.

- 5.6 However, this figure needs to be adjusted to take account of a number of factors including leakage, displacement, substitution and multiplier effects.

Leakage

- 5.7 Leakage is defined as the proportion of output that benefits those outside of the intervention target. At an Orkney level, the scale of leakage is significant. This is because only a small proportion of the overall Aquamarine spend will be spent on goods and services sourced from businesses based in Orkney. However, for the operation and maintenance stage a much higher proportion of the benefits will accrue to local businesses and the leakage for this stage is much lower.
- 5.8 For the rest of Scotland (excluding Orkney), leakage is taken as five percent for each project with the exception of operation and maintenance which is taken as 70%. For the O&M stage, Aquamarine has stated that they intend to source all of their inputs from within Scotland. This means that together Orkney and the rest of Scotland can expect the entire spend, with no leakage outwith Scotland.

Table 5 -2 Estimated leakage of Aquamarine spend			
Project stage	Orkney	Scotland (excluding Orkney)	
Fabrication		95%	5%
Installation		95%	5%
Operation & Maintenance		30%	70%
Decommissioning		95%	5%

Source: SQW Consulting

Displacement and substitution

- 5.9 Displacement arises whenever a new source of economic activity results in reduced activity elsewhere in the target area. The electricity generated by Aquamarine's Oyster devices is unlikely to lead to a reduction in electricity output of other electricity suppliers so we have assumed that there is zero product market displacement.
- 5.10 However, there is a risk that factor market (labour and capital) displacement will be quite high at a local level. This is because Orkney only has a limited number of businesses and workers that are likely to be able to supply the goods and services needed by Aquamarine. These businesses have limited capability in terms of the amount of work that they can take on, particularly due to the very tight labour market in the Orkney economy. Therefore, in order to take on contracts from Aquamarine Power, these companies may have to bring in new employees who were previously working for other existing local firms (displacement) or reduce the amount of work that they currently undertake for other clients (substitution).
- 5.11 However, displacement and substitution effects are likely to be somewhat lower for a number of reasons. Figure 3-1 showed that unemployment is increasing in Scotland and Orkney. The recession will lower the displacement effects in two ways; the risk of labour market displacement will fall in line with increasing unemployment as spare capacity in the labour market increases. Secondly, the falling demand for suppliers output means that the significant injection of demand that the Aquamarine proposal represents will help to safeguard the jobs of current workers.
- 5.12 Substitution will also be reasonably low because companies will face falling demand as the recession continues over the next two to three years. This will increase the level of spare capacity that firms have. Secondly, firms are able to improve their productivity or increase capacity through simple changes such as extending working hours or introducing overtime to take advantage of increased demand without dropping existing work. Lastly, given the specialist nature of the suppliers that are needed for the project, it is likely that some new firms may be created solely to take advantage of the Aquamarine proposal. This is particularly likely in the fabrication stages.
- 5.13 For these reasons, we have estimated that displacement and substitution would be low to medium. Based on the Scottish Enterprise (2008) *Additionality and Economic Impact Assessment Guidance Note* ready reckoners, this equates to an estimated combined displacement and substitution effect of 37.5%

Multiplier impacts

- 5.14 As well as the direct impacts of any intervention, it is important to take into account the impact this extra spend will have on other local businesses. These impacts are accounted for using economic multiplier effects.
- 5.15 A Type I (or supplier) multiplier is a measure of the indirect effects of the project by estimating the impact on Aquamarine's new suppliers. It reflects the increase in output of other companies in Aquamarine's supply chain as a result of Aquamarine's increased activity. The Type II multiplier includes the direct, indirect and induced effects of the Aquamarine

project. Induced effects consider the impacts of increased local spending of wages and salaries paid by Aquamarine and its suppliers on the economy.

