

Data Update: Shell's Oil and Gas Project Pipeline

February 2023

In September 2022, Oil Change International (OCI), in collaboration with Milieudefensie, published the briefing, "[Shell's Fossil Fuel Production: Still Pushing The World Towards Climate Chaos](https://priceofoil.org/2022/09/30/shell-fossil-fuel-production-climate-chaos/),"¹ assessing the scale and climate implications of Shell's oil and gas extraction assets.

Climate science indicates that there is no room to develop new fossil fuel extraction,² and some already producing projects will need to be phased out early,³ if the world is to keep global warming below 1.5 degrees Celsius (°C), the limit of the Paris Agreement. Yet, as our September 2022 analysis showed, Shell continues to approve new oil and gas extraction projects that lock in more climate pollution. Out of close to 32 billion barrels of oil equivalent (BOE) in oil and gas resources owned by Shell, nearly 40 percent were in projects not yet developed as of September 2022. If Shell proceeds with developing these new projects, they could cumulatively cause 4.3 billion tonnes (Gt) of additional carbon dioxide (CO₂) emissions, almost 30 times the annual CO₂ emissions of the Netherlands as of 2021.⁴

Despite Shell's claim to be "accelerating to net zero,"⁵ OCI analysis published in November 2022, "Investing In Disaster,"⁶ found that Shell ranked third globally amongst international oil and gas companies for the amount of new oil and gas production approved for development in 2022. Unless Shell changes course, the company is on track to rank amongst the top oil and gas expanders in the world over the coming three years (2023 through 2025) as well.⁷

This data update expands upon our September 2022 and November 2022 briefings to examine Shell's pipeline of new oil and gas extraction projects in greater detail. The data summarized is from the Rystad Energy UCube database, as updated in January 2023.⁸

¹ "Shell's Fossil Fuel Production: Still Pushing The World Towards Climate Chaos," Oil Change International and Milieudefensie, September 2022, <https://priceofoil.org/2022/09/30/shell-fossil-fuel-production-climate-chaos/>.

² Olivier Bois von Kursk et al, *Navigating Energy Transitions: Mapping the road to 1.5°C*, International Institute for Sustainable Development, October 2022, <https://www.iisd.org/publications/report/navigating-energy-transitions>.

³ Kelly Trout and Greg Muttitt et al, "Existing fossil fuel extraction would warm the world beyond 1.5 °C," *Environ. Res. Lett.* 17, 2022, <https://iopscience.iop.org/article/10.1088/1748-9326/ac6228>.

⁴ "Shell's Fossil Fuel Production," OCI and Milieudefensie, op cit.

⁵ Shell, "Our Climate Target," <https://www.shell.com/energy-and-innovation/the-energy-future/our-climate-target.html>.

⁶ "Investing in Disaster: Recent and Anticipated Final Investment Decisions for New Oil And Gas Production Beyond the 1.5°C Limit," Oil Change International, November 2022, <https://priceofoil.org/2022/11/16/investing-in-disaster/>.

⁷ "Investing in Disaster," OCI, op cit., Figures 9 and 13; Tables A5 and A6.

⁸ For background on the Rystad Energy UCube, see "Methodology" in: "Shell's Fossil Fuel Production," op cit., p. 19. Resource estimates reflect Rystad's projection of volumes of oil and gas resources that would be economic to extract under its base oil price case. At the time of this analysis (January 2023), Rystad's base oil price case sees

Shell's oil and gas extraction assets under construction

Under construction assets are those fields that are not yet producing, but for which Shell has made a final investment decision (FID), committing the capital necessary to develop them. Table 1 shows that, in total, Shell's under construction assets hold 2.58 billion BOE of oil and gas resources as of January 2023 (2.48 billion BOE of which is contained in the 27 non-shale assets listed in Table 1).

All the expansion projects listed in Table 1 were approved for development since the Paris Agreement. Rystad data show that in 2022 alone Shell approved final investment decisions to develop 10 new extraction assets, spanning Australia, Brunei, Malaysia, Norway, Oman, the United Kingdom, and the United States. Furthermore, in 2022, Shell invested in a massive liquefied natural gas (LNG) expansion project underway in Qatar.⁹ While Shell has a relatively small share in the project as a whole (just over 6 percent), the North Field East expansion now represents Shell's largest single under-construction project by cumulative resources.

