



Analysis of the Scottish Company Base and Market Opportunities: Low Carbon Heating & Cooling and Water Supply & Wastewater Sectors

A Final Report



*Creating a Competitive Edge for
People, Places & Organisations*

Contents

Section	Subject	Page No
	Executive Summary	i
I	Introduction	I
2	Scottish Water Supply & Wastewater Sector: Definition, Characteristics and Opportunities	2
3	Scottish Low Carbon Heating & Cooling Sector: Definition, Characteristics and Opportunities	7
4	Survey Analysis	11
5	Conclusions	46
6	Recommendations	50
Appendices		
I	Survey Approach	II
II	Survey Questionnaire	V

10th December 2014

Simon Hallam

Innovas Consulting Solutions Ltd

R1-2 Verdin Exchange High Street

Winsford Cheshire CW7 2AN

Main Office: 01606 551122

Mob: 07411 371810

Website: www.innovas.co.uk

E-mail: simon.hallam@innovas.co.uk

Executive Summary

Introduction

Scottish Enterprise, working with Highlands & Islands Enterprise, commissioned Innovas to carry out a study of businesses in the water supply & wastewater and low carbon heating & cooling sectors in Scotland. The purpose of the work is to identify market opportunities arising from the global growth in demand for related goods, services and technologies and to assess the capabilities of firms in Scotland to exploit these opportunities. The outcome of the work is a series of recommendations on how Scottish Enterprise and Highlands & Islands Enterprise, working with Scottish Development International, can best assist businesses to maximise both their growth potential and the benefits to the Scotland's economy.

Scottish Water Supply & Wastewater Sector

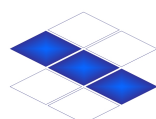
The water supply & wastewater sector is a mature one which has been established for many years with a number of new and emerging technology and service areas gaining market significance. The traditional technologies for water supply, distribution and wastewater/sewage treatment are much in demand in developing markets and companies in the water sector in the UK have done well in these international markets. There are a total of 135 companies identified in the sector in Scotland, 41 of which are Relationship Managed by Scottish Enterprise or Highlands & Islands Enterprise.

The surveyed companies (minus the 2 very large companies of Scottish Water and Jacobs) have an estimated turnover of £236 million and 2,275 employees. This provides an average of £5.1 million and 47 employees per company. The estimated size of the water sector for the 135 identified water companies (excluding the 2 large companies) is £678 million and 6,250 employees. Scottish Water has a turnover of £1,100 million and 3,600 employees. Jacobs has a global turnover of over \$1 billion.

Low Carbon Heating and Cooling Sector

Low carbon heating & cooling is defined as renewable heat and any technology that improves the efficiency of providing, distributing or using heating or cooling. The definition includes water and space heating and cooling in domestic and commercial properties and process heat and cooling for industrial purposes. It covers design, consultancy, manufacture, construction and maintenance of new capital equipment, infrastructure and retrofit.

There are a total of 227 companies identified in the Scottish low carbon heating and cooling (LCH) sector, 41 of which are Relationship Managed. The surveyed companies (minus the 3 large companies of SSE, Aggreko and Jacobs) have an estimated turnover of £182 million and 2,163 employees. This provides an average of £3.1 million and 33 employees per company. The estimated size of the sector for the 227 identified companies excluding the 3 large companies (SSE, Aggreko & Jacobs) is £694 million and 7,390 employees. The 3 large companies have multiple activities and it is not possible to accurately identify their turnover in the low carbon heating and cooling sector activities.



Cross-Sector Businesses

There are 17 companies that cross both the water supply/wastewater and LCH sectors and these companies tend to be involved in the efficient use of central heating systems, use of water/wastewater for heating, heat recovery, smart management and/or measuring and monitoring heat using sensors.

Survey Analysis

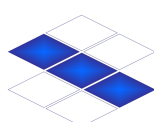
These results are based on completed surveys for Scottish companies (Relationship Managed and Non Relationship Managed). Some 95% of the surveyed companies (both sectors) had their headquarters in Scotland (above the UK average for the sector of 82%). In general, water supply/wastewater sector companies have been established for longer on average than the LCH companies. The LCH sector has had 18 (of the surveyed) companies established since 2010 which is an indication of the new and emerging activities in the sector, particularly around renewable energy technologies such as biomass and heat pumps.

Compared to the low carbon heating/cooling sector, the water supply/wastewater sector has a higher percentage of companies with manufacturing (30% vs 22%) and R&D (33% vs 23%) facilities and well over double the LCH percentage (25% vs 11%) for the operation of a facility in Scotland. However the percentage of companies with service facilities is similar for both sectors (40% to 45%). The water supply/wastewater sector companies on average have higher turnovers than those in the LCH sector. This is mainly because the average age of water supply/wastewater companies is higher and as such they have had opportunities to build sales over a longer period of time.

Some 59% of the LCH companies have fewer than 10 employees (compared to 44% of water supply/wastewater companies). However, 15% of LCH companies have over 50 employees (25% among water supply/wastewater companies). This indicates a group of medium sized companies around which supply chain and export initiatives can be formed. Over the past three years, 32% of the LCH companies and 41% of the water supply/wastewater companies spend more than 5% of turnover on R&D, which indicates that companies are keen to develop new products and services to expand their sales activities. This may in part explain why few companies stated that a lack of new products or services was a barrier to growth.

Companies in both sectors are very positive in their future growth forecasts with over 90% forecasting either growth or high growth. This reflects improvement in the general economy in the UK. The key markets for many of the companies in Scotland are construction, manufacturing and domestic, which benefit from overall economic growth. There are quite distinctive differences in the sales profiles, with LCH companies having far higher sales levels in Scotland whereas the water supply/wastewater sector shows higher international and rest of the UK sales.

Water supply/wastewater companies have a much higher propensity to export than LCH companies. This highlights the overseas reach of the water supply/wastewater companies and to a certain extent the current



strength and growth of the Scottish and UK markets for LCH products and services and the resultant focus on domestic markets by many firms.

Looking at future export plans, LCH companies appear to be more interested in more developed markets which can afford low carbon alternatives, and where there are definite legislation drivers. Water supply/wastewater companies focus on a range of markets due to the mix of technologies which are appropriate for all market types. There are more current non-exporting water supply/wastewater companies (58%) that are interested in exporting than LCH ones (35%). The percentage of companies interested in broader forms of overseas collaboration is around 70% for both sectors.

Conclusions

Barriers and Opportunities

The main **barriers** as stated by the companies are;

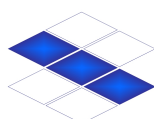
- Market conditions – instability of the LCH market and low growth levels in the UK for the water supply/wastewater sector
- Competition - reflects concerns of cheaper imports and expansion by companies in other areas of the UK and internationally in the fast growing LCH sector and the intense competition in the mature and slow growing UK water supply/wastewater sector
- Standards and regulations – changes at short notice being the main issue
- Finance for business growth
- Recruiting staff with technical skills.

Key issues highlighted by the companies as **challenges** include:

- Public sector reluctance to embrace new technologies and approaches
- Stricter regulations and standards for current products
- Smaller companies trying to compete with larger companies
- Lack of financial strength of company
- Time taken to get products to market
- Lack of R&D strength in company compared to larger competition

Opportunities included;

- Water supply/wastewater - deteriorating water supply/wastewater supply conditions in world markets and improved manufacturing costs making products more competitive in home markets
- LCH – Green Deal and ECO, increasing energy costs, Renewable Heat Incentive and feed in tariffs



Drivers included;

- Both sectors - better and faster broadband and internet based solutions
- Water supply/wastewater - quality standards and EU water supply/wastewater directives
- LCH – Renewable Heat Incentive and feed in tariffs.

Future Support Needs

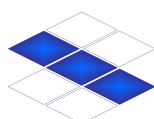
The support requirements for the majority of water supply/wastewater and LCH companies are different. The sectors are at different stages of development, with the water supply/wastewater sector being mature and the LCH sector being in the early stage of development. Both sectors place a high emphasis on financing the business, financing projects, developing business partnerships and networking. Water supply/wastewater companies are operating in a more mature market where the opportunities for growth are overseas and in new products/services to address new and niche problem areas. Their stated support needs reflect this with a focus on international trade, staff and innovation.

LCH companies place more emphasis on marketing advice and information than water supply/wastewater companies which again reflects the different stages of development for each sector, where new and emerging markets require more marketing support initially.

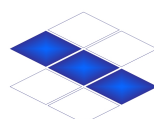
Recommendations

There are a number of areas where companies have clearly identified opportunities, barriers and where future support needs are required. These include finance, focused business support (including supply chain opportunities), international trade and innovation/R&D (which includes developing relationships with other business and networking). The recommendations are based around 4 themes:

1. **Finance** – improve knowledge of and access to existing finance and funding mechanisms. Water supply/wastewater sector requires support to commercialise new products/services. The LCH sector requires support to implement projects such as district heating networks. Both sectors would benefit from small scale funding to develop new products
2. **Focused Business Support** - supply chain work, international trade missions, networking with other sector companies and groups, networking with potential customers and meet the buyer style events. Water supply/wastewater sector has a mature well defined supply chain with regular procurement cycles which take time for SMEs to understand and access – focused supply chain development support with Scottish Water is strongly recommended. The LCH sector in particular will benefit from a problem/issue/aspiration type approach where the customers or public sector state a problem/issue/aspiration and in an informal event Scottish companies can discuss potential solutions directly with the stakeholders and funders and either as a group or individually develop solutions or a solution roadmap going forward.



3. **International Trade Sector Focused Initiatives** - A sector focused approach enables the support organisation to build up an understanding of key export markets which can then be passed onto the companies from a position of knowledge and experience. There is scope in the water supply/wastewater sector to bring together collaborative partnerships of Scottish companies with complementary goods and services for targeted trade missions and specific projects. A focused approach will ensure that Scottish companies have more opportunities to develop relationships in the selected markets and collaborate with overseas companies i.e. joint ventures, technology licensing, technical co-operation – this is important to Scottish companies who are at an early stage in their export activities such as many in the LCH sector and which can often lead to a first step in developing international trade.
4. **Innovation and R&D** - sector focused innovation groups have been proven in other areas of the UK to help companies develop products and services quicker and more effectively. The LCH sector companies require more support in developing new products and services and therefore the majority of the focus should be on early stage support. Water supply/wastewater companies require more support to verify their technologies, services and approaches, so that they can satisfy the technical and quality demands of the larger companies who tend to be at the top of the supply chain and who have very stringent selection criteria. Through the use of sector and/or technology specific networks the links between Scottish companies, research establishments and academic institutions should be strengthened. For the water supply/wastewater sector, Hydro Nation is a potential focus point for this activity.



I. Introduction

Study Purpose

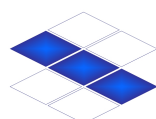
Scottish Enterprise, working with Highlands & Islands Enterprise commissioned Innovas to carry out a company capability analysis in the water supply & wastewater and low carbon heating & cooling sectors in Scotland. The purpose of the work is to identify market opportunities arising from the global growth in demand for related goods, services and technologies and to assess the capabilities of firms in Scotland to exploit these opportunities.

Critical to the assignment is determining whether it is possible to identify and/or develop defined supply chains in water supply & wastewater technologies and low carbon heat & cooling technologies and whether economic benefits could be realised by public sector initiatives to support new technology demonstrations, internationalisation and the development of new services and products. The work has involved:

- Assessment of business opportunities in terms of new domestic market segments or new geographical markets in the rest of the UK and in international markets, examination of strategies that companies are adopting to exploit these opportunities and highlighting the barriers to them achieving success in developing and delivering their strategy.
- Identification of the customer market segments that the businesses are currently supplying and the importance to the company of each market segment, including mapping key export markets for each sub-sector and assessing the relative export potential of each.
- Analysis of whether current non-exporting companies could reasonably expect to be successful in export markets with support, drawing on the performance of current successful exporting companies (in terms of products/services and size).

Central to the study was an in-depth survey of Scottish Enterprise and Highlands and Islands Enterprise Relationship Managed businesses in the water supply & wastewater and low carbon heating and cooling (LCH) sectors and additional relevant Non-Relationship Managed companies in the sectors to provide a broader assessment of the respective sector capabilities.

The study is the first dedicated examination of the water supply & wastewater treatment and LCH sectors in Scotland. The outcome of the work is a series of recommendations on how Scottish Enterprise and Highlands & Islands Enterprise, working with Scottish Development International, can best assist businesses to maximise both their growth potential and the benefits to Scotland's economy.



2. Scottish Water Supply & Wastewater Sector: Definition, Characteristics and Opportunities

Sector Definition

The water supply & wastewater sector is a mature one which has been established for many years with a number of new and emerging technology and service areas gaining market significance over the last few years. Water Supply and Wastewater are defined as the associated services, industries and other economic activities such as academic research. The definition does not include industries which use water significant amounts of water in their processes but would include new technologies which would manage the use of water for these industries.

- Water Supply and Treatment (including infrastructure where this includes using new technologies for wastewater and effluent treatments; excludes concrete bases);
- Contaminated water and Wastewater treatment;
- Infrastructure and services for water efficiency. e.g. (rainwater harvesting)
- Use of water for heat (but not hydro-electricity, as electricity generation is excluded)
- Infrastructure and services associated with water conservation
- Infrastructure and services associated with flood prevention
- Smart management of water including instrumentation
- Ground Water Remediation
- Water Features and swimming pools (e.g. supply of water fountains and swimming pool fit out)

The definition for the water supply & wastewater sector as used in this study is shown below. The definition covers 24 different sub sectors which form the overall structure of the sector. The definition does not include plumbers or general construction companies who have no specialised expertise in the water sector.

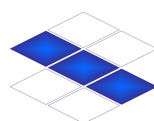


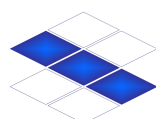
Table 2.1: Definition of the Scottish Water Supply & Wastewater Sector

Table 2.1: Definition of the Scottish Water Supply & Wastewater Sector	
Sub-Sector	Sub-Sector
Operation of water supply facilities	Supply of water supply/wastewater treatment equipment
Operation of water supply networks	Water testing and monitoring services
Operation of wastewater treatment facilities	Design, manufacture or supply of equipment for water testing and monitoring
Nutrient and mineral/resource recovery	Design, manufacture or supply of pipes, valves, filters and pumps
Heat recovery (ie. from canals, rivers, mine water etc)	Water features and/or swimming pools
Operation of sewage networks	Infrastructure and services for flood prevention
Operation of water storage facilities/use of associated technologies	Smart management of water (ie. instrumentation including sensors)
Construction of water supply facilities/use of associated technologies	Priority substances and micropollutants/emerging pollutants (filtration, sensors etc)
Construction of water supply networks/use of associated technologies	Desalination services
Construction of wastewater treatment facilities/use of associated technologies	Ground water remediation (including contaminated land treatment)
Construction of sewage networks/use of associated technologies	Infrastructure and services associated with water conservation
Design and manufacture of water supply/wastewater treatment equipment	Use of water for heat - industrial and domestic
Source: Scottish Enterprise, Highlands & Islands Enterprise and Innovas.	

Sector Characteristics and Opportunities

The Scottish water sector (in terms of the operation of facilities and supply of water) is dominated by one main utility company - Scottish Water. The geography of Scotland with large rural areas and many islands has provided opportunities for local water collection and supply and there are a number of companies that are also involved in providing water supply and wastewater treatment services for individual properties or small communities. The companies that provide these local services and solutions have the experience and expertise to export the solutions to many parts of the world.

The traditional technologies for water supply, distribution and wastewater/sewage treatment are much in demand in developing markets and companies in the water sector in the UK have done well in these international markets. Opportunities still exist in many countries with regions such as Central/Eastern Europe, Africa, Asia and South America having numerous countries with underdeveloped water supply and Wastewater treatment infrastructures.



The temporary solutions companies will always have opportunities with the offshore oil/gas and renewable energy industries expanding internationally as well as the increasing number of displaced peoples worldwide that require fast solutions and flexibility in positioning of them. Many of the aid related opportunities are via the United Nations and this is a route which some of the companies are actively using.

It should also be noted that temporary solutions are needed in many industries including leisure, agriculture, and offshore oil/gas and in emergency aid situations with a number of companies providing temporary and mobile solutions. The leisure industry also provides opportunities for those companies that have creative solutions for the decorative use of water in fountains and displays. These solutions are very suitable for the developed markets. Developed markets are those where the basic infrastructure has been completed and where the economic circumstances are such that more sophisticated uses of water are possible.

The developed markets also provide opportunities for sensors, heat recovery, smart management, and monitoring and water conservation particularly around the resource efficiency agenda. This is a relatively new set of opportunities and one which Scottish companies can compete with companies from other developed countries generally on an equal basis as the quality of solution and follow up service required is high. The developed markets include Western Europe, North America, the Far East and Australasia. The breadth of markets that the water sector companies can and do export to, provides good opportunities for the long term as well as short and medium term.

There are 41 Relationship Managed companies that can be classified in the water supply/wastewater sector. 17 of these are also providing products and services in the low carbon heat/cooling sector. There are a further 94 identified as being in the water supply/wastewater sector, who are not currently Relationship Managed. This provides a total of 135 companies in the Scottish water supply/wastewater sector. It should be stressed that this is not an exhaustive list of companies involved but does cover the majority of relevant companies. These are summarised below:

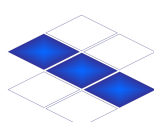
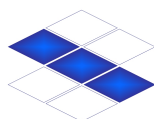


Table 2.2: Structure of the Scottish Water Supply & Wastewater sector

Description of Activity	Totals
Supply of water supply/wastewater treatment equipment	52
Water testing and monitoring services	41
Design and manufacture of water supply/wastewater treatment equipment	39
Use of water for heat - industrial and domestic	29
Construction of wastewater treatment facilities/use of associated technologies	25
Design, manufacture or supply of pipes, valves, filters and pumps	24
Construction of water supply facilities/use of associated technologies	22
Construction of water supply networks/use of associated technologies	17
Design, manufacture or supply of equipment for water testing and monitoring	16
Infrastructure and services associated with water conservation	16
Smart management of water (ie. instrumentation including sensors)	15
Infrastructure and services for flood prevention	13
Operation of wastewater treatment facilities	12
Operation of water storage facilities/use of associated technologies	12
Desalination services	12
Ground water remediation (including contaminated land treatment)	12
Construction of sewage networks/use of associated technologies	11
Operation of water supply facilities	9
Heat recovery (ie. from canals, rivers, mine water etc)	8
Operation of sewage networks	7
Operation of water supply networks	6
Priority substances and micropollutants/emerging pollutants (filtration, sensors etc)	6
Water features and/or swimming pools	5
Nutrient and mineral/resource recovery	2
Source: Innovas research (2014)	

The above table based on the 135 identified companies highlights the breadth of coverage in the Scottish water supply/wastewater sector, which has a high number of companies in the supply of equipment for water supply and wastewater treatment (52 companies). Of these 52 companies there are 39 that design and manufacture equipment. There are 24 companies also designing and manufacturing valves, pumps and pipes in Scotland which means that in a relatively small market there is strength in the design, manufacturing and supply of the key components for the water cycle. These are products which are and can be exported more easily than services to other developing markets in particular.