- 5.16 The value of the Type I (or supplier) multiplier will depend on the volume of inputs of goods and services that are purchased and also the location of the suppliers providing Aquamarine with these goods and services. As the geographical area of interest increases, so does the indirect multiplier. This is because a business located in one area, for example Orkney, is unlikely to be able to source all of its inputs from Orkney itself. However, if the geographical area is taken to be Scotland, the same company will be likely to source a higher proportion of its inputs from within Scotland and so the Type I multiplier is larger.
- 5.17 The Type II multiplier includes the direct and supplier effects as well as an income multiplier. The income multiplier is used to reflect the additional local expenditure of those people who have seen their own wages or salary increase as a result of the direct and supplier effects of the Aquamarine Power project.
- 5.18 The multiplier values for Orkney have been taken from a Fraser of Allander (1998) input-output model of the Orkney economy while the Scottish values have been derived from the national input-output tables and are shown in Table 5-3.

Table 5-3 Output multiplier values for Orkney and Scotland			
Multiplier type	Orkney	Scotland	
Type I		1.216	1.401
Type II		2.022	1.656

Source: Fraser of Allander Institute, 1998, Input-output table and model for the Orkney Islands and Scottish Government

Net Aquamarine Spend

- 5.19 Once all of the gross to net calculations have been considered, we are able to provide an estimated net spend to the Orkney and Scotland economies.

Table 5-4 Net Aquamarine spend estimates (£m)			
Project	Orkney	Rest of Scotland (excluding Orkney)	All of Scotland (including Orkney)
Marwick Head demonstration site		7.6	45.8
Brough Head commercial site		145.1	869.9
Total		152.7	915.7

Source: SQW Consulting

GVA impact

- 5.20 Gross Value Added is used as an indicator of the economic activity that a region, business or project generates. For Aquamarine's Oyster project, it is important to estimate the level of wealth creation that such a project may generate for Orkney and Scotland as a whole. At a project level, GVA is the value of the company's sales less the cost of purchasing the necessary inputs to generate those sales; it identifies what Aquamarine 'adds' to the raw materials that it purchases from suppliers.

- 5.21 Without details of the estimated turnover that the project is likely to generate, we have estimated the additional GVA that the Oyster project may generate by applying a ratio of turnover to GVA⁶ of 1:0.387 for Scotland and 1:0.384 for Orkney.
- 5.22 The net Aquamarine spend estimates calculated above are equivalent to net supplier turnover. By applying these ratios to this turnover, we are able to estimate the GVA generated by the additional spend. The final adjustment is to discount these GVA values at a discount rate of 3.5%⁷. This means that the GVA generated in the early years of the project is valued more highly than GVA generated a long time in the future. The estimated net direct GVA generated by the Aquamarine activity is shown below.

Table 5-5 Estimated GVA (£m, 2009 prices)			
Stage	Orkney	Rest of Scotland (excluding Orkney)	All of Scotland (including Orkney)
Fabrication	4.2	65.6	69.8
Installation	8.0	125.1	133.1
Operation & Maintenance	22.9	8.1	31
Decommissioning	3.2	50.5	53.7
Total	38.3	249.3	287.6

