Briefing note - Greenhouse gas emissions from offshore oil and gas industry

Issue

Under an independent Scotland 14.04 MtCO2e of offshore emissions from the oil and gas industry would be added to the Scottish emissions account, an increase of 27.5% in gross emissions (i.e. before accounting for EU ETS).

Scotland's emissions in 2009 were 51 MtCO2e before accounting for the effects of EU ETS. Emissions were 52 MtCO2e once EU ETS is factored in. Although there was a rise in 2009, in some years EU ETS works to lower our overall emissions (e.g. by 0.8 Mt in 2008).

Background

Emissions targets set under the Climate Change (Scotland) Act 2009 are based on the Scottish green house gas (GHG) inventory. This is disaggregated from the overall UK GHG inventory (similar data is produced for Wales, Northern Ireland and England).

Currently, emissions occurring offshore from the oil and gas industry are included in the overall UK GHG inventory. Under an Independent Scotland we would take around 90% of the offshore emissions which are currently "unallocated" below the UK level. Based on 2009 figures, this would add approximately 14.04 MtCO2e to our emissions account an increase of 27.5% in gross emissions (i.e. before accounting for EU ETS).

Our working assumption is that offshore emissions would be added to the net Scottish emissions account from the 1990 baseline. The 2020 target set by the CC Act would still be 42% - the starting point would just be higher. Our emissions targets, which were set at levels recommended by the independent, expert Committee on Climate Change, obviously exclude these unallocated emissions. If it were appropriate for a future independent Scotland to take on these emissions it would likely be appropriate to adjust our emissions targets accordingly.

Legislation - Amending emissions targets

Section 6 of the Climate Change (Scotland) Act2009, allows Ministers to modify annual emissions targets if there is a material change to the basis on which they were set in the first place. However, s. 6(8) of the Act provides that this may only be done before the beginning of the years to which the modified targets relate and cannot be used to put the targets on an upwards trajectory.

The impact of taking on such a large quantity of currently unallocated emissions would be such that it would breach the second restriction on modifying annual targets. There would also be a strong argument in favour of backdating the adjustment, thus breaching the first restriction. The Climate Change Act would therefore need to be amended by primary legislation to enable the appropriate adjustments to be made to Scotland's emissions targets.

- The Climate Change (Scotland) Act would therefore need to be amended by primary legislation to enable the appropriate adjustments to be made to Scotland's emissions targets.

Unallocated emissions

- Emissions from offshore oil and gas installations are not allocated to any of the four countries of the UK when the Greenhouse Gas Emissions Inventory is disaggregated.

- In 2009 (latest data), "unallocated" emissions accounted for 15.6 MtCO2e, which was 2.8% of total UK emissions (562 MtCO2e). Between 1990 and 2009 - UK emissions from offshore gas and oil increased by around 2.5%.

- The majority of unallocated emissions would be caught by the EU ETS but around 1Mt CO2e is methane, so will fall outside the scope of ETS.

- It is unclear what further ETS cap reductions to anticipate beyond 2020. If for the 2050 target we assume that the EU ETS has ended then the emissions reduction will depend on actual emissions related to the production of gas and oil.

- Emissions from this sector are on a downward trend: 15.2Mt in 1990, high of 20.5Mt in 2002, down to 15.6Mt in 2009. This is likely to reflect peaking production in the North Sea as well as improving efficiency.

- The table below gives UK oil and gas production in 1990, 2000, 2009 and 2010 in million barrels of oil equivalent (m boe)

	oil (m boe)	gas (m boe)
1990	627	311
2000	864	725
2009	467	409
2010	431	391

Extract of emails between Scottish Government officials February and March 2012
Names of individuals have been redacted

From: [REDACTED]@scotland.gsi.gov.uk
Sent: Friday, March 16, 2012 11:39 AM
To: [REDACTED]@scotland.gsi.gov.uk (x6)
Cc: [REDACTED]@scotland.gsi.gov.uk (x7)
Subject: RE: Constitutional issues - Emissions from offshore oil & gas and the administration of EU ETS in Scotland.

On the basis of the last DA inventory, between 1990 and 2009 - UK **GHG** emissions from offshore gas and oil have **increased** by around 2.5%.

