SCOTTISH DEVELOPMENT INTERNATIONAL

Scottish Enterprise

Scottish Enterprise

Low Carbon & Renewable Energy Research Report 2022

Contents

Scottish Enterprise foreword

David Rennie
Head of Low carbon Energy,
Scottish Enterprise

This results from the research contained in this report raise a number of interesting points for consideration – some of which we perhaps already knew, or at least thought we did, and some perhaps less so.

To observe that around three-quarters of the company base surveyed are already involved in the renewables and low carbon sector in some way is of course to be welcomed. And for those that are not currently involved, the majority of those plan to be relatively soon. Our long-standing oil and gas sector is now an energy sector.

And the fact that we have such experience built on our oil and gas experience is a strength of course – many of the renewables and low carbon sectors have a significant fit with that experience. The 'fit' between sectors as well as the significant growth opportunities, as set out in this report, clearly identifies a number of areas in which the sector can evolve and win the prize of the energy transition agenda.

It is also interesting to note that while there are a wide range of sectors for future opportunities, the most immediate are Wind, Hydrogen and Carbon Capture Utilisation and Storage (CCUS). This finding is in line with our own priorities. The potential growth in hydrogen markets for example is perhaps one feature of the fast-changing energy sector.

But with opportunities and capabilities, both of which exist in significant ways, comes barriers and challenges. Funding, support, policy uncertainty and concerns regarding skills are chief amongst those. Some of these challenges are perhaps not surprising, given the relatively early stages of some sectors in their development but challenges they remain.

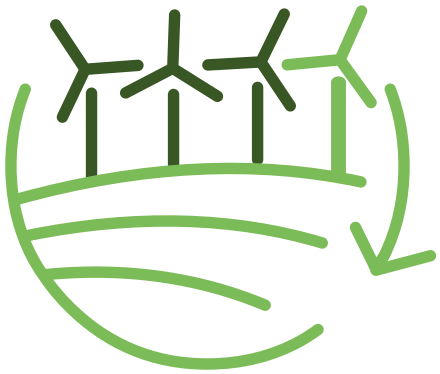
At Scottish Enterprise, we work with hundreds of companies in the energy sector offering a range of services including support for innovation, internationalisation, market research, and company introductions amongst many others. We have a focus and expertise on a range of energy sectors including Wind, CCUS and Hydrogen as well as others including Heat and Transport. We work with companies and partners every day to help them grow, develop, and overcome challenges and we will continue to do so. There are numerous examples of such support, but they include developing a cluster approach in Hydrogen, offering export support in Wind, and working with key projects in CCUS, amongst others

Finally, my thanks to Aberdeen & Grampian Chamber of Commerce for undertaking this research and to those companies who gave up their time to participate – such research depends on busy people making the time to do it and it is very much appreciated. We will use the findings from this research to help shape our activities and support.

Main findings

1. Many energy businesses are increasing their participation in the low carbon and renewable energy sector, building on the business they do currently.
2. Many have real ambition to become significantly more established than they are now.
3. They see opportunities but also challenges to achieving the potential, including funding, uncertainty and capability.
4. The carbon capture, utilisation and storage (CCUS) opportunity is the sheer scale of the market. The challenges are access to funding, the need to increase knowledge and the lack of certainty.
5. The hydrogen opportunity is the scale of the new projects that will come on stream. The key hydrogen challenges are, like CCUS, access to funding and the embryonic technology.
6. Scottish Enterprise has an important role in supporting these businesses in the coming years.

All energy businesses

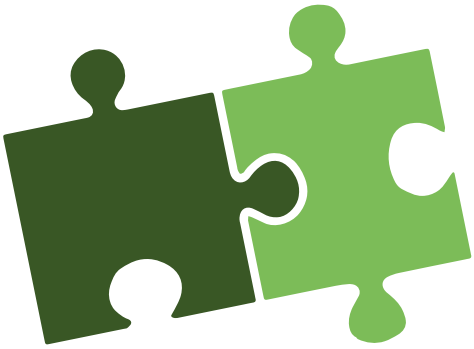


Three in four energy businesses are involved in Low Carbon & Renewable Energy

58%

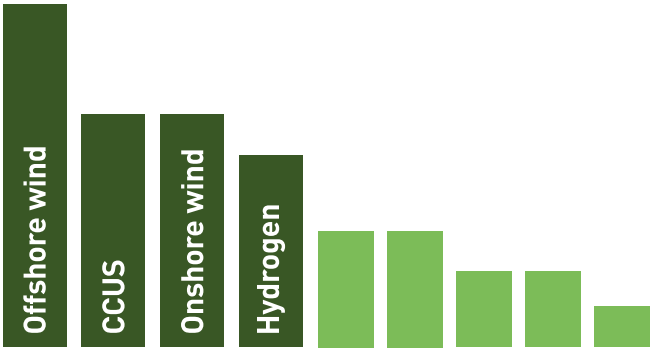
of businesses not currently involved in Low Carbon & Renewable Energy plan to become involved

Businesses that are currently involved in low carbon & renewable energy



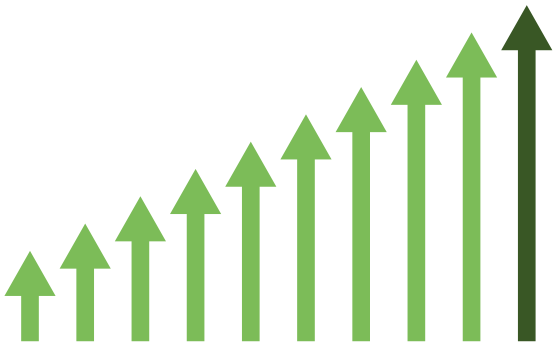
Low carbon & renewable energy work is often a **natural extension of what businesses do currently**

Most businesses more likely to **be established** in the key sectors in five years' time



Of the businesses currently involved in low carbon and renewable energy, **wind, CCUS & hydrogen stand out**

Most businesses currently at **the exploratory or early stages** of being active across the sectors

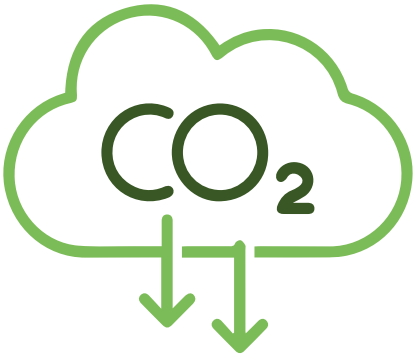


Exponential revenue growth expected in ten years' time

Three in five businesses identify a range of barriers to expansion, uncertainty is at the heart of it

Carbon capture, utilisation and storage (CCUS)

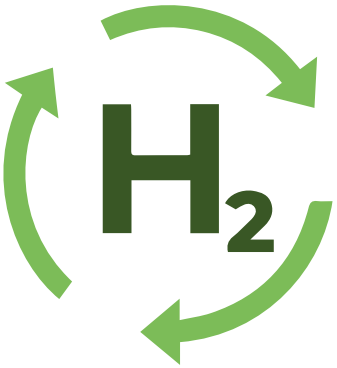
CCUS involvement focussed on **storage and capture**