Developing markets are those where the infrastructure still requires considerable investment to bring it up to the standard of a market such as the UK. There are opportunities for the building of new facilities and infrastructure as well as replacement of parts and maintenance operations. Developing markets also tend to



have a lower level of home based competition, unlike developed markets where home competition has had time to grow and strengthen over a longer period of time.

There are 41 companies in the water testing and monitoring services with 16 companies designing and manufacturing equipment for the above. This is a relatively high level of companies in these activities and supports previous studies which highlighted this as a strength for Scotland. This is further supported by the 15 companies in smart management of water with sensors incorporated into the definition. The equipment companies have products which are easily transferable to other developed markets.

In the energy and resource efficiency areas of the sector there are encouraging numbers of companies with 29 companies being involved in the use of water for heat, 8 in the recovery of heat from water and 16 in water conservation infrastructure and services. This indicates that Scotland is not falling behind the rest of the UK in this area.

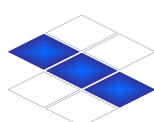
Despite the dominant position of Scottish Water in operating water supply and wastewater treatment facilities in Scotland there are still 8 other companies operating water supply facilities, most of which are for small scale local supply. There are also 5 additional companies operating water supply networks supplying local and regional demands and 11 other companies operating wastewater treatment facilities. This is mainly due to many Scottish industrial facilities having to adhere to strict water quality regulations for wastewater discharged to water courses, and therefore having their own wastewater treatment facilities.

The new area of extracting nutrients and minerals from water sources has 2 companies and the higher quality extraction and filtration area has 6 companies which is still a low level for a developed market and is an area which could be improved. There are a number of companies focused on the Scottish whisky distillery industry, which is currently enjoying a period of high growth.

The numbers above only tell part of the story for the sector. There are a number of larger engineering companies who manufacture equipment and can provide large turnkey projects both in Scotland and internationally. These companies are already active in international markets and are looking to expand their sales there. There are companies with specialisms in providing mobile solutions for emergency relief and solutions for the offshore oil/gas industry which are active in the export markets including via the UN.

Some 55% of the surveyed water companies are exporting. Key current export markets are Western Europe, Central Europe, and Middle East with 40% of companies exporting to these markets. The growth export markets with the highest level of interest are Asia, Far East, North America and China. Around 40% of the companies are forecasting high growth with over 50% forecasting growth and about 6% forecasting no growth.

There are 17 companies in the water supply/wastewater sector who also have activities in the low carbon heating & cooling sector.



3. Scottish Low Carbon Heating & Cooling Sector: Definition, Characteristics and Opportunities

Sector Definition

Low carbon heating & cooling is defined as renewable heat and any technology that improves the efficiency of providing, distributing or using heating or cooling. The definition includes water and space heating and cooling in domestic and commercial properties and process heat and cooling for industrial purposes. It covers design, consultancy, manufacture, construction and maintenance of new capital equipment, infrastructure and retrofit.

Heat Generation

- Renewable heat: solar thermal, heat pumps (air, ground, water)
- Efficient heat from fossil fuels, such as, efficient electric storage heaters, combined heat and power, efficient boilers, fuel cells, efficient HVAC etc
- Air conditioning and refrigeration processes and technologies
- Generation of heat from organic matter including biomass, biofuels and anaerobic digestion
- Generation of heat using fuel cells as part of combined heat and power systems.

Heat Distribution

- District heating
- Waste heat recovery and associated technologies
- Storage, to improve the efficiency of heat use or increase the penetration of renewable heat
- Combining heat and cooling needs.

Heat Control and Monitoring

- Controls, eg thermostats
- Sensors for heat monitoring
- Monitoring of energy use
- Design, simulation and heat modelling
- Smart thermal grid/demand management.

The definition for the low carbon heating and cooling sector as used in this study is shown below. The definition covered 29 different sub sectors which form the overall structure of the sector.

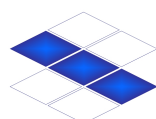


Table 3.1: Definition of the Low Carbon Heating and Cooling Sector

Sub-Sector	Sub-Sector
Design of equipment	Passive heating
Manufacturing of equipment	Efficient electrical heating
Installation of equipment	Efficient fossil fuel heating
Service and maintenance	Fuel cells
Consultant	District heating
Construction of facilities	Combined heat and power (including cooling)
Solar thermal	Design, simulation and heat modeling
Ground source heat pumps	Heat storage
Biomass	Heat recovery
Biofuels	Measurement and monitoring of heat (temperature)
Water source heat pumps	Smart thermal grid/demand management
Air source heat pumps	Controls - thermostats etc
Air conditioning technologies	Sensors - temperature
Refrigeration processes and technologies	Energy monitoring for heating/cooling systems
Passive cooling or ventilation	

Source: Scottish Enterprise, Highlands & Islands Enterprise and Innovas.

Sector Characteristics and Opportunities

The overall structure of the low carbon heating and cooling sector is diverse with much of the low carbon options being small scale installations without a central national generation capability. There are therefore no dominant companies around which to base the structure. Though many of the early innovations in this sector were based around overseas technology, Scottish companies have been catching up quickly especially in the areas of applying low carbon technologies to specific challenges.

There are 41 companies (Scottish Enterprise and Highlands and Islands Enterprise Relationship Managed) with activities in the low carbon heating and cooling sector. There are a further 186 companies identified that are Non-Relationship Managed, which were assessed as having activities in the low carbon heating and cooling sector. It should be stressed that this is not an exhaustive list of companies involved but does cover the majority of relevant companies. This provides a total of 227 companies in the Scottish sector.

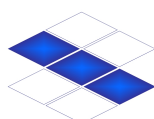
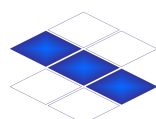


Table 3.2: Structure of Companies in the Scottish Low Carbon Heating and Cooling Sector

Description of Activity	Totals
Installation of equipment	98
Biomass	84
Solar thermal	61
Service and maintenance	53
Air source heat pumps	40
Consultant	39
Ground source heat pumps	38
Design of equipment	34
Heat recovery	31
Manufacturing of equipment	25
Water source heat pumps	25
District heating	24
Efficient electrical heating	22
Air conditioning technologies	19
Efficient fossil fuel heating	19
Passive cooling or ventilation	18
Energy monitoring for heating/cooling systems	18
Construction of facilities	17
Controls - thermostats etc	17
Combined heat and power (including cooling)	16
Refrigeration processes and technologies	14
Passive heating	14
Measurement and monitoring of heat (temperature)	12
Sensors – temperature	11
Heat storage	9
Smart thermal grid/demand management	9
Biofuels	8
Fuel cells	4
Design, simulation and heat modeling	3
Other	3

Source: Innovas research (2014).



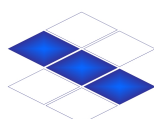
There is quite a difference between the Relationship Managed and Non-Relationship Managed companies with a high number of Relationship Managed companies involved in designing and manufacturing products with a good number in controls and energy monitoring. These areas are definitely transferable to international markets. In terms of the larger scale deployments such as district heating and Combined Heat and Power (CHP) there are 24 and 16 companies respectively.

The technologies have an even spread in the Relationship Managed companies but in the Non-Relationship Managed companies there is a high number of solar thermal and biomass technologies with 61 and 84 companies respectively, the majority of these are installation companies. There are also a high number of companies involved in heat pump technologies with about 40 in ground and air sourced heat pumps – again the majority are installation companies and not manufacturers. The vast majority of the equipment installed is designed and manufactured outside of Scotland. This is not unusual in the UK nations and regions where most of the equipment installed is manufactured outside the UK. However the importance of this adds to the attraction of inward investment to Scotland of manufacturers of equipment.

Overall, there are 31 companies involved in heat recovery and 9 in heat storage. The heat recovery aspects are generally in recovery of heat from air rather than water, though there are a number of companies involved with water. The efficient use of electrical heating and fossil fuel heating has a total of 22 and 19 companies respectively. This shows an increase in energy efficiency in line with government requirements.

Passive cooling or ventilation has 18 companies involved and passive heating has 14. This indicates the beginning of the development of improved designs for buildings in Scotland and the development of the sector spreading into architecture and design. There is a small number of fuel cell for heating companies at 4. This is to be expected in this new technology area. There were 8 companies identified with activities in biofuels, though it is possible that not all biofuels companies have been identified. This is a low number for a relatively mature sub sector where according to DECC figures about 4% of diesel in the UK is biodiesel.

Not surprisingly, the Relationship Managed companies are larger on average with a wider range of products and services than the Non-Relationship Managed ones. They also have a far higher level of export activity than Non-Relationship Managed companies. There are 17 companies in the low carbon heating & cooling sector who also have activities in the water supply/wastewater sector.



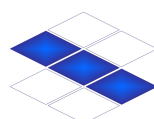
4. Survey Analysis

Overview

These results are based on 109 completed surveys for Scottish companies, including 56 Relationship Managed and 53 Non-Relationship Managed firms within the reporting timeframe. The surveys lend themselves to further disaggregation with areas of interest being the:

- Two main sectors of water supply and wastewater treatment and low carbon heating and cooling
- Size of companies
- Location of companies
- Age of companies
- Types of facility in Scotland
- Performance levels

The key criteria for the purposes of this report are the two main sectors, size of companies and performance levels. The survey used a mix of straightforward responses on figures, technology/service areas, performance, and international trade and planned developments with more open responses to barriers, new markets, reasons why these are being targeted and main companies in their supply chain. The responses to open questions provided a wealth of information which is used along with the evidence base to identify and develop potential interventions.



Structure of the Scottish Company Base

Table 4.1: Location of Surveyed Companies in Scotland		
Postcode Area	Number of LCH Businesses	Number of Water Supply/Wastewater Businesses
AB - Aberdeen/Aberdeenshire	3	3
DD - Dundee	1	1
DG - Dumfries	5	2
EH - Edinburgh / Lothian	14	9
FK - Falkirk	3	2
G - Glasgow	11	11
HS - Western Isles	0	0
IV - Inverness	6	4
KA - Kilmarnock	8	6
KW - Orkney	1	2
KY - Kirkcaldy	3	2
ML - Motherwell	2	3
PA - Paisley	3	1
PH - Perth	8	5
TD - Tweed	5	2
ZE - Shetland Isles	0	0
Total	73	53

Source: Innovas Sector Survey (2014).
 Note: Totals add up to 126 due to 17 firms operating in both sectors.

There are no strong geographical concentrations of the surveyed water supply/wastewater businesses and LCH sector companies. There is more of a split in the groupings of the companies for each sector in the overall identified companies in Scotland. There is a group of LCH sector companies in Edinburgh and its hinterland (including East, West and Mid Lothian and some border counties), with 47 based there (21% of total) against 18 water supply/wastewater companies (13%). Glasgow's post code area (including Lanarkshire and Dunbartonshire) on the other hand has 30 water supply/wastewater companies (22%) with 36 LCH companies (16%). Glasgow has historically had more of the heavy industry and engineering companies based there, which means it is logical that a higher percentage of water supply/wastewater companies, which have a high level of engineering are based there. Edinburgh has strong educational and research establishments focused on low carbon technologies which provide the spin out companies and employees for the LCH sector.

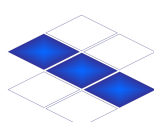


Table 4.2: Location of all Identified Companies in Scotland

Postcode Area	Number of All LCH Businesses	Number of All Water Supply/Wastewater Businesses
AB - Aberdeen/Aberdeenshire	17	13
DD - Dundee	7	1
DG - Dumfries	11	3
EH - Edinburgh	47	18
FK - Falkirk	10	9
G - Glasgow	36	30
HS - Western Isles	0	0
IV - Inverness	12	8
KA - Kilmarnock	26	13
KW - Orkney	3	3
KY - Kirkcaldy	12	5
ML - Motherwell	10	8
PA - Paisley	7	4
PH - Perth	18	15
TD - Tweed	14	5
ZE - Shetland Isles	0	0
Total	227	135

Source: Innovas Sector Survey (2014).

The more rural areas such as the Tweed postcode area which covers much of the Borders), Dumfries and the Kirkcaldy postcode area (which covers much of Fife) tend to have a higher percentage of LCH companies, mainly around biomass and solar thermal technologies. There are more local opportunities for off grid solutions and access to low carbon fuels such as biomass. Aberdeen with its access to the oil/gas industry has a higher relative level of water supply/wastewater companies (10%) than LCH ones (7%). Falkirk, Motherwell and Perth being strong engineering areas also have a higher relative level of water supply/wastewater companies.

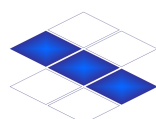
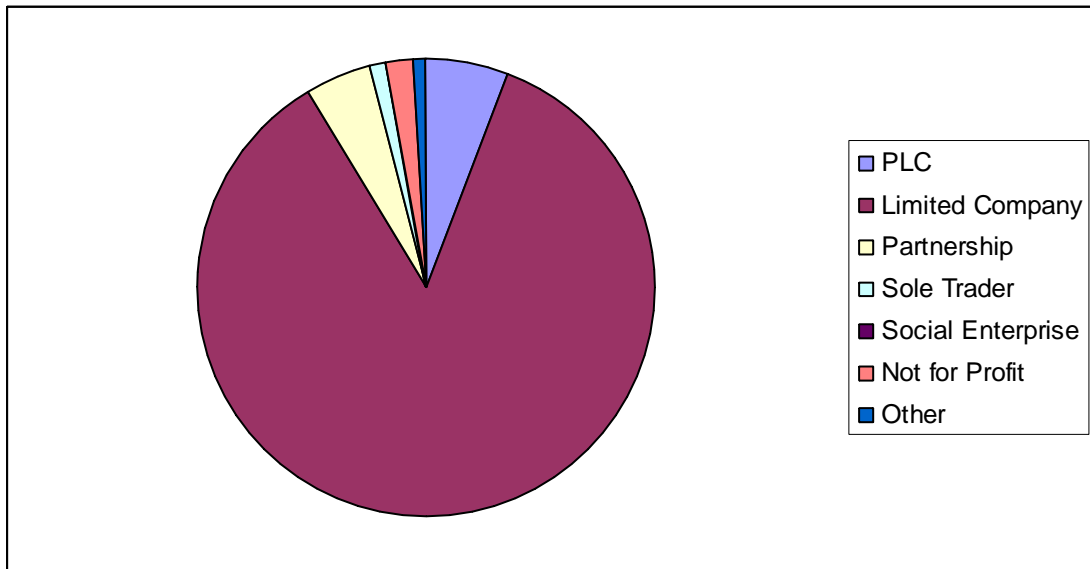


Figure 4.1: Company Status



Source: Innovas Sector Survey (2014).

The percentage of Limited companies is 86% with 6% being PLCs, 5% partnerships and the other 3% a mix. The mix of larger to SME companies is normal for the UK in these sectors. There is a high percentage (95%) of the surveyed companies with their headquarters in Scotland. Compared to other UK regions and nations where it is an average of about 82%, this is a high level. The other headquarters were based in Ireland, France, USA and two in rest of the UK.

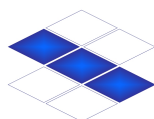
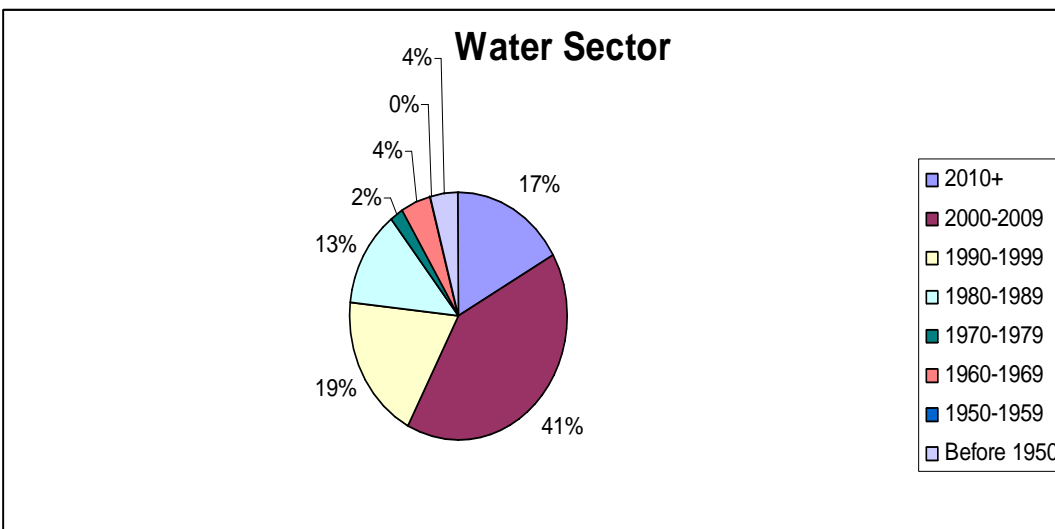
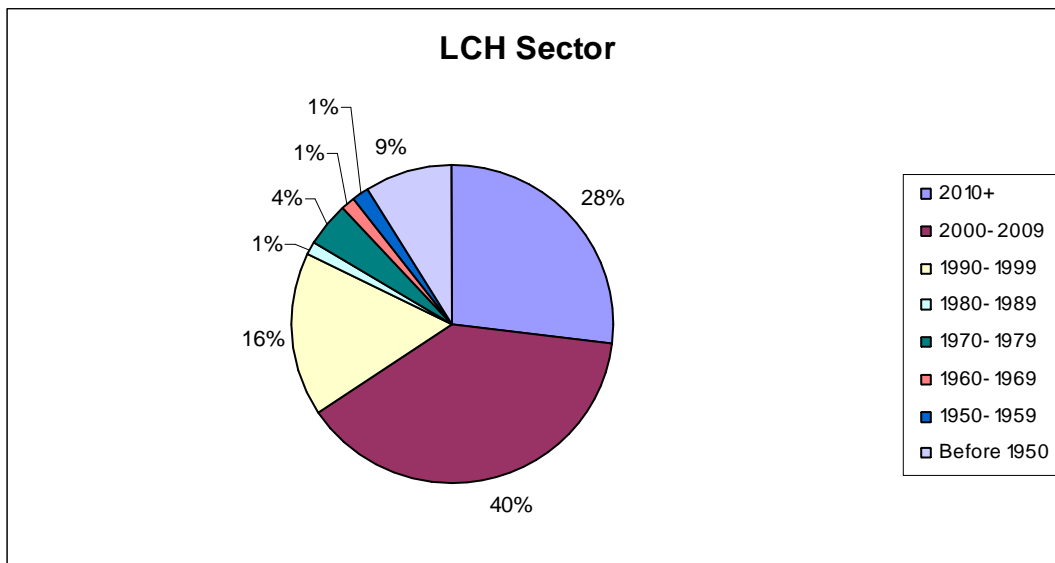


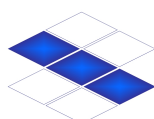
Figure 4.2 Relative Ages of Companies



Source: Innovas Sector Survey (2014).

In general the water supply/wastewater sector companies have been established for longer on average than the LCH companies. The LCH sector has had 18 companies established since 2010 which is an indication of the new and emerging activities in the sector, particularly around renewable energy technologies such as biomass and heat pumps.