1990	15.2MtCO2e
2000-2003	18.0MtCO2e
2009	15.6MtCO2e

Separate data on GHG emissions for oil and gas production from the "Scottish" sector of the North Sea are not directly available. Data for the period 2000-2010 on oil and gas production shows that the "Scottish" sector provides around 95% of the oil and between 48% (2000) and 61% (2007) of the gas. Estimates for earlier years is not yet available.

The table below gives UK oil and gas production in 1990, 2000, 2009 and 2010 in million barrels of oil equivalent (m boe).

	oil (m boe)	gas (m boe)
1990	627	311
2000	864	725
2009	467	409
2010	431	391

On the basis of the GHG information and site specific data from EU ETS sites, I estimate that 2009 emissions from the "Scottish" offshore industry were around 13.5MtCO2e of which 12.5Mt were in the EU ETS and 1.0Mt were in the non-traded sector.

…

The latest estimate provided by OBR suggests that UK oil and gas production in 2040 will equate to around 23% of production in 2010. Assuming that their assumption of 5% annual decline from 2017-2040 continues until 2050, 2050 production would be around 11% of 2010 production. An alternative higher estimate of oil and gas production in 2040 (provided by Alex Kemp's most optimistic scenario) equates to a figures of 44% of 2010 production. Assuming the annual average decline of 7% in the period 2042-2050 (matching the decline shown between 2032 and 2042 in Kemp's paper), 2050 production would be around 22% of 2010 production.

Assuming emissions change similarly to production, these estimates suggest that 2050 emissions from the offshore sector will be some 78%-89% less than emissions in 2010. Production in 2009 was some 6% higher than in 2010 but 1990 emissions were slightly lower

than in 2009. As a result we might expect 2050 emissions to be around 80% less than in 1990.

[REDACTED]

[REDACTED]
Environment Statistics
Rural and Environment Science and Analytical Services
ENFOR
1-F South, VQ
40441

My usual working days are Wednesday-Friday

…

From: [REDACTED]@scotland.gsi.gov.uk
Sent: 24 February 2012 14:19
To: [REDACTED]@scotland.gsi.gov.uk (x6)
Cc: [REDACTED]@scotland.gsi.gov.uk (x7)
Subject: RE: Constitutional issues - Emissions from offshore oil & gas and the administration of EU ETS in Scotland.

[REDACTED]

On the basis of the last DA inventory, between 1990 and 2009 - UK **GHG** emissions from offshore gas and oil have **increased** by around 2.5%.

1990	15.2MtCO2e
2000-2003	18.0MtCO2e
2009	15.6MtCO2e

Separate data on GHG emissions for oil and gas production from the "Scottish" sector of the North Sea are not directly available. Data for the period 2000-2010 on oil and gas production shows that the "Scottish" sector provides around 95% of the oil and between 48% (2000) and 61% (2007) of the gas. Estimates for earlier years is not yet available.

The table below gives UK oil and gas production in 1990, 2000, 2009 and 2010 in million barrels of oil equivalent (m boe).

	oil (m boe)	gas (m boe)
1990	627	311
2000	864	725
2009	467	409
2010	431	391

On the basis of the GHG information and site specific data from EU ETS sites, I estimate that 2009 emissions from the "Scottish" offshore industry were around 13.5MtCO2e of which 12.5Mt were in the EU ETS and 1.0Mt were in the non-traded sector