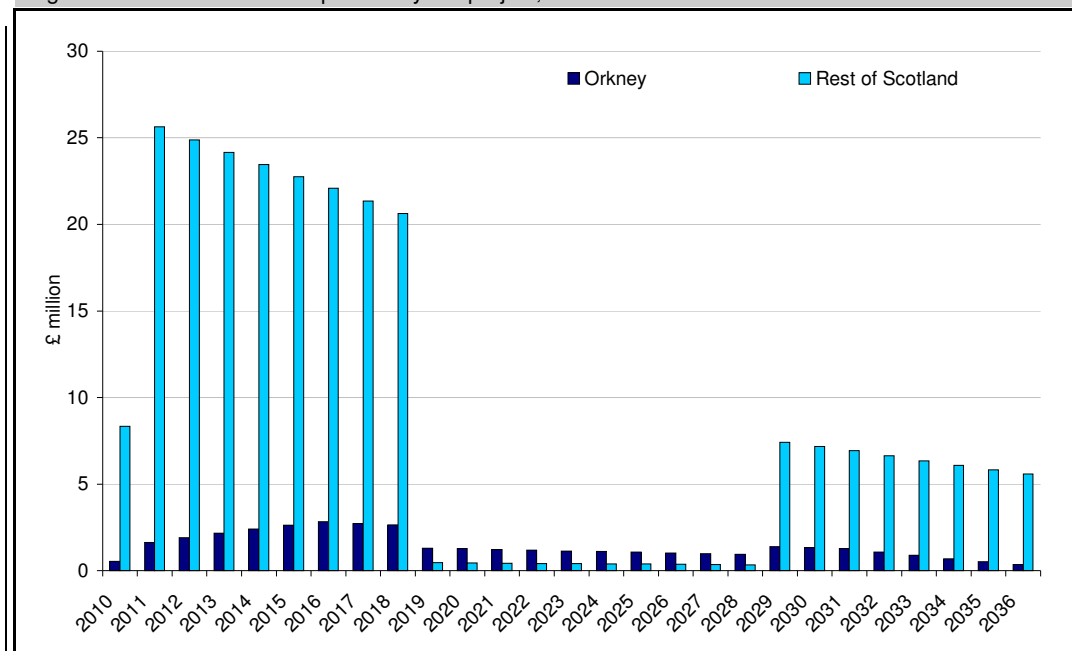
Source: SQW Consulting

- 5.23 Using the timescale of the project as outlined in Table 2-2, the estimated GVA impact can be broken down to show the economic impact across the lifetime of the project. For Orkney, the level of additional GVA that the projects generate for the economy annually is evenly spread out across the lifetime of the projects. This is because of the relatively low level of involvement with the fabrication, installation and decommissioning stages and the relatively higher level of involvement in the operation and maintenance phase. The economic impact is however likely to be greater for Orkney in the early years, particularly during the installation process, with more than £4 million of additional economic activity being generated during this time. In the operation and maintenance stage almost £1 million of GVA is created each year.
- 5.24 For the rest of Scotland, there are very large bursts of economic activity during the early stages as the Oyster devices are built in Scotland and then transported and installed in Orkney. The fabrication of the units is estimated to generate over £65 million of additional economic activity in the six years that Aquamarine expects this stage to last. The total GVA created by the installation stage for the rest of Scotland totals £125 million. The value of the operation and maintenance stage is much lower, at around £0.3 million a year over the lifetime of the devices.

⁶ Ratio of turnover to GVA identified from the Scottish Annual Business Statistics 2006

⁷ In line with HM Treasury Green Book standards

Figure 5-2 Estimated GVA impact of Oyster project, 2010 to 2036



Source: SQW Consulting

Employment impact

Direct employment

5.25 Aquamarine Power estimates that they are likely to employ 14 new staff as a result of the new project, with nine based in Orkney and a further five in the rest of Scotland. These are jobs that would not have been created without the Oyster project.

Table 5-6 Direct employment expected from new installation (number of new employees)

Project stage	Orkney	Scotland (excl. Orkney)
Fabrication	-	1
Installation	2	3
Operation & Maintenance	6	-
Decommissioning	1	1
Total	9	5

Source: Aquamarine Power

5.26 Given the varying timescale of the different elements of the project, it is unlikely that all direct employment will last for the same period of time. We have estimated the lifetime of each job using the timeline in Table 2-2. For example, since the fabrication stage is expected to last six years, we have assumed that the one direct job generated at this stage in the rest of Scotland will last for six years (or six job years).

Table 5-7 Calculating the direct employment expected from new installation (number of new job years)

Project stage	Estimated lifetime of each job	Orkney job years	Scotland (excl. Orkney) job years
Fabrication	6	-	6
Installation	5	10	15
Operation & Maintenance	25	150	-
Decommissioning	5	5	5
Total	n/a	165	26

