

Enhancements to Energy Trends gas tables

Background

This article outlines the i.) effects of new data from industry in regards to indigenous production and imports, ii.) methodological changes to the UK's gas export volumes and iii.) the inclusion of biomethane injections into the grid from certified Renewable Heat Incentive (RHI) installations.

Changes to gross gas production and gas import volumes

Gross gas production and imports have been revised from 2008 onwards following new data submitted by industry. As a result, some gas previously categorised as arising from indigenous production on the UKCS has been reallocated to imports. The supply of gas into the UK remains steady but the split between indigenous production and imports has altered.

Impact of revisions

Over the last 9 years, around ~2.6 per cent of the gas that has been reported as domestic production from some terminals should have been reported as imported gas from Norway. There are some more significant annual spikes outlined in table 1 below.

Table 1: Changes in UKCS gross production (GWh)

	2008	2009	2010	2011	2012	2013	2014	2015	2016
Previous	809,649	693,965	664,353	526,030	452,094	424,153	427,784	460,268	476,744
Revised	807,821	679,344	642,515	511,532	434,941	410,460	415,515	451,437	462,307
Difference	-0.2%	-2.1%	-3.3%	-2.8%	-3.8%	-3.2%	-2.9%	-1.9%	-3.0%

Consequently, this has had a similar impact to imports, where imports from Norway had previously been underestimated by around ~2.5 per cent as outlined in table 2 below.

Table 2: Changes in imports (GWh)

	2008	2009	2010	2011	2012	2013	2014	2015	2016
Previous	407,188	457,447	592,554	588,475	549,518	535,105	476,837	492,382	521,586
Revised	409,049	471,843	614,479	603,924	566,669	548,223	488,937	501,563	534,740
Difference	+0.5%	+3.1%	+3.7%	+2.6%	+3.1%	+2.5%	+2.5%	+1.9%	+2.5%

The breakdown of imports can be found in table ET 4.3 and ET 4.4 and users will see revisions for imports from Norway for the reasons mentioned previously along with two new sources from Norway specifically outlined in table ET 4.4.

Changes to gas export volumes

Changes have been made to the methodology used by BEIS to calculate exports to the Republic of Ireland and the Isle of Man. These changes include removing Virtual Reverse Flows (VRF) from the gas sent to Ireland, use of a new data source for gas to Northern Ireland and gas to the Isle of Man, which have now been separately identified in the latest Energy Trends table ET 4.3. Further details are provided below.

Virtual Reverse Flows (VRF) at the Moffat Interconnector

Under European Commission regulations¹ it is required that gas transported between two regulated natural gas pipeline systems must be bi-directional. This could be gas travelling in both directions physically or there is the option for gas to physically travel in one direction and then a reverse flow service on a virtual basis offered in the opposite direction.

¹ Regulation (EC) 1775/2005 of the European Parliament and of the Council of 28 September 2005 on conditions for access to the natural gas transmission networks.

However, the Moffat Interconnector² is uni-directional in a physical sense with physical gas flows leaving the UK and entering the Republic of Ireland (with take-off points at the Isle of Man and Northern Ireland). Consequently, from March 2016 a virtual reverse flow service was offered at the Moffat interconnector where Irish shippers are able to avail a surplus on the network and sell the gas back within the UK. As a result there are no physical flows from the Republic of Ireland to the UK and virtual gas flows are subtracted from exports to Ireland, which is referred to as netting.

Since March 2016 these virtual reverse flows have been counted within the export figure to Ireland despite no physical flows occurring. We have since worked with National Grid and Gas Networks Ireland (GNI) to identify and remove these virtual flows to ensure only physical flows are reported in table ET 4.3. In future publications only physical exports will be included in line with the methodology mandated by the International Energy Agency (IEA) and the European Union (EU).

Exports to the Isle of Man

Along with the above changes, gas sent to the Isle of Man via a take off point on the Moffat interconnector is separated identified using data provided by Manx Utilities. Annex A illustrates the basics of the gas flows from the UK through to the Republic of Ireland, Northern Ireland and the Isle of Man.