Table 2 illustrates the length of time over which Shell's currently under construction assets will be expected to operate, and their projected remaining resources as of 2030, 2040, and 2050. Of the 27 non-shale assets listed in Table 1 (all holding more than 1 million BOE of oil and gas resources), Rystad projects that two-thirds will still be producing oil and gas beyond 2040. More than one-quarter of their estimated resources would not yet be extracted by 2040 whilst 10 percent could still remain as of 2050.

Table 1: Shell's under construction oil and gas extraction assets

Project	Asset	Country	Shell's share ¹⁰ *operator	Estimated resources, million BOE	Approval year	Startup year	Last year of production
Non-shale assets under construction							
Prelude FLNG	Crux	Australia	82*	298	2022	2027	2057
Whale	Whale (AC772)	United States	60*	214	2021	2024	2057
QatarGas LNG T8-T11 (NFE-East)	QatarGas T10 (North Field)	Qatar	6	193	2021	2027	2080
	QatarGas T11 (North Field)	Qatar	6	193	2021	2027	2080
	QatarGas T9 (North Field)	Qatar	6	193	2021	2026	2079
	QatarGas T8 (North Field)	Qatar	6	173	2021	2026	2074
Vito	Vito (MC940)	United States	63*	163	2018	2023	2048

prices falling to below USD 40/bbl by 2030, and then steadily rising to a flat USD 67/bbl from 2040 to 2050 (all expressed in real \$2023).

⁹ Shell, "Shell to participate in Qatar's LNG expansion," 5 July 2022, <https://www.shell.com/media/news-and-media-releases/2022/shell-to-participate-in-qatars-lng-expansion.html>.

¹⁰ Percentages are rounded to the nearest whole value.

Mero (Libra NW)	Mero 4 (x-Libra NW)(Alexandre de Gusmao)	Brazil	20	115	2021	2026	2044
	Mero 3 (x-Libra NW) (Marechal Duque de Caxias)	Brazil	20	113	2020	2024	2045
	Mero 2 (x-Libra NW)(Sepetiba)	Brazil	20	111	2019	2023	2042
MLNG Satu	Timi	Malaysia	75*	72	2021	2023	2039
	Rosmari	Malaysia	75*	68	2022	2026	2047
	Marjoram	Malaysia	75*	68	2022	2026	2047
	Jerun	Malaysia	30	66	2021	2024	2057
Penguins	Penguins (redevelop)	United Kingdom	50*	57	2018	2023	2044
Jackdaw	Jackdaw (30/2a-6)	United Kingdom	100*	57	2022	2026	2045
Pierce	Pierce (gas blowdown)	United Kingdom	93*	55	2019	2023	2049
Mabrouk North East	Mabrouk North East (FFD Phase 1)	Oman	53*	50	2019	2023	2059
Ohaji South 2	Assa North/Ohaji South (Phase 1)	Nigeria	15*	40	2018	2023	2054
Ormen Lange	Ormen Lange Subsea Compression	Norway	18*	37	2022	2025	2041
Appomattox (FPS)	Rydberg (MC525)	United States	86*	35	2022	2023	2047
Gumusut-Kakap Semi	Jagus East	Brunei	73*	28	2022	2025	2037
Karachaganak	Karachaganak Expansion 1A	Kazakhstan	29	27	2020	2025	2048
	Karachaganak Expansion 1B	Kazakhstan	29	26	2022	2025	2056
Marmul EOR	Marmul EOR Phase 3	Oman	34	23	2017	2023	2061
Geronggong	Geronggong	Brunei	11*	6	2022	2025	2038
Tiko Marine	Tiko Marine	Cameroon	25*	2	2020	2023	2032
-	Other ¹¹	-	-	2	-	-	-
Total (non-shale) resources				2482			
Shale projects with under development wells							
Montney Play		Canada	100*	71	-	-	-

¹¹ Combined under-construction assets with fewer than 1 million BOE in estimated resources.