Source: SQW Consulting

Indirect employment

- 5.27 Aquamarine Power's activities in Orkney and Scotland will generate additional indirect employment. Given that there are very low direct jobs attributable to the project but very high levels of investment, we believe that simply using employment multipliers would result in an artificially low estimate of the number of indirect jobs being created. Therefore we have based the level of indirect employment on the GVA impacts discussed above.
- 5.28 According to the Scottish Government's Annual Business Statistics 2006, the average GVA per job year⁸ in Orkney was £49,722 and the average Scottish GVA per job year was £49,685⁹. Therefore we can determine the amount of additional employment that suppliers are likely to need by dividing the total GVA that the project is estimated to generate by the appropriate GVA per job figure. In total, it is estimated that the Oyster development could indirectly generate around 1,200 job years for Orkney and more than 7,000 job years for the rest of Scotland. The number of job years estimated to be generated by each stage is as follows:

Table 5-8 Estimated indirect job years

Stage	Orkney	Rest of Scotland (excluding Orkney)	All of Scotland (including Orkney)
Fabrication	100	1,562	1,662
Installation	193	3,033	3,226
Operation & Maintenance	742	263	1,005
Decommissioning	145	2,275	2,420
Total	1,180	7,132	8,312

Source: SQW Consulting

- 5.29 Given the estimated 27 years that the project will run for from initial fabrication to final decommissioning, it is estimated that an average of 308 jobs will be generated each year in Scotland as a whole, with 44 in Orkney and 264 in the rest of Scotland.
- 5.30 However, it is important to recognise that these job years are not going to be spread across the full time period of the Oyster project. There are large bursts of employment in the rest of Scotland at the fabrication and installation stages, with more than 800 jobs being generated

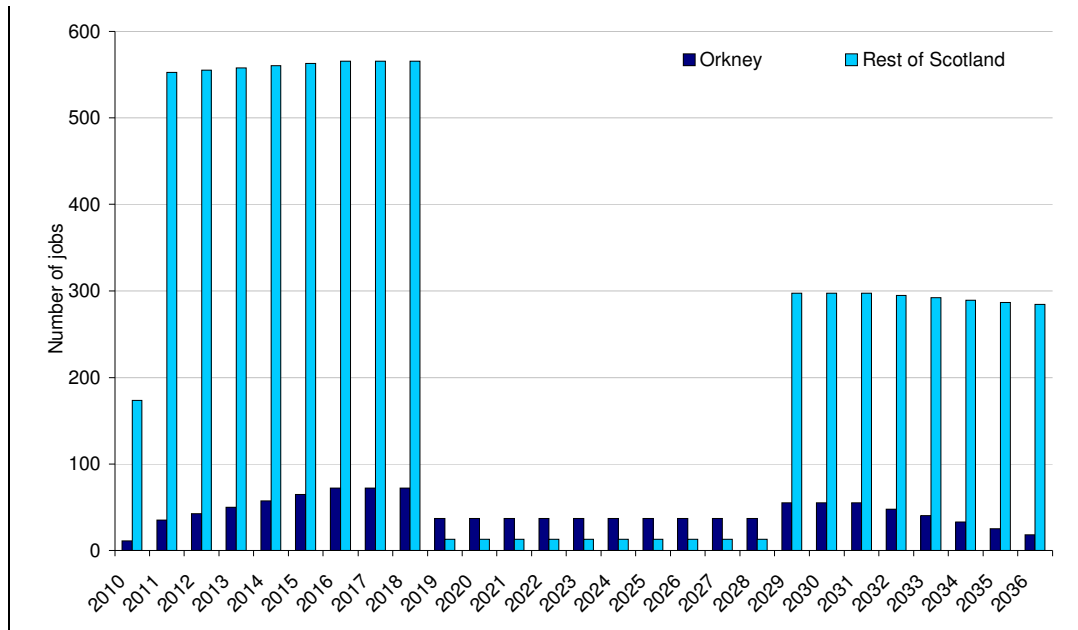
⁸ Taken as the average annual GVA generated per job of manufacturing, construction and services

⁹ These figures have been updated to 2009 prices using the latest HM Treasury GDP deflator values
http://www.hm-treasury.gov.uk/d/gdp_deflators.xls

across the six years of fabrication and installation. There is also a large spike of employment during the decommissioning stage. Although these stages of the project will generate a large amount of employment, it is only likely to be for a small period of time.

