

The transition to a low carbon energy system: insights on the role of the oil and gas sector

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1. Introduction and context

2017 has been significant year for energy activity in Scotland, both on a policy and technological front. Since the start of the year, the Scottish Government has launched its draft Scottish Energy Strategy (Scottish Government, 2017a) and draft Climate Change Plan (Scottish Government, 2017b) underpinning policy actions to address climate and emissions into the early 2030s. Additionally, new energy developments have kept on coming. On the electricity side, the latest data show that renewable electricity generation was 26% higher in the second quarter of 2017 than the same period in 2016. Total renewable electricity capacity rose by 16% over the same period. There were also major “firsts”, including Hywind Scotland - the world’s first floating offshore wind farm – beginning operation from October 2017 (Statoil, 2017) and the first ever coal-free working day for Great Britain’s electricity generation mix in April (Financial Times, 2017).

Firmly embedded in the Scottish Energy Strategy is the view that existing skills and expertise in the oil and gas industry can position Scotland for the transition to a low carbon economy, perhaps especially in the renewables sector. In an important element of the consultation of its draft Energy Strategy, the Scottish Government asked a series of questions about the role for the oil and gas sector in the decades to come, as Scotland moves towards a low carbon economy (Scottish Government, 2017b).

In a speech to the National Economic Forum the First Minister, Nicola Sturgeon, made the connection between current energy sector activities and “know-how”, and future opportunities in low carbon technologies: “The oil and gas sector will continue to play an important role in meeting Scotland’s future energy requirements. And of course, the industry also supports skills, investment, research and development and infrastructure for the wider energy sector. Because of that, it can play an important part in the development of low-carbon technologies – for example [in] offshore renewable energy.” In the foreword to the Scottish Energy Strategy, the Minister for Business, Innovation and Energy – Paul Wheelhouse – notes, “the exploration and production of oil and gas in Scottish waters will continue to provide high-value employment and a stable energy supply for decades to come. Our ambition is that these strengths should also provide the engineering and technical bedrock for the transformational change in Scotland’s energy system over the coming decades.” (Scottish Government, 2017a, p. 1).

The recent report on the submissions received (Why Research, 2017) identified that some responses stressed the “importance for Scottish Government helping to support and encourage transfer of skills from the oil and gas sector and its supply chain to the renewables sector”. This is a fundamental issue, and gets to the heart of the role for the oil and gas sector in contributing to Scotland and the UK’s economic objectives for the transition to a low carbon economy.

These recent statements suggest a number of important research questions that this note seeks to shed some new light.

- First, to what extent are firms active in the oil and gas sector considering opportunities in the renewables sector?
- Second, how does the expectation of being involved in renewables activities differ between firms in the sector? And, are there differences across firm *sizes* or between international or domestic (UK) firms?
- Third, are the positive motivations towards renewable activities stronger for firms with more optimistic attitudes towards their future oil and gas activities? Or are oil and gas firms seeking opportunities in renewables to help them diversify over the short-term? This point matters: recent news of the more positive outlook of firms towards the sector *could* lead to firms scaling back from expanding into such renewables markets.
- Finally, how do oil and gas firms’ attitudes towards renewables compare to other “non-oil and gas production” activities, namely decommissioning and “unconventional” oil and gas activities? These serve as interesting comparisons – as both are areas where there is expectation that oil and gas expertise can be “carried over” to these new market opportunities.

To help address these questions we use a unique dataset on oil and gas firms active in the UK gathered through the long-running ‘Oil and Gas Survey’ – a collaboration between the Fraser of Allander Institute and Aberdeen and Grampian Chamber of Commerce. The next section sets out the unique properties of this survey, and the rich dataset it provides, while Section 3 examines the questions raised earlier using data from this survey.

2. The ‘Oil and Gas Survey’: a unique dataset

This note draws principally from the long-running Oil and Gas Survey, jointly delivered by the Fraser of Allander Institute and Aberdeen and Grampian Chamber of Commerce. This is a postal and online survey of companies with a UK presence and active in the oil and gas industry, and covers areas including business optimism, activities, investment, skills and employment of these firms.

