



Oil & Gas
Authority

Projections of UK Oil and Gas Production and Expenditure



March 2019

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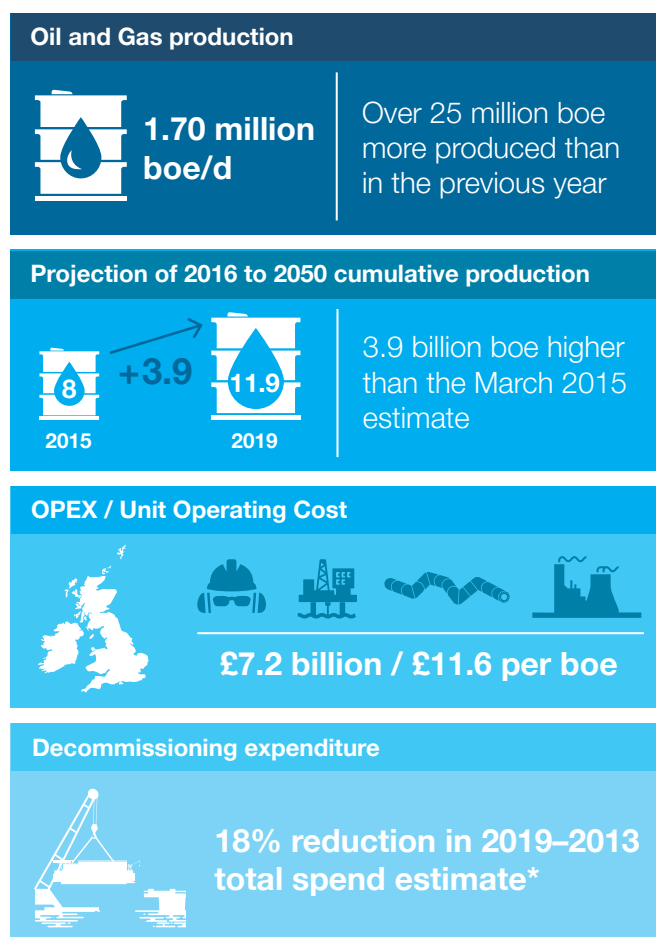
Executive summary

In 2018, the rate of UK oil and gas production averaged 1.70 million boe per day, an increase of more than 4% from the previous year.

The Oil and Gas Authority (OGA) now projects total cumulative UK hydrocarbon production from 2016 to 2050 to be 3.9 billion barrels of oil equivalent (boe) more than projected in March 2015.

- In 2018, oil production rose to 1.09 million barrels (bbls) per day, an increase of 8.9% from 2017 and the highest UK oil production rate since 2011. Gas production fell by 3.5% to 0.61 million boe per day.
- Total operating cost (OPEX) rose by 6.4% driven by higher activity, while unit operating cost (UOC) rose only marginally by 2.2%, from £11.4/boe in 2017 to £11.6/boe in 2018,* indicating stable cost efficiency.
- Capital expenditure (CAPEX) fell for the fourth straight year. This downwards trend of UK oil and gas upstream investment is however, expected to be halted in 2019, with a 4% increase projected.
- Annual decommissioning expenditure has risen year on year since 2015, with 2017 to 2018 seeing a 9% increase* to £1.45 billion, reflecting a higher level of decommissioning activity taking place.
- The five year outlook (2019–2023) projection for decommissioning expenditure is down 18% from the previous assessment last year.*