Vaca Muerta Shale	Argentina	various (30-90*)	20	-	-	-
Bowen Gas Project	Australia	50	5	-	-	-
Total shale resources			96			
Total resources of under construction assets			2578			

Source: Rystad Energy's UCube (January 2023)

Table 2: Shell's under construction oil and gas extraction assets (excluding shale) – number of assets in production and remaining resources by 2030, 2040, and 2050

	January 2023	2030	2040	2050
Number of producing assets	27 (assets under construction)	27	18	11
Resources remaining, million BOE	2481	1671	663	257
Resources remaining, percentage of 2023 total	100%	67%	27%	10%

Source: Oil Change International using data from Rystad Energy's UCube (January 2023)

Shell's pipeline to develop new oil and gas extraction

Discovered fields

Discovered assets are fields where Shell has completed exploration and announced discoveries of oil and gas but has not yet committed to develop them. In a world committed to curtailing the climate crisis, none of these assets should be developed. As OCI research has shown, the oil and gas in already producing and under-construction assets globally would cause enough pollution to push the world beyond 1.5°C of warming.¹² Yet, Shell continues to pursue and appraise new discoveries, providing no indication that it will keep undeveloped oil and gas in the ground.

Table 3 shows that, as of January 2023, Shell's discovered oil and gas fields and shale projects hold a combined 10.71 billion BOE of resources. This represents a 35 percent increase in Shell's estimated discovered resources compared to September 2022.¹³ A primary driver of this increase is Shell's October

¹² "Investing in Disaster," OCI, op cit., p. 3.

¹³ As of our September 2022 analysis, Shell had an estimated 7.9 billion BOE of discovered resources. "Shell's Fossil Fuel Production," OCI and Milieudefensie, op cit., p. 12.

2022 decision to invest further in the massive Qatari LNG project.¹⁴ The 25 assets listed in Table 3 include Shell’s largest non-shale assets, by total resources, that Rystad projects could be approved in the 2020s or 2030s.¹⁵ Together, these 25 assets hold 6.08 billion BOE of Shell-owned resources.

Table 4 illustrates the length of time over which these 25 assets will be expected to operate, if approved, as well as their projected remaining resources as of 2030, 2040, and 2050. These data show that 70 percent of the oil and gas in these fields would not yet be extracted as of 2040; nearly half of the resources would still remain as of 2050. All but three of these fields would still be producing oil and gas as of 2050. That is the same year by which Shell has committed to be a “net-zero emissions energy business.”¹⁶

Undiscovered (licensed) assets

Shell holds additional undeveloped assets that are still under exploration. These projects are more speculative as to their potential resources and economic viability, but still significant. Shell has said it will continue to spend USD 1.5 billion per year on exploration through to 2025.¹⁷ This is despite the science showing that the industry has not only discovered but also *developed* more oil and gas than can be safely extracted. As of January 2023, Rystad estimates that Shell’s undiscovered assets hold 3.11 billion BOE of resources. About 60 percent (1.87 billion BOE) of these resources are conventional whilst the remaining 40 percent (1.25 billion BOE) are shale resources in Canada and Argentina.¹⁸

Table 3: Shell’s discovered oil and gas extraction assets

Project	Asset	Country	Shell's share ¹⁹ *operator	Estimated resources, million BOE	Approval year	Startup year	Last year of production
Discovered non-shale assets							
Projected for approval in the 2020s							
Tanzania LNG T1 (Block 1 and 4)	Mzia-1	Tanzania	60*	376	2026	2031	2074
Mabrouk North East	Mabrouk North East (FFD Phase 2)	Oman	53*	312	2023	2025	2066

¹⁴ “Shell selected as partner in the North Field South LNG project,” Shell, 23 October 2022, <https://www.shell.com/media/news-and-media-releases/2022/shell-selected-as-partner-in-the-north-field-south-lng-project.html>.

¹⁵ Each of these 25 assets holds at least 75 million BOE in estimated resources.

¹⁶ Shell, “Achieving Net-Zero Emissions,” <https://www.shell.com/powering-progress/achieving-net-zero-emissions.html>.

¹⁷ Shell, “Energy Transition Progress Report 2021,” 2022, p. 18, <https://reports.shell.com/energy-transition-progress-report/2021/>.

¹⁸ Shale resources categorized as ‘undiscovered’ may be known and under evaluation but are generally not considered top-tier for productivity compared to discovered (core) shale resources.

¹⁹ Rounded to the nearest whole value.