Impact of revisions

Gas exports to the Republic of Ireland have decreased following the separation of gas to the Isle of Man from 2005 onwards. These increases are relatively small but are larger from March 2016 onwards following an amendment to the methodology to ensure that exports to the Republic of Ireland reported in table ET 4.3 are physical flows. An example of the structural change to table ET 4.3 can be found highlighted in Annex B.

Inclusion of biomethane injections into the grid from RHI installations

Previously the gas Energy Trends tables did not include biomethane injected into the grid in the upstream supply side of table ET 4.2, only gas that was available at terminals. Biomethane has been injected into the National Grid since 2014, though the volumes were small (0.02 per cent of supply in 2014, 0.2 per cent in 2016). As volumes are growing, BEIS will include these going forward.

The biomethane injections into the grid that will be reported are those certified under the Renewable Heat Incentive (RHI) into the gas supply for the UK. This data is obtained by the Renewable Heat team within BEIS, from Xoserve and then the team record match the data to a certified RHI installation. A single monthly number for biomethane injections is then provided to the oil and gas statistics team to include in the UK's gas supply.

Consequently, in the latest table ET 4.2 two new columns have been added to account for the additional gas supply, one for biomethane injections into the grid and another for total gas available³ in the UK. These structural changes are shown in Annex C.

The biomethane injections were already included in the downstream side of Table ET 4.2 within gas input into the transmission system. Gas Distribution Networks within Great Britain provide monthly data to BEIS for gas they input into the transmission system and through investigations it has been discovered that this data already contains biomethane injections into the grid. Therefore, the inclusion of the biomethane injections data rebalances gas supply and demand in table ET 4.2. This change has also impacted table ET 4.1 where the biomethane injections into the grid are included as transfers in the supply side.

² See page 103 of DUKES 2016 for a map of UK pipelines
www.gov.uk/government/uploads/system/uploads/attachment_data/file/540923/Chapter_4_web.pdf

³ Gas available at terminals plus biomethane injections into the grid.

Special feature – Enhancement to Energy Trends gas tables

Further developments

As ever, BEIS welcome comments on the methodology and suggestions for its improvement.