Figures for 2018

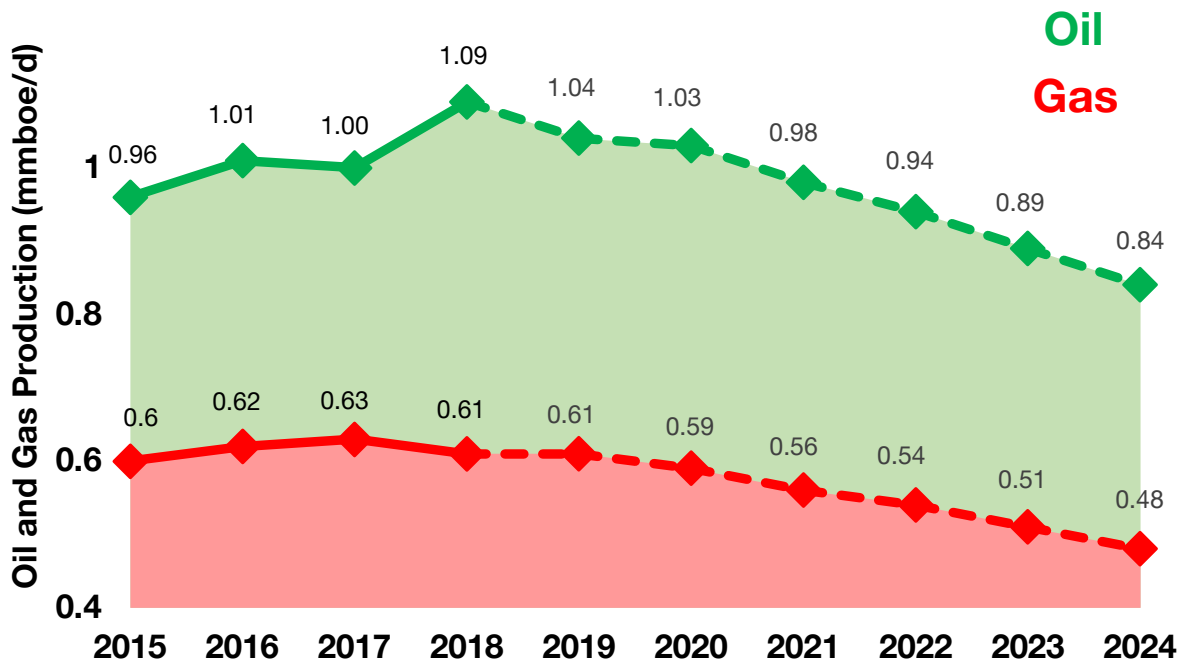


Notes
 The total decommissioning cost figure, which the 35% cost reduction target is set against, will be updated in the annual OGA summer decommissioning cost report/estimate.