Undertaken twice annually since 2004 – published in the Spring and Autumn of the year – this provides a unique time series on the business activities of oil and gas industry in the UK. The most recent issue of the survey (number 27) was published on 30 November 2017, and

highlighted the current challenges facing the sector (AGCC, 2017). The most recent survey received responses from companies with a total UK employment of over 40,000. With total direct and indirect employment in the UK supported by the offshore oil and gas sector of around 170,000⁶, we can see that this survey captures a substantial portion of firms active in the UK oil and gas sector.

Having a time series of data permits a host of other questions to be analysed, and in this note we draw on questions asked in recent years specifically about firms' attitudes to renewables. Specifically, since survey 19 (Autumn 2013) we have regularly asked the question, "Looking to the medium term (three to five years) do you think your organisation will be more involved in renewables?"⁷, and firms can choose from five possible answers: "Definitely", "Possibly", "Unlikely", "No" and "Not applicable". Responses to this question, and the other responses given by firms to the same survey, offers a fascinating insight into oil and gas firms' behaviours and attitudes towards renewables. By cross-referencing firms' answers to this question with other questions, we can examine the questions set out above, and – crucially – how these have evolved over time.

3. Results

Question 1: Are oil and gas firms considering opportunities in renewables in the medium term?

The most recent results reveal that 54% of all contractors anticipate becoming more involved in renewables in the medium term, responding either "Definitely" or "Possibly". We focus on contractors here as it is these firms who operate in the supply chain for oil and gas operators whom are most likely to have the expertise which might be carried across to renewables activities. This latest total figure is in line with the 53% of contractors who gave either of these responses in Survey 25, and is only slightly higher than the 51% of contractors giving these responses when the question was first asked in Survey 19.

Despite this almost static headline finding, there are interesting changes when we look at the specific answers to this question over the history of the survey.

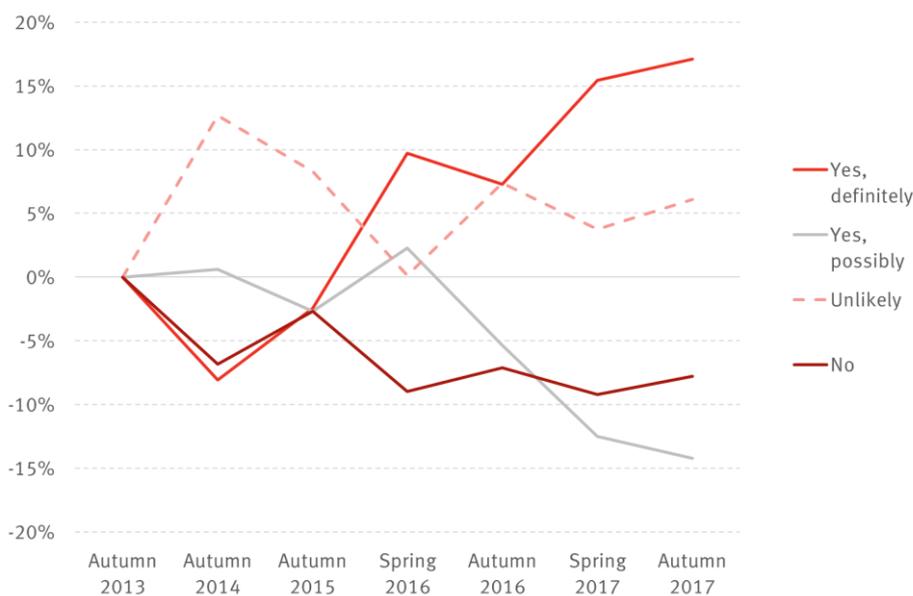
The first time the question was asked (Survey 19), 14% of contractors replied "Definitely", while 37% noted they would "Possibly" be involved in renewables over the medium term. Figure 1 shows how the share of contractors giving each possible response has changed since that first time it was asked, with the change shown relative to the initial values from Survey 19

⁶ Oil and Gas UK (2017) estimate that a total of 302,000 jobs in the UK are supported by the offshore oil and gas industry. We compare the UK employment of firms responding to the Oil and Gas Survey to the total of direct and indirect employment as firms which are captured in the survey are unlikely to have employment supported through induced expenditures related to oil and gas activities.