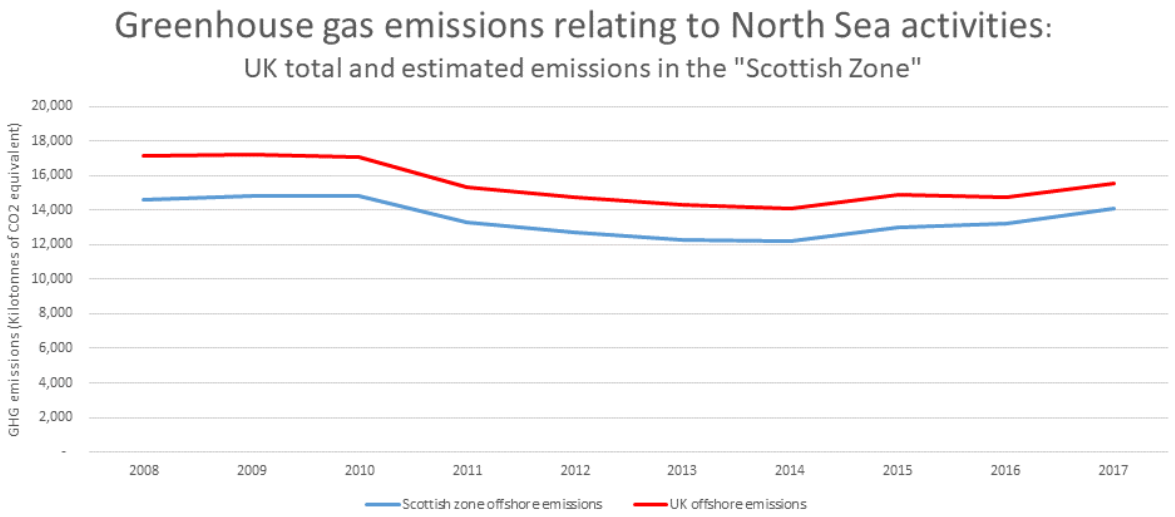
Email between Scottish Govt officials August 2019
Names of individuals redacted

From: [REDACTED]@gov.scot
Sent: 01 August 2019 14:00
To: Hogg A (Andrew) <Andrew.Hogg@gov.scot>; [REDACTED]@gov.scot
Cc: [REDACTED]@gov.scot
Subject: Offshore extraction emissions

Andy, [redacted], [redacted]

A few days ago for the NPF return, [redacted] provided an indicative estimate of emissions associated with oil and gas extraction activities in the Scottish Zone of the UK continental shelf; whilst noting that these activities are not currently included in the Scottish emissions statistics, nor are they included in Scotland's emissions targets.

I have now had the opportunity to improve my original estimate by exploiting field/installation level emissions data. In summary, we previously advised that emissions in 2017 were around 12.6 MtCO2e in the "Scottish zone"; we now advise that emissions are estimated to be around 14 MtCO2e in 2017. This means that, if we were to include these emissions in the statistics, offshore emissions would be the largest single emissions category, greater than domestic transport (13 MtCO2e).



Unallocated UK Emissions

KilotonnesCO2e

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Oil and Gas Extraction	17,081	17,167	17,069	15,329	14,692	14,314	14,033	14,886	14,683	15,544
Shipping (support vessels)	34	30	28	23	19	18	18	20	21	21
UK offshore emissions	**17,115**	**17,197**	**17,097**	**15,352**	**14,711**	**14,332**	**14,051**	**14,905**	**14,704**	**15,564**

Scottish share of verified CO2e emissions	**85.3%**	**86.2%**	**86.6%**	**86.7%**	**86.3%**	**85.8%**	**86.9%**	**87.3%**	**89.8%**	**90.3%**
Scottish Oil and Gas extraction	14,566	14,797	14,785	13,291	12,673	12,280	12,197	12,994	13,185	14,036
Scottish shipping (support vessels)	29	26	24	20	17	15	15	17	19	19
Scottish zone offshore emissions	**14,595**	**14,823**	**14,809**	**13,311**	**12,690**	**12,295**	**12,212**	**13,012**	**13,203**	**14,055**

Extract of Emails between Scottish Govt Officials March 2021
Names of individuals redacted

From: [REDACTED]@gov.scot
Sent: 13 March 2020 14:16
To: [REDACTED]@gov.scot [REDACTED]@gov.scot

Subject: RE: North Sea Emissions

Hi [REDACTED],

Thanks for sight of this.

Just to emphasise the point that [REDACTED] has alluded to, any decision to begin publishing offshore emissions stats could have significant policy and presentational implications for climate change legislation interests – so we'd definitely need to be involved in those conversations.

Given your steer that this is all at an early stage, happy to leave it there for now - but do please keep both [REDACTED] and I posted.

Best wishes,

[REDACTED]

[REDACTED]
Legislation and Adaptation Team Leader | Climate Change Division | Scottish Government
[REDACTED]| Area 3F South, Victoria Quay, Edinburgh, EH6 6QQ
www.gov.scot/climatechange | @ScotGovClimate

From: [REDACTED]@gov.scot
Sent: 13 March 2020 14:03
To: [REDACTED]@gov.scot
Cc: [REDACTED]@gov.scot
Subject: RE: North Sea Emissions

It's all very much at early stage of thinking through different options – any sensitivities would certainly be considered when had a firmer idea on routes we may go down. Will keep you both informed as develops.