Big opportunities for CCUS, but **areas of uncertainty**

Hydrogen

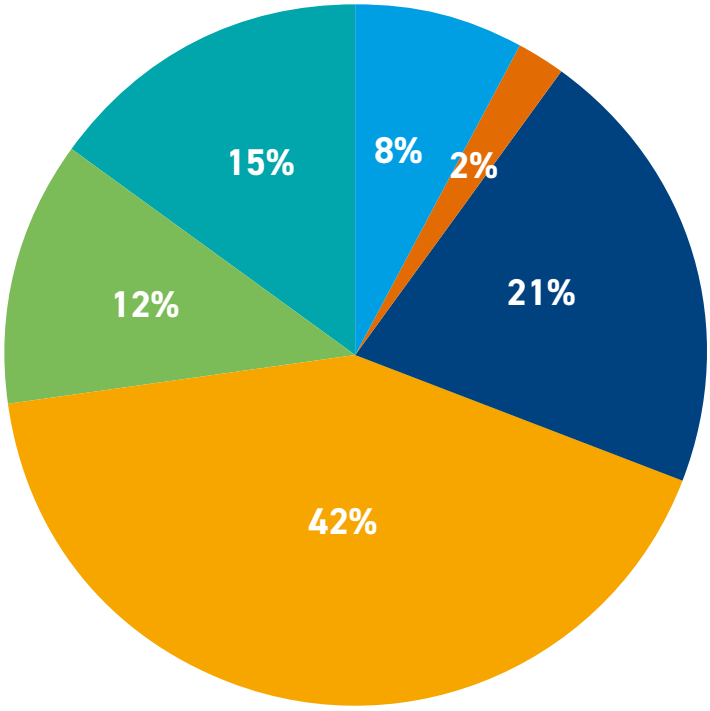
Hydrogen involvement is distributed across **storage, distribution and production covering almost the full hydrogen supply chain**



Big opportunities for hydrogen, but **also areas of uncertainty**

1.1 Current focus of energy businesses

We asked energy businesses what their current focus was with a range of answer options from 'sole focus is low carbon & renewable energy sectors' to 'sole focus is oil & gas'. Response results in pie chart below:

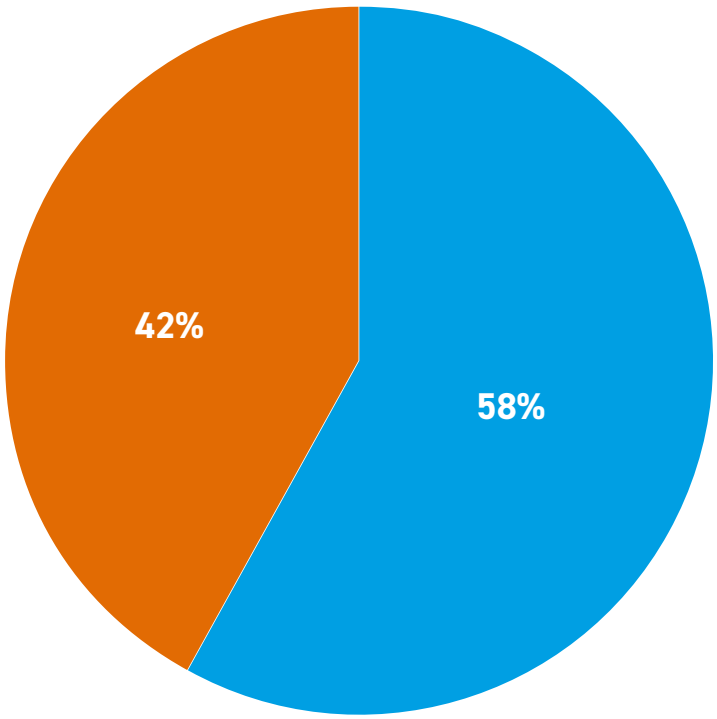


- Sole focus is low carbon & renewable energy sectors **(8%)**
- Not involved in oil & gas or low carbon & renewable energy sectors **(2%)**
- Sole focus is oil & gas **(21%)**
- Main focus is oil & gas but also involved in the low carbon & renewable energy sectors, at least to some degree **(42%)**
- Main focus is low carbon & renewable energy sectors but also involved in oil & gas, at least to some degree **(12%)**
- Equal focus on oil & gas and low carbon and renewable energy **(15%)**

Three in four energy businesses said they were currently involved in low carbon & renewable energy.

1.2 Businesses not currently in the sector, plans to become involved

We asked the 23% of businesses that said they were not currently involved in the low carbon & renewable energy sector, whether or not they had any plans to become involved in the future. Response results in pie chart below:



- Have no plans to become more involved in the low carbon & renewable energy sector in the foreseeable future **(42%)**
- Plan to become more involved in the low carbon & renewable energy sector within the next year/three years/five years **(58%)**

58% of those businesses said yes, they do plan to become involved in the future.

1.3 Why they do/do not have plans to become involved

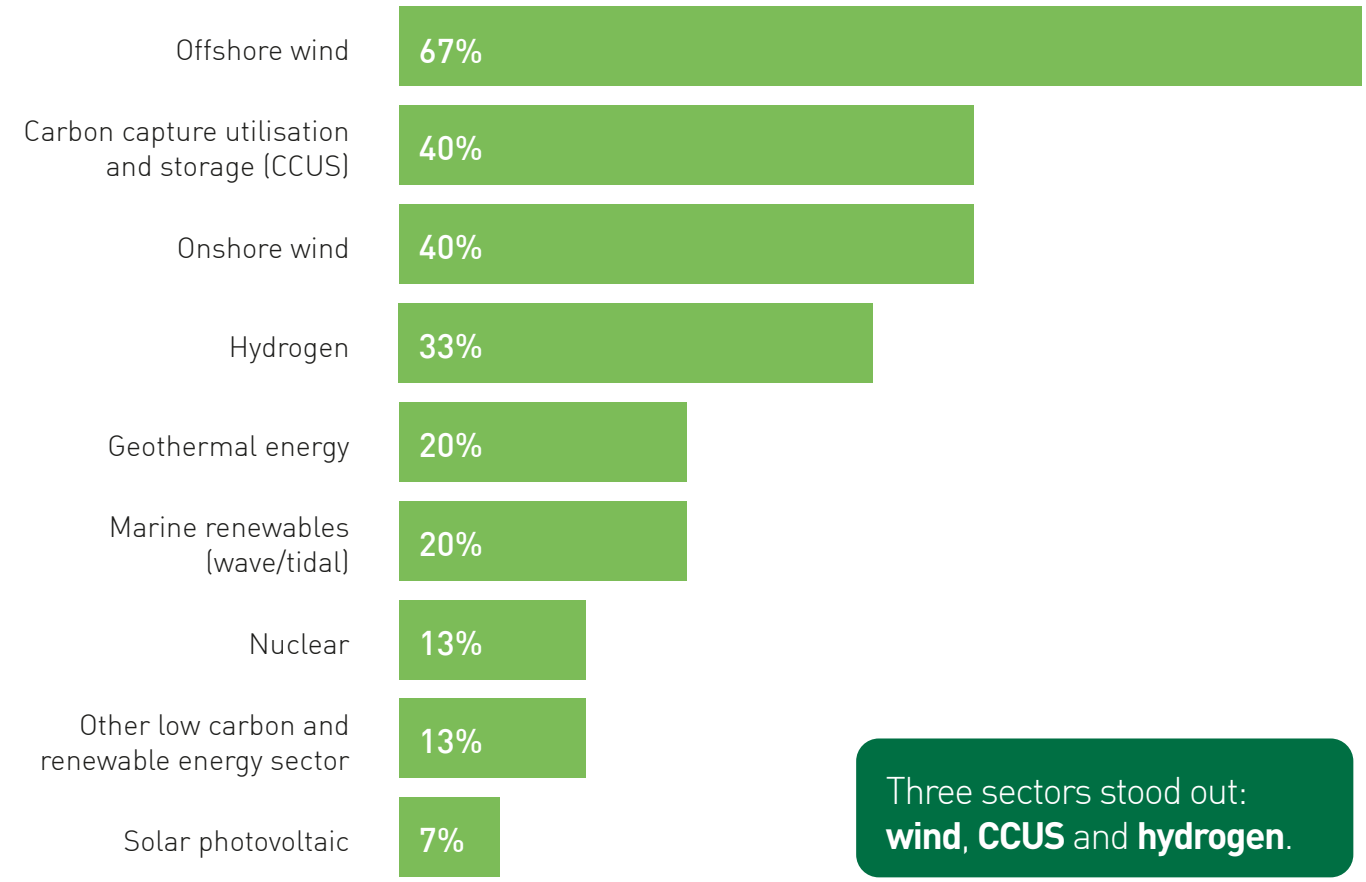
We then asked the companies which were not currently involved in the low carbon & renewable energy sector to comment on why they did or did not plan to become more involved. A representative selection of the responses are captured below.