⁷ This question has been asked in Survey 19, 21, 23, 24, 25, 26 and 27, covering the period from Autumn 2013 to Autumn 2017.

(i.e. an increase (decrease) above the horizontal axis suggests a growing (declining) share of contractors giving each response to the same question).

Figure 1: Change in the share of contractors selecting each response, relative to Survey 19 baseline



Source: FAI/AGCC surveys (various years) and authors' calculations

We can see two distinct periods in Figure 1. Between Survey 19 and Survey 23 (Autumn 2013 and Autumn 2015), we see that firms' are unsure about their future involvement in renewables. There is little change in the share of those positively motivated towards renewables work - the shares of firms responding either "Definitely", or "Possibly" falls with the only increase in those identifying future renewables work as "Unlikely".

From Survey 24 (Spring 2016) onwards, we see firms making up their minds; moving away from an uncertain position, and towards stronger (i.e. more positive, or more negative) responses. Survey 27 now sees 31% of contractors (up 17 percentage points from the first time this question was asked) reporting that they expect to "Definitely" be involved in renewables in the medium term. This largely mirrors a fall in those saying they would "Possibly" be involved in renewables (down 14%). At the same time, only 11% of contractors feel that they will not be involved in renewables (down 8%).

Question 2: does firm size, or the location of ownership, matter for firms' attitudes towards renewables?

Table 1 shows that larger oil and gas contractors (by number of UK employees) are typically more favourable towards renewables. 54% of firms with more than 100 employees report

either “Definitely” or “Possibly” working in renewables in the medium term, while 82% of firms with more than 500 employees give these responses.

Table 1: “Looking to the medium term, do you think that your organisation will be more involved in renewables?”, % responding by columns, contractors, Survey 27

Number of UK employees	Yes, definitely	Yes, possibly	Unlikely	No	Not relevant	Total	% responding “Definitely” plus “Possibly”
1-20	25%	25%	32%	11%	7%	100%	50%
21-99	25%	21%	33%	8%	13%	100%	46%
100-499	36%	18%	27%	9%	9%	100%	54%
500+	55%	27%	0%	18%	0%	100%	82%

Note: Rows may not sum due to rounding. % of contractors.
Source: FAI/AGCC surveys (various years) and authors’ calculations

Question 3: how do firms’ attitudes towards renewables differ between domestic and international firms?

Table 2: “Looking to the medium term, do you think that your organisation will be more involved in renewables?”, % responding by columns, contractors, Survey 27

Number of UK employees	Yes, definitely	Yes, possibly	Unlikely	No	Not relevant	Total	% responding “Definitely” plus “Possibly”
UK oriented firms	31%	26%	29%	6%	9%	100%	57%
Internationally oriented firms	33%	11%	22%	28%	6%	100%	44%

Note: Rows may not sum due to rounding. % of contractors. See text for definitions.
Source: FAI/AGCC surveys (various years) and authors’ calculations

In the survey we do not ask firms to identify the location of their headquarters, or where they conduct most of their business. Thus, we cannot be clear on which firms are UK or internationally owned. However, we do know the total employment of each firm, and each firms’ employment both in, and outwith, the UK. We can proxy for ownership/headquarters by identifying as “UK oriented” those firms where a majority of their total employment is in the UK, and “Internationally oriented” firms where the opposite is the case. The results of this categorisation for contractor firms in the most recent survey is shown in Table 2.

There is a more positive expectation for renewables activities among those firms that are UK oriented on this measure. Almost 60% of respondents with a majority of their employment in the UK “Definitely” or “possibly” see renewables work in their medium term future, while the

figure is 44% for “internationally oriented” firms. Similarly, the share of contractors answering “No” is considerably higher for Internationally oriented firms.

Question 3: how do current levels of activity and optimism about the future of UKCS relate to enthusiasm for renewables?

We can compare firms’ attitudes towards renewables against current levels of activity – relative to firms’ assessment of their “optimum” level of activity – and also against their confidence about the short-term future level of activity (i.e. 12 months into the future). These are shown in Tables 3 and 4 below.

Tables 3 shows the relationship from the most recent survey between firms’ current (self-determined) levels of activity compared to their “optimum” levels and their attitudes towards renewables.