- 5.31 For Orkney, there is also a spike of employment at the early and final stages but the most significant source of employment comes from the operation and maintenance stage of the project. With a total of 742 jobs years spread over a twenty four year period, this means that there will be around 31 additional jobs created each year. This is an important source of sustainable employment.

Figure 5-3 Estimated indirect employment impact of Oyster project, 2010 to 2036



Source: SQW Consulting

Total net employment

- 5.32 The total net additional job years created by the project are calculated by adding the direct, indirect and induced jobs together. The results are as follows:

Table 5-9 Total additional job years created by the project, Orkney and Scotland

	Orkney	Rest of Scotland (excluding Orkney)	All of Scotland (including Orkney)
Direct job years	165	26	191
Indirect and induced job years	1,180	7,132	8,312
Total job years	1,345	7,158	8,503

Source: SQW Consulting

6: Conclusion

- 6.1 This final section brings together the estimated economic impact of Aquamarine's proposed installations at Marwick Head and Brough Head and sets out the economic benefits that the project is estimated to generate.
- 6.2 The results are intended only to be indicative of the scale of impact that is likely to be generated based on the expenditure figures supplied by Aquamarine Power. The economic impact summary table below takes into account estimated displacement and multiplier effects associated with the project. The table includes the impact of the 10 MW wave power demonstration array at Marwick Head and the 190 MW commercial wave power farm at Brough Head.

Table 6-1 Estimated economic impact summary table

Geography	Additional GVA (£m)	Direct employment (job years)	Indirect employment (job years)	Total employment (job years)
Orkney	38.3	165	1,180	1,345
Rest of Scotland	249.3	26	7,132	7,158
Scotland (incl. Orkney)	287.6	191	8,312	8,503

Source: SQW Consulting

Annex A: The Marine Energy Supply Chain

Table A-1 Marine energy supply chain

2 digit SIC	4 digit SIC
26: Manufacture of Other Non-metallic Mineral Products	2640 : Manufacture of bricks, tiles and construction products, in baked clay
	2651 : Manufacture of cement
	2652 : Manufacture of lime
	2653 : Manufacture of plaster
	27: Manufacture of Basic Metals
27: Manufacture of Basic Metals	2721 : Manufacture of cast iron tubes
	2722 : Manufacture of steel tubes
	2751 : Casting of iron
	2752 : Casting of steel
	2753 : Casting of light metals
	2754 : Casting of other non-ferrous metals
	28: Manufacture of Fabricated Metal Products, Except Machinery and Equipment
28: Manufacture of Fabricated Metal Products, Except Machinery and Equipment	2811 : Manufacture of metal structures and parts of structures
	2821 : Manufacture of tanks, reservoirs and containers of metal
	2840 : Forging, pressing, stamping and roll forming of metal; powder metallurgy
	2851 : Treatment and coating of metals
	2852 : General mechanical engineering
	2871 : Manufacture of steel drums and similar containers
	2872 : Manufacture of light metal packaging
	2873 : Manufacture of wire products
	2874 : Manufacture of fasteners, screw machine products, chains and springs
	29: Manufacture of Machinery and Equipment Not Elsewhere Classified
29: Manufacture of Machinery and Equipment Not Elsewhere Classified	2911 : Manufacture of engines and turbines, except aircraft, vehicle and cycle engines
	2912 : Manufacture of pumps and compressors
	2913 : Manufacture of taps and valves
	2914 : Manufacture of bearings, gears, gearing and driving elements
	2922 : Manufacture of lifting and handling equipment
	2924 : Manufacture of other general purpose machinery not elsewhere classified
	2956 : Manufacture of other special purpose machinery not elsewhere classified