Acknowledgements

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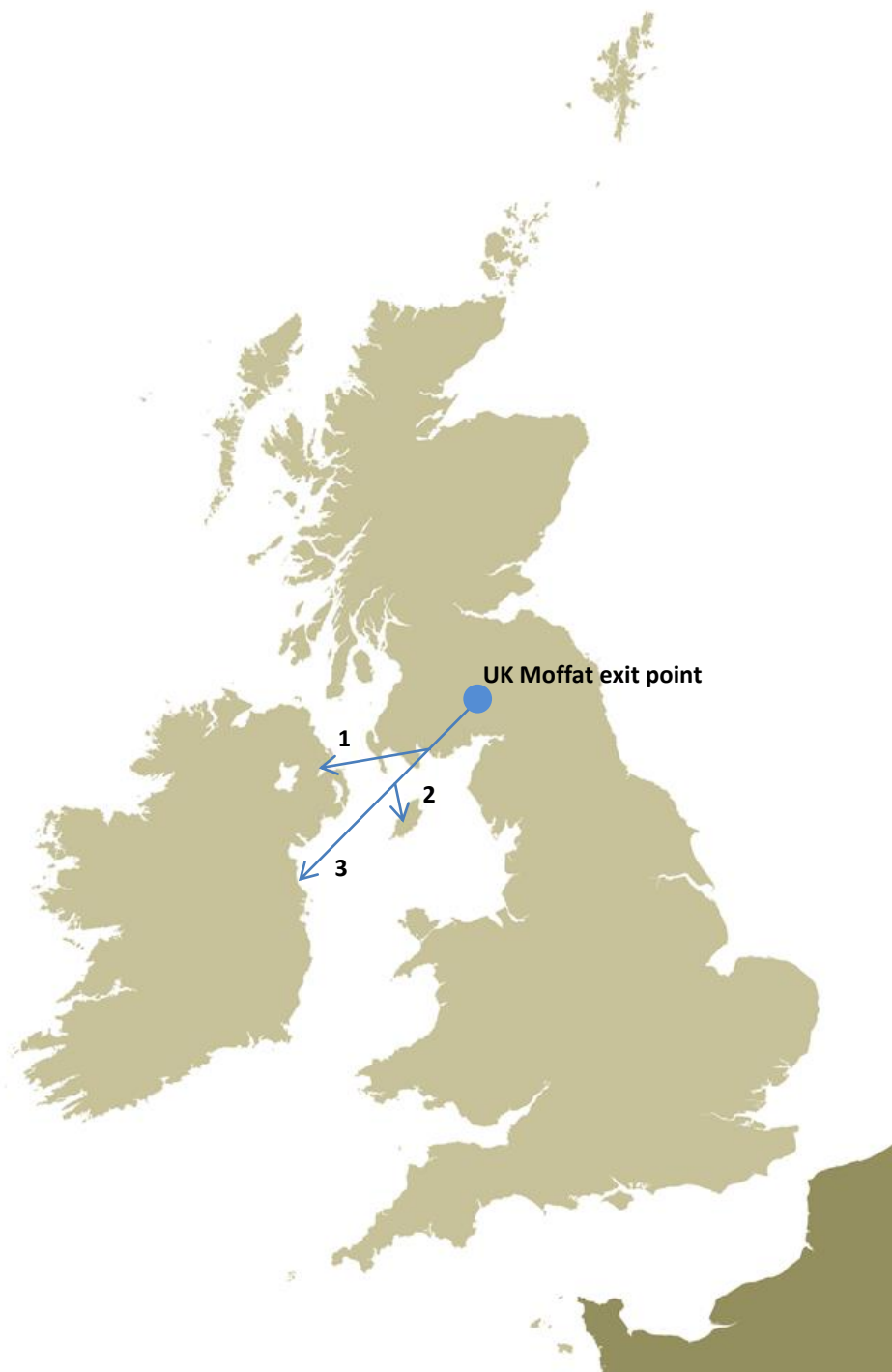
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Annex A: Gas flows from the UK to the Republic of Ireland with take-off points for Northern Ireland and the Isle of Man



Gas is sent from Great Britain via the Moffat exit point in Scotland through the Moffat interconnector to,

1. Northern Ireland via the Scottish Northern Ireland Pipeline (SNIP),
2. Then the Isle of Man via a take-off point on the Moffat interconnector,
3. And finally the Republic of Ireland via the Moffat interconnector.

Annex B: Energy Trends Table 4.3 under the new methodology

GAS

TABLE 4.3 Natural gas imports and exports

GWh

	Imports					Exports							Net Imports ¹⁰
	From Belgium ¹	From the Netherlands ²	From Norway ³	Liquefied Natural Gas ⁴	Total Imports	To Belgium ¹	To the Netherlands ⁵	To Norway ⁶	To the Republic of Ireland ⁷	To the Isle of Man ⁸	Liquefied Natural Gas ⁹	Total Exports	
2012	14,264	78,258	311,736	150,098	554,356	50,343	23,729	49	56,764	825	0	131,711	+422,645
2013	35,367	81,519	318,634	102,620	538,140	27,458	18,597	20	52,257	1,251	0	99,582	+438,558
2014	3,949	70,293	278,818	123,910	476,969	48,074	18,852	9	47,737	1,267	0	115,938	+361,030
2015	2,116	35,933	307,943	152,406	498,398	84,465	20,789	3	46,898	1,192	3,005	156,353	+342,045
2016 p	15,414	47,444	347,005	122,310	532,173	67,189	18,302	1	21,943	1,349	5,511	114,294	+417,879
<i>Per cent change</i>	(+)	+32.0	+12.7	-19.7	+6.8	-20.5	-12.0	-58.6	-53.2	+13.1	+83.4	-26.9	+22.2
2016 January - April	836	27,313	131,896	49,935	209,980	10,799	7,131	0	9,692	538	443	28,604	+181,376
2017 January - April p	12,576	9,352	154,991	32,373	209,292	15,946	5,715	0	6,564	495	2,486	31,205	+178,086
<i>Per cent change</i>	(+)	-65.8	+17.5	-35.2	-0.3	+47.7	-19.9	-	-32.3	-8.0	(+)	+9.1	-1.8
2016 February	228	6,729	31,328r	14,208r	52,492r	1,335	1,662	0	2,732r	134	-	5,863r	+46,629r
March	359	8,487	36,794r	12,686r	58,326r	1,961	1,765	0	2,285r	136	443	6,591r	+51,735r
April	-	4,919	29,788r	13,430r	48,138r	5,300	1,928	-	2,205r	126	-	9,559r	+38,578r
Total	587	20,135	97,910	40,324	158,955	8,596	5,356	0	7,222	396	443	22,013	+136,942
2017 February	5,355	3,590	40,662r	4,628r	54,235r	204	1,199	0	1,225r	130	1,014	3,772r	+50,464r
March	26	517	38,563r	9,983r	49,089r	3,201	1,393	0	1,456r	127	-	6,177r	+42,912r
April p	-	14	28,970	11,949	40,933	12,541	1,469	-	2,132	95	-	16,238	+24,695
Total	5,381	4,121	108,195	26,560	144,257	15,946	4,061	0	4,813	352	1,014	26,186	+118,071
<i>Per cent change¹¹</i>	(+)	-79.5	+10.5	-34.1	-9.2	+85.5	-24.2	-	-33.4	-11.3	(+)	+19.0	-13.8