Plan to become more involved in the Low Carbon & Renewable Energy sector	No plans to become more involved
"Have completed Fit4Renewables audit and planning to move into this sector."	*"Been working on Oil & Gas projects since 1999; why should I need to change now."*
"We are looking into this but we need more resources to be able to pursue this avenue."	*"We are focussing on decommissioning."*
"We will need to put in place structures and skill sets to get involved in the low-carbon and renewable energy sector."	*"Our speciality is design and manufacture of downhole tools and I estimate there is enough work to keep us extremely busy in the next five years."*

Those that said 'yes' were **actively looking into low carbon and renewable opportunities.**

1.4 Businesses not currently in low carbon & renewable energy sectors were asked what activities they plan to become more involved with

We asked the 58% who said 'yes', which sectors they were planning to become more involved with in the foreseeable future. See the results breakdown below:



Three sectors stood out: **wind**, **CCUS** and **hydrogen**.

Scotland/UK/Global desk research insight

We reviewed a range of low carbon & renewable energy market data sources. This section summarises the key findings: Scotland's LCRE sector economy is worth £5.5bn, with steady progress led by wind, nuclear & hydro. There are strong long-term growth projections.

Scotland's low carbon & renewable energy economy, key numbers [1]		
Metric	2020 (change v 2015)	% of UK total
Turnover	£5.5bn (no change)	13%
Employment	21k (down 2k)	10%
Number of businesses	10k (down 8k)	12%
Exports	£0.4bn (doubled)	7%

Sector-by-sector [2]	Scotland 2020 turnover (£k)	Scotland share of UK
All sectors	5,505,500	13%
Onshore wind	1,338,500	51%
Nuclear	842,000	21%
Offshore wind	616,500	16%
Hydropower	607,500	90%
Renewable heat	215,500	22%
Bioenergy	175,000	4%
Energy monitoring, saving or control systems	156,500	12%
Energy efficient lighting	119,000	7%
Low carbon financial and advisory service	110,000	18%
Solar photovoltaic	72,500	5%
Low emmission vehicles & infrastructure	45,000	1%
Renewable combined heat/power	26,500	6%
Alternative fuels	16,000	23%
Other renewable electricity	7,000	12%
Carbon capture and storage	5,500	22%
Fuel cells & energy storage	5,000	2%
Other energy efficient products	1,148,000	9%

Strong growth projections:

- Global service sector spending on carbon capture and storage is set to skyrocket this decade, quadrupling between 2022-25 [3]
- £180m Emerging Energy Technologies Fund to support the development of the hydrogen sector and carbon capture and storage (CCS) in Scotland.[4]
- Around 9,000 extra jobs in the offshore energy sector could be created in North-East Scotland by 2030 if the area receives enough funding to help it transition from fossil fuels to renewables.[5]

Renewable Employment in Scotland [6]	
Onshore wind	8,780
Offshore wind	4,700
Hydropower	3,290
Bioenergy	2,630
Renewable heat	2,390
Solar photovoltaic	1,070
Renewable combined heat & power	230
Other renewable electricity	120

Sources: 1&2 ONS 2020 data published in 2022, 3. Rystad Energy 2022, 4. Scottish Govt, 5. Robert Gordon University 2022, 6. Fraser of Allander Institute 2019

1.5 Current activity and future plans

We returned to the three in four energy businesses involved in low carbon & renewable energy to ask which sectors (from a choice of eight) their businesses were currently involved in as well as future plans of activity. The table below captures the results.

Low carbon & renewable energy sectors	Currently involved in	Planning to become more involved in
Offshore wind	45%	23%
Carbon capture, utilisation and storage (CCUS)	25%	35%
Hydrogen	22%	35%
Marine renewables (wave/tidal)	20%	17%
Onshore wind	14%	19%
Nuclear	12%	18%
Solar photovoltaic	10%	12%
Geothermal energy	9%	22%
Any LCRE sector	64%	62%

Again, three sectors stood out: **wind**, **CCUS** and **hydrogen**.

1.6 Why choose those sectors

We then asked the same businesses why they chose that low carbon & renewables sector(s); responses in table below.

Natural extension to what we do	Client demand	It's the future
"Closest fit to what we do in other industrial sectors." *"Natural transition from O&G."* *"Some of our equipment can be utilised in this sector."*	*"Client demands for our services in these sectors."* *"To meet client aspirations."*	*"Represents the future work required to reach Net Zero."* *"Low Carbon and Renewable Energy sectors will be the future."*

Many replied that low carbon & renewable energy sectors are often **a natural extension of what they do currently**.

1.7 Current stage of development

We asked low carbon & renewable energy businesses to describe what stage of development they were currently at: 'Exploratory', 'Early stage of being active' or 'Established', for each of the eight sectors.

Low carbon & renewable energy sectors	Exploratory	Early stage of being active	Established
Offshore wind	10%	34%	24%
Carbon capture, utilisation and storage (CCUS)	18%	26%	7%
Hydrogen	18%	26%	6%
Marine renewables (wave/tidal)	16%	20%	8%
Onshore wind	13%	15%	7%
Geothermal energy	19%	8%	3%
Nuclear	10%	7%	9%
Solar photovoltaic	5%	8%	6%

Most businesses described themselves as currently being at **the exploratory or early stages of being active across the sectors**.

1.8 Involvement in five years' time

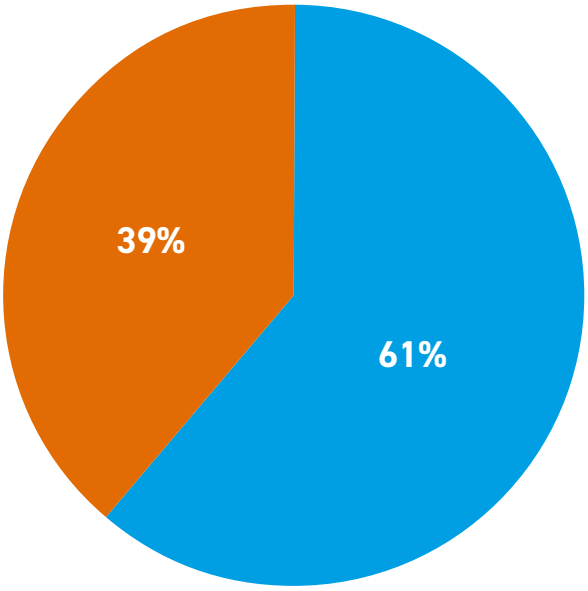
Building on responses received in 1.7, we asked what their involvement in five years' time will be. The table below indicates current and future change by sector with the far right column illustrating the percentage increase in activity after five years.

Low carbon & renewable energy sectors	Established currently	Established in five years time	% point difference, 5 years v currently
Offshore wind	24%	41%	+17
Carbon capture, utilisation and storage (CCUS)	7%	34%	+27
Hydrogen	6%	29%	+23
Marine renewables (wave/tidal)	8%	22%	+14
Onshore wind	7%	20%	+13
Geothermal energy	3%	16%	+13
Nuclear	9%	16%	+7
Solar photovoltaic	6%	13%	+7

Businesses have belief in the low carbon and renewable energy sector; many believed they would be **more likely to be established** in the key sectors in five years' time.

1.9 Barriers to expansion in low carbon & renewable energy

We asked if there were barriers to their expansion in any of these sectors, and if so, what they were. The pie chart illustrates responses with reasons for barriers captured in the table on right.