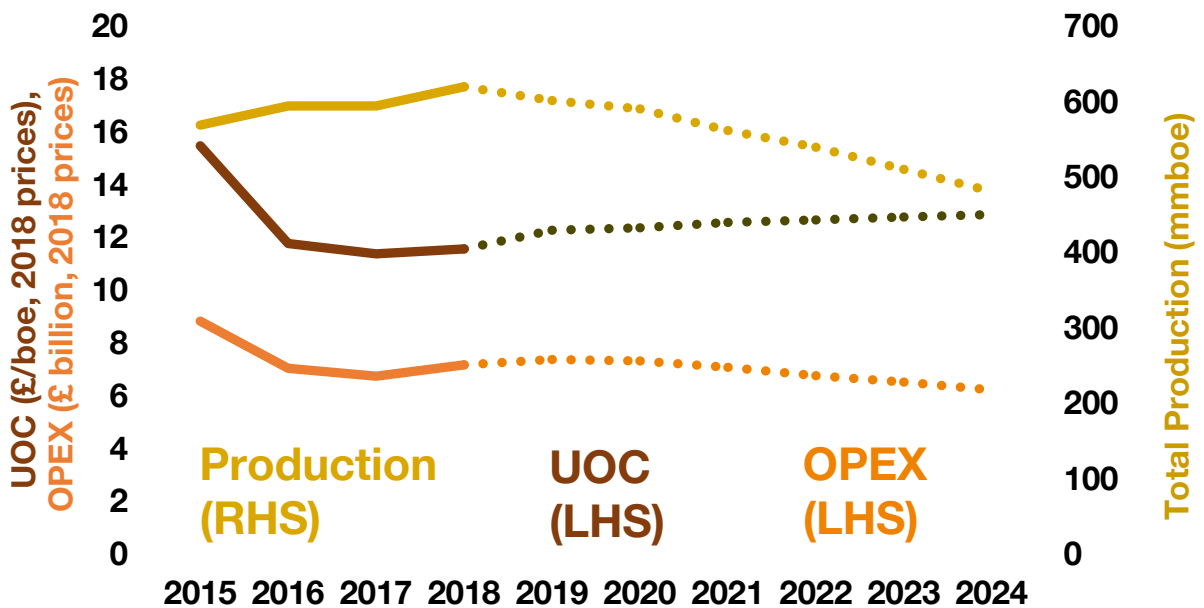
* Using 2018 Prices

Actual/Projected UK Production and Expenditure

Oil and gas production

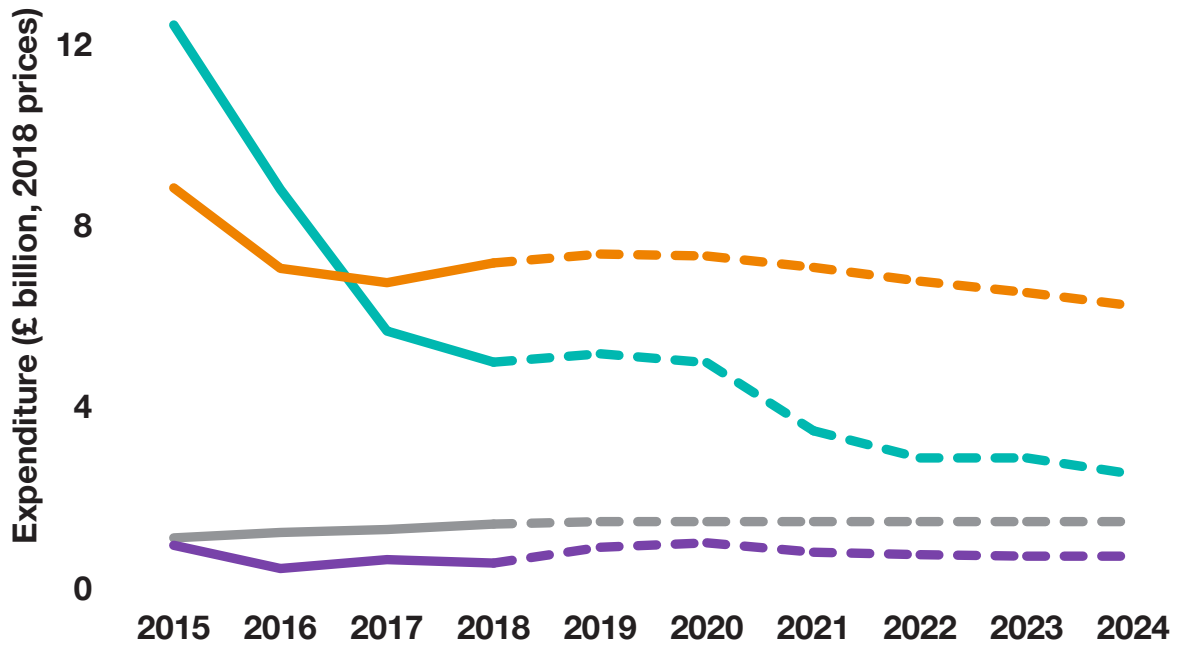


Unit operating costs

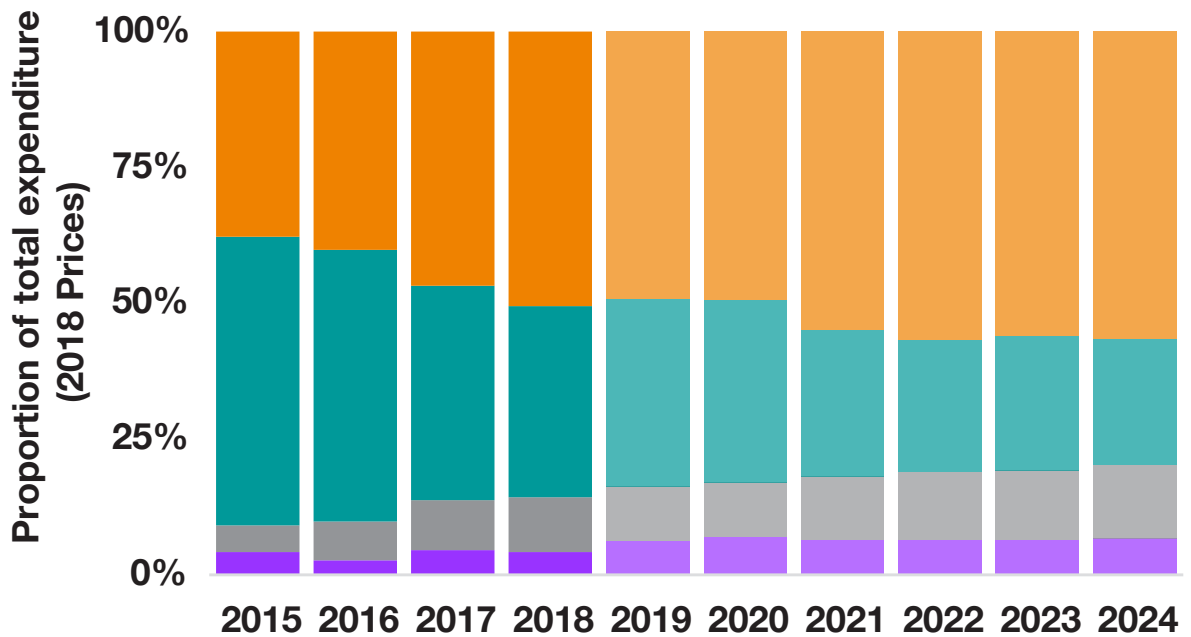


Figures post 2018 are projections

Expenditure (total by category)



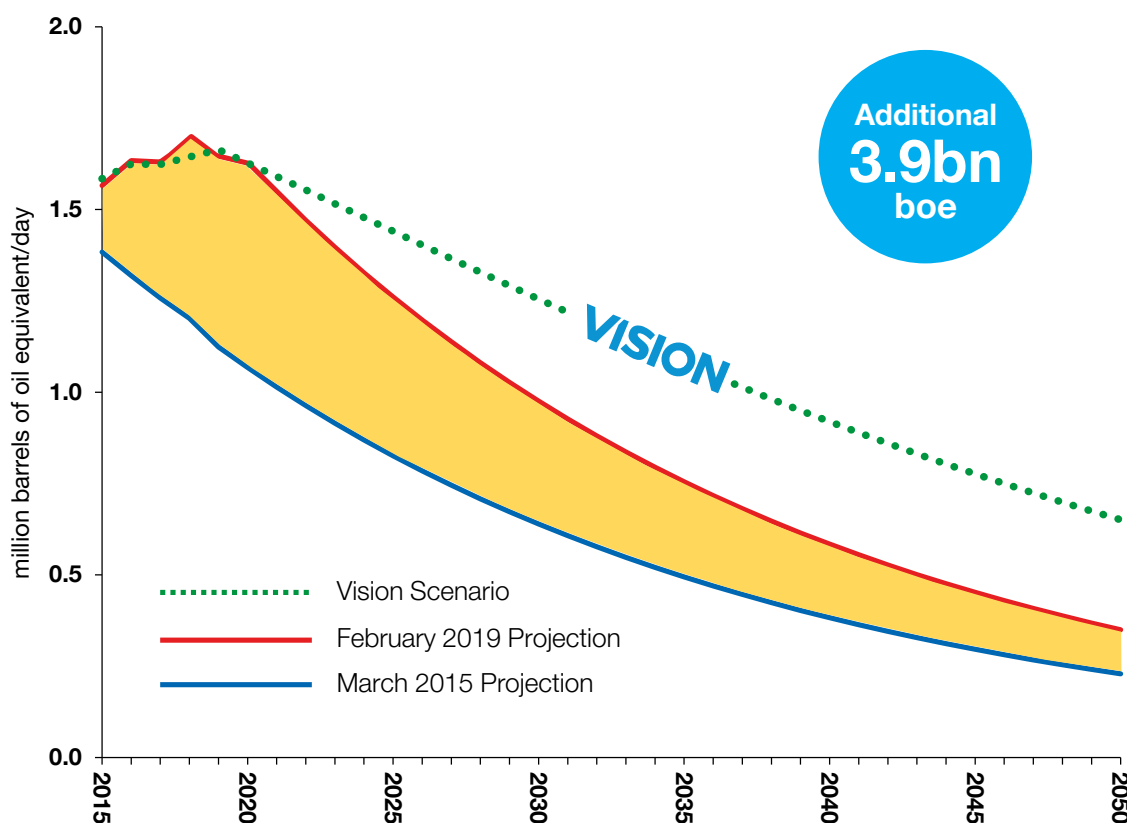
Expenditure (proportion by category)



Figures post 2018 are projections

Long Term Production Projection

Based on central production projections, cumulative production from 2016 to 2050 is now estimated to be 3.9 billion boe higher than projected in March 2015. This is an increase of 200 million boe from the previous production projection published in September 2018 and is the equivalent of gaining an additional four years of production (at the present rate) from the UK's largest currently producing oil field.