Cheers,
[REDACTED]

From: [REDACTED]@gov.scot
Sent: 13 March 2020 13:42
To: [REDACTED]@gov.scot
Cc: [REDACTED]@gov.scot
Subject: RE: North Sea Emissions

Yeah, I suppose so (grudgingly). The method is pretty decent. The main caveat being that the EU-ETS data continues to be supplied in its current form.

I would be a bit concerned that publishing offshore oil and gas emissions stats for the Scottish zone of the North sea could grow all sorts of arms and legs and it could end up being part of headline emissions. I'm copying in [REDACTED] so that he has a chance to hold his hands up in horror at the notion of doing this. [REDACTED]?

From: [REDACTED]@gov.scot
Sent: 13 March 2020 13:22
To: [REDACTED]@gov.scot
Subject: RE: North Sea Emissions

Thanks [REDACTED] – so it's stuff that we could publish (accepting lots of caveats and trying other routes first)?

From: [REDACTED]@gov.scot
Sent: 13 March 2020 13:01
To: [REDACTED]@gov.scot
Subject: RE: North Sea Emissions

Hi [REDACTED]

The UK level north sea emissions were extracted directly from the UK GHG inventory.

A Scottish share of the above was obtained using field level emissions from the EU-ETS, allocating each field to Scotland/non-scotland (based on the "Scottish zone" of the north sea presented in the GERS publication), then calculating the proportion.

It would be relatively simple to update this but it is only an estimate. If there is another route to obtain data directly, this should be pursued first, even if hopeless.

[REDACTED]

From: [REDACTED]@gov.scot
Sent: 13 March 2020 12:44
To: [REDACTED]@gov.scot
Subject: North Sea Emissions

Hi [REDACTED],

….

In terms of emissions data – the figures that you provided us last summer, what is it they were based on again, and is that something which would be easy enough to pull out on an annual basis? I know that BEIS/OPRED have the Environmental and Emissions Monitoring System which the industry supply data for and uses in their (OGUK) annual environmental report – I assume you don't have any special

knowledge of this, from the look of it it is not something which we could gain access to.

Appreciate you are particularly busy at moment but just trying to get to grips with what information is already out there before I speak to policy colleagues again.

Cheers,
[REDACTED]

From: [REDACTED]@gov.scot
Sent: Wednesday, August 25, 2021 2:52 PM
To: [REDACTED]@gov.scot [REDACTED]@gov.scot [REDACTED]@gov.scot
Cc: CCStatsModelling <CCStatsModelling@gov.scot>
Subject: RE: ETS installation list

They could absolutely do this themselves as the verified emissions data are public domain – it's basically just sitting down with a map for an hour or two. On balance, this is probably best for the reasons you gave below.

However, I'd be comfortable about giving them that file, or rather the attached version (which corrects a case-irregularity in the "Y/N"s in column 1), at least as a starting point. if we do share, I think we should specify that the analysis becomes their own – i.e. they need to:

1. Be aware that this was a thought experiment, rather than a full-on official bit of research;
2. Satisfy themselves that the Scottish/non-Scottish categorisation still applies, possibly using the weblinks provided as a starting point;
3. Give more thought to how the storage vessels location may have changed over time;
4. Obtain any new/updated data from the original source (or later edition) weblink provided.

[REDACTED]

[attachment: main_results.xlsx]

From: [REDACTED]@gov.scot
Sent: 25 August 2021 14:28
To: [REDACTED]@gov.scot [REDACTED]@gov.scot [REDACTED]@gov.scot
Cc: CCStatsModelling <CCStatsModelling@gov.scot>
Subject: RE: ETS installation list

That's great – thanks [REDACTED] /[REDACTED].

Sounds like there is something we could do; the question remains over whether we should include it I suppose. I'll wait to hear from you later on your chat with [REDACTED] then [REDACTED].

One more question for you [REDACTED] – is the below stuff you've done something that Ricardo would likely be able to do themselves as part of this project, or would we need to give them this work?

Conscious that 1. I don't want to create work for us if it is something that they could do, and 2. In some ways them making an assumption about 'Scottish Waters' and using it in an analysis is better than us making the assumption and giving it to them (puts a bit of distance between us and that assumption).