Kashagan	Kashagan Phase 2B	Kazakhstan	17	300	2027	2031	2100
QatarGas LNG T12-T13 (NFE-South)	QatarGas T13 (North Field)	Qatar	9	294	2023	2028	2081
	QatarGas T12 (North Field)	Qatar	9	294	2023	2028	2081
Loran-Manatee	Manatee	Trinidad and Tobago	100*	264	2024	2027	2050
Iara	Berbigao/Sururu II (x-Iara)	Brazil	25	210	2026	2029	2061
Tupi (x-Lula)	Tupi (x-Lula) RF/Oeste	Brazil	23	180	2024	2027	2057
Graff	Graff	Namibia	45*	149	2027	2032	2049
North Platte	Sparta (GB958)(x-N Platte)	United States	51*	148	2023	2027	2059
Tanzania LNG T1 (Block 1 and 4)	Chewa	Tanzania	60*	145	2029	2034	2075
Surplus Volumes - Transfer of Rights	Atapu (Surplus Volumes) II	Brazil	50	133	2027	2031	2052
Idku LNG T1	Aphrodite	Cyprus	35	122	2025	2029	2058
Appomattox (FPS)	Dover (MC612)	United States	100*	104	2025	2027	2059
North West Shelf LNG T3	Brecknock (Browse)	Australia	27	99	2027	2038	2072
Gato do Mato	Gato do Mato	Brazil	50*	97	2025	2029	2049
Clair	Clair South	United Kingdom	28	82	2024	2027	2056
QCLNG	Cecil Plains - SGP Phase 3	Australia	50*	78	2024	2025	2084
Val d'Agri	Val D'Agri Phase 2	Italy	39	77	2026	2029	2057
-	<i>Other (2020s)</i> ²⁰	-	-	1150	-	-	-
Total (non-shale) resources projected for approval in the 2020s				4614			
Projected for approval in the 2030s							
North Field	North Field B (domestic)	Qatar	9	1288	2038	2041	2100
Oil shale Jordan	Oil shale Jordan	Jordan	100*	751	2031	2036	2100
Tanzania LNG T2 (Block 1 and 4)	Jodari-1	Tanzania	60*	271	2034	2041	2086
	Pweza	Tanzania	60*	113	2034	2041	2076

²⁰ Combined assets with fewer than 75 million BOE in estimated resources projected for approval in the given decade.

Athabasca Oil Sands Project	Jackpine Extension	Canada	10	101	2035	2040	2100
Prelude FLNG	Bratwurst	Australia	100*	95	2032	2035	2066
	<i>Other (2030s)</i> ²⁰	-	-	598	-	-	-
Total (non-shale) resources projected for approval in the 2030s				3217			
All other discovered assets (non-shale) ²¹				1905			
Total (non-shale) resources				9736			
Shale projects with undeveloped resources							
Montney Play		Canada	100*	591	-	-	-
Vaca Muerta Shale		Argentina	various (30-90*)	378	-	-	-
Total shale resources				969			
Total resources of discovered assets				10705			

Source: Rystad Energy's UCube (January 2023)

Table 4: Shell's 25 largest discovered extraction assets (excluding shale, projected for approval in the 2020s or 2030s) – number of assets in production and remaining resources by 2030, 2040, and 2050

	January 2023	2030	2040	2050
Number of assets still producing	25 <i>(assets pre-FID)</i>	25	25	22
Resources remaining, million BOE	6083	5913	4256	2939
Resources remaining, percentage of 2023 total	100%	97%	70%	48%

Source: Oil Change International using data from Rystad Energy's UCube (January 2023)

Conclusion

To date, Shell has not presented any comprehensive plan as to how it will wind down its fossil fuel production and sales. Meanwhile, the company continues to invest in new oil and gas extraction that will take years, if not decades, to materialize. These projects threaten to make the transition to a renewable energy system slower and more expensive, whilst making the climate crisis worse. As shown

²¹ All other discovered assets with an estimated approval date of 2040 or later.

in our September 2022 briefing, halting approval and construction of new oil and gas fields – including the assets listed in Tables 1 and 3 – would be a critical first step for Shell to begin to align with the 1.5°C limit.²² In other words, when you are in a hole, the first step is to stop digging.

This data briefing was written by Kelly Trout of Oil Change International. For more information, contact research@priceofoil.org.

Oil Change International is a research, communications, and advocacy organization focused on exposing the true costs of fossil fuels and facilitating the coming transition towards clean energy.

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²² “Shell’s Fossil Fuel Production,” OCI and Milieudefensie, op cit., p. 15.