The "Vision Scenario" production profile is consistent with the Vision gross production revenue line in the "big opportunity" chart on page 5 of [Vision 2035](#).

The increase in production between the March 2015 projection and the current one has been supported by a number of OGA and industry led initiatives contributing to the additional 3.9 billion boe to 2050, including:

- A continuing increase in production efficiency.
- A reduction and relative stabilisation of unit operating costs.
- Improvements in asset integrity.
- The realisation of enhanced oil recovery (EOR) projects.
- Successful licensing rounds with associated exploration, appraisal and development commitments.
- Over 30 new fields coming onstream since 2015.

The future potential of the basin could be boosted further through investment, exploration successes and resource progression. The OGA is supporting this through emphasis on the revitalisation of exploration, increased access to data via the National Data Repository, the implementation of area plans and promoting the development and adoption of new technologies.

Notes

1. The production projections are informed by detailed field-by-field data provided to the OGA by the current operators of each field in early 2019.
2. This report includes updated estimates for earlier years.

Updated Medium Term Projections of UK Oil and Gas Production and Expenditure

The following table gives the OGA's latest projections of UK production of crude oil, natural gas liquids (NGLs) and natural gas for the period 2019 to 2024; the projections for gas relate to net production available for sale. Projections are also included for expenditure over the same period together with updated estimates for earlier years. The projections and the estimates of expenditure, which were provided to the Office for Budget Responsibility ahead of the Chancellor's Spring Statement on 13 March 2019, are based mainly on information from the OGA's UKCS Stewardship Survey.

The production projections are based on detailed field-by-field data provided to the OGA by the current operators of each field in early 2019. As usual, we have applied conservative contingencies. The extent of these contingencies reflects past experience of forecasting deviations. Historically, industry forecasts have tended to over-predict production significantly in the short and medium term, reflecting asymmetric upside and downside risks relating to field-level production.

March 2019 Update of OGA Projections of UK Oil and Gas Production and Expenditure

Production	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Change
											2017 to 2018
<i>Crude Oil (million tonnes)</i>	42.83	44.31	43.05	47.55	45.28	45.28	43.01	40.86	38.82	36.88	10.5%
<i>NGLs (million tonnes)</i>	2.46	3.14	3.45	3.32	3.16	3.16	3.00	2.85	2.71	2.57	-3.7%
<i>Oil (million tonnes)</i>	45.29	47.44	46.50	50.87	48.44	48.44	46.02	43.72	41.53	39.45	9.4%
<i>Oil (mtoe)</i>	49.54	51.95	50.94	55.74	53.07	53.07	50.42	47.90	45.50	43.23	9.4%
<i>Gross Gas (mtoe)</i>	38.82	39.84	39.98	38.61							-3.4%
<i>Net Gas (mtoe)</i>	34.43	35.54	35.73	34.39	34.39	33.53	31.86	30.26	28.75	27.31	-3.8%
<i>Net Gas (billion therms)</i>	13.66	14.10	14.18	13.65	13.65	13.31	12.64	12.01	11.41	10.84	-3.8%
<i>Oil & Net Gas (mtoe)</i>	83.97	87.49	86.68	90.13	87.46	86.60	82.27	78.16	74.25	70.54	4.0%
Production Rate	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	
<i>Crude Oil (million bbl/day)</i>	0.89	0.91	0.89	0.98	0.94	0.93	0.89	0.85	0.80	0.76	10.5%
<i>NGLs (million bbl/day)</i>	0.08	0.10	0.11	0.10	0.10	0.10	0.09	0.09	0.09	0.08	-3.7%
<i>Oil (million bbl/day)</i>	0.96	1.01	1.00	1.09	1.04	1.03	0.98	0.94	0.89	0.84	8.9%
<i>Gas (million boe/day)</i>	0.60	0.62	0.63	0.61	0.61	0.59	0.56	0.54	0.51	0.48	-3.5%
Total (million boe/day)	1.57	1.63	1.63	1.70	1.65	1.63	1.55	1.47	1.40	1.32	4.1%