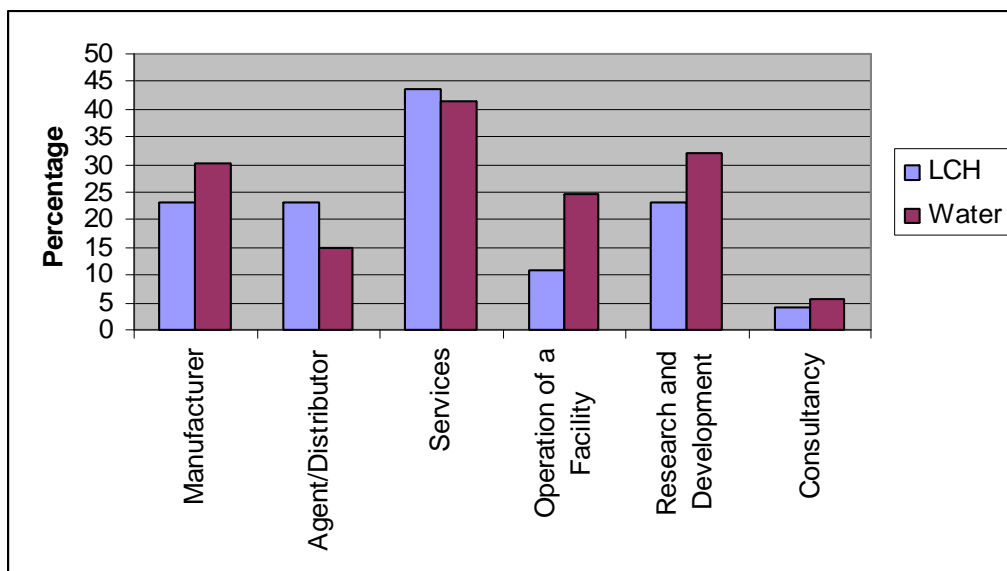
There is a spread of ages overall of LCH companies with 25% of the companies being young having being established after 2009 and a further 37% after 1999. This is a total of 62% that have been established in the last 14 years. 38% of the companies can be considered mature having been in operation for over 14 years. This means that the chances are that the more mature companies will have established themselves in export markets, having been in existence longer and having made the decision to enter export markets as part of the



sales growth strategy. Analysis by age of company shows a generally higher level of exports for the older companies.

The water companies are on average older with 43% being in operation for more than 14 years. This has given them time to get established in home markets and to expand overseas to generate extra turnover.

Figure 4.3: Company Type by Sector



Source: Innovas Sector Survey (2014).

The above table shows that the water supply/wastewater sector has a higher percentage of companies with manufacturing and R&D facilities and well over double the LCH percentage for the operation of a facility in Scotland. The higher level of manufacturing explains the higher focus of water companies on innovation as there is a need to develop new products to maintain and grow their existing markets.

There is a higher percentage of LCH companies acting as agents/distributors in Scotland and providing services. This reflects the fact that the majority of LCH companies buy in the base technology to package up their solutions and sell generally imported equipment.

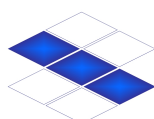
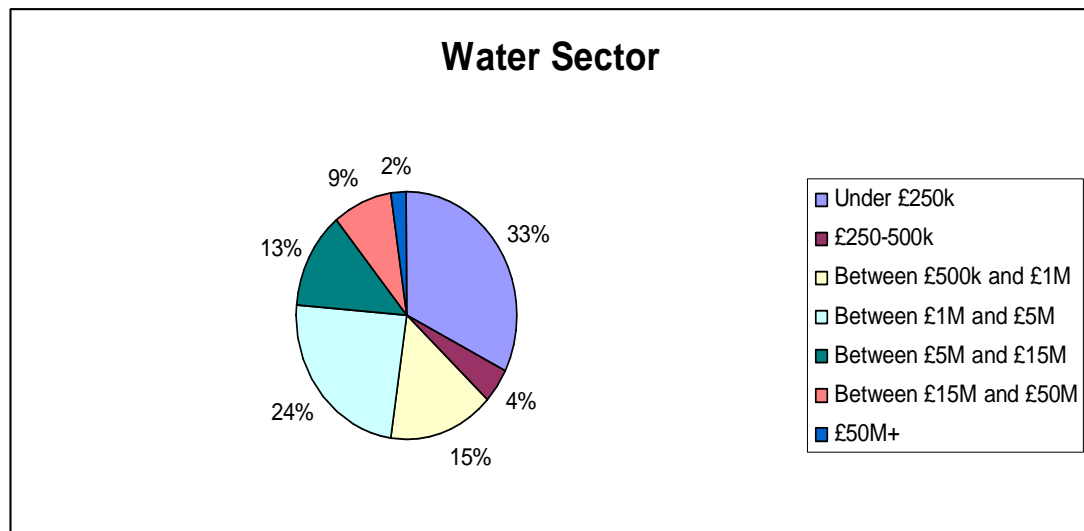
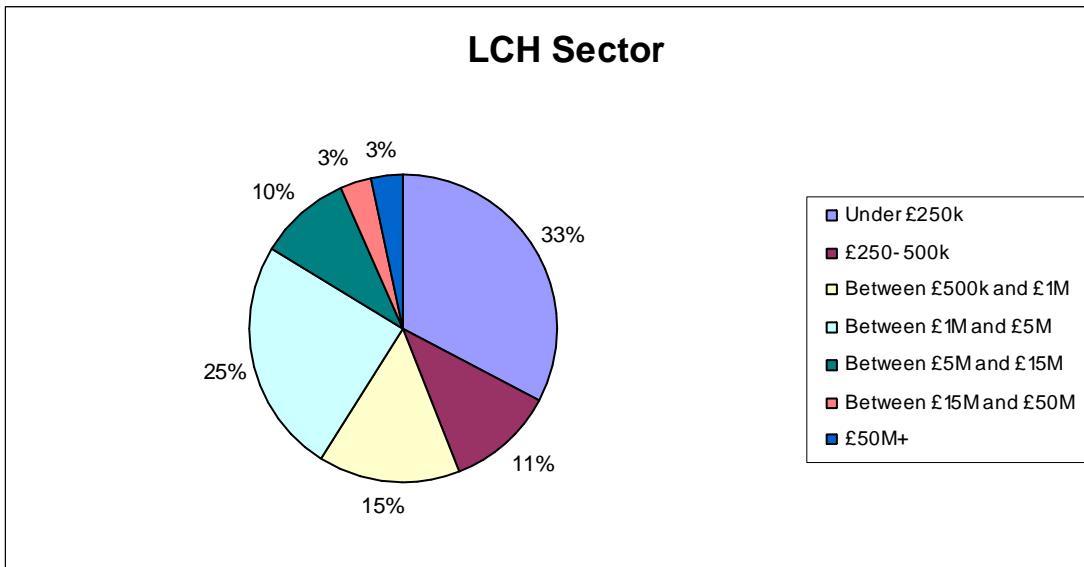


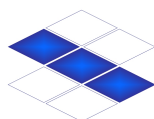
Figure 4.4: Turnover of Scottish Companies by Sector



Source: Innovas Sector Survey (2014).

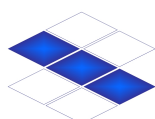
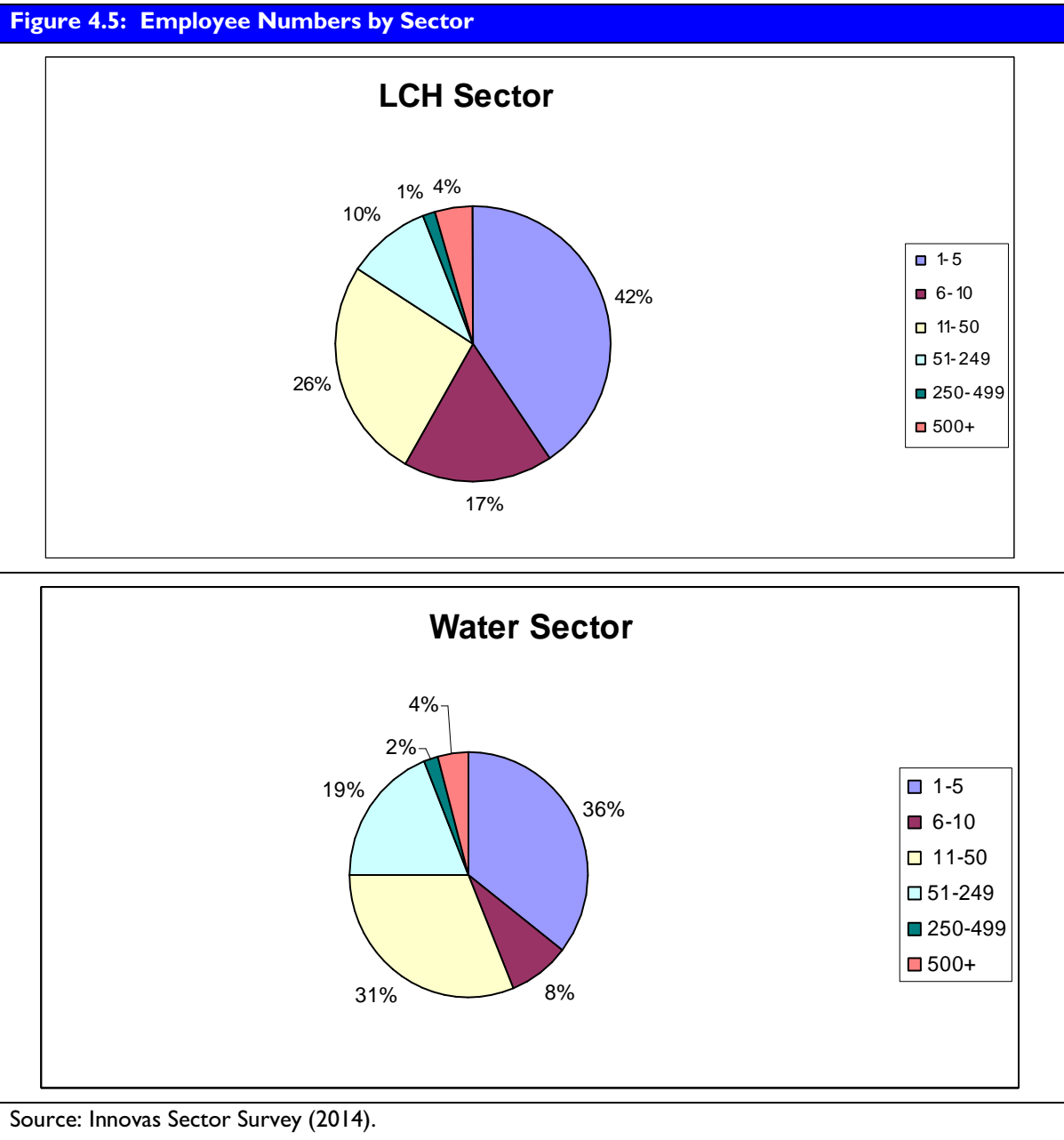
The water supply/wastewater sector companies on average have higher turnovers than the LCH sector ones. This is mainly because the average age of water companies is higher and as such they have had a chance to build sales over a longer period of time. This also shows the progression from smaller turnovers to higher ones is normal and the LCH sector can expect to see similar growth over a period of time.

Around 59% of the LCH companies have turnovers below £1 million, which indicates that there is a growing base of companies with the opportunity to grow sales in this expanding sector. There are a number of large companies with turnovers over £50 million in the LCH sector, SSE and Aggreko can genuinely be classed as Scottish based with very large turnovers in excess of £1 billion.



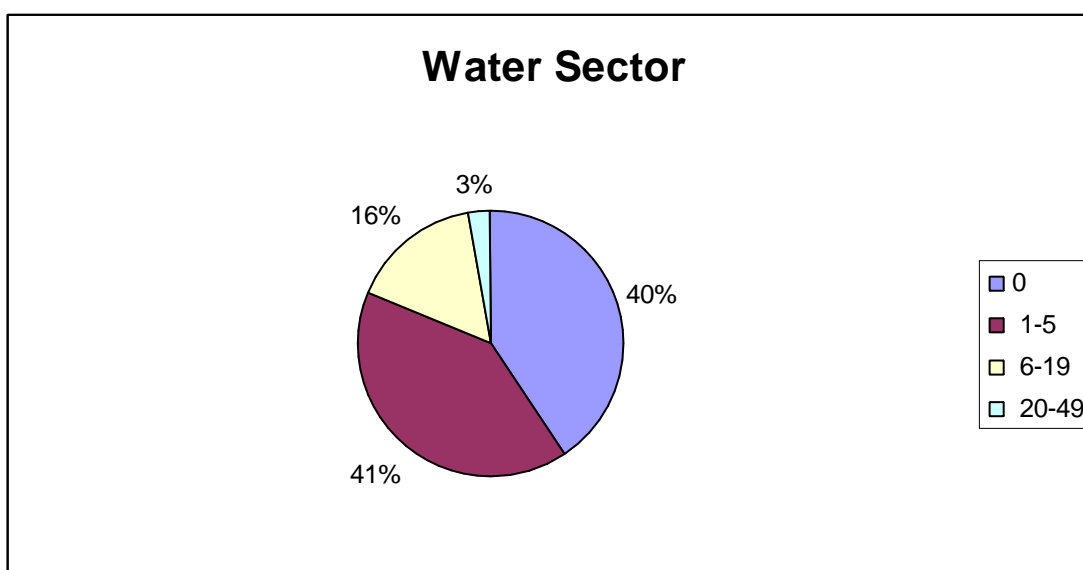
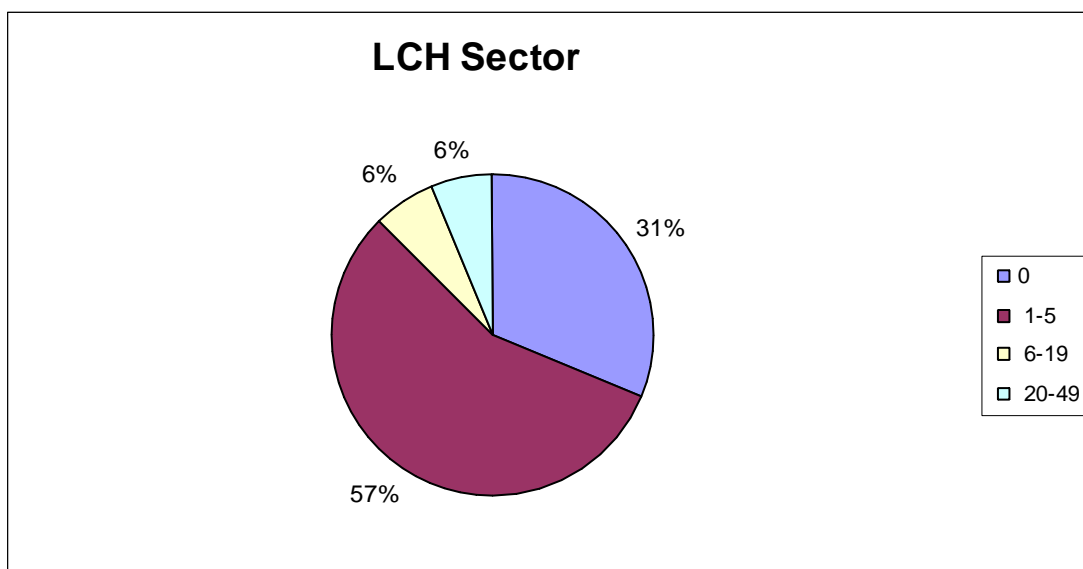
24% of water supply/wastewater sector companies have turnovers over £5 million with strong export sales. There are 2 large companies with turnovers over £50 million with Scottish Water dominating the sector with a turnover of £1.1 billion. Jacobs has a very large turnover in excess of \$11 billion but the vast majority of this turnover is outside of Scotland.

There is a range of company sizes in both sectors with some genuine world class companies already well established, other companies with strong turnovers that are well established in international markets and a strong base of smaller companies who can grow in local and home markets before expanding into international markets.



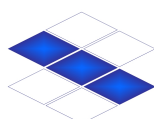
The employment numbers match the sales turnover trends with 59% of the LCH companies having less than 10 employees and 44% of the water companies. However there are 15% LCH companies with over 50 employees and 25% of the water companies. This indicates a group of medium sized companies around which supply chain and export initiatives can be formed.

Figure 4.6: R&D Staff Numbers by Sector



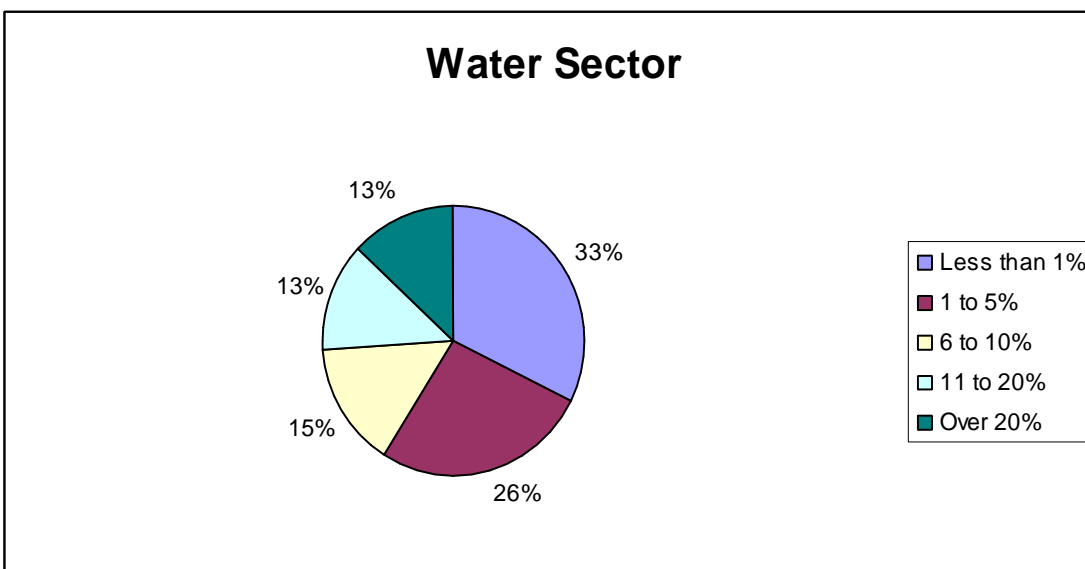
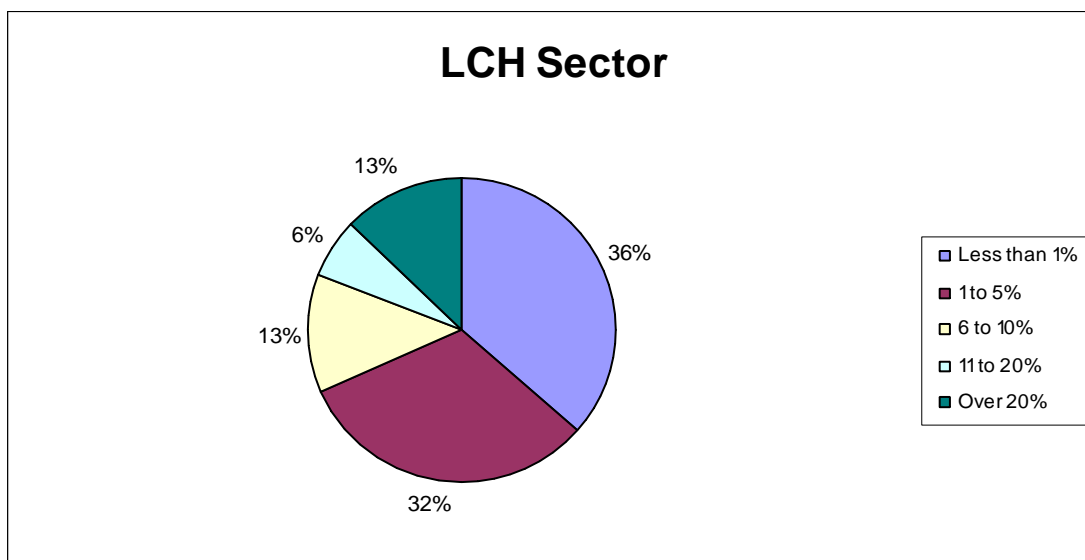
Source: Innovas Sector Survey (2014).