We see that attitudes towards renewables are positive across all levels of current activity. A majority of all firms at each activity level respond that they “Definitely” or “Possibly” anticipated being involved in renewables in the medium term.

Table 3: “Looking to the medium term, do you think that your organisation will be more involved in renewables?”, % responding by columns, by level of current activity relative to optimum levels, all firms, Survey 27

By level of current activity	Yes, definitely	Yes, possibly	Unlikely	No	Not relevant	Total	% responding “Definitely” plus “Possibly”
Above optimum levels	33%	33%	17%	17%	0%	100%	67%
At optimum levels	17%	38%	13%	17%	17%	100%	55%
Below optimum levels	32%	17%	31%	10%	10%	100%	59%

Note: Rows may not sum due to rounding. % of all firms.
Source: FAI/AGCC surveys (various years) and authors’ calculations

We can see from Table 4 that – perhaps surprisingly – expectations about “Definitely”, or “Possibly” being involved in renewables in the medium term are higher among those firms which are more positive about the business situation in 12 months’ time. Thus, our result appear to suggest that oil and gas firms who are more optimistic about the future of the oil and gas industry, are also those expecting to have involvement in renewables.

Table 4 “Looking to the medium term, do you think that your organisation will be more involved in renewables?”, % responding by columns, by expectations of the business situation in the UKCS in 12 months’ time

More or less confident about the business situation in 12 months' time	Yes, definitely	Yes, possibly	Unlikely	No	Not relevant	Total	% responding “Definitely” plus “Possibly”
More	35%	23%	19%	12%	12%	100%	58%
The same	27%	22%	24%	14%	14%	100%	49%
Less	0%	38%	50%	12%	0%	100%	38%

Note: Rows may not sum due to rounding. % of all firms.
Source: FAI/AGCC surveys (various years) and authors’ calculations

Question 4: How do firms’ attitudes towards renewables compare to other “non-production” activities?

Using the questions from the survey, we can compare oil and gas firms’ attitudes towards renewables and – in turn - unconventional oil and gas activities and decommissioning.

Table 5: Question: “Looking to the medium term, do you think that your organisation will be more involved in renewables?”, shown in columns, while row Question, “Looking to the medium term, do you think that your organisation will be more involved in unconventional oil and gas activity in the UK?”, % of all firms responding to both questions, excluding those indicating “Not relevant”, Survey 27

		<i>Involved in renewables in the medium term?</i>			
		<i>Yes, definitely</i>	<i>Yes, possibly</i>	<i>Unlikely</i>	<i>No</i>
<i>Involved in unconventional oil and gas activity in the UK in the medium term?</i>	<i>Yes, definitely</i>	6	4	3	0
	<i>Yes, possibly</i>	18	11	16	4
	<i>Unlikely</i>	9	10	8	3
	<i>No</i>	0	1	1	8

Note: % of all firms answering both questions. May not add to 100% due to rounding.
Source: FAI/AGCC surveys (various years) and authors’ calculations

We set out firms’ *relative* attitudes to renewables and unconventional oil and gas activities in Table 5. Some explanation of the table is in order, however. Summing each row, we can identify the most responses to firms’ expectations of being involved in “unconventionals”.

Table 3 shows that the most common answer was “Yes, possibly”, with 49% of firms giving this response. Summing each column, we can see that the most common answer for firms’ expectations of being involved in renewables was “Yes, definitely” (33% of firms).