Expenditure (£ billion)	2018 prices										
	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	
Exploration & Appraisal (E&A)	0.98	0.47	0.66	0.59	0.94	1.03	0.83	0.77	0.74	0.74	
Capital Expenditure	12.45	8.82	5.70	5.01	5.20	5.00	3.50	2.90	2.90	2.55	
Operating Costs	8.85	7.08	6.77	7.20	7.40	7.35	7.10	6.80	6.55	6.25	
Decommissioning	1.14	1.26	1.33	1.45	1.50	1.50	1.50	1.50	1.50	1.50	
Total Expenditure	23.41	17.63	14.45	14.25	15.04	14.88	12.93	11.97	11.69	11.04	
Average Unit	(£/boe)	15.5	11.8	11.4	11.6	12.3	12.4	12.6	12.7	12.8	12.9
Operating Cost	(\$/boe)	23.7	16.0	14.7	15.5						
Average Brent	(£/boe)	34.3	32.5	42.2	53.2						
Oil Price	(\$/boe)	52.4	44.0	54.4	71.1						

NGLs = natural gas liquids; mtoe = million tonnes of oil equivalent; 1 mtoe = 11.63 TWh;

1 TWh = 1/29.3071 billion therms; bbl = barrels; boe = barrels of oil equivalent;

net gas production = gross gas production less producers' own use;

average Brent oil price = annual average BFOE (Brent–Forties–Oseberg–Ekofisk) spot price

The contingencies also include a small notional allowance for production from recently discovered fields awaiting appraisal and as-yet-undiscovered fields that might be found and brought into production in this timeframe. The projections of expenditure were informed by operators' responses to the UKCS Stewardship Survey with appropriate weighting of as-yet unsanctioned expenditure.

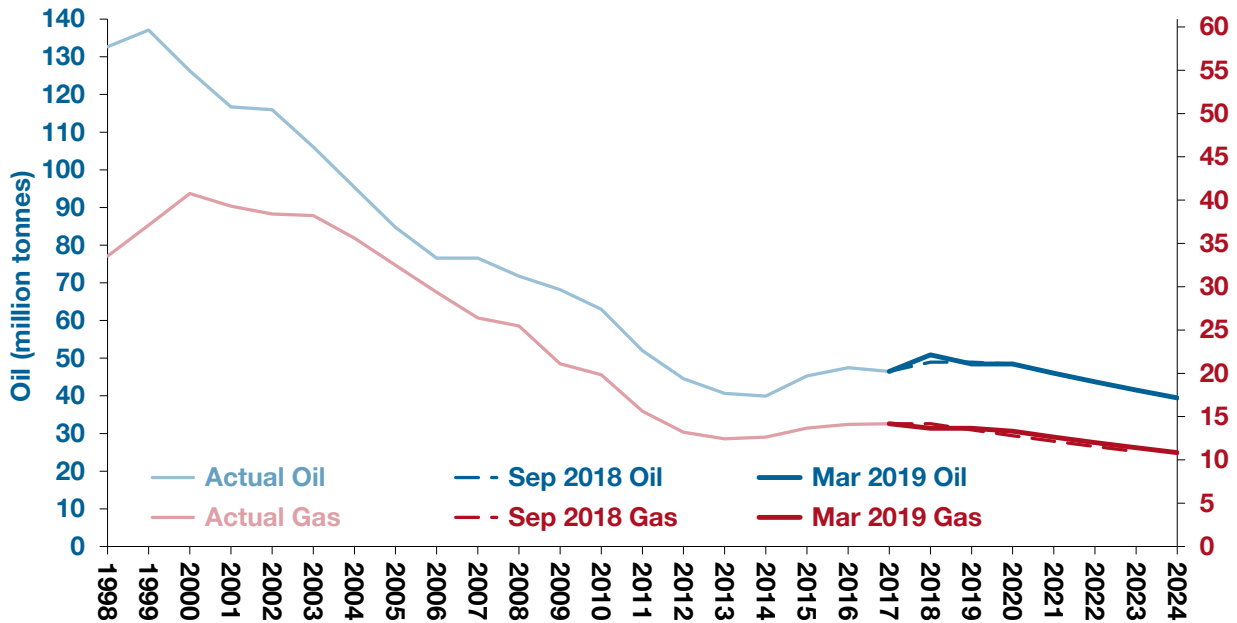
The following chart shows actual production from 1998 to 2024 and our current and previous (September 2018) projections out to 2023/2024; the colour-coded scales are different for oil (left-hand Y-axis) and gas (right-hand Y-axis).