There are 57% of the LCH companies with between 1 and 5 R&D staff which indicates that most LCH companies are conducting R&D, though as many companies are on average smaller than water ones the numbers of R&D staff will be lower relatively. 16% of the water companies have between 6 and 19 R&D staff; this is a high level of commitment to R&D and reflects the higher level of manufacturing in water companies.



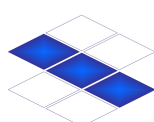
The larger LCH companies have high numbers of R&D staff with 6% having between 20 and 49 staff; this is a high level of commitment.

Figure 4.7: R&D Spend as a Percentage of Turnover by Sector



Source: Innovas Sector Survey (2014).

41% of the water companies have over 5% of their turnover spent on R&D which is a high level and indicates that water companies are keen to develop new products and services to expand their sales activities. It should be noted that in one of the later questions regarding barriers there was an unusually low percentage of both water and LCH companies stating that lack of new products or services was a barrier to growth. This supports the high level of R&D spend as being successful in developing new products and services. There is also a high level of need for innovation support stated by water companies which shows that these companies



are still interested in developing new products and maintaining their competitive position in home and international markets.

Though the average percentage spend by LCH companies is lower than for the water supply/wastewater sector there is still a high level of companies at 31% spending over 5% of their turnover on R&D. There was 1 LCH company with a turnover of between £5 and £15 million which spends over 20% of turnover on R&D. This company is heavily engaged in developing new products for the LCH sector. The higher level of spend on R&D is not surprising in the LCH sector where there is a high level of new entrants looking to develop new products and services to take advantage of the changes in regulations and new processes and technologies.

Water Supply and Wastewater Sector

Overview

This is for the surveyed companies only; the activities for all the identified companies in the water supply/wastewater sector can be seen in table 2.2. There is spread across the different activities for the surveyed companies, which in combination with the allocated activities for the non surveyed companies shown in section 2, indicates a fairly well balanced sector. However there were a number of areas where there were higher numbers including use of water for heat, design/manufacture of equipment and supply of equipment and water testing and monitoring services.

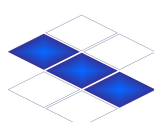
The design, manufacture and supply of equipment are very transferable to export markets and unsurprisingly they all supply into the water utility companies. The others included supply of equipment for treatment of swimming pools, maintenance of drainage systems, micro-hydro power generation systems, manufacture of line stopping and by-pass solutions and maintenance services. There are a number of companies that cross both the water supply/wastewater and LCH sectors, these companies tend to be the ones using water for heat and in heat recovery from water.

Size of the Sector

The estimation of the size of the water supply/wastewater sector has to take into account both the surveyed and non surveyed companies. Due to the large size of some of the companies with turnovers over £50million such as Scottish Water these have to be left out of the average turnovers and employees and indicated as separate figures.

The surveyed companies minus the 2 large companies of Scottish Water and Jacobs have an estimated turnover of £236 million and 2,275 employees. This provides an average of £5.1 million and 47 employees per company. This grosses up for the 133 identified water companies excluding Scottish Water and Jacobs to **£678 million and 6,250 employees.**

Scottish Water has a turnover of £1,100 million and 3,600 employees. Jacobs has its headquarters in the USA and a turnover of over \$11,000 million. Scottish Water has the vast majority of its turnover in the water



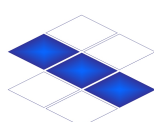
supply/wastewater sector, though much of this turnover is in the supply of water to domestic and industrial end user customers. Jacobs is a global company with multiple activities and it is not possible to accurately identify the turnover in the water supply/wastewater sector activities.

Table 4.3: Water Supply and Wastewater Activities

Description of Activity	Number of Businesses
Use of water for heat - industrial and domestic	18
Water testing and monitoring services	15
Design and manufacture of water supply/wastewater treatment equipment	14
Supply of water supply/wastewater treatment equipment	14
Construction of wastewater treatment facilities/use of associated technologies	11
Construction of water supply facilities/use of associated technologies	10
Smart management of water (ie. instrumentation including sensors)	9
Infrastructure and services associated with water conservation	9
Infrastructure and services for flood prevention	8
Operation of wastewater treatment facilities	7
Design, manufacture or supply of pipes, valves, filters and pumps	7
Ground water remediation (including contaminated land treatment)	7
Heat recovery (ie. from canals, rivers, mine water etc)	6
Operation of water storage facilities/use of associated technologies	6
Construction of water supply networks/use of associated technologies	6
Design, manufacture or supply of equipment for water testing and monitoring	6
Desalination services	5
Other	5
Operation of water supply facilities	4
Operation of sewage networks	4
Priority substances and micropollutants/emerging pollutants (filtration, sensors etc)	4
Operation of water supply networks	3
Construction of sewage networks/use of associated technologies	3
Water features and/or swimming pools	3
Nutrient and mineral/resource recovery	2

Source: Innovas Sector Survey (2014).

Note: Sample size of 53 companies.



Low Carbon Heating & Cooling Sector

Overview

All the activities were represented in Scotland which indicates a balanced spread across the activities. The design, manufacture and installation of low carbon heating/cooling equipment had the most numbers with the same companies being involved in most of those activities. There were 20 companies who described themselves as consultants, most of which are also designers, manufacturers and installers.

Biomass heating had the highest number of companies involved followed by solar thermal, air source heat pumps then ground source heat pumps. 14 companies are involved in district heating most of which are also involved in biomass. There are 5 in combined heat and power as with only 1 involved in district heating as well. In other parts of the UK CHP companies are more involved in district heating. The majority of companies stating design and manufacture as part of their activities tend to be the ones who purchase base equipment from other suppliers and then design and manufacture packages around them.

There is a strong core of companies in the controls, sensors and monitoring activities with 12, 8 and 10 companies respectively. The same companies for controls were also involved in sensors with all but 2 of the monitoring companies also being involved in controls and sensors. This tends to be because the technologies and markets for these 3 activities are similar.

There are 10 companies in air conditioning and 8 in refrigeration of which most were in both activities as well as 7 companies in passive cooling and heating. There are 2 companies involved in fuel cell technologies, though most fuel cell companies tend to be more involved in applied solutions for power generation or transport.

Size of the Sector

The estimation of the size of the low carbon heating and cooling sector has to take into account both the surveyed and non surveyed companies. Due to the large size and diverse nature of some of the companies with turnovers over £50million such as Scottish and Southern Electric (SSE) these have to be left out of the average turnovers and employees and indicated as separate figures.

The surveyed companies minus the 3 large companies of SSE, Aggreko and Jacobs have an estimated turnover of £182 million and 2,163 employees. This provides an average of £3.1 million and 33 employees per company. This grosses up for the 227 identified water companies excluding the 3 above to **£694 million and 7,390 employees**. SSE has a turnover of £30,600 million and employs 19,900 people. Its headquarters are in Scotland. Aggreko has a turnover of £1,500 million and employs 6,500 people of which 650 work in Scotland. Its headquarters are in Scotland.

Jacobs has its headquarters in the USA and a turnover of over \$11,000 million. These 3 large companies have multiple activities and it is not possible to accurately identify their turnover in the low carbon heating and cooling sector activities.

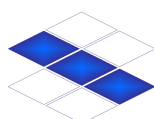
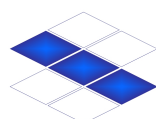


Table 4.4: Low Carbon Heating & Cooling Activities

Activity	Number of Businesses
Installation of equipment	29
Biomass	27
Service and maintenance	23
Consultant	20
Design of equipment	19
Manufacturing of equipment	16
Solar thermal	16
District heating	14
Air source heat pumps	12
Controls - thermostats etc	12
Heat recovery	11
Ground source heat pumps	10
Air conditioning technologies	10
Energy monitoring for heating/cooling systems	10
Efficient electrical heating	9
Refrigeration processes and technologies	8
Sensors - temperature	8
Water source heat pumps	7
Passive cooling or ventilation	7
Heat storage	7
Efficient fossil fuel heating	6
Measurement and monitoring of heat (temperature)	6
Combined heat and power (including cooling)	5
Construction of facilities	4
Biofuels	4
Passive heating	4
Design, simulation and heat modeling	3
Smart thermal grid/demand management	3
Other	3
Fuel cells	2

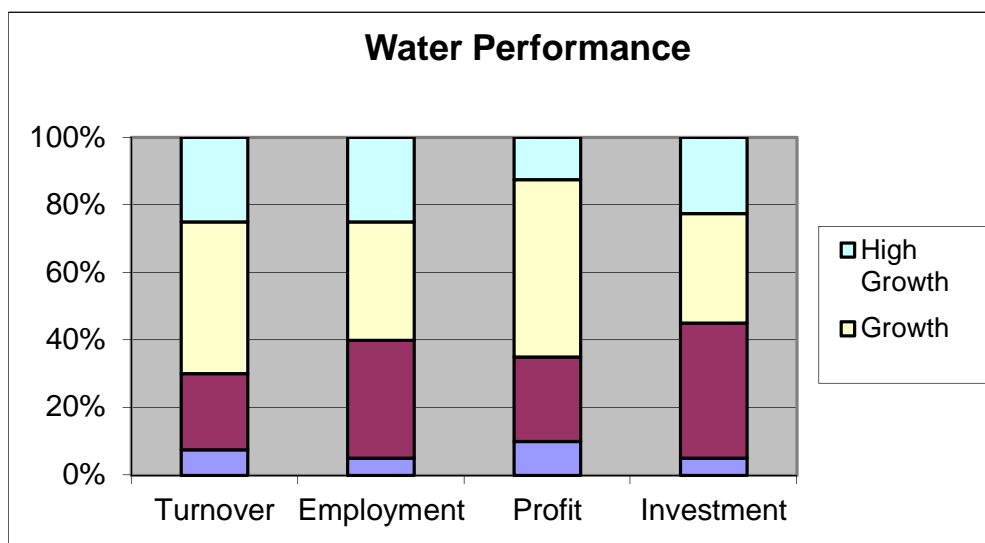
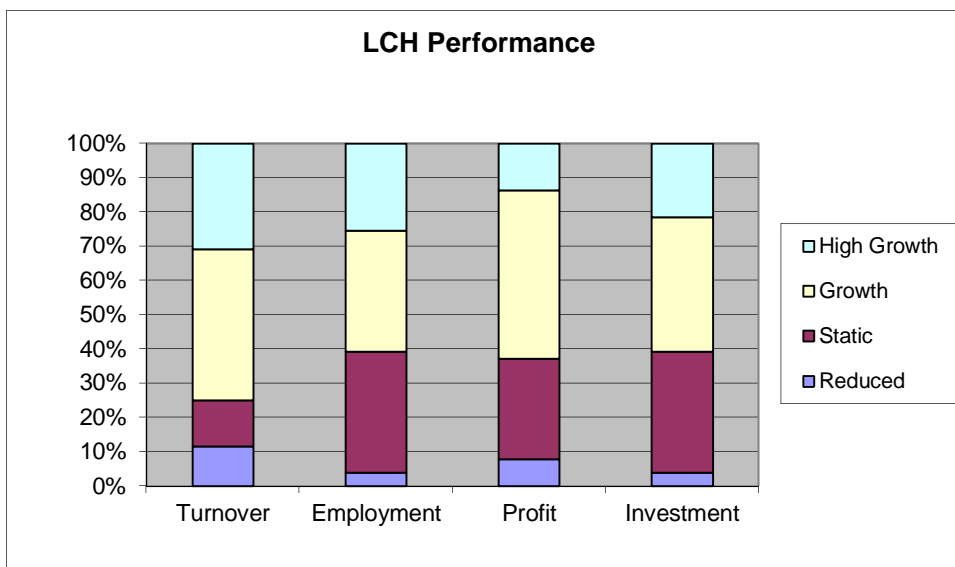
Source: Innovas Sector Survey (2014).

Note: Sample size of 73 companies.



Performance

Figure 4.8: Relative Performance of the LCH and Water Supply/Wastewater Sectors



Source: Innovas Sector Survey (2014).

The LCH sector has a slightly higher percentage of companies showing growth with about 75% and only about 10% showing reduced turnover. The wide range of activities in the LCH sector means that there is likely to be a wider spread of performance levels than for the more mature and closer focused water supply/wastewater sector. This still has about 70% of companies in growth, though with a lower percentage of companies showing reduced turnover at 5%. The performance levels for employment, profits and investments are similar for both sectors. The levels of investment in particular are encouraging, which indicates that confidence is coming back into the market.

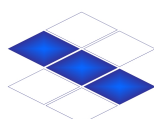
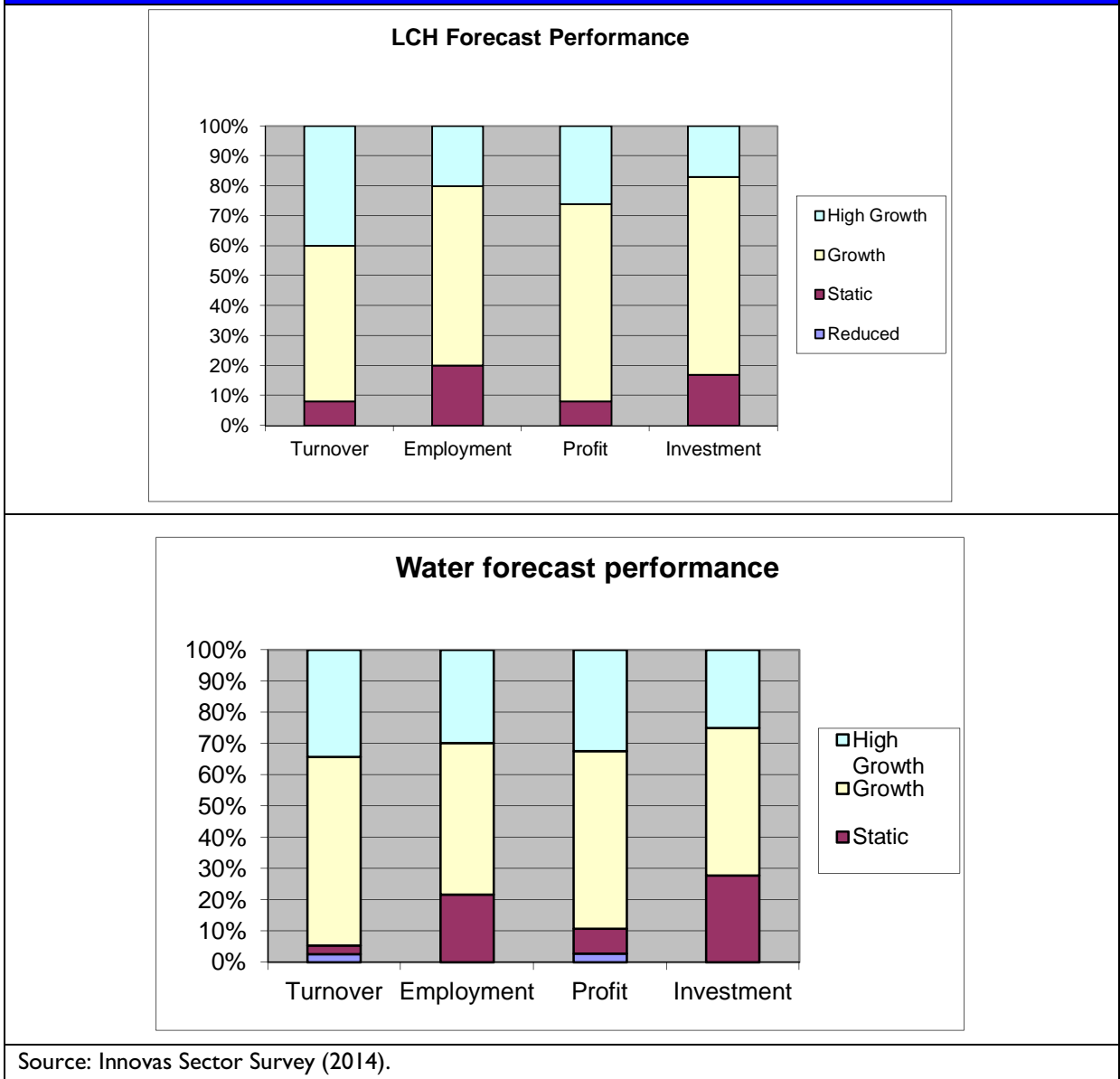


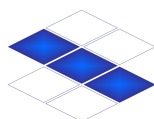
Figure 4. 9: Forecast Performance by Sector



Source: Innovas Sector Survey (2014).

There is a high level of confidence in the companies interviewed with 40% LCH companies and 35% water supply/wastewater companies anticipating high growth (high growth is defined as growth of above 20% in turnover per year) and 54% growth with only 8% of the companies expecting turnover to remain static. Only a small number expect turnover, profits, investment or employment to reduce. This indicates a high level of confidence in the future for both sectors, though comments by the companies regarding the barriers and challenges show that there is still realism that changes to government incentives and policies could adversely affect the market.

Overall 73% of the companies experienced growth (46%) and high growth (27%) which is a high level of growth, even for companies in the low carbon and environmental goods and services markets. Comparable



studies conducted by Innovas have shown growth levels of 60% in similar sectors to the LCH sector and 69% in the water supply/wastewater sector though the levels of high growth in water are much higher in Scotland.

Key Points on Company Growth

The levels of growth are being underpinned by the various government regulations/legislation, EU directives on water and carbon emissions, government carbon emission targets, incentives to achieve these targets and rising costs of water and energy. Currently there are many favourable drivers for growth for both these sectors.

Not all companies are seeing growth with about 9% seeing a reduction in turnover and profits though interestingly, and something that is mirrored in other parts of the UK, employment levels and investment levels are not reduced by anywhere near the same amount. This is a difference between previous recessions where employment levels decreased at about the same or above the levels of turnover reduction. It would appear that lessons were learnt as the companies who reduced staff most struggled to take advantage of the upturn in the market when it occurred.