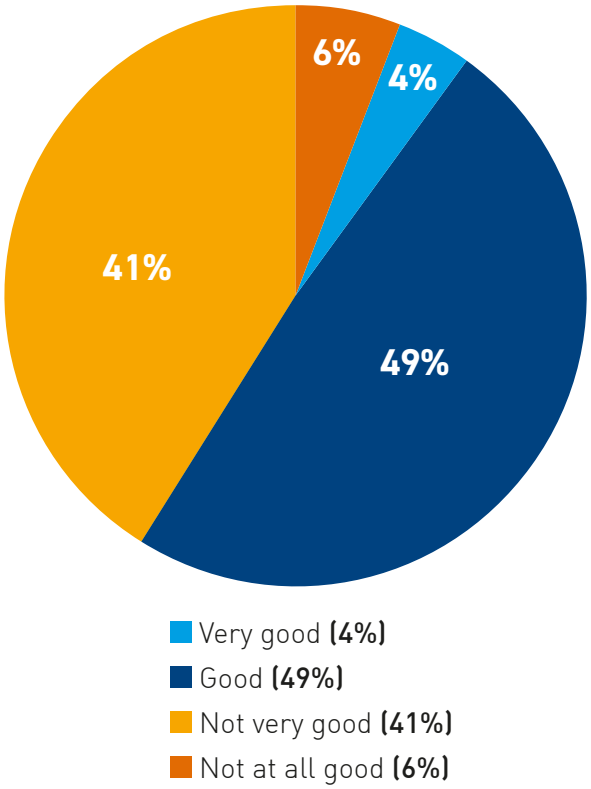


Funding	*"Funding, funding and funding."*
Uncertainty	*"Clarity of business models & regulatory framework for CCS and hydrogen."* *"Regulatory & commercial clarity."* *"Knowledge of where we fit into these new markets."* *"As a lower tier supplier within the supply chain, it is difficult to have visibility of the future / current opportunities in these sectors."*
Capability	*"The main players have established multi-national vendors and it is nigh impossible to get anywhere near the business."* *"Adoption of new technology. Geothermal energy – don't have the right equipment which will require a level of CAPEX."*

Three in five businesses identified a range of barriers to expansion, **uncertainty** was at the heart.

1.10 Businesses thoughts on the level of support on offer

We asked what businesses thought of the level of support on offer in the low carbon and renewable energy sectors. See the pie chart on the left and the reasons why summarised on the right.



Very good/Good	Not very good/ Not at all good
"We have received extensive support from Scottish Enterprise for the development of our services in the hydrogen sector." *"Ample opportunities for funding applications."*	*"We innovate and produce disruptive technologies that are seen by non experts in the business sector as too far fetched or because they are not tech savvy enough to realise the bigger benefits / picture."* *"We want to see more direct project involvement for SMEs where there will be clear learning and development of expertise."*

47% of businesses thought the level of support was not good and that there **was scope for more support** for the sector.

Stakeholder Interviews

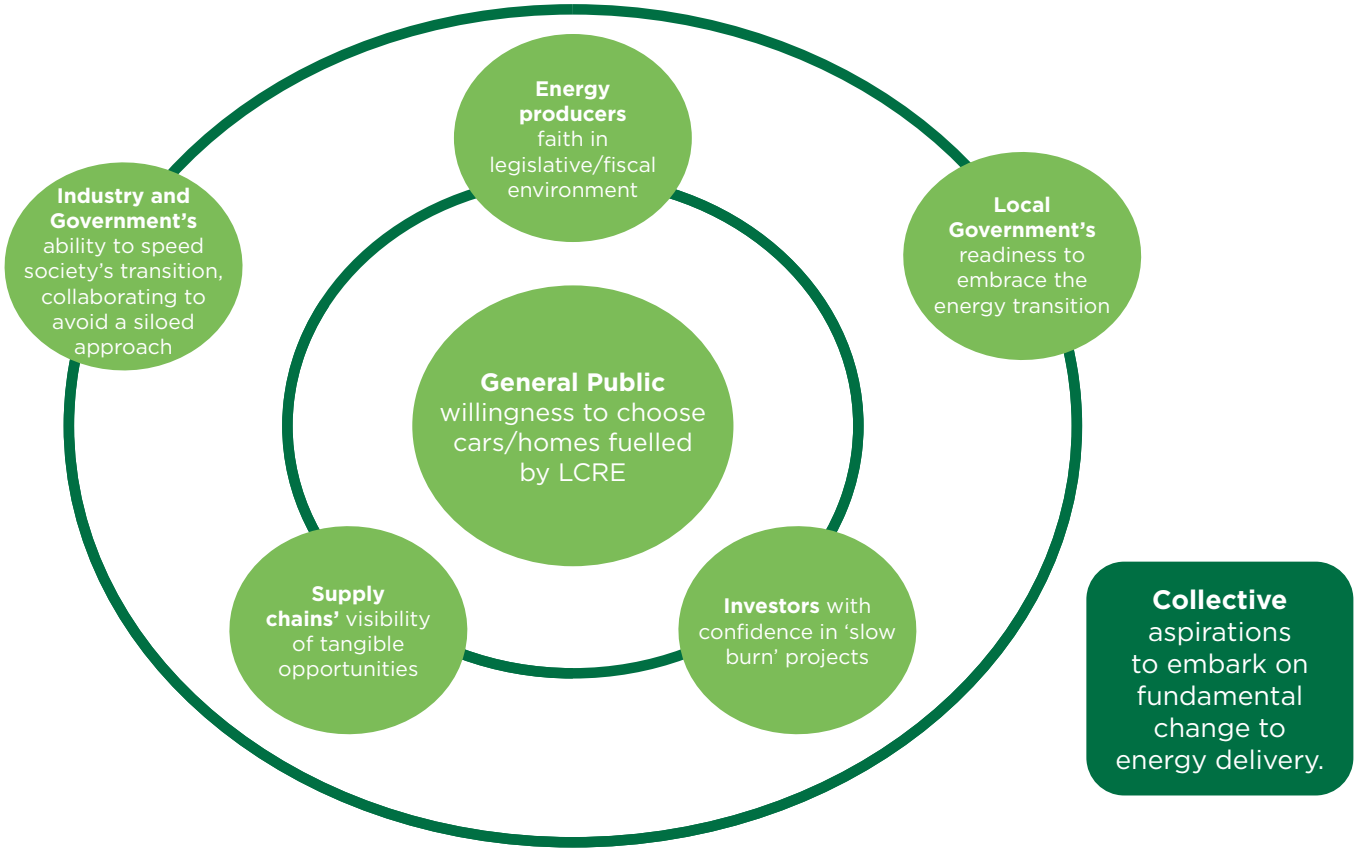
We conducted six stakeholder interviews, with key people from the industry including representatives from academia, industry bodies and sector innovators. We were keen to understand how they saw where we are now in the low carbon and renewable energy sector, its' potential, the opportunities and the barriers. These are the key findings.

Q. What is the scale of the LCRE opportunity?

A. The scale of the low carbon renewable energy opportunity/ growth potential is HUGE because literally every individual, whether they are in Scotland, the UK or the world, is going to be impacted, whether you've got to change how you heat your house or change what powers your car.

Q. What progress is being made to date?

A. Some progress is being made already, but there is a matrix of issues to be overcome to realise the full LCRE potential. The diagram below highlights the key issues raised in the stakeholder interviews. Stakeholders stressed that the general public's willingness to choose cars/homes fuelled by LCRE was at the heart of the discussion. They also felt that a collective effort was required to gain real traction.



