

Author Correction: Unextractable fossil fuels in a 1.5 °C world

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In this Article, a small, unintentional off-model calculation oversight meant that the volumes of unextractable oil and fossil methane gas for some categories of oil and gas in some regions were overestimated. Having corrected for this oversight, at a global level, unextractable oil and coal reserves in 2050 have not changed, whereas fossil methane gas is 3% lower than in our published estimates. Here we describe the differences between the corrected and original published estimates. It should be noted that most of our analysis (production pathways and unextractable resource estimates) remain unchanged from the published Article. The correction affects light tight oil, shale gas, tight gas and coalbed methane in regions where these categories form a part of the proved reserve base, namely, Australia, Canada, China and the United States. The error arose because there is no explicit distinction

between reserves and resources for these categories in the supply cost curves used in our model, TIAM-UCL.

Tables 1 and 2 (oil and fossil methane gas, respectively) of this Amendment show the corrected regional and global estimates of unextractable oil and gas. Alterations to the original Article are as follows: (1) the percentage of unextractable global fossil methane gas reserves in 2050 has been changed from 59% to 56%; (2) the percentage of unextractable oil has been corrected from 43% to 42% in 2100, and fossil methane gas has been corrected from 50% to 47%.

Table 1 and Fig. 1 of the original Article have been corrected to reflect the revised estimates of unextractable oil and gas reserves for the regions impacted, as shown in Tables 1 and 2, respectively, of this Amendment. For reference, the corrected version of Table 1 is shown below as Table 3.

In addition, the Supplementary Information of the original Article has been altered to reflect the corrected estimates of unextractable oil and gas reserves. The following changes were made to the Supplementary Information:

- A new section (section 8) explains in detail the source of the off-model calculation error and a step-by-step example for the United States.
- Supplementary Figs. 3 and 4 and Supplementary Tables 2 and 3 have been altered to reflect the corrected unextractable volumes (740 Gb and 87 tcm) of oil and gas and unextractable proportions of gas (56%). In addition, the text has been changed to reflect the reduction in unextractable global fossil methane gas reserves (from 59% to 56%) at the start of the section ‘Comparison to McGlade and Ekins (2015) paper’.
- A new file has been added that contains Source Data for Supplementary Figs. 1–16.

All authors agreed with this Author Correction, and we thank the peer reviewers for their feedback, particularly in communicating the correction in a clear and concise manner. The original Article has been corrected online.

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Table 1 | Regional and global difference in unextractable oil reserves after accounting error has been fixed

Region	Unextractable oil (Gb)		Unextractable oil (%)		Change in unextractable oil from original Article in 2050, Gb (%)	Change in unextractable oil from original Article in 2100, Gb (%)	Category corrected
	2050	2100	2050	2100			
USA	18	14	26	20	-3.7 Gb (-5%)	-3.7 Gb (-5%)	Light tight oil
Global	740	541	58	42	-3.7 Gb (0%)	-3.7 Gb (-1%)	

Table 2 | Regional and global difference in unextractable gas fossil methane reserves after accounting error has been fixed

Region	Unextractable gas in 2050 (2100), Tcm	Unextractable gas in 2050 (2100), %	Change in unextractable gas from original manuscript in 2050, Tcm (%)	Change in unextractable gas from original manuscript in 2100, Tcm (%)	Category corrected
Australia	0.7 (0.6)	29 (25)	-0.1 (-6%)	-0.1 (-6%)	Coalbed methane
Canada	1.1 (1.1)	56 (56)	-0.5 (-25%)	-0.5 (-25%)	Tight gas
China and India	1.3 (1.1)	29 (24)	-0.4 (-6%)	-0.4 (-8%)	Tight gas
USA	2.8 (2.8)	24 (24)	-3.1 (-28%)	-3.1 (-28%)	Shale, tight and coalbed methane
Global	87 (73)	56 (47)	-4.1 (-3%)	-4.1 (-3%)	

Table 3 | Corrected Table 1 from the original Article

Region	Oil				Fossil methane gas				Coal			
	2050		2100		2050		2100		2050		2100	
	(%)	(Gb)	(%)	(Gb)	(%)	(Tcm)	(%)	(Tcm)	(%)	(Gt)	(%)	(Gt)
Africa (AFR)	51	53	44	46	49	6	43	6	86	27	85	26
Australia and other OECD Pacific (AUS)	40	2	40	2	29 ^a (35)	0.7 ^a (0.8)	25 ^a (31)	0.6 ^a (0.7)	95	80	95	80
Canada (CAN)	83	43	83	43	56 ^a (81)	1.1 ^a (1.6)	56 ^a (81)	1.1 ^a (1.6)	83	4	83	4
China and India (CHI+IND)	47	17	36	13	29 ^a (35)	1.3 ^a (1.7)	24 ^a (32)	1.1 ^a (1.5)	76	182	73	177
Former Soviet Union (FSU)	38	57	29	44	63	30	55	26	97	205	97	205
Central and South America (CSA)	73	98	62	84	67	4	65	4	84	11	82	11
Europe (EUR)	72	12	72	12	43	2	40	1	90	69	90	69
Middle East (MEA)	62	409	38	253	64	36	49	28	100	5	100	5
Other Developing Asia (ODA)	36	8	31	7	32	2	25	2	42	10	39	9
USA	26 ^a (31)	18 ^a (21.7)	20 ^a (25)	14 ^a (17)	24 ^a (52)	2.8 ^a (5.9)	24 ^a (52)	2.8 ^a (5.9)	97	233	97	232
Global	58	740 (744)	42 (43)	541^a (545)	56^a (59)	87^a (92)	47^a (50)	73^a (77)	89	826	88	818

^aCorrected numbers. Previously published estimates are in parentheses.