The companies seeing a reduction in turnover are mainly in the LCH sector with renewable technologies such as biomass and heat pumps as well as companies involved in domestic hot water systems which are reliant on a buoyant construction market – something which is only just starting to recover back into growth. There are some quite marked differences in the profiles of those companies seeing high growth against those seeing a reduction in turnover. These profile differences are shown in more detail in Section 5.

Key Points on Future Growth Forecasts

The companies in both sectors are very positive in their future growth forecasts with over 90% forecasting either growth or high growth. The levels of high growth are 40% for the LCH sector and 35% for the water supply/wastewater sector – these are very high figures and reflect the current level of drivers and improvement in the general economy in the UK. Specifically the key markets for many of the companies in Scotland which are construction, manufacturing and domestic which benefit from overall economic growth.

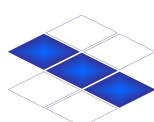
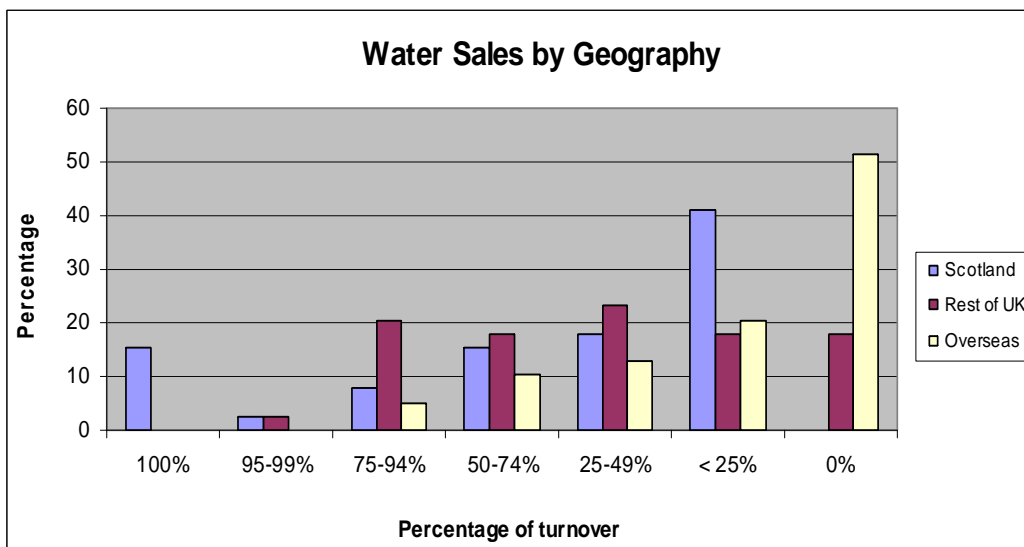
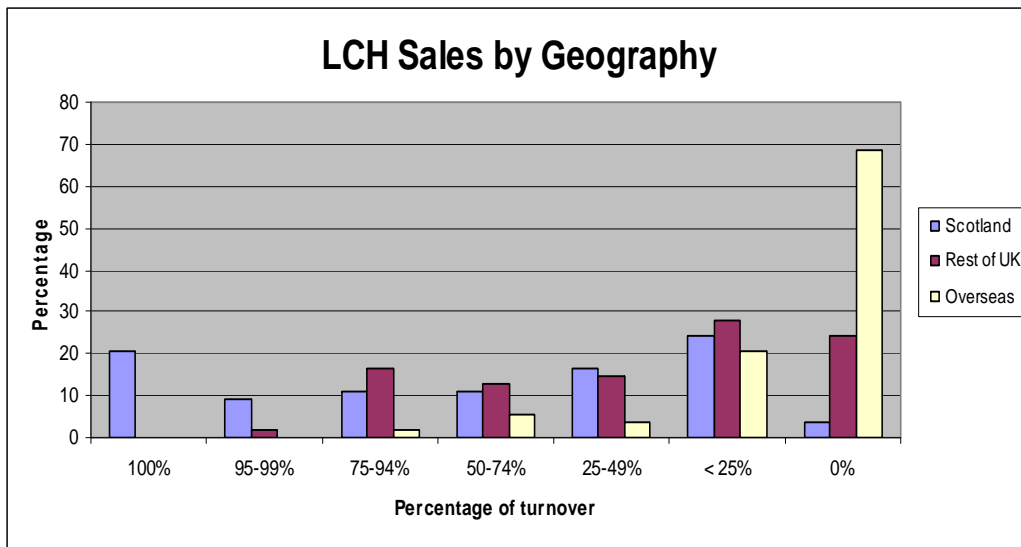


Figure 4.10: Geographical Breakdown of Sales by Sector



Source: Innovas Sector Survey (2014).

In the LCH sector there is a strong element of sales being made in Scotland with 30% of companies having over 94% of their sales in Scotland and 53% of the companies have over 50% of their sales there. This is a high level of sales in the home market for what is a relatively small geographical market. This does reflect the rather localised nature of sales for LCH companies in particular. Nearly 70% of LCH companies had no export sales; this reflects the localised nature of their sales and early stage of development for many of these companies.

There is considerable room for growth in sales to both the other areas of the UK and Overseas markets. This is already being targeted by many of the companies as part of their sales strategy for the next 3 years. This is highlighted in the table below where 62 companies (76% of the respondents to the question) are looking to expand sales in new geographical markets as well as expanding sales in existing markets.

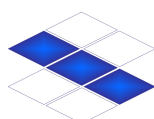


Table 4.5: Areas where Growth is Expected

% of companies by sector	LCH	Water
Geographic markets	60	64
Products/services	57	62

Source: Innovas Sector Survey (2014).

Some 60% of LCH and 64% of water supply/wastewater companies anticipate further growth in existing and new geographical markets with a slightly lower percentage for each forecasting growth through new products. Scotland is being targeted by 15 companies in both sectors for further expansion of sales with the rest of the UK by a further 21 companies. This highlights that the companies still see local markets as providing them with good opportunities to increase their sales. The drivers and improving economic situation is increasing confidence that these markets can deliver the required growth. The majority of these companies are in the LCH sector.

Many companies are anticipating further growth in existing markets which suggests confidence in the expansion of these markets, reducing the need to enter new markets. 20 companies see their growth coming in international markets; these are mainly water supply/wastewater sector companies. There is no clear picture currently being seen with the product areas for growth, though biomass and renewable energy for heating has the largest number of companies seeing these as growth areas.

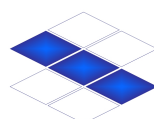
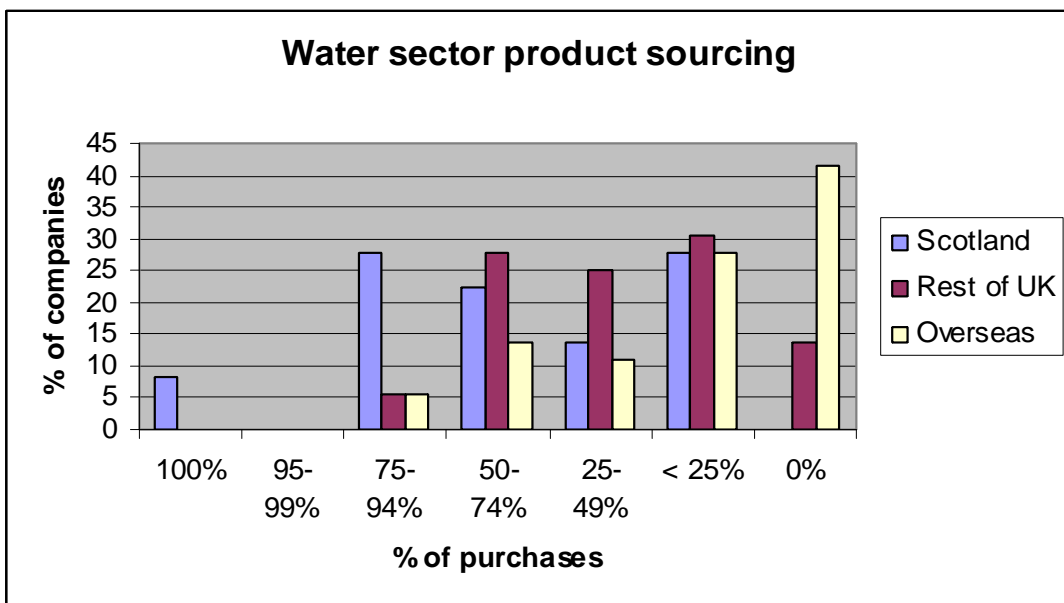
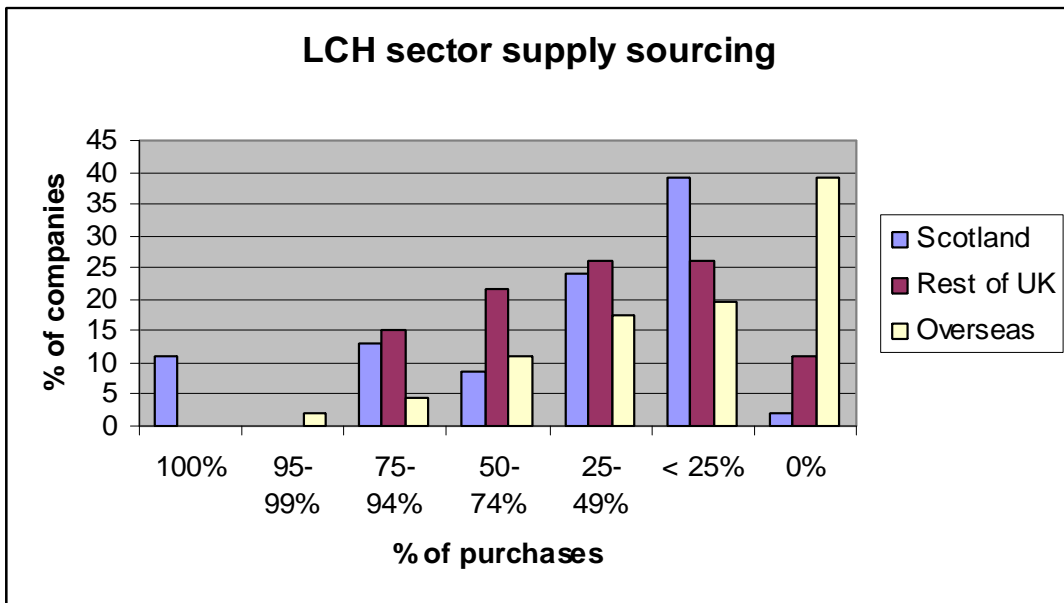


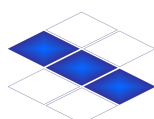
Figure 4.11: Source of Products and Supplies



Source: Innovas Sector Survey (2014).

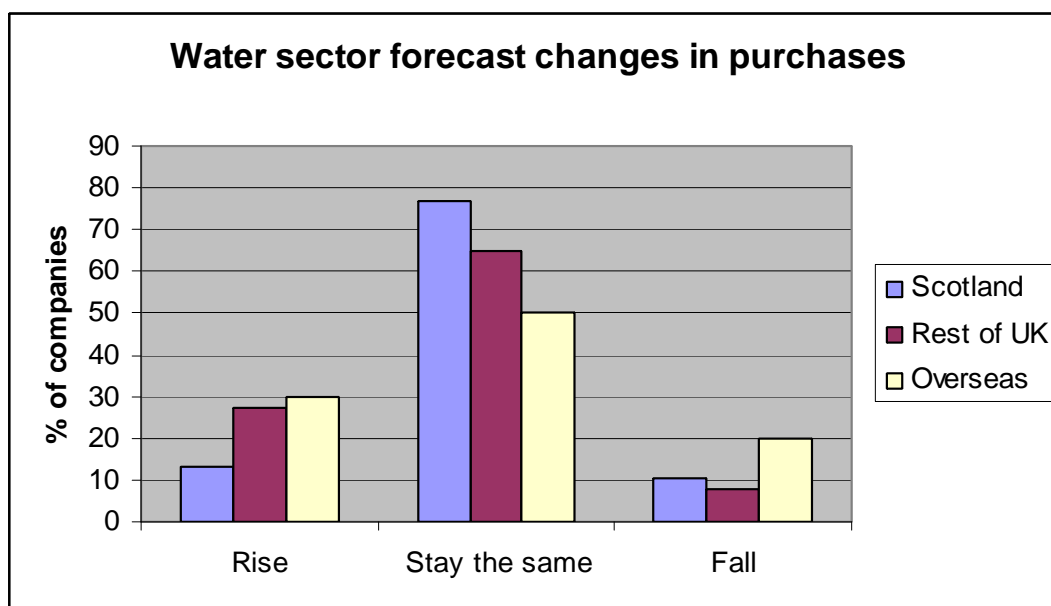
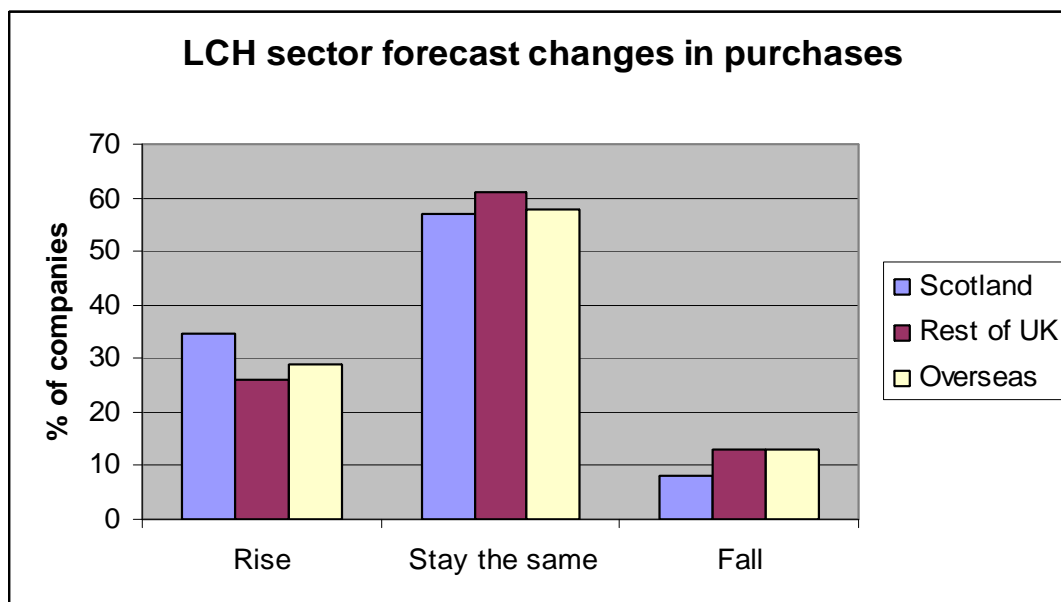
The highest level of supplies is procured in Scotland, with all but one company sourcing some supplies here. About 55% of the water supply / water treatment companies source over 50% of their supplies from Scotland. 42% source nothing overseas.

The LCH companies have a higher level of sourcing overseas and in the rest of the UK which indicates that many of the products they need are not available in Scotland. This is not unusual as there is a limited amount of manufacturing of the key equipment for many sub sectors in the LCH sector such as biomass boilers and solar thermal panels.



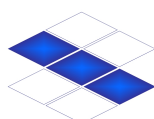
Two thirds of the companies said that they had no problem sourcing products and supplies from Scotland however a third stated that they did have problems and this included no Scottish manufacturers of specialised products, costs expensive compared to other areas of UK and internationally, more flexible production overseas and long delivery times from Scottish suppliers.

Figure 4.12: LCH Sector - Expected Change in Sourcing Supplies



Source: Innovas Sector Survey (2014).

The main difference between the sectors is that over 30% of the LCH sector companies anticipate sourcing more products from Scotland whereas only 12% of water supply/wastewater companies expect the same. This is offset by the fact that water supply/wastewater companies are already purchasing more from Scotland. This



indicates that the LCH companies expect the supply chain in Scotland to develop with time. All areas are expected to see an overall increase in procurement levels as the markets continue to grow.

Current Markets

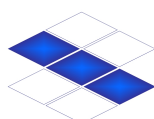
Table 4.6: Current Markets by Sector

Market	LCH	Water	Totals
Construction	21	19	40
Domestic end users	28	10	38
Water supply and wastewater companies	11	25	36
Commercial sector - including retail	22	9	31
Local government	15	12	27
Manufacturing - food & drink	14	13	27
Manufacturing - chemicals	13	12	25
Manufacturing - other	11	13	24
Academic establishments – schools, colleges, universities	12	10	22
Environmental consultancy	9	12	21
Services - other	11	9	20
Manufacturing - oil & gas	11	8	19
Engineering and architecture	9	10	19
Distributors - overseas	6	12	18
Healthcare including NHS	10	5	15
Tourism - including hotels	10	5	15
Distributors - UK based	8	7	15
Central government	8	4	12
Regulators including Environment agency and DEFRA	5	6	11
Marine industries	3	6	9
Leisure services	5	4	9
Public sector organisations including police and fire services	5	3	8
Bioscience sector	1	3	4
United Nations	1	2	3
Other overseas aid organisations	1	2	3

Source: Innovas Sector Survey (2014).

Note: Sample size of 73 firms operating in LCH sector and 53 companies operating in Water Supply/Wastewater sector.

What the table above indicates is that the construction sector is very important to both sectors. The domestic and commercial sectors are much more important to the LCH sector and the water supply and wastewater companies sector is very important to water supply/wastewater companies. The above four markets have the

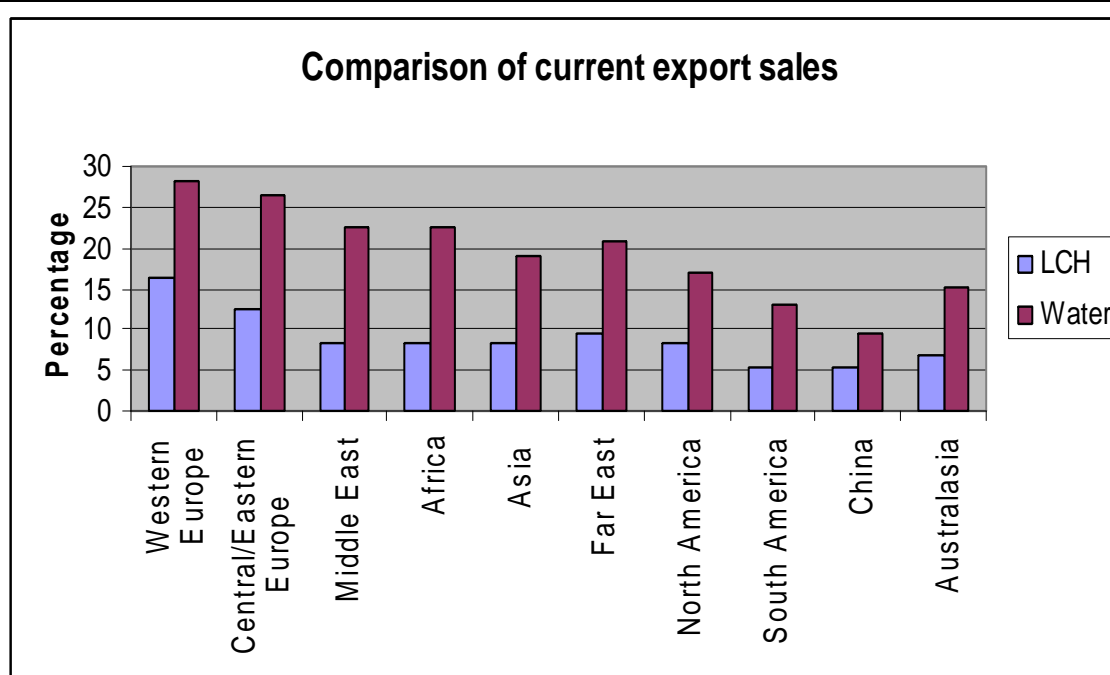


most companies involved in them closely followed by local government and the various manufacturing activities which are important to both sectors. The economic growth currently being seen, and forecast to continue, will provide good growth opportunities for companies supplying manufacturing. The water supply/wastewater companies are more likely to sell via international distributors and LCH ones to sell to the NHS and tourism sectors.