- Physical flows of gas through the Bacton-Zeebrugge Interconnector.
- Physical flows via the BBL pipeline.
- Via the Langeled pipeline, Vesterled pipelines, the Tampen Link (from Statfjord to FLAGS), SAGE pipeline (from the Norwegian Alveheim and Edvard Greig gas fields that are linked to SAGE) and the CATS pipeline (from the Norwegian Rev and Gaupe gas fields that are linked to CATS)
- From various sources to Milford Haven (South Hook and Dragon), Isle of Grain and Gasport Teesside
- Direct exports from the Chiswick, Grove, Kew, Markham, Minke, Orca, Stamford, Windermere and Wingate offshore gas fields.
- Injection into the Norwegian Ula field.
- Gas to the Isle of Man is included in exports to the Republic of Ireland up until 2004 and then separately identified from 2005 onwards.
- Gas reported by the Isle of Man at the exit point of the Moffat Interconnector from 2005 onwards.
- Exports of LNG in 2016 broken down by destination are as follows: Argentina (913 GWh), Egypt (1,018 GWh), Puerto Rico (443 GWh) South Korea (1,124 GWh) and United Arab Emirates (2,014 GWh)
- A negative figure means the the UK was a net exporter of gas.
- Percentage change between the most recent quarter and the same quarter a year earlier; (+) represents a positive percentage change greater than 100%.