2 digit SIC	4 digit SIC
31: Manufacture of Electrical Machinery and Apparatus Not Elsewhere Classified	3110 : Manufacture of electric motors, generators and transformers 3120 : Manufacture of electricity distribution and control apparatus 3130 : Manufacture of insulated wire and cable 3140 : Manufacture of accumulators, primary cells and primary batteries 3161 : Manufacture of electrical equipment for engines and vehicles not elsewhere classified 3162 : Manufacture of other electrical equipment not elsewhere classified
33: Manufacture of Medical, Precision and Optical Instruments, Watches and Clocks	3320 : Manufacture of instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process control equipment
35: Manufacture of Other Transport Equipment	3511 : Building and repairing of ships
40: Electricity, Gas, Steam and Hot Water Supply	4011 : Production of electricity 4012 : Transmission of electricity 4013 : Distribution and trade in electricity
45: Construction	4511 : Demolition and wrecking of buildings; earth moving 4512 : Test drilling and boring 4521 : General construction of buildings and civil engineering works 4524 : Construction of water projects
61: Water Transport	6110 : Sea and coastal water transport
65: Financial Intermediation, Except Insurance and Pension Funding	6512 : Other monetary intermediation 6522 : Other credit granting 6523 : Other financial intermediation not elsewhere classified
66: Insurance and Pension Funding, Except Compulsory Social Security	6603 : Non-life insurance
67: Activities Auxiliary to Financial Intermediation	6712 : Security broking and fund management
71: Renting of Machinery and Equipment Without Operator and of Personal and Household Goods	7121 : Renting of other land transport equipment 7122 : Renting of water transport equipment
72: Computer and Related Activities	7210 : Hardware consultancy 7222 : Other software consultancy and supply 7260 : Other computer related activities
73: Research and Development	7310 : Research and experimental development on natural sciences and engineering

2 digit SIC	4 digit SIC
74: Other Business Activities	7411 : Legal activities
	7412 : Accounting, book-keeping and auditing activities; tax consultancy
	7420 : Architectural and engineering activities and related technical consultancy
	7430 : Technical testing and analysis

Table A-2 Employment in the marine energy supply chain per 10,000 population, 2007

SIC Code and Industry	Scotland	No. of employees per 10,000 population	H&I	No. of employees per 10,000 population	Orkney	No. of employees per 10,000 population
2640 : Manufacture of bricks, tiles and construction products, in baked clay	272	1	1	0	0	0
2651 : Manufacture of cement	177	0	0	0	0	0
2652 : Manufacture of lime	0	0	0	0	0	0
2653 : Manufacture of plaster	0	0	0	0	0	0
2721 : Manufacture of cast iron tubes	64	0	0	0	0	0
2722 : Manufacture of steel tubes	1,167	2	0	0	0	0
2751 : Casting of iron	105	0	0	0	0	0
2752 : Casting of steel	319	1	1	0	0	0
2753 : Casting of light metals	112	0	1	0	0	0
2754 : Casting of other non-ferrous metals	163	0	0	0	0	0
2811 : Manufacture of metal structures and parts of structures	6,750	13	391	9	0	0
2821 : Manufacture of tanks, reservoirs and containers of metal	785	2	181	4	0	0
2840 : Forging, pressing, stamping and roll forming of metal; powder metallurgy	1,673	3	3	0	0	0
2851 : Treatment and coating of metals	1,278	2	3	0	0	0
2852 : General mechanical engineering	6,487	13	354	8	20	10
2871 : Manufacture of steel drums and similar containers	50	0	0	0	0	0
2872 : Manufacture of light metal packaging	297	1	0	0	0	0
2873 : Manufacture of wire products	524	1	3	0	0	0
2874 : Manufacture of fasteners, screw machine products, chains and springs	404	1	0	0	0	0
2911 : Manufacture of engines and turbines, except aircraft, vehicle and	1,018	2	258	6	1	1