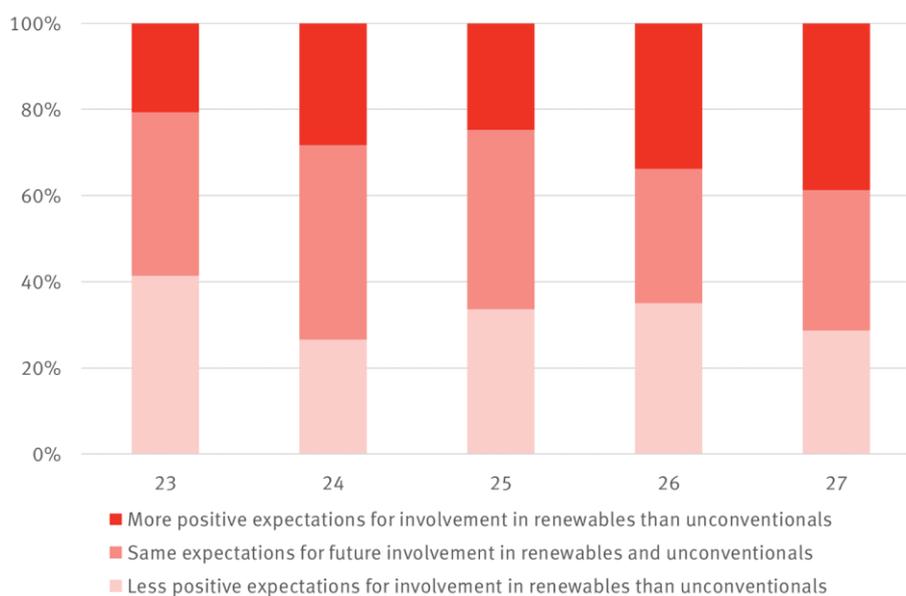
As each firm responded to both renewables and unconventional questions, we can identify the relative outlook for these opportunities. We can simplify this by identifying three areas (shaded in different tones in Table 4).

The light grey area identifies firms who had equal anticipation of their involvement in renewables and unconventional. These are on the diagonal entries in Table 4 and capture total 33% of all responses.

The light red area corresponds to firms whose attitudes are more positive towards renewables than for unconventional. We identify 39% of all firms to be in this area.

Of the alternative case – i.e. those firms more positive about their involvement in UK unconventional than renewables – we mark these in the dark red shaded area. This group comprises 29% of all firms.

Figure 2: Oil and gas companies’ expectations of involvement in renewables in the next three to five years relative to their expectations of involvement in unconventional oil and gas activity in the UK, % of all firms responding to both questions Survey 23 to 27



Source: FAI/AGCC surveys (various years) and authors’ calculations

The latest results therefore suggest that oil and gas firms are *more* positive towards their future involvement in renewables than unconventional oil and gas work in the UK.

But how has this *relative* attitude between firms’ expectations in renewables and unconventional oil and gas changed over time?

Figure 2 shows that the net share of oil and gas firms more positive about their future involvement in renewables compared to unconvensionals is at a record high. This reflects a decline in the share of firms being more positive about unconvensionals, but also a fall in those firms being equally positive between both activities.

We now repeat this for renewables expectations against decommissioning. We know that there are significant decommissioning activities currently occurring in the UK. Oil and Gas UK (2017) note that there around over 100 north east of Scotland companies involved in the Brent decommissioning project, and that around 85% of project spend to 2025 will be made in the UK.

Table 6: Question: “Looking to the medium term, do you think that your organisation will be more involved in renewables?”

		<i>Involved in renewables in the medium term?</i>			
		<i>Yes, definitely</i>	<i>Yes, possibly</i>	<i>Unlikely</i>	<i>No</i>
<i>Involved in decommissioning in the UK in the medium term?</i>	<i>Yes, definitely</i>	20	8	8	4
	<i>Yes, possibly</i>	10	18	15	5
	<i>Unlikely</i>	3	0	0	0
	<i>No</i>	0	1	4	5

Note: % of all firms answering both questions. All cells may not add to 100% due to rounding.
Source: FAI/AGCC surveys (various years) and authors’ calculations