Q. Are there any barriers in the way?

A. Some crucial questions to address, at the heart of realising the LCRE opportunity.

	General Public	Energy Producer	Supply Chain Business	Investor	Local Government
Why should we...	*...switch now, because if you call your local heating engineer, what you're going to get is somebody who thinks of gas and boilers as the answer.*	*...invest in LCRE, when the risk profile just isn't right.*	*..re-imagine our currently profitable business when we don't have certainty about the opportunity and delivering LCRE solutions currently increases our cost base?*	*...invest in a project that is ten years from fruition, further out than pharma?*	*...fully back sectors, even although they may not deliver in the short-term?*
"Currently, carbon emissions are zero cost...to de-carbonise (today) will add cost ..and is commercial suicide." *"Investment in new energy is a risk, loss-making currently."*					

Q. How do we overcome the barriers?

A. There are several ways to address the issues/help realise the LCRE opportunity.

General Public	Energy Producer	Supply Chain Business	Investor	Local Government
Increase focus on driving LCRE demand *Incentivise the purchase of LCRE options (like tax holidays)* *Overcome hurdles like charging points, simple LCRE billing*	*Maximise attractive-ness to invest* *Windfall tax re-investment in LCRE*	*Give incentives to business to develop LCRE alternatives, like 45Q..a game changer for the US* *Support with training for the LCRE roles that have no overlap with the current energy business roles*	*Create certainty through consistent clear focus on govt/ society commitment to net zero, meaning zero* *Create a regulatory environment that has an overview of the energy landscape*	*Re-emphasise support areas to transition, make the area ready* *Build momentum, share the excitement about the scale of the opportunity*
"A co-ordinated effort, setting us all up to survive/thrive in the long-term." *"Technology won't change until demand does."* *"Need to turn plans into action."*				

1.11 Current/expected revenue for each sector

We were keen to understand the momentum in the low carbon & renewable energy sector, so, for each sector, we asked businesses four revenue questions shown in the table below. The first column is current revenue, expressed as 'high, medium or low' (see note below), the other three columns are expectations for revenue in 2023, 2027 and 2032 expressed as a multiple of revenue in the last financial year.

Low Carbon & Renewable Energy sectors	Current	Expected Revenue (Versus last financial)		
	Last Financial	2023	2027	2032
Offshore wind	High	X 1.5	X 11	X 26
Geothermal energy	High	X 3	X 8	X 17
Hydrogen	Medium	X 5	X 122	X 305
Carbon capture, utilisation and storage (CCUS)	Medium	X 5	X 11	X 40
Onshore wind	Low	X 11	X 24	X 56
Solar photovoltaic	Low	X 6	X 25	X 50
Marine renewables (wave/tidal)	Low	X 3	X 13	X 48
Nuclear	Low	X 3	X 15	X 45

The key take-out from these results is that businesses expect **exponential revenue growth in ten years' time; hydrogen in particular.**

Note: High/Medium/Low is the Research Chamber ranking of businesses responses to the question about approximate revenue in the last financial year (Larger average numbers ranked as High (over £3m), Lower average numbers ranked as Low (under £1m), Numbers in-between ranked as Medium)

Case Study:
NRC

Tell us a little bit about your company, what you do and what makes you different?

NRC provides industrial equipment and associated support both locally and globally. With one of the largest inventories of industrial equipment within the UK, we support our clients utilising our specialist skills, knowledge and staff, meeting demand and overcoming unusual or particularly difficult challenges they may face. Coupled to this is our emergency and oil spill response division that gives us the ability to offer our clients an environmental and safety solution as a complete package.

Tell us about your low carbon and renewable energy sector plans in the coming years? What has driven your thinking?

NRC has provided our core suite of industrial and emergency services to oil and gas clients for many years. Alongside this, NRC has been investigating how we can help those same clients and others move towards renewables. Many of our core services will still be required such as confined space entry, rescue teams, specialist cleaning etc. We have been focusing more since 2020 on what additional new service lines can be brought to support the renewable energy sector and have spent a significant time developing these new service lines. We are excited to be on the cusp of bringing these new service lines to market. We see across the next couple of years a move to a minimum of 30% of our overall business in Scotland coming from the renewable sector initially and increasing to over 50% by 2030.

What are the main benefits for your organisation of operating in the low carbon and renewable energy sector?

Firstly, for us all, it's improving the overall quality of life on the planet, helping society as whole benefit from a move to renewables. We also see the application of our existing experience and skills into a new market allowing us to further develop our current staff and provide additional support to many of our existing clients. In a similar vein, it will also allow us to attract some of the up and coming best and brightest candidates who have real passion to make energy security and transition a fully attainable goal for the next generation, happening now.

What have been your biggest business challenges in the sector and how have you overcome these?

Our single biggest challenge has been in identifying how and where we fit in this new market. I think that has been a question many organisations have been asking themselves. For us, engagement with stakeholders and linking in with forums, events and government led groups has helped us recognise where and how we fit. Once that challenge is overcome, it simply becomes one of internal building, be it resources, people, or track record, once the foundations are solid, the rest can be built.

What are the advantages/potential of operating in Scotland?

Scotland is fortunate to have natural resources such as wind and wave energy in abundance. In addition, Scotland has a long-proven record of training and development of workforce to take on new and challenging industries. Coming from a track record of oil and gas operations where compliance with the highest standards is the norm, transforming our businesses, staff and focus into a new market is exciting and rewarding, all of this is happening in Scotland right now. Being part of this low-carbon and renewable energy transition is what makes Scotland an ideal location for any business to operate from.

What one piece of business advice would you give to companies who are thinking about getting involved in the low carbon and renewable energy sector?

New sectors face new challenges, yet often an adaptation of existing solutions can present the best way forward. Engage with industry, regulators, groups and operators to develop a deeper understanding of what currently exists, what is being planned, and how business can adapt and help fill the gaps. The main advice that can be given is to really understand how your current or future service lines can be adapted to fit in to low carbon and renewable energy sector.

Key findings: Participation in CCUS

2.1 Carbon capture, utilisation and storage (CCUS) involvement

We then switched the focus to CCUS specifically. We asked businesses, which, if any, carbon capture, utilisation and storage (CCUS) areas they were involved with currently or plan to be involved in the future. We grouped the answers into any mention of 'storage', 'capture' or 'transport'. See table below.

CCUS	Currently involved with	Planned to be in the future
Storage (Reservoirs, wells, facilities, marine & subsea, pipeline, compression, storage & terminals, support & services)	37%	65%
Capture (CO_2 liquefaction, CO_2 regasification, Pre-combustion capture, post-combustion capture, oxy-fuel combustion, utilisation, support & services)	22%	57%
Transport (Pipeline, storage & terminals, support & services)	18%	37%
Other	6%	6%
Any CCUS involvement	43%	71%

Most businesses involved in CCUS are focussed on **storage and capture**.

Note: data includes any mention of current involvement with any of the activities.

2.2 CCUS specific question areas

We were keen to understand CCUS issues/ barriers, opportunities, training / skills provision, sector prospects and CCUS support from SE. The summary of the answers to these five questions and selected quotes are outlined in the table below:

Issues/ barriers	Opportunities	Training/skills provision	Sector prospects	Support you need from SE
Funding Knowledge	Huge market potential	Not yet clear what is required	Good Promising	Introductions, connections Lobbying

"At this stage the CCUS involves mainly construction, but our core business is operation & maintenance."

"CCUS cannot be done without pipelines, wells and reservoir engineering. Training in these is non existent in the UK.... Norway is 25 years ahead of us."

The overall response from businesses was that they saw **big opportunities for CCUS, but also areas of uncertainty**.

Strong CCUS growth trajectory

"I am hugely encouraged that CCS is now on a strong growth trajectory after enduring some very difficult years. Over the past decade I have seen CCS move from being falsely identified only as a coal fired power generation technology to being increasingly embraced as a vital element of meeting the climate challenge due to its versatility of application, demonstrated effectiveness and ability to deal with enormous volumes of emissions. Recently, its role in removing CO_2 from the atmosphere has added yet another string to its bow. Time is not on anyone's side. We must press on with vigour in rapidly accelerating still further the deployment of CCS."

Source: Brad Page, Former CEO, Global CCS Institute, extract from report, Global status of CCS 2021, CCS Accelerating to Net Zero, Global CCS Institute

Case Study:
Expro

Tell us a little bit about your company, what do you do and what makes you different?

Working for clients across the well life cycle, Expro is a leading provider of energy services, offering cost-effective, innovative solutions and what we consider to be best-in-class safety and service quality. Our extensive portfolio of capabilities spans well construction, well flow management, subsea well access and well intervention and integrity solutions.

With roots dating to 1938, Expro has approximately 7,200 employees and provides services and solutions to leading exploration and production companies, both onshore and offshore, in approximately 60 countries.