Between the September 2018 projection now, medium term assessments of UK expenditure have changed. On a like for like basis (in 2018 prices), between 2019 and 2023, exploration and appraisal (E&A) and operating costs are now estimated to be 28% and 5% higher, respectively, than the previous estimate. Conversely, capital expenditure and decommissioning expenditure are projected to be 9% and 18% lower, respectively, than the levels previously projected. The reduction of medium term decommissioning expenditure can be attributed to a combination of both field life extensions and a decrease in the forecast of individual field's decommissioning costs.

Between September 2018 and now, the projection of near-term (2019–2023) oil production has been cut by 0.3% (6 million bbl) and the projection of gas production has been raised by 3.7%. (36 million boe). In overall terms that is a 1.1% increase representing 30 million boe.

After 2024, oil and gas production are both assumed to decline at 5% a year as illustrated in the table on page 11 below. The production projections out to 2035 are available in spreadsheet form in a variety of units.

Actual/Projected UKCS Oil and Gas Production



While central projections of oil and gas production are shown in the chart, a wide range of outcomes is possible. The future rate of production is dependent on a number of different factors including the level of investment and the success of further exploration. A significant share of future oil and gas production is expected to come from new fields and major projects in existing fields compounding the difficulty of making accurate forecasts given the risk of project slippage and uncertain start-up profiles. The central projections are therefore our best estimates rather than definitive predictions of future UK production of oil and gas.

UK Oil and Net Gas Production and Demand (all level figures in million tonnes of oil equivalent)

	Oil			Net Oil			Oil exports			Oil import dependency		
	Production	Demand	Oil Exports/ (Imports) as per cent of demand	Net Oil Exports/ (Imports) as per cent of demand	Oil Exports/ (Imports) as per cent of demand	Oil Exports/ (Imports) as per cent of demand	Oil Exports/ (Imports) as per cent of demand	Oil Exports/ (Imports) as per cent of demand	Oil Exports/ (Imports) as per cent of demand	Oil Exports/ (Imports) as per cent of demand	Oil Exports/ (Imports) as per cent of demand	Oil Exports/ (Imports) as per cent of demand
1998	145	91	54	60%								
1999	150	90	61	68%								
2000	138	89	49	55%								
2001	128	88	40	46%								
2002	127	87	40	47%								
2003	116	87	29	34%								
2004	105	89	15	17%								
2005	93	92	1	1%								
2006	84	91	(7)									
2007	84	88	(4)									
2008	79	86	(8)									
2009	75	83	(8)									
2010	69	81	(12)									
2011	57	79	(22)									
2012	49	77	(28)									
2013	44	76	(31)									
2014	44	76	(32)									
2015	50	77	(28)									
2016	52	79	(27)									
2017	51	79	(28)									
2018	56	75	(19)									
2019	53	75	(21)									
2020	53	74	(21)									
2021	50	74	(23)									
2022	48	73	(26)									
2023	46	73	(28)									
2024	43	73	(30)									
2025	41	73	(32)									
2026	39	73	(34)									
2027	37	73	(36)									
2028	35	72	(37)									
2029	33	72	(39)									
2030	32	72	(40)									
2031	30	72	(42)									
2032	29	72	(44)									
2033	27	72	(45)									
2034	26	73	(47)									
2035	25	73	(48)									