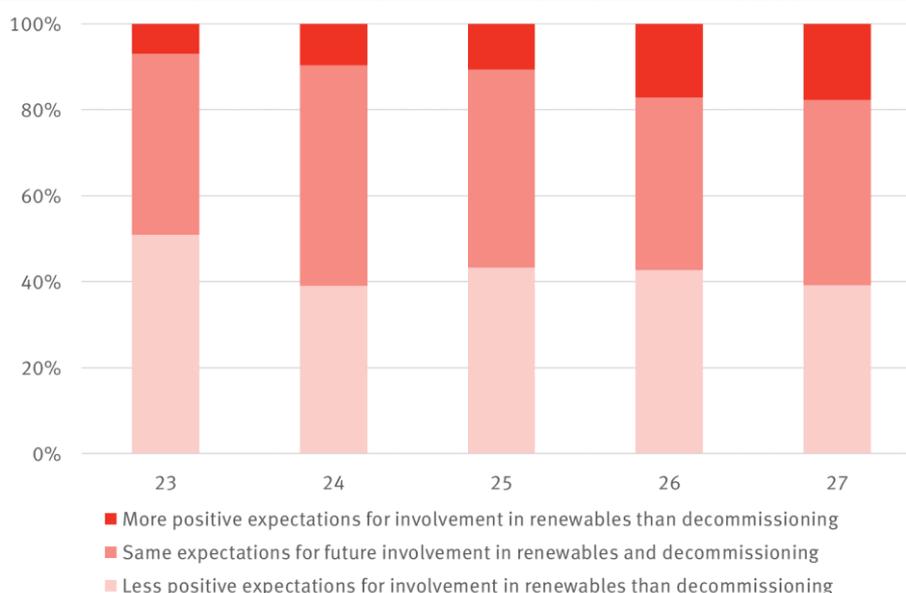
We can see from comparing across row and column totals that firms have higher expectations of being involved in decommissioning than renewables. Summing across the first two rows, we can see that 84% firms expect to be “Definitely” or “Possibly” involved in decommissioning, while (summing down the first two columns) only 57% of firms have the same expectations for renewables.

It is no surprise that more firms have a higher expectation of being involved in decommissioning activities than in renewables: 43% of firms (in the dark red area) compared to 17% (the light red area), with 40% of firms having the same expectations in both activities (i.e. the diagonal in Table 6).

One final point to examine is how attitudes to renewables, unconvensionals and decommissioning have changed over the past couple of years. Using the same framework as above, we can show how the share of firms responding to these questions has evolved.

Figure 3 reinforces the view that firms' expectations of involvement in renewables has typically been more muted than for decommissioning. But the current value of 17% of firms more positive about involvement in renewables is another high, and has risen from 7% to 17% of all firms between 2015 and 2017 (Surveys 23 and 27).

Figure 3: Oil and gas companies' expectations of involvement in renewables in the next three to five years relative to their expectations of involvement in decommissioning activity, % of all firms responding to both questions, Survey 23 to 27



Source: FAI/AGCC surveys (various years) and authors' calculations

4. Conclusions

The transition to a low carbon energy system is a major policy focus in Scotland, as is ensuring that economic opportunities in new renewables technologies are harnessed. The opportunity exists that the UK / Scotland can build on the expertise gained over many decades in the oil and gas sector and that oil and gas companies can develop new UK market opportunities in the renewables sector.

To help answer questions round this low carbon transition, we have analysed the responses of oil and gas companies over the past four years in the long-running "Oil and Gas Survey" – a collaboration between the Fraser of Allander Institute and Aberdeen and Grampian Chamber of Commerce - to help shed light on the sentiments of oil and gas companies active in the UK towards their future involvement in renewables activity.

In answer the questions set out above, our analysis of this unique dataset allows us to make the following tentative conclusions:

First, since the start of 2016 there has been an increase in firms “making up their minds” towards their involvement in renewables, and towards stronger (i.e. more positive, or more negative) responses. The most recent data suggest that 31% of contractors “definitely” expect to be involved in renewables in the medium term, up 17 percentage points from 2013 when this question was first asked.

Second, it appears that positive inclinations towards future involvement in renewables is stronger among larger firms (i.e. those over 500 employees), and among firms which are “UK oriented” in their business activities (although the measure of this is necessarily proxied using employment levels – and which might be a poor proxy for the markets in which a firm undertakes activities, or where firms are headquartered/owned).

Third, there is broadly equal support for firms’ future involvement in renewables when compared to their current level of activity. Those firms reporting being beyond optimum levels were slightly more positive than those below, but the difference was small. Looking to the next twelve months, firms who are more optimistic about the future of the oil and gas activities in the UK continental shelf are also those expecting to have greater involvement in renewables.

Finally, we see that firms’ expectations towards renewables compared to unconventional activities and decommissioning have moved over the past two years. Firms’ are now more positive about renewables involvement than at any point previously when compared to unconventional oil and gas work in the UK, while firms’ expectations about their involvement in decommissioning remain more positive, reflecting ongoing activities in this activity in the UK.

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