Annex C: Energy Trends Table 4.2 under the new methodology

GAS

TABLE 4.2 Natural gas production and supply

GWh

		Upstream gas industry							Downstream gas industry							
		Gross gas production ¹	Less Producers' own use ²	Exports ³	Plus Imports	Net imports ⁴	Gas available at terminals ⁵	Plus Biomethane injected into the grid ⁶	Total gas available ⁷	Gas input into transmission systems ⁸	Operators' own use ⁹	LNG Terminals' Own Use ¹⁰	Less Storage Own Use ¹¹	Stock changes ¹²	Metering differences ¹³	Gas output from transmission systems ¹⁴
2012		434,941	48,461	144,023	566,669	+422,646	809,127	-	809,127	809,460	1,682	2,218	595	-326	6,099	799,191
2013		410,460	46,000	109,664	548,223	+438,559	803,019	-	803,019	803,478	2,017	1,517	644	-1,265	5,697	794,869
2014		415,515	45,313	127,907	488,937	+361,030	731,153	136	731,289	732,137	1,500	1,831	651	+1,731	5,302	721,121
2015		451,437	51,024	159,517	501,563	+342,046	742,459	980	743,439	741,539	1,725	2,252	458	-3,973	7,281	733,796
2016 p		462,307	50,079	116,862	534,740	+417,878	830,106	1,919	832,025	830,966	2,369	1,808	140	-16,382	4,065	838,966
<i>Per cent change</i>		+2.4	-1.9	-26.7	+6.6	+22.2	+11.8	+95.9	+11.9	+12.1	+37.3	-19.7	-69.4	(+)	-44.2	+14.3
2016	January - April	156,811	18,235	29,909	211,284	181,376	319,952	504	320,456	320,346	750	738	72	-35,330	1,053	353,062
2017	January - April p	164,842	16,920	31,767	209,854	178,086	326,008	838	326,846	326,550	1,246	478	16	-17,661	980	341,492
<i>Per cent change</i>		+5.1	-7.2	+6.2	-0.7	-1.8	+1.9	+66.2	+2.0	+1.9	+66.2	-35.2	-78.3	-50.0	-7.0	-3.3
2016	February	37,154r	4,480	6,237r	52,866r	+46,629r	79,302r	116	79,418	79,591r	171r	210r	15	-11,518	334	90,379r
	March	39,195r	4,408	7,011r	58,746r	+51,735r	86,523r	132	86,654	86,301r	218	187r	16	-5,323	420	90,784r
	April	38,173r	4,261	9,746r	48,324r	+38,578r	72,490r	139	72,629	72,649r	141	198	26	-3,596r	338r	75,541
Total		114,522	13,149	22,994	159,936	136,942	238,315	386	238,701	238,542	530	596	58	-20,438	1,091	256,704
2017	February	37,837r	4,071	3,875r	54,339r	+50,464r	84,230r	192r	84,422r	84,291r	362	68r	5	-2,288r	131r	86,011r
	March	41,298r	4,161r	6,351r	49,263r	+42,912r	80,050r	220	80,270r	80,061r	271	148r	5	-1,441r	351	80,728r
	April p	40,629	4,101	16,352	41,047	+24,695	61,223	219	61,442	61,316	187	177	4	-4,465	344	65,069
Total		119,764	12,333	26,577	144,648	118,071	225,502	631	226,133	225,668	820	393	14	-8,194	826	231,808
<i>Per cent change¹⁵</i>		+4.6	-6.2	+15.6	-9.6	-13.8	-5.4	+63.5	-5.3	-5.4	+54.8	-34.1	-75.0	-59.9	-24.3	-9.7

1. Includes waste and producers own use, but excludes gas flared.
2. Gas used for drilling, production and pumping operations.
3. Includes exports direct from UKCS as well as others carried out by the downstream gas industry from the national transmission system.
4. A negative figure means the UK was a net exporter of gas.
5. Gas available at terminals for consumption in the UK as recorded by the terminal operators.
6. Biomethane injections into the grid from installations certified under the Renewable Heat Incentive (RHI).
7. Gas available at terminals and from biomethane injected into the grid.
8. Gas received as reported by the pipeline operators. This differs from gas available at terminals due to different methods for calculating the volumes of gas involved being used by the terminal and pipeline operators. Pipeline operators include Transco, who run the national pipeline network, and other pipelines that take North Sea gas supplies direct to consumers.
9. Gas consumed by pipeline operators in pumping operations etc.
10. Estimated at 1.5 per cent of gas from LNG terminals entering the National Transmission Systems.
11. Gas used in the Rough Storage Facility.
12. Stocks of gas held in specific storage sites, either as liquefied natural gas, pumped into salt cavities or stored by pumping the gas back into fields. A positive number shows stock being placed into storage which reduces the gas output from the the transmission systems.
13. The National Transmission System (NTS) consists of 276 discrete metering points with a degree of measuring uncertainty associated with each individual meter. The complexity of the system makes it difficult to ensure that all meters are accurate so that errors or bias in the flow calculations may occur. These errors/biases may occur for a number of reasons such as liquid contamination in the meter tube or on the plate itself, plate installation issues, dull plate edge, damage to plate edge, warped plate, grease on plate and incorrect parameters within the flow computer configuration.
14. Including public gas supply, direct supplies by North Sea producers, third party supplies and stock changes. These figures differ from those for total consumption in Table 1.2 which include producers and operators own use of gas excluded in this table.
15. Percentage change between the most recent quarter and the same quarter a year earlier; (+) represents a positive percentage change greater than 100%.