	Net Gas			Net Gas Exports/ (Imports) as per cent of demand			Gas import dependency		
	Production	Net Gas Demand	Net Gas Exports/ (Imports) as per cent of demand	Net Gas Exports/ (Imports) as per cent of demand	Net Gas Exports/ (Imports) as per cent of demand	Net Gas Exports/ (Imports) as per cent of demand	Net Gas Exports/ (Imports) as per cent of demand	Net Gas Exports/ (Imports) as per cent of demand	Net Gas Exports/ (Imports) as per cent of demand
1998	85	82	2	3%					
1999	94	88	6	6%					
2000	103	91	12	13%					
2001	99	90	10	11%					
2002	97	88	9	10%					
2003	96	89	8	9%					
2004	90	91	(1)						
2005	82	89	(7)						
2006	74	84	(10)						
2007	67	86	(19)						
2008	64	88	(24)						
2009	53	82	(29)						
2010	50	89	(39)						
2011	39	74	(34)						
2012	33	69	(36)						
2013	31	69	(38)						
2014	32	63	(31)						
2015	34	64	(30)						
2016	36	73	(38)						
2017	36	71	(35)						
2018	34	68	(33)						
2019	34	66	(32)						
2020	34	63	(29)						
2021	32	60	(28)						
2022	30	57	(27)						
2023	29	56	(28)						
2024	27	56	(29)						
2025	26	54	(28)						
2026	25	55	(30)						
2027	23	56	(33)						
2028	22	56	(33)						
2029	21	56	(35)						
2030	20	57	(36)						
2031	19	55	(36)						
2032	18	55	(37)						
2033	17	54	(37)						
2034	16	55	(39)						
2035	16	56	(40)						

	Oil & Gas			Net Oil & Gas Exports/ (Imports) as per cent of demand			Oil & Gas import dependency		
	Production	Net Gas Demand	Oil & Gas Exports/ (Imports) as per cent of demand	Net Oil & Gas Exports/ (Imports) as per cent of demand	Net Oil & Gas Exports/ (Imports) as per cent of demand	Net Oil & Gas Exports/ (Imports) as per cent of demand	Net Oil & Gas Exports/ (Imports) as per cent of demand	Net Oil & Gas Exports/ (Imports) as per cent of demand	Net Oil & Gas Exports/ (Imports) as per cent of demand
1998	230	173	57	33%					
1999	244	178	66	37%					
2000	241	180	61	34%					
2001	227	177	50	28%					
2002	224	175	49	28%					
2003	213	176	37	21%					
2004	194	180	14	8%					
2005	175	180	(5)						
2006	158	175	(17)						
2007	151	173	(23)						
2008	143	175	(32)						
2009	128	165	(37)						
2010	119	170	(51)						
2011	96	153	(57)						
2012	82	146	(64)						
2013	76	145	(69)						
2014	76	139	(63)						
2015	84	142	(58)						
2016	87	152	(65)						
2017	87	150	(63)						
2018	90	143	(53)						
2019	87	141	(53)						
2020	87	136	(50)						
2021	82	133	(51)						
2022	78	131	(53)						
2023	74	130	(55)						
2024	71	130	(59)						
2025	67	127	(60)						
2026	64	128	(64)						
2027	60	129	(68)						
2028	57	128	(71)						
2029	55	129	(74)						
2030	52	129	(77)						
2031	49	127	(78)						
2032	47	127	(80)						
2033	44	127	(82)						
2034	42	128	(85)						
2035	40	128	(88)						

Notes:

Oil Demand includes Bunkers (estimated at 2.6 mtoe from 2018 onwards); Net Gas Production and Demand exclude oil and gas producers' own use.

Both actual and projected Net Exports (Imports), and thus Import Dependency, are as implied by the difference between UK production and UK demand.

The production projections for 2019–2024 are consistent with those published by the OGA at <https://www.ogaauthority.co.uk/data-centre/data-downloads-and-publications/production-projections/>.

After 2024, oil production is assumed to decline at 5% pa and gas production to decline at 5% pa.

The demand projections for 2018–2035 are consistent with the Reference Scenario in "Updated Energy and Emissions Projections 2017", published by BEIS (at <https://www.gov.uk/government/publications/updated-energy-and-emissions-projections-2017>) in January 2018.



Oil & Gas Authority

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