As the energy industry embraces transition and the need to make real and visible headway towards a lower carbon world, the key enablers to change will be those who can truly differentiate themselves as solutions providers. At the core of Expro is our culture of innovation, where we inspire and innovate with purpose to seek out solutions for every challenge.

Today, Expro's wells expertise and range of well intervention, integrity and flow measurement offerings are transferable to the low carbon and renewable energy industry, offering a low-carbon line of business adjacent to its oil and gas portfolio. As the industry seeks to address the energy challenges of tomorrow, we believe that Expro is well positioned to play a leading role in enabling our clients to achieve their carbon reduction goals in support of the transition.

Tell us about your low carbon and renewable energy sector plans in the coming years? What has driven your thinking?

Expro has been providing discrete services to the geothermal industry since 1986 and started on the sustainable journey early in 2020, recently publishing its inaugural Environmental, Social and Governance (ESG) report in April 2022.

Expro created a portfolio advancement function in November 2021 to evaluate the opportunities presented by energy transition and define a strategy to grow the business in these areas, with initial focus on geothermal and carbon capture & storage.

Alistair Geddes, Expro's Chief Operating Officer said "Previously our strategy has been to provide discrete services focused on well integrity and assurance, as these are also essential for geothermal and carbon capture wells. As we have developed our internal capabilities and knowledge of our customers' challenges, our approach now is more holistic and centres on providing solutions in support of the energy transition markets. As the industry seeks to address each of tomorrow's challenges, we are here to devise and deliver each solution, helping to achieve a sustainable business for Expro and our customers, and a brighter future for our planet. Not because we have to, but because we want to. And because we can."

What are the main benefits for your organisation of operating in the low carbon and renewable energy sector?

We all have a part to play in creating a brighter future for our planet. Operators expect more from service partners in helping to achieve their carbon-reduction commitments. It's about demonstrating the ability to reduce emissions at every stage of the energy collection process. But it's also so much more than that.

It's about experience, expertise; relationships and trust. The ability to transfer decades of skills, techniques and proven technologies to the immediate challenges of today, combined with the knowhow to grasp the complexities of tomorrow's challenges and be open and collaborative in engineering the right solutions for each one.

Expro is committed to the energy transition and the goals set to reduce carbon emissions by 50% by 2030 and Net Zero by 2050. We are also committed to supporting our customers' carbon reduction objectives leveraging our innovation engine and technology platform to develop the next generation of solutions that we believe will support customers in creating a more sustainable future.

Ingrid Huldal, Expro's Senior Portfolio Advancement Manager said "There are a number of benefits to operating in the low carbon and renewable energy sector. Collective action is needed from across all industries, government and consumers to address the challenges of climate change. We must all play our part. The transition from oil and gas is happening and most of our oil and gas customers have strategies to transition away from fossil fuels into different energy sources. It makes good business sense; it provides us with a diversified revenue stream and customer base and enables us to remain relevant in the future. Additionally, our employees want to be part of a company that takes its corporate social responsibility seriously. The energy transition provides opportunities to grow professionally, and it presents new challenges to develop innovative technology and solutions to address the energy challenges of tomorrow".

What have been your biggest business challenges in the sector and how have you overcome these?

Our biggest challenge has been in understanding the market drivers and specific technical challenges faced in these new energy spaces. The customer base is very different from the oil and gas sector and the marketing data is not as accessible. Establishing contacts, driving opportunities, and understanding the technical challenges of this new customer base is an ongoing priority.

This has been addressed by commitment from the highest levels in Expro, combined with a realigned organisation committed to investing in adopting and adapting our technology portfolio in line with new energy sector demands.

What are the advantages/potential of operating in Scotland?

Scotland has a reputation of being innovative and in engineering solutions to problems. This strong reputation and easy access to industry experts and innovative disruptive technology allows companies in Scotland to play a leading role in solving the energy transition challenges.

What one piece of business advice would you give to companies who are thinking about getting involved in the low carbon and renewable energy sector?

Commit to making the change and support your organisation in taking the steps needed to understand how to become involved and identify the transferable skills and services your company can provide.

Key findings: Participation in hydrogen

3.1 Hydrogen involvement

We then switched the focus to hydrogen specifically. We asked businesses which, if any, hydrogen areas they were involved with currently or plan to be involved in the future. We grouped the answers into any mention of 'storage & distribution' or 'production'. See table below.

Hydrogen	Currently involved	Planned to be in the future
Storage & distribution (Pipelines, compression, storage terminals, support & services, vehicle fuelling)	24%	56%
Production (Steam methane reforming, auto-thermal reforming, pyrolysis, support & services, electrolysis, system integration)	22%	42%
Other	4%	4%
Any hydrogen involvement	31%	60%

Businesses are spread across both sub-sectors.

Note: data includes any mention of current involvement with any of the aspects.

3.2 Hydrogen specific question areas

Finally, we asked a series of questions about hydrogen specifically. We were keen to understand businesses issues/ barriers, opportunities, training/skills provision, sector prospects and hydrogen support they need from SE. The summary of the answers to these five questions and selected quotes are outlined in the table below:

Issues/ barriers	Opportunities	Training/skills provision	Sector prospects	Support you need from SE
Funding Embryonic technology	New projects?	Limited Unknown	Good Strong Massive	Connections Funding
"View of hydrogen sector's prospects..." *"...MASSIVE. I believe that hydrogen will be the bridge between renewable energy (solar, wind, geothermal) and the world as a safe, simple and transportable energy source."* *"....lots of opportunities for local supply chain."* *"...Growing and will lead the future."*				

The overall response from businesses was that, in common with CCUS, they saw **big opportunities for hydrogen, but also areas of uncertainty**.

Hydrogen future growth

"Total hydrogen use could grow from today's 115 Mt per annum to around 500 to 800 Mt by mid-century, with hydrogen (and fuels derived from it) by then accounting for about 15-20% of total final energy demand on top of the close to 70% provided by direct electricity use.

All of this hydrogen must be produced in a zero-carbon fashion via electrolysis using zero-carbon electricity ("green hydrogen") or in a low-carbon fashion using natural gas reforming plus CCS ("blue hydrogen") if deployed in a manner that achieves near-total CO_2 capture and very low methane leakage.

Blue hydrogen will often be cost-effective during the early stages of the transition, particularly where existing "grey hydrogen" production can be adapted and retrofitted with CCS. But, in the long-term, green hydrogen will very likely be the cheaper option in most locations, with dramatic cost reductions to below $2/kg possible during the 2020s. This green hydrogen production will in turn generate a very large electricity demand, increasing total required supply of zero-carbon electricity by as much as 30,000 TWh.

Strategies for net-zero emissions by 2050 must therefore recognise the major role of clean hydrogen and the implications for clean electricity supply required. They must also ensure a sufficiently rapid take-off during the 2020s to make the transition to 2050 feasible."

Source: Energy Transitions Commission, Making the Hydrogen Economy Possible, April 2021

Case Study:
EV Offshore

Tell us a little bit about your company, what do you do and what makes you different?

EV provide advanced vision-led diagnostic services to the upstream energy sector to help understand the cause of performance or integrity issues for wells, pipelines and storage vessels. Our expertise in research and engineering has led to the development of unique, fit for purpose camera systems and advanced visual processing techniques that are deployed by a highly skilled field service team to locate, visualise and quantify complex issues. This factual information helps our customers to understand the cause, severity and implication of these issues, and enables them to make effective decisions on how to overcome them.

Tell us about your low carbon and renewable energy sector plans in the coming years? What has driven your thinking?

There is no escaping the fact that the face of energy production is changing and that need for sustainable, low carbon energy is front and centre in social, political and economic agendas. EV has always been focussed on reducing emissions, maximising productivity and protecting the environment and our core services in the oil and gas industry help to solve problems that eliminate inefficiency on every project we are involved in. As a logical extension, we are targeting low-carbon and renewable projects where our expertise can be applied to help solve challenges of a similar nature to those within the oil and gas industry. This includes high-temperature, deep geothermal energy production and carbon capture and sequestration assets where structural integrity and flow performance are of critical importance.