There are 2 companies with UN agencies as a customer and 3 with overseas aid organisations which might be considered fairly low for companies providing products and services in the water and heating sectors. A few additional market segments of note are farms and agriculture and festivals/events both for water supply/wastewater sector companies. With 11 of the market segments having over 20 companies supplying into them, it suggests that there is scope to look at supply chain programmes or enhanced procurement initiatives.

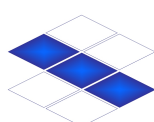
International Trade

Figure 4.13: Comparison of Current Export Sales



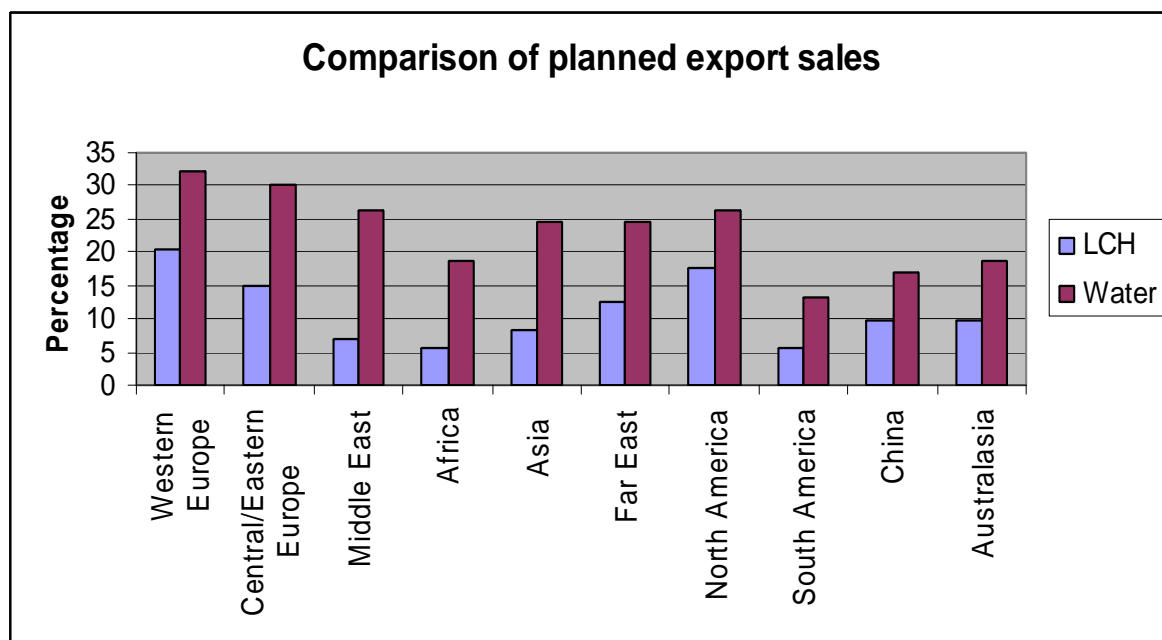
Source: Innovas Sector Survey (2014).

From a sector point of view the vast majority of exporting companies are in the water supply/wastewater sector or those that cross both sectors. This actually is normal and seen in every other area of the UK where the water supply/wastewater sector has a very strong export performance historically. The maturity and slow growth in the UK water supply/wastewater sector as a customer has forced companies to seek growth overseas.



The low carbon heating and cooling sector is fairly young with a still quickly expanding Scottish and UK market which is not mature or saturated. It is natural for companies in this sector to seek growth in the easier to service markets closer to home.

Figure 4.14: Comparison of Planned Export Sales



Source: Innovas Sector Survey (2014).

This table shows that in a number of areas such as the Middle East, Asia and Africa that the difference in the numbers of water supply/wastewater companies planning to export there compared to LCH ones is even higher than those for current exports. This suggests that water supply/wastewater companies are increasingly looking to export markets for growth whereas LCH companies are planning to focus mainly on home markets.

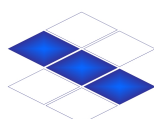


Table 4.7: Areas of Growth for Companies by Sector

Planned Geographic Area	Number of Businesses	
	LCH	Water
Western Europe	5	4
Central/Eastern Europe	5	6
Middle East	2	5
Africa	1	3
Asia	2	6
Far East	2	3
North America	7	6
South America	1	2
China	3	5
Australasia	3	4

Source: Innovas Sector Survey (2014).

The difference between those currently exporting to a market and those planning to export to that market is important. There are more companies planning to export to North America, Western Europe and Central Europe who are not currently exporting there than for the other areas. The least popular areas for new export markets are South America and Africa. The majority of LCH companies looking at new export markets are looking at Western Europe, North America and Central Europe.

The **main reasons** for companies exporting to the markets they do are fairly straightforward with need for products to solve local issues – particularly water related ones in developing markets, good profit levels achievable in the export markets, acceptability of products in export markets that are similar to the UK such as Western Europe and contacts in export markets. There were a few specific ones based around need to provide independent renewable energy solutions for heating/cooling and this is where some companies have specifically designed products, their products are more suited to export markets rather than the home market. Some of the key **export issues** included:

- Identifying and engaging with local agents and distributors
- Local regulations and legislation
- Lack of internal resources
- The financial investment required to prime exporting activities
- Adapting products to the local market conditions

These are standard across the UK and internationally for any company looking to export.

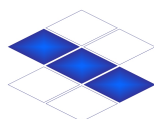


Table 4.8: Plans for Export among Current non-Exporters

Plans to Export	Percentage of Businesses	
	LCH	Water
Plans to Export		
Yes	26%	58%
No	65%	32%
Undecided	9%	11%

Source: Innovas Sector Survey (2014).
Sample size of 36 LCH and 19 Water companies.

There is a far higher level of interest in non exporting water supply/wastewater companies to export than non exporting LCH companies. The fast growing LCH market in Scotland and the UK supporting by government incentives and initiatives makes growth in these markets more possible than for water supply/wastewater companies as this sector is mature in the UK and growth is more likely to be achieved in overseas markets.

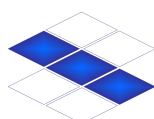
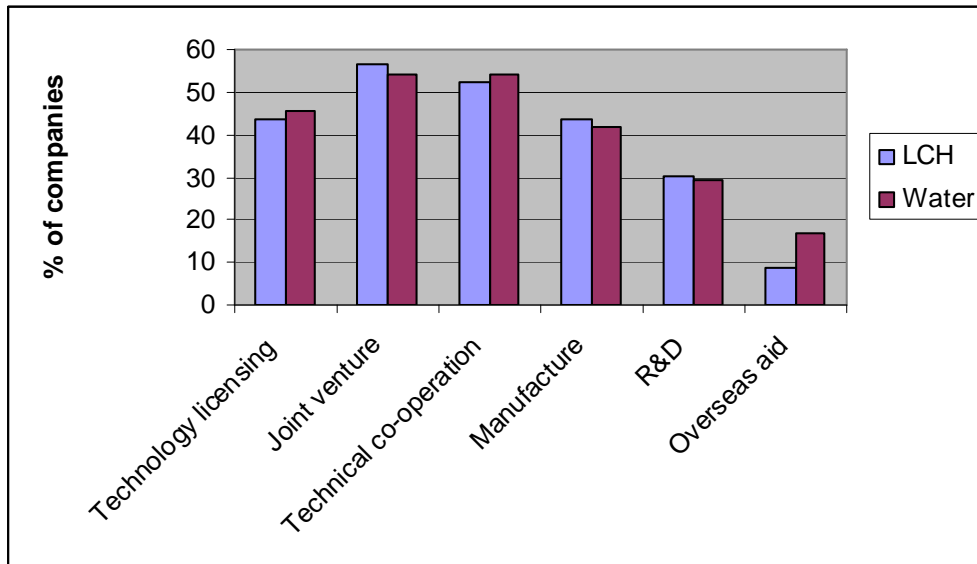
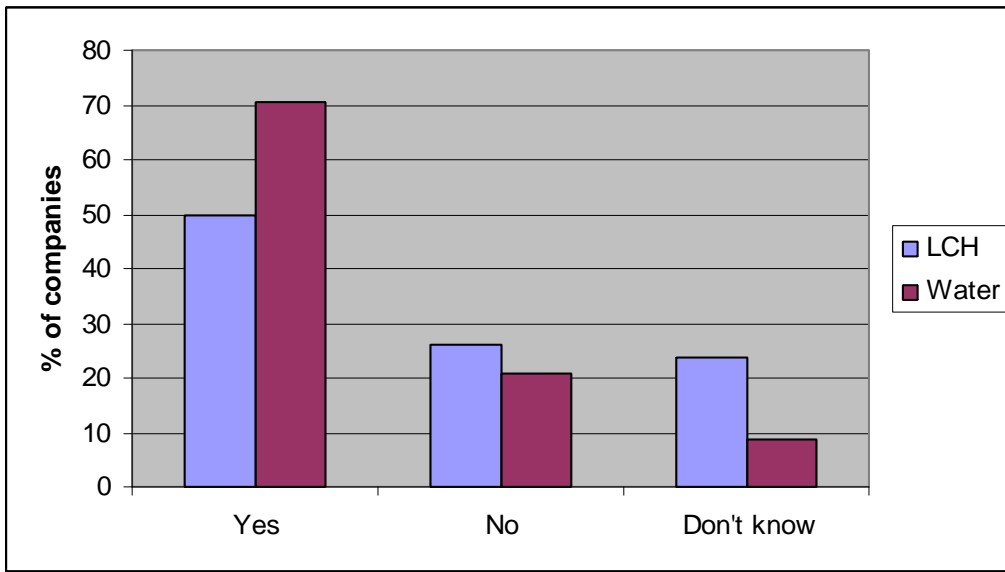
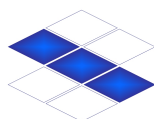


Figure 4.15: Interest in Overseas Collaborative Opportunities by Sector



Source: Innovas Sector Survey.

The lowest amount of overall interest is in overseas aid collaborative opportunities. However this is more a reflection of the types of technologies that the surveyed companies have and the administrative difficulties often involved in successfully supplying overseas aid opportunities. Most interest being for joint ventures and technical co-operation, though technology licensing, manufacture and R&D opportunities closely followed.



International Trade Analysis

There is a clear split between the water supply/wastewater and LCH sectors with 49% of the water supply/wastewater companies having export sales and only 31% of the LCH companies having export sales. 28% of the water supply/wastewater companies have over 25% of their sales in export markets and 15% of the companies having over 50% in export sales. For the LCH companies 12% have over 25% of their sales in export markets and 8% have over 50% in export sales.

There are a higher percentage of water supply/wastewater companies who are also not currently exporting but who are planning to export in the future with 11 out of 19 non exporting companies interested in exporting in the future. This is in contrast to the LCH companies where only 9 out of 34 non exporting companies state they are interested in exporting in the future.

Currently exporting water supply/wastewater companies also are looking to expand their market coverage with all the geographical areas being targeted for a variety of reasons, some of which are shown below. The most popular areas for new exports are Central Europe, Asia and North America. Though Africa, the Far East and South America had the lowest levels of future interest they still had more interest than the majority of areas from the LCH sector companies. Only North America for the LCH companies had a higher level of interest than any from the water supply/wastewater sector with Western Europe and Central Europe the next highest interest.

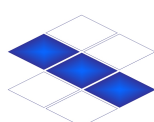
Water Supply/Wastewater Sector Exports

Many of the water supply/wastewater companies exporting state that the reasons for exporting were due to the UK market becoming mature and that the majority of new opportunities were being seen overseas. This view was further strengthened with comments regarding the development and testing of products in the Scottish and UK markets then being exported to other developed markets with existing products and services being exported to developing markets. The competitive nature of the UK market also meant that better profits can be obtained in overseas markets, especially developing ones, where competition is less.

There are a number of water supply/wastewater companies supplying the oil and gas industry with some bespoke and quite innovative products/services. They identify the markets in the Pacific Rim as being particularly interesting at this time as most of the new oil and gas field developments are happening there.

Areas with high population growth such as India and Pakistan are also being targeted by water supply/wastewater companies with wastewater, sewage and contaminated groundwater treatment products/services. The increase in population is putting extreme pressure on the systems in these areas and therefore providing opportunities for the deployment of tried and tested products/services.

The English market, where water metering is becoming more prevalent, is also providing increased opportunities for products/services that improve the efficiency of, and monitoring of, water use. Some of the major projects in England, such as those around London, are also providing good opportunities for Scottish



companies. The companies which are both in the water supply/wastewater and LCH sectors tend to have a strong Scottish and UK base of sales with sales into the more developed and advanced markets overseas. Their products are generally focused on the efficient use of central heating systems, use of water for heating and/or measuring and monitoring heat using sensors.

The sensor companies also are seeing good overseas sales in the Far East and North American markets. This is an area that will continue to grow as the less advanced developing markets catch up with the mature markets in the use of technology. The companies involved in water use efficiency and water storage see continuing growth internationally in the long term as water use is put under pressure.

Water supply/wastewater companies state that the key challenges facing them are finding the right distributors, gaining access to the target customers, understanding legislation and regulations in target markets and expanding into new markets. These are the challenges seen by the majority of experienced exporters in other areas of the UK and in other sectors.

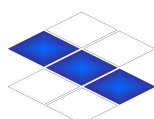
LCH Sector Exports

There are a number of competing drivers which are currently leading to LCH companies being less interested in exporting and being more focused on the home markets. Legislation such as the Renewable Heat Incentive is driving the home markets which are seen by many of the LCH companies as being very attractive at the moment. The LCH sector is fairly new and has a number of new and emerging technologies, unlike the water supply/wastewater sector which has many mature and well tried and tested technologies. The home markets are still growing, have not received full potential and are providing ample opportunities for many of the LCH companies over the short term.

The markets for low carbon alternatives for heating and cooling tend to be those which are developed markets and with a strong level of legislation and incentives driving the reduction of carbon emissions. Companies state that markets such as North America in particular, Western Europe and Central Europe are the key ones for low carbon heating.

The current export markets reflect this with Western and Central Europe having the highest level of exports though a high percentage of this is from LCH companies with both water and LCH products/services. These two markets have high levels of interest from currently exporting LCH companies though the highest level of interest is in North America which is another developed market with good levels of legislation and incentive drivers. Some of the key things the LCH companies stated they are looking for are similar markets to the home ones with good incentive levels, social housing and rising energy costs.

The challenges for LCH companies are identifying the right markets to enter, understanding legislation in new markets, developing the right resources internally and ensuring that the home market is established to provide a stable financial base to expand from. These are the challenges commonly seen by new exporters and are quite different to those for the water supply/wastewater sector companies. The future support needs for LCH



companies gave a very low overall emphasis on international trade whereas for water companies there was a high level.

LCH companies are currently far more focused on home markets and access to procurement opportunities in the home markets are more important to them currently.

The Studies for the Department of Business Innovation and Skills in 2009-10¹ and subsequent years show that the water supply/wastewater sector has a higher level of export sales than the low carbon heating and cooling sectors. The survey responses reflect this and therefore Scotland is not unusual in this regard.

Barriers and Challenges

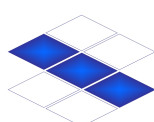
The companies were asked to state the key barriers to growth and these are shown in the table below.

Table 4.9: Barriers to Growth		
Barriers	LCH	Water
Lack of suitable sites and premises	7	4
Difficulties in recruiting staff with scientific/technical skills	20	17
Other staff/recruitment issues	9	9
Need to develop business management skills	4	6
Lack of suitable training providers available locally	4	3
Lack of finance for business growth	21	16
Lack of new products or services	1	3
Lack of resources for R&D	10	11
Market conditions	25	16
Limited marketing conditions	10	8
Lack of market intelligence	11	7
Competition	25	23
Export costs	6	4
Standards and regulations	22	15
Location/distance from markets	11	12

Source: Innovas Sector Survey (2014).
Sample size of 73 LCH and 53 Water Supply/Wastewater sector companies.

There are a number of differences in the stated barriers with LCH companies faced with a higher degree by standards and regulations, market conditions and lack of finance for business growth. The interesting issue as

¹ BIS - The Low Carbon and Environmental Goods and Services Sector in the UK: An Industry Analysis – April 2010 with updates in 2011, 2012 and 2014



stated by many of the companies with the standards and regulations is not the actual regulations but the changes in them implemented by government with short notice. The market needs stability and recent history has shown that government, whilst providing some good incentives, has not managed to provide the long term stability and market confidence desired by companies in the LCH sector. The changes in feed in tariffs in 2012 are a classic case in point, where the sudden change slowed growth in the solar PV market and led to a number of companies moving out of the market. The concerns in this area are genuine as investment by the companies and into the companies is dependant on the assessment of risk by investors. The lower the levels of stability the less likely investment is for companies.

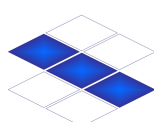
The market conditions concerns are based on the instability of the new and emerging LCH sector and the high level of competition which has entered the market both from Scottish/UK companies and those from overseas. Though economic conditions are improving it is still clearly difficult for companies in these sectors with conditions still tough both in the UK and overseas markets. The water companies also identify market conditions as a key barrier, though that is more to do with the lower levels of growth in the home markets and the intense competition from companies already involved in it. The companies further stated that access to procurement opportunities provided by the public sector and larger companies was difficult, though they saw it as important for their future development.

Competition was identified by the highest number of companies as being a major barrier to growth in both sectors, this reflects concerns of cheaper imports and expansion by companies in other areas of the UK and internationally. Both the water and low carbon heating sectors have sub sectors which are mature and have a degree of established UK competition and new imported competition, often at lower prices. This was born out with the comments from the companies on the barriers. Accessing suitable finance in a timely manner is also highly rated as a key barrier to growth, though this is universal and not limited purely to these sectors.

There is not much that can be done to reduce the competition concerns apart from ensuring that Scottish companies have access to targeted finance, the procurement and international trade opportunities that can provide growth, the right business skills to exploit them and the innovation and research capabilities to develop new products/services that can compete on the global stage. This is something that all public sector support organisations strive to deliver for their companies with varying degrees of success.

The recruitment of technical staff is seen as a significant barrier to growth by both sectors, which is seen in other areas of the UK. Competition for technical staff is high across the UK for a variety of sectors not just the water and LCH ones.