SIC Code and Industry	Scotland	No. of employees per 10,000 population	H&I	No. of employees per 10,000 population	Orkney	No. of employees per 10,000 population
cycle engines						
2912 : Manufacture of pumps and compressors	2,813	5	0	0	0	0
2913 : Manufacture of taps and valves	1,291	3	0	0	0	0
2914 : Manufacture of bearings, gears, gearing and driving elements	1,187	2	3	0	0	0
2922 : Manufacture of lifting and handling equipment	2,092	4	45	1	0	0
2924 : Manufacture of other general purpose machinery not elsewhere classified	1,939	4	178	4	0	0
2956 : Manufacture of other special purpose machinery not elsewhere classified	1,321	3	25	1	0	0
3110 : Manufacture of electric motors, generators and transformers	1,094	2	6	0	0	0
3120 : Manufacture of electricity distribution and control apparatus	2,133	4	12	0	0	0
3130 : Manufacture of insulated wire and cable	1,210	2	2	0	0	0
3140 : Manufacture of accumulators, primary cells and primary batteries	191	0	120	3	0	0
3161 : Manufacture of electrical equipment for engines and vehicles not elsewhere classified	29	0	0	0	0	0
3162 : Manufacture of other electrical equipment not elsewhere classified	889	2	59	1	2	1
3320 : Manufacture of instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process control equipment	5,888	11	63	1	5	3
3511 : Building and repairing of ships	5,754	11	189	4	8	4
4011 : Production of electricity	4,165	8	117	3	6	3
4012 : Transmission of electricity	2,486	5	5	0	0	0
4013 : Distribution and trade in electricity	4,530	9	314	7	0	0
4511 : Demolition and wrecking of buildings; earth moving	1,375	3	49	1	0	0
4512 : Test drilling and boring	313	1	4	0	0	0
4521 : General construction of buildings and civil engineering works	53,436	104	6,105	141	497	250
4524 : Construction of water projects	45	0	6	0	0	0

SIC Code and Industry	Scotland	No. of employees per 10,000 population	H&I	No. of employees per 10,000 population	Orkney	No. of employees per 10,000 population
6110 : Sea and coastal water transport	2,275	4	923	21	268	135
6512 : Other monetary intermediation	44,375	86	1,352	31	69	35
6522 : Other credit granting	5,178	10	36	1	0	0
6523 : Other financial intermediation not elsewhere classified	2,038	4	49	1	0	0
6603 : Non-life insurance	5,539	11	15	0	0	0
6712 : Security broking and fund management	3,738	7	39	1	1	1
7121 : Renting of other land transport equipment	1,089	2	35	1	0	0
7122 : Renting of water transport equipment	145	0	53	1	18	9
7210 : Hardware consultancy	1,451	3	17	0	0	0
7222 : Other software consultancy and supply	17,264	34	774	18	10	5
7260 : Other computer related activities	7,644	15	177	4	7	4
7310 : Research and experimental development on natural sciences and engineering	12,717	25	702	16	59	30
7411 : Legal activities	23,037	45	851	20	33	17
7412 : Accounting, book-keeping and auditing activities; tax consultancy	15,127	29	966	22	50	25
7420 : Architectural and engineering activities and related technical consultancy	44,851	87	1,969	46	55	28
7430 : Technical testing and analysis	3,596	7	206	5	9	5
TOTAL	305,890	595	16,662	386	1,118	562

Source: ABI

Table A-3 Number of workplaces in the marine energy supply chain per 10,000 population, 2007

SIC Code and Industry	Scotland	No. of workplaces per 10,000 population	H&I	No. of workplaces per 10,000 population	Orkney	No. of workplaces per 10,000 population
2640 : Manufacture of bricks, tiles and construction products, in baked clay	16	0	1	0	0	0
2651 : Manufacture of cement	2	0	0	0	0	0
2652 : Manufacture of lime	0	0	0	0	0	0
2653 : Manufacture of plaster	0	0	0	0	0	0