To date, EV has provided diagnostic services for over 100 geothermal wells, for more than 25 operating companies over four continents, and our mix of geothermal activity has steadily grown year on year. More recently, we have partnered with some of the world's leading carbon capture and sequestration facilities, including the leading-edge Aquistore project that is operated by the Canadian Petroleum Technology Research Centre (PTRC).

What are the main benefits for your organisation of operating in the low carbon and renewable energy sector?

Our vision is to be the leader in downhole visual analytics and we believe that, by positioning ourselves at the forefront of energy transition, our relevance and value within natural gas, hydrogen, geothermal and carbon capture sectors will continue to grow and prosper.

What have been your biggest business challenges in the sector and how have you overcome these?

The main challenge has been establishing a network and relationships with operating companies who fall outside of the oil and gas sector and are often operating in territories where EV are not established. To overcome this EV have created synergistic relationships with service providers who are familiar with the industry and have contractual relationships with the end user. These technical partnerships create a three-way "win" for the customer, our partner and EV and in a timeframe that may not otherwise be possible with solely organic business development.

The second challenge is that a number of the projects we have been involved with are pilot schemes and/or at a pre-commercial phase. This often means that projects are run within tight budgets in which little or no provisioning has been made for diagnostics and contingency. This is not unexpected and it is not uncommon to perform demonstration jobs, but by maintaining excellent performance and demonstrating the value of the information provided we have been able to meet or exceed the customer's expectations, which leads to greater budgetary allocations on subsequent projects.

What are the advantages/potential of operating in Scotland?

Scotland is internationally recognised as a leader in innovation and excellence in the energy sector. With the skills, infrastructure and connections that have been developed through the exploration of oil and gas in the North Sea, combined with excellent academia and geographical proximity to natural resources, Scotland will remain a central figure in energy transition. This provides a stable business outlook allowing companies to invest with confidence for both domestic and export markets.

What one piece of business advice would you give to companies who are thinking about getting involved in the low carbon and renewable energy sector?

The need for change creates opportunity. Whether a new start seeking to spin-up or existing energy related company seeking to diversify, find a niche where challenges and limitations with current practices have tangible economic impact to business, and focus on solutions to help overcome this that are true to your core capabilities and values. This is real: the need for low-carbon energy and the push to net zero cannot be ignored and the growth and opportunity created in this sector will be huge.

Closing Remarks: Aberdeen & Grampian Chamber of Commerce

Ryan Crighton,
Director of policy and marketing,
Aberdeen & Grampian Chamber of Commerce

The country that owns green, that dominates that industry, is going to have the most energy security, national security, economic security, competitive companies, healthy population and, most of all, global respect.

Not my words, but those of three-time Pulitzer Prize winner Thomas Friedman, who specialises in global trade.

It is a sentence often reflected upon in Aberdeen, as it succinctly captures the size and scale of the opportunity in front of us as we accelerate towards a net zero society.

Over the decades, we have been the careful custodian of the UK's world-leading energy sector. But the prosperity it has brought us has always felt finite.

Most feared, or were in denial, that one day the sun would set on the oil and gas titans dotted along our coastal horizon, taking with it our lucrative energy jobs.

However, things have changed. That cliff-edge now feels like a new dawn; one with longevity.

The climate crisis – thrown into sharp focus by COP26 last year – has brought about an unprecedented opportunity for our country to become the pioneers who will unlock the low carbon technologies of the future.

But winning a prize this big was never going to be easy. The challenges outlined in this report are equal in scale to the opportunities.

Essentially, we need to deliver the reindustrialisation of Scotland to make sure we capitalise on our green energy potential.

This includes delivering an integrated energy cluster focused on the delivery of net zero, with manufacturing and subsea engineering expertise to maximise economic benefit from Scotland's rapidly-growing offshore wind and hydrogen sectors.

To do this, the report suggests fiscal stability will be crucial factor in giving companies the confidence to invest.

We are asking companies and investors to channel billions of pounds away from oil and gas into technology and industries with a longer payback and lower margins. They can only do that with certainty about the taxation they will be subject to.

Finally, and perhaps most crucially, it is essential that we retain our skilled energy workforce and supply chain through what might be the most challenging period of the transition, between now and 2030, the point when jobs in low carbon energy are available at scale.

In this space, we face challenges both today and tomorrow.

There is so much about our energy sector that is different to other parts of the economy. However, when it comes to human capital, it faces similar headwinds to almost every other business in the country right now.

Skilled workers have again become almost as precious a commodity as the energy they produce. And research suggests this problem is only going to become more acute.

There has been a 16-percentage point increase in the loss of staff to other oil and gas basins, suggesting the battle for workers has become an international one.

At the same time, seven out of ten firms here say they will need to grow their headcount over the next three years to cope with an increase in work spanning both tradition oil and gas and renewables. Something must give, and that's before skills transfer is brought into consideration.

However, if we can crack these problems, then we have every chance of becoming that nation that Thomas Friedman describes.

Any prize worth winning, is worth fighting for. Competition will be fierce, but Scotland has natural assets and a rich industrial legacy to lead the world once more.