The lack of new products or services is not seen as a barrier with only a few companies highlighting this. This is a positive result as nearly all the companies therefore are happy with their development of new products and services. The results from the R&D section with high relative levels of R&D spend suggests that companies in these sectors are developing and launching new products and services. Lack of suitable premises, export



costs and training providers are also seen as not being an important barrier to growth overall. Key issues highlighted by the companies as **challenges** include:

- Changes/reduction in feed in tariffs and government incentives – strongly marked
- Public sector reluctance to embrace new technologies and approaches
- Stricter regulations and standards for current products
- Smaller companies trying to compete with larger companies
- Lack of financial strength of company
- Time taken to get products to market
- Lack of R&D strength in company compared to larger competition.

The companies were also asked about what they see as **opportunities** and these included:

Water Supply/Wastewater sector

- Deteriorating water supply conditions in world markets
- Improved costs of manufacturing products making products more competitive in home markets

LCH Sector

- Regulations and legislation driving uptake of products – also applies for water supply/wastewater sector
- Green Deal and ECO
- Increasing energy costs increasing uptake of energy efficiency products
- Feed in tariffs
- RHI.

Some of the **key drivers** identified included:

Water Supply/Wastewater sector

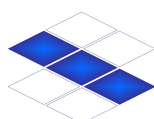
- Water quality standards and EU water directives

Both Sectors

- Better and faster broadband
- Internet based solutions

LCH Sector

- RHI – strongly marked
- Feed in tariffs.

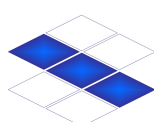


Future Support Needs

Table 4.10: Future Support Needs						
Future Support Needs	Importance					
	LCH			Water		
	High	Mid	Low	High	Mid	Low
Developing collaborative partnerships and agreements with research institutions	5	14	24	8	14	14
Developing collaborative partnerships with other businesses	22	18	8	15	19	4
Financing the business	21	16	9	21	9	6
Accessing supply chain opportunities into larger businesses	15	16	15	16	17	4
Access to postgraduate students (eg. for product training)	2	10	32	5	8	22
Funding for projects	17	12	15	14	10	11
General business advice	3	23	19	3	21	12
Innovation and R&D	13	12	19	18	7	11
International trade	10	10	24	13	9	13
Awareness of overseas environmental standards	9	8	26	12	8	16
Accessing overseas procurement opportunities	8	12	23	11	11	14
Marketing information and/or advice	12	18	17	7	21	8
Networking	14	21	11	12	20	4
Resource efficiency	7	15	20	11	9	15
Recruitment	8	21	17	10	16	9
Sites and premises	4	17	23	3	13	18
Skills and training	10	24	10	12	14	9

Source: Innovas Sector Survey (2014).
Sample size of 73 LCH and 53 Water Supply/Wastewater sector companies.

The support requirements for the majority of water supply/wastewater and LCH companies are different. The sectors are at different stages of development with the water supply/wastewater sector being mature and the LCH sector being in the early stage of development. The age and turnover profiles of the water supply/wastewater and LCH sectors reflect the difference in these stages with the water supply/wastewater sector having an average of older companies and higher levels of turnover. Both sectors place a high emphasis on financing the business, financing projects, developing business partnerships and networking.



Finance is critical for any business wishing to expand sales – the LCH sector in particular is reliant on financing for projects. This is often the customers’ responsibility to obtain, though it is in partnership between the companies and customers that successfully make this happen on many occasions. Developing business partnerships and networking are interlinked and something that the members of trade associations stated as being some of the key benefits of being involved with them.

The water supply/wastewater companies have a greater requirement for international trade support and access to overseas market and procurement opportunities. They also have more interest in developing research partnerships and innovation and R&D as well as recruitment, skills and training and accessing PhD students though these are still at fairly low levels. The water supply/wastewater companies are operating in a more mature market where the opportunities for growth are overseas and in new products/services to address new and niche problem areas. Their stated support needs reflect this with a focus on international trade, staff and innovation.

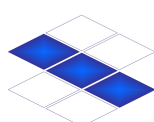
The LCH companies place more emphasis on marketing advice and information than water supply/wastewater companies which again reflects the different stages of development for each sector, where new and emerging markets require more marketing support initially. The more mature sectors tend to have well defined marketing approaches and hence less support is required.

Developing collaborative partnerships with research institutes and accessing postgraduates is seen as a low priority generally. Though there are good opportunities for Scottish companies to enhance their R&D and innovation processes, the companies currently do not rate these areas. This suggests either that they are unaware of what can be done or genuinely do not believe that it is in the businesses interest to engage with research/academic establishments and their highly qualified staff.

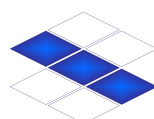
General business advice is also not seen as important by most companies though focused specific and specialist advice is. This is seen in other areas of the UK where more focused support is desired but in short supply. In times of recession and recovery areas such as finding sites and premises tends not to be too much of a problem for business growth. The difficulty is in finding sites for new LCH, particularly, and water or wastewater treatment facilities where planning permission and local objections can lengthen the process and make it difficult to develop business quickly.

Table 4.1 I: Membership of Trade Associations	
Trade Association	Number of Businesses
Scottish Environmental Technology Network	7
Chartered Institution of Water and Environmental Management (CIWEM)	5
British Water	3
Combined Heat & Power Association	2
Scottish Environment Services Association	0
Construction Industry Research and Information Association (CIRIA)	1

Source: Innovas Sector Survey (2014).



There is very a low level of membership of trade associations from the companies interviewed. The fact that only 3 companies are members of the British Water Association is surprising given the relatively active nature of it in international trade initiatives. The companies mentioned that they were members of a variety of other associations and networks including Scottish Renewables, Hot Water Association and Solar Trade Association though no more than 3 companies are members of each of these. The key benefits of membership are seen by companies as networking, the chance to collaborate with other companies, advice regarding changes in regulations and legislation and better access to trade shows.



5. Conclusions

Profiles of High Growth and Reduced Turnover Companies

High Growth Company Profiles

The high growth companies generally already have sales above £1 million and are less than 14 years old. They have manufacturing and R&D facilities with a high spend (over 10% turnover) on R&D. They are interested in exporting and international collaborations with over 40% already exporting. They are forecasting only high growth (67%) or growth (33%).

There is an acknowledgement of the barriers facing them. They also strongly identify future support needs as either high or medium for the majority of the elements. This suggests that the high growth companies take the time to be aware of the barriers facing them and that they understand that support is required to help them develop their businesses. It also suggests that they are actively engaging with support organisations and have positive views on the support provided.

Companies with Reducing Turnover

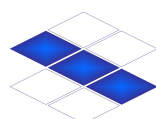
The companies that stated that their sales turnovers had declined in the last 3 years tend to either have turnovers below £250k or between £1 and £5million, which suggests either difficulties in getting established or difficulties dealing with competition. The age of the companies also tends to be higher than for high growth ones. They tend not to be manufacturers and have either no or limited R&D facilities and activities. Export sales are very low and interest in exporting is very low. There is a high reliance on the home Scottish market with the majority of sales being here.

There is a limited acknowledgement of barriers and a very low level of importance being placed on future support needs. This suggests that these companies are not taking the time to look outside the company and therefore not recognised key barriers or seeking the support to overcome them and develop their businesses. None of these companies are members of any of the trade associations mentioned in the survey.

A higher proportion of LCH companies than water supply/wastewater companies reported reductions in turnover, though this is a relatively small sample. The instability in the market caused by changes in government legislation is likely to have an effect damaging the confidence of companies.

Key Points

There have been a number of studies from organisations such as the Institute of Export and UKTI which show that companies which export tend to have higher levels of R&D activity, are outward looking and look for support when it is needed. This leads to higher growth levels and a much more positive outlook for the future. This is certainly supported by the survey results.



The results from this survey suggest that underperforming firms are focused on a limited geographical area for sales, have limited R&D, are mainly suppliers rather than manufacturers and though most were established before 2000 they are struggling to assert themselves. This may well be due to a lack of ambition and the desire to keep the business at a small level, which in itself is nothing wrong. However, inward looking companies with limited ambition are vulnerable to companies with high growth ambitions who are happy to move into new markets.

Where Growth is Coming From

Water supply/wastewater companies had an even split between growth in the home market of Scotland/the rest of the UK and international markets. This reflects the current markets for the water supply/wastewater sector. The products where growth is likely to come from are varied with no real sub set of technologies being dominant, though the companies stated that they see growth coming from new products and services including those around wireless technology, enhanced recovery of nutrients, minerals etc via membrane technologies and water resource efficiency.

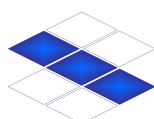
R&D spend by water supply/wastewater sector companies (as a proportion of turnover) is generally higher than that for the LCH companies, which is reflected in the higher percentage of companies in the water supply/wastewater sector having manufacturing and research facilities in Scotland than the LCH sector, which in turn has a higher level of services and agent/distributor facilities.

Water supply/wastewater companies are developing and selling a higher percentage of their own products than LCH companies which are selling a higher level of other companies' products. That is particularly true of the solar thermal, air conditioning, heat pump and biomass technologies where there is little Scottish based – indeed UK based – original product development and manufacture. This also explains the lower levels of export sales and desire to trade internationally for many of the LCH companies. However, there is a core of LCH companies that are developing solutions around bought in technology which is being exported as part of a package.

The LCH companies were very different in that 80% stated that growth would come from home markets and the UK, with only 20% stating that international markets would provide growth. The product areas where growth is coming from is narrow with solar thermal, biomass and heat pumps being the predominant areas. The renewable heat incentive, green deal, feed in tariffs, energy company obligations and building regulations are definitely driving the LCH sector forward.

International Trade

Water supply/wastewater sector companies have a higher propensity to export than LCH companies. This reflects the more mature nature of the home markets where there is strong competition and opportunities for growth are more limited, hence expansion is more likely in overseas markets where the opportunities are



across all the activities. There is a high level of interest from water supply/wastewater companies in international collaborations and from the current non-exporting companies in expanding overseas.

LCH companies currently have a strong and fast growing home market and as such do not necessarily need to export to grow their businesses. The LCH companies who are exporting tend to be manufacturers and those supplying products to other LCH companies.

Trade Associations

The very low level of membership of the trade associations suggests that although companies have stated networking and developing business partnerships as being important, they do not use these particular associations currently, and there is "clustering" around particular associations/networks. There is a wide variety of associations, normally based around specific technology areas, but nothing really for either the water supply/wastewater or LCH companies to use as a wider networking opportunity. This presents an opportunity to provide such a wider reaching, but business and networking focused initiative.

Companies in both Sectors

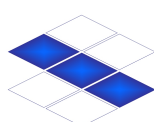
There are 17 companies operating in both the water supply/wastewater and low carbon heating & cooling sectors. Their products are generally focused on the efficient use of central heating systems, use of water for heating, heat recovery, smart management and/or measuring and monitoring heat using sensors. Six of those companies are involved in heat recovery with 3 recovering heat from rivers/canals/greywater and 5 companies use water for heating purposes. Four companies are involved in measurements & monitoring, energy monitoring and smart management of water.

The companies involved in heat recovery are a separate group from those involved in measurements, monitoring and management. Eight companies are involved in the design and manufacture of equipment. There are 6 companies with turnovers above £5million, which is above average for both sectors (water supply/wastewater has 22% and LCH 16% of firms turning over more than £5million per annum). This shows that the companies with activities in both sectors are generally larger than average with higher than average R&D intensity, and also higher than average export sales (with 41% of companies being involved in export).

Barriers

There are a number of differences in the stated barriers across the sectors, with LCH companies affected more by standards and regulations, market conditions and lack of finance for business growth. The water supply/wastewater companies also identify market conditions as a key barrier, though that is more to do with the lower rates of growth in the home markets and the intense competition from companies already involved in it.

The companies further stated that access to procurement opportunities provided by the public sector and larger companies was difficult, though they saw it as important for their future development. Competition was



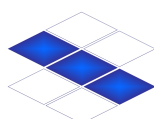
identified by the highest number of companies as being a major barrier to growth in both sectors, this reflects concerns of cheaper imports and expansion by companies in other areas of the UK and internationally. Accessing suitable finance in a timely manner is also highly rated as a key barrier to growth, although this is universal across all economic sectors and not limited purely to water supply/wastewater and low carbon heating/cooling.

There is not much that can be done to reduce competition concerns apart from ensuring that Scottish companies have access to targeted finance, procurement and international trade opportunities that can provide growth, the right business skills to exploit them and the innovation and research capabilities to develop new products/services that enables them to compete on the global stage. This is something that all public sector support organisations strive to deliver for their companies with varying degrees of success.

Future Support Needs

The key future support needs as identified by the companies are;

- Finance for company growth – critical at every stage of a companies development – there are many options here and helping companies find the right option is very useful
- Collaboration with other companies – mainly in the same sector with complementary products and services or access to target markets
- Networking – with companies in the same sector and potential customers
- Funding for projects – essential for many of the LCH companies who are reliant on customers getting funding for their projects
- Innovation and R&D – very strongly marked by manufacturing water supply /wastewater companies who understand the need to continue developing new products and services to beat the competition. Still important to the LCH companies but again mainly the manufacturing ones, rather than those who supply bought in equipment or provide services
- Accessing supply chain opportunities into larger companies – nearly all the water supply/wastewater companies saw this as important. The LCH companies were split between those companies with domestic end user focused products/services who were not interested and those who are manufacturers or had solutions applicable for larger scale projects. There are a number of companies who stated that large companies do not want to use smaller companies as suppliers. LCH companies have stated that they expect the LCH supply chain in Scotland to develop in the future.



6. Recommendations

Overview

The recommendations are based on the survey results and analysis, which highlighted the level of interest in the future support needs in relation to collaborating with other businesses, networking, business finance, international trade and innovation/R&D support. All these areas are seen as important for growth across both sectors.

It would be easy to provide a long list of recommendations covering all areas stated by the companies as being desirable to them. However there is a limited resource available to deliver support and there is already a large amount of general business support available which can be more effectively promoted to the companies. The companies can also be more effectively prepared to identify and access support which is right for them. The four main recommendations below cover the main areas of concern to the companies and in which public sector intervention has proven to be effective in other areas of the UK and internationally.

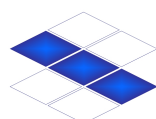
1. Finance

There are numerous pathways to finance, not all of which are known to water supply/wastewater and LCH companies, and many of which are technology or market specific. It is difficult for companies to spend the time and resources accessing them and to know whether they are accessing the right options. Therefore a sector focused signposting and advisory service is recommended as an important step to support companies to access suitable finance from the numerous sources already available.

Smaller companies that are developing new products often require relatively small amounts of finance to take these developments to the next stage and therefore it is also recommended to look at a small scale finance fund or mechanism which is easy to access and, most importantly, fast to make a decision. It is often the speed of access rather than size that helps companies progress ahead of the competition.

It is recommended that a co-ordinated approach to developing funding packages for LCH projects is adopted, especially for areas such as district heating where initial pump priming is required to get the infrastructure in place which can then act as a framework for new and emerging technologies to be applied, proven and heat distributed efficiently to customers.

The water supply/wastewater sector in particular requires funding to support the commercialisation of new technologies, services and approaches. This should link in with innovation and R&D initiatives to provide an environmental technologies verification service to enable the smaller companies to achieve the correct certification and have genuine real life results available which have been verified as part of the process.



2. Focused Sector Support

The water supply/wastewater and LCH sectors, though sharing similar support requirements, have distinctly different support requirements when it comes to accessing markets, especially international ones, accessing finance and innovation/R&D. Focused sector support enables sector and technology specific initiatives to be delivered efficiently and tends to be better appreciated by those companies that take advantage of the support available. It also enables a pool of knowledge and experience to be developed by the support organisations which will enable them to provide more effective support to sector companies.

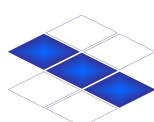
Sector focused initiatives can include supply chain work, international trade missions, networking with other sector companies and groups, networking with potential customers and meet the buyer style events. All of which meet some of the key future support requirements stated by the companies.

For the water supply/wastewater sector there is a well defined supply chain. It is recommended that supply chain and networking initiatives should include the main players in the sector such as Scottish Water and the main tier two contractors, who often are the ones who pull multi-disciplinary solutions together. The supply chain work should include mapping out the technology roadmap for the water supply/wastewater sector and where the main opportunities and customers are for each technology segment. The water supply/wastewater sector has quite rigid timescales for when products need to be approved and when procurement takes place often years in advance.

A detailed understanding of the above will help companies in their planning as to whether to focus efforts on the home or international markets. This will help smaller companies understand where they need to focus their efforts to enable them to enter the supply chain, saving time and effort. It will also help the support providers to develop specific and effective networking opportunities to bring suppliers together with the right level of customer in the supply chain at the right time. The Hydro Nation initiative is a natural one to support the mapping and networking for the water supply/wastewater sector.

The LCH sector is much more varied with a far higher level of small customers spread across Scotland, the UK and internationally. Therefore supply chain initiatives will need to be more localised and based on specific project opportunities, for example the development of a district heating network. Dialogue will need to include stakeholders, end users, contractors, suppliers and developers of new technologies and services. A sector focused support group should facilitate this contact and provide mid to long term visibility of future opportunities as well as supporting Scottish companies take advantage of those immediate opportunities.

Both sectors will benefit from networking events based on technology, market opportunity and geographical areas – there should be a planned but flexible programme of events which companies are encouraged to provide their ideas for with the opportunity to host events themselves. This is something which is effective in other parts of the UK and which tend to generate good results in terms of attendance and business outcomes.



The LCH sector in particular will benefit from a problem/issue/aspiration type approach where the customers or public sector state a problem/issue/aspiration and in an informal event Scottish companies can discuss potential solutions directly with the stakeholders and funders and either as a group or individually develop solutions or a solution roadmap going forward. This approach has been used successfully by countries such as Denmark since the 1970s. It enhances better understanding between all parties and has helped the development of critical technology sectors such as wind energy, district heating, biomass and energy efficient buildings where Danish companies are some of the worlds leading, in these sectors. It is useful where a specific target has been stated but no roadmap put in place to achieve it i.e. reducing carbon emissions in buildings by 25% by 2020.

The LCH sector will also benefit from a sector support group which can liaise and co-ordinate actions with the numerous technology specific organisations such as the Solar Trade Association, Hot Water Association, CHP Association and Scottish Renewables. Having a focal point for all the different types of technologies with their different customer bases will enable a more consistent approach to be utilised for support purposes.

Sector focused support organisations are also better placed to advise the Scottish Government on future policy which may benefit the sectors both in terms of more effective implementation of strategy to deliver the various environmental targets that it is committed to i.e. carbon emission reduction and EU water directives.

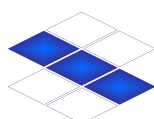
3. International Trade Sector Focused Initiatives

As part of the sector focused initiatives there should be targeted export market support assistance including technology focused missions, both outward and inward to the key export markets identified by Scottish Enterprise. These could include;

- Sensors and monitoring equipment – Far East, North America, China and Western Europe
- Water supply and wastewater treatment equipment – Central Europe, Asia and Africa
- Temporary water solutions – Africa, Middle East and United Nations/overseas aid agencies
- Low carbon heating – Western Europe, North America

The support requirements are different for each sector in terms of assessing whether a company is ready to export, and if it is suitable at the stage of their development. A sector focused approach enables the support organisation to build up an understanding of key export markets which can then be passed onto the companies from a position of knowledge and experience. This approach is valued by companies. It is recommended that a small number of export markets for each sector are focused on and links developed with the various support organisations in those markets that can help Scottish companies develop their sales there.