[REDACTED]

From: [REDACTED]@gov.scot
Sent: 25 August 2021 11:56
To: [REDACTED]@gov.scot [REDACTED]@gov.scot [REDACTED]@gov.scot
Cc: CCStatsModelling <CCStatsModelling@gov.scot>
Subject: RE: ETS installation list

In theory yes, but there will undoubtedly be issues in matching/reconciling the emissions data with the output (barrels) data from woodmac.

Not entirely sure about company level – ownership (from memory) tends to be quite difficult for offshore stuff – i.e. Rigs are owned by X, operated by Y and the licences owned by Z

From: [REDACTED]@gov.scot
Sent: 25 August 2021 11:53
To: [REDACTED]@gov.scot [REDACTED]@gov.scot [REDACTED]@gov.scot
Cc: CCStatsModelling <CCStatsModelling@gov.scot>
Subject: RE: ETS installation list

So, you could show for each asset and for each company their emissions (and emissions per barrel) over time?

[REDACTED]@gov.scot Head of Energy and Climate Change Analysis
Office of the Chief Economic Adviser – OCEA | Scottish Government
[REDACTED]

From: [REDACTED]@gov.scot
Sent: 25 August 2021 11:37
To: [REDACTED]@gov.scot [REDACTED]@gov.scot [REDACTED]@gov.scot
Cc: CCStatsModelling <CCStatsModelling@gov.scot>
Subject: RE: ETS installation list

The data in that spreadsheet are all verified EU-ETS emissions data

From: [REDACTED]@gov.scot
Sent: 25 August 2021 11:36
To: [REDACTED]@gov.scot [REDACTED]@gov.scot [REDACTED]@gov.scot
Subject: RE: ETS installation list

Thanks [REDACTED] whence came your data if not wood mac?

[REDACTED]
Head of Energy and Climate Change Analysis
Office of the Chief Economic Adviser – OCEA | Scottish Government
[REDACTED]

From: [REDACTED]@gov.scot
Sent: 25 August 2021 11:19
To: [REDACTED]@gov.scot [REDACTED]@gov.scot [REDACTED]@gov.scot
Subject: RE: ETS installation list

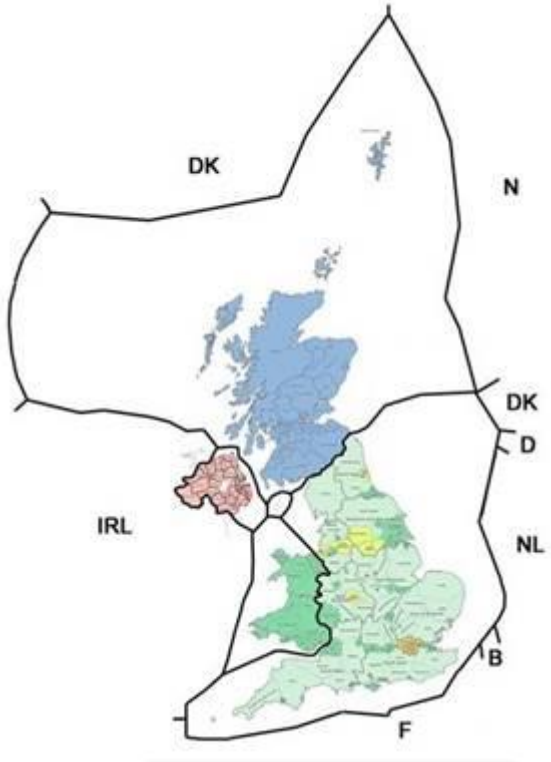
Hi [REDACTED]

I actually did something incredibly similar 2 years ago, resulting in the attached, which maps all the UK installations to the Scottish zone and RUK zones of the UKCS. I did this to see what Scottish offshore emissions would look like in the, purely hypothetical case that we ended up including these in our emissions stats.

I (think) also have the woodmac data referred to by [REDACTED] (and used to calculate offshore GVA/GDP in the quarterly national accounts) but I have put a note on that indicating that it's potentially disclosive so I've kept that to myself for the time-being.