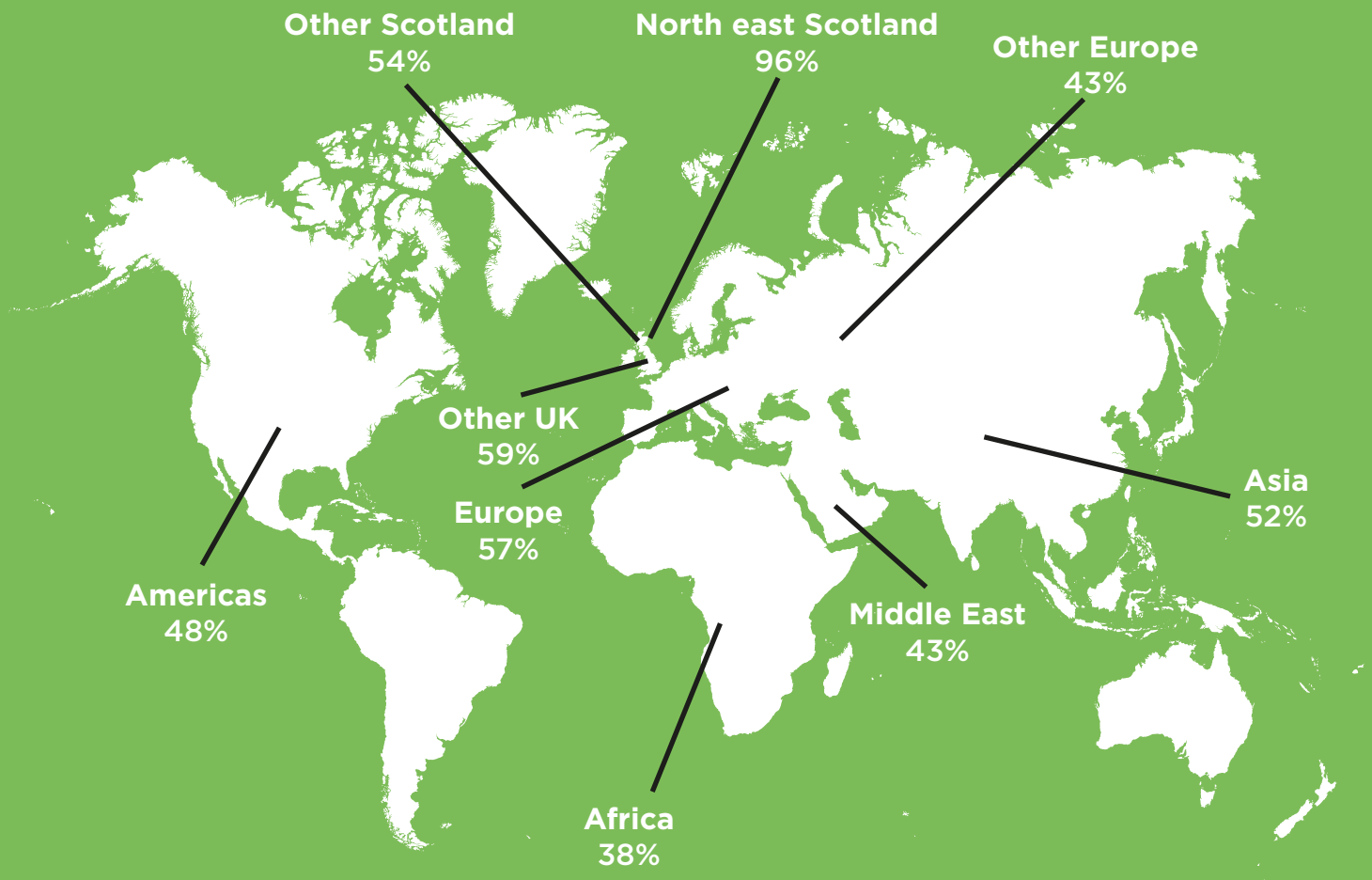
Appendix

Report includes research from four sources

Source	Sector survey (x150 businesses)	Case studies (x3 businesses)	Stakeholder interviews (x6 stakeholders)	Desk research (x20 sources)
How	Survey link emailed to energy businesses in the sector & promoted via AGCC marketing channels, supported by the Chamber network & SE	Interviews with businesses who responded to the main survey	Depth interviews with key sector stakeholders	Review of published work on the sector
What	Business profile, involvement in Low Carbon & Renewable Energy, at what stage/why choose over others, revenue projections, barriers/ issues, what support they are looking for Also, focus on CCUS & hydrogen specifically, including key issues, employment, training, investment	Expansion on their answers, focussed on their own journey	Their views of the sector	Low carbon & renewable sector overview, including scale, trends
When	6 April to 10 May	April/May	May/June	April/May/June

Global profiles of businesses in sector survey

Where do you conduct your business?



Which of these best describes your business	
Contractor/Service Company	88%
Licensee & Operator	12%

How many people in your workforce are based in Scotland? (Mean figure)
141

About Scottish Enterprise

Scottish Enterprise is Scotland's main economic development agency and aims to deliver a significant, lasting effect on the Scottish economy. Our role is to help identify and exploit the best opportunities for economic growth. We support ambitious Scottish companies to compete within the global marketplace and help build Scotland's globally competitive sectors. We also work with a range of partners in the public and private sectors to attract new investment to Scotland and to help create a world-class business environment.

There is an opportunity to increase Scotland's impact in overseas markets and by aligning our trade and investment activities with the work of our partners, we can maximise Scotland's international presence and visibility.

We achieve this through Scottish Development International (SDI), which is a partnership between the Scottish Government, Scottish Enterprise and Highlands and Islands Enterprise and its work is guided by the Scottish Government's strategy for economic development in Scotland.

To find business support from Scotland's public sector, please visit www.findbusinesssupport.gov.scot

Disclaimer

Contact Information

Kevin Taylor

Low Carbon Transition -Team Leader

Scottish Enterprise

E Kevin.Taylor@scotent.co.uk

Christopher Steven

Low Carbon Transition - Specialist

Scottish Enterprise

E Christopher.Steven@scotent.co.uk

Research Chamber

Andrew Pyke

Research and insights manager

Research Chamber
Aberdeen & Grampian Chamber of Commerce

T 07597 576767
E andrew.pyke@agcc.co.uk

Samira Heshmatzadeh

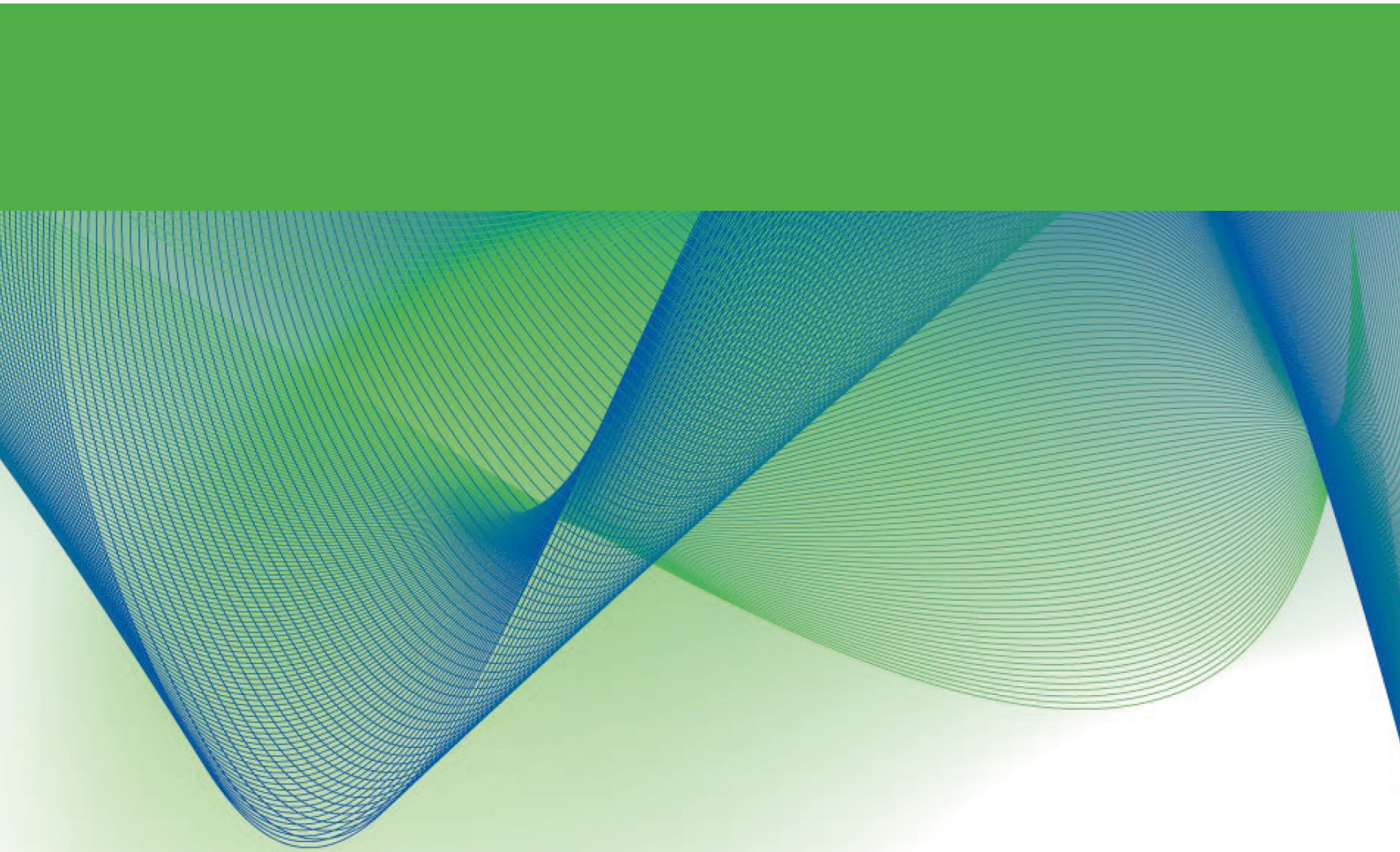
Research executive

Research Chamber
Aberdeen & Grampian Chamber of Commerce

T 07970 645481
E samira.heshmatzadeh@agcc.co.uk

SCOTTISH DEVELOPMENT INTERNATIONAL

Scottish Enterprise



If you require this publication in an alternative format and/or language
please contact the Scottish Enterprise Helpline on 0300 013 3385
or Scottish Development International Helpline on 0300 013 2734
or email enquiries@scotent.co.uk

Scottish Enterprise
Atrium Court
50 Waterloo Street
Glasgow
G2 6HQ

www.scottish-enterprise.com

Scottish Development International
5 Atlantic Quay
150 Broomielaw
Glasgow G2 8LU
investment@scotent.co.uk

www.sdi.co.uk