SIC Code and Industry	Scotland	No. of workplaces per 10,000 population	H&I	No. of workplaces per 10,000 population	Orkney	No. of workplaces per 10,000 population
2721 : Manufacture of cast iron tubes	2	0	0	0	0	0
2722 : Manufacture of steel tubes	24	0	0	0	0	0
2751 : Casting of iron	6	0	0	0	0	0
2752 : Casting of steel	12	0	1	0	0	0
2753 : Casting of light metals	7	0	1	0	0	0
2754 : Casting of other non-ferrous metals	7	0	0	0	0	0
2811 : Manufacture of metal structures and parts of structures	255	0	25	1	0	0
2821 : Manufacture of tanks, reservoirs and containers of metal	18	0	2	0	0	0
2840 : Forging, pressing, stamping and roll forming of metal; powder metallurgy	65	0	2	0	0	0
2851 : Treatment and coating of metals	82	0	2	0	0	0
2852 : General mechanical engineering	827	2	88	2	4	2
2871 : Manufacture of steel drums and similar containers	1	0	0	0	0	0
2872 : Manufacture of light metal packaging	4	0	0	0	0	0
2873 : Manufacture of wire products	23	0	1	0	0	0
2874 : Manufacture of fasteners, screw machine products, chains and springs	22	0	0	0	0	0
2911 : Manufacture of engines and turbines, except aircraft, vehicle and cycle engines	45	0	5	0	1	1
2912 : Manufacture of pumps and compressors	59	0	0	0	0	0
2913 : Manufacture of taps and valves	23	0	0	0	0	0
2914 : Manufacture of bearings, gears, gearing and driving elements	25	0	1	0	0	0
2922 : Manufacture of lifting and handling equipment	98	0	2	0	0	0
2924 : Manufacture of other general purpose machinery not elsewhere classified	125	0	10	0	0	0
2956 : Manufacture of other special purpose machinery not elsewhere classified	106	0	8	0	0	0
3110 : Manufacture of electric motors, generators and transformers	52	0	2	0	0	0

SIC Code and Industry	Scotland	No. of workplaces per 10,000 population	H&I	No. of workplaces per 10,000 population	Orkney	No. of workplaces per 10,000 population
3120 : Manufacture of electricity distribution and control apparatus	64	0	4	0	0	0
3130 : Manufacture of insulated wire and cable	26	0	1	0	0	0
3140 : Manufacture of accumulators, primary cells and primary batteries	10	0	2	0	0	0
3161 : Manufacture of electrical equipment for engines and vehicles not elsewhere classified	11	0	0	0	0	0
3162 : Manufacture of other electrical equipment not elsewhere classified	101	0	9	0	1	1
3320 : Manufacture of instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process control equipment	163	0	9	0	2	1
3511 : Building and repairing of ships	103	0	25	1	1	1
4011 : Production of electricity	78	0	25	1	5	3
4012 : Transmission of electricity	12	0	1	0	0	0
4013 : Distribution and trade in electricity	51	0	10	0	0	0
4511 : Demolition and wrecking of buildings; earth moving	140	0	13	0	0	0
4512 : Test drilling and boring	26	0	4	0	0	0
4521 : General construction of buildings and civil engineering works	4,197	8	661	15	51	26
4524 : Construction of water projects	23	0	3	0	0	0
6110 : Sea and coastal water transport	188	0	86	2	12	6
6512 : Other monetary intermediation	1,826	4	135	3	8	4
6522 : Other credit granting	273	1	10	0	0	0
6523 : Other financial intermediation not elsewhere classified	250	0	14	0	0	0
6603 : Non-life insurance	108	0	5	0	0	0
6712 : Security broking and fund management	232	0	14	0	1	1
7121 : Renting of other land transport equipment	110	0	10	0	0	0
7122 : Renting of water transport equipment	37	0	20	0	7	4
7210 : Hardware consultancy	342	1	13	0	0	0

SIC Code and Industry	Scotland	No. of workplaces per 10,000 population	H&I	No. of workplaces per 10,000 population	Orkney	No. of workplaces per 10,000 population
7222 : Other software consultancy and supply	3,926	8	183	4	5	3
7260 : Other computer related activities	1,258	2	77	2	5	3
7310 : Research and experimental development on natural sciences and engineering	336	1	32	1	4	2
7411 : Legal activities	2,253	4	107	2	5	3
7412 : Accounting, book-keeping and auditing activities; tax consultancy	1,920	4	153	4	9	5
7420 : Architectural and engineering activities and related technical consultancy	6,805	13	459	11	18	9
7430 : Technical testing and analysis	378	1	38	1	1	1
TOTAL	27,153	53	2,274	53	140	70

Source: ABI