Some additional thoughts on your questions…

1. Can we robustly define what platforms are in 'Scottish Waters'? (is that even a thing, or is that a deep political question?) Mapping installations to areas is really quite easy but, as you suggest, what constitutes "Scottish waters" is the difficult bit – I used to use the term "notional Scottish zone". There is some legal basis to the area defined and used in the GERS analysis, I forget the details but if you look at maps like this ([REDACTED] probably had the proper hydrological version behind his head when he worked in Fisheries) then they come with a list of legislative references which define each of the demarcation lines. My understanding is that this is the best representation of what Scottish waters would look like and don't recall anyone challenging it (with the exception of some who say that the curvature around the Holy Isle shouldn't be there).



2. To what extent do the companies that operate these platforms contribute to the Scottish economy, i.e. Scottish GVA or GDP? Should we include them as 'Scottish businesses'?

As indicated above, there is a published version of GDP/GVA for Scottish waters (as defined above). When I was producing/developing these stats, it was the case that we continued to major with onshore emissions as "Scottish GDP" and then included a separate table on the offshore stuff. [REDACTED] will be able to provide an update on the status of this. The current cadre of GDP stattos may be more gallus than I ☺. One thing to perhaps bear in mind is that defining emissions using installations makes perfect sense as it's these that do all the emissions… For GDP and/or other bits of the national accounts, there may be a case for a nuanced treatment which looks at the undersea assets themselves – i.e. whilst an installation might be located in one area, the field it is extracting from may span boundaries - probably a minor issue though.

Happy to chat through this

[REDACTED]

From: [REDACTED]@gov.scot
Sent: 25 August 2021 10:30
To: [REDACTED]@gov.scot [REDACTED]@gov.scot [REDACTED]@gov.scot
Subject: RE: ETS installation list

Coincidentally, we're looking at a similar request for [redacted] around id'ing installations in the Scottish zone (using Wood Mack) and he wants to use it to do GDP calculations, so hopefully these two requests can link up. I'm hopefully speaking to him later so will get back to you after that

[redacted]

[REDACTED] Head of Energy and Climate Change Analysis
Office of the Chief Economic Adviser – OCEA | Scottish Government
[REDACTED]

From: [REDACTED]@gov.scot
Sent: 25 August 2021 09:29
To: [REDACTED]@gov.scot [REDACTED]@gov.scot [REDACTED]@gov.scot
Cc: [REDACTED]@gov.scot
Subject: FW: ETS installation list

[REDACTED] /[REDACTED] (and copying [REDACTED] for his combined GHG/I-O table knowledge/input) – quick Oil and Gas question if I may?

We're doing a project with Ricardo on the UK Emissions Trading System, and trying to gauge whether or not we should include offshore installations (platforms presumably) in the analysis. Ordinarily we wouldn't include them as their emissions aren't counted in our GHG inventory, but for this analysis what we are aiming to understand is the impacts of the UK ETS on businesses in Scotland/their competitiveness etc. So it isn't really GHG related, not directly anyway.

I have two questions:
1. Can we robustly define what platforms are in 'Scottish Waters'? (is that even a thing, or is that a deep political question?)
2. To what extent do the companies that operate these platforms contribute to the Scottish economy, i.e. Scottish GVA or GDP? Should we include them as 'Scottish businesses'?

Thanks – and if it is easier to chat just let me know and I will set something up.

[REDACTED]

From: [REDACTED]@gov.scot
Sent: 16 August 2021 15:07
To: [REDACTED]@ricardo.com
Cc: [REDACTED]@ricardo.com [REDACTED]@ed.ac.uk [REDACTED]@sepa.org.uk
[REDACTED]@gov.scot
Subject: ETS installation list

Hi [REDACTED],

[REDACTED] had shared with me the difficulties you were having with getting a definitive list of ETS installations in Scotland, and the mismatches between the list that Scot Govt ([REDACTED]) provided and the list you'd made from the EUTL.

I've been in touch with [REDACTED] (in copy) at SEPA about this, and he's provided the attached list, as live installations pulled from SEPA's access to ETSWAP.

Feel free to ask [REDACTED] direct if you have any follow-up questions or queries about the list. Happy to provide any further steer myself about what we should consider in scope of your work from our side, should you need, once you've figured out the various lists.

Thanks
[REDACTED]

[REDACTED]**| Senior Policy Officer (Carbon Pricing and ETS)**
Domestic Climate Change Division | Energy & Climate Change Directorate | Scottish Government
[REDACTED]