There is particular scope in the water supply/wastewater sector to bring together collaborative partnerships of Scottish companies with complementary goods and services for targeted trade missions and specific projects. The presence of many active and experienced Scottish exporters in the water supply/wastewater sector



provides opportunities for less experienced exporters to develop mutually beneficial partnerships where joint offers might be developed.

The use of existing contacts in the aid organisations, such as the UN, should also to be examined. This will enable the reduction of the resources and time required for Scottish companies to access and win business. It will also provide opportunities for the smaller innovative companies with relevant technologies who otherwise would not look for business in this area.

The export market potential for water supply/wastewater sector companies is relatively easy to identify and define. However for LCH sector companies it is less easy to identify on a sector basis, and therefore a map of market potential for specific technology areas is required (ie. low carbon heating, low carbon cooling, sensors and energy efficiency).

An important aspect of this focused approach is that Scottish companies have more opportunity to develop relationships in the selected markets and collaborate with overseas companies in the ways stated in the survey (ie. joint ventures, technology licensing, technical co-operation), which is important to Scottish companies who are at an early stage in their export activities such as many in the LCH sector and which can often lead to a first step in developing international trade.

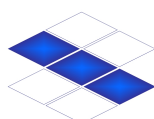
4. Innovation and R&D

Sector focused innovation groups have been proven in other areas of the UK to help companies develop products and services quicker and more effectively. Again the ability to develop relationships with academic and research organisations with a sector/technology focus enables a real depth of understanding to be developed by the support organisation and its staff. This is the kind of support that companies appreciate and will make use of, when they can see genuine benefits to them spending their limited time and resource on.

There should be a continuous dialogue, through specific networking events, between the larger companies which are key to sector development in Scotland such as Scottish Water and SSE and those companies in the supply chain or who wish to be part of the supply chain. The aim being for the larger customer companies to discuss their future issues and requirements directly with the companies potentially developing new solutions. This early view of the potential opportunities can be used by the companies to focus their innovation and research effort into specific technology/market areas, and by the sector support teams to assess where they should be focusing their support into. This approach should be part of the supply chain initiatives.

The LCH sector companies require more support in developing new products and services and therefore the majority of the focus should be on early stage support. However there is still the need for funding and support for LCH companies to implement projects where new technologies can be tested, proven and have genuine exposure to real life situations where comparative results can be attained.

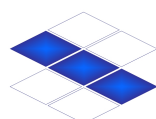
The water supply/wastewater companies require more support to verify their technologies, services and approaches, so that they can satisfy the technical and quality demands of the larger companies who tend to be



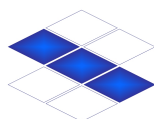
at the top of the supply chain and who have very stringent selection criteria. This has been highlighted as a particular issue with smaller companies, which stated that the time taken is a major barrier to them expanding sales turnover and obtaining additional investment to expand business activities.

Through the use of sector and/or technology specific networks the links between Scottish companies, research establishments and academic institutions should be strengthened. For the water supply/wastewater sector, Hydro Nation is a potential focus point for this activity. Test sites for new technologies for both sectors is important and should be a priority to help support the SMEs in particular to test, monitor and prove their technologies prior to product commercialisation.

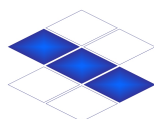
The sector focused support should identify technology calls for funding opportunities and support Scottish companies to access them when relevant and appropriate. The support should also link into the existing innovation networks such as the Enterprise Europe Network and support companies in accessing the support from these organisations.



APPENDICES



Appendix I – Survey Approach



Introduction

As part of the study, surveys were carried out of businesses operating in either (or both) the water supply/wastewater and low carbon heating/cooling sectors. The survey sample was split into two groups:

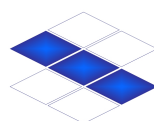
1. Businesses that were on Scottish Enterprise's and HIE's lists of lists of Relationship Managed firms²
2. Other businesses that were not currently Relationship Managed, but which were believed to be active in one or both of the sectors; the list of these firms was drawn from a variety of databases held by or accessed by Innovas, plus some additional businesses identified by Scottish Enterprise and HIE

The survey is a vital source of evidence for the study. It provides individual company information including economic measures, international trade activities and research/development activities. The same survey was used for both sets of businesses.

The survey enables a baseline to be established, which can form the basis of future surveys, and from which trends can be measured and analysed. It provides important hard market information that highlights the relative importance of each sector to the Scottish economy and provides focus for the development of recommendations based on hard economic information. The survey covers the following key information:

- Sector location, size (turnover and employment) and structure
- Company ownership, legal status, age, etc
- Company activities
- Markets (customer, geography) and propensity to trade
- Recent sector growth (turnover, employment, profit, investment)
- Innovation and R&D (staff, turnover, new products/services)
- R&D and collaborations
- Networks and trade body membership
- Future growth (turnover, employment, profit, investment); key geographic and product growth opportunities
- Main barriers to growth
- Key business support needs
- Previous support received from Welsh Government and effectiveness; changes needed

² Excluding any businesses that have been surveyed by (or on behalf of Scottish Enterprise) in the previous six months, in line with Scottish Enterprise's survey protocol.



Relationship Managed Firms

Based on the list of Relationship Managed firms provided and taking into consideration firms that were to be excluded from the survey, this left 89 firms to be contacted. Efforts to publicise the survey and to maximise survey participation involved the following:

- Introductory telephone calls to all companies to inform them about the survey and to confirm appropriate contacts at the business who would be best place to complete the survey
- Individual email shots to all firms providing further information about the survey, a link to the web survey and providing firms with a choice of completing the survey themselves online or via a telecom with one of the members of the survey team (all bar a handful preferred to complete the online version)
- Follow up reminder calls and emails on a periodic basis to those companies that had yet to complete the survey.

Firms were contacted up to five occasions via a combination of telephone calls and email shots to maximise the response rate and also to fill in any gaps in information contained in completed response.

Following the original telephone calls and email shots, 11 firms stated that the survey was not relevant to them, and these firms were not pursued any further. This gave a final total of 78 relevant contacts, of which 56 completed the survey in the reporting timeframe (a response rate of 72%).

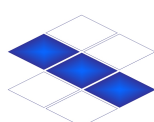
Non-Relationship Managed Firms

Drawing on several different sources, a total of 348 firms were identified. Following further investigation, it turned out that 37 businesses were no longer trading, whilst another 32 were ruled not relevant following a close inspection of their activities. For a further 41 firms, it was not possible to identify any contact details (telephone or web/email).

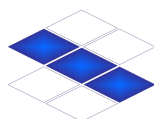
Introductory telephone calls were subsequently made to those companies for which no principal contact was provided. Following this, a total of 240 “live” firms were left. The approach to conducting the survey was as follows:

- Individual email shots to all firms providing further information about the survey, a link to the web survey (the Non-Relationship Managed firms survey was purely web-based)
- Follow up reminder emails on a periodic basis to those companies that had yet to complete the survey.

Firms were contacted up to five occasions to maximise the response rate. A total of 53 firms completed the survey in the reporting timeframe (a response rate of 23% - above the market research industry average for “cold call” surveys).



Appendix II – Survey Questionnaire



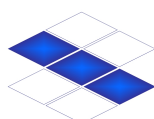
Company Information

1) Company details	
Company name	
Address 1	
Address 2	
Address 3	
Address 4	
City/Town	
County	
Postcode	
Telephone	
Contact name	
Contact position	
Contact email	
Company email	
Company website	

Section I: Company Overview

This section seeks basic information about your company's Scotland operations.

2) What is your company status?	
PLC	
Limited Company	



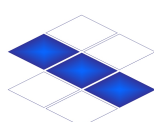
2) What is your company status?	
Partnership	
Sole Trader	
Social Enterprise	
Not for Profit Organisation	
Other (please specify)	

3) Are your company's headquarters located in Scotland?	
Yes	
No	

4) If NO (Q3), where is the head office (UK town/city, or country if outside UK)

5) In what year was the company established in Scotland?

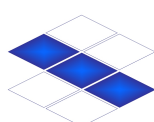
6) How many people (full-time equivalent) did your company employ in Scotland in the 2012/13 financial year?	
1-5	
6-10	



6) How many people (full-time equivalent) did your company employ in Scotland in the 2012/13 financial year?	
11-50	
51-249	
250-499	
500+	

7) What was the turnover of your Scotland company operations in the 2012/13 financial year?	
Under £250k	
£250k-£500k	
Between £500k and £1m	
Between £1m and £5m	
Between £5m and £15m	
Between £15m and £50m	
Over £50m	

8) How many of your staff in Scotland (full-time equivalent) are engaged in R&D activities?	
0	
1-5	
6-19	
20-49	



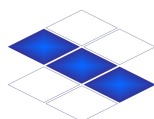
8) How many of your staff in Scotland (full-time equivalent) are engaged in R&D activities?	
50+	

9) What percentage of your turnover is invested in R&D?	
Less than 1%	
1% to 5%	
6% to 10%	
11% to 20%	
Over 20%	

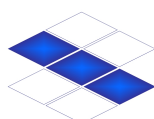
Section 2: Sector Information

This section seeks information about the activities and recent performance of your company's Scottish operations.

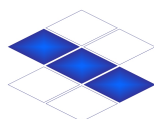
10) Which of the following best describes your activities in the water supply/wastewater supply/wastewater sector? [Please select all relevant options]	
Operation of water supply facilities	
Operation of water supply networks	
Operation of wastewater treatment facilities	
Nutrient and mineral/resource recovery	
Heat recovery (ie. from canals, rivers, mine water etc)	
Operation of sewage networks	
Operation of water storage facilities/use of associated technologies	



10) Which of the following best describes your activities in the water supply/wastewater supply/wastewater sector? [Please select all relevant options]	
Construction of water supply facilities/use of associated technologies	
Construction of water supply networks/use of associated technologies	
Construction of wastewater treatment facilities/use of associated technologies	
Construction of sewage networks/use of associated technologies	
Design and manufacture of water supply/wastewater treatment equipment	
Supply of water supply/wastewater treatment equipment	
Water testing and monitoring services	
Design, manufacture or supply of equipment for water testing and monitoring	
Design, manufacture or supply of pipes, valves, filters and pumps	
Water features and/or swimming pools	
Infrastructure and services for flood prevention	
Smart management of water (ie. instrumentation including sensors)	
Priority substances and micropollutants/emerging pollutants (filtration, sensors etc)	
Desalination services	
Ground water remediation (including contaminated land treatment)	
Infrastructure and services associated with water conservation	
Use of water for heat - industrial and domestic	
Other (please specify)	



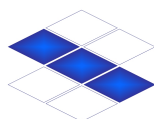
11) Which of the following best describes your activities in the low carbon heating or cooling sector? [Please select all relevant options]	
Design of equipment	
Manufacturing of equipment	
Installation of equipment	
Service and maintenance	
Consultant	
Construction of facilities	
Solar thermal	
Ground source heat pumps	
Air source heat pumps	
Water source heat pumps	
Biomass	
Biofuels	
Air conditioning technologies	
Refrigeration processes and technologies	
Passive cooling or ventilation	
Passive heating	
Efficient electrical heating	
Efficient fossil fuel heating	



11) Which of the following best describes your activities in the low carbon heating or cooling sector? [Please select all relevant options]	
Fuel cells	
District heating	
Combined heat and power (including cooling)	
Design, simulation and heat modelling	
Heat storage	
Heat recovery	
Measurement and monitoring of heat (temperature)	
Smart thermal grid/demand management	
Controls - thermostats etc	
Sensors - temperature	
Energy monitoring for heating/cooling systems	
Other (please specify)	

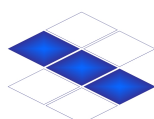
12) Are you planning to target any new sectors? [If YES, please list these sectors (based on the list in Q10 and Q11 above)]

13) Please give a brief description of your water supply & wastewater treatment and/or low carbon heating/cooling activities and your key products/services (200 words max)



14) What type of operation does your company have in Scotland? [Please select all that apply]	
Manufacturer	
Agent/Distributor	
Services	
Operation of a Facility	
Research and Development	
Other (please specify)	

15) How has the company's performance changed over the past three financial years ending in 2012/13? [Please select the appropriate options]				
	High Growth (>20% per annum)	Growth	Static	Reduced
Turnover				
Employment				
Profits				
Investment				



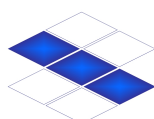
16) What percentage of your inputs to production (ie. supply of products/services utilised in production) is sourced from:	
Scotland	
Rest of UK	
Overseas	

17) Over the next few years, do you expect these percentages to:			
	Rise	Stay the same	Fall
Scotland			
Rest of UK			
Overseas			

18) What are the names of your five key suppliers?

19) Do you face any barriers in accessing resources from the Scottish supply chain?	
Yes	
No	
Don't know	

If "YES" (Q19), please describe these barriers
--

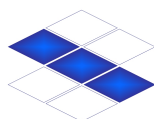


--

Section 3: Markets

This section seeks information about the customer and geographic markets of your company's Scotland operations.

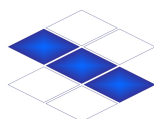
20) What are the main customer sectors for your activities? [Please select all that apply]	
Central government	
Local government	
Academic establishments – schools, colleges, universities	
Healthcare including NHS	
Public sector organisations including police and fire services	
Regulators including Environment agency and DEFRA	
Construction	
Manufacturing - food & drink	
Manufacturing - chemicals	
Manufacturing - oil & gas	
Manufacturing - other	
Marine industries	
Engineering and architecture	
Bioscience sector	
Environmental consultancy	
Engineering and architecture	



20) What are the main customer sectors for your activities? [Please select all that apply]	
Services - other	
Commercial sector - including retail	
Domestic end users	
Tourism - including hotels	
Water supply and wastewater companies	
Leisure services	
Distributors - UK based	
Distributors - overseas	
United Nations	
Other overseas aid organisations	
Other (please specify)	

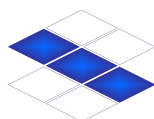
21) What is the estimated geographical breakdown of your sales? [%] Total must = 100%	
Scotland	
Rest of UK	
Overseas	
Total (must = 100%)	

22) If you are trading internationally, with which world regions do you currently trade? [Please



select all relevant options]	
Western Europe including Nordic countries	
Central/Eastern Europe including Turkey, Russia, Baltic states, Ukraine, Moldova and Georgia	
Middle East	
Africa	
Asia including Indian sub continent and all other former USSR states not included in Eastern European definition but not China	
Far East including Japan	
North America including Mexico, Caribbean and Arctic	
South America including Antarctic	
China	
Australasia	

23) Which are your most important markets and why?

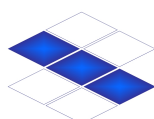


24) If you are trading internationally, with which world regions do you intend to trade in future? [Please select the relevant options - these can include existing export markets that you intend to continue to focus on, as well as new export markets]	
Western Europe including Nordic countries	
Central/Eastern Europe including Turkey, Russia, Baltic states, Ukraine, Moldova and Georgia	
Middle East	
Africa	
Asia including Indian sub continent and all other former USSR states not included in Eastern European definition but not China	
Far East including Japan	
North America including Mexico, Caribbean and Arctic	
South America including Antarctic	
China	
Australasia	

25) Why are you targeting these markets?

26) What are the key challenges of doing business in these markets?

27) Have you drawn on any specific international market research to inform your future plans?



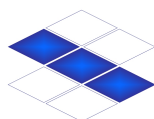
--

28) If you do not currently trade internationally, is this something you would consider in future?	
Yes	
No	
Undecided	

29) If YES (Q28), which markets are you interested in?

30) Are you interested in any overseas collaborative opportunities?	
Yes	
No	
Don't know	

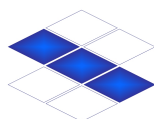
31) If YES (Q30), please indicate your areas of interest [select all that apply]	
Technology licensing	
Joint venture	
Technical co-operation	
Manufacture	
R&D	



31) If YES (Q30), please indicate your areas of interest [select all that apply]	
Overseas aid	
Other (please specify)	

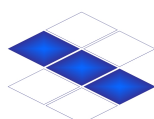
32) What are the key technology drivers that are likely to impact upon your business over the next few years, and what threats/opportunities do they present to your business?	
Key technology drivers	
Challenges/threats to your business	
Opportunities for growth for your business	

33) What are the key regulations/legislation that are likely to impact upon your business over the next few years, and what threats/opportunities do they present to your business?	
Key regulations/legislation	
Challenges/threats to your business	
Opportunities for growth for your business	



34) What networks/membership organisations is your business part of? <i>[These could include business representative organisations and wider networks involving public sector bodies and charities]</i>	
Scottish Environmental Technology Network	
Combined Heat & Power Association	
Scottish Environment Services Association	
British Water	
CIWEM	
CIRIA	
Other (Please Specify)	

35) What are the benefits of these organisations to your business?



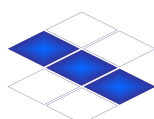
Section 4: Future Developments

This section seeks information about the future plans of your company's Scottish operations.

36) How do you expect your business to grow in the next three financial years after 2012/13? [Please select the appropriate options]				
	High Growth (>20% per annum)	Growth	Static	Reduced
Turnover				
Employment				
Profits				
Investment				

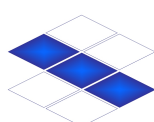
37) If GROWTH or HIGH GROWTH (Q36), where do you expect your growth to come from?	
Geographic markets [please specify which markets]	
Products/services [please specify which ones]	

38) What are the most significant barriers to growth in your company? [Please select the FIVE most significant barriers]	
Lack of suitable sites and premises	
Difficulties in recruiting staff with scientific/technical skills	
Other staff/recruitment issues	
Need to develop business management skills	



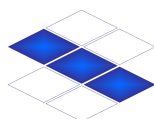
38) What are the most significant barriers to growth in your company? [Please select the FIVE most significant barriers]	
Lack of suitable training providers available locally	
Lack of finance for business growth	
Lack of new products or services	
Lack of resources for R&D	
Market conditions	
Limited marketing conditions	
Lack of market intelligence	
Competition	
Export costs	
Standards and regulations	
Location/distance from markets	
Other (please specify)	

39) Thinking about your future business support needs, please rate the importance of the following types of support for your company [please select the appropriate options]			
	High	Medium	Low
Developing collaborative partnerships and agreements with research institutions			
Developing collaborative partnerships with other businesses			



Financing the business			
Accessing supply chain opportunities into larger businesses			
Access to postgraduate students (eg. for product training)			
Funding for projects			
General business advice			
Innovation and R&D			
International trade			
Awareness of overseas environmental standards			
Accessing overseas procurement opportunities			
Marketing information and/or advice			
Networking			
Resource efficiency			
Recruitment			
Sites and premises			
Skills and training			

40) Do you have any other specific business support needs?



[BLANK PAGE]

